

Exhibit B – Wauchula AMI RFP Technical Response Template

PREPARED FOR

City of Wauchula

DATE

July 8, 2024

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1 COVER LETTER

Core & Main is pleased to submit our proposal in response to the City of Wauchula's RFP 24-05 Advanced Metering Infrastructure (AMI) Implementation. Core & Main has a long history of providing high quality products to the City of Wauchula and is we are enthusiastic about the opportunity to assist the City in deploying a successful, cost-effective AMI program and enhancing its utility management capabilities. Throughout the proposal, we believe the City of Mount Dora will see that **Core & Main fully understands the goals of Mount Dora** in this AMI program.

Solution built right for the City of Wauchula: Core & Main sees the value in building the best team for our customers and we have included best-in-class partners, Sensus, Bermex, VertexOne, Valerin Group, and WeProject, to be part of our solution for the City of Wauchula.

Sensus FlexNet Communication Network: Our proposed solution leverages the Sensus FlexNet communication network, a proven system that ensures reliable and secure data transmission. The FlexNet network is designed for efficiency and resilience, providing a robust backbone for the City's AMI system, and ensuring minimal operational disruption. Unlike cellular or third-party networks, FlexNet is dedicated to the purpose of Utility communications, such as reading meter endpoints as is its primary task. Each time the FlexNet system has been improved, backward compatibility of the endpoint has been maintained.

Smart Utility Network: Only FlexNet provides utilities across the Country with the flexibility to communicate and control many third-party devices. This ability will allow FlexNet to be the backbone of a Smart Utility platform Mount Dora can use for many current and future needs. FlexNet, bundled with the CORE+ suite of solutions, will provide the ability to adopt many Smart Applications for the utility's water, wastewater, stormwater, and gas distribution systems.

Industry-Leading Metrology: We offer industry-leading metrology that includes solid-state technology, supporting precise and reliable measurements. Our solution also features remote connect/disconnect capabilities, which enhance operational efficiency by reducing the need for manual interventions in service management.

Cost-Effective Dual-port Endpoint Modules: A key feature is the integration of dual-port endpoint modules, delivering substantial savings by eliminating the need for multiple units in dual water service configurations. With a 20-year battery life, these modules also offer long-term reliability, reducing maintenance costs and providing sustained operational stability.

Software and Network as a Service: Our solution includes both Software as a Service (SaaS) and Network as a Service (NaaS) models. The SaaS model offers continuous updates and enhancements, ensuring that the City benefits from the latest advancements in AMI technology without the burden of significant capital expenditures. The NaaS model provides an all-inclusive AMI offering with ongoing managed services with the technology provider.

Scalability and Real-Time Data Collection: Our solution is built with scalability in mind, allowing for seamless expansion as the City's needs grow. The system provides real-time data collection, which

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enhances operational efficiency, allows for proactive issue resolution, and improves customer service through timely and accurate billing information.

Experienced Local Team and Expedited Deployment: Core & Main prides itself on a team with extensive experience in AMI deployments. We are committed to meeting the City's timeline and delivering a fully functional AMI solution. Core & Main is showing our commitment to The City of Wauchula with 18 stocking branch locations in the state of Florida. Our primary servicing branch for Wauchula is located nearby in Lakeland.

In conclusion, Core & Main is well-equipped to provide a state-of-the-art AMI solution that offers robust communication capabilities, industry-leading metrology, and comprehensive service models. Our proposal ensures long-term value through advanced technology, operational efficiency, and exceptional customer service.

We appreciate the opportunity to submit this proposal and look forward to the possibility of working with the City of Wauchula to achieve its AMI goals.

Payton Duncan, Smart Utility Specialist, will be the primary contact throughout the proposal evaluation and next steps:

Payton Duncan
Smart Utility Specialist
Payton.Duncan@coreandmain.com
M: 386-473-2165

Best regards,



David Bryant

District Manager
Core & Main LP

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2 PROPOSER OVERVIEW AND PROJECT PERSONNEL

2.1 Company Information

Proposer information: Please fill in the table(s) below.

Table 2-1. Company Information

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
6.1.1	Proposer Co. Name			Core & Main, LP
6.1.2	Office Address			3216 Winter Lake Rd Bays 5 – 10, Lakeland, FL 33803
6.1.3	Contact Name			Payton Duncan
6.1.4	Contact Title			Smart Utility Specialist
6.1.5	Contact email			Payton.Duncan@coreandmain.com
6.1.6	Contact Phone #			(386)473-2165
6.1.7	Proposer Financial Information			Core & Main LP is a publicly traded company. Latest financial statements can be found here: https://ir.coreandmain.com/financials/sec-filings/default.aspx

Company Background & History

Core & Main LP (CNM) was established in 2004 and built on the foundation of 80+ legacy companies, including HD Supply Waterworks, Hughes Supply, and National Waterworks. Our products are integral to building, repairing, and maintaining water and wastewater systems. They serve as part of the basic municipal infrastructure required to support population and economic growth, including residential and commercial construction. CNM holds a leading market position in the United States for water, sewer, storm drain, and fire protection products.

Headquartered in St. Louis, Missouri, we have over 5,500 employees across 49 states and over 350 locations that strive daily to provide local knowledge, experience, and service nationwide.

Our Vision

To foster a world where communities thrive because our people and products provide safe, sustainable infrastructure for generations to come.

Our Mission

We are industry leaders, supplying local expertise, service, and products nationwide to build innovative water, wastewater, energy and fire protection solutions for our customers and the communities we serve.

We invest in the development and well-being of our people, who are the key to our future. Together, we act with honesty and integrity because we believe strong relationships make for strong communities.

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Our Core Principles



- Our team members are family.
- Honesty & integrity guide us.
- Everyone is in sales.
- We value industry, technical & local expertise.
- We are action-oriented & accountable.
- We are growth-focused.

Business Structure

- Core & Main LP (“Core & Main,” the “Company,” “we,” “our” or “us”) is a Florida limited partnership.

Contact Information

Local Knowledge
Local Experience
Local Service, Nationwide®



- Address: 1830 Craig Park Court. St. Louis, MO 63146
- Phone: 314-432-4700
- Website: https://coreandmain.com/
- President: Brad Cowles
- CEO: Steve LeClair

Local Branch – Lakeland, FL

- Address: 3216 Winter Lake Rd, Lakeland, FL 33803
- Phone: 863-868-8279
- Email: Lakeland@coreandmain.com
- Website: Lakeland, FL - Core & Main (coreandmain.com)

Size & Support

Operating approximately **350 branches** nationwide, we combine local expertise with a national supply chain to provide contractors and municipalities with innovative solutions for new and aging infrastructure. Our **5,500 associates** are committed to helping their communities thrive with safe and sustainable infrastructure. CNM has over 1,600 sales representatives offering local sales and support along with over 200 technical product specialists at the national and regional levels with expertise in specific product and service offerings.

Core and Main is a publicly traded company under ticker symbol CNM. CNM became publicly traded on the New York Stock Exchange in July of 2021 and holds a current market cap of over $10 Billion USD.



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Sustainability

Our Core & Main vision statement defines our most essential, broadest focus: "a world where communities thrive." Our company is a leading distributor of products and services for water infrastructure, which means the earth's most valuable resource is at the core of our business. We align our business strategy and operations with the goal of safe, sustainable infrastructure for generations. For additional detail about Core & Main's Environmental, Social & Governance efforts, view our most recent ESG report found here: https://coreandmain.com/who-we-are/esg/

Core & Main AMI Expertise

Core & Main offers Metering & Technology as one of its core growth initiatives. Our company has been supporting automated meter functions, in its modern form, for over two decades, starting with its infancy in touch-read, its evolution into drive-by radio read, and, more recently, AMI.

Core & Main is the largest distributor of Sensus metering products in the United States and the exclusive Sensus distributor in the state of Florida. Core & Main has successfully completed over 1,900 metering projects nationwide, worked with utilities to implement over 100 Sensus AMI projects in the Southeast Region (Florida, Georgia and Alabama), and over 40 in the state of Florida. This experience has offered our team the opportunity to learn best practices and minimize customer disruptions during deployments.



With branches across the United States, Core & Main provides our customers with premium waterworks supplies and services. Our primary service branch for the City of Wauchula is located in Lakeland. Additionally, Core & Main has 17 additional waterworks locations throughout the state of Florida. We have full-time local AMI service and support technicians and project managers on staff that will be dedicated to the deployment of this project.

In addition to an exceptional product offering, Core & Main is uniquely qualified to offer additional value-added services that enhance customer service and reliability. Examples of these value-added services include:

- Serving as a Sensus Value-Added Reseller (VAR), the highest level of distributor classification.
- Inventory support from local, state and nation-wide branches
- Knowledgeable local personnel to work with the City to proactively identify and solve problems
- Project management and installation services to efficiently implement the AMI Solution.

Licenses

Core & Main holds a Certified Underground Utility and Excavation Contractor License in the state of Florida, which further supports our qualifications for serving the City and its residents through this project.

- Underground Utility & Excavation License, State of Florida. Core & Main
- License Number: CUC1225503

Business Authorization

Also found in the Appendix.

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State of Florida
Department of State

I certify from the records of this office that CORE & MAIN LP is a limited partnership organized under the laws of the State of Florida, filed on November 22, 2004.

The document number of this limited partnership is A04000001840.

I further certify that said limited partnership has paid all fees due this office through December 31, 2024 and that its status is active.

I further certify that said limited partnership has not filed a Certificate of Withdrawal.

Given under my hand and the Great Seal of the State of Florida at Tallahassee, the Capital, this the Twentieth day of March, 2024

Secretary of State

Tracking Number: 1816194575CU

To authenticate this certificate,visit the following site,enter this number, and then follow the instructions displayed.

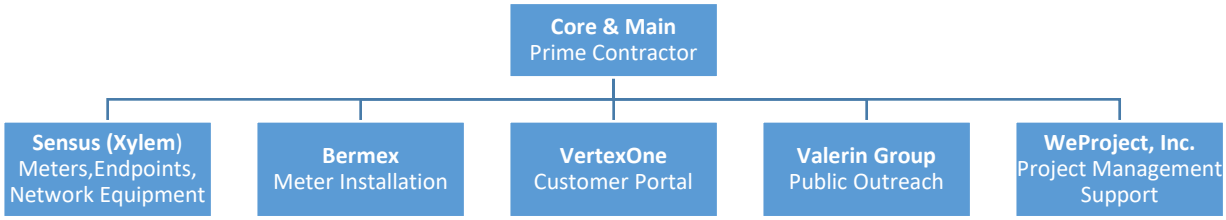
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2.2 Project Personnel

As the prime contractor, Core & Main accepts responsibility for all aspects of this program. Our team will lead all partner integrations and sub-contractors to see the various portions of our program are completed on time and within budget.

Below is an organizational chart outline for the City of Wauchula AMI program.



Below we have outlined key project personnel and their roles:

Core & Main:

- Payton Duncan, Florida Smart Utility Specialist – Orlando, FL
- Jason Milhorn, Outside Sales Representative – Orlando, FL
- Joe Holsten, Operations Manager – Orlando, FL
- David Bryant, District Manager –Orlando, FL
- Dewayne Self, Regional Initiative Manager – Metering & Technology
- Ryan Johnson, Regional Vice President – Southeast Region

Sensus:

- Mark Costello, Account Development Manager – South Florida
- EJ Gomes, Director of Sales, Electric US – Morrisville, NC

Bermex:

- David C Mack, Business Development Manager – Stow, Ohio
- Kenny Murphy, President – Stow, Ohio
- Tommy Combs, Director of Operations
- Ken Warner, Senior Operations Manager – Tampa, FL
- Sylvia S. Rafanan – AMI Deployment Manager

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- Brett Mains – AMI Project Manager

VertexOne:

- Cole Davidson – Director of Business Development

The Valerin Group:

- Valerie Ciudad-Real – President | Chief Executive Officer valeriec@valerin-group.com
- Justina Hicklyn Peart – South Florida Regional Manager justina@valerin-group.com
- David Wood Alexis, Jr. – Communications Specialist david@valerin-group.com
- Chuck Thompson – Creative Director chuck@valerin-group.com

WeProject, Inc.

- Silvia Rodriguez, PMP – Founder, Owner: Silvia@WeProject.com

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XYLEM & SENSUS

As a leading global water technology company, Xylem is dedicated to solving the world's most challenging water issues across utility, industrial, commercial, and residential markets. Over the last 100+ years, Xylem's unique combination of innovative products and services, proven expertise, and unmatched customer support have been helping to create a more water-secure and resilient world. Across the water cycle, Xylems innovative solutions use less energy, reduce operating expenses, and support sustainability efforts. Xylem believes that by working together, we can ensure water is accessible, affordable, and safe for all.

SENSUS AMI EXPERTISE

With more than 125 years of experience, Sensus understands what it takes to make reliable and accurate utility products that will endure any environment while delivering consistent performance our customers can rely upon. Sensus has been enhancing its unique FlexNet AMI solutions for water utilities for more than 20 years. With the FlexNet solution, they are proud to be the North American leader in RF radio and AMI technology.

Since introducing its first water communications technology system in the early 1990s, Sensus has refined and perfected battery quality and power management. With the introduction of FlexNet for water in 2006, Sensus proved the value of a fixed communications network for water utilities. In 2009, Sensus accomplished what no other vendor has done by deploying field-proven smart water networks with true two-way capability available every minute of every day to battery-powered field devices.

Over 2,500 water utilities in the U.S. and Canada use the Sensus FlexNet system, with over 50 million SmartPoints installed and in operation. Based on this experience, Sensus has unparalleled system capabilities and expertise in delivering a proven AMI solution.

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Bermex

Bermex works towards providing the best solutions by reducing our clients' costs and minimizing customer complaints. We work with gas, electric, and water utility companies to design a plan that best fits the challenges you're facing. Customized service plans include meter reading, billing and collection, AMR and AMI transition assistance, and call center services. We're dedicated to building a strong partnership with our clients in order to provide them with services that benefit their company in the long run. We have been servicing customers with integrity and reliability since 1972.

Bermex was founded on a handshake, and that symbol of trust has carried our business for more than four decades. We hold ourselves to a world-class standard of integrity, because for our business to work, we need your trust. That's our No. 1 priority. Bermex has a rich history, but we're also a part of ACRT Services.

ACRT Services offers expert, independent consulting solutions to utilities and associated organizations throughout the United States, including vegetation management consultation and training, customized safety courses, technology solutions, and utility metering services. We assess and monitor systems for liabilities, consult with decision-makers on planning.

Bermex, Inc. (Bermex) is a wholly owned subsidiary of ACRT Services, Inc. (ACRT Services). Bermex is incorporated in the state of Michigan. Bermex has been performing meter reading and other utility contracted services since 1983.

Bermex Business Organization

Bermex currently has operations in Alabama, Florida, Georgia, Kentucky, Louisiana, Ohio, New York and Texas. Bermex employs 450 team members on 25 projects.

Corporate Headquarters:
Bermex, Inc.
4500 Courthouse Blvd Suite #150
Stow, Ohio 44224

Regional Office:
Bermex, Inc.
8413 Laurel Fair Circle Suite #102
Tampa, Florida 33610

Regional Office:
Bermex, Inc.
1380 Dublin Rd. Suite #200
Columbus, Ohio 43215

Regional Office:
Bermex, Inc.
2880 W. Oakland Park Blvd
Fort Lauderdale, FL 33311

Bermex plans to use VPie Work Order Management Software for this deployment.

Board of Directors – Bermex, Inc:

- Kenny Murphy – President
- Brad Schroeder—Treasurer
- Alan Rothenbuecher – Secretary

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Bermex Utility Services & Installation Expertise

Bermex has been a premier meter services vendor since 1972, our customers have a history of staying with us for decades and entrusting us to handle many of their service needs including meter reads, field collections, meter turn-ons and shut-offs, delivery of customer notifications, meter change-outs, installation of AMR devices, and utility locating services. They stay because we consistently save them money, mitigate operational problems, and improve customer service by providing quality personnel and ample support.

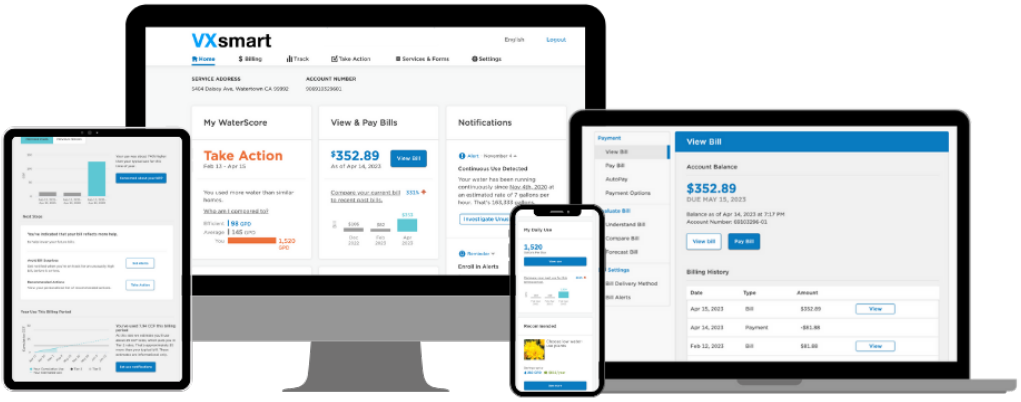
Our goal is to present valuable information that empowers our customers to make the best decisions for their organization. We understand the described scope as defined in the request for proposal and our team is committed to completing goals set by the City of Mount Dora. We hope that this proposal provides the information needed for you to evaluate our service and continue our partnership.

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VertexOne

For 30 years, VertexOne has been helping utilities and energy companies across North America achieve digital transformation and business process optimization.

VertexOne develops cloud software designed to revolutionize the customer experience for utilities, energy retailers, suppliers, and energy transition companies through a comprehensive customer-to-cash technology platform. Whether you're ready to implement effective customer engagement solutions, modernize your billing and customer information systems, or embrace the power of automation and data analytics, VertexOne has you covered.



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THE VALERIN GROUP:

The Valerin Group, Inc. (Valerin), is a woman-owned, full-service communications firm headquartered in Tampa with offices in Orlando, West Palm Beach, and Coral Springs, specializing in public involvement, community outreach, marketing, graphic design, website and mobile app development, multimedia, video production, drone, and trilingual services. Valerin's talented staff is comprised of communications, creative and technical professionals, who combined have more than 425 years of experience and have worked on over 725 public utility and transportation projects for public sector clients, including municipalities, counties, and state agencies such as the FDOT.

Community Engagement Expertise:

For this project, Valerin will develop a detailed Customer Engagement Plan that is tailored to the specifics of the project. Key elements of the plan will include the development of outreach strategies, identifying engagement activities and providing an outline of tools, tactics, techniques, and technology to effectively communicate with the City's customers. The objective of the plan will be to notify applicable agencies, affected property owners and tenants of project specifics and anticipated impacts. It will also identify potential issues and anticipated community concerns as well as strategies to address them, including developing Frequently Asked Questions (FAQs) at the start of the project. The plan will serve as our communications blueprint and will be updated as needed throughout the life of the project.

Certifications include:

- State of Florida: Woman Business Certification
- Florida Department Of Transportation: Disadvantaged Business Enterprise (DBE)
- Florida Department Of Transportation: Small Business Enterprise (SBE)

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WEPROJECT, INC.

WeProject is a Project Management Office (PMO) with over 23 years of Project Management experience, that serves as an extension to small- to medium-sized businesses within the public and private sector. We have hands-on manufacturing, firmware, software, process, testing, QA/QC, and AMI project experience from inception through implementation. We also offer support services during the maintenance/managed services phases. Our services fall under three major categories:

PMO resources, including people, tools, and techniques.
Project Management Mentorship programs.
Workshops and events with focus on Project Management and leadership.
Our company vision is to bridge the gaps that naturally exist among stakeholders and improve customer efficiencies, while reducing work-related stress. Our mission is to provide unbiased professional services, equally advocating for stakeholders and project deliverables. We achieve our mission and work towards our vision by consistently applying our core values: Trust, Teamwork, Total Quality, and Tenacity.

Certifications include:

- WeProject is minority- and woman-owned, registered as a Historically Underutilized Business (HUB) since October 4, 2019. NCSBE Cert. #: 381822

Past Performance:

- AMI QA/QC Support for Xylem-Sensus (Multiple Projects)
- AMI Deployment for City of Newberry (USA Municipal)
- AMI Integrations & FSAT for City of Clewiston (USA Municipal)
- MDM Consultation, Technical Writing, & Training for Honeywell-Elster
- AMI Deployment for Hope Water & Light (USA Municipal)
- AMI Deployments for CFE, Multi-Region (Mexican Utility)
- AMI/MDM Deployment for San Francisco PUC (USA Utility)
- MDM Integration for Hydro-Quebec (Canadian Utility)
- MDM Integration for Salt River Project (USA Utility)
- MDM Integration for ICE (Costa Rican Utility)

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On the following pages we have provided brief biographies of our team's key personnel, highlighting their relevant experience and qualifications on previous similar projects. Upon request, we can provide detailed resumes for any team member.

	**Payton Duncan** *Smart Utility Specialist* Core & Main PROFILE Payton Duncan is a graduate from Missouri University of Science & Technology with a bachelor's degree in engineering management., with an emphasis on Management of Technology and Supply Chain Management. Payton is a Smart Utility Specialist, focusing on Sensus Technology. Payton has previous knowledge and experience in project management and technology implementation during his time as an engineering student and in the Water & Wastewater Industry. Payton will help support the project as well as ongoing support. Payton also served as the Digital Project Manager for MDWASD's Wastewater AMI Program.
	Darrin Anderson *Outside Sales Representative* Core & Main PROFILE Darrin Anderson is the Outside Sales Representative, OSR, for the City of Wauchula.
	**James Hiester** *Sr Mgr, Sales – Electric* Core & Main PROFILE James Hiester has over 17 years of experience in the Electric Utility industry with multiple AMI technologies including electric metering, radio frequency networks, smart grid, and various other data analytics, asset management, and data management applications. He also has experience working with Utilities such as Florida Power & Light, Duke Energy, and Progress Energy on low to medium voltage Power Distribution Design and asset management. He has been involved in a combined 100+ deployments of AMR/AMI systems while on staff with Core & Main and previously Sensus. With a Bachelors of Science in Electrical Engineering from University of Central FL, he has been able to apply knowledge and experience from a broad base to assist customers many topics common to utility personnel.

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Noel "Dewayne" Self
Sr. Manager Sales- SE Region Meter Initiative
Core & Main

PROFILE
Dewayne is a 15-year meter industry veteran beginning his career with Core & Main in 2006 and was one of the original members of the National Services Group (NSG). During his time with the NSG he was tasked with selling turn-key metering projects across the United States. Dewayne has served in a variety of functions from implementation and project management to sales support and consultation. Since 2013 Dewayne has served as the regional metering/AMI initiative- manager in his current role Dewayne manages the product specialists and is responsible for ensuring customer support success and sales performance for the region. Dewayne has worked on a variety of Sensus Automated Metering projects ranging in size from 500 touch read endpoints to 200,000 AMI endpoints. Dewayne is a graduate of the University of Arkansas with a degree in business-finance. Additionally, Dewayne served as a communications specialist in the US Army where he attended US Army Signal school and worked with a variety of encrypted HF/UHF/SHF radio systems.



Steve Bruntlett
Senior Manager, Construction Projects & Project Management
Core & Main

PROFILE
Steven Bruntlett is a Senior Sales and Construction Manager with Core & Main. He also holds all relevant contractor licenses for Core & Main in the state of Florida. Steven has an engineering background with 7+ years of AMI experience. He is responsible for oversight on all AMI Projects, along with managing the CORE+ on-going maintenance group. Steven's managerial experience along with knowledge of proper operating procedures will play a key role in the implementation and support of the proposed AMI Project.



Shawn Kietzman
Senior Sales Manager
Core & Main

PROFILE
Shawn Kietzman is a 25-year water meter industry veteran. During his career, Shawn has worked with both manufacturers and distributors focusing on the development and delivery of metering & technology projects. Shawn spent 7 years as a volunteer for the American Water Works Association. He used that time to better understand the challenges and needs of utilities and how to best educate/train operators to offer safe drinking water. Through the successful delivery of over $250M projects in his career, Shawn has a deeper understanding of proper methodologies and use cases for technology deployments. Shawn uses his experience to help utilities round the country utilize technology to improve their quality and delivery of drinking water.

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	**Mark Costello** *Account Development Manager – Central / South Florida* Xylem | Sensus PROFILE Mark Costello has worked in the utility industry for over 8 years, specializing in technology-focused utility solutions. Over that time, Mark has been able to experience and observe the numerous challenges that our utility partners face every day. This experience has created a strong affinity for developing comprehensive, sustainable, and cost-effective utility solutions with our collective team's resources. Mark resides in Palm Beach County, FL with his family. This local presence will be an invaluable resource for the City from quick response capabilities to local knowledge of the challenges that are specific to the South Florida area.
	**EJ Gomes** *Director of Sales, Electric US* **Sensus, a Xylem Brand** **PROFILE** EJ is a proven project development and sales leader with 15 years of professional experience managing cross-functional teams from within the governmental, utility, and private sectors of the energy industry.
	Tommy Combs *Director of Operations* **Bermex, Inc.** **PROFILE** Tommy Combs, holding a Bachelor of Science in business management from the University of Tampa, is the director of operations at Bermex with more than 20 years of experience in the utility service industry. He has led numerous AMI and AMR projects throughout his career, with his most recent experience working with Riviera Utilities in Alabama and City of Albany, Ga. Previous projects include TECO Peoples Gas- 300,000+ Gas Meters, Peace River Electric- 50,000 Electric Meters, Gulf Power- 400,000 Electric Meters, Shelby Energy- 14,000 Electric, and Bluegrass Energy- 55,000 Meters.
	David Mack *Senior Business Development Manager* **Bermex, Inc.** **PROFILE** David Mack is a metering services business development manager at ACRT Services. He has more than two decades of transportation logistics and utility operations

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	experience and has been with Bermex since 2012. Mack holds a bachelor's degree in business administration from Ohio Christian University, located in Circleville, Ohio.
BERMEX	**Sylvia S. Rafanan** *AMI Deployment Manager* **Bermex, Inc.** **PROFILE** Sylvia is an AMI Deployment Manager brings over 15 years of experience in the utility industry specializing in smart meter deployments. She brings a diverse background in electric and gas deployment projects for major deployments for Pudget Sound Energy, PG&E, and Arizona Public Service. Sylvia has Bachelor of Science degree in Civil Engineering and Electrical Technology.
BERMEX	**Ken Warner** *Senior Operations Manager* **Bermex, Inc.** **PROFILE** Ken, who is currently based in Tampa, Florida, began his career as a meter reader in 1998 with South Central Power in Ohio. Over the past 24 years, he has acquired a wealth of experience in the utility industry, having worked at all levels. Ken's areas of expertise include utility locating, leak surveys, electric and gas meter exchange, as well as safety compliance.
BERMEX	**Brett Mains** *AMI Project Manager* **Bermex, Inc.** **PROFILE** Brett is a Project Manager for Water Smart Meter Deployment bringing over 10 years' experience in water operations. Brett started as a meter reader and worked is way up to Field Supervisor for Toho Water Authority. Brett has experience in water meter deployments and is a large meter specialist. He has a degree in management from Florida State University.
 vertexone	**Cole Davidson | VertexOne** *Director of Business Development* Experienced Director of Partner Sales driving revenue growth through strategic alliances. Proven track record in cultivating and leveraging partnerships to maximize channel effectiveness, exceed sales targets, and expand market reach. Skilled in developing and executing comprehensive partner strategies that deliver joint value propositions and foster long-term customer relationships. Adept at leading high-performing teams, inspiring excellence, and delivering exceptional results in fast-paced, dynamic environments. Let's connect and explore how we can drive remarkable business outcomes together.

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	**Valerie Ciudad-Real – Quality Assurance/Quality Control** During Valerie's 33-year career, she has developed and implemented hundreds of public participation programs and communication plans for public sector clients, including the Florida Department of Transportation (FDOT), municipalities, expressway and transit authorities, planning organizations, and counties. Valerie serves as a communications manager responsible for overseeing assigned staff and public engagement and outreach activities and also leads Valerin's Quality Assurance/Quality Control program. Valerie's leadership and commitment to excellence guide the Valerin team to perform to the highest standards on behalf of their clients.
	**Christine Girardin – Senior Community Outreach Specialist** Christine brings 27 years of experience in communications, copywriting, editing, research, and graphic design. In the past 14 years, she has established a reputation as a reliable, credible communications specialist. Additionally, her skill set includes Microsoft Office and leveraging various social media platforms for public involvement and outreach efforts. During her career, she has been a print journalist and public information officer for several agencies, including serving as a senior community outreach specialist on projects for various government agencies and municipalities, including the Polk Regional Water Cooperative (PRWC), Florida Department of Transportation (FDOT), Pinellas County Utilities, Collier County, Hillsborough County, Hillsborough Metropolitan Planning Organization (MPO), City of Tampa, and City of Naples. Christine also has taken the Document Accessibility Course through Utah State University and is certified in converting documents to meet ADA compliance. Christine has a BA degree in Political Science from Augusta State University, an AS degree in Graphic Design Technology from Palm Beach State College and an AA in Communications from Polk State College.
	**Tiffani McClain – Senior Community Outreach Specialist** Tiffani has over 17 years of diverse marketing, public relations, community outreach, and social media management experience. As a communications professional, Tiffani has developed and implemented strategic communication plans for both private and public-sector clients, including digital and social media, community engagement, and community outreach. Tiffani supports numerous community and stakeholder communications efforts through survey initiatives and develops social media content appropriate to the client's respective platforms. In addition to content and audience development, she works with clients in a collaborative manner to manage communications logistics such as audience and demographic research, subscription and contact data, and event/social media calendars. Tiffani also has taken the Document Accessibility Course through Utah State University and is certified in converting documents to meet ADA compliance. Tiffani has a BA degree in Communications from Florida Atlantic University.

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Chuck Thompson – Graphic Artist

Chuck has more than 37 years of extensive experience serving as a creative director and project manager providing creative services, including graphic and website design for a wide range of public sector clients. He offers marketing and visual communication solutions and prides himself in his problem-solving abilities through design. His designs allow the public to identify and connect with the client's message to promote successful results. He specializes in both traditional and digital media solutions and is the recipient of multiple gold and silver Addy awards, as well as a Clio Award for his past design work.



Silvia Rodriguez, PMP – Sr. Project Manager

Silvia Rodriguez is a Project Management expert and eternal optimist, whose goal is to bring out the best in everyone she meets. She believes we're all valuable, but we must remain hungry and humble.

Silvia led smart grid and energy management projects for a fortune 100 company, before spearheading WeProject. Throughout her 20+ years in project management, Silvia has been known for her tenacity, energy, and positive attitude. Silvia's innate soft skills and systematic approach have helped deliver complex multi-million-dollar smart city projects in Canada, USA, and Latin America. Among those projects were MDM, AMI, and sub-metering deployments for utilities, independent power producers, and retail customers.

Silvia is a certified Project Management Professional (PMP) and a member of the North Carolina Project Leaders Toastmasters club. She holds a Bachelor of Science degree in Project Management and an Associate of Applied Science in Industrial Engineering.

Nancy Garcia - Chief Financial Officer

Nancy Garcia is a Solutions expert, with a focus on Organizational Excellence. She believes that teamwork and each individual's motivation to learn and share knowledge are essential to finding root cause and resolving the task at hand. Nancy's successful 20-year career at a software company plus the financial management of a small trade business since 2007, has yielded expertise from a wide variety of systems & hardware (SQL, Salesforce, LIMS, SCADA, PLCs, RS232 equipment, CNCs, etc.) to financial business operations & long-term business success. Nancy's volunteer work spans across churches, ASQ Raleigh and Civil Rights. With her husband and three girls as priority, Nancy makes it a point to mentor teenagers on the importance of God, selflove, family, country, education, and work ethic.

Brittany D. Wilson - Project Coordinator

Brittany D. Wilson is a forward-thinking, solutions-driven professional currently working as a Project Coordinator at WeProject. Her inquisitive nature and experience in the transition from Advanced Meter Reading technology to Advanced Meter Infrastructure brings a refreshing perspective to the deployment process. Her unmatched ability to take what she learns and convert that knowledge into effective training materials, helps expedite and obtain desired Quality Assurance and Quality Control levels by training co-

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	workers and those without any AMI experience. Understanding and following established QA/QC processes allowed Brittany to showcase her dynamic thinking and suggest approaches which helped AMI customers achieve a near zero installation data defect rate. Brittany has been known for her perseverance and desire to see things through no matter the difficulty. This attitude coupled with her experiences within customer care and business intelligence makes her a well-rounded professional. Brittany holds an Associate of Science in Biology and a certificate in Business Intelligence. She also has over eight years of administrative experience as well as technical experience in Excel, Tableau, Power BI, and SQL.
WEPROJECT	**Nishitha Singh - SmartGrid Systems Associate** Nishitha Singh began her career with Google in 2019 and has 5 years' experience as a Business Analyst. Her focus has been on Agile Methodologies for iterative development and adapting to changing user needs. As a Smart Grid Associate, Nishitha has successfully transitioned into the AMI industry, performing Data Validation at a near perfect rate and monitoring an operational AMI system daily. Nishitha's diligence has helped customers improve their QA/QC metrics from a 20% data failure rate down to 1.5%, while changing their system from AMR to AMI technology. Nishita's skills include analyzing data using SQL, conducting Root Cause Analysis and Impact Analysis to identify discrepancies, underlying issues and assess the consequences, whilst enabling informed decision making. Born and raised in India, Nishitha graduated from Jawaharlal Nehru Technological University in 2019, specializing in Electrical and Electronic Engineering. She is passionate about strategic thinking with a problem-solving attitude.

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2.3 References

Please provide references for the Proposer's managed services for similar municipal utility deployments, including the information requested in Table 2-2. Please indicate all experience in the US Southeast or Florida where managed services are provided. If the system covers water-only areas, please indicate this fact.

When completing Table 2-2, the Proposer shall supply information for a minimum of one reference of a project (completed in the last 3 years) that meets each of the following criteria:

- **AMI –Electric & Water Solution:** AMI deployment, including water-only or electric and water with two or more water-only areas within the overall territory.
- **AMI – with Customer Portal:** AMI deployment, including use of Tyler's ERP Pro Customer Portal. Proposer to describe the functionality in use.
- **AMI – with Tyler ERP Pro**: AMI deployment successfully integrated with a Tyler ERP Pro system. Proposer to describe the functionality in use.

References that meet more than one of the above criteria would be especially valuable.

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Table 2-2. References

Rqmt. #	Rqmt. or Project Description	Utility Name	Utility in FL?	Contact Name and Title	Contact Phone #	Contact Email	Start/Completion Date	Number of Meters		Project Description
								Electric	Water	
6.2.1		Newberry, FL	Yes	Mike New, City Manager	352-472-2161	mnew@@newberryfl.gov	Final Stages of Active Deployment	2,500	2,500	CNM Prime, W/G/E, Sensus FlexNet, Tyler Encode
6.2.2		Lakeland, FL	Yes	James Moore, Smart Grid Systems Manager	863-834-6383	James.moore@lakelandelectric.com	Services Began 2013	135,000	60,000	Sensus W/E
6.2.3		Troy, AL	No	Danny Lee, AMI Coordinator	334-670-6062	Danny.lee@troyal.gov	Services Began 2014-2015	9,500	10,000	W/E, Tyler Encode
6.2.4		Talquin Electric	Yes	Dane Clemons, IT Manager	850-893-6853	Dane.clemons@talquinelectric.com	Services Began 2010	60,000	25,000	Sensus W/E
6.2.5										
6.2.6										
6.2.7										
6.2.8										
6.2.9										
6.2.10										
6.2.11	**Identify any failed or defaulted projects in the last 5 years.**	**Description**								
		NONE								
6.2.12	**Identify any claims or judgments outstanding against your company or**	**Description**								
		NONE								

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	sub-suppliers.	

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2.4 Customer Site Visits

Table 2-3. Customer Site Visits

Rqmt. #	Requirement Description	Comply?		Comments / Clarifications
		YES	NO	
6.3.1	The Proposer shall recommend up to three customers for site visits. Preference will be given to utilities of similar size, scope, and proximity to the City.	X		• Clewiston, FL • Lakeland, FL
6.3.2	The Proposer shall work with at least two customers to arrange an on-site (or virtual) demonstration of systems and discuss utility processes, issues, etc. The City prefers that the Proposer not attend these on-site customer visits beyond simple introductions at the start of a meeting.	X		We will work with two customers to ensure the City receives an on-site demonstration.

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3 TECHNICAL SOLUTION

Introduction

Core & Main is pleased to present our proposal for a comprehensive Advanced Metering Infrastructure (AMI) solution designed to meet the City's needs. Our approach integrates advanced Sensus hardware and software, ensuring a robust, reliable, and future-proof system. This document outlines the proposed Sensus AMI water meters and modules, non-meter devices, the physical connection methods, the communications backbone (Sensus FlexNet), necessary communications studies, required software programs, our CORE+ SaaS/NaaS plan for successful system integration, and ongoing managed services. Additionally, it includes details of the warranty coverage for the proposed meters. Each component has been carefully selected to align with the City's technical requirements and operational goals, providing a pathway to efficient water management and improved service delivery.

The FlexNet system is purpose-built to meet utilities' needs today and in the future. Our system is distinguished from competitive offerings by offering expandability with innovative solutions over time while maintaining backwards compatibility for your existing deployed products. Sensus avoids obsolescence by developing products that bring in new applications while maintaining backward compatibility to all your endpoints in the field, for the life of your FlexNet system. FlexNet also brings you consistent system performance over time using our exclusive FCC-protected RF frequencies, and the ability to support many applications simultaneously by operating multiple RF frequencies.

AMI Water Meters and Modules

To address diverse metering needs, Core & Main proposes a suite of Sensus meters and modules, each selected for its specific strengths in accuracy, durability, and application. Sensus develops and manufactures a complete complement of AMI products. This includes electric, water, and gas meters; communication network modules; solutions for real time distribution applications; communication products that support third-party products and applications to meet the business and operational requirements of utilities; and easy-to-use Head End System software solutions and analytic solutions for a wide range of applications.





- **SRII Meter:** The SRII Meter, a positive displacement meter, features a durable brass construction and magnetic drive, making it suitable for both residential installations. Its robust design and compatibility with AMI systems ensure long-term reliability and ease of integration.
- **iPERL Meter**: For environments requiring advanced precision and data management, the iPERL Meter offers electromagnetic metering with no moving parts, enhanced accuracy and durability, and advanced alarms. This meter is ideal for residential applications where reliable and precise water measurement is essential.

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- **Ally Meter:** The Ally Meter, is a groundbreaking smart water meter featuring an integrated, self-cleaning, three-state ball valve for remote service shut off, turn on and reduced flow states. Electromagnetic flow measurement allows for enhanced metering accuracy while integrated pressure and temperature sensors deliver valuable environmental data. It is well-suited for advanced residential applications, providing real-time data and control capabilities that facilitate proactive management of water resources. The Sensus ally® water meter features an integrated 3-state valve, temperature and pressure sensors and alarms.



- **OMNI+ Meter:** The OMNI+ Meter, a turbine meter, is designed for large commercial and industrial applications. Its wide flow range and advanced metrology make it perfect for environments with complex flow patterns, offering high accuracy and seamless integration with AMI systems.
- **Cordonel:** The Sensus Cordonel is a state-of-the-art water meter designed for high accuracy and reliability. It features an ultrasonic measurement principle, which ensures precise readings even at low flow rates. The Cordonel meter is suitable for a wide range of applications, from residential to commercial and industrial settings. In addition, the integration of pressure and temperature sensors in the Sensus Cordonel meter offers significant advantages for water management and operational efficiency. The pressure sensor aids in early detection of leaks by detecting sudden drops in pressure while the temperature sensor helps ensure water quality and prevention for the growth of harmful bacteria.



- **Sensus 520M Single-Port and Dual-Port Modules:** To complement our metering solutions, Core & Main proposes the Sensus 520M single-port and dual-port modules, which are critical endpoints in the AMI ecosystem. These modules support remote data collection and communication, allowing for efficient and accurate meter reading. The single-port module is designed for applications requiring a single data point connection, while the dual-port module supports two data points, making it ideal for scenarios where multiple connections are needed, such as a dual residential service. Both modules are designed to integrate seamlessly with the FlexNet communication network, enhancing data accuracy and reliability.



AMI Electric Meters and Modules

Sensus is proposing the Sensus Stratus IQ for your residential electric customers and the Aclara kV2c for commercial and industrial customers. FlexNet is also compatible with the Aclara I-210+c residential electric meter and the Honeywell A3 C&I meter, which we are presenting as alternative options

Electric Residential Meters

The Sensus Stratus IQ is the enhanced version of our Stratus residential meter, featuring several innovations and expanded capabilities including leading edge tamper and safety provisions, as

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suggested by our customers. Both the Stratus and Sensus Stratus IQ meters have shipped to electric and combination utilities ranging in size from hundreds to millions of meters across North America. Additionally, we have been providing the FlexNet-enabled Aclara I-120+c to electric utilities for more than 5 years.

Electric Commercial Meters

The proposed Aclara kV2c meter family is one of the most widely accepted meters in the market today, with more than two million units deployed. It is designed to provide Wauchula with reliable and accurate revenue metering combined with advanced real-time instrumentation, true power quality monitoring and real cost of service measurements.

The Honeywell A3 ALPHA meter is also available with an internal SmartPoint module to enable Wauchula to collect data from C&I customers. Sensus is the #1 seller of Honeywell A3 meters.

As a part of our on-going electric meter support, Core & Main and Sensus technical personnel will work with Wauchula for all four of the proposed electric meters, not just our own.

FlexNet Supports Prepayment Capabilities

The Head End System supports prepayment capabilities with disconnect switch-equipped Stratus and Aclara meters. In addition to operating the switch, the Head End System can integrate to your prepayment vendor of choice and integrate with their system in real time using the MultiSpeak API.

Physical Connection

The physical connection of the proposed Sensus meters and modules into the City's water distribution system is designed for reliability and ease of installation. Residential meters, including the SRII, iPERL and Ally models, will be installed in standard meter boxes or vaults, connected using couplings that ensure secure and straightforward installation. These meters are battery-powered, which minimizes wiring complexity and reduces installation time. For commercial and industrial meters such as the OMNI+ and Cordonel, installation will utilize flanged connections to accommodate various pipeline sizes. These meters are equipped with integrated batteries and they require minimal wiring for data connectivity, further simplifying the installation process.

The Sensus 520M single-port and dual-port modules will be connected to the respective meters, facilitating seamless data transmission to the FlexNet network. These modules are designed for easy integration, with a focus on minimizing installation complexity and ensuring reliable data transmission. The integration process involves securely mounting the modules adjacent to the meters and establishing communication links using standardized protocols, ensuring compatibility and reliability across the network.

Non-Meter Devices

Core & Main recognizes the importance of enhancing the functionality of the AMI system beyond basic metering. As part of our proposal, we include non-meter devices that support advanced smart utility applications, including water level monitoring, temperature sensing, pressure management and leak detection. These devices provide valuable data for optimizing system performance and resource allocation.

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- **Sensus Smart Gateway**: The Sensus Smart Gateway serves as a versatile device that bridges various sensors with the Sensus FlexNet communication network. It facilitates the integration of sensors for water quality, pressure, and level monitoring, enabling real-time data collection and management. The Smart Gateway supports multiple communication protocols and ensures secure data transmission, enhancing the City's ability to monitor and manage its water distribution network effectively.



- **The Sensus Water Level Monitoring Kit:** With the Sensus Water Level Monitoring Kit combined with the Sensus Smart Gateway, the city can remotely monitor and trend the level of water at key facilities in its system. Customizable alarms can be set to alert utilities when levels reach certain thresholds, which can be transmitted to utility systems or individuals allowing for proactive resolution. The Sensus Water Level Monitoring Kit enables proactive utility operation and maintenance, decreases the need to deploy field crews, leverages the FlexNet communication network and provides a cost-effective data accumulation option.
- **Water Temperature Sensors:** With its integrated temperature sensor, the Ally meter offers real-time data to help maintain water quality, optimize energy usage, and ensure efficiency in maintaining the temperature of the City's water supply. Leveraging the FlexNet communication network, the Ally meter allows for remote temperature monitoring and control throughout the AMI system. Data collected by Ally's water temperature sensor can trigger alerts for temperature anomalies, ensuring regulatory compliance and maintaining operational standards.
- **Sensus Pressure Sensor Kit:** The Sensus Pressure Sensor Kit combines with the Sensus Smart Gateway Sensor Interface to provide utilities knowledge of water pressure at almost any point in their water system. Knowing the water pressure at multiple locations can help determine where a main break has occurred, where a pump or valve has malfunctioned and where a system may have issues delivering water for fire protection and for public consumption. Leveraging the FlexNet communication network through the Smart Gateway Sensor Interface, the pressure sensor kit empowers utilities to monitor pressure remotely. Customizable alarms can be set to alert utilities of high- or low-pressure conditions at remote locations. Alarms can be transmitted and forwarded to utility systems or individuals allowing for proactive resolution. Additionally, pressure data can be accumulated to develop new insights into the operation of the water system. The Sensus Pressure Sensor Kit transmits pressure data through the Sensus Smart Gateway Sensor Interface. With two 4-20 mA analog inputs and two Form A digital inputs, the Sensus Smart Gateway Sensor Interface can cover multiple applications at a single site. Additionally, **the Sensus Pressure Sensor Kit for OMNI+** combines with the Sensus Smart Gateway Sensor Interface and OMNI+ commercial water meters to provide knowledge of water pressure at almost any point in a water system.
- **Acoustic Leak Detection – Permalog+:** Permalog+ uses sound waves to monitor distribution lines and localize leaks. By detecting leaks and other flow problems, the Permalog+ aids in the conservation of millions of gallons of water, aiding in the discovery of lost revenue. Sensors

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activate overnight, listening to the distribution system when ambient noise is at its lowest, then report pipeline conditions back to the utility via the Sensus FlexNet communication network. Once flow conditions are reported back through the network, the City can analyze the data to determine if a leak condition exists.

A Smart City Starts with Smart Infrastructure

The Sensus FlexNet solution now goes beyond the meter to provide for monitoring and intelligence across the entire municipal landscape to provide the foundation of a smart utility and smart city. With continual innovation addressing our customers' needs, Sensus has expanded its AMI solution into a full smart utility network solution that empowers cities across multiple functions and that serves as the robust, proven foundation for the smart city.

Sensor Monitoring - Any Time, Any Location, Any Sensor



The Sensus Smart Gateway Sensor Interface enables a wide range of applications for Sensus FlexNet customers. The Smart Gateway is a battery-powered FlexNet radio with four sensor inputs – two 4-20 mA inputs and two Form A digital inputs – that ties data seamlessly to the FlexNet Head End System.

The Smart Gateway empowers Sensus customers to use a wide variety of third-party sensors to monitor water quality, water distribution pressure, storm water, wastewater, and reclaimed water assets – using the same FlexNet infrastructure they utilize for meter reading.

The Smart Gateway is a battery-powered sensing technology that can connect to a variety of applications in all locations-even areas where no power or land-based communications are available. With the Smart Gateway sensor interface, you can leverage the FlexNet communication network to:

Monitor pressures, temperatures, levels, and switches remotely
Transmit and forward alarms to utility systems or individuals to resolve issues quickly
Analyze stored data to develop new insights into operating conditions
Applications for the Smart Gateway are many and include:

- Leak Reporting
- Lost Revenue
- Pressure Profile
- Demand Planning
- Hydraulic Management
- Flushing Management
- Water Loss Management
- Water Quality Management
- Energy Management
- Safety Management
- Storm Water Management
- Temperature Management

Remotely Monitor Water Levels in Reservoirs, Basins and more

Water level is a key piece of information for a water utility. With the Sensus Water Level Monitoring Kit combined with the Sensus Smart Gateway Sensor Interface, utilities can now remotely monitor and trend the level of almost any water surface in their system.

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Leveraging the FlexNet communication network through the Sensus Smart Gateway Sensor Interface, this ultrasonic, non-contact solution empowers utilities to monitor the level of water at rivers, reservoirs, open channels, basins, and other remote water facilities. Customizable alarms can be set to alert utilities to high and low water levels. Alarms can be transmitted and forwarded to utility systems or individuals allowing for proactive resolution. Additionally, water level data can be accumulated and analyzed to develop new insights into the operation of the water system.

The Water Level Monitoring kit is mounted above the water level and is designed to provide precise and efficient data transmission. Equipped with a one-year warranty, this advanced system offers remote liquid level status for crucial water surfaces, enabling proactive operation and maintenance. The kit comes complete with a transducer, transmitter, and handheld programmer, ensuring a seamless setup and operation. The sensor's ability to communicate key metrics remotely not only improves overall system efficiency but also significantly reduces operational costs and manual intervention. This innovative solution ensures that water management systems are more responsive and reliable, making it an invaluable tool for modern water infrastructure.

Pressure Management – Sensus Analytics Pressure Profile software application



The Sensus Analytics Pressure Profile software application provides full visibility of the City's water system with near real-time pressure data - empowering utilities to improve customer service, reduce wear and tear on aging infrastructure and enable more efficient operations. Integrated with the FlexNet communication network, the system transforms into a smart utility network through seamless data collection from the Ally smart water meters and pressure sensor kits. With remote pressure monitoring capabilities, Pressure Profile helps identify and alert utility crews to deviations in pressure throughout the community to prevent leakage and bursts.

Several deployment options are available to capture essential pressure data and device status. At the service connection, the City can deploy Ally residential smart water meters with integrated pressure monitoring capabilities to map the pressure at the user level. For OMNI+ commercial and industrial water meters, the Sensus Smart Gateway Sensor Interface works with attached pressure sensors and can be used to access pressure at the most critical users. For monitoring asset performance in the distribution system, the Sensus Smart Gateway Sensor Interface combined with the pressure sensor kits can be deployed on service and main lines, at pressure reducing valves (PRV), pump stations, and storage tanks. Sensors can be deployed anywhere in the system and provide the right data at the right time allowing the utility to make decisions with the utmost confidence.

Key Features:

- ESRI based map view with utility GIS layer integration.
- Explore and trend out pressure, total head and alarms.

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- User-configurable alarms
- Address search to quickly locate areas of interest.
- Captures low-pressure readings and sends alerts before failures can occur.
- Custom grouping for zone management, districts, water source, focus areas and service management.
- Three years of data storage

By integrating pressure sensors across the water distribution network, the AMI system can monitor and manage pressure levels. This data is crucial for maintaining optimal pressure, reducing the risk of pipe bursts, and ensuring consistent water delivery. Pressure management capabilities also support the identification of areas with potential pressure issues, guiding targeted maintenance and infrastructure improvements.

Leak Detection – Permalog®+ Acoustic Leak Detection System



The Permalog+ acoustic leak detector is an advanced device designed to detect and pinpoint leaks in water distribution networks. Utilizing sophisticated acoustic technology, the Permalog+ monitors the sound of water flow and identifies the distinctive noise patterns caused by leaks. Sensors activate overnight, listening to the distribution system when ambient noise is at its lowest. Through a direct protocol connection with the Sensus 520M SmartPoint, it features wireless communication capabilities with the FlexNet communication network, allowing for real-time data transmission to the AMI system. This enables rapid detection and response to potential leaks, significantly reducing water loss and operational costs. Once flow conditions are reported back through the network, the utility can analyze the data to determine if a leak condition exists. The Permalog+ is highly sensitive and can detect even small leaks that might otherwise go unnoticed, making it an invaluable tool for maintaining the integrity and efficiency of water infrastructure.

Installation is fast and easy. Permalog+ sensors magnetically attach to gate valves throughout your distribution system. This allows the sensors to be mounted temporarily or permanently. With as little as five data loggers per mile, far less than any other leak detection system, Permalog+ is a fast and economical way to proactively address current and potential leak conditions.

Integration with leak detection sensors provides critical data for identifying and addressing leaks in the water distribution system. This capability enhances the City's ability to detect leaks early, minimize water loss, and reduce repair costs.

Key Features:

- Acoustic Leak Detection: Utilizes sensors to detect the sound of leaks, pinpointing their location in the distribution network.
- Correlation Technology: Analyzes data from multiple sensors to accurately identify the leak's position.

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- Automated Alerts: Generates alerts when a leak is detected, enabling rapid response and minimizing water loss.
- Temporary or permanent mounting
- Seamless integration with FlexNet

Water Balance Monitoring – Water Operations Management and Reporting with Xylem Data Lake

Flow sensors installed at key points at the Water Treatment Plant and in the distribution network provide real-time data on water flow. This capability allows for accurate water balance monitoring, identifying discrepancies between water production and consumption that may indicate leaks, unauthorized usage, or other issues. The data collected can be used to generate detailed reports and alerts, enabling proactive management and reduction of non-revenue water.

Key Features:

- Leak Detection: Identifies and localizes potential leaks within the distribution network.
- Usage Monitoring: Tracks water usage patterns to detect anomalies and unauthorized consumption.
- Reporting and Alerts: Generates reports and sends alerts for detected discrepancies, allowing for prompt action.

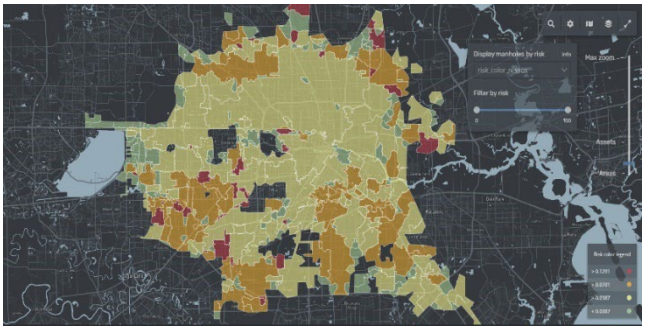
Sewer Flow Monitoring – Advanced Monitoring Solutions for Wastewater by CORE+



To support comprehensive water and wastewater management, Core & Main *can* offer additional integration of sewer flow monitoring capabilities. This solution provides detailed insights into the flow dynamics of the sewer system, aiding in the identification of inflow and infiltration issues, blockages, and capacity concerns.

Key Features:

- Real-Time Flow Monitoring: Measures sewer flow rates at various points in the network to provide accurate data on system performance.
- Inflow and Infiltration Detection: Identifies and locates potential sources of unwanted water entering the sewer system.
- Blockage Detection: Monitors flow patterns to detect potential blockages or restrictions in the sewer lines.
- Capacity Analysis: Provides data for evaluating system capacity and planning for infrastructure upgrades or maintenance.



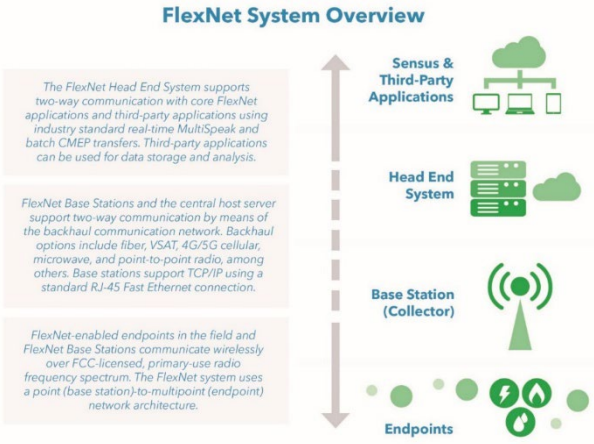
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- The integration of these non-meter devices into the AMI system enhances the City's ability to monitor, manage, and optimize its water distribution and sewer networks, providing actionable insights and improving overall system efficiency.

Communications Backbone: Sensus FlexNet

The Sensus FlexNet communication network will serve as the backbone of the proposed AMI system, providing a reliable, secure, and scalable platform for data transmission. FlexNet utilizes a licensed, point-to-multipoint radio network that operates on a dedicated FCC spectrum. This architecture offers extensive coverage with minimal infrastructure, requiring fewer base stations and repeaters compared to other network designs. The result is a cost-effective and efficient communication network that supports long-range data transmission across the City's water distribution system.

Data transmission over FlexNet is characterized by high bandwidth and low latency, ensuring real-time availability of meter data. Encrypted communication channels safeguard data integrity and privacy, protecting against unauthorized access and potential breaches. FlexNet's scalable design supports future expansion, accommodating increased data loads and additional devices as the City's AMI needs evolve. This flexibility makes it an ideal solution for both current and future requirements, providing a foundation for continuous improvement and innovation in water management.



Key Features:

- **Managed Services:** The managed services offering and ongoing year-over-year support for the system is directly with Sensus, the FlexNet communication provider.
- **Support Multiple Applications on a Single Communication Network:** FlexNet allows Wauchula to fully leverage assets with a complete AMI system that supports electric and water metering, DA, and other applications on a single communication network. The Sensus FlexNet solution is ideally and uniquely suited for combination utilities because it is the only AMI solution with a unified communication architecture that guarantees performance for both AMI applications while also providing unmatched support for Distribution Automation (DA), Demand Response (DR), Conservation Voltage Reduction (CVR), and Volt/Var Optimization (VVO), phase detection, load control, street lighting, and more.
- **Real-Time Monitoring and Analytics:** Provides real-time monitoring and analytics by processes incoming data to generate insights into water consumption patterns, detect anomalies such as leaks or meter tampering, and predict demand trends. This capability

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empowers utilities to make informed decisions promptly, improving operational efficiency and customer service.

- **Remote Device Management:** The FlexNet head-end system supports remote configuration and management of Sensus meters and modules. Utilities can remotely update firmware, adjust metering parameters, and troubleshoot issues without sending personnel to the field. This capability reduces operational costs, minimizes downtime, and ensures optimal performance of the entire AMI infrastructure.
- **Scalability and Flexibility**: Designed with scalability in mind, the FlexNet head-end system can accommodate the addition of new meters and devices as the city expands its water distribution network. It supports multi-application networks, allowing utilities to integrate various sensor technologies and expand functionalities beyond basic metering.
- **Data Security and Compliance:** The FlexNet head-end system employs robust security measures, including data encryption, secure communication protocols, and access controls.
- **Integration Capabilities**: Integration with third-party systems, such as Customer Information Systems (CIS) like Tyler, enhances operational synergy. The FlexNet head-end system facilitates seamless data exchange, ensuring that metering data integrates seamlessly into billing systems for accurate customer invoicing and revenue management.
- **Reliability and Performance**: With a proven track record in utility deployments worldwide, the FlexNet head-end system is known for its reliability and performance in diverse environmental conditions. It operates on a robust communication network that ensures high availability and data accuracy, even in challenging urban or remote settings.

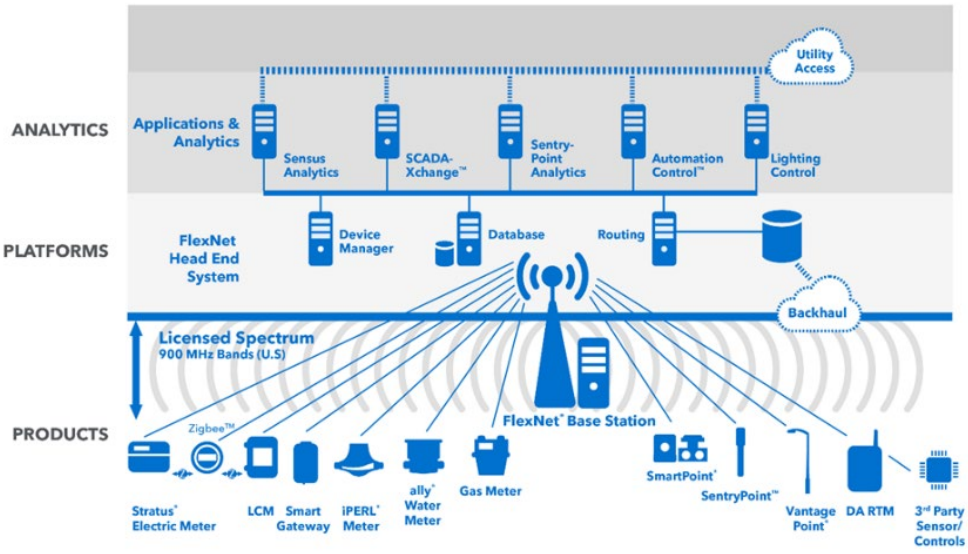


Figure: Devices Supported on the FlexNet System

Point-to-Multipoint Design

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Sensus' FlexNet system's point-to-multipoint design makes it the most flexible and scalable AMI system in the industry. It is also the only AMI system to readily accommodate Wauchula future bandwidth needs upon installation, without service interruptions or costly network reconfigurations. Its unique network design incorporates state-of-the-art, software-defined radios for AMI endpoints and collectors. The FlexNet AMI solution is differentiated from competitive offerings through its superior reach, configurability, expandability, security, and ability to support multiple applications on a single network.

In our point-to-multipoint FlexNet system, endpoints communicate directly to base stations, without relying on neighboring endpoints to send messages. This design ensures much lower latency and enables superior outage detection and restoral messaging to help with restoring power to City of Wauchula's utility customers. Sensus' point-to-multipoint technology also allows utilities to segment available spectrum into separate channels so that mission critical automation applications and devices can have a dedicated pathway; for instance, the DA communications will be placed on separate, dedicated RF channels enabling prioritization for SCADA automation data streams over the FlexNet network. With licensed spectrum and multi-channel optimization, you can prioritize time-sensitive applications, such as DA, DR, and remote disconnect/reconnect operations as well as alarms and alerts. This capability ensures that the applications are not forced to compete with other network traffic to get messages to the Head End System.

The ability to provide channelized spectrum is one of the essential characteristics that will allow Wauchula to achieve optimal AMI network performance using the FlexNet communication network. Open standards-based networks, built on multi-channel licensed spectrum, allow Wauchula to transcend the limits of unlicensed mesh AMI networks, and realize a consistent ROI over the course of a low-risk lifecycle.

The point-to-multipoint architecture allows for quicker, more flexible installation of endpoints because utilities can remove and replace individual endpoints at virtually any time and place without disrupting any other endpoints in the network. This network stability is also seen when a customer asks for their meter to opt-out of AMI. The Sensus Stratus IQ meter fully supports Wauchula opt-out solution, and the FlexNet network's communications will not be interrupted by having some number of meters installed with their RF transmissions disabled.

AMI Network Design for 100% Redundant Coverage

As reflected in the Propagation Study provided in the Appendix, we have proposed an AMI network design with multi-channel, full-duplex, two-way communications to all meters and other FlexNet-enabled devices in your territory, including full communication to at least one FlexNet base station and with a significant percentage of meters redundant to multiple base stations.

Meter Data Management: Sensus Analytics and Xylem Data Lake

Our proposed AMI system incorporates a suite of Sensus software solutions designed to achieve the City's objectives in data management, analytics, and customer engagement. Sensus Analytics, in conjunction with Xylem Data Lake (formerly known as Utility Data Lake), provides advanced data analytics, reporting, leak detection, and consumption analysis. This software solution enhances

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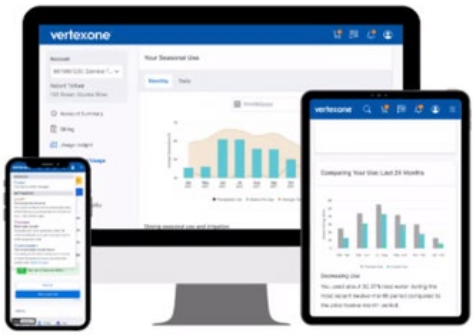
operational efficiency by offering actionable insights through comprehensive data visualization and intuitive dashboards. It enables City staff to make informed decisions based on accurate and timely information, improving overall water management.

Sensus Analytics is an advanced data analytics platform designed to optimize the management and operation of utility systems. By collecting and analyzing data from smart meters, sensors, and other connected devices, Sensus Analytics provides utilities with real-time insights into water usage. The platform features customizable dashboards, powerful reporting tools, and predictive analytics capabilities, enabling utilities to identify patterns, detect anomalies, and make informed decisions to improve efficiency and customer service. With its user-friendly interface and robust integration capabilities, Sensus Analytics supports seamless connectivity with existing systems, helping utilities reduce operational costs, enhance asset management, and ensure regulatory compliance. The platform also empowers customers with detailed usage information, promoting transparency and engagement.



Xylem Data Lake (XDL) is a powerful, cloud-based data management and analytics platform designed to centralize and analyze vast amounts of data from various water management systems and devices. It integrates data from meters, sensors, and other devices to provide comprehensive insights into water usage, system performance, and environmental conditions. By leveraging Sensus Analytics and Xylem Data Lake, utilities can make data-driven decisions, predict and prevent issues, optimize operations, and enhance customer service. With robust security measures, scalability, and interoperability, the platform supports seamless integration with existing systems and helps utilities achieve greater efficiency and sustainability in their water management practices. Xylem Data Lake stores data from all FlexNet devices and sources are stored in one centralized and secure repository to offer a complete picture of the entire system. With unfettered data access, this data tool gives the City the flexibility to choose how to view data at any time.

Web-based Customer Portal: VertexOne



As part of our comprehensive Advanced Metering Infrastructure (AMI) solution, we propose integrating the VertexOne web-based customer portal. The VXSmart Customer Portal is a SaaS solution hosted by VertexOne through AWS. VXSmart has 24/7/365 resources focused on their customer portal, with a dedicated development team. VXSmart has already integrated with FlexNet many times and has 100+ integrations with utilities in the United States and Canada.

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The VXSmart Customer Portal includes many customer-service features which are commodity agnostic and are used by electric, gas, and water utilities, including:

- Bill history
- View consumption
- Service order/history
- Form submission
- Update account/contact information
- Call deflection (payment arrangement
- View/pay bill
- Submit meter read
- Budget billing
- Communication engine
- Document repository
- Broadcast
- Promo campaign
- Marketplace

Features that are specifically for water utilities include:

- Leaks
- Water conservation
- Water budgets
- The various consumption dashboards
- Disaggregation
- Recommendations for savings

The VXSmart Customer Portal ingests the AMI data and displays it on computers, tablets, and mobile devices. The data flow between the FlexNet AMI system and the VXSmart Customer Portal is four times per day, via CMEP. The VXSmart solution is applicable to an end user-customer portal, utility dashboard, landlord portal, and contractor portal.

Integration with Tyler New World ERP System

To streamline operations and enhance data management, Core & Main proposes seamless integration with the Tyler New World ERP system. This integration will enable automatic synchronization of metering data, customer billing information, and operational workflows between the AMI system and the ERP platform. Key integration features include:

- Data Exchange: Automated transfer of meter readings, customer account details, and service orders between the AMI system and Tyler New World ERP, ensuring data consistency and accuracy.
- Billing Integration: Integration of metering data into the ERP system for accurate customer billing and revenue management.
- Operational Efficiency: Streamlined workflows and reduced manual data entry through integration, improving overall operational efficiency and reducing administrative overhead.

Key Benefits:

- Real-Time Data Sync: Ensures that meter readings and customer information are always up to date in both systems, facilitating prompt billing and customer service.
- Enhanced Accuracy: Minimizes errors associated with manual data entry and improves billing accuracy through automated data synchronization.

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- Operational Visibility: Provides comprehensive visibility into water consumption trends, customer usage patterns, and system performance through integrated reporting and analytics.
- Cost Savings: Reduces operational costs by eliminating duplicate data entry tasks and optimizing resource allocation based on real-time data insights.
- By integrating the AMI system with the Community Plus CIS, Core & Main enables the City to leverage advanced technology for more efficient utility management, enhanced customer service, and improved financial oversight.

Security

Core & Main prioritizes the security of data transmitted and stored within the AMI system, adhering to industry best practices and regulatory requirements. Our approach to data security includes:

- Encryption: Utilization of strong encryption protocols to secure data transmission between meters, modules, and the central system.
- Access Control: Implementation of robust access control measures to restrict system access based on user roles and responsibilities.
- Data Integrity: Continuous monitoring and validation of data integrity to ensure that information remains accurate and reliable.
- Cybersecurity Measures: Regular updates and maintenance of cybersecurity measures to protect against evolving threats and vulnerabilities.
- Compliance: Adherence to relevant data protection regulations and standards to safeguard customer data and ensure privacy.

By integrating these data security measures into the AMI system, Core & Main ensures that sensitive information remains protected from unauthorized access or breaches, maintaining the trust and confidence of the City of Wauchula and its customers.

Sensus' FlexNet AMI system supports and/or adhere numerous NIST standards including:

- Point-to-multipoint communication.
- ANSI
- UL
- FCC
- IEEE
- AES encryption
- Multi-Speak
- NERC-CIP
- FIPS
- IETF
- Zigbee
- DNP3
- American Gas Association
- OSHA
- ISA
- IP
- Matter
- ISCJWG
- NSF
- American Water Association

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Additional supported standards are:

- Compliance and Alignment with Recognized Standards Bodies
- NERC reliability – NERC-CIP 002-009, CIP---1, CIP-004
- Best practices such as NIST, ISO2700x, FIPS 140-2, NIST SP 800-53, NIST SP 800-82
- Open SG – AMI-SEC, NIST (IR 7628), SGIP, AMI-SEC, NEMA SG-AMI
- AMI-SEC
- NIST (IR 7628) Guidelines for Smart Grid Cyber Security
- SGIP
- NEMA SG-AMI

These standards and guidelines are all supported by the FlexNet system and have been superseded by newer standards. Our AMI solution incorporates IEC 62443 and other applicable NIST standards.

System Test Fixture

Core & Main understands the criticality of testing and validating the AMI system components before full deployment. As part of our proposal, we include a dedicated System Test Fixture to simulate real-world operating conditions and verify the functionality and interoperability of all hardware and software components. The System Test Fixture allows for comprehensive testing of metering accuracy, data transmission reliability, software performance, and system integration capabilities.

Key Features:

- Metering Accuracy Testing: Ensures that meters meet specified accuracy standards under various flow conditions.
- Data Transmission Reliability: Verifies the stability and consistency of data transmission from meters to the central system.
- Software Performance Testing: Assesses the functionality and responsiveness of AMI software applications, including data analytics and customer portal interfaces.
- Interoperability Testing: Validates the seamless integration of Sensus hardware and software with existing City systems, ensuring compatibility and data consistency.
- Portability: System test fixture mounted on a cart with wheels, holding tank, pump, piping and valves.

By employing a rigorous testing regimen with the System Test Fixture, Core & Main ensures that the AMI solution meets or exceeds the City's requirements for performance, reliability, and operational efficiency. This proactive approach minimizes deployment risks and ensures a smooth transition to enhanced water management capabilities.

Field Installation and Work Order Management System

Core & Main has developed a systematic approach to mass meter change-outs and installations to ensure a smooth transition to the proposed AMI system, minimizing disruption to the City of Wauchula's operations and customers. Our approach includes thorough planning, effective communication, and a detailed execution strategy:

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Project Management Approach:

Core & Main's Project Management Team will support the FlexNet AMI project deployment by providing scalable, strategic leadership for the full duration of the project. We partner with the utility's team to understand their processes, develop a project schedule, and manage the details of for the overall project plan based on knowledge gained from more than 1,900 AMR/AMI deployments spanning electric, water, and gas utilities across North America. Our goal is to keep the AMI project on schedule, saving time and money while delivering on the projects' commitments.

Our project management team provides professional, cooperative, and flexible leadership, ensuring a seamless AMI integration for every utility customer. We will provide program and project management services in accordance with the agreement between the parties, which may include the coordination and support outlined in the following list:

- Developing communication plans
- Developing risk registers and management plans
- Organizing pre-deployment planning and customer review meetings
- Developing project schedules
- Coordinating with Sensus' supply chain and all subcontractors to facilitate equipment ordering and fulfillment
- Assisting with base station site preparation (electrical, mechanical, communication)
- Assisting with base station installation, programming, and certification
- Installing and commissioning the Head End System
- Commissioning of the communication link between the base stations and the Head End System
- Testing the data transfer to the customer billing system
- Setting up the Head End System account
- Facilitating training sessions for installers and Head End System operators
- Assisting with ordering, shipping, Return Material Authorization (RMA), storing, installing, and programming the endpoints
- Optimizing the read performance for the endpoints
- Facilitating customer acceptance testing of the FlexNet system (phased acceptance) in accordance with the mutually developed Customer Acceptance Test Plan (CAP)
- Assisting with the operation of the deployed system for the duration of the network deployment

Planning and Coordination

The success of a mass meter change-out program depends on careful planning and coordination. Our team will collaborate closely with City of Wauchula stakeholders to develop a detailed project plan that outlines the scope, timeline, and resource requirements. Key planning activities include:

- Site Surveys: Conducting preliminary site surveys to assess existing meter installations and identify any specific requirements or challenges.

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- Scheduling: Developing a phased installation schedule that minimizes disruption to residents and ensures efficient use of resources.
- Inventory Management: Ensuring that all meters, endpoints, and installation materials are available and properly inventoried to support uninterrupted installation progress.

Communication and Customer Engagement

Effective communication with residents is essential to the success of the meter change-out program. Core & Main has partnered with the Valerin Group to implement a comprehensive public outreach and communications strategy that includes:

- Advance Notifications: Providing advance notice to residents about the upcoming meter replacements, including information on what to expect and any required preparations.
- Appointment Scheduling: Offering flexible appointment scheduling options to accommodate residents' availability and minimize inconvenience.
- Customer Support: Establishing a dedicated customer support line to address any questions or concerns from residents during the installation process.

Installation Execution

The installation phase is executed by Bermex' highly trained technicians who follow standardized procedures to ensure efficient and high-quality meter installations:

- Pre-Installation Inspections: Performing inspections of existing meter installations to identify any issues that need to be addressed prior to the new meter installation.
- Meter Replacement: Removing existing meters and installing new Sensus meters and endpoints. Each installation is documented to ensure accurate records of meter replacements.
- Data Integration: Integrating new meters into the Sensus FlexNet system and verifying data transmission and accuracy. This step includes syncing the new meters with the City's AMI System for real-time data collection and monitoring.
- Quality Assurance: Conducting quality assurance checks to verify that all installations meet the required standards and that the meters are functioning correctly.

Post-Installation Support

After the installation, the Core & Main Team will provide ongoing support to ensure the new meters and AMI system operate smoothly:

- Follow-Up Visits: Scheduling follow-up visits to address any issues or adjustments required after the initial installation.
- Performance Monitoring: Monitoring the performance of the new meters and addressing any discrepancies or issues that may arise.

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- Customer Feedback: Gathering feedback from residents to identify areas for improvement and enhance the overall installation experience.

Safety and Compliance

Safety and compliance are integral to our installation approach. Core & Main adheres to all relevant safety standards and regulations, ensuring that our installation practices meet or exceed industry requirements. Our technicians are trained in best practices for safe meter installations, including proper handling of equipment and materials, and adherence to safety protocols.

By implementing a well-organized and systematic approach to mass meter change-outs and installations, Core & Main ensures a seamless transition to the new AMI system, enhancing water management capabilities while minimizing disruption to the City and its customers.

Software-as-a-Service (SaaS)

Under the SaaS model, Sensus will manage the Head End System in our secure data center. Our team of experts will be responsible for the day-to-day monitoring, maintenance and management of the software application, servers, and database. Our highly trained professionals are responsible for ensuring that your system is always operating at peak performance. Sensus monitors the utility's servers around the clock to ensure high availability and reliability. Our data center teams perform all hardware maintenance and software patch installation, updates, and upgrades to ensure that your team has access to all the latest features and capabilities that FlexNet has to offer. Sensus guarantees 99% or higher application availability (uptime). Notably, the Head End System has observed availability of greater than 99.5% in SaaS production environments.

SaaS Disaster Recovery

Sensus SaaS customers receive disaster recovery instances in our world-class Tier IV data centers as a standard component of the service.

Sensus currently operates two active and geographically dispersed data centers in North America. Data centers are connected over high-speed, private-line communication with data synchronization. Sensus maintains SAS-70 type 2 certification for all US data centers. Facilities are manned around the clock, with redundant power, communication, and generators. Two-factor authentication is required for access. There is no single point of failure in any layer of the disaster recovery infrastructure.

All existing Sensus SaaS customers currently have near-real time replication on multiple live data centers. For these data centers, the recovery time objective (RTO) is 48 hours. The recovery point objective (RPO) is 24 hours. If desired, Sensus is open to discuss enhanced RTO and RPO target levels, with reduced times available at an additional charge.

Ongoing CORE+ Managed Services

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Core & Main's CORE+ Managed Services Plan outlines our strategy for integrating the proposed Sensus hardware and software with the City's existing systems, while minimizing risk and administrative burden. Our integration strategy employs an API-driven approach to facilitate seamless connectivity between Sensus systems and existing City infrastructure. This method ensures smooth data flow and compatibility with current systems, reducing the need for extensive reconfiguration and minimizing the risk of operational disruptions.

The managed services administration component of our CORE+ plan includes hosted application software, proactive network monitoring, data management, system maintenance, and dedicated technical support. An additional scope of work can include managed field services incorporating the water meters, endpoints and edge devices into the CORE+ plan. This comprehensive service offering provides a turnkey solution that relieves City staff from the complexities of system upkeep, allowing them to focus on core municipal functions. By providing continuous support and system maintenance, we ensure consistent performance and reliability of the AMI system.

Risk mitigation is a key focus of our CORE+ plan. We incorporate redundancy, robust backup protocols, and comprehensive training for City staff to minimize potential points of failure and ensure operational continuity. Our approach reduces the impact of unforeseen issues and enhances the resilience of the AMI system, providing peace of mind and stability for the City's water management operations.

Conclusion

Core & Main is committed to delivering a comprehensive and integrated AMI solution that meets the City of Wauchula's current needs and prepares for future challenges in water and electric system management. Implementing AMI systems presents a transformative opportunity for utilities to enhance their operational efficiency, customer service, and overall water management capabilities. Solutions like the Sensus FlexNet communication network, paired with high-precision water meters such as the iPERL, Ally, OMNI+ and Cordonel, and electric meters such as StratusIQ (residential) and Aclara KV2C (Commercial), ensure accurate, real-time data collection and transmission. These technologies facilitate proactive maintenance, rapid leak detection, and effective resource management, ultimately leading to substantial cost savings and improved service reliability.

The integration of advanced analytics platforms, such as Sensus Analytics, further empowers utilities by providing deep insights into consumption patterns, system performance, and potential issues. These insights enable utilities to make data-driven decisions, optimize resource allocation, and enhance customer engagement through detailed usage reports and alerts. The addition of tools like Xylem Data Lake, the Smart Gateway Sensor Interface and Permalog+ acoustic leak detectors complement these capabilities, offering robust data management and precise detection solutions. As utilities face increasing demands for efficiency and sustainability, these integrated AMI solutions offer a comprehensive approach to modern water management, ensuring long-term operational excellence and customer satisfaction.

By choosing Core & Main to implement these advanced technologies, the City of Wauchula positions itself at the forefront of innovation, addressing current challenges while preparing for future demands. The combination of reliable hardware, sophisticated software, and expert support ensures a seamless transition to a more efficient and responsive water management system. Our

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comprehensive suite of solutions represents a significant step forward in the evolution of utility management, delivering unparalleled benefits that extend from the operational core to the end consumer. We look forward to partnering with the City of Wauchula to implement a state-of-the-art AMI system that supports sustainable water practices and enhances quality of service for residents and businesses alike.

For further details regarding technical specifications, pricing information, and additional services, please refer to the accompanying RFP table submittals.

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4 CUTOVER PLAN

We recognize that billing operations cannot take a back seat to a meter change out. With the FlexNet AMI system and our experience with the Tyler ERP Pro billing system, we are confident that business continuity can be maintained during meter deployment. Below is a sample task list detailing a framework for how this process would work during the deployment phase and is derived from experience in working with the Tyler ERP Pro and FlexNet systems. Note that this is a preliminary sample which would be customized to accommodate Wauchula's specific requirements or concerns.

Preparation for Reading, Project Kickoff - Onward

- Network collector infrastructure is deployed and operational prior to beginning meter change out.
- Billing activity is expected to take place during change out activity and should be identified and scheduled as part of the change out activity. Necessary resources are allocated to assist with this process.
- Installed meters are verified for network connectivity on regular intervals during installation process.
- Engage Tyler ERP Pro to verify data interchange format, read importation format, and any Wauchula specific requirements.

Preparation for Reading, 1-2 Days Prior to Read Window

Project manager shall:

- Make sure all completed meter change out records are imported to Tyler ERP Pro via WOMS integration.
- Verify Head End System connectivity of recent change outs and identify any meters that need investigation.
- Meters slated for change out on read day are identified so that final reads can be collected from installation staff for billing purposes.

Billing Window / Read Day(s)

Integration to Billing Software: Core & Main and Sensus understand that one of the first steps in the AMI system rollout will be the integration of the Head End System software to Wauchula's billing software.

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Using Demo Board for integration Testing: Core & Main and Sensus understand that the testing of integration from Sensus Analytics to Tyler ERP Pro will utilize the Demo Board. Core & Main and Sensus will work with Wauchula and Tyler ERP Pro to accomplish this testing.

Meters not yet changed out: These are read via legacy means (AMR, etc.) and imported to Tyler ERP Pro using current business process.

Meters changed out during the monthly reading activities: New meter change out data is not processed until the bill run is complete for the month. Final or exit readings taken from the existing meter will be collected by project management staff and merged with Tyler ERP Pro billing import file.

Re-Reads / Re-checks: While these are expected to be rare, confidence in billing is of the utmost importance, and project management staff will be available to answer any questions or to investigate any possible anomalies.

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5 MANDATORY PROPOSAL REQUIREMENTS

The following set of requirements are mandatory. Failure to comply with any of the below requirements may result in disqualification.

Table 5-1. Mandatory Requirements

Rqmt. #	Requirement	Comply		Comments / Clarifications
		YES	NO	
M.5.1	No proposal shall be accepted from, nor will any contract be awarded to, any Supplier who is in arrears to the City upon any debt, fee, tax, or contract, or who is a defaulter, as surety or otherwise, upon any obligation to the City, or who is otherwise determined to be irresponsible or unreliable by the City.	X		
M.5.2	All Suppliers, including the Suppliers' subcontractors, must be qualified and licensed under the laws, rules, and regulations of the State of Florida to perform the work required by these contract documents.	X		We will work with two customers to ensure you receive an on-site demonstration.

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Rqmt. #	Requirement	Comply		Comments / Clarifications
		YES	NO	
M.5.3	Failure to properly complete the proposal and required forms and requested data shall result in disqualification, including: • File formats that are not word searchable via commonly available desktop software (i.e., MS Office, Adobe Acrobat, etc.). • Failure to use the proposal forms furnished by the City. • Failure to provide signatures as requested by authorized representatives on proposal form(s).	X		
M.5.4	Submittal issues such as: • Evidence or suspicion of collusion among Proposers. • Unauthorized alteration of proposal forms. • Violation of the City's purchasing rules, Florida statutory requirements, or the requirements of this RFP.	X		
M5.5	The Supplier shall satisfactorily complete all Standard submittal forms.	X		

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Rqmt. #	Requirement	Comply		Comments / Clarifications
		YES	NO	
M.5.6	The proposed solution must include a managed software as a service (SaaS) offering with a minimum of a 10-year contract period.	X		
M.5.7	The proposed solution must include a managed network (NaaS) with a minimum 10-year contract period as a service offering.	X		
M.5.8	The Supplier must have five or more US customers using software as a service/network as a service during the last 5 years.	X		
M.5.9	The Supplier's system must support remote firmware upgrades on each type of endpoint device and have successfully executed this capability previously in a production environment.	X		
M.5.10	The proposed solution must support remote meter reads without needing site visits or drive-by activity.	X		
M.5.11	The proposed solution must support a customer portal with the ability to display quantities and required alerts (see Table 13-5)	X		
M.5.12	The Supplier must provide a system test fixture (see Table 12-1) as part of the proposed solution.	X		

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Rqmt. #	Requirement	Comply		Comments / Clarifications
		YES	NO	
M.5.13	The Supplier's proposed solution must include field installation services for both electric and water accounts along with any required water meter pit remediation.	X		
M.5.14	The proposed solution must interface with the City's Tyler ERP Pro system in such a manner as to provide an equivalent set of billing inputs with minimal disruption to existing City processes.	X		Integration with Sensus FlexNet system will provide minimal disruption of existing City processes.
M.5.15	All network and field devices (including metering endpoints) associated with the Supplier's system must not interfere with the City's lift station radios or SCADA system. SCADA system for electric uses cellular routers that are 4G LTE and is IP-based utilizing bands B2, B4, B5, B12, B13, B14, B77, and B71. SCADA system for WWTP / WTP is protected with some being cellular based and some internet based. The guarded SCADA frequency range for the WWTP / WTP is 2400 HZ.	X		The Sensus FlexNet system operates on a FCC primary licensed frequency outside of any lift station radios or SCADA systems.

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Rqmt. #	Requirement	Comply		Comments / Clarifications
		YES	NO	
M.5.16	The City strongly desires a single Supplier contract with sole responsibility for all project phases, including the provision of long-term managed services. It is a mandatory requirement that the technology owner/developer be the contract signatory on the long-term managed services agreement. Please include a sample managed services agreement as supplemental information supporting this mandatory requirement.	X		See sample Sensus SaaS Agreement in Attachment C of the Appendix.
M.5.17	The Supplier of the managed services offering and the ongoing year-over-year support for the system must be the technology provider of the AMI software systems.	X		Core & Main is a Value-added reseller of the Sensus AMI System

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Rqmt. #	Requirement	Comply		Comments / Clarifications
		YES	NO	
M.5.18	The Supplier of all software integrations to City systems must be the technology provider of the AMI software systems. The technology owner/developer must supply a project manager / prime resource to support and oversee the entire system integration effort including statement of work, design, development, FSAT testing, and acceptance. Please elaborate on the team structure being proposed for software integrations.	X		Sensus will provide a project lead for the setup and integration of the Sensus Software. Core & Main will provide a project manager for the installation of the project.
M.5.19	The technology Supplier shall provide initial training and ensure ongoing training is available for the system's life.	X		Core & Main will provide initial training and ongoing training for the life of the system. Sensus offers free online training Sensus Training (sensus-training.com)

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6 CLARIFICATIONS, ASSUMPTIONS, AND EXCEPTIONS

Qualifications of Core & Main LP
Submitted to the City of Wauchula
RFP 24-05 AMI System Implementation

Notwithstanding anything contained in any bid or contract documents to the contrary, Core & Main LP ("Core & Main") hereby qualifies its bid as follows. The bid of Core & Main and acceptance by Core & Main of any subsequent agreement is made expressly conditioned upon assent by the City of Wauchula, FL (the "Owner"), to the following additional or different terms, which shall supersede and control over the terms of any request for bid or request for proposal, any contract documents and specifications, and any prior addenda thereto:

1. Price Lock: Core & Main reserves the right to increase prices at any time in the event of a manufacturer or subcontractor price increase. Core & Main will provide evidence of the manufacturer's or subcontractor's price increase and will only increase its prices by the same percentage the manufacturer's or subcontractor's prices increase. In the event the Owner objects to the price increase, the Owner will delete the affected materials or services from the contract and neither party will have any further obligation to the other with respect to the materials or services removed from the contract except the Owner will be obligated to pay for materials or services delivered.

2. Warranty: The extent of the warranty to be provided for this project is set forth in the attached City of Wauchula Warranty.

3. Insurance: To the extent provided in its policy, Core & Main LP ("Core & Main") will only be able to provide a certificate of insurance, endorsements and coverage that are current form and meet industry standards subject to agreement by Core & Main's insurance provider, with such coverage to be in place until final completion of the project. A Memorandum of Insurance is attached to demonstrate the level of coverage carried by Core & Main. Insurance coverage provided by Core & Main will be consistent with the provisions of Core & Main's policy, notwithstanding any differing or conflicting provisions in any bid or contract documents. Insurance limits may be satisfied by a combination of General Liability and Excess/Umbrella coverage. General aggregate limits apply per location. Core & Main will not be required to provide Builder's Risk, Pollution Liability, or any coverage other than the coverage identified in its certificate of insurance. Neither Core & Main nor its subcontractors or suppliers will be required to provide copies of their respective insurance policies. Notwithstanding anything contained in any bid documents or contract documents to the contrary, by acceptance of Core & Main's bid or proposal, the Owner accepts Core & Main's certificate of insurance in full compliance with all insurance requirements, including but not limited to notice provisions, coverage, language, policy limits, policy forms, self-insured retention and deductible amounts.

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The parties agree that Core & Main's insurance is provided on a contributory basis, and is primary, but only to the extent of the products, services, and operations of Core & Main LP.

4. Terms and Conditions, Par. 3.5.2 – Environmental Indemnity: Delete this paragraph entirely.

5. Terms and Conditions, Par. 3.5.3.I. – Delete this paragraph entirely.

6. Terms and Conditions, Par. 3.5.4.A. – In the first sentence, delete the phrase, "Final Acceptance of the work" and replace with, "delivery." In the last sentence, delete the phrase, "until such time that the Owner issues written notice of Final Acceptance of the work."

7. Terms and Conditions, Par. 3.15.4.B. – Delete the last sentence of this paragraph entirely.

8. Terms and Conditions, Par. 3.16.1 – Intellectual Property: Delete this section, including all subparagraphs, entirely.

9. Terms and Conditions, Par. 3.17.4 – Competent Performance of the Work: Delete this section entirely. The terms under which the Owner will be permitted to take over the work due to Contractor's default will be negotiated and agreed between the parties in the agreement resulting from this solicitation.

10. Core & Main reserves the right to negotiate contract terms and conditions mutually agreeable to both parties. If the parties are unable to reach an agreement on contract terms, the parties will have the right to discontinue negotiations for the project. In that event, neither party will have any further obligation or liability to the other arising out of this solicitation or the RFP response, Core & Main will not be in default of any obligations under the bid or contract documents and Core & Main will not forfeit its bid security.

Dated this ___27__ day of August, 2024.

CORE & MAIN LP



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COMPLETED RFP TABLES (SECTIONS 7 – 21)

Complete all tables by supplying "Comply (Yes, No)" indications for each requirement as well as comments and clarifications as needed.

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7 CUSTOMER ENGAGEMENT

Please fill out the table below.

Table 7-1. Customer Engagement

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
7.1	The Proposer shall describe its experience with and approach to developing customer engagement plans.	X		Our team member, The Valerin Group, Inc. (Valerin), a full-service and woman-owned communications firm, has developed and implemented hundreds of Public Engagement and Outreach Plans for public infrastructure projects and programs for agencies including counties, municipalities, expressway and transit authorities, planning organizations and the Florida Department of Transportation (FDOT). For this project, Valerin will develop a detailed Customer Engagement Plan that is tailored to the specifics of the project. Key elements of the plan will include the development of outreach strategies, identifying engagement activities and providing an outline of tools, tactics, techniques, and technology to effectively communicate with the City of Wauchula's customers. The objective of the plan will be to notify applicable agencies, affected property owners and tenants of project specifics and anticipated impacts. It will also identify potential issues and anticipated community concerns as well as strategies to address them, including developing Frequently Asked Questions (FAQs) at the start of the project. The plan will serve as our communications blueprint and will be updated as needed throughout the duration of the project.
7.2	The Supplier must support at least 1 day on-site for the City's "AMI Day" meeting with residents.	X		Our team is adept at planning and coordinating virtual and in-person public meetings and events. The date and time of the "AMI Day" meeting with residents are to be determined. However, Valerin will work with the City to ensure that the meeting is advertised in a timely manner via the City's website, social media platforms, post cards, etc. Valerin will also be available to coordinate with the City to provide support identifying an ADA compliant event site, if requested by the City.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				An appropriate number of Valerin personnel will be on hand to assist and support the City of Wauchula, including event setup and breakdown of event.
7.3	The Supplier must support 1 day on-site for a City Commission Meeting.	X		Valerin will support the project team and City staff by attending a designated City Commission meeting. Support may include but is not limited to preparing a presentation, if needed, note taking and developing a meeting summary.
7.4	The Supplier's installer must print advance notification customer communication materials, such as postcards. The content of these mailers will be developed in collaboration with the City. The Supplier must manage the timing and mailing of these materials to provide at least 14 days of notice to customers before installation.	X		Valerin will work with the City to create notification mailers, such as post cards, that are in “plain language” and will ensure they are compliant with the American with Disabilities Act (ADA) standards. The mailers will comply with the City’s branding guidelines. The draft of the mailer will be provided to the City for review and approval well in advance of the minimum 14-day notice to customers (prior to meter installation), to allow for review and feedback, if needed. Approved notices will be mailed out by Valerin to ensure delivery to customers at least 14 days prior to their installation date. Valerin will also work with the City to develop a direct mailing list that will be maintained and used to notify customers during the project.
7.5	The Supplier must print door hangers that installers will distribute at residential locations during successful and attempted installations. The content of these door hangers will be developed in collaboration with the City.	X		Valerin will work with the City to create door hangers that are informative, easy to understand, and contain contact information. They will also be developed to follow City branding guidelines. The door hangers will be printed, folded in half and inserted into plastic door hanger bags and provided to the installers for placement on residential door handles during successful and attempted meter installation activities. Valerin will work closely with the contractor and City to clearly convey installation expectations and requirements to customers.
7.6	The Proposer shall provide recommendations for additional marketing material based on its experience.	X		Additional marketing materials can include Frequently Asked Questions (FAQs), a project fact sheet, posters with QR codes, inserts and onserts as part of the water bill, and development of content for placement on the City’s social media platforms and website. Based on customer demographics, Valerin can translate material in Spanish, French, etc., if needed.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
7.7	The Proposer shall describe other options for customer engagement, if applicable.	X		In addition to standard/traditional customer engagement, our team also identifies and attends community events as well as provides project-related information (fact sheet, etc.) at locations such as libraries, community centers, places of worship, senior centers, etc. For example, our team can setup a booth and/or disseminate project information at local community events. Our team can also partner with neighborhood associations and special interest groups and attend regular meetings to provide them with project updates and answer questions. These activities and stakeholder communications are documented in a project-specific stakeholder database that can produce reports upon request by the City.

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8 AMI ELECTRIC METERS

8.1 General Features

Please fill out the table below.

Table 8-1. General Features

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
8.1.1	Define the meter manufacturer (by form if different manufacturers).	X		Sensus' supply chain partner, Flextronics, manufactures the Sensus Stratus IQ residential meter for Sensus. Sensus collaborates with third-party meter manufacturers to produce FlexNet-enabled electric meters. We partner with Aclara to manufacture I-210+c single phase meters and kV2c polyphase meters for FlexNet deployments. We also partner with Honeywell to produce FlexNet-enabled ALPHA A3 polyphase meters. We have worked with our partners to seamlessly integrate our FlexNet communication modules into their meter manufacturing processes. Their facilities have well-established production capabilities and processes to ensure the integrated meters meet Sensus' quality standards. Please refer to the Tables 1-4 provided in the Appendix: Attachment K for specific Meter Forms by Manufacturer.
8.1.2	Primary single-phase meter as offered shall have been in production for more than a year at time of proposal. Proposer shall provide number of units shipped in the last 12 months.	X		Sensus Stratus IQ meters have been in production for more than three years. The Sensus Stratus IQ is the enhanced version of our Stratus residential meter, featuring several innovations and expanded capabilities, including leading edge tamper and safety provisions as suggested by our customers. Sensus has shipped 6 million Stratus meters to date. Sensus' production line has the capacity to manufacture over 1 million Stratus meters annually. Sensus has shipped Stratus and Sensus Stratus IQ meters to utilities of various sizes across North America.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
8.1.3	Single-phase meters shall be available from at least two different manufacturers. Identify which manufacturers' meters and models are supported.	X		The proposed FlexNet solution supports single-phase meters from two different meter manufacturers: 1. Sensus Stratus IQ 2. Aclara I-120+c Please refer to Tables 1&2 provided in Attachment K of the Appendix for specific Meter Forms by Manufacturer.
8.1.4	Meters shall be solid-state ANSI compliant with a configurable minimum six-digit (not including identifiers) scrolling LCD display for residential meters, six digits for commercial meters.	X		All proposed residential and commercial meters are solid state, and their LCD displays all support 6 digits, not including identifiers.
8.1.5	Meters shall include an integrated "under the glass" communications module compatible with the AMI system.	X		Each FlexNet-enabled electric meter includes an" under the glass" SmartPoint communication module, which is installed in the meter at its respective factory during manufacture.
8.1.6	Meter manufacturer shall supply a sample nameplate for each meter form for the City's approval prior to meter shipment. Specific nameplate colors or meter numbering shall be available for each form and class if requested by the City.	X		Our solution complies with this requirement.
8.1.7	All meters including the communications module shall be tested at the factory and shipped with the test report.	X		The FlexNet SmartPoint is installed in the electric meters during manufacturing. All meters are programmed with WAUCHULA 's approved meter program and fully tested at the factory. Factory certified test results are sent electronically when the meters ship.
8.1.8	Meters shall ship from the factory pre-programmed. The program shall be approved by the City.	X		Each electric meter is shipped with your approved program, which is installed at the factory.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
8.1.9	All three-phase meters shall be available with an optional ANSI C12.18 compliant optical port for local reading and programming.	X		Our solution complies with this requirement.
8.1.10	Single-phase and 12S meters shall include a port for configuration and reading. There should be a means to remotely disable and enable the port.	X		The Sensus Stratus IQ meter supports an optical port that can be disabled, if desired.
8.1.11	Meter shall support over the air and local F/W updates for both meter and communications related firmware. Meter shall have F/W rollback capability. Proposer shall describe this functionality. Meter shall continue to meter during firmware update.	X		All proposed electric meters support both local and remote over-the-air firmware updates for both the meter and FlexNet transceiver. During a firmware download, the meter will continue to operate and measure normally. Firmware rollbacks are supported by downloading the desired firmware file into the meter or FlexNet transceiver. The same firmware process is used and can be performed locally or remotely over-the-air.
8.1.12	Single-phase meters shall include a 200A bi-stable latching disconnect switch matching the rating of the meter.	X		The Sensus Stratus IQ meter has a bi-stable service switch design which remains in its current state regardless of whether it is powered up or not.
8.1.13	Disconnect switch can be remotely operated via AMI system, RF tool, or optical port. Switch shall not connect if there is load side voltage. Meter shall provide an alarm in this case.		X	The Head End System supports remote connect/disconnect of an electric meter's service switch. Field operation of the switch is supported with a laptop and FlexNet microtransceiver. Operation of the service switch via the optical port is not supported. Load Side Sense (LSS) is supported for meters equipped with a service switch. Any attempt to close and open service switch with voltage present on the load side will trigger the switch to send a LSS alarm to the Head End System. The switch will remain open if LSS is triggered.
8.1.14	Meter shall be able to be programmed to perform a self-read, as well as a demand reset at a specific time and day of the month.	X		Our solution complies with this requirement.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
8.1.15	Proposer shall describe the meter losses during normal operation.	X		Sensus Stratus IQ Meter Burden: Form 2S - Power Supply < 0.8 watts/7.9VA @ 240VAC Aclara kV2c Meter Burden: 120V 2.2W 3.5VA 240V 2.8W 6.6VA 277V 2.4W 6.8VA Current Circuit Burden < 0.25 VA per phase
8.1.16	Meter shall use nonvolatile memory for storing data.	X		Our solution complies with this requirement.
8.1.17	Meter shall support voltage monitoring and profiling. Proposer to describe these voltage measurement capabilities.	X		All FlexNet-enabled meters have voltage monitoring capabilities, including load profile profiling and the ability to monitor and send alarms if voltages exceed configured voltage threshold limits for a configurable amount of time. Voltage can be selected for one of the load profile registers to support the ability to log voltage readings over time and graph this information in the software. The utility can set the high- or low-voltage threshold levels they prefer to best inform them of voltage events out on their distribution feeders. This enables the utility's engineers to better understand which (high/low) voltage events are occurring throughout the utility's service territory. A voltage alarm will be triggered when the voltage crosses the set threshold level. Typical voltage accuracy is +/-2 V.
8.1.18	Mechanical demand reset mechanism shall be provided as an option.	X		The Aclara kV2c meter may be ordered with a demand reset. Pricing is available upon request.
8.1.19	Does the meter manufacturer require a first article customer approval process? If so, describe that process.	X		Electric meters require a first article meter for the meter types WAUCHULA plans to order. Sensus technical experts will work with your team to develop the meter programs and nameplates for all your electric meters. Then, Sensus will make a few first article meters of each type for your meter shop to approve.

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8.2 Ratings and Standards

Please fill out the table below.

Table 8-2. Ratings and Standards

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
8.2.1	All meters shall comply with the current versions of the following ANSI industry standards: ANSI C12.1, C12.10, C12.19, C12.20, and C37.90.1.	X		Our solution complies with this requirement.
8.2.2	Meters shall comply with UL 2735. If this requires a higher cost meter than what would otherwise be needed to meet this specification, Proposer may also quote a non-UL-listed option in addition to the UL-listed meter.	X		All electric meters supported in the FlexNet system have passed UL 2735 testing.
8.2.3	Meters shall comply with IEC 61000-4-4 and C62.45.	X		Sensus tests to ANSI C12.1-2008 / C12.20-2010; Test Case #25 (Effect of electrical fast transient/burst test), which is harmonized with IEC 61000-4-4. C62.45 is no longer an active standard.
8.2.4	Meters shall comply with applicable FCC standards.	X		Our solution complies with this requirement.
8.2.5	Temperature range. -40 to +85 degrees C.	X		Our solution complies with this requirement.
8.2.6	Frequency: 60Hz.	X		Our solution complies with this requirement.
8.2.7	ANSI C12.20 accuracy class 0.5 or better for residential meters, class 0.2 for commercial meters.	X		Our solution complies with this requirement.

8.3 Metered Quantities

Please fill out the table below.

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Table 8-3. Metered Quantities

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
8.3.1	Energy: Wh, VAh or VARh (delivered, received, sum, net)	X		Our solution complies with this requirement. Please note Aclara meters and Honeywell meters feature meter keys that enable certain functionality. These options are included in the pricing spreadsheet.
8.3.2	Max demand: W, VA, VAR. (Specify if demand is rolling or block)	X		Both rolling and block demand calculations are supported with the appropriate meter keys enabled for Aclara and Honeywell meters.
8.3.3	Current (commercial meters only), Voltage, Power factor, Watts, Vars	X		Yes, all of these measurements are supported by the Aclara kV2c meter with the appropriate meter keys enabled. Voltage, pf, and watts are standard capabilities.
8.3.4	Time of use: min 4 seasons, 4 rates, 4 switch points for energy quantities required. If proposing non-TOU meters, describe how the system can calculate TOU billing determinants from interval data.	X		All proposed electric meters support TOU.
8.3.5	Interval data: min 4 channel 35 days, 15 min intervals - configurable to 5, 15, 30, or 60 min intervals	X		Our solution complies with this requirement.

8.4 Electric Meter AMI System Functionality

Please fill out the table below.

Table 8-4. Electric Meter AMI System Functionality

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
8.4.1	Meter shall support system functionality described in the specification. Advanced metering functionality that is not available to the head-end over the AMI	X		Sensus acknowledges this requirement.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	network is not to be considered when identifying compliance.			
8.4.2	Meter shall be able to receive encrypted messages via the physical port, the AMI system, and if available, an RF tool as part of the AMI system.		X	All FlexNet communications support encryption. The FlexNet system supports an AES 256-bit encryption. Encrypted over-the-air communication is supported from the Head End software to the FlexNet Transceiver in the meter. Electric meter optical ports are compliant with ANSI C12.18 password-based security standards; they do not support encryption.
8.4.3	All supplied integrated meter types shall support auto registration to the AMI system. Proposer shall describe diagnostics information provided by the meter upon meter installation. Proposer is asked to describe the process used during installation.	X		When electric meters are installed, they auto-register on the FlexNet system. Electric meters require no special preparation before installation to communicate on the FlexNet network. After installation, each meter automatically sends a series of messages, informing the Head End System that it is installed and operational including its configuration settings. The Head End System uses these messages to automatically register the endpoint. Once the Head End System registers a meter, it automatically begins storing meter data. When a meter order is shipped to the utility, a factory file with all the relevant meter data is sent to the utility's inventory department for use in incoming inspection. Another file is also sent for your Head End System. Once the Head End System registers that a meter has been installed, it updates the meter's state from an "uninstalled" state to an "installed" state. This field process is automatic. Sensus will import factory files to your Head End System during the project and train WAUCHULA employees in this process.
8.4.4	Meter shall support time synchronization via the AMI system and locally.	X		In the FlexNet system, base stations are responsible for maintaining time across the entire network. All base stations are equipped with a GPS device that ensures alignment to NIST time standards. A base station will broadcast a time synchronization message every 15

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				minutes; this approach ensures highly accurate timing across the network for electric meters -- typically better than 50 milliseconds. All endpoints receive the base station time sync message directly, so there is no need to have a complicated method for managing time through multiple other endpoints, as is used in some AMI systems.
8.4.5	Meter shall support a method for local verification that it has successfully joined the AMI network.	X		FlexNet supports local verification that a meter has registered on the network once this has been accomplished.
8.4.6	Meter shall include a mechanism to send an outage message after a user-definable interval when it has lost power. (Note that the state of Florida considers any interruption longer than 1 minute to be a sustained outage.) Proposer shall describe this functionality.	X		FlexNet-enabled meters support the ability to set a user defined time for declaring a permanent outage. A one-minute setting is supported. Once this time has expired, the FlexNet transceiver, powered by its on-board supercapacitor, sends four outage messages spread over a 10-minute span.
8.4.7	Meter shall support remote meter configuration by way of the AMI network and RF field tool. Proposer shall describe the parameters that are programmable.	X		Both remote over-the-air and local meter configuration of electric meters is supported in FlexNet. Sensus uses a total replacement approach for upgrading a meter's configuration. Updates are sent to the FlexNet transceiver which manages the configuration update for the meter. This process is like the one used for updating a meter's firmware.
8.4.8	Supplier shall provide the City with a file per meter shipment identifying all attributes for each electric meter shipped for installation into the Head End System.	X		At the time of "order acknowledgement", the utility receives a notification confirming the Style # and Specification ID # of the build characteristics of the meter for their review and acknowledgement, along with a unique order and line number for that specific meter. Just prior to shipping, WAUCHULA will receive the meter test information, as well as manufacturers information files (which will also be preloaded into your Head End System to allow for seamless incorporation of the meter into your network), thereby eliminating manual input and potential for human error.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				At the time of shipping, you will be notified of the specific order and line numbers included in the shipment, along with the Part #s, to allow for cross reference against the initial order acknowledgement.
8.4.9	Describe the transmission of electricity meter data up to the head-end. Discuss frequency of reading and interval data transmission as well as events and alarms.	X		FlexNet features dedicated alarm RF channels for sending critical alarm messages directly to the Head End System in real time, which separates these messages from other message types (including billing reads and interval data). The FlexNet system uses a point to multipoint design where the meters and other endpoints communicate directly to the network. Meters manage their programmed read intervals and transmission times. At the programmed time, meters transmit their billing reads to network base stations which forward them immediately to the FlexNet Head End System. These automatically transmitted messages deliver a wide variety of message types to the head end system including interval readings, daily register readings, load profile data, and alarm information. Sensus experts will work closely with your team to develop your meter programs which will include the load profile settings and transmit intervals for send billing data to the base stations. The proposed electric meters support 5-, 15-, 30-, and 60-minute load profile interval data logging. FlexNet supports configurable data transmission rates from 5 minutes to 24 hours.
8.4.10	System shall provide the ability to identify which phase (A,B,C) each meter is associated with.	X		Phase Detection is one of the many value-added solutions enabled by Sensus brand meters. Our Professional Services team delivers this solution as a service when needed. Typically, utilities pay for an agreed number of phase detection studies per year for maintenance but may also request the service impromptu to help recover their system following disruptive events.

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8.5 Electric Meter Alarms and Events

Please fill out the table below.

Table 8-5. Meter Alarms and Events

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
8.5.1	Provide a list of all meter events and alarms. Events and alarms shall be available and resettable via the AMI network, RF tool, and optical port if the meter is so equipped.	X		Alarms and events can be configured remotely via multiple methods. Details regarding specific alarms and events for each proposed meter are provided in Attachment E: Meter Events and Alarms.
8.5.2	Reverse Energy: The meter shall detect reverse power flow on an integrated meter programmed or operating as a non-net energy integrated meter or non-bidirectional integrated energy meter.	X		Reverse energy detection is a configurable feature. The meter sets an alarm flag indicating reverse energy detection for a non-net meter. This alarm is reported in the Head End System software.
8.5.3	Meter shall alarm on tilt.	X		The Sensus Stratus IQ meter supports a tilt detection alarm. The meter also features a patented electronic tamper detection provides a positive proof method of identifying when an energized meter is removed from the meter socket.
8.5.4	Meter shall alarm on tilt/outage combination indicative of meter removal from socket.	X		In the Sensus Stratus IQ meter, our patented electronic tamper detection provides a positive proof method of identifying when an energized meter is removed from the meter socket.
8.5.5	Meter shall alarm on attempted magnetic tamper.	X		The Sensus Stratus IQ meter sends a magnetic tamper alarm when a magnetic field is detected. Sensus testing confirmed that a magnetic field alarm was generated by the meter in all magnetic field tests. WAUCHULA can use these alarms to inform your tamper Investigations department for further investigation at the service. These findings were validated by a battery of magnetic field tests that Sensus performed at our Testing LAB in Morrisville, NC. A variety of configurations using magnetic fields generated by a rare earth magnet with a remanence of up to 14,800 gauss were run to generate these findings.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				The Sensus Stratus IQ meter utilizes air core di/dt sensors, which are immune to DC magnetic fields.
8.5.6	Meter shall alarm if voltage is outside of set limits.	X		All proposed electric meters support the ability to set voltage sags and swell thresholds. Once the line voltage goes above or below these set levels, the meter will transmit a voltage sag/swell message to the Head End System software.
8.5.7	For three-phase meters: The meter shall monitor per phase voltages, currents, and phase angles to detect incorrect polarity or incorrect phase sequencing.	X		Aclara and Honeywell three-phase meters support these capabilities with the proper meter key enabled.
8.5.8	Specify additional meter alarms or functionality in the meter that the City may utilize.	X		Details regarding meter alarms and functionality are provided in Attachment A: Product Data Sheets and Attachment E: Meter Events and Alarms.

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9 AMI WATER METERS AND MODULES

Please fill out the table below.

Table 9-1. AMI: Water Meters and Modules

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
9.1	A 20-year battery life is required for all battery-powered field devices. Please note that this section applies not just to water meters: If your architecture includes other battery-powered devices, such as repeaters. 1. Describe all conditions on the 20-year warranty. 2. Provide the reading frequency that the battery life warranty is based on and other battery-life-impacting activities such as firmware updates, LP interval length, frequency of on-request reads, and (if available) remote disconnect/reconnect. 3. For the water meter communications module battery warranty, state the approach taken for a failed battery (replace module, module, register, etc.). 4. If module only, state the assumption for this, such as if there will be cut wires and splice in a new module. (Cut wires and splicing *are not* preferred. A module that connects to the meter register with a waterproof inductive coupling or a highly		X	The G-500 warranty document, which is included in the Appendix, provides specific product life and battery warranty details. **Water SmartPoints** • Water SmartPoint communication modules have been designed for easy, streamlined installation and activation. • The 520M SmartPoint communication module is designed for pit-set environments and is available for both single- and dual-port operation. The 520M SmartPoint is installed through the pit lid to maximize performance in fixed base applications. The module can be installed with either a TouchCoupler connection or wire connection, with the former being recommended to avoid water intrusion concerns for wire terminations. • The 510M SmartPoint communication module is for non-submersible/non-pit installations. The 510M SmartPoint utilizes TouchCoupler, the patented Sensus inductive coupling communication platform, to interface with the encoded meter. With TouchCoupler, the 510M SmartPoint can connect to the meter using existing two-wire AMR installations instead of requiring utilities to

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	water-resistant connection such as a Nicor *is* preferred.)			access the home to install a new three-wire system. This results in a fast, efficient, and reliable connection at minimal cost. • Battery-powered water SmartPoint communication modules are protected by a 20-year warranty based on the default setting of collecting the meter data every hour and transmitting the data every 4 hours. These reading/transmission rates are configurable but deviating from the default setting will impact the warranty. • The 20-year warranty is based upon one on-demand read per month and five firmware downloads. Exceeding these number may impact battery life. • 520M SmartPoint modules are fully sealed and do not have replaceable batteries. Any battery failure or other covered condition will be replaced with a NEW module including a NEW warranty. • The warranty provides a no cost replacement for first 15 years and a prorated replacement cost for years 16 to 20. **ally® meter** • ally® Meters that register water flow are warranted to perform to the accuracy level set forth in the ally Data Sheet available at sensus.com for fifteen (15) years from the Date of Installation, but no longer than sixteen (16) years from date of manufacture, not including the meter's sensors, valve, and gear motor, which are warranted under different terms described below. As used herein, "Date of Installation" means the date after which the ally Meter has been out of

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	

empty pipe for seven (7) consecutive days, as those days are measured by the ally Meter and stored in the meter's nonvolatile memory.

- Ally meter batteries and components have the following warranties:

Batteries – 15 years
Sensors – 5 years
Valve and Gear Motor – 5 years
SmartPoint modules and batteries in service w/ ally meter – 15 years.
SmartPoint modules used with an ally meter are warranted based on the following uses:

- Default installation setting of six transmissions of billing data and pressure per day
- One update of temperature per day
- Five firmware upgrades for SmartPoint module and five for the ally meter
- 2,500 operational commands (demand reads, ally valve command, or a configuration command)
- 15 diagnostic commands

SmartPoint warranty has 10 years at no cost and a prorated cost for years 11 to 15.

** notwithstanding the foregoing, valve and gear motor component of ally meters are not warranty beyond 2,000 valve state operations even if the warranty period provided has not yet expired.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	

- Ally meters are fully sealed and do not have replaceable batteries. Any battery failure or other covered condition will be replaced with a NEW module including a NEW warranty.

iPERL® meter

- iPERL® Meters that register water flow are warranted to perform to the accuracy levels set forth in the iPERL Data Sheet available at sensus.com for twenty (20) years from the date of Sensus shipment.
- iPERL meters are fully sealed and do not have replaceable batteries. Any battery failure or other covered condition will be replaced with a NEW module including a NEW warranty.
- Sensus will repair or replace non-performing iPERL System Batteries, and/or the iPERL System flowtube, the flow sensing and data processing assemblies, and the register ("iPERL System Components") with hourly reads, at no cost for the first fifteen (15) years from the date of Sensus shipment, and for the remaining five (5) years at a prorated percentage, applied towards the published list price in effect for the year the product is accepted by Sensus under the warranty conditions

SRII meter

SR II® and accuSTREAM™ 5/8", 3/4" & 1" Meters are warranted to perform to new meter accuracy level set forth in the SR II and accuSTREAM Data Sheets available at sensus.com for five (5) years from the date

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Rqmt. #	Requirement Description	Comply YES	Comply NO	Comments / Clarifications
				of Sensus shipment or until the registration shown below, whichever occurs first. Sensus further warrants that the SR II and accuSTREAM meters will perform to at least AWWA Repaired Meter Accuracy Standards for fifteen (15) years from the date of Sensus shipment or until the registration shown below, whichever occurs first: New Meter Accuracy 5/8" SR II Meter and accuSTREAM Meter — 500,000 gallons — 1,500,000 gallons 3/4" SR II Meter and accuSTREAM Meter — 750,000 gallons — 2,250,000 gallons 1" SR II Meter and accuSTREAM Meter — 1,000,000 gallons — 3,000,000 gallons • Electronic Register+™ are warranted to be free from defects in material and workmanship from the date of Sensus shipment for a period of 20 years. • Sensus will repair or replace non-performing Sensus Electronic Register+™ with hourly reads for the first ten (10) years from the date of Sensus shipment, and for the remaining ten (10) years, at a prorated percentage, applied towards the published list prices in effect for the year product is accepted by Sensus under warranty conditions **Cordonel® meter** • Cordonel® meters that register water flow are warranted to perform to the accuracy levels set forth in the iPERL Data Sheet available at sensus.com for twenty (20) years from the date of Sensus shipment.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	• Cordonel® meters are fully sealed and do not have replaceable batteries. Any battery failure or other covered condition will be replaced with a NEW module including a NEW warranty. • Sensus will repair or replace non-performing Cordonel® System Batteries, and/or the Cordonel® System flowtube, the flow sensing and data processing assemblies, and the register ("Cordonel® System Components") with hourly reads, at no cost for the first fifteen (15) years from the date of Sensus shipment, and for the remaining five (5) years at a prorated percentage, applied towards the published list price in effect for the year the product is accepted by Sensus under the warranty conditions **OMNI+ meter** • Omni+ registers are fully sealed and do not have replaceable batteries. Any battery failure or other covered condition will be replaced with a NEW module including a NEW warranty. • Omni+ registers are warranted to be free from defects in material and workmanship from the date of Sensus shipment for 10 years. The warranty provides a no cost replacement for the full 10 years. **Smart Gateway** One year warranty • Warranty valid only for analog meter sample rate of 4 times per hour with hourly transmit rate or greater for the analog channel(s).

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
9.2	Water meter bodies should be warranted for a minimum of 10 years for full replacement with a 5-to-10-year period starting in year 11, where the warranty declines on a prorated basis.	X		The G-500 warranty document, which is included in the Appendix , provides specific product life and battery warranty details. **iPERL® meter** – 20-year life expectancy and warranty **ally® meter** – 15-year life expectancy and warranty • iPERL and ally Connectors and Cables are warranted to be free from defects in materials and workmanship, under normal use and service, for ten (10) years from the date of Sensus shipment. **SRII meter** – 25-year warranty on maincases. 20-year life expectancy and warranty on Electronic Register+. New meter accuracy standards for 5 years or specified registration, whichever occurs first. Repaired meter accuracy standards for 15 years or specified registration, whichever occurs first. **Cordonel® meter** – 12-month warranty on maincases and replacement measuring chambers. Maincase life expectancy is 20 years. **Omni+ meter** – 18-month warranty on maincases and replacement measuring chambers. Maincase life expectancy is 10+ years. Measuring chamber life expectancy by new meter and repaired meter accuracy as specified registration which are variable per size and type.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
9.3	The Proposer will provide the material of the proposed meter body (e.g., brass, poly, etc.).	X		Core & Main / Sensus will be providing a polymeter body IPerl. We do have the ability to provide a metal body IPerl should that be the Utilities preference but the cost may vary. The current offering meets all LCRR compliance requirements along with NSF61 & 372 requirements. The metal iPERL+ meter body has a flow tube that is comprised of lead-free bronze alloy with a composite polymer core with an electronic register. The OMNI+ meter consists of two basic assemblies; the maincase and the measuring chamber. The measuring chamber assembly includes the “floating ball” impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all electronic programmable register with protective bonnet. The maincase is made from industry proven Ductile Iron with an approved NSF epoxy coating. Maincase features are; easily removable measuring chamber, unique chamber seal to the maincase using a high pressure o-ring, testing port and an AWWA compliant strainer.
9.4	The Proposer shall provide displacement and non-displacement (e.g., electromagnetic, ultrasonic) metering options in the pricing sheet.	X		OMNI+ Electronic Register The OMNI+ electronic register is hermetically sealed with an electronic pickup containing no mechanical gearing. The OMNI+ register features a programmable totalizer registration, an optional digital pulse signal, AMI/ AMR reading digits, and a resettable test totalizer. The large, easy-to-read LCD also displays both forward and reverse flow directions. The OMNI+ tamper-proof security cover can be positioned in any of 270 degrees of rotation, with indexing points at each of the 90-degree customary register viewing positions. Magnetic Drive Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the “floating ball” impeller. Measuring Element The hydro-dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI+ C² meter Cordonel® Ultrasonic C&I water meter Cordonel® is an innovative ultrasonic C&I water meter with patented flow technology that measures low- to high-volume flow

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				with unmatched accuracy. Equipped with pressure and temperature sensing, alarms, and data storage, it fills a critical need in commercial, industrial, and irrigation markets
9.5	Battery life and status information must be transmitted to the head-end. Describe the battery life information transmitted by the water module, including the transmission frequency.	X		Every 4 hours, as part of its normal transmission process, the SmartPoint communication module measures its battery voltage and temperature under load. This information is then transmitted to the Head End System, where the data is stored. The current battery voltage for each SmartPoint is also displayed on its individual meter information page in the Head End System, along with other important information. If the battery voltage is less than 3.3 volts, a Low Battery alarm is triggered at the SmartPoint. This alarm is transmitted to the Head End System, where it can generate a Low Battery report. The Low Battery alarm field can be monitored daily by automating this alarm report within the software. The Low Battery alarm typically gives the user a minimum of 6 to 12 months' worth of advance warning of a critical battery condition.
9.6	Water meter nameplates should be customizable. Describe how meter/module labels or nameplates can be customized for the City as part of this project.		X	Sensus uses a standard label for water metering products. If changes are needed to this standard label, our team is willing to discuss this option.
9.7	AMI modules shall also be labeled with the manufacturer's name, ID number, date of manufacture, and any required FCC labeling.		X	Sensus uses a standard label for water metering products. If changes are needed to this standard label, our team is willing to discuss options during contract negotiations.
9.8	The City has six bulk metering points in its water system. The Supplier shall provide an appropriate bulk metering solution for water balance computations, invoice validation, and net leak detection, but not for billing. The solution shall provide appropriate scaling or translation to result in a metered quantity delivered to the head end system. Proposer		X	Sensus supports retrofitting to third-party meters according to the included compatibility data sheet. Incompatible registers require new compatible replacement registers and/or UME where applicable, provided by WAUCHULA . Otherwise, replacement with new Sensus meter is recommended.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	shall provide pricing for the proposed solution in the pricing sheet.			
9.9	The City has approximately 500 newer Kamstrup FlowIQ 2100 and 3101 ultrasonic meters with the iTron cable/plug that it would like to retrofit with an AMI communication module. Proposer to provide a solution to allow these meters to be read by the proposed AMI system. Provide what quantities and features your proposed AMI solution can retrieve from the meter.	X		The FlexNet system supports the ability to use the Sensus 520M SmartPoint to communicate data from the Kamstrup FlowIQ water meter through the system. This will utilize alarms which are built into the Sensus SmartPoint.
9.10	Residential meters shall be available from at least two different manufacturers. Identify which manufacturers' meters are supported.	X		The FlexNet system supports multiple water meters via our adaptable SmartPoints, which can be installed on a wide variety of water meters. A list of compatible manufactures is included in Attachment S: Meter Compatibility Guide.
9.11	The meter/module must be capable of accepting a tamper seal.	X		Our solution complies with this requirement.
9.12	The module's firmware must be remotely upgradable from the head-end system and handheld devices. Describe all remote firmware and configuration capabilities of the water modules. Describe the process to affect these updates.	X		Firmware can be upgraded over-the-air (OTA) via FlexNet or onsite using a handheld device. Remote firmware upgrades and configuration changes can be uploaded to individual meters, to groups of meters, or to entire meter populations. Sensus uses a total replacement approach for upgrading firmware files. Updates are sent to the SmartPoint communication module as individual packets. The Head End System individually notifies each SmartPoint participating in the firmware download before initiating packet delivery. The packets are securely broadcasted to accelerate firmware download when delivering packets to multiple endpoints. Endpoints selected to receive the firmware upgrade accept the packets; unselected endpoints ignore the packets.
9.13	Modules shall support 60-minute interval recording periods. Describe the duration of		X	The standard water SmartPoint has a meter sample rate of every hour with a transmit rate of every four hours to provide the 20-year warranty.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	interval data (in months and days) that can be stored.			Sensus offers a water SmartPoint with a one-year warranty that allows the utility to sample the meter read every 5 minutes and transmit every 30, 45 or 60 minutes. The interval definitions can be factory-configured and modified from the Head End System. The Head End System retains 60 days of data, a timeframe that is sufficient to ensure data redundancy, delivery to the appropriate applications, and for troubleshooting purposes. Also, Sensus Analytics provides standard data retention of 36 months with extended times available.
9.14	On-request reads from the head-end to the water meter must be possible. Describe on-request water read functionality and time for data to be returned to the head-end.	X		SmartPoints provide the ability to conduct on-demand reads from water meters. We have designed use cases for fast responses from single meters or small batches of meters where the information is needed quickly, as well as supporting large batch on-demand requests. The FlexNet system automatically uses the fastest means based on the number of meters in each on-demand request. The first two use cases below use individual queries to each of the respective meters, and these are completed one at a time. The third option which is designed for large batch requests, uses a parallel strategy where all meters are queried simultaneously after the last billing read transmission, which occurs every four hours. Should a utility CIS representative need to ping a water meter while on the phone with a customer, FlexNet supports fast on-demand responses. Typically, the on-demand read will be received by the CIS rep in 60 to 90 seconds when the smartpoint is in MOM mode. (Middle of Minute) For the use case where up to 240 meters are being researched and an on-demand read is needed, the on-demand read response is about one minute per meter. For larger batch on-demand read requests, FlexNet uses a parallel communication strategy – listen after talk (LAT). This method returns the requested on-demand reads in about four hours.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
9.15	On-request reads shall obtain an up-to-the-minute reading from the meter. If this requirement is not met, state where the reading is obtained (e.g., communication module, data concentrator, etc.) and the maximum age of the reading under normal operating conditions.	X		On-demand reads for water meters return the current 'on the glass' read from the meter to provide the most current data available.
9.16	Describe the approach to starting to read for meter and register changes or how old meter reads are handled if new registers start at zero.	X		Replacement meters and registers have unique identification numbers. The changes are typically captured in the installation vendor's standard work order management process. The meter/register change is a standard process handled within common Billing/CIS systems
9.17	The module shall support the collection of register interval data from all meters.	X		Our solution complies with this requirement.
9.18	The module shall support the collection of water pressure and temperature readings from meters/devices that provide it.			SmartPoints support Sensus Ally and Cordonel meters for water pressure and temperature. An alternative is to use the Smart Gateway to integrate with "other" devices to bring back temperature and pressure from a wide variety of devices.
9.19	Water meters and modules shall transmit digital register reads rather than pulse counts.	X		Register reads are transmitted electronically.
9.20	Water meters/modules must provide leak detection. Describe this detection capability.	X		SmartPoint modules support leak detection. The alarm has configurable leak detection parameters that can be set upon installation, and later modified over the air or during a site visit to the meter. Leak detection on the SmartPoint is effective with any compatible meter make or model – either Sensus meters or third-party meters. Leak detection is configurable both for the amount of water in any given interval and for the number of continuous intervals. For example, the SmartPoint can send a leak alert when 1 cubic foot of water per hour has flowed through the meter for 24 hours in a row. Both the amount of water and number of hours are configurable. Any amount that can be detected and reported by the meter can be set for the leak threshold. For example, with Sensus meters, this amount is configurable down to

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				0.01 cubic feet per hour, 0.1 cubic feet per hour, 1 cubic foot per hour, 10 cubic feet per hour, and so on. Several settings for duration are also available: 24 hours, 48 hours, 72 hours, and so on. **High Flow Alarm** The SmartPoint communication module also features a high flow alarm, which can be set to send an alarm whenever a certain high amount of water goes through the meter in any given interval. The threshold is configurable, and can be set by meter size, or any other value to flag usage that is higher than usual for that metered service. **Meter Generated Alarms** Sensus water meters provide continuous consumption alerts which are user configurable. These alerts are transmitted to the Head End System. **Flow Monitoring via Customer Portal** Sensus is proposing our Customer Portal so your customers can set their own customized leak alert thresholds. For instance, customers can temporarily lower the leak threshold when they are going out of town on vacation. FlexNet can detect continuous consumption based around a customer's configurable parameters. This is accomplished through FlexNet's leak detection capabilities. Sensus provides several leak detection mechanisms to alert utility personnel, and even the consumer directly, of possible leaks at the residence or business.
9.21	Water modules shall be readable by the head-end system and the Supplier-recommended handheld devices.	X		SmartPoints can be read remotely from the Head End System or locally using a handheld device.
9.22	Water modules shall be synced to within 30 seconds of system time. Interval data must be time-stamped. Elapsed time is not acceptable.	X		The Head End System stores the actual time of an event in its database. Time is in UTC time and converted to local time in the Head End System's GUIs for user access.
9.23	Water modules shall transmit a cut wire occurrence.	X		Our solution complies with this requirement.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
9.24	Describe all water disconnect/reconnect capabilities available, including meter sizes on which this feature is available, whether the valve is integral to the meter or separate, impact on box size, and flow control options provided (e.g., on, off, restricted flow)	X		Sensus' ally water meter is equipped with a 3-state ball valve (open, closed, reduced flow), a temperature sensor, a pressure sensor, and a self-cleaning algorithm for the valve. The valve in internal to the meter. The ally meter does not require a separate SmartPoint, as a FlexNet communication module is built into the meter. The ally water meter is available in 5/8", 5/8 x 3/4" and 3/4" sizes. A 1" version of the ally meter is currently on the Sensus roadmap. **Remote Service Shut off, Turn on, and Reduced Flow Capabilities** Sensus' ally meter is equipped with a three-state (on, off, and reduced flow) valve that allows for remote control of service connections. With just a few clicks, utilities can turn off, turn on, or reduce the flow of water to satisfy a range of use cases: • **Turn on** water services for new customer accounts or resume services for existing customers. • **Turn off** water services for inactive customer accounts. **Reduce** water services for delinquent accounts to minimize further revenue loss without imposing public health risks.
9.25	Describe the network topology for water meters—star connection, pt-to-pt, mesh through meter, etc.	X		FlexNet is a star topology, point-to-multipoint network design that uses FCC-licensed, primary-use spectrum. This spectrum is 100% primary use for Sensus solutions; through FCC-licensed regulations, no other entities are allowed to use the exclusive RF frequencies that we will assign to your FlexNet system for your service territory. Sensus will license your RF frequencies to you for the life of your FlexNet system. Endpoints, including water meters and SmartPoints, communicate directly to all nearby base stations all the time, 24x7x365.
9.26	Does the meter manufacturer require a first-article customer approval process? If so, describe that process.	X		SmartPoints are programmed on-site as a part of their installation in the field. No first article meters are required.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
9.27	Describe all data transmitted from water modules, including register data, interval data, events (be specific), and alarms (be specific).	X		The Sensus AMI system transmits meter readings, hourly consumption data, and alarms for leak detection, reverse flow, empty pipe, magnetic tampering, and low battery.
9.28	Describe all backflow indication/prevention capabilities of the proposed water meters.	X		All proposed water meters and SmartPoints include backflow alarms that are triggered during true backflow events. If the meter is reversed, the backflow alarm can be used to indicate potential water theft.
9.29	Describe the data encryption provided by water modules.	X		Sensus has designed our security encryption to use the same AES-256 bit encryption for all our solutions – including FlexNet-equipped water meters and SmartPoints.
9.30	Describe the module antenna configuration and how through-the-lid mounting is accomplished.			The 520M is designed for submersible, pit-set environments, and mounts through the pit lid. Several options are available for facilitating the SmartPoint's installation, including drilling the existing lids. In this case, the antenna (at top) mounts above the pit lid and the SmartPoint attaches to the antenna from underneath the lid.  *SmartPoint 520M Pit Set Module*

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
9.31	Describe the module battery replacement process, if any.	X		The SmartPoint has a 20-year warranty which includes the battery. The battery is not replaceable; instead, a module with a low battery may be returned under warranty for another SmartPoint.
9.32	Describe the minimum clearance needed between the top of the meter and the bottom of the box lid.	X		Minimal clearance from meter box lid bottom to top of installed meter is required, enough so that the lid is not resting on the meter. Standard AMI box lids offset the position of the AMI module so that it is not installed directly over the top of the meter below, thus having no impact to installation requirements. If the meter is not properly centered within the box or positioning otherwise requires the AMI module to be installed directly above the highest point of meter, clearance should be sufficient, so the module is not resting on the meter. The module has a total height of 5.09". Approximately 4 5/8" should be accounted for from mounting surface to bottom of module.
9.33	Describe the transmission of water data up to the head-end. Discuss the frequency of reading and interval data transmission, as well as events and alarms.	X		The standard water SmartPoint has an hourly meter sample rate with a transmit rate of every four hours (6 times a day). Events and alarms are transmitted to the Head End System when they occur. Sensus offers a water SmartPoint that allows the utility to sample the meter read every 5 minutes and transmit every 30, 45, or 60 minutes. This version has a reduced warranty due to higher battery usage.
9.34	List all water meters that the Proposer's module is compatible with and specifically identify the proposed meters for this proposal.	X		The SmartPoint communication module is compatible with several encoder register types, including those manufactured by Badger, Master Meter, Mueller, and Neptune. For a full chart of meters and registers that are compatible with the water SmartPoint, please refer Attachment F: Water SmartPoint Compatibility Guide.
9.35	Provide the operating temperature range in degrees Fahrenheit for the water module.	X		The 520M SmartPoint features an operating temperature range of - 22° F to +185° F
9.36	Specify additional alarms or functionality in the module that the City may use.	X		SmartPoints provide the following alarms for water meters: • Swapped Meter • Continuous Flow • High Flow

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				• Meter Communication Failure • Non-numeric Read Backflow/Reverse Flow Bidirectional Communication Failed.
9.37	Provide expected meter body lifetime per supported meter.			**iPERL® meter** – 20-year life expectancy and warranty **ally® meter** – 15-year life expectancy and warranty • iPERL and ally Connectors and Cables are warranted to be free from defects in materials and workmanship, under normal use and service, for ten (10) years from the date of Sensus shipment. **SRII meter** – 25-year warranty on maincases. 20-year life expectancy and warranty on Electronic Register+. New meter accuracy standards for 5 years or specified registration, whichever occurs first. Repaired meter accuracy standards for 15 years or specified registration, whichever occurs first. **Cordonel® meter** – 12-month warranty on maincases and replacement measuring chambers. Maincase life expectancy is 20 years. **Omni+ meter** – 18-month warranty on maincases and replacement measuring chambers. Maincase life expectancy is 10+ years. Measuring chamber life expectancy by new meter and repaired meter accuracy as specified registration which are variable per size and type.

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10 NON-METER DEVICES

Please fill out the table below.

Table 10-1. Non-Meter Devices

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
10.1	State the manufacturer of non-metering devices (e.g., pressure detection, leak detection, gateway devices) if different from the Proposer.	X		Sensus directly manufactures base stations, SmartPoints, the Smart Gateway endpoint, Distribution Automation endpoints, and Sensus Head End System, and Sensus Analytics software. Load Control Modules are manufactured by EnTek at their facility in Florida. Lighting modules are manufactured by Itron at their factory in Ireland. The DA Fault Current Indicator (FCI) is produced by Horstmann at their factory in Germany.
10.2	Describe the data collection method offered (e.g., point-to-multipoint transceiver). Please provide the functionality of these devices and the installed base of each device type.	X		FlexNet uses a point-to-multipoint design in which each FlexNet-enabled endpoint in the field communicates directly to all nearby base stations all the time. Proposed endpoints include: Smart Gateway – Sensus manufacturers; a few thousand installed; Enables 4-20 mA and digital state inputs from a wide variety of 3rd party devices to bring their data to the Head End System Lighting Module – Itron manufacturers; thousands installed; Enables over the air on/off control of WAUCHULA lights; Dimming supported on fixtures supporting this capability. DA endpoints: T866, RTM II+ – Sensus manufacturers; greater than 10,000 installed; Enables WAUCHULA to extend the functionality of their SCADA system out on the distribution system. Electric applications include integration with and remote monitoring and control of reclosers, capacitor bank, and regulators.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				Load Control Modules (LCMs) – EnTek manufactures; greater than 10,000 installed. Enables demand response programs for WAUCHULA end customers to reduce system peak load by enabling utility aggregate control of large customer loads like A/C units, water heaters, and irrigation systems.
10.3	Describe how the functionality of each non-metering device is supported at the system level.	X		The Head End System receives all in-coming non-metering messages (as well as metering messages) from the devices installed on your FlexNet network. Data received is stored in the Head End System with numerous reports and views to access the data available to authorized City personnel.
10.4	Indicate whether the devices UL Listed.	X		The residential LCM has UL approval. Other devices designed for non-customer installations do not.
10.5	System must support a load control device/solution that is minimally capable of interrupting one 30-amp device. This includes A/C units, hot water heaters, and pool pumps. Describe this functionality and the numbers of LC devices per premise that can be controlled.	X		LCMs are equipped with on-board relays, including 5-amp relays and a 30-amp relay. Each can be programmed and operated independently – supporting up to three on premise equipment types depending on the model selected.
10.6	Describe the electrical characteristics of LC devices including their amperage interrupt capability, tamper detection, etc.	X		The LCM solution comes in 240 V residential and 480 V irrigation versions. LCMs typically have three relays – one 30 A and two 5 A. The Head End System monitors whether the LCM participates in demand response events or not.
10.7	LC functionality shall include a cold load pickup strategy such as randomization over a defined time frame. Describe this and other load management functions offered.	X		The LCM's cold load picked strategy is designed into the LCM. Today, the LCM has a soft coded cold load pickup time option of around 15 minutes. This delay allows the LCM to delay its load reconnecting to the distribution system for a period after normal feeder loads have been reenergized following an outage to help reduce the initial loading on the distribution feeder when power is restored.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				This time delay enables the LCM to receive a time sync message from a base station following a power outage to confirm whether it is in a DR event or not. LCMs are initially set up and configured as a part of their installation. The Head End System supports full over-the-air configuration of LCMs in the field including setting up DR events, initiation of DR events, and monitoring LCM participation in the events. LCMs can store up to 5 future DR events in on-board memory.
10.8	For a specified load control device, describe any customer override capabilities for LC actions and how the system is made aware of and processes those actions.	X		Today, customers can opt out of DR events by requesting WAUCHULA to opt out them out of DR events temporarily. This requires utility personnel to remove them for the time requested from the Head End System's DR events and add them back later at agreed time.
10.9	Describe the extent to which non-metering devices have been incorporated into the AMI head-end system.	X		The listed non-metering devices have been fully incorporated into the Head End System. DA endpoints are operated using the purpose designed Automation Control Head End Software which is designed for highly available DA applications including integration with WAUCHULA 's SCADA system via its real-time DNP3 protocol API.
10.10	Describe any pricing level interaction capability from customer to the City including demand response, CPP, etc.	X		FlexNet supports several demand response solutions, including TOU, load control modules (LCMs), conservation voltage reduction (CVR), ZigBee based HAN devices, and Prepayment. For pricing level interaction, the system becomes more complex. Sensus has integrated with many other third-party systems and thus, our Professional Services team is prepared to scope out and implement these types of solutions which are not standard offerings and are not a part of our current RFP response. When WAUCHULA is ready to implement one of the demand response solutions, Sensus suggests that we collaborate to scope the project and layout a system architecture during the Integration Workshop. Once the

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				scope is agreed to, we will provide a quote for the work and proposed SOW.
10.11	Describe any programmable controllable thermostat capabilities provided by the AMI system.	X		Programmable thermostat capabilities are provided through two of the above listed solutions – Zigbee from the electric meter to the smart thermostat or using an LCM to control the thermostat's operation.X
10.12	Describe any Home Area Network devices and support, and the network technology/protocols used to communicate with these devices. If your solution relies on Zigbee to communicate with HAN devices, indicate whether the residential meters proposed include Zigbee capability or if a special meter or gateway would be required.	X		HAN communication is supported using Zigbee protocol from the electric meter to the HAN device. Residential electric meters may be ordered with Zigbee functionality or not; this decision must be made at time of meter order as Zigbee capability cannot be added to the meter later. Devices supported on the FlexNet system are listed in Attachment H: Home Area Network Functionality.
10.13	Describe the proposer's support for smart streetlight controllers at both the system and hardware levels, including visibility and availability of energy and power quality data from streetlight controllers in the AMI head-end. Provide a list of streetlights (manufacturer and model) that can be retrofitted with proposer's streetlight module.		X	Ubicquia UbiCell is a completely stand-alone product, and not integrated with FlexNet in anyway. We are able to provide this product at the request of the City. https://www.ubicquia.com/products/smart-lighting-control-ubicell
10.14	Identify all distribution automation devices supported (e.g., FCI, transformer monitor, cap bank controllers, or recloser interface), protocol used (DNP 5/IEC 61850, etc.), and how these operate on the proposer's system.	X		Field Equipment: RTM II+ (IED), NaviComm (FCI), T866 The RTM II+ uses DNP3 and Modbus protocols to interface with IEDs in the field. The Distribution Automation software, AutomationControl (AC), integrates with your SCADA system using a DNP3 protocol API integration. AC is a highly available solution that has been engineered to provide the service needed by your SCADA system and Operations Team. DA devices communicate over their own dedicated RF frequencies to support your SCADA system's real time needs. Additional information is provided in Attachment G: FlexNet Distribution Automation Solution.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
10.15	Provide the operating temperature range in degrees Fahrenheit for each non-metering device offered.	X		Each product has its own temperature rating. Here are several: RTM II, NaviComm, TC032 & T866: Operating temperature FlexNet: -40° to 185°F (-40° to 85°C) Cellular: -40° to 158°F (-40° to 70°C) Entek Load Control Module Operating temperature -40° to 167°F (-40° to 75°C) Smart Gateway Operating temperature -22° to 185°F (-30° to 85°C) M4002 Operating temperature -40° to 122°F (-40° to 50°C) Command Link II Operating temperature -32° to 122°F Archer II (handheld) Operating temperature -4° to 140°F (-30° to 70°C) See attached individual specific product data sheets.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
10.16	Describe the communications approach from the AMI system to each non-meter device supported and discuss how or whether these devices participate in overall AMI system communications in roles such as repeaters, etc.	X		The FlexNet system is point-to-multipoint communication network that uses FCC-licensed, primary-use RF spectrum. It is the most complete communication network solution on the market today that is capable of supporting multiple applications. Sensus develops and manufactures a complete complement of AMI communication network products. This includes electric, water, and gas meters, communication modules, solutions for distribution automation (DA) communications, lighting control, and communication products that support third-party products and applications to meet the business and operational requirements of utilities. The following diagram shows the high-level system architecture of the FlexNet system, in which FlexNet-enabled endpoints communicate wirelessly to long-range FlexNet Base Stations via the FlexNet communication network. The base stations pass the data to the FlexNet Head End System software, which interfaces with the utility's existing software systems and passes the appropriate data, such as billing and outage data, to each. FlexNet system communication is completely two-way from end to end. See Figure 7 & 8
10.17	Describe the number of proposed non-meter devices, the purpose of each, and the expected maintenance activities required by the City for each.	X		Non-meter devices required include the FlexNet Base Station No repeaters or intermediate network devices are necessary in your FlexNet system. One of the advantages of a FlexNet system that it requires only a small number of network devices to provide RF coverage to your entire service area. At the core of the Sensus FlexNet solution is the FlexNet Base Station, (M400B2) which anchors the flexible, point-to-multipoint architecture of AMI meter-reading systems and other high-value applications. Base stations are data collectors that serve as the field devices in the FlexNet system, installed throughout your service territory in accordance with the RF Propagation Study our RF engineers have performed for your area. Base

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	stations have been designed to be installed on a variety of vertical assets including existing communication towers, water towers, poles, in substations, and on building roof tops. These compact, efficient devices fit into space-constrained environments, both indoor and outdoor, allowing them to be deployed in both remote and densely populated areas. The FlexNet communication network connects all base stations in an area directly to all the water, electric, and gas meters and other endpoint types across large geographic areas. This design improves reliability and increases the network's speed. Since base stations communicate over miles, the number of network devices needed in a FlexNet system is greatly reduced when compared to other AMI systems. This reduced number minimizes the number of backhaul connections needed for your FlexNet AMI system and lowers operations and maintenance costs for the 20-year life of your system. The FlexNet Base Station is the most sensitive AMI network device available on the market today, with the minimum detectable signal approaching theoretical limits. This sensitivity, coupled with overlapping coverage for data reception from endpoints, offers unmatched reliability and accessibility in hard-to-reach locations. Your FlexNet system's base stations are designed to take full advantage of the FlexNet communication network and its FCC-licensed, primary-use spectrum, which delivers long-distance communication using Sensus' point-to-multipoint AMI network. M400B2 FlexNet Base Stations provide field-proven, overlapping, high-bandwidth communications to all endpoints. Their efficient transceivers can transmit and receive simultaneously in a 200-kHz band of spectrum, which provides more dedicated data channels, more granular data, and higher network capacity than competitive solutions. Designed to support multiple backhaul communication capabilities, they may be equipped with either single or redundant backhaul to communicate directly to the FlexNet Head End System without the need for relays or repeaters – speeding up normal communication and making system restoration following an extended outage a breeze.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	Base Station Installation and Commissioning Base Station Mounting The M400B2 FlexNet Base Station is packaged in a NEMA-4 cabinet enclosure that facilitates easy mounting outdoors or indoors on a wide variety of structures, poles, or walls. This design makes the M400B2 a flexible network device that can be installed virtually anywhere. Typically, the M400B2 is mounted at ground level for easy mounting and access by field personnel, with the coaxial cable going up to the antenna, which is mounted at the height delineated in the RF propagation study. Base Station Installation FlexNet Base Stations are installed on any vertical asset, including communication towers, water tanks, poles, and buildings. They provide field-proven, overlapping, high-bandwidth communications to all FlexNet-enabled endpoints, including water, gas, and electric meters, as well as to a wide variety of smart network devices using Sensus' FCC-licensed, primary-use, full-duplex RF frequencies. When the order for the M400B2 is placed, the mounting type is also selected: pole mount or wall mount. This selection determines the mounting kit that will be shipped with the base station. The base station installation guide provides details and guidelines on how to install M400B2 FlexNet Base Stations. It is included as Attachment XX_M400B2 FlexNet Base Station Installation Guide. Base Station Site Requirements Site requirements for installing FlexNet Base Stations are as follows: • Located according to the RF propagation study. • Appropriate mounting space available. • A proper grounding connection available. • Access to AC power.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	• Each base station location requires a suitable structure to mount the antenna that gives an unobstructed view of the endpoints, per the RF propagation design. • The FlexNet Base Station has been designed to interface to a wide variety of communications options for its backhaul connection to the FlexNet Head End System. No repeaters or intermediate network devices are necessary in your FlexNet system. One of the advantages of a FlexNet system that it requires only a small number of network devices to provide RF coverage to your entire service area.

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11 COMMUNICATIONS

Please fill out the table below.

Table 11-1. Communications

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
11.1	Based on facility location data supplied by the City, the Proposer shall provide an RF coverage plan and maps that demonstrate adequate communication to all devices to address all requirements in this proposal specification. Device types must be visually different (i.e., by color, shape, etc.) in the Proposer's RF coverage plan.	X		Wauchula's FlexNet Network is designed with 100% RF coverage and 100% redundancy with overlapping base station coverage for your electric meters, water meters, and distribution automation endpoints as requested. If a base station goes offline, nearby endpoints will continue to send their messages to other nearby base stations which will continue to process them normally using the FlexNet system's All Points Always architecture.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
11.2	The Supplier shall provide a cellular endpoint-based option for the AMI solution and total ownership cost over 10 years.		X	The FlexNet system is point-to-multipoint communication network that uses FCC-licensed, primary-use RF spectrum. It is the most complete communication network solution on the market today that is capable of supporting multiple applications. Sensus develops and manufactures a complete complement of AMI communication network products. This includes electric, water, and gas meters, communication modules, solutions for distribution automation (DA) communications, lighting control, and communication products that support third-party products and applications to meet the business and operational requirements of utilities. The following diagram in Figure 7 & 8 shows the high-level system architecture of the FlexNet system, in which FlexNet-enabled endpoints communicate wirelessly to long-range FlexNet Base Stations via the FlexNet communication network. The base stations pass the data to the FlexNet Head End System software, which interfaces with the utility's existing software systems and passes the appropriate data, such as billing and outage data, to each. FlexNet system communication is completely two-way from end to end.
11.3	The Supplier shall provide a non-cellular endpoint-based option with collector/radio for the AMI solution and total cost of ownership over 10 years.	X		See explanation in 11.2 Cost provided in City provided Pricing Sheet.
11.4	Based on the proposed network design, all meters must have a redundant communication path that will automatically be used if their normal communication path fails or is unavailable. Explain how this is achieved.	X		FlexNet Network is designed with 100% RF coverage and 100% redundancy with overlapping base station coverage for your water meters and endpoints as requested. If a base station goes offline, nearby endpoints will continue to send their messages to other nearby base stations which will continue to process them normally using the FlexNet system's All Points Always architecture. See propagation Study in Appendix A.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
11.5	Identify the type of network topology used (e.g., mesh, point-to-multipoint), frequencies used, and transmit power.	X		FlexNet is a star topology, point-to-multipoint network design that uses FCC-licensed, primary-use spectrum. In a FlexNet system, each endpoint communicates directly to the FlexNet Base Stations without the need to "hop" through other endpoints. This spectrum is reserved exclusively for FlexNet customers. No other entities are permitted to use this spectrum; interference from unauthorized devices is prohibited by law. All endpoint types, including electric meters, water meters, and distribution automation endpoints use this high-performance design.
11.6	Network transceiver and/or network repeater devices may be required. The Proposer shall state any such requirement for its system and include pricing for the proposed devices. All devices required beyond this number to ensure acceptable system performance shall be provided free of charge by the Supplier to the City, including installation.	X		We have designed your FlexNet system to provide 100% coverage and 100% redundancy for your service area using just two M400B2 base stations as listed on the RF Propagation Study. Your FlexNet system is fully designed to service the water meters and endpoints listed in your RFP. Sensus will agree to supply any additional base stations above the number being quoted in our proposal, if needed, to achieve agreed KPIs. Pricing for the M400B2 base stations and their installation and certification is included in the price sheet. If any additional base stations are required, then Sensus agrees to supply them at no charge as well as providing free mounting onto the new location's vertical asset. The City will be responsible for make ready items like pole, backhaul, and providing electric service to the base station.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
11.7	Describe the Proposer's backhaul plan.	X		Sensus designed our FlexNet Base Stations to be as flexible as possible to support a variety of backhaul communication options from the base station to the central host server. This interoperability helps utilities work with their preferred communication systems and helps them realize long-term technical and financial goals. Base stations support Transmission Control Protocol/Internet Protocol (TCP/IP) using a standard Register Jack 45 (RJ-45) Fast Ethernet connection. If desired, different backhaul types can be used at different base stations throughout the same network. Common backhaul options used by our customers include: • Fiber • Very Small Aperture Terminal (VSAT) • 4G/5G cellular • Microwave • Point-to-point radio The FlexNet system operates most efficiently with a backhaul communications latency of less than 100 milliseconds and a minimum data speed of 256 kilobytes per second, with higher speed backhaul facilitating faster file transfers (such as firmware downloads).
11.8	The Supplier shall provide as-built network installation location information in shapefiles capable of being loaded into a GIS system.	X		Upon installation and certification, FlexNet includes as-built packets for each base station.

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11.9	Describe the remote firmware update process, including typical circumstances requiring an upgrade (firmware bug, feature enhancement, etc.). Include all remotely upgradable devices. If devices are not remotely upgradable, describe how local updates are performed.	X		All FlexNet-enabled meters support over the air (OTA) configuration and firmware updates. Sensus will announce in a Product Information Notice (PIN) any new firmware versions that are released to production for our customers. WAUCHULA can decide whether to take a version based on its content – new features, bug fix etc. FlexNet supports remote upgrades for an individual or groups of FlexNet-enabled meters. For firmware upgrades, Sensus uses a total replacement approach for upgrading firmware files. Updates to a meter or SmartPoint are performed over a period of time. The firmware update process is as follows. (The configuration update process for changing an endpoint's program is similar). As the firmware is being downloaded, there is no impact to the meter or SmartPoint's normal activities. The Head End System queries the endpoint to determine whether all required packets have arrived. If packets are missing, they are retransmitted by the Head End System. When the complete firmware file has been received, the SmartPoint runs a Cyclic Redundancy Check (CRC) which validates the file to ensure it is correct. If the code is found to be valid, the Head End System issues a command with the Cipher Block Chaining Message Authentication Code (CBC-MAC) signature to to execute the changeover to the new firmware. The firmware download process is as follows: 1. The Head End System notifies all meters or SmartPoints that a firmware download session is about to start. 2. Every meter or SmartPoint that matches the noted characteristics will accept firmware download packets; all remaining endpoints ignore the firmware download packets. 3. The Head End System broadcasts the entire firmware image multiple times; multiple broadcasts increase the success rate that a meter or SmartPoint has heard and received every packet. 4. Meters or SmartPoints rebuild a binary image based on packets received and maintain a list of packets not received.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				5. The Head End System reaches out to each meter or SmartPoint to be flashed individually, using encryption if enabled, and determines if packets are missing. 6. If packets are missing, the meter or SmartPoint reports the missing packets. If there are no missing packets, the meter or SmartPoint performs the firmware upgrade and then notifies the Head End System of its status (success or failure). 7. The Head End System determines which packets have yet to be received by SmartPoints and rebroadcasts the missing set of packets multiple times. The process repeats until the firmware download completes successfully.
11.10	Describe the process ensuring no metering data loss during a firmware update.	X		An endpoint will experience a brief interruption only at the end of the process when the new firmware file is flashed into device memory – only the time it takes for the endpoint to reboot. During this brief endpoint reboot, there is no disruption to the consumer's service. The firmware design and firmware download solution are designed to not impact any of the states in the endpoint. All read values and alarm conditions are retained, as well as the current state/position of the remote disconnect switch/valve. No additional actions are required by the utility after the completion of a firmware download.

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11.11	Network components combined (meters and communications devices) shall be able to retain at least 30 days of data. Describe how this is accomplished. Note that this is a storage requirement for the deployed network and metering equipment. Further longer-term system-level retention requirements are included below.	X		Data Retention The FlexNet Head End System retains 60 days of data, a timeframe that is sufficient to ensure data redundancy, for delivering data to the appropriate applications, and for troubleshooting purposes. Longer-term storage is best kept in the utility's MDMS software, Utility Data Lake, or Sensus Analytics applications. Data stored in the head end system includes: • All meter reads • All meter alarms • All meter details • All RF metrics • All base station alarms • All lifecycle state information • All route details The 60 days of data stored in the FlexNet Head End System software applies to reads, alarms, and RF metrics. All other information regarding the meters and base stations is stored indefinitely. Sixty days is suitable to export read and alarm data into a longer-term application, such as the utility's MDMS software, Utility Data Lake, or Sensus Analytics applications for further analysis. The data is stored in a relational database. Sensus supports Microsoft SQL and Oracle. Storage of Meter Locations The FlexNet Head End System stores location details. During installation, the meter can optionally be programmed with its GPS location, and these details can be retrieved from the meter at the head end system. There is another option for storing meter location data. During the synchronization that occurs during meter installation, the CIS or other application can provide the head end system with the meter's location data. Additionally, the latitude and longitude coordinates stored in the FlexNet Head End System can be provided to external applications through both CMEP and MultiSpeak interfaces. Storage of Channel Multipliers, Meter Multipliers, Units of Measure per Channel, and Other Basic Meter Information

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				All metadata relative to meter reads is retrieved from the meter and stored in the FlexNet Head End System. The metadata is used to convert units of measure in the Device Manager GUI. When exporting the data, the system can be configured to apply the metadata – or not, as some third-party systems prefer to apply within their software. Under normal operations, base stations do not store information. Instead, when endpoint messages come in, they are immediately forwarded on the Head End System. This approach delivers the information to you the fastest. In the case that a base station goes offline or loses its backhaul connection, the adjacent base station will keep sending endpoint messages it receives – with no loss of functionality. WAUCHULA ’s proposed FlexNet system is fully redundant. When the backhaul connection for a base station goes down, the base station will continue to receive all endpoint messages and store them for up to 30 days. Meters can store reads as well. Water endpoints typically store 35 days of history with electric meters storage depending on the meter’s load profile configuration.
11.12	The network must provide 100% coverage with two-way communication for every meter and device.	X		FlexNet systems are point to multipoint networks that use full duplex (two-way) communications. Your FlexNet system will operate over the primary use RF frequencies that we will assign for your system’s exclusive use in your service area. WAUCHULA ’s FlexNet system has been engineered to provide 100% RF coverage and 100% redundancy for the water, electric, and DA endpoints included in WAUCHULA RFP, as shown in Attachment B: AMI Network Design.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
11.13	The Supplier must submit network design and planned equipment locations, mounting details, and power requirements to the City for approval before installation. Identify all supporting work to be performed by the City.	X		The proposed FlexNet network design is detailed in Attachment B: AMI Network Design, which includes these details of your FlexNet system. The proposed M400B2 base station is packaged in an outdoor enclosure capable of being pole-mounted or wall-mounted. Documentation with installation diagrams and instructions is also provided upon contract award and execution of a mutual NDA. The M400B2 is typically mounted at the base of the vertical asset, with the antenna mounted at the height stated in the RF design.
11.14	The Proposer must confirm that it understands that the Supplier is responsible for all site RF surveys when/if they are needed.	X		Sensus performs site surveys for each base station site. Pricing for site surveys is included in the base station installation services. WAUCHULA is responsible for on-site power and permission to use the site.
11.15	The Supplier will participate in and lead, if appropriate, any design and/or status reviews during network and meter deployment.	X		Our solution complies with this requirement.
11.16	All network communication equipment shall comply with all applicable FCC regulations.	X		Our solution complies with this requirement.
11.17	All outdoor enclosures shall meet NEMA 4 and be lockable. Door-open contacts shall be included that will cause an alarm at the head-end system.	X		Our solution complies with this requirement.
11.18	Describe the radiation exposure for each piece of network equipment, including meters for installers and customers.	X		All network equipment meets applicable radiation exposure standards, within acceptable human exposure limits, as demonstrated by third party studies. Upon deployment, you will receive the FlexNet Base Station Installation Guide, which includes written instructions for workers, stating acceptable limitations for working on or around network devices. FlexNet transceivers operate much less frequently than other AMI solutions – reducing RF exposure even further. Typically, a meter is in transmit mode only a few seconds a day.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
11.19	Describe all network equipment battery backup requirements or recommendations. For equipment with a backup power source, state how long the device will remain operational without A/C power (assuming a continuous outage).	X		M400B2 base stations are equipped with two batteries that ensure the base station's normal operations continue in the event of an AC power outage. These on-board batteries provide a minimum of eight hours of normal operation. This design helps FlexNet achieve superior performance in reporting power outages on your distribution system. During a long outage event, if longer base station hold-up times are desired, you can recharge the base station's batteries using portable generators to maintain indefinite operation of your FlexNet system.
11.20	Any network device, other than water meters, must be able to automatically recharge the battery when operating using A/C power.	X		Base stations meet this requirement. Electric meters do not have batteries; they use a supercapacitor that recharges when the meter is powered up.
11.21	A network battery life span of at least 5 years is required. The Proposer shall define the battery maintenance cycle for their solution. Network equipment must send battery status and low battery alarm information to the head-end system.	X		Depending on geographic location and service use, base station batteries have an expected life of 5 to 7 years. Batteries are designed to fully operate the base station for a minimum of 8 hours upon loss of primary AC power with many utilities experiencing longer hold up times. The Head End System communicates continuously with the base stations and will flag battery alarms that it receives. Typical maintenance is a yearly visual inspection of the base stations to confirm filters are clean and connections are maintained.
11.22	Describe all equipment with solar and battery powering options.		X	While Sensus does not directly offer this feature today, utilities can partner with third party providers to add alternative powering options to base stations, including solar panels.
11.23	List the installation/mounting options available for each type of network device.	X		Installation and mounting details are included in Attachment R: Base Station Installation and Commissioning.
11.24	The Supplier shall be responsible for programming network communication equipment before field installation.	X		As a standard feature during the certification process, Sensus programs and configures base stations as part of their installation process.

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11.25	If the Proposer's system is based on a point-to-multi-point (star) configuration, discuss how bandwidth problems can be mitigated by forcing blocks of meters to register to an assigned take-out point rather than all meters preferentially seeking a single take-out point.	X		FlexNet System Bandwidth In a FlexNet system, meters and other FlexNet-enabled endpoints communicate directly to the base stations, which serve as the backbone of the point-to-multipoint FlexNet communication network. This design ensures that endpoints communicate using their maximum throughput all the time, no matter where in your service territory they are installed. The FlexNet system operates over our primary-use RF channels, which Sensus utility customers have the exclusive rights to use. In addition, the FlexNet system supports the ability to communicate simultaneously over separate RF frequencies, called data channels, at the same time. Also, since all FlexNet transceivers are full-duplex, they are able to talk and listen at the same time, further increasing data throughput. For each data channel used, the uplink data rate is 37.5 kilobits per second (kbps) at all times, and the downlink RF channel provides an additional 20 kbps capability. So, for each endpoint, 57.5 kbps per channel is always available. These data channel speeds are cumulative; for example, three data channels, as shown in the following graphic, provides 172.5 kbps effective throughput – around the clock. With the FlexNet system, this communication speed is the same for any endpoint located anywhere in the FlexNet system's coverage area. SEE FIGURE 9: FLEXNET SYSTEM THROUGHPUT PER CHANNEL By contrast, a mesh system uses hops to enable its meters to communicate to a network takeout point. Communication algorithms estimate that each hop reduces the speed of communication by half. This results in a reduction of communication throughput to 25% of the first meter's original communication speed in a mesh system with only three hops, and a reduction to 12.5% in four hops. This reduction in speed results in inconsistent performance across the meter population, depending on how close a particular meter is to a takeout point. Some mesh systems are designed with a much higher number of hops in order to reduce the number of takeout points in a system, which even further reduces communication speeds across these networks.

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				Part of this considerable speed reduction is that a mesh system uses half-duplex communication, meaning that it will only be able to either listen (receive) or talk (transmit) at a given time. This fact means that endpoints that require many hops will be very slow in communicating. Another consequence of depending on hops for communication is evident during system outages. In these times, when a utility needs to be able to rely on their AMI system to identify outages and restore power, AMI systems using hops underperform since their "chain of hops" is broken when a particular meter in the chain is powered down. By contrast, in a FlexNet system, the meters do not form the AMI network; instead, meters report their outage and restoral messages directly to the FlexNet Base Stations, which immediately sends these critical alarms directly to the FlexNet Head End System. Immediate Bandwidth Expansion Capabilities The FlexNet system is the only AMI system that can readily accommodate future bandwidth needs upon installation without service interruptions or costly network reconfigurations. The FlexNet system's unique network design incorporates state-of-the-art, software-defined radios for the FlexNet transceivers in meters. Sensus' utility customers have benefited from this design. A simple reprogramming process can remotely increase a network's original bandwidth via radio modulation updates, effectively doubling or tripling the available raw throughput. This solution ensures that network performance can be upgraded substantially over time as a utility's AMI needs grow. Smart Grid Application Capacity The FlexNet system is the only system capable of dedicating additional applications to separate RF channels within the spectrum so that those applications do not impede normal metering operations. For example, the FlexNet system provides dedicated DA channels on the spectrum that transmit back to the head end system. This is accomplished through the use of Sensus' primary-use spectrum. With the FlexNet system, data transmissions are assigned to specific channels on the FCC-licensed, primary-use spectrum based on specific metering functions, such as daily meter reads and priority messaging. Additional

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				channels may simply be configured at base station locations to add additional capacity and to accept new applications on the network.
11.26	Describe any communications settings available to allow prioritization of various packet types such as DA messages to ensure they receive preferential treatment for delivery.	X		A new AMI system is a big investment, and with the FlexNet solution, utilities can achieve all their business needs with one network. FlexNet easily supports multiple applications on a single network while offering the unique ability to operate these applications on separate, dedicated frequencies. These applications include electric metering, water metering, distribution automation (DA), demand response (DR), lighting control, CVR, and others. In addition to ensuring high performance for all applications, using dedicated frequencies allows for solution expansion and avoids conflicts between applications and multiple internal utility groups. These benefits make FlexNet particularly well-suited to combination networks, where utilities operate some combination of electric and water systems simultaneously. In addition, FlexNet also supports 15 levels of prioritization for FlexNet messages. Sensus has set the prioritization to ensure that high priority messages are always processed first. For example, a DA message is prioritized higher than a meter billing message. Messages involved with normal activities have lower-level priority. Competing AMI networks often rely on half-duplex, unlicensed spectrum, and a single RF channel to deliver outage updates, revenue integrity information, and data transactions. This approach adds latency and limits bandwidth and network capacity. FlexNet has no such restrictions, providing exceptional network scalability and value that other AMI networks cannot match.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
11.27	Describe all commissioning, test, and calibration files provided by the Proposer for each type of communicating device, including meters. The Supplier will be required to import these into the head-end system. Describe in detail the contents of each of these file types.	X		All electric meters are manufactured and tested with an integrated FlexNet radio board. Each radio is thoroughly tested first when the board is manufactured, and again later, when the meter and board are combined into the final unit. • Sensus' meters are assembled at our factory and fully tested, calibrated, and configured to comply with the previously agreed-to settings. • Aclara meters are assembled with a FlexNet radio board at their factory and undergo a similar vetting process. • Honeywell meters are assembled with a FlexNet radio board at their factory and undergo a similar vetting process. Meters ship from their respective factories to the utility. Every meter's accuracy is tested and verified on calibrated ANSI-approved hardware. Functional test stations are used to insert and check that correct meter configurations are loaded into the meter and to ensure that each meter passes all functional tests. The production data file for each meter in the shipment is sent to the customer when the order ships with the agreed content and format. For electric meters, when we begin a project deployment, we use a First Article process to allow the utility's meter shop to test and confirm that the meters (typically four per type) are correct before larger quantities are scheduled for production.
11.28	Describe all remote mount antenna requirements/options for each network device type, including meters.	X		Base stations have external remote antennas that can be pole-mounted or wall-mounted. The RF network design specifies the desired centerline mounting height of the antenna for each base station site. Water meters use SmartPoint radios with external antennas that normally mount in the pit lid (for pit installations). Electric meter antennas are internal to the meter itself.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
11.29	All network and field devices (including metering endpoints) associated with the Proposer's system must not interfere with the City's water SCADA system. **This requirement is mandatory.** Frequencies for these systems are as follows: SCADA system for electric uses cellular routers that are 4G LTE and is IP-based utilizing bands B2, B4, B5, B12, B13, B14, B77, and B71. SCADA system for WWTP / WTP is protected with some being cellular based and some internet based. The guarded SCADA frequency range for the WWTP / WTP is 2400 HZ.	X		FlexNet systems operate over our primary-licensed, 900 MHz frequencies that are exclusive to our AMI systems. FlexNet will not interfere with Wauchula 's existing utility systems.
11.30	Describe the timing for all communication devices and meters (electric and water) to return to normal after recovering from a system-wide communication network outage.	X		Water endpoints are battery powered, so they continue to operate normally during outages. Since base stations are equipped with on-board batteries that enable them to operate normally during an outage for up to eight hours; they continue to process messages throughout the outage. Electric meters power down during an outage. Their on-board supercapacitor continues to power the meter's FlexNet transceiver for up to 10 minutes, allowing the transmission of randomized outage alarms during this period. For long outage events, base stations and electric meters will power up following their restoration of power. Upon powering up, they begin to communicate immediately and begin normal operation. FlexNet uses point-to-multipoint communications where a meter communicates to all nearby base stations, all the time (All Points Always), so a FlexNet system recovers from outages much faster than other AMI systems.

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12 SYSTEM TEST FIXTURE

From Exhibit A: To support these needs, the Proposer shall provide a preliminary design of such a board and pricing to construct and deliver it to the City before training and field deployment. The City is not looking for a commercially available meter test fixture for accuracy testing. The proposed solution must:

a. Be a deliverable that is purchased and remains with City post project implementation
b. Be designed for the purposes of testing the operation of the meters and the overall AMI system. The test fixture is not intended to be used for meter accuracy testing.
c. Be portable with wheel mounting preferred
d. Be able to support include at least one of each type of proposed device (meter and all other ancillary equipment) as part of the project. It is anticipated that a separate test fixture be utilized for water and another separate fixture for electric given the differences in implementation.
e. For water: Be able to generate water flow through the meters in both directions as well as other events and alarms supported by the meters.
f. For electric: Be able to have visual indicators indicating on/off (e.g., light bulb for confirming connect/disconnect) or other confirmations of operations.

Please fill out the table below.

Table 12-1. Meter System Test Fixture

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
12.1	As described above, a System Test Fixture is required that meets or exceeds required elements. Please describe the proposed system test fixture in detail sufficient to understand the intended offering.	X		
12.2	The system test fixture shall be suitable for in-depth training of City personnel.	X		Our solution complies with this requirement.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
12.3	The system test fixture shall be able to be read by the to-be-deployed network and head-end system and provide a platform to demonstrate system capabilities in various venues such as City Commission meetings or customer engagement "AMI Day" at City offices.	X		Our solution complies with this requirement.
12.4	The system test fixture shall support system testing and potential testing of new firmware releases before field installation.	X		Our solution complies with this requirement.
12.5	The system test fixture shall support billing and other integration testing before field rollout.	X		Our solution complies with this requirement.
12.6	The system test fixture shall support testing new third-party devices offered by the Supplier and their sub-suppliers.	X		Our solution complies with this requirement.
12.7	The system test fixture shall contain at least one of each type of field device to be deployed as part of the project.	X		Our solution complies with this requirement.
12.8	Please list all additional smart devices to be included in the system test fixture.	X		Our solution complies with this requirement.

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13 SOFTWARE SYSTEMS

Please fill out the table below.

13.1 Managed Services

Table 13-1. Managed Services

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.1.1	Detail the City's interaction process with managed services support via telephone, email, web portal, hours of support, etc. If 24/7 support is not provided as part of the standard managed services offering, state the options for upgrading to 24/7 support, including pricing.	X		Managed services support is available to 24/7, as described in Attachment C: Sample AMI Agreement.
13.1.2	Describe the head-end system update process, the time durations to implement it, and the frequency of releases.	X		As a SaaS customer, you will enjoy the benefits of our SaaS solution including Head End System software patches, updates, and upgrades which Sensus personnel will perform. Any upgrade will be coordinated with your team. Patches usually include small updates including security upgrades; these may occur monthly as needed. Updates are larger improvements to the Head End System typically twice per year. Upgrades are larger releases (like 4.x to 5.x) with several changes and are released every 2 to 4 years. The expected software upgrade time will be scheduled with your team based on the planned release's needs. Often an upgrade can be performed in several hours; typically, they are done during the evening.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.1.3	Describe managed services data centers (primary and disaster recovery locations). Provide photographs of these facilities (inside and outside).		X	For our SaaS customers, we provide a disaster recovery location in Sensus' world-class Tier IV data centers. For our U.S.-based customers, Sensus operates two geographically dispersed data centers – one in Boise, Idaho, and another in Raleigh, North Carolina. These data centers are connected using redundant, high-speed, private-line communication with data synchronization. Sensus maintains SAS-70 type 2 certification for all US data centers. Facilities are manned around the clock, with redundant power, communication, and generators. Two-factor authentication is required for access. There is no single point of failure in any layer of the disaster recovery infrastructure. WAUCHULA 's system will run in one of the data centers, with the other being your disaster recovery environment. Due to security, we are not able to provide photographs of these facilities, however we would be willing to provide a tour of the data center
13.1.4	Describe the disaster recovery process and the maximum time from system failure to recovery. Describe the point of recovery (last backup, yesterday, point of failure, etc.)	X		Further providing peace of mind to its customers, Sensus delivers in the most critical times. Sensus maintains a geographically separated disaster recovery Head End System. When a catastrophic disaster event is declared, Sensus will fail over to the disaster recovery instance, guaranteeing that WAUCHULA has a live production system up within 48 hours (RTO) of a catastrophic event, with no more than 1 hours' worth of data lost (RPO). For utilities that have greater needs, with more reliance on real-time applications, Sensus can offer to provide faster failovers and less data loss. For some utilities, we provide a disaster recovery failover within 4 hours (RTO) with no more than 5 minutes of data loss (RPO).
13.1.5	Describe system backup processes, scope, and recovery request process.	X		SaaS Service Backup and Disaster Recovery Management

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				For the SaaS environment, the configuration for the utility's backup network is a full-scale, replicated system located in a separate facility than its primary data center. Storage-level replication between the two locations is to provide rapid recovery in a disaster recovery situation. All existing Sensus SaaS customers currently have real-time replication on multiple live data centers. Sensus performs the ITIL management processes for SaaS Managed Services utilities. Sensus performs a regular series of back-ups and maintains these records in our data centers.
13.1.6	Describe and provide all applicable service-level agreements.	X		Our baseline SaaS offering includes Service Level Agreements (SLAs) for uptime and availability of the Head End System application. We are willing to negotiate additional SLA performance guarantees as required by WAUCHULA . Sensus guarantees 99% or higher availability (uptime) when using our SaaS solution; currently, SaaS is observing greater than 99.5% availability.
13.1.7	Describe the system and field device software and firmware update processes and durations.	X		FlexNet supports remote upgrades for an individual or groups of FlexNet-enabled meters. For firmware upgrades, Sensus uses a total replacement approach for upgrading firmware files. Updates to a meter or SmartPoint are performed over a period of time. The firmware update process Is as follows. (The configuration update process for changing an endpoint's program is similar.) As the firmware is being downloaded, there is no impact to the meter or SmartPoint's normal activities. The Head End System queries the endpoint to determine whether all required packets have arrived. If packets are missing, they are retransmitted by the Head End System.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	When the complete firmware file has been received, the SmartPoint runs a Cyclic Redundancy Check (CRC) which validates the file to ensure it is correct. If the code is found to be valid, the Head End System issues a command with the Cipher Block Chaining Message Authentication Code (CBC-MAC) signature to execute the changeover to the new firmware. The firmware download process is as follows: 1. The Head End System notifies all meters or SmartPoints that a firmware download session is about to start. 2. Every meter or SmartPoint that matches the noted characteristics will accept firmware download packets; all remaining endpoints ignore the firmware download packets. 3. The Head End System broadcasts the entire firmware image multiple times; multiple broadcasts increase the success rate that a meter or SmartPoint has heard and received every packet. 4. Meters or SmartPoints rebuild a binary image based on packets received and maintain a list of packets not received. 5. The Head End System reaches out to each meter or SmartPoint to be flashed individually, using encryption if enabled, and determines if packets are missing. 6. If packets are missing, the meter or SmartPoint reports the missing packets. If there are no missing packets, the meter or SmartPoint performs the firmware upgrade and then notifies the Head End System of its status (success or failure). 7. The Head End System determines which packets have yet to be received by SmartPoints and rebroadcasts the missing set of packets multiple times. The process repeats until the firmware download completes successfully.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				Local firmware downloads and reprogramming of a meter or SmartPoint is supported. If a previous firmware version is needed, it can be downloaded to endpoints using the same process.
13.1.8	Describe managed services staffing and hours of coverage.	X		Sensus' data centers are monitored 24x7x365.
13.1.9	Describe trouble call response time commitments.	X		Sensus is committed to providing quality support to our utility customers. Support details and response times are provided in Attachment C: Sample AMI Agreement.
13.1.10	Describe data center physical security and power security.	X		Data center physical security is as follows: • 24x7x365 onsite staffed technicians and security personnel, with a dedicated guard room protected by ballistics-rated glass. • Electronic badge card key and pin access. • Motion-activated digital security cameras (interior and exterior). • Biometric authentication readers on data center access doors through a mantrap entrance. Facilities are manned around the clock, with redundant power, communication, and generators. Two-factor authentication is required for access. There is no single point of failure in any layer of the disaster recovery infrastructure.
13.1.11	Describe historical data center uptimes.	X		Sensus guarantees 99% or higher availability (uptime). Notably, the Head End System has observed availability in SaaS production environments of greater than 99.5% availability.
13.1.12	The Supplier will ensure that all personally identifiable information (PII) regarding the City's customers will be protected from being released. At all times, ownership of any such data remains with the City.	X		Customer data or Personally Identifiable Information (PII) is not stored in the FlexNet system; it is typically stored in the utility's CIS or other system. (Sensus considers PII to include billing rates, addresses and other personal information, payment plans, and payment methods.) Sensus does store

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				data about a customer's meter, such as cryptographic keys and configuration details within the FlexNet system. The closest thing to PII stored in the Head End System is meter reads and alarms, but this data is associated with the meter ID, not the customer. The association of the meter ID with a customer is managed in the utility's CIS or other system. Sensus Analytics (SA) supports the ability to integrate with your third-party software systems; only data you request will be integrated into SA.
13.1.13	Describe the City's required efforts associated with the implementation of managed services. Include any point-to-point VPN or other requirements. The City will require assistance to implement this.	X		Sensus' Managed Services customers have far fewer responsibilities than utilities who opt to manage their Head End Systems and networks using their own staff. Roles and responsibilities are detailed in Attachment C: Sample AMI Agreement.
13.1.14	The Supplier will notify the City of any security issues (physical or cyber) no later than the next business day after the Supplier becomes aware, including a description of the issue's resolution and any actions the City should take. Describe this process.	X		Customer Incident Notification As part of its vulnerability management and incident response programs, Sensus considers timely notification of security incidents to be critical. Whether the incident is discovered internally or externally, Sensus evaluates its severity in a timely manner and begins the customer notification process according to our incident response policies as well as SaaS contractual agreements. Our security incident procedures outline the roles and responsibilities of Sensus versus tenants during security incidents. Incident Response SaaS incident and problem management provides the policies and procedures for responding to incidents and performing root cause analysis for ongoing problems. Sensus personnel use the Salesforce Self-Service Portal to document and track issues for all managed environments. In the event of an error

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	or a malfunction, Sensus authorized personnel open a new Salesforce ticket. Sensus maintains run books for monitoring, operational verification, issue handling, and resolution procedures. Additionally, the standard operating procedure documents contain escalation paths for different classes of issues that cannot be resolved in a timely manner. If Sensus personnel are unable to resolve an issue, the issue is escalated to the appropriate Subject Matter Expert (SME). Incident and problem management: • Respond to incidents and problems that may occur to the Head End System application. • Maintain policies and procedures for responding to incidents and performing root cause analysis for ongoing problems. • Sensus personnel use the Salesforce Self-Service Portal to document and track incidents. • If Sensus personnel are unable to resolve an issue, the issue is escalated to the appropriate Subject Matter Expert (SME). • Maintain responsibility for managing incident and problems through resolution, and coordinate with customer personnel or any required third-party vendor to resolve the issue. Once a security vulnerability is discovered and validated, we are committed to a timely release of information and certified patches on the various components of the solution. To ensure we are providing secure products, we provide timely updates of any vulnerabilities in a variety of formats. We maintain a public website for customers, where we post notifications and updates on vulnerabilities and patches. In

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				addition, we send emails to customers who sign up for real-time notifications. We provide details on the software impacted, the vulnerability, the version, and the mitigations. The Sensus Partner and Advisor Network (SPAN) meets regularly to discuss security-related issues with our customers. It provides a forum for two-way communication of security issues and new areas for us to address or consider. In addition, SPAN provides a communication path for security updates in our current products and security roadmap items.
13.1.15	The supplier shall have a notification process to inform the City of all software or firmware problems that the Supplier becomes aware of that may impact the City and provide a time frame for resolutions. Describe this process.	X		Sensus will provide information on software or firmware issues. A Product Information Notice (PIN) is published for any new software or firmware release detailing new features as well as improvements and issues resolved.
13.1.16	Describe any backdoors in the managed services systems and how they are managed.	X		The Sensus solution has no backdoors. Your System Administrator will have complete control over the user permissions enabled in your Head End System.
13.1.17	The Supplier shall have a formal process for users to submit problem reports. The Proposer shall submit this process as part of their proposal.	X		There are several methods for documenting and reporting issues, including phone calls to our 1-800 # support line, chatting with a support technician, and entering a new support ticket online.
13.1.18	Describe all web browser versions supported. Web browsers must at least support SSL.	X		The Head End System software is a secure, web-based portal to the FlexNet system that is secured using Secure Sockets Layer (SSL) encryption via HTTPS. Access to the Head End system is accomplished through a browser-based web interface and requires no special software on the user's computer other than the user's and utility's preferred web browser. The Head End System can be accessed using standard web browsers (Chrome, Edge, or Firefox).

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.1.19	The City prefers that all user interaction be web-based. If any thick clients are required, describe those and how installation and upgrades are managed.	X		Access by Wauchula staff to the Head End system is accomplished through a browser-based web interface and requires no special software on the user's computer other than the user's and utility's preferred web browser. The Head End System can be accessed using standard web browsers (Chrome, Edge, or Firefox). For your customers, Sensus intends to deliver a secure, web-based Customer Portal. Empowering your customers with data is a great way to provide timely information to your customers. With the Customer Portal, your customers will be able to view their own historical consumption, set usage limits, and enable usage notifications. For example, customers will be able to use water usage data to drive their own decisions. For instance, customers will gain awareness and control over their own water service by being able to access usage graphs in a simple and easy-to-use Customer Portal. Giving customers this level of control will empower them to proactively correct issues, change usage habits, and ultimately conserve water for themselves and for the region.
13.1.20	Maintenance shall be performed only during off-hours (11 PM to 6 AM Eastern time) unless under emergency.	X		Sensus can comply with this requirement.
13.1.21	The Supplier shall notify the City of any available software or firmware updates to the AMI system and their recommendation on implementing each.	X		Sensus will be your managed service supplier. Product Information Notices (PINs) are issued for all firmware and software releases – giving your team the information you need to make informed upgrade decisions.
13.1.22	The system must maintain an online set of water and electric metering-related data for 5 years. The data must be retained for the managed services contract's life and reloadable if needed for the City's data analysis. The City requires that all	X		The Sensus Analytics solutions retain up to 36 months in the standard offering with additional data storage available for an additional fee. We have included data retention of 5 years in the pricing submitted.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	system data be archived and provided to the City in a documented format that the City can maintain every calendar year. These archives must include all billing determinants provided by the system. Describe this process and the file format.			Increase in data storage terms can be negotiated separately if desired in the future. Sensus can provide yearly archive information as needed. The format can be a mutually agreed format
13.1.23	The Supplier shall provide details on how service restoration after a major outage would be accomplished within 1 business day.	X		Sensus maintains a level system for support needs. A major outage would garner the highest level of support and attention to restore processes as soon as possible.
13.1.24	The Supplier shall provide a pricing option for a test environment for the Head-end application with separate network device(s) to perform stand-alone testing using the supplied Meter System Test Fixture.		X	A test environment can be provided upon further discussion of needs.
13.1.25	The SaaS or Managed Services offering must be provided from a SOC 2 Type II certified data center(s).	X		

13.2 AMI Head-End System

AMI head-end software: These are all system requirements regardless of which managed services component provides the capability. Please fill out the table below which represents the AMI head-end software requirements.

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Table 13-2. AMI Head-End Software

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.2.1	All head-end system interfaces will be accessible by commonly used web browsers (Chrome, Firefox, Edge, Safari, etc.) and support simultaneous users.	X		The Head End System may be accessible by multiple simultaneous users and interfaces with standard web browsers (Chrome, Edge, or Firefox).
13.2.2	Head-end system will support calculations of the City standard KPI indices including SAIDI, CAIDI, SAIFI, and MAIFI using the outage and blink data available in the system (monthly and with the ability to annualize). The system must provide standard reports whose data can be extracted to allow the City to easily calculate these KPI's. Supplier will coordinate the meter configuration during the project to ensure that settings that define momentary and sustained outage are consistent with the City's needs and regulatory definitions since Florida and IEE definitions of these parameters differ.		X	The Head End System and Sensus Analytics support several standard reports. The SAIDI, CAIDI, etc. computations are not available in the Head End System nor in Sensus Analytics. If desired, for an additional fee, Sensus' Professional Services team can be engaged to develop these reliability metrics. FlexNet collects data that can be used to support calculation of these items. The Head End System supports the export of raw data to another system for calculation
13.2.3	Head-end system shall have the ability to report on outage occurrences and blink counts for all electric meters. Outage notifications will be reported to the head-end within 1 minute of the occurrence for 99% of meters.		X	FlexNet provides superior outage and power restoration notification and our customers tell us that they can use it to get their customer's lights back on faster. In the absence of line power, FlexNet-enabled electric meters detect, log, and report outages to the Head End System. Momentary or permanent outage is determined using a utility configured time threshold – typically set at 60 seconds. This time threshold must be exceeded before the meter reports an outage as extended: otherwise, the meter reports a momentary outage. Once a permanent outage condition has been flagged, the meter will transmit four randomized outage messages over the next 10 minutes. The first time slot is from 0 to 32 seconds. Sensus expects that most WAUCHULA outage alarms will process in the first 32 second time slot. Three additional outage messages will be

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				transmitted by the meter's FlexNet radio over the remainder of the 10-minute hold-up time. Blinks and voltage sags and swells will be transmitted upon the end of the voltage averaging interval (VAW), which is configurable.
13.2.4	The head-end system shall automatically retry missing billing reads and missing interval data.	X		The FlexNet system software performs a backfill process for electric meters to retrieve any missing billing or load profile interval data. Water endpoints transmit several historical reads in every message, allowing the Head End System to receive any missing information efficiently while conserving battery life in the water SmartPoints.
13.2.5	The head-end system must provide a user-configurable ability to send text messages and emails for selectable events and indications (e.g., outage/restoration). The Proposer shall provide a list of events for which this notification is possible for water meters, electric meters, and other network components and how they will be grouped or otherwise filtered. For each occurrence type, up to five media recipients shall be possible. It is required to be able to assign City recipient event notification emails and text numbers per water and electric meter account to support key account vigilance. These are City personnel notification processes. Individual customer notifications are included as part of the customer portal requirements. Describe these functionalities in detail.		X	Managed Notifications, our Head End System application, provides you with the ability to send customized email and text messages to utility personnel, including the ability to group multiple alarm or alert categories into a single notification. There is a max of 4,000 characters on the recipient line for each notification, which should be more than ample to support (5) e-mail addresses. There is no capacity on the number of notifications which may be configured. At WAUCHULA 's discretion, the Managed Notifications application can send these notifications to external e-mail addresses and phone numbers; however, Sensus does not recommend this approach. Sensus does not currently support the ability to interface directly with Facebook or any other social media application. We are being asked to support this capability for other customers and anticipate being able to do so in the future. We recommend holding an Integration Workshop to define and scope the work. There will be a fee for this capability.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				A list of events and alarms can be found in Attachment E: Meter Events and Alarms.
13.2.6	For outages, it is required that the City have the ability to set up text and/or email notifications for up to 5 city employees where they are aware of at least one outage on the system. This notification should contain all outages present at the time the message is sent. Sending a text and/or email per outage is not acceptable. Describe this functionality in detail.		X	This capability to batch and filter outage alarms is not a supported feature; however, our Professional Services team can develop this solution for a fee. We recommend holding an Integration Workshop to define and scope the work.
13.2.7	The head-end system time shall be synced to a network time server that is synced to a national standard.	X		In a FlexNet system, the base stations are the timekeepers; each has on-board GPS. Base stations send out a (configurable) time sync message every 15 minutes. This design ensures time is maintained accurately throughout the FlexNet system.
13.2.8	Time accuracy relative to system time: 1 minute for electric, 5 minutes for water.	X		In the FlexNet system, base stations are responsible for maintaining time across the entire network. All endpoints receive the base station time sync message directly, so there is no need to have a complicated method for managing time through multiple other endpoints, as is the case in some AMI systems. Time in electric meters is typically maintained within 50 milliseconds. Time synchronization of water endpoints occurs via different mechanisms. Battery-powered SmartPoints operate in one of two communication modes: “Middle of Minute” (MOM) or “Listen After Talk” (LAT). SmartPoints operate in MOM mode under optimal conditions, only switching to LAT if MOM is not achievable. Once MOM mode conditions are returned, units will switch back into that mode. This process is performed automatically through the Head End System; it can also be manually adjusted when desired. FlexNet’s exclusive MOM communications keeps the water SmartPoints synchronized within milliseconds of network time.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				All battery-powered endpoints in MOM mode synchronize to a beacon from the FlexNet Base Station at the middle of each minute. This continuous time synchronization enables SmartPoints to deliver meter data based on true top-of-the-hour meter reads. MOM is an exclusive feature of FlexNet technology, providing a host of benefits, including true on-demand, two-way communications from the Head End System to the meter's SmartPoint module, as well as highly accurate SmartPoint clock synchronization.
13.2.9	The head-end system shall support Standard Time and Daylight Savings Time.	X		FlexNet supports Daylight Saving Time.
13.2.10	Firmware updates for individual, all, or groups of devices shall be possible. Describe these capabilities and the associated process.	X		Sensus' flexible firmware updates deliver a secure, reliable, and timely solution to a single endpoint, a group of endpoints, or an entire endpoint population type without impacting billing data collection or any other critical function of the AMI solution. The management of firmware updates is performed using real-time, efficient tools. Sensus' firmware download solution supports all FlexNet-enabled endpoints.
13.2.11	During the firmware download process: The head-end will provide a robust set of reports or displays to show the download status, estimated time to completion, all error conditions, and all other information needed to manage the firmware update process effectively. Firmware updates for all devices will be logged.	X		The Head End System supports an informative, easy to use GUI for firmware download jobs. The display shows this firmware download information.
13.2.12	Head-end system shall support the ability to turn off all radios in any electric meter. A handheld will be required to turn the radios back on. Describe these capabilities and the associated process.	X		The proposed Sensus Stratus IQ meter supports Opt-out mode, in which all radio transmissions, including the FlexNet transceiver and optional Zigbee board, are turned off. The

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				meter continues to listen enabling the meter to continue to receive time sync messages to maintain proper time. Opt Out mode does not affect the overall AMI system performance since endpoints communicate directly with the AMI system. Authorized utility staff can control the meter's Opt-out state from a handheld or remotely from the Head End System.
13.2.13	The head-end system shall support all interval data recording lengths and channel configurations available in meters.		X	The Head End System supports 5-, 15-, 30-, and 60-minute load profile interval lengths in all proposed electric meters. The Sensus Stratus IQ meter also supports a one-minute interval length. The Head End System supports up to 32 channels in the Sensus Stratus IQ meter and up to 20 channels in the Aclara kV2c meter. The standard kV2c meter load profile configuration supports 8 channels; a meter key is required in each meter that needs more than 8 channels enabled.
13.2.14	The head-end system must be able to identify and enforce the inability to disconnect accounts identified as "medical do not disconnect." Explain how this is achieved.	X		This capability is included in our most recent version of the Head End System and is available for use by WAUCHULA . Each meter being assigned this status will need to be set to enable this function in the Head End System.
13.2.15	The head-end system shall support reading all quantities available in meters, including but not limited to: • kWh (electric) • Var (electric) • Under the cover meter temperature (electric) • Last read. • Unit of measure. • Number of meter digits. • Device firmware version.	X		The Head End System supports retrieving these values and much more from the electric meters. (We believe that car is VAR.) Note: Some values in electric meters require a meter key to be turned on to enable functionality in the Aclara and Honeywell meters.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	• Disconnect switch status			
13.2.16	The head-end system will support the establishment of daily, weekly, or monthly billing schedules.	X		Our solution complies with this requirement.
13.2.17	The head-end system shall support other non-billing schedules to bring back items of interest to the City, such as service voltage, pressure readings or smart sensor data (like tank levels). Describe this capability and what water metering quantities (water and electric) can be so scheduled.	X		Xylem / Utility Data Lake (UDL) To support the ability for the utility to run ad-hoc queries and create custom reports, Sensus can deliver the Utility Data Lake (UDL) solution, which stores FlexNet endpoint data and is updated daily. This replicated database allows the utility to design and maintain scripts and queries without interacting with the primary Sensus FlexNet database. The data retention period for the Utility Data Lake application is designed for years of data storage, enabling it to act as an extended data repository. The Utility Data Lake can also integrate with your third-party business intelligence tools, and it supports standard Open Database Connectivity (ODBC) connections, making it compatible with most standard query editors and reporting tools. Standard Reports in UDL The Utility Data Lake (UDL) dashboard features a clean and intuitive interface with a navigation bar for easy access to difference sections. Pre-built, standard reports are readily available for common utility data queries, enhancing user experience by providing out-of-the-box solutions. Reports show essential metadata, including creator, report status (such as “Published”), and date created, enabling users to quickly assess the report’s details. Flexibility for advanced users is maintained through the option to “Add New Report,” accommodating the need for custom report creation. Enhanced search and filter functions are present to expedite the retrieval of specific reports, streamlining the data management process.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	The following out-of-the-box reports are available: Master Reports •Master Route Register and Interval Reads (Electric): Shows the latest reads for all meters within a specified time window. •Master Route No Readings: Lists all meters that are active in the system but have not been sending reads within a specified time window. Consumption Reports •Consumption Report: Lists the meters' consumption based on meter readings within a specified time window. •Consumption Summary: Shows daily consumption of all meters as a default; can also be configured to show consumption within last week, month, quarter, or year. The consumption is grouped by year/month and unit of measure (UOM). •High Low Meter Exception Report: Displays meters whose reads exceed the minimum and/or maximum threshold within a specified time window. •Consumption vs. Previous Read: Compares the latest reading (from the RNI) with the last known read received from the CIS. •Consumption Exception 24 Hour Report: This report shows meters that satisfy these conditions: 1) The daily average consumption exceeds the entered daily consumption threshold. 2) The number of days when the daily thresholds are exceeded is greater than the entered exception per day threshold. •Average Consumption: Shows meters' consumption on the specified roll-up date, detailing consumption for each interval time and registered read for the selected date, incorporating filters such as commodity, device status, account status, billing cycle, and service type.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	•Consumption by Zone Report: Enables listing of all devices with consumption data based on selected zones within a specific time window, with an option to filter by high consumption threshold. Miscellaneous Reports in UDL •Acoustic Leak Report (Water): Displays leakage information for devices within a specified time window using acoustic data from Permalog+ sensors attached to water pipes. •All Alarms Report: Lists all alarms that occur during a time window. Users select which alarm to show. •Alarm Count Report: Users must select a particular alarm to monitor and the report will provide counts of that alarm from the last 24 hours, 72 hours, 30 days, 60 days, and 90 days from the selected date. It also provides average daily usage for each time period. Retrieves as far as 120 days prior and provides the first date when alarm was reported. •Endpoint Details: Shows the current state of meters that are created within a specified time window. •Device Event History: Events of a device sorted by event date time. Two types of events are displayed in this report: •Register reads •Alarms Commonly Used Standard Reports Consumption Report The Consumption Report in UDL shows meter consumption data within in a date range. It calculates consumption as the most recent read minus first read, and can be filtered by commodity, device status, account status, and other components. Display options include the consumption period, value, unit of measure, device ID, and account details. This report has an option to only show meters above a consumption threshold.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	Alarms Report The Alarms Report in UDL shows all alarm events for meters in a selected date range. It displays the alarm name, time, device ID, and device status, with multiple rows per meter, if multiple alarms have occurred for that device. The user can filter this report by commodity to only show the relevant alarm types. List of Orphaned Meters The Orphaned Meters list in UDL shows meters marked as "orphaned" in the FlexNet. “Orphaned” means a meter is sending data, but no account information is tied to it. This report shows the last raw read, last alarm, and days since the meter’s status changed. It is especially useful for identifying meters the utility has lost association with. Custom Reporting Through XDL/UDL In addition to the out-of-the-box reports available through UDL, it allows for nearly infinitely customizable reporting options. By default, the UDL includes an integrated, web-based business intelligence tool to run queries, create custom reports, and develop visual dashboards and charts. Custom reports, queries, and scripts can be saved in UDL and shared across your team. Reports can be scheduled or actioned on a threshold value. Utility staff can build dashboards from scratch or copy and modify existing ones. The SPAN Business Intelligence subcommittee is a great resource for sharing and collaborating with other utilities. Additionally, our Professional Services team is available for consultation and development services. Alternatively (at an additional cost), a site-to-site VPN can be stood up to provide a direct connection to a local SQL Client or

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				to your own Business Intelligence tools such as Microsoft Power BI or SAP Crystal Reports.
13.2.18	The head-end system shall support on-request reads of any meter in the system. All meter data shall be returnable by such reads. **On-request read capability is a mandatory requirement for water and electricity meters.**	X		Our solution complies with this requirement.
13.2.19	Head-end system shall be able to perform an on-request demand reset for electric meters. Describe how this demand reset function works on a scheduled and on-request basis. Include a description of and the time sequence of any data brought back as part of a demand reset.	X		The Head End System – both singly and in groups of electric meters, supports on demand resets. Once the on-demand request is received by the meter it will send the requested read to the Head End System in a few seconds. Electric meters also support the ability to perform the demand reset itself based on a programmable schedule.
13.2.20	Head-end system shall have the ability to confirm demand reset has occurred by examining demand reset count before and after the request. Describe how this confirmation occurs on the head-end system.	X		This information for a meter can be viewed on the Head End System's Device Manager screen in the Head End System.
13.2.21	Head-end system shall report on voltage threshold violations consistent with the thresholds available in electric meters.	X		This information for a meter can be viewed on the Head End System's Device Manager screen.
13.2.22	Head-end system shall detect and report time-stamped indications of all electric meter outages and restoration.	X		The FlexNet system performs particularly well in reporting outage and power restorations across your service area. Our utility customers have reported reduced power outage times for their customers – using the improved information provided by their FlexNet system to better direct their outage restoration crews.
13.2.23	Head-end system shall support all TOU functionality defined in Table 8-3Table 8-3, including modifying such settings.	X		The Head End Software supports Time of Use functionality in electric meters. All proposed electric meters can support being configured with TOU measurement. FlexNet supports remote over-the-air

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				(OTA) configuration updates to electric meters, including TOU changes.
13.2.24	The system must provide a geospatial/map view of all devices on the communications network, which includes various device statuses via visual differentiation (color, etc.). Communications paths and health status should be included on these maps.	X		Using Network Metrics, WAUCHULA personnel can view all of the communication paths via the Head End System for every endpoint including electric and water meters. Network Metrics supports map views and images. Users can customize their view to more easily focus on the type of information that interests them. In addition, the Outage Management System application (part of our Sensus Analytics solution) supports maps with endpoints geographically located with color coding indicating their status.
13.2.25	Head-end system shall support pre-pay for electricity. Describe this pre-pay capability and any third-party relationships involved in your offering. (Note that the requirement for this RFP is to provide an AMI solution that is “pre-pay-ready”. The utility intends to purchase a pre-pay application separately.)	X		The Head End System software supports standard interfaces to existing industry prepayment applications. This enables you to select the prepayment software vendor of your choice that best fits your needs and business processes. Sensus has worked with PayGo and Exceleron to implement prepayment systems for joint customers. The future integration to the third-party prepayment system is not priced in this RFP proposal and will require a specific SOW and pricing process when WAUCHULA is ready to move forward with your prepayment solution.
13.2.26	The Proposer shall provide a complete list of events and alarms supported by the head-end system and endpoints.	X		For a full list of alarms and events, please refer to Attachment E: Meter Events and Alarms.
13.2.27	Collecting metering data from deployed meters must be possible if the communications network is down. If there is a temporary failure or unavailability of all or a portion of the communications network, describe the backup process by which the City will gather meter reading data until repairs are made.	X		FlexNet-enabled electric meters and water meters can be read locally with a handheld, laptop, or drive-by solution. No endpoint configuration changes are necessary for this process. In addition, since all FlexNet endpoints communicate 24x7x365 with all nearby base stations all the time, if one base station goes offline, the others receiving a meter’s messages continue

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				to process them normally. In this case, there is no impact to read collection.
13.2.28	The system shall provide reports to address the following: • Water meter low battery. • Electric meter low battery (if outage battery is used) • Meter configuration changed. • Meter errors. • Service Voltage (sags, swells, minimums, maximums, averages, etc.) • High flow, reverse flow, high/low pressure. • Tampers. • Battery status for all battery-backed network devices. • Counts of outages, blinks, and momentary interruptions	X		Our solution complies with this requirement. FlexNet provides several apps, GUIs, and reports where this information can be viewed.
13.2.29	The Proposer shall list available reports and capabilities in support of smart sensory devices (e.g., pressure, temperature, pH/water quality, and others as available). These capabilities will not be implemented in the initial AMI implementation but are part of the City's strategic roadmap.	X		See response for 13.2.17
13.2.30	Discuss remote connect and disconnect capabilities via batch operations.	X		The Head End System software supports remote disconnect and connect of the remote service switches singly or as part of a group of meters. Sensus customers use this capability extensively to perform their cut-ons and cut-offs remotely using their FlexNet systems – saving time and money compared to doing these tasks on-site. Also, a reconnect can be performed fast following a customer payment, often restoring power before the customer returns home from paying their bill at WAUCHULA 's local offices.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.2.31	Discuss remote connect and disconnect load side voltage detection and closure prevention.	X		The Head End System supports over the air (OTA) operations of an electric meter's service switch for one meter or a group of meters. Load Side Sense (LSS) The Sensus Stratus IQ and Aclara I-210+c meters are equipped with a Load Side Sense circuit. This allows the meter to determine whether an unsafe voltage is present on the load side before trying to close the meter's service switch. This solution prohibits the switch from being closed if a temporary power source (such as a generator, jumper cords from an adjacent house, battery pack, or inverters) was placed on the load or house wiring while the meter's service switch was opened. Upon reception of a command to close the service switch, the load side is examined for the presence of voltage and the endpoint will abort the attempted closure and issue a response back to the Head End System software indicating the presence of the voltage. The current state of the service switch is provided remotely by the Head End System for your Customer Service Representatives (CSRs) using GUIs or via integrations to other utility systems. The state of the remote service switch is also shown on the meter's display.
13.2.32	Disconnect switch status (open/closed/restricted flow-for water) shall be visually displayed on system displays.	X		The current state of the service switch is provided remotely by the Head End System for your Customer Service Representatives (CSRs) using GUIs or via integrations to other utility systems. The state of the remote service switch is also shown on the meter's display.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.2.33	The head-end system shall support remote connect/disconnect status confirmation reads.	X		Our solution complies with this requirement.
13.2.34	Head-end system must support secure web-service calls from other systems to allow connect/reconnect operations. Describe these web services.	X		Connect/reconnect operations, which are real time applications, are normally accomplished from other systems using a MultiSpeak API interface to the Head End System. The details of the integration will be scoped in the Integration Workshop run by Sensus' Professional Services team.
13.2.35	The head-end system shall provide the ability to perform on-request reads of events and alarms (in addition to events automatically alarming up to the head-end system).	X		In a FlexNet system, events and alarms are automatically transmitted to the Head End System by the endpoints in the field. If desired, the Head End System can be used to make on-request reads for events and alarms for electric and water meters at any time.
13.2.36	Describe configurable parameters in water and electric meters and how changes to the parameters are implemented. Include changes to TOU schedules and seasons, LP interval, demand reset behavior, Sag & Swell limits, etc.	X		Today's Sensus electric meters can provide significantly more information than the traditional real, apparent, and reactive energy measurements and energy consumption readings provided by older non-AMI meters. Electric meters can be configured to calculate a variety of data including energy, demand, TOU, load profile, power factor, temperature, current, frequency, voltage, demand reset count, harmonics, CVR and load side sensing. Sensus experts will sit down with your team and help you create the meter specification for each of your meter types. The configuration files are used during the manufacturing process in the factory to enable each electric meter to ship with your desired settings. After deployment, FlexNet supports over-the-air changes to metrology logging, register collection, and event reporting through the Head End System for all electric meters. The described parameters for electric meters may be reprogrammed over the air without a truck roll, saving your utility time and money.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				SmartPoint communication modules for water applications also provide flexible programming and configuration options to allow for different levels of granularity in interval consumption, data collection, storage, alarming, and reporting. The programming and installation tools offer a variety of measurement configurations (such as gallons and cubic feet) in increments of 1, 10, 100, and so on. Water endpoints support over-the-air configuration updates too from the Head End System.
13.2.37	Describe the system's firmware update process from end to end, including any retries, commit processes, rollback processes, etc.	X		FlexNet supports remote upgrades for an individual or groups of FlexNet-enabled meters. For firmware upgrades, Sensus uses a total replacement approach for upgrading firmware files. Updates to a meter or SmartPoint are performed over a period of time. As the firmware is being downloaded, there is no impact to the meter or SmartPoint's normal activities. The Head End System queries the endpoint to determine whether all required packets have arrived. If packets are missing, they are retransmitted by the Head End System. When the complete firmware file has been received, the SmartPoint runs a Cyclic Redundancy Check (CRC) which validates the file to ensure it is correct. If the code is found to be valid, the Head End System issues a command with the Cipher Block Chaining Message Authentication Code (CBC-MAC) signature to execute the changeover to the new firmware. The firmware download process is as follows: 1. The Head End System notifies all meters or SmartPoints that a firmware download session is about to start.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	2. Every meter or SmartPoint that matches the noted characteristics will accept firmware download packets; all remaining endpoints ignore the firmware download packets. 3. The Head End System broadcasts the entire firmware image multiple times; multiple broadcasts increase the success rate that a meter or SmartPoint has heard and received every packet. 4. Meters or SmartPoints rebuild a binary image based on packets received and maintain a list of packets not received. 5. The Head End System reaches out to each meter or SmartPoint to be flashed individually, using encryption if enabled, and determines if packets are missing. 6. If packets are missing, the meter or SmartPoint reports the missing packets. If there are no missing packets, the meter or SmartPoint performs the firmware upgrade and then notifies the Head End System of its status (success or failure). 7. The Head End System determines which packets have yet to be received by SmartPoints and rebroadcasts the missing set of packets multiple times. The process repeats until the firmware download completes successfully. Local firmware downloads and reprogramming of a meter or SmartPoint is supported. If a previous firmware version is needed, it can be downloaded to endpoints using the same process.
13.2.38	The head-end system shall not store sensitive customer personally identifiable information such as Social Security numbers, credit card numbers, etc. Name and address are acceptable if no other personally identifiable information is associated with them.	X		Personally Identifiable Information (PII) is not stored in the FlexNet system; it is typically stored in the utility's CIS or other system. (Sensus considers PII to include billing rates, addresses and other personal information, payment plans, and payment methods.) Sensus does store data about a customer's meter, such as cryptographic keys and configuration details within the FlexNet system. The closest thing to PII stored in the Head End

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				System is meter reads and alarms, but this data is associated with the meter ID, not the customer. The association of the meter ID with a customer is managed in the utility's CIS or other system.
13.2.39	No data may be released or sold from the City system.	X		Our solution complies with this requirement.
13.2.40	Hardware, software, and firmware configurations: The system shall maintain and provide current identification of hardware versions, firmware, and software for all AMI system components.	X		The Head End System is the System of Record for the FlexNet system. It retains knowledge of all the endpoints installed in your system including each endpoint's type, configuration, and firmware version. Multiple versions can be supported on your system at the same time.
13.2.41	Duplicate meter serial numbers: The system shall identify the premises where the same serial number has been used more than once.	X		FlexNet serial numbers are unique; they are not repeated. The FlexNet system does not provide a report for identifying duplicate meter serial numbers.
13.2.42	Network component status: The system shall report on the health of the Supplier's network components, including memory errors, battery status, signal strength, connection errors, redundancy, and whether the network components pass or fail the Supplier's operating specifications.	X		The Network Metrics application within the Head End System provides detailed information for all of the base stations in your system. Users can create their own customized view in Network Metrics to focus on the data of most importance to them.
13.2.43	Describe the confirmation process for any control action or customer messaging from the system.	X		All control actions from the Head End System are acknowledged by the endpoints in the field and their status displayed on GUIs.
13.2.44	Provide a detailed product roadmap showing any enhancements that can be incorporated into the proposed AMI system.	X		Please refer to Attachment Q: Roadmap.

13.3 Meter Data Management (Lite)

Please fill out the table below.

Table 13-3. Meter Data Management

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.3.1	The system must support loading and maintaining GPS coordinate data for water meters and other field-deployed devices in decimal degrees to a six-decimal resolution.	X		For water metering upgrades, approved handheld devices for SmartPoint installation can acquire and program SmartPoints with their GPS location during the installation process. This LAT/LONG is then stored within SmartPoint and transmitted to the Head End System. The install vendors coordinate this work for the endpoint and base station installations. For electric metering upgrades, normally an electric meter is installed without acquiring the GPS coordinates on-site to speed up the meter installation process and save time. As part of their standard work order process, Concord installers will collect the GPS coordinates on site and return the data with the completed work order information. The Head End software can export the GPS data for both water and electric endpoints to Sensus Analytics.
13.3.2	Preconfigured reports for examining meter data shall be provided. Describe these reports.	X		The proposed solution includes the Sensus Analytics Enhanced Bundle and the Customer Portal. WAUCHULA can generate reports from the following applications: • Billing Access • Billing Adaptor • Customer Portal • Device Access • Files Dashboard • Report Access • Meter Insight Additional applications are available for advanced analytics beyond the base offering: • Alert Manager • Alarm Insight • Voltage Insight • Load Insight • Outage Management System • Service Management Application

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				• Pressure Profile Application
13.3.3	The system must include water and energy balance analytics and dashboards. Please describe.		X	Standard functionalities within the proposed Sensus Analytics solution allow users to create virtual meter groups, export reports, and/or mine for specific data useful in calculating water balance and energy balance equations.
13.3.4	The system must manage the database of meter readings and other related information about the meters and the AMI system.	X		Our solution complies with this requirement.
13.3.5	The system must be able to export data from reports in standard .CSV format.	X		Data from our Sensus Analytics reporting platform can be exported as a flat file, CSV format, Excel file, HTML data, PDF, rich text format, or a text file
13.3.6	The system must provide a dashboard display that includes: • Peak usage. • Missed readings (excluding in-process missed read retrieval and missing LP gap fill-in processes). • Usage comparisons for like time periods. • Alerts and alarms. • Current status, including current read, disconnect status, etc.		X	Some of this capability is supported in the Head End System software and some in the Sensus Analytics suite of applications. For an additional fee, Sensus' Professional Services team can build a custom dashboard using Utility Data Lake (UDL).
13.3.7	The system must provide validation, editing, and estimation (VEE) capability for water and electric meter reads to identify suspicious reads, allow City personnel to override a billing value, and estimate a billing read based on previous like time periods.		X	FlexNet delivers a read interval success (RIS) rate of 99.8% without VEE. VEE is planned in a future roadmap development; a completion date has not been established. Our VEE solution will be a simple and cost-effective complement to the high AMI RIS rate utilities are already receiving through the proposed FlexNet solution.
13.3.8	The system shall support analytic leak and burst pipe detection with a definable rule set for water interval reads over various time periods, including sudden sustained high reads.	X		Our solution complies with this requirement.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.3.9	The system shall be able to report on user-defined low or no flow conditions for water and electric meters over a specified time.	X		FlexNet alerts utilities to low-flow or no-flow conditions for water meters and generates reports over a selected period of time. Comparable reports are available for electric meters, such as power state conditions.
13.3.10	The system shall be able to report on water and electric reverse flow conditions.	X		Our solution complies with this requirement.
13.3.11	The system shall be able to report leaks.	X		The Sensus FlexNet system has the capability to transmit “Continuous Flow” alarms. These will notify of a potential leak situation. We are also capable of utilizing Permalog devices for enhanced Acoustic Leak Detection capabilities.
13.3.12	The system shall support reporting on user-defined conditions considered abnormally high/low water consumption over a specified time.	X		FlexNet not only informs the utility of abnormal consumption through the included apps, it can inform your customers of their consumption details through the Customer Portal.
13.3.13	The system shall support enhanced analytics capabilities to identify non-technical loss (e.g., tampering/theft, energy loss or diversion, suspicious accounts based on usage patterns, and aggregated meter consumption comparisons).	X		Sensus Analytics offers the ability to review collected FlexNet system alarms from a wide variety of devices. The Head End System supports the ability to study individual meter information in detail. For an additional fee, Sensus’ Professional Services team can build a custom dashboard using UDL.
13.3.14	System shall support enhanced analytics capabilities to allow for monitoring and identification of under-utilized, over-utilized, or at-risk transformers throughout the distribution system (kVA utilization, loss of life and remaining life computations)	X		The capability to study overloaded and under-loaded distribution transformers is available in our optional Load Insight application. This application can be used to also study other critical assets in your distribution system (with optional Professional Services integration to WAUCHULA ’s connectivity data).
13.3.15	System shall support enhanced analytics capabilities to allow for outage and reliability analysis and reporting including Outage/Restoration, and Reliability Computations (SAIDI, SAIFI, CAIDI, CAIFI, MAIDI, MAIFI)		X	These computations are not available in the Head End System nor in Sensus Analytics. If desired, for an additional fee, Sensus’ Professional Services team can be engaged to develop these reliability metrics.
13.3.16	System shall support enhanced analytics capabilities to allow for demand and capacity monitoring (e.g.,	X		The FlexNet software supports the ability to support customer demand. The Head End System brings back demand including maximum demand values programmed in electric meters. This information can be viewed for any meter

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	customer demand contributions, demand response impacts)			and exported via integration to WAUCHULA 's downstream software systems for further study. Additionally, Sensus Analytics supports several water-related solutions including Revenue Locator -- an application that uses advanced analytical tools to examine water meter inaccuracies and identify apparent losses. This solution empowers proactive revenue recovery and operational efficiencies through identifying meter under-performance due to under-registration, meter read errors, and incorrect meter sizing. Another optional water application, Pressure Profile, enables remote pressure monitoring capabilities, providing visibility into the utility's water distribution system as a whole. The solution combines pressure data from ally meters and Smart Gateway sensor devices into a map-based solution, graphically displaying the pressure of measured points with respect to location over time.
13.3.17	System shall support enhanced analytics capabilities to allow for monitoring of power quality (e.g., voltage monitoring, voltage optimization, CVR/CVO, outage, and restoration.	X		Electric meters support a wide variety of power quality monitoring capabilities including voltage, outage and restoration notification, voltage sags and swells, and conservation voltage reduction (CVR). Sensus Stratus IQ meters can be configured as a bellwether meter, transmitting average voltage measurements over a five-minute period. This data can be passed from the Head End System to the optional Voltage Insight application where they will be displayed. Voltage Insight is a tool that provides vertical integration from the endpoint to data analytics applications, greatly increasing speed to market and realization of benefits for the utility. It enables the utility to run scenarios by varying high and low voltage level thresholds to view bad voltage in graphic form for user-configured time periods and supports viewing voltage information by substation and distribution feeder (with optional Professional Services integration to your connectivity data).
13.3.18	Describe how the proposed solution can provide load forecast using data from the AMI system for all meters in the system with identified EV and/or PV presence behind the meter. Does the system support		X	The Stratus IQ+ supports all the current capabilities of the Stratus IQ meter plus much more. • More processing capacity • More firmware code space

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	KPI's to track changes in customer adoption of EV charging using data from the AMI system. Does the system provide KPI's to track changes in customer PV installations using data from the AMI system			• More on-board memory – Random access memory (RAM) & Non-volatile memory (NVM) • Edge Computing – Full support for Applications (apps) running on the meter Q4 2023 o No additional hardware card or costs will be required for the Stratus IQ+ (single phase) or Stratus Evolve (polyphase) meters to implement these apps. o Impedance Q3 2024 o Distribution Transformer Failure Prediction Q3 2024 o Disaggregation Q3 2024 o Meter Socket Failure Prediction Q3 2024 o Appliance Failure Prediction Q3 2024 o Loads that are always on that shouldn't be (for example - stuck water heater relay) Q3 2024 o Distributed Intelligence Q1 2025 o Distribution System Modeling Q1 2025. Will be able to identify meter phase & meters on distribution transformers. o Peer to Peer communications utilizing apps for inter-operation among meters. Production launch Q2 2025. o Managing electric vehicle charging Q2 2025 Card Slot Expansion for alternate communications or additional processing capabilities allowing for expandability in the future. Sensus is designing optional communication cards to run in Stratus IQ+ and Stratus Evolve meters in addition to the existing FlexNet transceivers in the meters. Both communications are able to operate at the same time without impacting the performance of the other. For instance – a meter equipped with a cellular option board and a FlexNet transceiver is able to communicate to the FlexNet Head End System using both.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	o Cellular (all major cellular carriers supported) Q3/Q4 2024. o GPS Q3/Q4 2024 o Wi-Fi Q3/Q4 2024 – Matter (new in-home standard for communicating to end customer equipment) o Bluetooth Q3/Q4 2024 o Direct-connect Fiber Q3 2025 • ANSI Standard Direct Current (DC) meter version – Currently in Beta testing o Form 2S and DIN Rail prototypes undergoing field testing now o Enables utilities to more accurately measure green energy loads -- solar panels, residential battery systems, electric vehicles Distributed Intelligence App Development Sensus foresees a future where apps are shared among our utility customers from a central location. Sensus will certify each app to ensure it performs properly in the meters and with the FlexNet system. • Apps will run in the meter in a container where they are isolated from other meter functions to ensure that they cannot impact normal metering functions. Sensus will support a variety of app development options including: o Sensus-developed apps o Third-party developed apps o Utility-created apps • Sensus will provide a developer's toolkit including guidance on the app development process. • Sensus will certify all new apps. Once an app is certified, Utilities can download them remotely over their FlexNet system or alternate communication cards installed in their meters with no truck roll required.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.3.19	MDM Lite Functionality: Describe the MDM Lite functionality offered by your system. This description should address functions like system water balance support, multiple meter LP data aggregation for load studies, theft detection through pattern recognition such as an outage followed by reduced consumption, etc. Also, provide information on what your other municipal customers do with this MDM functionality.	X		Some utilities need an MDM for simple but accurate data collection, management, and reporting. Sensus Essential Analytics is a bundle of applications that provides core meter data management performance, enabling daily utility operations like billing and meter and sensor monitoring. In addition to the key features found in Essential Analytics, Sensus Enhanced Analytics also provides alarm management capabilities, allowing utilities to go beyond billing applications and gain insight on system performance and health. The modular nature of Sensus Analytics allows you to right-size your analytics software by buying only the applications you need. If you want to add advanced analytics tools, the flexible platform easily scales to accommodate that.
13.3.20	The system must support display of meteorological data such as temperature, dew point temperature, and rainfall. The data must be displayed in conjunction with water usage reports.		X	This feature is not part of our standard offering.

13.4 Outage/Restoration Information System

Please fill out the table below.

Table 13-4. Outage/Restoration Information System

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.4.1	At a minimum, system must provide outage/restoration visualization using a map format (not full outage management functionality).	X		Sensus provides an optional value-add OMS application for utilities looking to enhance their outage management solution. The application extends the basic outage information for meters found in the Head

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				End System to present outage summaries overlaid on a mapping solution. Sensus' Analytics Outage Management System provides a configurable display, including reports, detailing which meters are in an outage state, which have been in an outage state, which meters have been restored, and which meters have been reported out and also restored. The price for this application is included in Network Managed Service Fees provided in Table 22-8.
13.4.2	System must provide the ability to ping the electric meter from a map format to confirm meter is still in an outage.		X	The Head End System can ping an electric meter to determine whether it is powered up or still without power; pinging a meter from a map format is not supported in the Head End System. If your future Milsoft OMS system supports this ability, the Head End System can pass real time alarm data to it using the Head End System's MultiSpeak interface.
13.4.3	System must provide per meter email and texting capabilities on outage and restoration described in Table 13-2. These texts must be able to be different for various accounts and cannot be global in nature such that all outages are sent to one text number.		X	The Head End System and Sensus Analytics can configure different types of meter alarms to trigger emails or texts to utility personnel. If your third-party systems support this ability, the Head End System can pass real-time alarm data to those systems using the Head End System's MultiSpeak interface.
13.4.4	System must provide the ability for the City to receive notification to multiple text numbers to allow them to be aware that they have an outage on the system without being overrun with text messages from each meter. This functionality should be configurable to allow the City to configure the number of outages that must occur before this text is triggered. Describe in detail how this requirement is implemented in your system.		X	The Head End System supports sending text and email notifications to WAUCHULA personnel. The capability to 'group' notifications is not supported, however. For an additional fee, Sensus' Professional Services team can develop a solution that can aggregate outage notifications.
13.4.5	The head-end system shall report on outages (blink, momentary, and sustained). These outage types shall	X		In the absence of line power, FlexNet-enabled electric meters detect, log, and report outages to the Head End System. The type of outage –

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	be configurable parameters by the City that define power loss duration for each event type. (Note that the state of Florida considers any interruption longer than 1 minute to be a sustained outage.) Describe these blink and outage parameters and how these events are reported.			momentary or permanent (sustained) – is determined using a utility-configured time threshold that can be set as low as 1 minute. This time threshold must be exceeded before the meter reports a power outage as a permanent outage; otherwise, the meter reports a momentary outage. Sensus-supplied electric meters support momentary and permanent outages are reported on a per-meter basis. Blink outages are measured and reported by the FlexNet transceiver, which measures voltage swells and sags over a programmable voltage averaging window (VAW) and automatically reports the Voltage Max, Min, and Average to the Head End System upon closing of the VAW. The settings for all these limits are programmable in the meter program.

13.5 Customer Portal

Please fill out the table below.

Table 13-5. Customer Portal

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.5.1	The Proposer shall include a City customer web portal as a part of their solution.	X		We have included VertexOne's Customer portal as a part of our solution for Wauchula.
13.5.2	Describe all mobile application extensions that may be available on this portal.	X		VertexOne leverages a mobile responsive design, which automatically formats the application according to the device on which it is being used. For more information on the benefits of using a progressive mobile app vs native app, please visit https://www.vertexone.net/blog/pwa-next-stage-in-customer-experience-revolution

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.5.3	The customer web portal software shall allow the City's customers to initialize a new portal account using their addresses, City billing account numbers and the amount of the last payment received. Initializing a new customer account shall require no involvement of City staff.	X		**VXengage** provides secure registration and login for each utility account (including AMI and non-AMI accounts, and residential, multi-family, commercial, industrial, and irrigation accounts). On the Portal registration page, the customer is prompted to enter their registration code, or account number and zip code to register. Customers are then prompted to create a password and provide their email address as their username.
13.5.4	The customer web portal's functionality shall be available for water and electric services.	X		
13.5.5	The portal must have the ability to display customer data, including: • Consumption and cost graphs for the past 12 months. (Data must be retrieved from the City's CIS system.) • Hourly (or as set in meters) interval readings for water or electric over the past 6 months. • Current consumption since the last billing for water and electric (Billing date information must be retrieved from the City's CIS system). • Billing history report for the last 12 months. (Billing information must be retrieved from the City's CIS system.) • High usage periods (based on user-definable limit). • Leak indication.	X		
13.5.6	The customer web portal software shall allow customers to set up accounts using an e-mail, cell phone number, username, and password.	X		VertexOne provides secure registration and login for each utility account (including AMI and non-AMI accounts, and residential, multi-family, commercial, industrial, and irrigation accounts). On the Portal registration page, the customer is prompted to enter their registration code, or account number and zip code to register. Customers are then prompted to create a password and provide their email address as their username.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.5.7	The customer web portal shall include provisions for customers to reset or retrieve their passwords and/or usernames without City involvement.	X		VertexOne provides the ability for customers to register for on-line access and to reset/recover user-id/password.
13.5.8	The customer web portal shall include the ability for the City to reset a customer's password to a default that the customer must reset on the next login.	X		VertexOne provides the ability for City staff to reset/recover user-id/password.
13.5.9	The customer web portal shall support Multi-Factor authentication as part of the account login process.	X		Based on selected functionality. Not included in base bid.
13.5.10	The customer web portal must support the display of meteorological data such as temperature, dew point temperature, and rainfall. The data must be displayed in conjunction with water and electric usage reports.	X		The customer portal features a seasonal use chart within the customer portal that provides an overlay of customer's usage history with temperature and precipitation data pulled from World Weather Online's weather data API.
13.5.11	The customer web portal shall include the ability for customers to retrieve their current water or electric meter readings via a request to the AMI head-end.	X		VertexOne will be integrating with the Sensus MDMS and VertexOne has over 75 live clients using this integration. Dues to the vast amount of data with interval read, VertexOne's standard integration is consuming data 4 times a day. VertexOne can update information from the CIS real-time.
13.5.12	The customer web portal shall be able to make bill comparisons for a customer's neighbors. This shall be based on latitude and longitude (lat/lon) to determine the "nearness" of other customers. A provision must be made to exclude immediate neighbors based on lat/lon to avoid any potential disclosure of personally identifiable information. The Proposer shall describe this functionality in detail.	X		Reads can be compared to previous billing periods or years (to understand seasonality), or relative to the Utility's goals. Residential customers can also see consumption comparisons to similar households (based on geography, number of occupants and size of irrigable area) as well as their end use disaggregation.
13.5.13	The portal shall allow customers to receive notifications of a subset of system event messages. At a minimum, outage or leak customer notifications must be selectable by individual customers through	X		Wauchula customers have the power to set volumetric and dollar-based threshold alerts in their Portal 'Communication Preferences'. Customers can set their own parameters for the High Use Notification, which is triggered when current use is set to exceed their normal seasonal use. Customers can also set

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	the portal interface. Notification of specific events shall be selectable per customer. The notification mechanism shall be customer-selectable (text and/or email). Describe this functionality for water and electric meters and define what events are configurable.			their own parameters for the Bill Forecast Notification, which is triggered when they are on track to exceed a dollar-defined bill increase. All notifications can be sent via email, text, or voice based on the customer's preference
13.5.14	The customer web portal shall display City-entered customer notification information on a per-customer or broadcast basis.	X		Alerts can be sent through multiple channels—email, SMS text message, or automated voice call. Wauchula can decide whether they would like to turn alerts on in an opt-in or opt-out manner. Customers have the ability to sign up for or edit their enrollment in various usage and billing notifications in the Customer Portal's 'Communication Preferences' section. Utility staff also have the ability to proactively send service-related alerts through email, SMS or automated phone call.
13.5.15	The customer web portal shall allow customers to use water and electric interval data to perform "what if" bill comparisons against alternate consumption usage. The portal admin function shall include the City's ability to enter alternate rates. No rate development activity is in the Supplier's scope.	X		Customers can see a chart of their current and historical water use compared to a water budget, allocation or consumption goal. Water Budgets are sent to VertexOne in a regular data feed and are then displayed alongside consumption in the Utility Dashboard and Customer Portal. Consumption goals can be displayed the same way. These have been calculated as a percent reduction from the customer's historical use, but this calculation is parameterized to fit the utility's requirements. VertexOne optionally offers a conservation Program Participation module which measures the impact of conservation programs. Utility partners use this module to study the impact of different water efficiency programs, such as toilet rebates, rain barrels, weather- based irrigation controllers, landscaping workshops, and more. For the City to update rates, the rate will need to be updated in the CIS as an option for VertexOne to call the CIS and show the "what-if" comparison.
13.5.16	The customer web portal shall include single sign-on integration to the City's existing web portal.	X		Based on selected functionality. Not included in base bid.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.5.17	The Supplier shall interface with the City's customer portal.	X		Based on selected functionality. Not included in base bid.

13.6 User Interfaces

The Proposer will provide screenshots from the software user interface showing how a system user would view each of the use cases listed in the table below. Include comments on how each of these screens would be accessed.

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For each of these User interfaces, supplier shall include a brief explanation as to how the User will perform these functions.

Table 13-6. User Interface Screen Shots Requested

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.6.1	Disconnect/reconnect management	X		Details are provided in Attachment I: User Interface Screenshots.
13.6.2	Outage report	X		Our solution complies with this requirement.
13.6.3	Meter read rate performance	X		Our solution complies with this requirement.
13.6.4	Network equipment issues	X		Our solution complies with this requirement.
13.6.5	Leak summary	X		Our solution complies with this requirement.
13.6.6	Alarms/events	X		Our solution complies with this requirement.
13.6.7	Dashboard-level view of critical system information	X		Our solution complies with this requirement.
13.6.8	Customer portal screen showing usage history and other customer-relevant information	X		Our solution complies with this requirement.

13.7 Documentation

Please fill out the table below.

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Table 13-7. Required Documentation for Project Execution

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
13.7.1	The Supplier shall provide a Microsoft Visio system diagram of the plan, from head-end system to field devices. An "as-built" update of this diagram will be required before project closure.	X		Please see Attachment J: Visio System Diagram.
13.7.2	The Supplier shall provide a list of all documentation submitted to the City during the project and as a part of training.	X		A full complement of operator's manuals, installation instructions, and related materials will be furnished as part of the training and is detailed in that section of the response. Other documents furnished over the course of the project will include Contract Documents and your FlexNet system's FCC Spectrum Lease Agreement.

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14 CUSTOMER IT SYSTEMS INTEGRATION

Please fill out the table below.

Table 14-1. Customer IT System Integration Requirements Summary

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
14.1	The Supplier shall provide the appropriate software integration to automatically transfer appropriate data to and from the billing and CIS. The City's CIS is a Tyler ERP Pro system. All licenses required to use the Supplier-provided integration software will be provided to the City by the Supplier.	X		
14.2	The Supplier shall provide the appropriate software integration to implement any other functionality described herein.	X		
14.3	The system must interface with the City's Tyler ERP Pro System to provide an equivalent set of billing inputs to Tyler ERP Pro with minimal disruption to existing City processes. **This is a mandatory requirement.** Describe in detail how this integration will be achieved.	X		We will work with the City to complete the integration process by utilizing a proven methodology. Sensus/Core & Main has successfully accomplished many previous integrations.
14.4	The Supplier will be responsible for integrating their installation contractors Work Order Management System (WOMS) with the City's CIS System for meter exchanges with minimal disruption to existing City processes. This integration is only for the field deployment phase of the project. **This is a mandatory requirement.** Describe in detail how this integration will be achieved.	X		This will be provide in a flat file designed for easy upload into the City's CIS.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
14.5	The existing City metering and billing process flow is shown in Exhibit A Figure 1-3, and the anticipated flow during and after this project is shown in Exhibit A Figure 1-4. The Proposer shall describe how 1) its WOMS fits into this plan, 2) individual installations are managed, and 3) the data flows back to the AMI head-end system and the City's Tyler ERP Pro System.	X		Core & Main will ensure that all necessary data is transferred via a flat file from the WOMS into the City's CIS. The WOMS will keep track and require proof of installation via photographs for each installation.
14.6	The existing Tyler ERP Pro System must remain fully functional during the rollout. Describe how the Proposer will support this need and ensure a smooth transition to full AMI billing operations with meters being removed and replaced daily.	X		We will provide a flat file of meter installations on a basis agreed upon by both parties. This will allow for an easy and smooth upload of customer data.
14.7	The Supplier will provide an integration to the City's Customer Portal (Tyler ERP Pro Smart Meter Access).	X		
14.8	The Supplier will provide an integration of lat/lon data gathered by the meter installer into the Tyler ERP Pro system or other geolocation system of record chosen by the City.	X		
14.9	Proposer to include any recommended integrations for Distribution Automation and SCADA capabilities.	X		Integrations can be provided. More information and workshopping will be needed to price full integration.

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15 SECURITY

Please fill out the table below.

Table 15-1. Security System Requirements Overview

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
15.1	The entire network shall have an overall security scheme from the AMI head-end system through meters and other field devices. Please describe this scheme.	X		As a global technology leader in AMI solutions, Sensus is committed to information security and ensuring that your data is safe and protected. This commitment extends to Sensus' assets and information, customer-hosted environments, and AMI solutions developed by Sensus for our customers. To ensure this commitment to information security, Sensus has developed information security policies specific to our organization and products. These policies address a variety of business and technology areas, including network, system, and application security. Our policies provide guidance to Sensus personnel within the information security domain and ensure our compliance with government regulation, industry standards, and information security best practices. Sensus implements AES-256 bit encryption across the entire FlexNet communication network – from the meters and other endpoints in the field to the FlexNet Base Stations to the Head End System. Base stations backhaul communications are secured and validated using a Transport Layer Security (TLS) Virtual Private Network (VPN). This ensures the integrity of the communication across an Internet Protocol-based (IP-based) backhaul network that can be public. All sensitive data at rest or in transit is encrypted using strong commercial-grade encryption protocols (such as TLS, SSH, PGP, and SFTP). This provides protection for all data exchanged and stored within the Sensus FlexNet solution. Sensitive data stored on the system is limited to cryptographic keys, and passwords.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
15.2	Over-the-air security is required for all system components, including head-end, network components, backhaul communications, meters, and field devices (handhelds, etc.). Please describe the encryption method, key management process, related functions, and applicable standards for each system and device. While NERC CIP compliance is not currently a City requirement, the City would like security across the system to be NERC CIP compliant. Describe the level of such compliance provided.	X		Per our response to Requirement 14.1.1, a 256-bit encryption scheme is used for all endpoint types, including electric meters, water meters, and distribution automation endpoints. In a FlexNet system, encryption provides end-to-end protection. Encryption on the meter occurs on the SmartPoint communication module. Once a meter receives a communication from the Head End System, it retrieves the unique key from local storage, uses it to decrypt the command, validates that the command came from the Head End System, and then processes the command. Should anything fail in this process, the meter will not complete or acknowledge the command. This is then recorded in the Head End System. This encrypted communication protects all messages transported across the FlexNet network from eavesdropping, man-in-the-middle, injection, and spoofing attacks. The FlexNet system is compliant with NERC-CIP 002-009, CIP---1, and CIP-004.
15.3	Security is required for public-facing applications, such as customer usage/profile data. Please describe the encryption method, key management process, related functions, and applicable standards for each system and device.	X		Sensus believes security is of primary importance when developing its software products. The Sensus Customer Portal has been designed to guard against security threats using the following methods: • SQL Injection • Cross Site Scripting • Broken Authentication and Session Management • Insecure Direct Object References • Cross Site Request Forgery • Restricted URL Access • Transport Layer Protection with SSL/TLS • Remote Code Execution All personally identifiable information is encrypted.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
15.4	For any other devices such as thermostats, streetlights, etc. included in the proposal, security is required. Please describe for each system and device the encryption method used, key management process, and any other related functions and any applicable standards.	X		All FlexNet-enabled endpoints use the same AES-256 bit encryption implementation. Zigbee-enabled endpoints use the Zigbee Alliance standard 128-bit encryption method from HAN devices to the electric meter they are paired with.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
15.5	Is a security maintenance program in place? If so, describe the frequency of key updates, password updates, etc. Describe actions the City must take to maintain security, such as staff password management, customer portal account password management, etc.	X		We have developed a robust program of security validation and testing that involves internal and external resources, enabling our products to evolve as security testing and validation evolves. For example, Sensus security testing is a standard part of every new product or software release. For WAUCHULA ’s FlexNet system, your System Administrator will manage the rules your system requires for new passwords your internal users as well as encryption key rotation. This includes managing user role permissions for your team and adding or removing team members as needed. Password Policy When using our RBAC, utilities can configure their own password policy rules to meet their security requirements. This is performed through administration web pages, for individuals with the appropriate user permissions. Audit logs are available that track each failed login; the logs can be forwarded via syslog to an external logging server. Sensus Customer Portal For the Customer Portal, we have designed user account management to be self-serving, where your end customers can manage their account themselves. The Customer Portal allows for utility Customer Service Representatives (CSRs) to look up accounts from many fields. When the Customer Portal is being used, there is a click-through button that allows CSRs to see exactly what the consumer is viewing on the portal. From there, the CSR can use the Device Access application to access any data that might address the consumer’s questions.

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15.6	Describe third-party penetration testing performed on the system hardware, firmware, and software included in your proposal. Please state, when completed, any critical findings and frequency at which such testing is repeated. Also, describe how this testing was conducted and how often it is repeated.	X		In addition to Sensus' internal Quality Assurance (QA) resources which tests every new hardware, firmware, and software version prior to its release to our customers, our security team performs regular monthly security assessments and penetration end-to-end tests on our internal FlexNet systems to ensure current and future releases do not contain vulnerabilities. The security team uses a variety of open-source and commercial tools that include (but are not limited to) the following: • Nessus • GE Digital Achilles (Wurldtech) platform • Checkmarx dynamic scanning • Checkmarx static scanning • Proprietary fuzzing and grammar checking Internal Security Assessments • Dedicated Sensus security team - Responsible for all Sensus data center security for our SaaS customers - Actively participates in and monitors industry regulation and standards regarding security (such as InfraGard, NERC, FERC, NIST, OpenSG, etc.) • Monthly vulnerability scanning • Patch and antivirus management Third-Party External Passive and Active Testing We employ external security experts to perform the following testing and validation on an annual basis and during major revision changes to our products: • Architecture and code reviews (NCC Group, IBM) • End-to-end penetration testing of the Sensus environment on an annual basis (Wirehead Security, Rapid7) • End-to-end security assessment and penetration testing on customer environments (SAIC, Bishop-Fox, GE Digital/Wurldtech) This testing provides us and our customers with an objective, third-party assessment of system security, as well as the security of the system as implemented in customer environments. Any issues or vulnerabilities discovered are communicated to the development teams to be corrected through our

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				change control process. They are re-tested once a new version of software is available.
15.7	If a security event is detected, a process must exist to notify the City and support any customer questions/concerns. Describe this process.	X		Security updates are presented in the security users group meetings which is one of our several customer-run customer sub-committees. We recommend that a WAUCHULA IT representative participate in this group. If a security vulnerability is discovered and validated, Sensus is committed to a timely release of information and certified patches on the various components of our products. To ensure secure quality products, Sensus is committed to providing the following: High Risk Vulnerability: • Notification of plan within 24 hours of release from Sensus or third party. • Assistance with mitigating controls and configurations. • Certification of software update within 30 days. Medium Risk Vulnerability: • Notification of plan within three (3) business days of release from Sensus or third party. • Assistance with mitigating controls and configurations. • Certification of software update within 90 days. Low Risk Vulnerability: • Notification of plan within ten (10) business days of release from Sensus or third-party • Assistance with mitigating controls and configurations. • Certification of software update provided with next release of Sensus software.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
15.8	Has a security issue forced a component or system update in the past 12 months? If yes, describe that incident and the response.	X		Yes. Typically, monthly, security patches are performed on our systems to stay current with the ever evolving need to improve security as new threat vectors develop.
15.9	For managed services, please detail the location of servers, backup systems, and associated security plans—cyber and physical.	X		For our Software as a Service (SaaS) customers, Sensus maintains data centers in Raleigh, NC, and Boise, ID. One location will be your primary data center with the other serving as the disaster recovery site. As a global technology leader in AMI solutions, Sensus is committed to information security and ensuring that your data is safe and protected. This commitment extends to Sensus' assets and information, customer-hosted environments, and solutions developed by Sensus for our customers. To ensure this commitment to information security, Sensus has developed information security policies specific to our organization and products. These policies address a variety of business and technology areas, including network, system, and application security. Our policies provide guidance to Sensus personnel within the information security domain and ensure our compliance with government regulation, industry standards, and information security best practices.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
15.10	Role-based security must be implemented to allow the City to restrict functionalities to various levels of its personnel to prevent unauthorized activities. An example of this is the water meter disconnect. This ability and other such critical functions must be able to be restricted by City-defined roles.	X		Head End System - User Management The Head End System uses Role-Based Access Control (RBAC) to its interfaces to validate access, ensure separation of duties, and restrict access to critical functions. This approach provides a granular level of access control for the various roles required by complex organizations. User Permissions User permissions define what actions each user can perform. Permissions are not only related to read and write functions, but also access to features and actions available within the system. User Roles User roles are a convenient way to provide a new user with the appropriate permissions, as many users are comprised of the same type and have the same permissions. The utility can define common user roles, and then are able to quickly determine what user type a new user is when adding them to the system. If permission changes are made at the user role level, any user with that user role will get the new set of user permissions without the administrator having to edit every single account. The system provides a default set of pre-defined user roles for out-of-the-box convenience. You can create and edit unlimited roles with granular permissions, depending on your access control needs.

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16 SYSTEM PERFORMANCE

Please fill out the table below.

Table 16-1. System Performance

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
General				
16.1	Excluding planned outages for maintenance, system operational availability shall be 99.9%.		X	Sensus will commit to mutually agreed service levels (SLAs) for your FlexNet system in the SOW which will have a section for service level agreements. The FlexNet system we have proposed for you provides 100% RF coverage and 100% redundant coverage of the water meters, electric meters, and DA endpoints in your service territory using 14 base stations. Sensus guarantees 99% or higher availability (uptime) for your SaaS Head End System. Notably, the Head End System has observed availability in Software as a Service (SaaS) production environments of greater than 99.5% availability. Please refer to Attachment C: Sample AMI Agreement for SLAs on system uptime rate.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.2	Describe all occurrences that could cause communications degradation and affect required read success rates and the percentage of bandwidth loss expected for each occurrence. This includes environmental issues such as rain, seasonal foliage changes, etc.	X		The FlexNet system, which uses our primary-use RF frequencies, is designed to provide high performance in all-weather environments. We have designed your FlexNet system to account for both your local terrain and clutter (which includes foliage, buildings, and other obstacles as described in the propagation study.) Selecting a FlexNet AMI system also offers your team the assurance of protection from RF interference – guaranteed by the FCC. Your AMI system will be the only authorized user of your RF frequencies in your service area which we will assign to UICNSB for the life of your system. Sensus' All Paths Always (APA) architecture enables your endpoints to communicate to the Head End System through all nearby base stations all the time, 24x7x365. This continuous, overlapping RF coverage provides additional capability to achieve continued performance – especially in severe weather. For water meter installations, the SmartPoint's RF transmissions will be impacted if the location is under water due to a storm surge or hurricane. The amount of signal degradation will vary depending on the depth of the water at the site. Once the water recedes, the location's performance will go back to normal.
16.3	The hosted AMI network shall be monitored for performance, with regular reports to the City of read success and other critical KPIs. Describe monitoring and reporting of the AMI network performance.	X		The Head End System offers several monitoring and real time performance screens that can be used by your team to verify your system's performance – 24x7x365. Sensus will work with your team to define KPIs for inclusion in the SOW for your FlexNet system.
Billing Demand Reads				

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.4	Loss of any previous demand and consumption registers for demand meters shall be 0%. This may be achieved by retries that read previous demand registers if needed but no loss of demand data shall occur. Describe your electric meter demand reset and read process that ensures this level of performance. This requirement also applies to any meters that are configured for TOU with demand.		X	Sensus cannot guarantee a perfect 0% loss; however, we have mechanisms built into the system's design to retrieve missed messages. An example where a 0% level is challenging is if a meter has not communicated because it is powered off and can't communicate. Another example is when the paperwork processing a meter change-out has not gone through yet and a meter has been swapped out for another. The Head End System supports the ability to receive demand and TOU readings from electric meters in the field. For missing electric meter reads, including demand reads, the Head End System supports an automated backfill process where missing reads are requested from meters in the field. No user intervention is necessary in this process. In addition, the Head End System supports the ability to ping a meter for its missing readings. Electric meters may be programmed to perform the demand reset themselves, or the Head End System supports the ability to receive demand reset requests from WAUCHULA 's integrated CIS or other third-party software. These 3rd party software requests are automatically processed by the Head End System as they come in.
Register and Load Profile (LP Interval) Reads				

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.5	Ninety-eight percent of electric and water LP data shall be read daily and be available by 1 AM. This is required for intervals as short as 5 minutes for all meters.		X	Most meters send in their final reading of the day at midnight. The register read transmission times, frequency and time of day is configurable by the utility in the meter programs. The FlexNet system is designed to perform backfill as a normal process to acquire any missing reads that have not in yet. This tried-and-true procedure has provided our utility customers with high read success. For backfill to have time to run, time is needed for additional readings to come in. Currently, the next billing read for electric and water meters is scheduled to come in around 4 a.m. to fill in any missing readings. FlexNet is constantly performing this backfill function; therefore, a 1 a.m. deadline may or may not be relevant. We interpret this requirement to be more relevant to systems on a single time read. Our system typically needs more than an hour to complete the fill-in process, but with the low latency design of FlexNet, it is highly likely that an excess of 98% is achievable. Once the backfill process completes later in the morning, missing rates will become available.
16.6	A retry strategy shall automatically collect missing reads, ensuring 100% of register and LP data for any given day are read within 3 days.	X		We have designed FlexNet to meet a goal of 100% coverage for all of your electric and water meters. In addition, our system provides 100% redundancy coverage for your meters.
On Request Reads				

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.7	On-request reads from the head-end system for any metered or status quantity from any electric meters shall succeed in 10 seconds or less for 98% of attempts.		X	Different endpoint types support different response times. For electric meters and DA endpoints, which are electric powered devices, fast speeds are supported. Water meters and SmartPoints, which are battery powered, require longer response times to maintain their on-board battery's life. Instantaneous on-demand reads are available for electric endpoints and typically arrive in 10 seconds once the meter receives the request. On average, water endpoints respond to on-demand read requests in 30 to 90 seconds for a small group of meters. These readings will be from the meter, not old, stored data in the SmartPoint. For on-demand requests from large numbers of water meters, a broadcast method is used which takes about 4 hours to return the data.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.8	For water meters, on-request reads shall succeed in 15 seconds or less for 98% of attempts. Describe the on-request read mechanics for water—values in real-time from the meter or last read value stored in a data concentrator or some other device.		X	As discussed in Requirement 15.1.8, communications to water meters and their SmartPoints are designed to preserve long battery life. These readings will be the latest reading available in the meter itself. Water SmartPoint On-Demand Reads Water SmartPoint communication modules provide the ability to conduct on-demand reads from water meters, and these reads can be accomplished in one of two ways, depending on the use case. There are three use cases supported by the FlexNet system for on-demand reads of water meter endpoints. We have designed these use cases to support fast responses for smaller numbers of meters, where the information is needed quickly, as well as being able to support large batch on-demand requests. The FlexNet system will automatically use the fastest means based on the number of meters in each on-demand request. The first two use cases below use individual queries to each of the respective meters, and these are completed one at a time. The third option, which is designed for large batch requests, uses a parallel strategy where all meters are queried simultaneously after the last billing read transmission, which occurs every 4 hours. • For the use case where a utility Customer Service Representative (CSR) needs to ping a water meter while on the phone with a customer, the FlexNet system supports fast on-demand responses. Typically, the on-demand read will be received by the representative in 30 to 90 seconds. • For the use case where up to 240 meters are being reached, and an on-demand read is needed, the on-demand read response is about 1 minute per meter. • For larger-batch on-demand read requests, the FlexNet system uses a parallel communication strategy called Listen After Talk (LAT). This method is designed for large-batch requests and will return the requested on-demand reads in about 4 hours.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.9	Low payload responses minimally including meter pings shall respond in 2 seconds or less 98% of the time.		X	The FlexNet system supports fast communication with different endpoint types support different response times. For electric meters and DA endpoints, which are electric powered devices, fast speeds are supported. Meter pings responses for electric endpoints typically arrive in several seconds of receiving the ping from the Head End System. Water meters and SmartPoints, which are battery powered, require longer response times to maintain their on-board battery's life. On average, water endpoints respond to pings requests in 30 to 90 seconds for a small group of meters. For large numbers of water meters, a broadcast method is used which takes longer. In outage situations, when some electric meters are often powered down, the Head End System supports the ability to automatically ping electric meters based on their normal communication success metrics. A % confidence number is entered by your team; the Head End System will ping each meter indicated an appropriate number of times to achieve this % confidence that a meter is powered up or powered off. This solution has been designed in conjunction with our customers to help in the outage restoration process.
Disconnect/Reconnect				

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.10	Electric meter disconnect and reconnect requests shall occur after initiation with confirmation received within 30 seconds for 99% of requests. Any disconnect request must also return the current register read.		X	The Head End System sends connect/reconnect commands to electric and water meters in the field. This can be accomplished using a job in the Head End System itself, or with a manual request, or via requests from an integrated third-party software. Confirmation of the connect/disconnect will be available in the Head End System GUI within minutes with most electric meters responding within 30 seconds. A register read may be retrieved too using an on-demand request which requires another Head End System request to the meter. On average, water endpoints respond to commands and requests in 30 to 90 seconds for a small group of meters. For larger groups of water meters, a broadcast method is used and is a longer process, as described above.
16.11	Water meter disconnect and reconnect requests shall occur after initiation, with confirmation received within 1 minute for 99% of requests. Any disconnect request must also return the current register read.		X	The given time frame for a full activation and acknowledgment is 2 minutes. While most operations occur within the 1 minute time frame.
Outage/Restoration Information				

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.12	Individual electric meter outage and/or restoration shall be reported to the head-end system and viewable on the UI within 1 minute for 99% of occurrences.	X		Sensus expects that WAUCHULA will receive outage alarm messages in the initial outage alarm time block (0 to 32 seconds) for an electric meter. Configurable Outage Detection Time Threshold Each time the FlexNet transceiver in an electric meter detects the absence of power at the meter, an algorithm prompts it to evaluate the condition to determine whether the loss of signal is due to a momentary outage or a permanent outage. The type of outage reported is defined based on a configurable time threshold in the electric meters. WAUCHULA can program the meter to recognize a permanent outage after detecting an absence of power for as few as 8 seconds or as many as 120 seconds. Normally the time selected is after the distribution line's protective devices -- breakers, reclosers, and lateral fuses – have operated before a permanent outage is declared. Outage alarms are available for viewing in the Head End System's Device Manager GUI and can be passed to other integrated WAUCHULA software systems via the Head End System's real time MultiSpeak AMI interface, if desired
16.13	Outages and/or restorations including 200 meters or less shall all be reported to the head-end system and viewable on the UI within 1 minute for 99% of the affected meters.	X		Sensus expects that WAUCHULA will receive these outage alarm messages in the initial outage alarm initial time block (0 to 32 seconds). As noted above, the Configurable Outage Detection Time Threshold, in the electric meters' program will impact the reporting time for declaring a permanent outage condition.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.14	Large scale outages and/or restorations including up to the entire the City electric meter population shall be reported to the head-end system and viewable on the UI within 5 minutes for 99% of the affected meters.		X	In a FlexNet system, electric meters are designed to transmit four outage alarms over ten minutes following a permanent outage. The 10-minute hold up time is maintained by a supercapacitor on the FlexNet transceiver in the electric meter. Sensus customers have told us that their FlexNet system provides them with timely outage and restoral information which helps them restore power faster to their customers. Sensus expects WAUCHULA to receive most outage alarm messages in the initial time block (0 to 32 seconds). After the momentary outage time threshold is exceeded, the meter randomly sends the first permanent outage notification within a timeframe of 0 to 32 seconds. It then randomly sends three subsequent messages in successive 184-second windows. Each successive message increases the probability that the outage notification will be successfully received by the base station's nearby when a widespread outage condition occurs.
16.15	Text messages and emails sent as part of the outage and restoration information system shall be initiated within 1 minute of the head-end system receiving the related notification.		X	Emails and text notifications are supported. The time to send is longer than one minute.
Over the Air Firmware Updates				
16.16	Field devices shall continue their normal operation during a firmware update. Once the new firmware image has been completely received, the system shall include the ability for the City to switch to the new image on an individual device or group of devices. The download should take no more than 1 day per device, 2 weeks for all devices, and the switch should take less than 5 minutes.		X	All endpoints continue to operate normally during a firmware update. Under the proposed NaaS model, Sensus is responsible for all firmware upgrades throughout your system. Once the new firmware download to the meter has been confirmed to be valid, the switch to the new firmware file will be a few seconds. The process of upgrading all your endpoint firmware may take longer than two weeks based upon the quantities of units being updated for your system.
System Scalability				

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
16.17	System must be scalable to continue to satisfy the City's future needs throughout the managed services contract period. While no DA devices are planned to this point in the project, support for DA devices identified by proposer in numbers typical for a utility the size of the City must be supported in the future without degrading any of the system functionality implemented. Provide confirmation the proposed system meets this requirement and provide the assumptions made including number of DA devices assumed, type of devices and network bandwidth requirements for each.	X		Sensus has designed a robust FlexNet system that provides 100% RF coverage and 100% redundancy for your electric meters, water meters, and DA endpoints as listed in your RFP. The system also has room to grow over time.

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17 FIELD INSTALLATION AND WORK ORDER MANAGEMENT SYSTEM

17.1 General

Please fill out the table below.

Table 17-1. General Project Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.1.1	Identify and describe the Proposer's prior experience with the planned installation subcontractor.	X		
17.1.2	Identify and explain any constraints or preferences the Proposer has regarding the order of installation of field devices (e.g., electric meters before water meters).	X		No Constraints both meter types will be installed simultaneously
17.1.3	The City will supply a list of VIPs to the Supplier's installer. Also, there are no medical disconnects. The installer will consider these items when scheduling appointments and managing customers.	X		Procedures for VIP and Medical critical customers is included in our procedures
17.1.4	Describe the personal protective equipment used by installers. Also, describe field practices and the safety processes to ensure equipment is maintained, checked, and adequate for safe usage.	X		
17.1.5	The Proposer shall discuss how a temporary installer stand-down requested by the City would be implemented and include pricing in the supplied Pricing sheet.	X		

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	The City reserves the right to issue a stand down at no cost due to excessive or significant safety violations.			
17.1.6	The City will supply fenced storage and limited offsite office space for the Supplier's installation subcontractor. Describe the installer's needs in this area.	X		
17.1.7	The Supplier shall ensure that its installation subcontractor is provided with all training and documentation related to the Supplier's products needed to execute safe, high-quality installations of all devices.	X		
17.1.8	The Supplier or its subcontractor will supply all required field installation tools, including handhelds.	X		
17.1.9	Supplier will be responsible for resealing meters. Required seals and rings to be supplied by the City.	X		
17.1.10	The Supplier and its installation subcontractor shall use handhelds capable of scanning meter/module bar codes, and the WOMS must include processes that ensure that the bar code of the installed meter/module is scanned post-installation such that the data exported to the City's billing system is ensured to contain the correct meter to customer correlation. For water meters, this process must also ensure proper correlation of the meter module serial number to the water meter body serial number.	X		
17.1.11	The City's water account billing is organized into five billing cycle periods with fourteen manual	X		

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	reading routes. The Supplier must work with the City to develop a strategy to avoid billing interference during installation. This may or may not require a billing blackout window. The Proposer shall provide its initial input to this approach as a part of their proposal.			
17.1.12	Handheld devices must be secure. Describe the security features enabled in installer handhelds.	X		
17.1.13	Installers shall use a mobile work-order management system to manage the meter deployment.	X		
17.1.14	The Installer WOMS system must retain access to all installation-related documentation (pictures, notes, account information, etc.) for 3 months after the conclusion of the deployment.	X		
17.1.15	Describe the integration process for establishing data exchange between the proposed WOMS system and the City's CIS system and ensuring these systems stay synchronized throughout the deployment process.	X		
17.1.16	The Proposer should describe the premise data that the City will need to provide per premise for use by the installer.	X		All software will be Cloud Hosted. Any field software will be installed on either a Windows PC or Android handheld device.
17.1.17	The Proposer shall discuss how changes to the City's metering system data, such as new accounts, are communicated to the Supplier so they can update their Workorder systems during the project.	X		

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.1.18	The Proposer shall describe all meter programming data requirements the City must supply.	X		All configuration profiles will be set up and installed on handheld devices and City PCs by Core & Main/Sensus. Requirements are standard Windows PC and/or Android handheld device.
17.1.19	The Proposer shall include in the supplied pricing sheet the pricing for the appropriate number of City-owned handheld devices required for the meter population in this RFP for future meter programming and troubleshooting required by City field personnel.	X		It is recommended that at least 3 devices are purchased.
17.1.20	Describe in detail the field and material management processes, including: • Receipt inspection. • New installer onboarding/training so the installer can install independently. • Safe driver training and instruction. • Material issuance to installers. • Inventory control and periodic true-up. • Return material authorization. • Return to utility process—number of attempts, etc.	X		
17.1.21	Describe the proposed due diligence process to ensure accounts that are not exchanged upon the initial site visit (e.g., Can't Complete) are systematically processed to maximize installation success rate. Please include: • Number of site visits (minimum of 2) • Number of calls for scheduling appointments including number of after-	X		The process will be tracked through the Installation WOMS. This process will include multiple attempts before an installation is returned to the City for further investigation.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	hours calls (minimum of 3 calls with one being after-hours) • Proposed sequence of visits and calls including duration between events			
17.1.22	The installer must capture GPS coordinates for all field-installed devices and meters, upload them to the head-end system, and make them available for the outage visualization portal. Lat/Lon in decimal degrees is preferred, with a six-decimal place resolution collected at the point of the physical meter with accuracy dependent on the device used for collection. Sub-meter accuracy is not a requirement. Proposer to specify delivered accuracy at the point of the meter. Preferred accuracy is within 2 meters of the physical meter.	X		
17.1.23	The Supplier shall submit all proposed attachments to City-owned infrastructure for prior approval.	X		
17.1.24	The Supplier's installer shall provide pricing in the supplied pricing sheet for meter box remediation, including: • Leaks upon arrival (notify the City). • Meter box damage. • Box too low or high. • Tree root intrusion. • Apparent tampering (notify the City). • Safety concerns. • Sites requiring repairs. • Obstructed meters.	X		

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	• Damaged electric service entrance			
17.1.25	The City desires that the installation portion of this project be turnkey to the extent possible. As such, the Proposer should include pricing in the supplied pricing sheet and other blocking conditions that the installer has encountered in other projects.	X		
17.1.26	The Supplier will provide pricing in the supplied pricing sheet for replacement lids and meter boxes to repair damaged units encountered during deployment. The City will provide the purchasing standard for these items.	X		
17.1.27	The Supplier will provide pricing in the supplied pricing sheet for remedying meter boxes substantially below or above grade.	X		
17.1.28	The Supplier will provide pricing in the supplied pricing sheet for remediation of any as-found damage/deficiencies in plumbing connections including materials.	X		
17.1.29	The Supplier will provide pricing in the supplied pricing sheet for remediation of meter yokes or risers that are encountered in need of repair. Bidder to provide replacement materials.	X		
17.1.30	Standard working hours for installation activities are Monday-Friday, 7 AM to 4 PM (last install). Fieldwork outside these hours, including weekends, must have prior approval from the City.	X		

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	While not preferred, weekend work can be supported if needed to remediate the project schedule.			
17.1.31	The Supplier to describe its Quality Assurance (QA) field installation audit process. Provide details demonstrating that audits are conducted by an independent auditor (prevent self-audit), randomization such that all installers are periodically audited, target audit percentages (% of installs) throughout the deployment period, and typical items that are audited as part of the process.	X		

17.2 Return Material Authorization (RMA) Process

Please fill out the table below.

Table 17-2. RMA Process Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.2.1	Describe the RMA process used during installation and afterward by the City. Describe the process for products under and out of warranty. Include each type of device provided by the Proposer.	X		
17.2.2	Describe the level of root cause analysis provided with each RMA returned to the City.	X		
17.2.3	Describe the historical RMA turnaround times for each device type proposed for this project.	X		

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17.3 Call Center

Please fill out the table below.

Table 17-3. Call Center

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.3.1	Describe the call center process to be used during installation for appointment scheduling. This includes appointment scheduling from customer call-ins as well as call center staff pro-actively calling customers to setup appointments.	X		Please see Installation Scope Documentation
17.3.2	Describe the customer complaint resolution from the initial call to the final issue resolution.	X		Please see Installation Scope Documentation
17.3.3	Describe how this call center will be integrated with the City's call processes. Describe the ability to access call center records, including notes taken at calls.	X		All of our customer appointments are scheduled in out WOMS, Cities call center staff can be provided limited access to view technicians scheduled appointments for customer service.
17.3.4	Describe hours of call center operation and support for after-hour calls (5 PM to 8 PM).	X		Bermex does provide Call Center in Florida from 5pm to 7pm. Customer can schedule appointments via our portal 24 hours a day or leave a voice message and we will return calls from 8am to 7pm Monday-Friday
17.3.5	Describe and provide any scripted responses used by the call center.	X		Call Center Scripts will be detailed out during our kick off meeting with the utility as these are all unique to each installation. Our team will prepare the scripts and present prior to project kickoff
17.3.6	Describe the call center recording process for recording calls between representatives and customers.	X		All Calls are recorded and archived for 30 days. These can be converted to digital wave files but are bookmarked by the time and call center rep when they initiate the call
17.3.7	Describe the call center issue escalation process.	X		See Installation scope document

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.3.8	Describe your customer notification and scheduling process and the call center's role.	X		Customer notification is done by postcard, doorhanger and phone call. Postcards have QR link to our 24 hour portal for appointment scheduling. Please see Installation Scope Document for further details
17.3.9	Describe all planned door hanger notifications, their placement time, and their content.	X		Please see Installation Install procedures for doorhangers
17.3.10	Describe all planned customer notification letters, the time they were sent, and their content.	X		Each postcard will be designed specifically for each project. They will detail project scope, time when will be in area to commence installs and how to contact Bermex or a City representative
17.3.11	Call center personnel should have visibility into the WOMS field scheduling for informed customer discussions.	X		All CSRs will have access as appointments are scheduled in WOMS
17.3.12	Describe all call center audits and processes for corrective measures.	X		Please see Installation Install scope documentation

17.4 Scrap Material

Please fill out the table below.

Table 17-4. Scrap Materials

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.4.1	The Supplier will process all scrap meters and City-owned scrap materials (electric meters, water meters, water modules) on a mutually agreeable periodic basis.	X		

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	The City does not have a retention requirement for legacy meters prior to disposal. Picture documentation will be utilized to address any customer questions.			
17.4.2	All disposal permitting (including for batteries) is the Supplier's responsibility.	X		
17.4.3	The Supplier will provide an option for disposing of water and electric meters for a set administrative fee while providing remaining credits to the City for acceptable scrap value of materials. Credits would be offset from outstanding invoices.	X		Administrative Fee of 15% is added to all Credited Invoices

17.5 Personnel

Please fill out the table below.

Table 17-5. Project Personnel Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.5.1	The Supplier will be responsible for the complete training of their installation contractor personnel. Describe that training, including safety and QA aspects. Describe the incremental qualifications required for transformer rated electric installers, larger commercial or compound water meters.	X		Please see AMI electric and water field training course outlines in Bermex File.
17.5.2	Describe the field supervision structure envisioned for the installation phase of this project.	X		Project Manager who will oversee the project, Field Auditor who is responsible for conducting audits on completed inspections daily, these audits are used for training and process improvement. Desk Auditor who

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
				reviews all data entry to ensure that all information is captured correctly and provided to the customer daily.
17.5.3	The Supplier's installation subcontractor personnel must wear a picture identification badge that is visible to customers. Describe this badging process.	X		Employees is provided with a company badge from Bermex, we also like to have a badge supplied by the Utility/City showing us a contractor for the project. All badging is kept displayed on the outer most garment and provided to customers for review. We do not allow customers to take our badge but may view it on our person.
17.5.4	The Supplier's installation subcontractor personnel must be uniformly dressed and drive vehicles easily identifiable with the company name and logo. Describe how this will be implemented. Project-specific signage must be reviewed and approved by the City.	X		All Vehicles are provided by Bermex and are uniform in their appearance, are clearly marked with decals. We will add additional decals to the vehicle stating contractor working for the city and will have the decal approved prior to printing
17.5.5	Describe the installation subcontractor background and drug testing processes.	X		All employees are put through Preemployment, Post Accident and Random drug testing. Additional each employee goes through a background check to confirm National felony search, National Sex offender Registry, Driving Record, Education, and Local and State Criminal Search
17.5.6	The City shall have the right to deny installers access to City property and request their removal from the project for any reason.	X		
17.5.7	The Supplier's installation subcontractor personnel must be fluent in the English language.	X		

17.6 Safety and Environmental

Please fill out the table below.

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Table 17-6. Safety and Environmental Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.6.1	The safety of the City's customers, employees, and subcontractors is paramount. Personnel safety only supersedes environmental protection as a City concern. The City expects all Supplier and/or subcontract personnel on City property to observe the City's safety and environmental processes and all applicable state and federal rules and regulations.	X		
17.6.2	The Supplier's installation subcontractor shall have a documented safety training program to which all installers must adhere. Provide this document if a subcontractor has been selected.	X		Safety Documentation attached
17.6.3	All safety issues or accidents during installation must be reported to pre-established/agreed City staff and organizations immediately. Provide this proposed process.	X		Incidents are documented in our WOMS, Pictures taken and reported immediately via phone to Utility contact. Incident remains open until cleared by the Utility
17.6.4	The Supplier must provide the required safety training to all installers. The installer/Supplier shall provide OSHA 300 reporting. Training shall include, at a minimum, electrical and arc flash hazards.	X		
17.6.5	Describe your overall safety program, including training, protective gear/PPE issuance and maintenance, audits, reporting, etc.	X		Please see AMI electric and water field training course outlines in Bermex File.
17.6.6	Describe your safety driving training program (e.g., Smith Driving or equivalent).	X		Each vehicle is tracked using Real Time GPS and monitors for bad driving behavior. Additionally drivers are put through Smith Systems driving course

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17.7 AMI Electric Meters

Please fill out the table below.

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.7.1	The Supplier's installation subcontractor shall follow a process to ensure electric AMI meters are readable from the head-end system post-installation before invoicing.	X		
17.7.2	The City has some net-metered customers now and expects more to be added. These customers will have a meter that is configured to read delivered and received energy. It is anticipated that all AMI electric meters will have the ability to meter delivered and received energy. How will any net-metered customers be identified to the installer such that delivered and received energy is delivered to the head-end and made available for billing? Proposer to describe process.	X		These customers will be noted by the City, then the WOMS will make note of each account that is under these requirements.
17.7.3	Supplier shall be responsible for defining logistics and managing meter base repairs (e.g., meter box, lid, internal components, overhead service line, or other condition requiring repair). Supplier shall utilize a licensed local electrician to ensure that all work is completed to the City's standards.	X		

17.8 AMI Water Meters

Please fill out the table below.

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Table 17-7. AMI Water Meters Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.8.1	The Supplier's installation subcontractor shall follow a process to ensure water AMI meters are readable from the head-end system post-installation before invoicing.	X		
17.8.2	The Supplier shall be responsible for defining logistics and managing all plumbing repairs encountered during installation (e.g., valves, broken pipes, etc.,) including materials. The Supplier shall use a locally licensed plumber to ensure all work is completed to the City's standards. Pricing for repairs shall be included in the supplied pricing sheet.	X		

17.9 Network

Please fill out the table below.

Table 17-8. Non-Metering Network Device Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.9.1	The Supplier's installation subcontractor shall follow a process to ensure all non-metering network devices communicate with the head-end system post-installation before invoicing.	X		

17.10 Photos

Please fill out the table below.

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Table 17-9. Photo-Documentation Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
17.10.1	The installation subcontractor shall obtain before and after photos of all meters. The photos must include clear views of the meter register reading and serial number.	X		
17.10.2	The Proposer shall describe the file naming convention and process for capturing and storing these photos. All photos and other site data will be provided to the City via mutually agreeable secure media at the end of the project. They shall be easily searchable and tied to an agreed account reference/key. The City shall have access to site photos during the rollout within 2 days of each installation.	X		Each picture is captured and uploaded to our Work Order Management System. A PDF work order can be generated for each install and the city may archive them for future use
17.10.3	All photos will be date and time-stamped and geotagged.	X		
17.10.4	The installer will purge all City-specific data, including photos from its system and handhelds after the archive is delivered at the end of the project.	X		

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18 ACCEPTANCE TESTING

Please fill out the table below.

Table 18-1. Acceptance Testing Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
18.1	The Supplier will submit a functional acceptance test plan to allow the City to verify the functionality defined in this specification, including integrations to City systems as specified herein.	X		Our solution complies with this requirement.
18.2	The meter system test fixture (defined previously) will be used to support functional acceptance testing. As such, the Supplier should ensure this board is populated with all devices needed to test the system fully.	X		Sensus will build and supply a demonstration board with all endpoint types and meters being deployed on your FlexNet network. These endpoints will communicate to base stations installed in your network as well as WAUCHULA ’s Head End System. The meter demonstration board will be able to be used to fully test meters types like those installed in your service area.
18.3	If special test equipment is needed to exercise a system function, the Supplier shall loan such devices to the City for the test duration.	X		We acknowledge and accept this requirement, though this was not anticipated.
18.4	Functional acceptance testing will be performed successfully before deploying field hardware.	X		Typical SOP dictates that a small representative population of test meters are deployed upon the completion of the base station infrastructure deployment. This initial step allows for the evaluation of both the network and meter’s performance and behavior, providing a demonstration prior to the commencement of mass deployment. Sensus understands the billing system integration will be completed and tested prior to meter installations in the field.

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18.5	The City intends that meters configured to their requirements, including nameplates, be tested as a part of the functional acceptance testing. The Supplier must ensure meters meeting City requirements are populated on the meter system test fixture.	X		Our solution complies with this requirement.
18.6	The Supplier will submit a final acceptance test plan to allow the City to verify the functionality defined in this specification, including integrations to City systems as specified herein, with most field meters deployed.	X		Sensus' Professional Services team manages your entire end-to-end integration requirements. We work with both utility and third- party vendor stakeholders, as needed, to identify the integration requirements, such as data flows and integration methods. Once we understand the complete solution requirements and your team agrees on the scope of the work, we begin integration work based on the agreed supplemental Statement of Work. As an integral part of the service, Sensus will perform the testing and validation of integration between the Head End System and your third-party systems. Testing will verify that the data and integration points are flowing as outlined, per technical and business requirements. Pricing for these services is included in AMI Software Integration Services provided in Table 22-1.
18.7	Final system acceptance testing (SAT) will be conducted when 95% or more field meters are deployed. The test shall confirm the system's operational readiness and resolve any outstanding issues from the functional acceptance testing.	X		Sensus acknowledges this requirement.
18.8	As the pricing section notes, system payments are governed by passing the initial and final acceptance testing. Mutually agreed-upon percentage completions govern field device and installation costs.	X		Sensus acknowledges this requirement.

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19 TRAINING

Please fill out the table below.

Table 19-1. Training Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
19.1	Please list all applicable training courses to be provided on-site, via the Internet and off-site locations. Also, list refresher training(s) and the number of trainees permitted. All training must be comprehensive enough to ensure City staff can effectively install all products offered and operate all systems and software. Topics that must be covered in the training include, but are not limited to, the following: • Meter installation. • Meter troubleshooting. • Meter configuration. • Handheld usage. • Network components. • An overview of the AMI product and head-end software. • System operations and troubleshooting, including interactions among endpoints and network devices, network devices, and the AMI head-end, as well as interaction between the AMI head-end and other system components such as MDM Lite, OMS, and customer portal. • Identification, management, and resolution of events and alarms. • Customer portal administration.	X		As a new FlexNet customer, throughout deployment and implementation, Sensus offers a stepped learning approach to gradually educate your team. The purpose of this training is to not only help WAUCHULA staff become operationally effective as quickly and efficiently as possible in running your FlexNet system. It also affords access to the core library of learning aids for expanded learning and for new employees for tomorrow. Please see Attachment L: Training Course Catalog.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	• Tyler ERP Pro system integration usage.			
19.2	Provide a typical training schedule that contains lessons, suggested attendees, and durations.	X		Please see Attachment L: Training Course Catalog.
19.3	The number of trainees allowed for any or all types of training must be clearly defined in the Proposer's responses. Provide a training plan which outlines the requirements listed above. The plan should include facilities and/or resources required.	X		There is no limit on the number of attendees in any given training. However practical considerations should be taken to ensure there is adequate instructor time to answer questions. Facility requirements are dictated by the class. That said, minimum requirements for classroom-based instruction include: • Projector or Similar Display Screen • Wi-Fi / High Speed Internet • Adequate seating for attendees • Student computers for practical instruction, in some classes
19.4	At the end of training, maintenance personnel will understand proper installation and maintenance procedures, as well as the use of the AMI head-end software system.	X		We agree and have incorporated this need in our training. Maintenance procedures are a key component to the successful long-term operation of any AMI system. Maintenance personnel who are educated on head-end operation can often avoid field visits that would have been otherwise necessary.
19.5	Describe the training materials to be provided for each course.	X		Attendees will be provided with the following documentation, which is available online and as part of our training materials. • System overview description • System flow charts (provided as part of our Solution Design and architecture) • File descriptions and record layouts • Description of program function and logic • Operating procedures • Screen layouts • Data entry procedure • Report descriptions • Descriptions of all user options and operations

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	• Descriptions of all error messages are provided in the product user manuals. • Security documentation (that is, hardening guidelines). Sensus provides hard copies to all participants attending the instructor-led training event. Materials include a Student Manual and any accompanying Job Aids.
19.6	Describe the availability of refresher training and future training for new employees.	X		Follow up training is available. This is a key area where Core & Main's local staff and/or Sensus specialists can provide added value long after the project is complete. We recognize that while initial system training is very important, new questions will arise over time as staff changes.

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20 CONTRACTUAL OBLIGATIONS AND WARRANTIES

Please fill out the table below.

Table 20-1. Contractual Obligations and Warranty Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.1	Water meter/module water ingress failures are critical problems. The Proposer should identify any projects where they have experienced water meter/module failure that resulted from water ingress. Describe the situation(s) in detail, including how the issue was resolved for each project and how the product was modified due to this issue.	X		Project: Redesign of iPERL water meter Date completed: Q3 2014 Project description: Sensus began using a potting material to better protect the meter's electronics if the unit became submerged in water. Following the redesign, failure rate for issues related to water intrusion decreased substantially. Water intrusion related failures are 0.67% of all confirmed iPERL meter failures since 2014. Project: Redesign of OMNI Register Date completed: Q4 2018 Project description: Sensus made improvements to the manufacturing process regarding treatment/preparation of the OMNI register cups prior to potting. This resulted in a significant reduction of water ingress into the register which were confirmed in engineering tests.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.2	Proposer to provide historical annualized hardware failure rates over the last 3 years for the 2S electric meter being proposed. Failure rate = (failed meters that were produced in year x)/ (total meters produced in year x). If you cannot provide the exact answer, is the rate less than 1%?	X		Residential electric meters have an expected annual failure rate of 0.5% per year. This number includes the meter itself and the FlexNet transceiver.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.3	If the electric meters use a separately manufactured communication module, Proposer to provide historical annualized hardware failure rates over the last 3 years for the communication module used in the proposed electric meters. Failure rate = (failed modules that were produced in year x)/ (total modules produced in year x). If you cannot provide the exact answer, is the rate less than 1%?	X		The 0.5% annual failure rate for residential meters includes FlexNet transceivers.

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<table>
<tr><th>Rqmt. #</th><th>Requirement Description</th><th colspan="2">Comply</th><th>Comments / Clarifications</th></tr>
<tr><th></th><th></th><th>YES</th><th>NO</th><th></th></tr>
<tr><td>20.4</td><td>The Proposer will provide historical annualized hardware failure rates over the last 3 years for the proposed residential water meter modules. Failure rate = (failed modules produced in year x)/ (total modules produced in year x). If you cannot provide the exact answer, is the rate less than 1%?</td><td>X</td><td></td><td>
<table>
<tr><th>(A)
Meter Interface Units</th><th>(B)
Expected Failure rate (Failures/100 units/year)</th></tr>
<tr><td>Year 1</td><td>0.10%</td></tr>
<tr><td>Year 2</td><td>0.10%</td></tr>
<tr><td>Year 3</td><td>0.05%</td></tr>
<tr><td>Year 4</td><td>0.05%</td></tr>
<tr><td>Year 5</td><td>0.05%</td></tr>
<tr><td>Year 6</td><td>0.05%</td></tr>
<tr><td>Year 7</td><td>0.05%</td></tr>
<tr><td>Year 8</td><td>0.05%</td></tr>
<tr><td>Year 9</td><td>0.05%</td></tr>
<tr><td>Year 10</td><td>0.05%</td></tr>
<tr><td>Year 11</td><td>0.05%</td></tr>
<tr><td>Year 12</td><td>0.05%</td></tr>
<tr><td>Year 13</td><td>0.05%</td></tr>
<tr><td>Year 14</td><td>0.05%</td></tr>
<tr><td>Year 15</td><td>0.05%</td></tr>
<tr><td>Year 16</td><td>0.10%</td></tr>
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<tr><td>Year 20</td><td>0.20%</td></tr>
</table>
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</table>

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.5	The Proposer will provide historical annualized hardware failure rates over the last 3 years for proposed collection points and network communication equipment. Failure rate = (failed units produced in year x)/ (total units produced in year x). If you cannot provide the exact answer, is the rate less than 1%?	X		The M400B2 base station has an expected failure rate of 0.5% per year.
20.6	Supplier shall provide a 5-year warranty on electric meters beginning at completion of installation.		X	Extended warranties are available for an extra cost. Pricing information for this option is included in the pricing tables. Sensus confirms that our quoted $1.33/year/meter optional extended warranty pricing is for an extended 5-year warranty for the electric meters. Sensus is willing to mutually negotiate in/out costs if the situation applies.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.7	The Supplier shall provide a 20-year warranty on battery-powered devices such as water meter modules. Any warranty replacements under this warranty shall not involve wire splicing.	X		Our solution complies with this requirement.
20.8	The Supplier shall guarantee all system components are supported through the expected 10-year term of the managed services agreement.	X		Our solution complies with this requirement.
20.9	The Supplier shall guarantee all system components are backward compatible for up to 15 years.	X		Our solution complies with this requirement.
20.10	Proposer shall state terms and costs for optional extended warranties for each category of field-installed equipment in the supplied pricing worksheet.	X		Extended warranties are available for an extra cost. Pricing information for this option is included in the pricing tables

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.11	The Supplier shall be responsible for broad-based device failures exceeding 5% of any installed device category in a rolling 12-month period. The remedy shall be the complete replacement of all potentially affected devices, including field in/out costs for the affected population.		X	Device failure details are available in Attachment N: Terms of Sale and Warranties. In addition, in the unlikely event of described excessive device failures, Sensus works proactively to resolve issues as they arise with utmost attention to your needs and concerns, almost always solving problems with a commercial resolution.
20.12	Provide a detailed list of all subcontractors planned to service this implementation.	X		Concord Utility Services will be the main installation contractor for this project. Established in 2006, Concord Utility Services, a California Corporation, is a utility contracting company specializing in Automated Meter Infrastructure (AMI) and mass meter deployment in the water distribution space. Concord is headquartered in Murrieta CA and serves the national market with office locations in AZ, FL, GA, NV, NC & TX. While Concord's primary objective is to support utilities, cities, municipalities, and districts with mass deployment installation services, Concord offers additional system maintenance and upgrade services such as asset and system audits, asset mapping, conformance and standardization field work, and utility systems integrations to create operational efficiencies that make a difference – in billing, customer service, procurement, and field services. Over the past 17 years and 2.5+ million meter & endpoint installations stand a resolute team of industry experts, including Project Managers, Project Leads, Field Technicians, Operations Analyst, Fleet Manager, Safety Coordinator, HR personnel, IT & Data Managers, and Quality Auditors, who work collectively to ensure the success of each project. Supporting Concord Utility Services will be Allegiant Utility Services Inc. Allegiant Utility Services is a world class utility service organization that has been providing meter installation, meter testing, and meter sales to Municipalities and Electric Cooperatives for over 20 years.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.13	The Proposer will describe what post-contract mobilization and end-of-project demobilization efforts look like.	X		Following successful completion of meter installations and acceptance, demobilization of crews is expected to be a straightforward process. Any leftover material will be returned to the utility for shelf stock. Any rented storage or restroom facilities will be returned. Any WAUCHULA facilities utilized by installation staff will be left in a tidy presentable state. Core & Main will continue to provide post-project support on a local and in-person basis.
20.14	The Supplier will obtain any required FCC radio licenses on behalf of the City, which will be valid for 20 years. License pricing will be reflected in the base price or the monthly managed services fee.	X		Sensus owns the FCC licenses for the RF frequencies we are assigning to your FlexNet system; they will be exclusively yours to use for your FlexNet system for 20 years for your service area.
20.15	The Supplier will obtain all required sub-supplier software licenses on behalf of the City, which will be integrated with the pricing shown for their products.	X		Our solution complies with this requirement. This is a standard feature of our Head End System software SaaS managed service.
20.16	Any materials delivered to the City as a part of this project will be contracted as Freight on Board the City delivery point.	X		Our solution complies with this requirement.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.17	The City reserves the right to sample test any lot shipment received.	X		Our solution complies with this requirement.
20.18	The data must always reside inside the United States for all systems and services provided.	X		Our solution complies with this requirement.
20.19	The AMI system shall not be interfered with by any other RF signals related to commonly deployed FCC-compliant technology (i.e., home electronics and home RF devices, such as wi-fi, appliances, cellular telecommunications devices, etc.). Resolution of such interference is 100% the Supplier's responsibility throughout the anticipated 10-year term of a managed services agreement.	X		Your FlexNet system will operate on RF frequencies that are exclusively assigned for your FlexNet system. If any interference occurs, Sensus investigates the source of the interference and alerts the interferer to filter back their transmitter to comply with our primary license from the FCC.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
20.20	The Proposer shall provide a draft contract for deployment/managed services—a full unexecuted copy of a standard managed services and/or deployment contract. Please note that this requirement does not imply acceptance of any Proposer wording.	X		Please refer to Attachment C: Sample AMI Agreement.

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21 SCHEDULE

Please fill out the table below.

Table 21-1. Project Schedule Requirements

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
21.1	The Proposer will provide a project plan, including an initial schedule showing relevant milestones and the City's initial planning elements, as shown in Table 21-2 and in line with the overall timeframes presented in Exhibit A Section 2.2. The Proposer's installation subcontractor and City staffing requirements should be identified in the schedule based on resource count and skill set.	X		Inserted in attached Appendix – "Sample Project Schedule"
21.2	The project schedule will be refined with the selected Supplier as a part of contract negotiation.	X		

Table 21-2 defines Wauchula 's broad schedule plan for input to the Proposer's proposed project plan.

Table 21-2. Wauchula Conceptual Schedule Elements

Project Phase	Anticipated Activities
Kick-off meeting	• Contract deliverables review. • Overall project plan. • Communications plan. • Deployment plan.

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Project Phase	Anticipated Activities
	• Additional information requirements. • Review proposed KPI and metrics for deployment success. • Training plan. • Safety plan.
Meter system test fixture development	• System test fixture design. • System test fixture construction. • System test fixture usage in testing, training, SAT, and customer education.
System test planning	• Functional System Acceptance Test (FSAT) plan. • Final System Acceptance Test (SAT) plan.
Material logistics	• Discuss shipping and receipt plan. • Discuss the RMA process.
Customer engagement, stakeholder outreach, and education	• Town hall or public meeting materials. • Communications strategy and execution. • Collateral to address negative perceptions of AMI (e.g., privacy invasion). • The City (internal) touchpoints to ensure buy-in from across all staff that the new platform will impact. • Other change management tactics and strategies deemed appropriate.
Hardware specification and meter configuration	• Discuss configuration option decisions to be made by the City, including all meter labeling and configuration issues.
Systems integration	• Installation of meters and other hardware elements and integration of all proposed software with the City's existing platforms, with full testing of all critical functions (e.g., monthly billing) in preparation for acceptance testing. • Acceptance testing (initial and final) as described above in this RFP.
Managed services administration	• Administer all software and maintain reliable points of contact for City inquiries. • Other managed services offerings as defined herein (i.e., ad hoc services or analytics) or via the Supplier's suite of services.

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22 SUPPORT SERVICES

Please fill out the table below.

Table 22-1. Support Services

Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
22.1	The Supplier will provide adequate project support personnel for the project's duration, including a project manager (PM). The Proposer will describe the proposed organizational structure, identify individuals involved, and provide resumes and industry background information for those individuals. Proposer to describe anticipated on-site durations for their PM for various project phases. Please note that the City expects a significant PM presence on-site during FSAT. The City shall have the ability to approve the project manager and/or suggest a new project manager if required.	X		
22.2	The Supplier and/or its installation subcontractor are responsible for all files imported into the head-end system to allow the system to recognize and register meters as they are installed. Training for the City	X		This is standard procedure for our typical AMI deployments.

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Rqmt. #	Requirement Description	Comply		Comments / Clarifications
		YES	NO	
	must include managing this process before and after project completion.			
22.3	The Supplier will support the City in redesigning business processes and define required/no longer required employee roles that can be repurposed related to the AMI program. The Proposer shall describe typical levels of engagement and support in this area.	X		We strongly agree with this approach and will support this effort. Core & Main and Sensus will lead an Integration Workshop for each integration to define and agree to the details of each.
22.4	Several system integrations are required to be provided by the Supplier, as described in Exhibit A Section 14. The Proposer will include pricing for these services in its AMI proposal in the supplied pricing sheet.	X		Our solution complies with this requirement.
22.5	The Supplier will provide adequate support should emergency conditions occur during field deployment (e.g., hurricane). The Proposer shall provide details on emergency response operations to maintain the City's business continuity.	X		Proper procedures will be in place during emergency situations to prioritize the safety of everyone involved, while maintaining a continuance of work.

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WAUCHULA, FL RFP 24-05
ADVANCED METERING INFRASTRUCTURE (AMI) SYSTEM IMPLEMENTATION

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Required Forms

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- 5.1.3 Bidder’s Qualifications
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- 5.1.5 Drug-Free Workplace Certificate
- 5.1.6 Non-Collusion Affidavit
- 5.1.7 Public Entity Crimes Statement
- 5.1.8 Tabulation of Subcontractors and Suppliers

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SECTION 5.1: FORMS TO SUBMIT WITH BID

The following forms must be completed and included in the Bidder's response to this Solicitation. This list represents the forms only and does not include all information and items necessary to be responsive to the Bid Solicitation.

5.1.1 Bid Form

5.1.2 Bid Security

5.1.3 Bidder's Qualifications

5.1.4 Bidder's Statement of Disputes, Litigation, Arbitration, and Surety Completion

5.1.5 Drug-Free Workplace Certificate

5.1.6 Non-Collusion Affidavit

5.1.7 Public Entity Crimes Statement

5.1.8 Tabulation of Subcontractors and Suppliers

5.1.9 Exhibit B – Wauchula AMI RFP Technical Response Template

5.1.10 Exhibit C – Wauchula AMI RFP Pricing Worksheet

SECTION 5.2: FORMS FOR CONVENIENCE

The following forms are included for convenience in the Bid Documents. The Owner may require additional forms during the performance of the Work:

5.2.1 Certificate of Final Completion Form

5.2.2 Certification of Substantial Completion Form

5.2.3 Change Order Form

5.2.4 Contractor's Application for Payment Form

5.2.5 Field Order Form

5.2.6 Notice of Award Form

5.2.7 Notice to Proceed Form

5.2.8 Payment Bond Form

5.2.9 Performance Bond Form

5.2.10 Work Change Directive Form

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5.1.1 Bid Form

PROJECT: City of Wauchula AMI System Implementation

A. Bid Recipient

1. This Bid is submitted to:

   City of Wauchula
   Attn: City Manager
   126 South 7th Street
   Wauchula, FL 33873

2. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the Owner in the form included in the Bid Documents to perform all Work as specified or indicated in the Bid Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bid Documents.

B. Bidder's Acknowledgements

1. The Bidder accepts all of the terms and conditions of DIVISION 1: INSTRUCTIONS TO BIDDERS, including without limitation those dealing with the disposition of the Bid Security. The Bid will remain subject to acceptance for 180 days after the Bid Opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

C. Bidder's Representations

1. In submitting this Bid, the Bidder represents that:

   a. The Bidder has received a complete set of Bid Documents and other related data identified in the Bid Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date
1	July 30, 2024

   b. The Bidder has examined and carefully studied the Bid Documents, Addenda, and the other related data identified in the Bidding Documents, and provided the information to Subcontractors and Suppliers who have provided quotations to the Bidder for the Work.

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c. The Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

d. The Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

e. The Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in DIVISION 1: INSTRUCTIONS TO BIDDERS, and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in DIVISION 1: INSTRUCTIONS TO BIDDERS.

f. The Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplemental examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by the Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bid Documents to be employee by the Bidder, and safety precautions and programs incident thereto.

g. The Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bid Documents

h. The Bidder is aware of the general nature of the Work to be performed by the Owner and others at the Site that relates to the Work as indicated in the Bid Documents.

i. The Bidder has correlated the information known to the Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bid Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bid Documents.

j. The Bidder has given the Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that the Bidder has discovered in the Bid Documents, and the written resolution thereof by the Engineer is acceptable to the Bidder.

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k. The Bid Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

l. Bidder certifies Bidder's authority and qualification to do business in the state where the Project is located.

m. Bidder certifies to the greatest extent practicable, all equipment and products purchased with funds made available under this award should be American-made. To support the efforts, any non American-made equipment proposed must be accompanied by proof of good-faith efforts to utilize American-made equipment such as written quotes, solicitations, advertisements, etc.

D. Bidder's Certification

1. Bidder certifies that:

a. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

b. The Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

c. The Bidder has not solicited or induced any individual or entity to refrain from bidding; and

d. The Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph:

i. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

ii. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of the Owner, (b) to establish Bid Prices at artificial non-competitive levels, or (c) to deprive the Owner of the benefits of free and open competition;

iii. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of the Owner, a purpose of which is to establish Bid Prices at artificial, non-competitive levels; and

iv. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

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E. Basis of Bid

1. The Bidder has reviewed DIVISION 6: TECHNICAL SPECIFICATIONS; and will complete the Work in accordance with the Contract Documents for the price specified in Exhibit C – Wauchula AMI RFP Pricing Worksheet.

F. Time of Completion

1. The Bidder agrees that the Work will be completed and ready for final payment in accordance with the Contract Documents within **two years** after the issuance of the Notice to Proceed.

G. Attachments to This Bid

1. The following documents are submitted with and made a part of this Bid:

   a. DIVISION 5: FORMS – Bid Form

   d. DIVISION 5: FORMS – Bid Security

   c. DIVISION 5: FORMS – Bidder's Qualifications

   d. DIVISION 5: FORMS – Bidder's Statement of Disputes, Litigation, Arbitration, and Surety Completion, Last Three (3) Years

   e. DIVISION 5: FORMS – Drug-Free Workplace Certificate

   f. DIVISION 5: FORMS – Non-Collusion Affidavit

   g. DIVISION 5: FORMS – Public Entity Crimes Statement

   h. DIVISION 5: FORMS – Tabulation of Subcontractors and Suppliers

   i. Exhibit B – Wauchula AMI RFP Technical Response Template

   j. Exhibit C – Wauchula AMI RFP Pricing Worksheet

H. Defined Terms

1. The terms used in this Bid with initial capital letters have the meanings stated in DIVISION 1: INSTRUCTIONS TO BIDDERS.

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I. Bid Submittal

The Qualifications to Bid of Core & Main LP are attached hereto and incorporated by reference as though fully set forth herein.

1. This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)

(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: Core & Main LP

By: _____ (SEAL)

(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): David Bryant, District Manager

State Contract License No. CUC1225503

A Corporation

Corporation Name: _____

_____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____

(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Corporate Seal)

Attest _____

(Signature of Corporate Secretary)

Date of Qualification to do business in Florida is _____/_____/_____.

State Contractor License No. _____.

A Joint Venture

Name of Joint Venture: _____

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First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____(SEAL)

By: _____
(Signature of first joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address 3216 Winter Lake Road, Bays 5-10
Lakeland, FL 33803

Phone No. (863) 868-8279 Fax No. _____

E-mail David.Bryant@coreandmain.com

SUBMITTED on August 26, 20 24.

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BID SECURITY

City of Wauchula
Project No. RFP 24-05 AMI System Implementation

5.1.2 Bid Security Form

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):
Core & Main LP
3216 Winter Lake Rd Bays 5-10
Lakeland, FL 33803

SURETY (Name and Address of Principal Place of Business):
ATLANTIC SPECIALTY INSURANCE COMPANY
605 Highway 169 North, Suite 800
Plymouth, MN 55441

OWNER (Name and Address):
City of Wauchula
126 South 7th Avenue
Wauchula, FL 33873

BID
Bid Due Date: **08/27/2024**

Project (Brief Description Including Location):
Project No. RFP 24-05 AMI System Implementation

BOND
Bond Number: **N/A**

Date (Not later than Bid due date): **08/26/2024**

Penal sum **Five percent of the amount bid** (Words) **5% of amount bid** (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	**SURETY**
Core & Main LP (Seal)	**ATLANTIC SPECIALTY INSURANCE COMPANY** (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By:	By:
Signature and Title **Wayne McVaugh** **Attorney-in-Fact**	Signature and Title **Annmarie Breene** (Attach Power of Attorney) **Attorney-in-Fact**
Attest:	Attest:
Signature and Title **Patrick Breene** **Witness**	Signature and Title **Joanne Wagner** **Witness**

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Note: Above addresses are to be used for giving required notice.

A. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to the Owner upon default of the Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

B. Default of Bidder shall occur upon the failure of the Bidder to deliver within the time required by the Bid Documents (or any extension thereof agreed to in writing by the Owner) the executed Agreement required by the Bid Documents and any performance and payment bonds required by the Bid Documents.

C. This obligation shall be null and void if:

   i. The Owner accepts the Bidder's Bid and the Bidder delivers within the time required by the Bid Documents (or any extension thereof agreed to in writing by the Owner) the executed Agreement required by the Bid Documents and any performance and payment bonds required by the Bid Documents, or

   ii. All Bids are rejected by the Owner, or

   iii. The Owner fails to issue a Notice of Award to the Bidder within the time specified in the Bid Documents (or any extension thereof agreed to in writing by the Bidder and, if applicable, consented to by Surety when required by Paragraph E hereof).

D. Payment under this Bond will be due and payable upon default by the Bidder and within 30 calendar days after receipt by the Bidder and the Surety of written notice of default from the Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

E. The Surety waives notice of any and all defenses based on or arising out of any time extension to issue the Notice of Award agreed to in writing by the Owner and the Bidder, provided that the total time for issuing the Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid Due Date without the Surety's written consent.

F. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph D above is received by the Bidder and the Surety and in no case later than one year after the Bid Due Date.

G. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

H. Notices required hereunder shall be in writing and sent to the Bidder and the Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

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I. The Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

J. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

K. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

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Applicant Name: ATLANTIC SPECIALTY INSURANCE COMPANY

NAIC No: 27154
FEIN: 133362309

Uniform Certificate of Authority Application (UCAA)
Certificate of Compliance

STATE OF FLORIDA

OFFICE OF INSURANCE REGULATION

I, KEVIN McCARTY, hereby certify that I am the* INSURANCE COMMISSIONER of the State of FLORIDA and have supervision of insurance business in said State and as such I hereby certify that **ATLANTIC SPECIALTY INSURANCE COMPANY** of NEW YORK, NY is duly organized under the laws of said State and is authorized to transact the business of D 010 FIRE,D 020 ALLIED LINES,D 040 HOMEOWNERS MULTI PERIL,D 050 COMMERCIAL MULTI PERIL,D 080 OCEAN MARINE,D 090 INLAND MARINE,D 110 MEDICAL MALPRACTICE,D 160 WORKERS COMPENSATION,D 170 OTHER LIABILITY,D 173 PREPAID LEGAL,D 192 PRIVATE PASSENGER AUTO LIABILITY,D 194 COMMERCIAL AUTOMOBILE LIABILITY,D 211 PPA PHYSICAL DAMAGE,D 212 COMMERCIAL AUTO PHYSICAL DAMAGE,D 220 AIRCRAFT,D 230 FIDELITY,D 240 SURETY,D 250 GLASS,D 260 BURGLARY AND THEFT,D 270 BOILER AND MACHINERY,D 280 CREDIT,D 300 INDUSTRIAL FIRE,D 450 ACCIDENT AND HEALTH,D 520 INDUSTRIAL EXTENDED COVERAGE,D 620 MISCELLANEOUS CASUALTY,** insurance in this State.

IN TESTIMONY WHEREOF, I have hereunto set my hand at Tallahassee, Florida on this 28th day of July A.D. 2011.



Kevin McCarty

* Insurance Commissioner, Officer or Superintendent of Insurance authorized to certify to the insurance business within the domiciliary state.

** Lines of Insurance as shown on Form 3 of UCAA

© 2003 National Association of Insurance Commissioners

February 4, 2004
Form 6

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[intact] specialty solutions

Atlantic Specialty Insurance Company

Period Ended 12/31/2023

Dollars displayed in thousands

Admitted Assets		**Liabilities and Surplus**	
Investments:		**Liabilities**	
Bonds	$ 2,666,141	Loss Reserves	$ 1,191,377
Preferred Stocks	-	Loss Adjustment Expense Reserves	401,505
Common Stocks	765,847	**Total Loss & LAE Reserves**	1,592,881
Mortgage Loans	-		
Real Estate	-	Unearned Premium Reserve	806,718
Contract Loans	-	Total Reinsurance Liabilities	45,997
Derivatives	-	Commissions, Other Expenses, and Taxes due	78,425
Cash, Cash Equivalents & Short Term Investments	194,124	Derivatives	-
Other Investments	9,571	Payable to Parent, Subs or Affiliates	-
Total Cash & Investments	3,635,684	All Other Liabilities	810,774
Premiums and Considerations Due	338,312	**Total Liabilities**	3,334,795
Reinsurance Recoverable	127,403		
Receivable from Parent, Subsidiary or Affiliates	17,691	**Capital and Surplus**	
All Other Admitted Assets	93,457	Common Capital Stock	9,001
		Preferred Capital Stock	-
Total Admitted Assets	4,212,546	Surplus Notes	-
		Unassigned Surplus	251,805
		Other Including Gross Contributed	616,946
		Capital & Surplus	877,751
		Total Liabilities and C&S	4,212,546

State of Minnesota
County of Hennepin

I, Kara Barrow, Secretary of Atlantic Specialty Insurance Company do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company, on the 31st day of December, 2023, according to the best of my information, knowledge and belief.

Secretary

Subscribed and sworn to, before me, a Notary Public of the State of Minnesota on this 19th day of March, 2024.

Notary Public

KERRI RIECHERS
Notary Public
Minnesota
My Commission Expires January 31, 2025

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intact INSURANCE

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: **Annmarie Breene, Babette Ward, Cathy H. Ho, Dana Donahue, Joanne C. Wagner, Kimberly G. Sherrod, Lori S. Shelton, Patricia A. Rambo, Patricia Dorsaneo, Patrick Breene, Sara Owens, Wayne G. McVaugh**, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of: **unlimited** and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof in pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an "Authorized Officer") may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this first day of January, 2023.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

By _____
Sarah A. Kolar, Vice President and General Counsel

STATE OF MINNESOTA
HENNEPIN COUNTY

On this first day of January, 2023, before me personally came Sarah A. Kolar, Vice President and General Counsel of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and she acknowledged the execution of the same, and being by me duly sworn, that she is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.

ALISON DWAN NASH-TROUT
NOTARY PUBLIC - MINNESOTA
My Commission Expires
January 31, 2025

_____
Notary Public

I, the undersigned, Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.

Signed and sealed. Dated 26th day of August, 2024.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

_____
Kara L.B. Barrow, Secretary

This Power of Attorney expires
January 31, 2025

Please direct bond verifications to surety@intactinsurance.com

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FLORIDA DEPARTMENT OF FINANCIAL SERVICES

ANNMARIE BREENE

License Number : W955245

Non Resident Insurance License

- 0920 - NONRES GEN LINES (PROP & CAS)

Issue Date

02/27/2023

NOTICE - This non-resident license is limited to the classes of insurance reflected above and is further limited to ONLY those classes of insurance for which you are licensed in your home state.

Please Note: A licensee may only transact insurance with an active appointment by an eligible insurer or employer. If you are acting as a surplus lines agent, public adjuster, or reinsurance intermediary manager/broker, you should have an appointment recorded in your own name on file with the Department. If you are unsure of your license status you should contact the Florida Department of Financial Services immediately. This license will expire if more than 48 months elapse without an appointment for each class of insurance listed. If such expiration occurs, the individual will be required to re-qualify as a first-time applicant. If this license was obtained by passing a licensure examination offered by the Florida Department of Financial Services, the licensee is required to comply with continuing education requirements contained in 626.2815 or 648.385, Florida Statutes. A licensee may track their continuing education requirements completed or needed in their MyProfile account at https://dice.fldfs.com. To validate the accuracy of this license you may review the individual license record under "Licensee Search" on the Florida Department of Financial Services website at www.myfloridacfo.com/division/agents.

Jimmy Patronis
Chief Financial Officer
State of Florida

City of Wauchula
Project No. RFP 24-05 AMI System Implementation

5.1.3 Bidder's Qualifications

The Bidder warrants the truth and accuracy of all statements and answers herein contained.
(Include additional sheets if necessary.)

THIS QUESTIONNAIRE MUST BE COMPLETED AND SUBMITTED WITH YOUR BID.

A. COMPANY'S NAME: Core & Main LP

B. CO. PHYSICAL ADDRESS: 3216 Winter Lake Road Bays 5-10, Lakeland, FL 33803

C. TELEPHONE NUMBER: ((863) 868-8279 D. FAX: ( )

E. Bidding as an; individual:_____; a partnership: X ; a corporation:___; a joint venture:___.

F. If a partnership: list names and addresses of partners; if a corporation: list names of officers, directors, shareholders, and state of incorporation; if joint venture: list names and addresses of venturers and the same if any venturer is a corporation for each such corporation, partnership, or joint venture:
Core & Main Intermediate GP, LLC (General Partner), 1830 Craig Park Court, St. Louis, MO 63146
Core & Main Midco, LLC (Limited Partner), 1830 Craig Park Court, St. Louis, MO 63146

G. Your organization has been in business (under this firm's name) as a limited partnership for how many years? 7 years

H. Have you ever been awarded additional time to complete work awarded to you during the past five (5) years? If so, state when, where (contact name, address, and phone number) and why.
To the best of our knowledge, in the state of Florida, during the past 5 years, Core & Main has not been awarded additional time as a result of its fault or negligence.

I. Have you ever been assessed liquidated damages under a contract during the past five (5) years? If so, state when, where (contact name, address, and phone number) and why.
To the best of our knowledge, in the state of Florida, during the past 5 years, no.

J. Have you ever failed to complete work awarded to you? If so, state when, where (contact name, address, phone number) and why?
To the best of our knowledge, in the state of Florida, during the past 5 years, no.

K. Have you ever been debarred or prohibited from bidding on a governmental entity's construction project? If yes, name the entity and describe the circumstances:

To the best of our knowledge, in the state of Florida, during the past 5 years, no.

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L. **Will you subcontract any part of this Work? If so, describe which major portion(s):**
Yes, installation services will be subcontracted to Bermex.

M. **If any, list (with contract amount) MBE/WBE's to be utilized:**
-Valerin
-WeProject

N. **What equipment do you own to accomplish this Work?**
N/A

O. **What equipment will you purchase/rent for the Work? (specify which)**
N/A

P. **List the following in connection with the Surety which is providing the Bond(s):**

Surety's Name: ATLANTIC SPECIALTY INSURANCE COMPANY

Surety's Address: 605 Highway 169 North, Suite 800, Plymouth, MN 55441

Name, address and phone number of Surety's resident agent for service of process in Florida:

Chief Financial Officer
200 East Gaines Street
Tallahassee, FL 32399

Phone: ( )

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BIDDER'S STATEMENT OF DISPUTES, LITIGATION, ARBITRATION, AND SURETY COMPLETION

City of Wauchula
Project No. RFP 24-05 AMI System Implementation

5.1.4 Bidder's Statement of Disputes, Litigation, Arbitration, and Surety Completion – Last Three (3) Years

Project	Name and Address of Owner or Engineer	Name and Phone Number of Owner or Engineer Representative	Date of Contract	Amount	Status
To the best of its knowledge, Core & Main LP has not been involved in any pending litigation, judgments or settlements of court cases relative to providing Advanced Metering Infrastructure (AMI) Implementation Services to its customers in the state of Florida during the past three (3) years.					

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DRUG-FREE WORKPLACE CERTIFICATE

City of Wauchula
Project No. RFP 24-05 AMI System Implementation

5.1.5 Drug-Free Workplace Certificate

I, the undersigned, in accordance with Section 287.087, *Florida Statutes* hereby certify that Core & Main LP
(Print or Type Name of Firm)

- ☑ Publishes a written statement notifying that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace named above and specifying actions that will be taken against violations of such prohibition.
- ☑ Informs employees about the dangers of drug abuse in the workplace; the firm's policy of maintaining a drug-free working environment and available drug counseling, rehabilitation, and employee assistance programs; and the penalties that may be imposed upon employees for drug-use violations.
- ☑ Gives each employee engaged in providing commodities or contractual services that are under bid or proposal a copy of the statement specified above.
- ☑ Notifies the employees that as a condition of working on the commodities or contractual services under bid or proposal, the employees will abode by the terms of the statement and will notify the employer of any conviction of or plea of guilty or nolo contendere to any violation of Chamber 1893 or any controlled substance law of the State of Florida or the United States for a violation occurring in the workplace, no later than 5 days after such conviction, and requires employees to sign copies of such written statement to acknowledge their receipt.
- ☑ Imposes a sanction on or requires the satisfactory participation in a drug-abuse assistance or rehabilitation program, if such is available in the employee's community, by any employee who is so convicted.
- ☑ Makes a good faith effort to continue to maintain a drug-free workplace through the implementation of the drug-free workplace program.

"As a person authorized to sign this statement, I certify that the business, firm, or corporation named above complies fully with the requirements set forth herein."

Authorized Signature — Date Signed: 8/26/24

State of: FLORIDA
County of: ORANGE
Sworn to and subscribed before me this 26 day of AUGUST, 2024.
Personally known ✓ or Produced Identification _____
Specify Type of Identification

Signature of Notary

My Commission Expires: 2-27-26

BRENDA F. ECKROSE
Commission # HH 215403
Expires February 27, 2026

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NON-COLLUSION AFFIDAVIT

City of Wauchula
Project No. RFP 24-05 AMI System Implementation

5.1.6 Non-Collusion Affidavit of Prime Bidder

State of FLORIDA

County of ORANGE

David Bryant (Name), being first duly sworn, deposes and says that:

1. He/She is District Manager (Title) of Core & Main LP (Company), the Bidder that has submitted the attached bid;

2. He/She is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

3. Such Bid is genuine and is not a collusive or sham Bid;

4. Neither the said Bidder not any of his/her officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or has refrained from bidding in connection with such Contract; nor in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or if any other Bidder; not has fixed any overhead, profit or cost element of the Bid Price, or the Bid Price of any other Bidder; not has secured through any collusion, conspiracy, connivance or unlawful agreement, any advantage against the City of Wauchula, Florida or any person interested in the proposed Contract; and

5. The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(Signed) _____
Name

David Bryant, District Manager
Title

Subscribed and sworn to before me this 26 day of AUGUST, 2024

_____
Signature

INSIDE SALES
Title

My commission expires 2-27-26

BRENDA F. ECKROSE
Commission # HH 215403
Expires February 27, 2026

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PUBLIC ENTITY CRIMES STATEMENT

City of Wauchula
Project No. RFP 24-05 AMI System Implementation

5.1.7 Sworn Statement Pursuant to Section 287.133(3)(A), *Florida Statues*, on Public Entity Crimes

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted to the City of Wauchula, Florida by

   David Bryant, District Manager
   (print individual's name and title)

   for Core & Main LP
   (print name of entity submitting sworn statement)

   whose business address is 3216 Winter Lake Road Bays 5-10, Lakeland, FL 33803

   And (if applicable) its Federal Employer Identification Number (FEIN) is 03-0550887.
   (If the entity has no FEIN, include the Social Security of the individual signing this sworn statement: _____.)

2. I understand that a "public entity crime" as defined in Section 287.133 (1)(g), *Florida Statues* means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or such an agency or political subdivision of any other state or of the United States and involving anti-trust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "convicted" or "conviction" as defined in Section 287.133(1)(b), *Florida Statutes*, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or stated trial court of record relating to charges brought by indictment or information after July 1. 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that "affiliate" as defined in Section 287.133(1)(a), *Florida Statutes*, means:

   1. A predecessor or successor of a person convicted of a public entity crime: or

   2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters in to a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

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5. I understand that a "person" as defined in Section 287.133 (1)(e), *Florida Statutes*, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

6. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. (indicate which statement applies).

_X_ Neither the entity submitting this sworn statement, nor any of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

___ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

___ The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. (attach a copy of the final order)

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, *FLORIDA STATUES*, FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

(Signature)

Sworn to and subscribed before me this 26 day of AUGUST, 20 24.

Personally known ✓

OR Produced Indentification _____

(Type of Indentification)

Notary Public-State of FLORIDA

My commission expires 2-27-26

BRENDA F. ECKROSE
Commission # HH 215403
Expires February 27, 2026

(Printed, Typed or Stamped
Commissioned Name of Notary Public)

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TABULATION OF SUBCONTRACTORS AND SUPPLIERS

City of Wauchula
Project No. RFP 24-05 AMI System Implementation

5.1.8 Tabulation of Subcontractors and Suppliers

The Undersigned states that the following is a full and complete list of the proposed Subcontractors and Suppliers on this Project and the class of work to be performed by each and that such list will not be added to nor altered without written consent to the Owner through the Engineer.

	SUBCONTRACTOR OR SUPPLIER AND ADDRESS	MBE/WBE STATUS	CLASS OF WORK OR MATERIAL
1.	Bermex, Inc. 4500 Courthouse Blvd Suite #150, Stow, Ohio 44224	N/A	Installation Services
2.	Valerin 4767 New Broad Street, Orlando, FL 32814	WBE	Customer Engagement
3.	WeProject 211 E. Six Forks Rd, Building C, Suite 205 Raleigh, NC 27609	WBE	Project Management
4.	Sensus a Xylem Brand Raleigh, NC 27609	N/A	Materials for Project
5.	VertexOne 1321 Upland Dr PMB 8389, Houston, TX 77043	N/A	Customer Portal Supplier
6.			
7.			
8.			

BIDDER: Core & Main LP
By: [signature]
Name: David Bryant
Title: District Manager
Date: 8/26/24

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Appendix

- Delegation of Signing Authority
- Certificate of Authority
- Addendum Acknowledgement
- CNM Exceptions Statement
- Company’s www.Sunbiz.org Record
- Financials
- Certificate of Insurance
- Certificate of Limited Partnership
- Copies of Valid Licenses
- Implementation Plan & Schedule

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DELEGATION OF SIGNING AUTHORITY

Docusign Envelope ID: 2D601C17-5BA6-44FA-9231-C20BD4DC6126

DELEGATION OF AUTHORITY

I, Ryan Johnson, Regional Vice President of Core & Main LP, a Florida limited partnership (the "Company"), hereby delegate authority to David Bryant (the "Delegate"), to execute and deliver the proposal for RFP 24-05 AMI System Implementation (the "Document") to the City of Wauchula, FL, and to take or cause to be taken any and all actions in connection therewith as such individual may consider necessary or desirable, with such necessity or desirability being conclusively evidenced by the actions so taken, on behalf of the Company.

This Delegation is limited to the Document as described above.

The Delegation is personal to the Delegate. The Delegate may not further delegate the authorities granted in this Delegation.

IN WITNESS WHEREOF, I have hereunto set my hand on August 26, 2024.

CORE & MAIN LP, a Florida limited partnership

By: DocuSigned by: RYAN JOHNSON
Ryan Johnson, Regional Vice President

Confidential

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CERTIFICATE OF AUTHORITY

Core & Main LP
1830 Craig Park Court
St Louis, MO 63146

CERTIFICATE OF AUTHORITY
Chief Financial Officer

Name of Company:	Core & Main LP, a Florida limited partnership
Reference:	Customer Sales Contracts, RFPs, Bids, and Related Matters
Date:	July 29, 2019

THE UNDERSIGNED DOES HEREBY CERTIFY that I am the CEO of Core & Main LP, a Florida limited partnership ("Core & Main") and am authorized to sign on behalf of Core & Main. As CEO, I am authorized to make and deliver this certificate. I do hereby designate Mark Witkowski, Vice President and Chief Financial Officer, as my designee, and authorize him to execute and deliver, or cause to be executed and delivered, any and all bids and offers for furnishing materials and/or services, including related non-disclosure agreements, requests for qualifications, responses to requests for proposals, customer sales contracts, supply agreements, distributor agreements, purchase orders and similar agreements (the "Documents"), and to take or cause to be taken any and all actions in connection therewith as such individual may consider necessary or desirable, with such necessity or desirability being conclusively evidenced by the actions so taken by such individual. Further I hereby ratify and approve all previous actions taken by such individual with respect to the execution and delivery of such Documents in the name of and on behalf of Core & Main.

The authorization hereunder is effective as of the date hereof, and shall continue until the earlier of the undersigned's revocation of such authorization in writing, or the last date of his employment with Core & Main.

IN WITNESS WHEREOF, the undersigned has executed this instrument as of the 29 day of July, 2019.

Stephen O. LeClair, CEO

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ADDENDUM ACKNOWLEDGEMENT

Contract Bidding Documents

RFP 24-05 AMI System Implementation

ADDENDUM NO. 1

City of Wauchula
126 South 7th Avenue
Wauchula, Florida 33873

July 30, 2024

RFP No.: RFP 24-05
RFP Name: Wauchula Advanced Metering Infrastructure (AMI) System Implementation
Addendum: ADDENDUM NO. 1

This Addendum shall modify and become a part of the original solicitation document. The following clarifications, changes, additions, and/or deletions are hereby made part of the Contract Documents for RFP 24-05 AMI System Implementation and shall be included with all contract documents. All other terms and conditions remain the same.

TO ALL PROSPECTIVE PROPOSERS:
Per the originally posted schedule, the question period is now closed as of 5:00pm on July 23, 2024. The received questions along with the City responses are included in this addendum.

As a reminder, the proposal due and opening date is not changed and remains as Tuesday August 27, 2024 at 3:00pm EST per the original RFP documents.

/40126/1#60771613 v1

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Prospective Bidder Questions with City Responses

Number 1: Question: Please confirm if the City is willing to accept a Water AMI only solution I.e. You are willing to separate the two bids to explore the advantages of separating these systems?

Answer: No.

Number 2: Question: May we have further clarification regarding the testing requirements called out in section 3.12.4?

Answer: RFP 24-05 section 3.12.4 contains standard City terms and conditions. Please refer to Exhibit A Wauchula AMI RFP Technical Specifications for further clarifications regarding project specific testing expectations, testing fixtures, acceptance testing and testing requirements.

Number 3: Question: We would like to confirm the 24-month installation warranty

Answer: RFP 24-05 section 3.17.3 contains standard City terms and conditions including a 24-month installation warranty to ensure installation quality. Please refer to Exhibit A Wauchula AMI RFP Technical Specifications for further clarifications regarding project warranty requirements.

Number 4: Question: May we conduct site surveys prior to bid deadline? Do we need to schedule with the city, for the site surveys?

Answer: Yes, please coordinate any desired survey scheduling with the City through the originally provided email contact included here again for reference: scamacho@cityofwauchula.com. Please note, the proposal bid deadline remains unchanged.

/40126/1#60771613 v1

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This addendum acknowledgment sheet must be submitted electronically with your response by the due date and time indicated in the RFP. Failure to return this sheet may disqualify Proposer.

Dan Bryant — 8/26/24

Proposer's Signature — Date

Core & Main LP

Company Name

3216 Winter Lake Rd, Bays 5-10 Lakeland, FL 33803

Company Address

(863) 868-8279 — ( )

Phone Number — Fax Number

Please acknowledge receipt and review of this Addendum with your submittal response.

/40126/1#60771613 v1

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CNM EXCEPTIONS STATEMENT

Qualifications of Core & Main LP
Submitted to the City of Wauchula
RFP 24-05 AMI System Implementation

Notwithstanding anything contained in any bid or contract documents to the contrary, Core & Main LP ("Core & Main") hereby qualifies its bid as follows. The bid of Core & Main and acceptance by Core & Main of any subsequent agreement is made expressly conditioned upon assent by the City of Wauchula, FL (the "Owner"), to the following additional or different terms, which shall supersede and control over the terms of any request for bid or request for proposal, any contract documents and specifications, and any prior addenda thereto:

1. Price Lock: Core & Main reserves the right to increase prices at any time in the event of a manufacturer or subcontractor price increase. Core & Main will provide evidence of the manufacturer's or subcontractor's price increase and will only increase its prices by the same percentage the manufacturer's or subcontractor's prices increase. In the event the Owner objects to the price increase, the Owner will delete the affected materials or services from the contract and neither party will have any further obligation to the other with respect to the materials or services removed from the contract except the Owner will be obligated to pay for materials or services delivered.

2. Warranty: The extent of the warranty to be provided for this project is set forth in the attached City of Wauchula Warranty.

3. Insurance: To the extent provided in its policy, Core & Main LP ("Core & Main") will only be able to provide a certificate of insurance, endorsements and coverage that are current form and meet industry standards subject to agreement by Core & Main's insurance provider, with such coverage to be in place until final completion of the project. A Memorandum of Insurance is attached to demonstrate the level of coverage carried by Core & Main. Insurance coverage provided by Core & Main will be consistent with the provisions of Core & Main's policy, notwithstanding any differing or conflicting provisions in any bid or contract documents. Insurance limits may be satisfied by a combination of General Liability and Excess/Umbrella coverage. General aggregate limits apply per location. Core & Main will not be required to provide Builder's Risk, Pollution Liability, or any coverage other than the coverage identified in its certificate of insurance. Neither Core & Main nor its subcontractors or suppliers will be required to provide copies of their respective insurance policies. Notwithstanding anything contained in any bid documents or contract documents to the contrary, by acceptance of Core & Main's bid or proposal, the Owner accepts Core & Main's certificate of insurance in full compliance with all insurance requirements, including but not limited to notice provisions, coverage, language, policy limits, policy forms, self-insured retention and deductible amounts. The parties agree that Core & Main's insurance is provided on a contributory basis, and is primary, but only to the extent of the products, services, and operations of Core & Main LP.

4. Terms and Conditions, Par. 3.5.2 – Environmental Indemnity: Delete this paragraph entirely.

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5. Terms and Conditions, Par. 3.5.3.I. – Delete this paragraph entirely.

6. Terms and Conditions, Par. 3.5.4.A. – In the first sentence, delete the phrase, "Final Acceptance of the work" and replace with, "delivery." In the last sentence, delete the phrase, "until such time that the Owner issues written notice of Final Acceptance of the work."

7. Terms and Conditions, Par. 3.15.4.B. – Delete the last sentence of this paragraph entirely.

8. Terms and Conditions, Par. 3.16.1 – Intellectual Property: Delete this section, including all subparagraphs, entirely.

9. Terms and Conditions, Par. 3.17.4 – Competent Performance of the Work: Delete this section entirely. The terms under which the Owner will be permitted to take over the work due to Contractor's default will be negotiated and agreed between the parties in the agreement resulting from this solicitation.

10. Core & Main reserves the right to negotiate contract terms and conditions mutually agreeable to both parties. If the parties are unable to reach an agreement on contract terms, the parties will have the right to discontinue negotiations for the project. In that event, neither party will have any further obligation or liability to the other arising out of this solicitation or the RFP response, Core & Main will not be in default of any obligations under the bid or contract documents and Core & Main will not forfeit its bid security.

Dated this 26th day of August, 2024.

CORE & MAIN LP



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COMPANY'S WWW.SUNBIZ.ORG RECORD

State of Florida
Department of State

I certify from the records of this office that CORE & MAIN LP is a limited partnership organized under the laws of the State of Florida, filed on November 22, 2004.

The document number of this limited partnership is A04000001840.

I further certify that said limited partnership has paid all fees due this office through December 31, 2024 and that its status is active.

I further certify that said limited partnership has not filed a Certificate of Withdrawal.

Given under my hand and the Great Seal of the State of Florida at Tallahassee, the Capital, this the Twentieth day of March, 2024

Secretary of State

Tracking Number: 1816194575CU

To authenticate this certificate,visit the following site,enter this number, and then follow the instructions displayed.

https://services.sunbiz.org/Filings/CertificateOfStatus/CertificateAuthentication

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H04000232505 3

CERTIFICATE OF LIMITED PARTNERSHIP

OF

HUGHES WATER & SEWER, LTD.

(a Florida limited partnership)

The undersigned, desiring to form a limited partnership pursuant to the laws of the State of Florida, does hereby certify as follows:

1. Name. The name of the limited partnership is as follows:

Hughes Water & Sewer, Ltd.

2. Address. The street address of the principal place of business and the mailing address for the limited partnership are as follows:

One Hughes Way
Orlando, FL 32805

3. Registered Agent. The address of the office and the name and address of the agent for service of process required to be maintained by Section 620.105, Florida Statutes, are as follows:

Corporation Service Company
1201 Hayes Street
Tallahassee, FL 32301

4. General Partner. The name and business address of the general partner of the limited partnership are as follows:

Hughes GP & Management, Inc.
One Hughes Way
Orlando, FL 32805

F04-1125

5. Termination. The latest date upon which the limited partnership is to dissolve is December 31, 2054.

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SECRETARY OF STATE
DIVISION OF CORPORATIONS

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Under penalties of perjury, the undersigned declares that it has read the foregoing and knows the contents thereof and that the facts stated therein are true and correct.

Signed this 19th day of November, 2004.

GENERAL PARTNER:

HUGHES GP & MANAGEMENT, INC.

By: _____

Name: John Z. Paré

Title: Secretary

#2300510_v3

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FLORIDA DEPARTMENT OF STATE
DIVISION OF CORPORATIONS
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ACCEPTANCE OF DESIGNATION AS REGISTERED AGENT AND AGENT FOR SERVICE OF PROCESS

The undersigned, having been designated the Agent for Service of Process, pursuant to Section 620.105, Florida Statutes, and Registered Agent, pursuant to Section 620.192, Florida Statutes, of Hughes Water & Sewer, Ltd., a limited partnership to be formed concurrently herewith under the Florida Revised Uniform Limited Partnership Act (1986), does hereby accept such designation and the obligations provided for in Sections 620.105 and 620.192, Florida Statutes.

CORPORATION SERVICE COMPANY

Dated: 11/22, 2004

By: Deborah D. Skipper

Name: Deborah D. Skipper

Title: Asst. V. Pres.

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DIVISION OF CORPORATIONS
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AFFIDAVIT OF CAPITAL CONTRIBUTIONS

The undersigned, Hughes GP & Management, Inc., the sole general partner of Hughes Water & Sewer, Ltd., a Florida limited partnership, certifies:

1. The amount of capital contributions to date of the limited partners is $0.

2. The total amount of capital anticipated to be contributed by the limited partners at this time totals $1,000.

Signed this 19th day of November, 2004.

FURTHER AFFIANT SAYETH NOT.

Under the penalties of perjury, the undersigned declares that it has read the foregoing and knows the contents thereof and that the facts stated herein are true and correct.

GENERAL PARTNER:

HUGHES GP & MANAGEMENT, INC.

By: _____

Name: John Z. Paré

Title: Secretary

#2300510_v3

SECRETARY OF STATE
DIVISION OF CORPORATIONS
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CERTIFICATE OF AMENDMENT TO

CERTIFICATE OF LIMITED PARTNERSHIP OF

HUGHES WATER & SEWER, LTD.

Pursuant to the provisions of section 620.1202, Florida Statutes, HUGHES WATER & SEWER, LTD., a Florida limited partnership, adopts the following Certificate of Amendment to its Certificate of Limited Partnership:

FIRST: The name of the limited partnership is HUGHES WATER & SEWER, LTD.

SECOND: The limited partnership's Certificate of Limited Partnership was filed with the Florida Department of State on November 22, 2004.

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2006 OCT 25 AM 10:06
SECRETARY OF STATE
DIVISION OF CORPORATIONS

THIRD: Section 1 of the Certificate of Limited Partnership of the limited partnership is hereby amended in its entirety to read as follows:

1. Name. The name of the limited partnership is as follows:

HD Supply Waterworks, Ltd.

FOURTH: This Certificate of Amendment shall be effective at the time of its filing with the Florida Department of State.

The undersigned general partner of the limited partnership hereby executes this Certificate of Amendment to the Certificate of Limited Partnership this 24th day of October, 2006.

GENERAL PARTNER:

HUGHES GP & MANAGEMENT, INC.,
a Delaware corporation

By: _____
David Bearman, Vice President

4100468_v2

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09 SEP 30 AM 8:44
SECRETARY OF STATE
TALLAHASSEE, FLORIDA

CERTIFICATE OF AMENDMENT TO CERTIFICATE OF LIMITED PARTNERSHIP OF HD Supply Waterworks, Ltd.

Pursuant to the provisions of section 620.109, Florida Statutes, this Florida limited partnership, whose certificate was filed with the Florida Department of State on November 22, 2004, adopts the following certificate of amendment to its certificate of limited partnership:

FIRST: Amendment(s): (indicate article number(s) being amended, added, or deleted)
2. Address. The street address of the principal place of business and the mailing address for the limited partnership are as follows:

3100 Cumberland Blvd., Suite 1700
Atlanta, GA 30339

4. General Partner. The name and business address of the general partner of the limited partnership are as follows:

HD Supply GP & Management, Inc.
3100 Cumberland Blvd., Suite 1700 Atlanta, GA 30339

SECOND: This certificate of amendment shall be effective at the time of its filing with the Florida Department of State.

THIRD: Signature(s)
The undersigned current general partner executed this document on September 29, 2009.

Signature(s) of new general partner(s), if applicable:

HD Supply GP & Management, Inc.
by S. Simons as attorney-in-fact

Corporate Creations International Inc.
11380 Prosperity Farms Road #221E
Palm Beach Gardens FL 33410
(561) 694-8107

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SECRETARY OF STATE
DIVISION OF CORPORATIONS

17 AUG -1 AM 10:24

CERTIFICATE OF AMENDMENT
TO
CERTIFICATE OF LIMITED PARTNERSHIP
OF

HD SUPPLY WATERWORKS, LTD.

Insert name currently on file with Florida Department of State

Pursuant to the provisions of section 620.1202, Florida Statutes, this Florida limited partnership or limited liability limited partnership, whose certificate was filed with the Florida Department of State on **11/22/04**, assigned Florida document number **A04000001840**, adopts the following certificate of amendment to its certificate of limited partnership.

This amendment is submitted to amend the following:

A. If amending name, enter the new name of the limited partnership or limited liability limited partnership here:

N/A

New name must be distinguishable and contain an acceptable suffix.

Acceptable Limited Partnership suffixes: Limited Partnership, Limited, L.P., LP, or Ltd.
Acceptable Limited Liability Limited Partnership suffixes: Limited Liability Limited Partnership, L.L.L.P. or LLLP.

B. If amending mailing address and/or principal office address, enter new mailing address and/or principal office address here:

New Principal Office Address: N/A
(Must be STREET address)

New Mailing Address:
(May be post office box)

C. If amending the registered agent and/or registered office address on our records, enter the name of the new registered agent and/or the new registered office address here:

Name of New Registered Agent: N/A

New Registered Office Address:

Enter Florida street address

, Florida
City *Zip Code*

New Registered Agent's Signature, if changing Registered Agent:

I hereby accept the appointment as registered agent and agree to act in this capacity. I further agree to comply with the provisions of all statutes relative to the proper and complete performance of my duties, and I am familiar with and accept the obligations of my position as registered agent.

_____

If Changing Registered Agent, Signature of New Registered Agent

D. If amending the general partner(s), enter the name and business address of each general partner being added or removed from our records:

Title	Name	Address	Type of Action
GP	HD Supply Waterworks Group, LLC	3100 Cumberland Blvd. Suite 1700 Atlanta, Georgia 30339	■ Add ❑ Remove

E. If the limited partnership or limited liability limited partnership is amending its "limited liability limited partnership" status, enter change here:

- ❑ **This Limited Partnership hereby elects to be a "Limited Liability Limited Partnership."**
- ❑ **This Limited Partnership hereby removes its "Limited Liability Limited Partnership" status.**

(NOTE: If adding or removing" limited liability limited partnership" status, all general partners must sign this amendment.

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SECRETARY OF STATE
DIVISION OF CORPORATIONS
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F. If amending any other information, enter change(s) here: *(Attach additional sheets, if necessary.)*

N/A

Effective date, if other than the date of filing: August 1, 2017

(Effective date cannot be prior to nor more than 90 days after the date this document is filed by the Florida Department of State.)

Note: If the date inserted in this block does not meet the applicable statutory filing requirements, this date will not be listed as the document's effective date on the Department of State's records.

Signature(s) of a general partner or all general partners*:

(*NOTE: Only one current general partner is required to sign this document unless the limited partnership is adding or removing a "limited liability limited partnership" election statement. Chapter 620, F.S., requires all general partners to sign when adding or removing a "limited liability limited partnership" election statement.)

CD&R Plumb Buyer, LLC
Current General Partner

By: _____

Name: Theresa A. Gore

Title: Vice President and Secretary

Signature(s) of all new or dissociating general partner(s), if any:

HD Supply Waterworks Group, LLC
New General Partner

By: _____

Name: Theresa A. Gore

Title: Vice President and Secretary

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17 AUG -1 AM 10:24
SECRETARY OF STATE
DIVISION OF CORPORATIONS

Filing Fee:	$52.50
Certified Copy (optional):	$52.50
Certificate of Status (optional):	$8.75

State of Florida

Department of State

I certify the attached is a true and correct copy of the Certificate of Amendment, filed on August 29, 2017, for HD SUPPLY WATERWORKS, LTD. which changed its name to CORE & MAIN LP, a Florida limited partnership or limited liability limited partnership, as shown by the records of this office.

I further certify the document was electronically received under FAX audit number H17000232454. This certificate is issued in accordance with section 15.16, Florida Statutes, and authenticated by the code noted below.

The document number of this limited partnership is A04000001840.

Authentication Code: 817A00017874-083017-A04000001840-1/1

Given under my hand and the
Great Seal of the State of Florida,
at Tallahassee, the Capital, this the
Thirtieth day of August, 2017

Ken Detzner
Secretary of State

FLORIDA DEPARTMENT OF STATE
Division of Corporations

August 30, 2017

HOLLAND & KNIGHT

,

Re: Document Number A04000001840

The Certificate of Amendment for HD SUPPLY WATERWORKS, LTD. which changed its name to CORE & MAIN LP, a Florida limited partnership or limited liability limited partnership, was filed on August 29, 2017.

The certification you requested is enclosed. To be official, the certification for a certified copy must be attached to the original document that was electronically submitted and filed under FAX audit number H17000232454.

Should you have any questions concerning this matter, please telephone (850) 245-6051, the Registration Section.

Michelle Milligan
Senior Section Administrator
Division of Corporations Letter Number: 817A00017874

CERTIFICATE OF AMENDMENT
TO
CERTIFICATE OF LIMITED PARTNERSHIP
OF

HD SUPPLY WATERWORKS, LTD.

Insert name currently on file with Florida Department of State

Pursuant to the provisions of section 620.1202, Florida Statutes, this Florida limited partnership or limited liability limited partnership, whose certificate was filed with the Florida Department of State on 11/22/2004, assigned Florida document number A04000001840, adopts the following certificate of amendment to its certificate of limited partnership.

This amendment is submitted to amend the following:

A. If amending name, enter the new name of the limited partnership or limited liability limited partnership here:

CORE & MAIN LP

New name must be distinguishable and contain an acceptable suffix.

Acceptable Limited Partnership suffixes: Limited Partnership, Limited, L.P., LP, or Ltd.
Acceptable Limited Liability Limited Partnership suffixes: Limited Liability Limited Partnership, L.L.L.P. or LLLP.

B. If amending mailing address and/or principal office address, enter new mailing address and/or principal office address here:

New Principal Office Address: N/A
(Must be STREET address)

New Mailing Address:
(May be post office box)

C. If amending the registered agent and/or registered office address on our records, enter the name of the new registered agent and/or the new registered office address here:

Name of New Registered Agent: N/A

New Registered Office Address:

Enter Florida street address

, Florida
City *Zip Code*

New Registered Agent's Signature, if changing Registered Agent:

I hereby accept the appointment as registered agent and agree to act in this capacity. I further agree to comply with the provisions of all statutes relative to the proper and complete performance of my duties, and I am familiar with and accept the obligations of my position as registered agent.

_____

If Changing Registered Agent, Signature of New Registered Agent

D. If amending the general partner(s), enter the name and business address of each general partner being added or removed from our records:

Title	Name	Address	Type of Action
N/A			❑ Add ❑ Remove
			❑ Add ❑ Remove
			❑ Add ❑ Remove
			❑ Add ❑ Remove
			❑ Add ❑ Remove
			❑ Add ❑ Remove

E. If the limited partnership or limited liability limited partnership is amending its "limited liability limited partnership" status, enter change here:

❑ **This Limited Partnership hereby elects to be a "Limited Liability Limited Partnership."**

❑ **This Limited Partnership hereby removes its "Limited Liability Limited Partnership" status.**

(NOTE: If adding or removing" limited liability limited partnership" status, all general partners must sign this amendment.)

F. If amending any other information, enter change(s) here: *(Attach additional sheets, if necessary.)*

Effective date, if other than the date of filing:
(Effective date cannot be prior to nor more than 90 days after the date this document is filed by the Florida Department of State.)
Note: If the date inserted in this block does not meet the applicable statutory filing requirements, this date will not be listed as the document's effective date on the Department of State's records.

Signature(s) of a general partner or all general partners*:

(*NOTE: Only one current general partner is required to sign this document unless the limited partnership is adding or removing a "limited liability limited partnership" election statement. Chapter 620, F.S., requires all general partners to sign when adding or removing a "limited liability limited partnership" election statement.)

CORE & MAIN GP, LLC

By:

Name: Theresa A. Gore, CD&R WW Holdings, LP

Title: Manager

CD&R PLUMB BUYER, LLC

By:

Name: Theresa A. Gore, CD&R WW Holdings, LP

Title: Manager

Signature(s) of all new or dissociating general partner(s), if any:

Filing Fee:	**$52.50**
Certified Copy (optional):	**$52.50**
Certificate of Status (optional):	**$8.75**

A04000001840

Florida Department of State
Division of Corporations
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H19000233403ABCZ

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From:
Account Name : HOLLAND & KNIGHT
Account Number : 075350000340
Phone : (407)425-8500
Fax Number : (407)244-5288

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LP/LLLP AMENDMENT/RESTATEMENT/CORRECTION

CORE & MAIN LP

Certificate of Status	0
Certified Copy	1
Page Count	02
Estimated Charge	$105.00

LTS 8-6-19

Electronic Filing Menu Corporate Filing Menu Help

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2019 AUG -5 P 5 12

SECRETARY OF STATE
TALLAHASSEE, FLORIDA

CERTIFICATE OF AMENDMENT
TO
CERTIFICATE OF LIMITED PARTNERSHIP
OF
CORE & MAIN LP

Pursuant to the provisions of section 620.1202, Florida Statutes, this Florida limited partnership, whose certificate was filed with the Florida Department of State on November 22, 2004, adopts the following Certificate of Amendment to its Certificate of Limited Partnership.

FIRST: The name of the limited partnership as identified in the records of the Florida Department of State is CORE & MAIN LP. The limited partnership's Florida document number is: A04000001840 .

SECOND: Article 4 of the Certificate of Limited Partnership of Core & Main LP (the Company) is hereby amended to reflect the admission of a new General Partner Core & Main Intermediate GP, LLC and the dissociation of the previous General Partner Core & Main Midco, LLC to read:

"Article 4 – General Partners

The name and street address of the General Partner of the Company is:

Core & Main Intermediate GP, LLC
1830 Craig Park Court
St. Louis, Missouri 63146

THIRD: This Certificate of Amendment shall be effective as of the "date and time" of its filing with the Florida Department of State.

[Signature Page to follow]

Signatures of current general partner:

CORE & MAIN MIDCO, LLC, a Delaware
limited liability company

By its sole member, Core & Main Holdings, LP
By its general partner, CD&R Plumb Buyer, LLC

By:
Name: Theresa A. Gore
Title: Vice President and Secretary

By its general partner, Core & Main GP, LLC

By:
Name: Theresa A. Gore
Title: Vice President and Secretary

Signature of new general partner:

CORE & MAIN INTERMEDIATE GP, LLC,
a Delaware limited liability company

By its sole member, Core & Main Midco, LLC
By its sole member, Core & Main Holdings, LP
By its general partner, CD&R Plumb Buyer, LLC

By:
Name: Theresa A. Gore
Title: Vice President and Secretary

By its general partner, Core & Main GP, LLC

By:
Name: Theresa A. Gore
Title: Vice President and Secretary

Division of Corporations

A04000001840

Florida Department of State

Division of Corporations

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MERGER OR SHARE EXCHANGE

Core & Main LP

Certificate of Status	0
Certified Copy	1
Page Count	03
Estimated Charge	$86.25

Electronic Filing Menu Corporate Filing Menu Help

LTS 4-7-2020

CERTIFICATE OF INSURANCE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 07/31/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Willis Towers Watson Northeast, Inc.
c/o 26 Century Blvd
P.O. Box 305191
Nashville, TN 372305191 USA

CONTACT NAME: Willis Towers Watson Certificate Center
PHONE (A/C, No, Ext): 1-877-945-7378 FAX (A/C, No): 1-888-467-2378
E-MAIL ADDRESS: certificates@willis.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : ACE American Insurance Company	22667
INSURER B : Willis Submission Carrier	GENRC
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
Core & Main LP
1830 Craig Park Court
Saint Louis, MO 63146

COVERAGES **CERTIFICATE NUMBER:** W34384132 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR X SIR Each Occurrence: $500,000 GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT LOC OTHER:			XSL G48900161	08/01/2024	08/01/2025	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 500,000 $ 500,000 $ 15,000 $ 500,000 $ 1,500,000 $ 1,500,000
B	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY			SEE ATTACHED	08/01/2024	08/01/2025	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 2,000,000 $ $ $
	UMBRELLA LIAB OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y / N: No If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		SEE ATTACHED	08/01/2024	08/01/2025	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
B	Additional Lines of Coverage			SEE ATTACHED	08/01/2024	08/01/2025		

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

Evidence Only

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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SR ID: 26249902 BATCH: 3563233

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ADDITIONAL COVERAGE SCHEDULE

NAMED INSURED: Core & Main LP

AUTOMOBILE LIABILITY
Policy Effective & Expiration Dates: See Page 1
Limits: See Page 1

POLICY NUMBER	STATE	INSURER(S) AFFORDING COVERAGE
ISA H10823766	All Other States	ACE American Insurance Company

WORKERS COMPENSATION & EMPLOYERS LIABILITY
Policy Effective & Expiration Dates: See Page 1
Limit: See Page 1

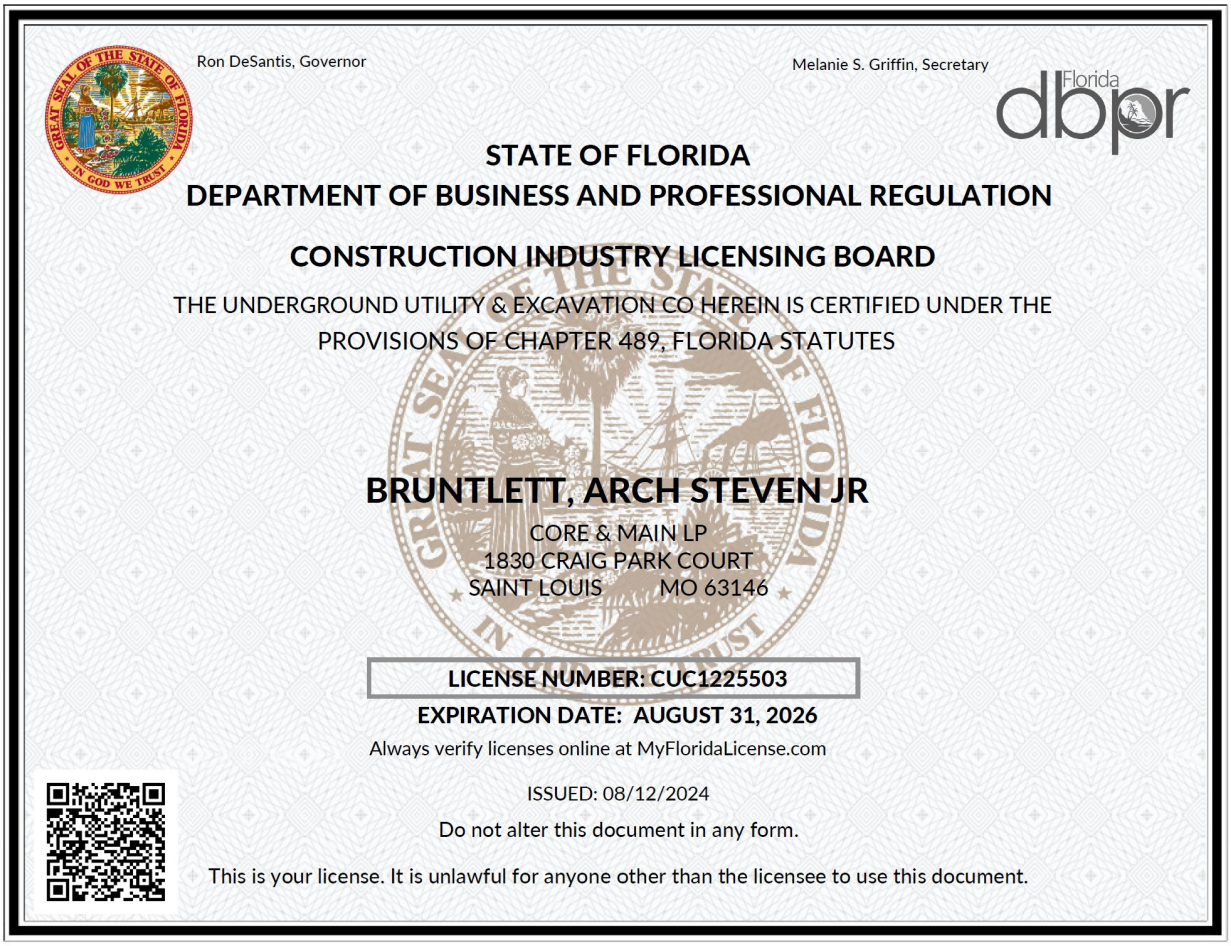
POLICY NUMBER	STATE	INSURER(S) AFFORDING COVERAGE
WLR C55521098	All Other States	ACE American Insurance Company
SCF C55521153	Wisconsin	ACE Fire Underwriters Insurance Company

EXCESS LIABILITY
Policy Effective & Expiration Dates: 08/01/2024-08/01/2025

POLICY NUMBER	TYPE OF INSURANCE	LIMITS	INSURER(S) AFFORDING COVERAGE
140001151	Excess Automobile Liability	$3M xs $2M	QBE Specialty Insurance Company
MKLM6MM50000091	Excess General Liability	$5M xs Primary GL	Markel American Insurance Company

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Ron DeSantis, Governor

Melanie S. Griffin, Secretary

Florida dbpr

STATE OF FLORIDA

DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

CONSTRUCTION INDUSTRY LICENSING BOARD

THE UNDERGROUND UTILITY & EXCAVATION CO HEREIN IS CERTIFIED UNDER THE PROVISIONS OF CHAPTER 489, FLORIDA STATUTES

BRUNTLETT, ARCH STEVEN JR

CORE & MAIN LP
1830 CRAIG PARK COURT
SAINT LOUIS MO 63146

LICENSE NUMBER: CUC1225503

EXPIRATION DATE: AUGUST 31, 2026

Always verify licenses online at MyFloridaLicense.com

ISSUED: 08/12/2024

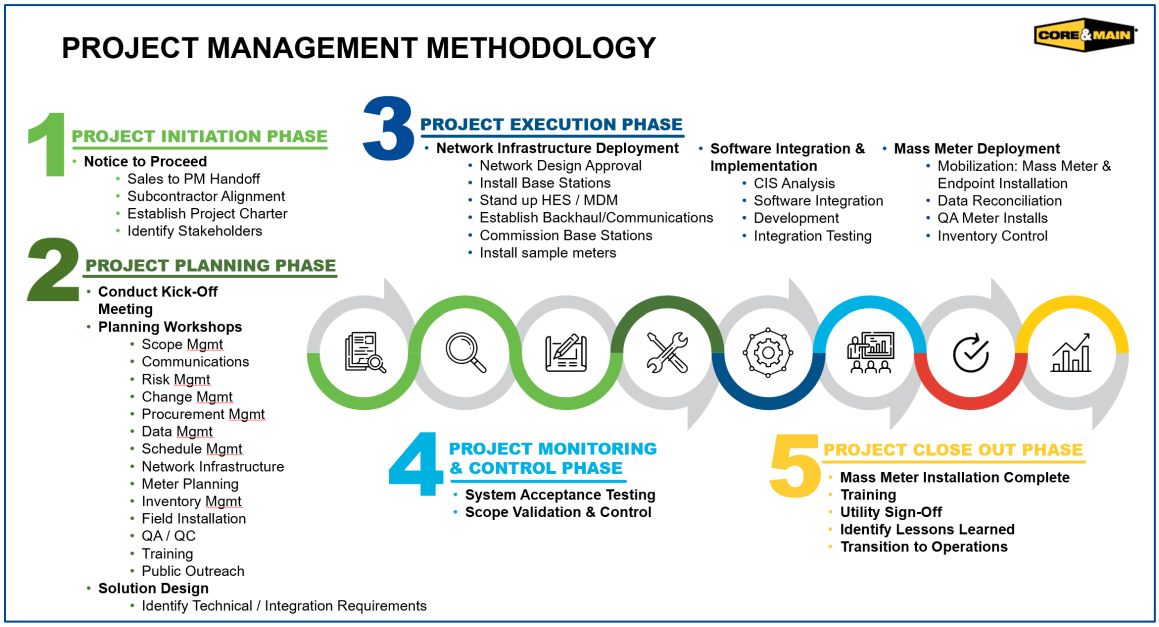
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Implementation Plan & Schedule

The CORE+ Team utilizes a structured methodology with proven processes and procedures in planning, safety, quality, deployment, and communication to successfully implement AMI systems. This foundation enables Core & Main's experienced and dedicated team to deliver projects on time, within budget, and with industry-leading customer satisfaction.



1. PROJECT INITIATION PHASE

Notice to Proceed

1. Sales to Project Management Handoff
2. Subcontractor Alignment
3. Deliver Project Charter
4. Identify Stakeholders
5. Schedule Project Kick-off Meeting with Customer

2. PROJECT PLANNING PHASE

Conduct Project Kick-Off Meeting

1. Scope Management Workshop
    a. Review project expectations
    b. Project contacts identified
    c. Work Breakdown Structure (WBS) / Gantt Chart Created
        i. Original Project Baseline Created
        ii. Milestones Identified
        iii. Critical path(s) Identified

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2. Discuss project processes (RTU process, installation data file, installed/adjusted box height, etc.)
    a. Discuss/confirm RMA and salvage process
    b. Discuss meter installation schedule
    c. Review meter delivery process
    d. Discuss creation of and implementation of daily data file transfer (subcontractor and billing)
    e. Discuss access to installer's portal (demo)
    f. Utility to provide CIS contact
        i. Work with manufacturer to develop import file and billing export file
        ii. Import file pulls data from CIS system into analytics software
        iii. Billing export file pulls reads from MDM and uploads into CIS system
    g. Field installation discussion
    h. Meter installation contractor discussion
        i. Contractor to identify field manager to coordinate daily activities
    i. Utility and Core & Main to designate the installation information to collect
        i. Old meter ID number
        ii. Old meter read
        iii. New meter ID number
        iv. New meter size
        v. New transmitter number
        vi. GPS coordinates
    j. How will installation information be entered into CIS system
        i. Manual or electronic
    k. Utility to provide CNM with billing file containing customer information
    l. Location for storing meters
    m. Plan for disposal of old meters
    n. Process for signing out material to subcontractor
    o. Process for existing conditions (examples below)
        i. Water
            1. Leaks
            2. Old valves
            3. Damaged pits
            4. Height for meter box placement and adjustments
    p. Discuss method for handling non-compliant residents
    q. RTU process (Examples below)
        i. Unable to Locate
        ii. Wrong Information
        iii. Customer Refusals
        iv. Existing Leak
        v. Water Plumbing Conditions
    r. Acceptable hours to work
        i. Start and end time
        ii. Weekends

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iii. Holidays

3. Manufacturer Training Needs
    a. Onsite training
    b. Utility to provide name, email address, and phone number of those needing access to the dashboard
4. Develop refined project schedule

Planning Workshops

1. Communications Management Workshop
    a. Communications Plan
        i. Project Stakeholders Identified
        ii. Preferred Methods of Contact Identified
        iii. Stakeholders Interviewed on Desired Contact Scope
    b. Status Meetings Identified
    c. Field Resources Identified
    d. Identify Vendors
        i. Local Emergency Clinics
        ii. Electrical
        iii. Minor Plumbing
        iv. Major Plumbing
        v. Restoration - Dirt
        vi. Restoration - Concrete/ Asphalt
    e. Project Dashboard
    f. Communication Groups (CNM Specific)
    g. Communication Groups (Project Team Specific)
    h. Outside Communication Procedure
    i. Project Dashboard
    j. Local Branch Communications/ Reporting Defined
        i. Monthly Report Process Communicated
        ii. Cost Tracking Process Communicated
2. Risk Management Workshop
    a. Client Tolerance to Risks
    b. Contractor Tolerance to Risks
    c. Plans for Risks Encountered Identified
        i. Risk Identification
        ii. Risk Evaluation
        iii. Risk Prioritization
        iv. Risk Log Created
3. Change Management Workshop
    a. Organizational Change Requirements Defined
    b. Create Change Log
    c. Discuss Change Order Process
4. Procurement Management Workshop
    a. Installer Handheld Equipment Ordered
        i. Install software (create config files/ import files, alarms)

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        ii. Send copy of config/network files to branch
        iii. Handhelds Properly Set-up
    b. AMI Equipment Ordered Based on Site SOWs
    c. Invoicing and Reporting Requirements
        i. Monthly Report Process Defined
        ii. Cost Tracking Process Identified
        iii. Local Branch
        iv. Contractors
5. Data Management Workshop
    a. Data Flow from Client to Installer
        i. Work Order Integration
        ii. Integration and Testing Background
        iii. Work Order Types
        iv. Data Format and Content
        v. Special Account Identification
        vi. File Transfer Details
        vii. Interface Testing
    b. Data Flow from Installer to Client Billing System
        i. Work Order Integration
    c. Billing Integration
        i. Software and Testing Background
        ii. Billing Read Request
        iii. Billing Read Response
        iv. Software Testing
6. Schedule Management Workshop
    a. Area Route Planning
    b. Installation Production Schedule
    c. Black Out Schedule
    d. Appointment Scheduling
    e. Installation Standard Operating Procedures
    f. Special Installation Procedures
    g. Assist and RTU Process
7. Network Infrastructure Workshop
    a. AMI Scope Defined (high level)
    b. Licensing
    c. Permitting
    d. Electrical
8. Meter Planning Workshop
    a. Water
        i. Meter Types
        ii. Compound
        iii. Turbin
        iv. Fire
        v. Residential

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vi. Intermediate
vii. Retrofit

b. Meter Configurations
i. Number of Digits
ii. Smart Alarm Parameters

9. Inventory Management Workshop
a. Meters
b. Endpoints
c. Misc. Materials
d. Warranty
e. RMA
f. Scrap/ Recycling
g. Inventory at Conclusion of Project

10. Field Installation Management Workshop
a. Installation Processes
i. RTU Process
1. Customer Refusal
2. Acknowledgement Form
3. Letter from Client
4. Customer-side Leak
5. Ground Wires
6. Client-side Leak
7. Unable to Locate
8. Poor Plumbing Criteria Process
9. Out of Scope Plumbing Conditions
ii. Field Areas of Consequence / Priority
1. Private Properties
2. Specific-Need Customers
3. C&I Customers
4. Restricted Areas
iii. Images
iv. QA / QC
v. Pilot (POC) Planning
vi. Technician / Customer Interactions
vii. Signage
1. Door Hangers
2. Vehicle Identification
3. Badges
viii. Service Line / LCRR Audit Requirements (if required) (Customer/ Client)
ix. Post-Install Requirements
1. Additional Work
2. Approval Process
3. Crawl Space
4. Confined Space

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5. Additional Personnel
6. Traffic Control
7. After Hours
8. Replace Valve
9. Minor Plumbing
10. Major Plumbing
11. Minor Carpentry
12. Major Carpentry
13. Pit Lid (Remove & Replace)
14. Pit Lid (Drill)
15. Dewatering
16. Debris removal
17. Replace Box
18. Re-Pipe
19. Replace Meter Box
20. Raise / Adjust Meter Box
21. Line Flushing
22. Site Condition Standards

b. Handheld Equipment Data Requirements Defined

11. QA / QC Management Workshop
    a. Field Audit Requirements
    b. Office Audit Requirements
    c. Performance Improvement Requirements
    d. Reporting Requirements
    e. Customer Acceptance Defined
    f. Sign-off Process
12. Training Management Workshop
    a. Schedule Training
        i. Meter Installation Training
        ii. Endpoint Installation Training
        iii. Activation Process Training
        iv. Troubleshooting Process Training
        v. Head End System Training
        vi. MDM Training
    b. Software Training
        i. Scheduled by CNM if in-scope
        ii. Coordinate with existing software vendors (if applicable)
13. Public Outreach Management Workshop
    a. Public Relations Strategy Review
    b. Mailers
    c. Tags
    d. PSA
    e. Call Center Plan
    f. Social Media

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g. Website

Solution Design

1. Project Design Phase
    a. Obtain area site map from utility, along with service addresses-Based off prop study
        i. Inside/Outside set?
    b. Evaluate potential tower sites
        i. Water towers
        ii. Communication towers
        iii. Buildings, poles, etc.
    c. Items to consider
        i. Is the tower of sufficient height
        ii. Are there appropriate mounting points for necessary equipment
        iii. Is there a clear path for conduit and cabling
        iv. Is there a suitable location for a data collector
        v. How will power be supplied to the data collector
2. Who is responsible for getting power to the site
        i. Is there access to suitable grounding
        ii. Who owns the land-access (gates locked)
        iii. Power lines involved – is power available

Identify Technical/Integration requirements

1. CIS Analysis
2. Software Integration
3. Development
4. Integration Testing

3. PROJECT EXECUTION PHASE

Direct and Manage Project Work (Scope and Schedule Management Plans)

1. Acquire / Develop / Manage Team (Resource Management Plan)
2. Large Meter Surveys Conducted per Plan
3. Residential Meter Surveys Conducted per Plan
4. Pilot (POC) Installs Conducted per Plan
5. Residential Meter Installations Conducted per Plan
6. Intermediate Meter Installations Conducted per Plan
7. Large Meter Installations Conducted per Plan
8. Retrofits Conducted per Plan
9. Manage Project Knowledge (Communications Plan)
10. Manage Quality (Quality Management Plan)
11. Implement Risk responses (Risk Management Plan)
12. Manage Stakeholder Engagement
13. Manage Inventory (Procurement Management Plan)

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Network Infrastructure Deployment

1. Coordinate network infrastructure installation
    a. Selected contractor(s) approved
        i. Licensed Electrician (if needed)
        ii. Additional Work Requirements (as needed)
    b. Selected contractor(s) setup as Vendor (if needed)
    c. Permit and Easement Requirements (if needed)
    d. Coordinate site survey with CNM, Utility, and tower contractor
    e. Verify structure condition for antenna mounting
    f. Confirm antenna height
        i. Antenna locations and positions
    g. Confirm power requirements and availability
    h. Verify base station placement and outdoor/indoor conditions of location
    i. Provide preconstruction and post construction photographs and as-built drawings
    j. Confirm selection of backhaul with Utility and necessary equipment (modem, cellular, fiber, ethernet, etc.)
    k. Verify installation compliance with Utility and any government regulations
2. Verify base station installation
    a. Installed in designated location with proper housing
    b. Properly connected to power
    c. Verify antennas and coaxial cables have been installed in appropriate locations
    d. Perform initial base station configuration
    e. Network approval from manufacturer
    f. Arrange certification and commissioning of infrastructure
    g. Deliver certification notice upon completion

Software Integration & Implementation

1. CIS Data Analysis
    a. Mass Meter Inventory Upload
    b. Mass Meter Exchange
    c. HES Data Sync
    d. Integration Fee considerations
2. Third-Party Software Implementation Requirements
    a. Timeframe
    b. Milestones
    c. Integration considerations
    d. Examples: CIS, Customer Portal, GIS, SCADA, WOMS, etc.
3. Software Integration
    a. HES <> MDM
    b. HES <> CIS
    c. HES <> OMS
    d. MDM <> CIS
    e. MDM <> GIS
    f. MDM <> Customer Portal

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g. CIS <> WOMS
4. Integration Testing

Mass Meter Deployment

1. Mobilization: Mass Meter & Endpoint Installation
    a. Provide endpoint installation training
        i. Subcontractor must sign document confirming acceptance of manufacturer's recommended installation instructions
    b. Handheld programming device training for utility and installer
    c. Verification of endpoint activation
    d. Appropriate photos captured
    e. Troubleshooting endpoints that are not communicating
    f. Validate quality of installation crews
        i. QA Meter Installs
        ii. Perform scheduled and random field inspections
    g. Monitor deployment process
        i. Train utility personnel to monitor deployment process
        ii. Run system reports to identify installation issues
    h. Execute returned material process
2. Data Reconciliation
3. Inventory Control

4. PROJECT MONITORING & CONTROL PHASE

System Acceptance Testing

1. Conduct Acceptance Testing
    a. Base Stations SAT
    b. Water SAT
    c. MDM SAT
2. Evaluate system performance
    a. Confirm all hardware is installed and communicating (ongoing)
    b. Confirm billing process is accurate (ongoing)
3. Perform system cleanup
    c. Resolve unresponsive endpoints

Scope Validation & Control

1. Monitor / Control Project Work
2. Control Scope (Scope management Plan)
3. Control Schedule (Schedule Management Plan)
4. Control Costs
5. Control Quality (Quality Management Plan)
6. Control Resources (Resource Management Plan)
7. Monitor Communications (Communications Management Plan)
8. Monitor Risks (Risk Management Plan)
9. Control Procurements (Procurement Management Plan)
10. Monitor Stakeholder Engagement

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11. Monitor Inventory Levels (to include projected remaining inventory at project conclusion)
12. Report Inventory Levels (to include projected remaining inventory at project conclusion)

5. PROJECT CLOSEOUT PHASE

Mass Meter Installation Complete

Training

1. Conduct HES Training
2. Conduct MDM Training
3. Conduct Customer Portal Training
4. Conduct Meter Installation Training
5. Conduct Meter Endpoint Installation Training
6. Conduct Meter Activation Process Training
7. Conduct Meter Troubleshooting Process Training

Perform closeout procedures

1. Document closeout process for final review
2. Hold closeout meeting with subcontractors to formalize project completion
    a. Subcontractor Invoice closeout
3. Schedule closeout meeting with customer to formalize project completion

Utility Sign-Off

1. Complete RTU Transfers to Client
2. Return Remaining Inventory to Client
3. Close Procurements
4. Lessons-Learned Meeting
5. Lessons-Learned Documented
6. Archive Documentation
7. Final Invoicing
8. Survey Client

Transition to Operations

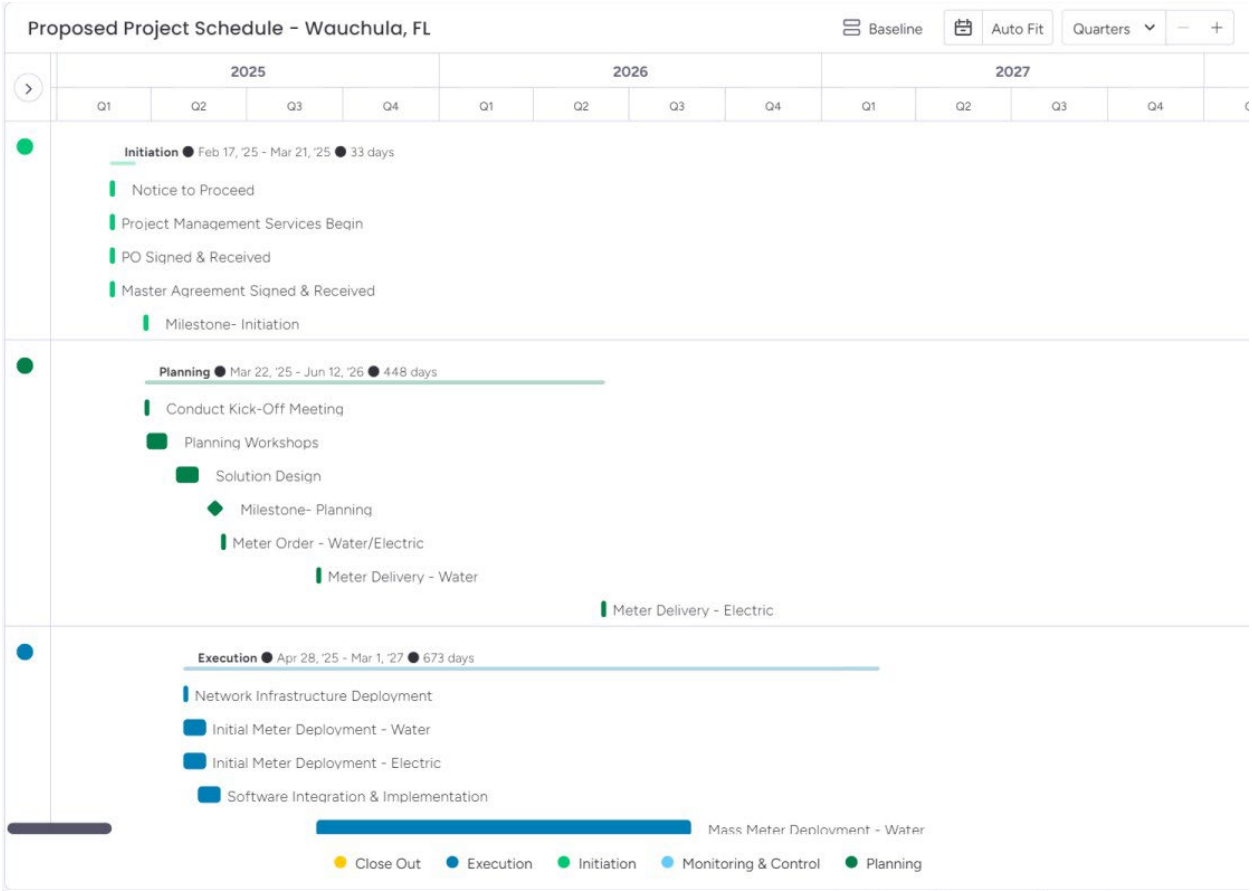
The CORE+ Team utilizes a structured methodology with proven processes and procedures in planning, safety, quality, deployment, and communication to successfully implement AMI systems. This foundation enables Core & Main's experienced and dedicated team to deliver projects on time, within budget, and with industry-leading customer satisfaction.

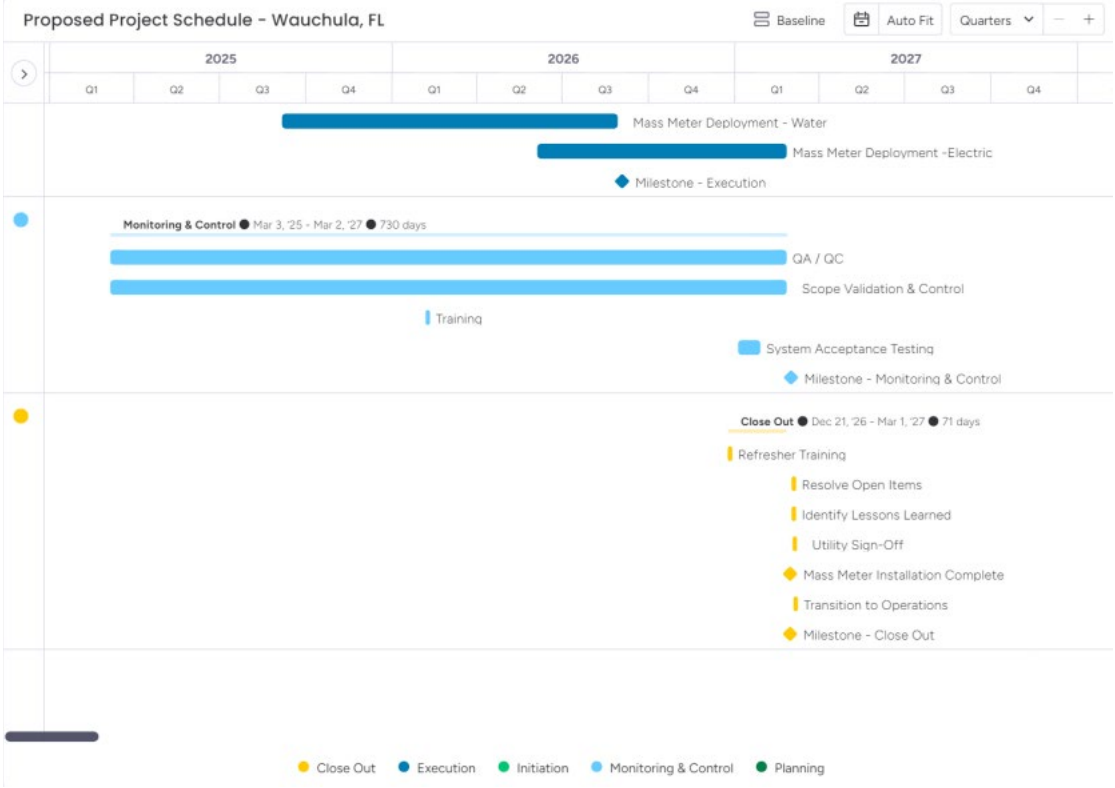
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SAMPLE PROJECT SCHEDULE

Please find Core & Main's Sample Project Management plan outlined below with preliminary dates.

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Attachments

- Attachment A: Submittals and Product Data Sheets
- Attachment B: Propagation Study and AMI Network Design
- Attachment C: Sample AMI Agreements
- Attachment D: CyberSecurity Risk Mitigitation Controls Document
- Attachment E: Sensus Meter Events and Alarms
- Attachment F: Water SmartPoint Compatibility Guide
- Attachment G: FlexNet Distribution Automation Solution
- Attachment H: Home Area Network Functionality
- Attachment I: User Interface Screenshots
- Attachment J: Visio System Diagram
- Attachment K: Supplemental Electric Information
- Attachment L: Training Course Catalog
- Attachment M: Sensus M400B2 User Guide
- Attachment N: Terms of Sale and Warranties
- Attachment O: System Text Fixture User Guide
- Attachment P: Bermex Attachments
- Attachment Q: Roadmap
- Attachment R: Base Station Installation and Commissioning Guide
- Attachment S: Meter Compatibility Guide

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ATTACHMENT A: SUBMITTALS AND PRODUCT DATA SHEETS

MECHANICAL MEASUREMENT WATER METERS

SRII Meter

xylem
Let's Solve Water

DATA SHEET
WDS-10032-04



SR II® Water Meter

Positive Displacement Water Meter with Sensus® Electronic Register+™

The Sensus SR II® is for measurement of potable and reclaimed water flow usage in residential services.

Operation

Water flows through the meter's strainer and into the measuring chamber where it drives the piston. The hydrodynamically balanced piston oscillates around a central hub, guided by the division plate. A drive magnet transmits the motion of the piston to an electronic sensor located within the register. The Electronic Register+ calculates the rotations into volume totalization units displayed on the register LCD.

Construction

SR II meters consist of three basic components: maincase, measuring chamber and sealed register. Maincases are made of NFS approved brass with externally-threaded spuds. Registers are housed in a bonnet of synthetic polymer. Measuring chambers are Rocksyn®, a corrosion-resistant, tailored thermoplastic material formulated for long-term performance and especially suitable for aggressive water conditions. Maincase bottom plates are available in brass or, if frost protection is desired, cast iron or synthetic polymer.

Sensus Electronic Register+

The Sensus® Electronic Register+™ is an advanced electronic register with 120 days of hourly data logging with 30-day data pull intervals available. It provides greater reliability, higher-resolution readings, and more advanced features than any other electronic communication register previously available.

Magnetic Drive

The SR II features a hydrodynamically balanced piston design that eliminates premature wear of components. The meter utilizes a patented positive reliable drive coupling. The high strength magnets eliminate "drive slip" in normal use and also provide adequate strength to drive remote register units.

Maintenance

SR II meters are engineered to provide long-term value and virtually maintenance-free operation. Simplicity of design allows interchangeability of parts of like-size meters, reduced parts inventory requirements and ease of maintenance. The register can be removed without relieving the water pressure or removing the maincase from the installation.

FEATURES

- 5/8", 5/8" x 3/4", 3/4", and 1"Sizes
- Sensus® Electronic Register+™ advanced electronic register
- Hydrodynamically balanced piston design
- Compatible with current Sensus AMI/AMR systems

BENEFITS

- Enable more cost-effective, accurate meter readings
- Deliver a wide range of flows
- Provide lasting measurement accuracy for years of dependable service
- Integrate seamlessly with the FlexNet SmartPoint® module
- Tamper resistant
- Improve customer service
- Environmental and public health conscience

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SR II® Water Meter

Positive Displacement Water Meter with Sensus® Electronic Register+™

Smart Alarms

Electronic Register+ has several user configurable smart alarms. Get alerts and address these issues before they become more costly:

- Tampering
  Detect register removal as well as magnetic interference to reduce apparent water losses and protect against unauthorized activities.
- Low Battery
  Replace your meters before they stop recording consumption through alerts indicating battery capacity to the meter is running low.
- Customer Leak
  Detect continual consumption of water over a configurable period of time to indicate downstream leaks. This can reduce water loss and leak adjustment costs.
- Reverse Flow
  Keep untreated water from re-entering your distribution system or deter tampering attempts when reverse flow is detected.
- High Flow
  Detect broken pipes, high usage and reduce property damage through an alert triggered when excessive flow rates are recorded.



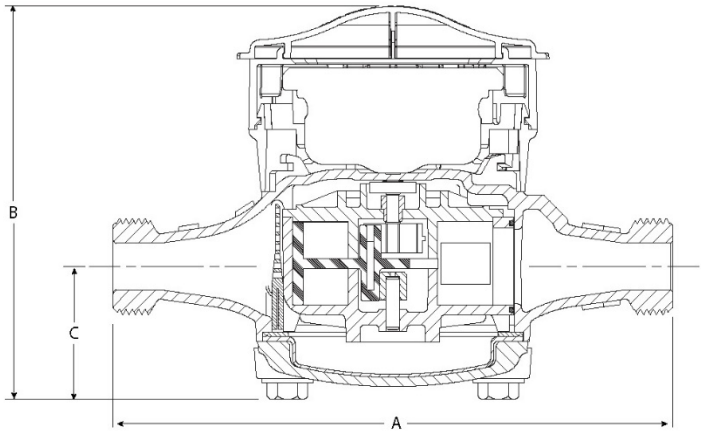
SPECIFICATIONS

Service	Measurement of potable and reclaim water. 0-100% humidity. Fully submersible. IP68+rated.			
Temperature Ranges	Water operating: Ambient air operating: Storage air:	33 °F (0.55 °C) to 80 °F (26.7 °C) -22 °F (-30 °C) to 140 °F (60 °C) -30 °F (-34.4 °C) to 158 °F (70 °C)		
Low flow registration (95%-101.5%)	5/8" (DN 15 mm) size: 1/4 gpm (0.06 m^3/hr)	5/8" x 3/4" (DN 15x20 mm) size: 1/4 gpm (0.06 m^3/hr)	3/4" (DN 20 mm) size: 1/2 gpm (0.10 m^3/hr)	1" (DN 25 mm) size: 3/4 gpm (0.15 m^3/hr)
Normal operating flow range (100% ±1.5%)	5/8" (DN 15 mm) size: 1 to 20 gpm (0.25 to 4.5 m^3/hr)	5/8" x 3/4" (DN 15 mm) size: 1 to 20 gpm (0.25 to 4.5 m^3/hr)	3/4" (DN 20 mm) size: 2 to 30 gpm (0.45 to 7.0 m^3/hr)	1" (DN 25 mm) size: 3 to 50 gpm (0.07 to 11.0 m^3/hr)
Maximum pressure loss	5/8" (DN 15 mm) size: 7.0 psi at 20 gpm (0.5 bar at 4.5 m^3h)	5/8" x 3/4" (DN 15 mm) size: 7.0 psi at 20 gpm (0.5 bar at 4.5 m^3h)	3/4" (DN 20 mm) size: 9.0 psi at 30 gpm (0.6 bar at 7.0 m^3h)	1" (DN 25 mm) size: 7.3 psi at 50 gpm (0.5 bar at 11.0 m^3h)
Maximum operating pressure	150 psi (10.0 bar)			
Measurement element	Oscillating piston			
Register	Electronic Register+: Hermetically sealed, communication of smart alarms with cable output options. 9 available digits. Direct Read: Hermetically sealed, no communication output. 6 odometer wheels.			
Capacity	10,000,000 gallons, 1,000,000 cubic feet or 100,000 m^3 capacity.			
Register Resolution	Electronic: .01 gallons/imperial gallons, .001 cubic foot, or .0001 m^3. Direct Read: 10 gallons, 1 cubic foot, or 0.01 m^3/ or 0.1 m^3/sweep hand revolution.			
Meter Connections	5/8" (DN 15 mm) size: 3/4" (20 mm) threads 3/4" (DN 20 mm) size: 1" (25 mm) threads (All threads are straight pipe, external type, conforming to ANSI B1.20.1 or ISO R228, if specified.)		5/8" x 3/4" (DN 15x20 mm) size: 1" (25 mm) threads 1" (DN 25 mm) size: 1-1/4" (32 mm) threads	
Conformance to Standards	Meets the requirements of NSF 61, Annex G and NSF 372. Complies with the most current AWWA Standard C700.			
Materials	Maincase - Bismuth BiAlloy CDA 89836 or EnviroBrass II C89520 Register Box - Synthetic polymer Measuring chamber - Rocksyn®		Bottom plate - Bismuth BiAlloy CDA89836 Magnets - Ceramic Casing bolts - Stainless steel Strainer - Synthetic polymer	

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SR II® Water Meter

Positive Displacement Water Meter with Sensus® Electronic Register+™



DIMENSIONS AND NET WEIGHTS

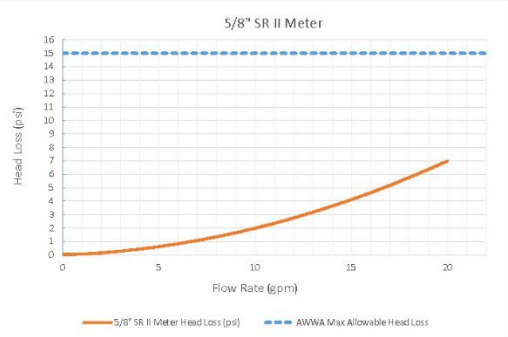
Meter Size	A	B	C	Width	Net Weight
5/8″ (DN 15mm)	7-1/2″ (190 mm)	5-3/8″ (136 mm)	1-3/4″ (44 mm)	3-7/8″ (98 mm)	4.3 lb. (1.97 kg)
5/8″ x 3/4″ (DN 15mm x 20mm)	7-1/2″ (190 mm)	5-3/8″ (136 mm)	1-3/4″ (44 mm)	3-7/8″ (98 mm)	4.4 lb. (2.0 kg)
3/4″ Short (DN 20mm)	7-1/2″ (190 mm)	5-7/8″ (149 mm)	2-3/16″ (56 mm)	4-1/2″ (114 mm)	6.2 lb. (2.81 kg)
3/4″ (DN 20mm)	9″ (229 mm)	5-7/8″ (149 mm)	2-3/16″ (56 mm)	4-1/2″ (114 mm)	6.4 lb. (2.90 kg)
1″ (DN 25mm)	10-3/4″ (273 mm)	7-1/8″ (181 mm)	2-3/4″ (70 mm)	6-1/2″ (165 mm)	11.9 lb. (5.4 kg)

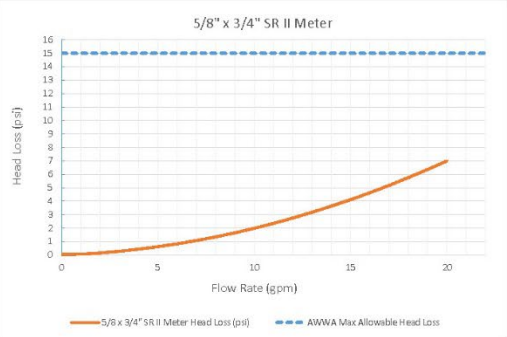
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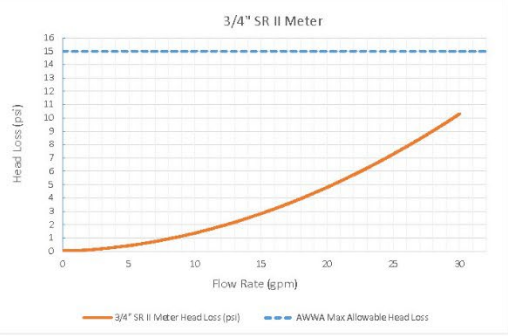
SR II® Water Meter

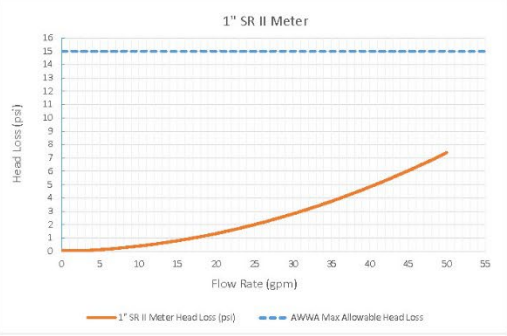
Positive Displacement Water Meter with Sensus® Electronic Register+™

Head Loss Curves









xylem

Xylem.com | Sensus.com

SENSUS | 637 Davis Drive | Morrisville, NC 27560 | 800.638.3748

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Let's Solve Water

DATA SHEET
WDS-10018-06



OMNI+ Turbo (T²) Water Meter

1-1/2", 2", 3", 4", 6", 8" and 10"

The OMNI™+ T² meter operation is based on advanced Floating Ball Technology (FBT).

Performance

The patented measurement principles of the OMNI+ T² meter ensure greater accuracy, expanded accuracy range and longer service life than any other comparable class meter. The OMNI+ T² meter has no restrictions on sustained flow rates within its continuous range. The floating ball measurement technology allows installation in any orientation and flows up to maximum rated capacity without undue wear or accuracy degradation.

Construction

The OMNI+ T² meter consists of two basic assemblies; the maincase and the measuring chamber. The measuring chamber assembly includes the "floating ball" impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all electronic programmable register with protective bonnet. The maincase is made from industry proven Ductile Iron with an approved NSF epoxy coating. Maincase features are; easily removable measuring chamber, unique chamber seal to the maincase using a high pressure o-ring, testing port and a convenient integral strainer.

OMNI+ Electronic Register

The OMNI+ electronic register is hermetically sealed with an electronic pickup containing no mechanical gearing. The OMNI+ register features a programmable totalizer registration, an optional digital pulse signal, AMI/ AMR reading digits, and a resettable test totalizer. The large, easy-to-read LCD also displays both forward and reverse flow directions. The OMNI+ tamper-proof security cover can be positioned in any of 270 degrees of rotation, with indexing points at each of the 90-degree customary register viewing positions.

Magnetic Drive

Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the "floating ball" impeller.

Measuring Element

The hydro-dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI+ T² meter.

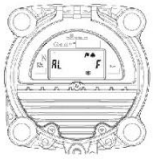
OMNI™+ REGISTER DISPLAY



Segment Test View



Totalizer View



Notification View



Flow Rate View

Conformance to Standards

The OMNI+ T² meter meets and far exceeds the most recent revision of AWWA Standard C701 class II standards. Each meter is performance tested to ensure compliance. All OMNI meters are NSF/ANSI Standard 61, Annex F and G approved.

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OMNI+ Turbo (T²) Water Meter

1-1/2", 2", 3", 4", 6", 8" and 10"

Strainer

The OMNI+ T² with the AWWA compliant "V" shaped strainer uses a stainless steel screen along with Floating Ball Technology (FBT). This creates a design that greatly improves accuracy, even in difficult settings. A removable strainer cover permits easy access to the screen for routine maintenance.

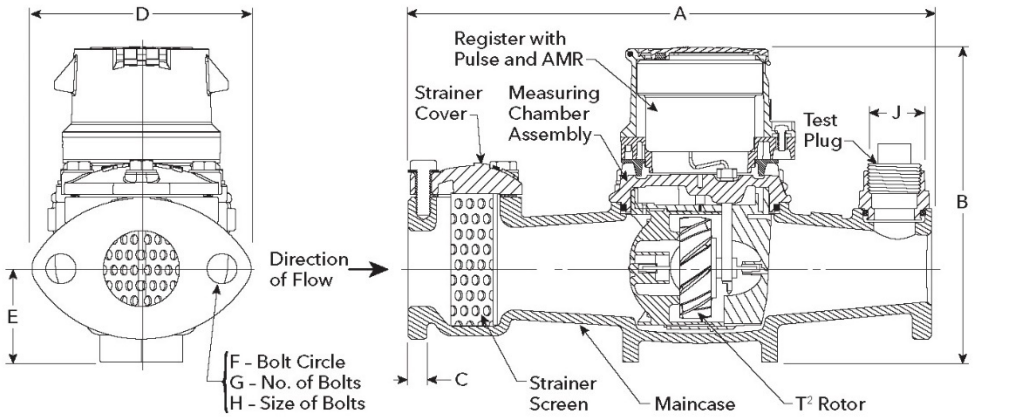
AMR/AMI Systems

Meters and Electronic Registers are compatible with current Sensus AMR/AMI systems and other AMI communication systems that use the Sensus UI1203 protocol.

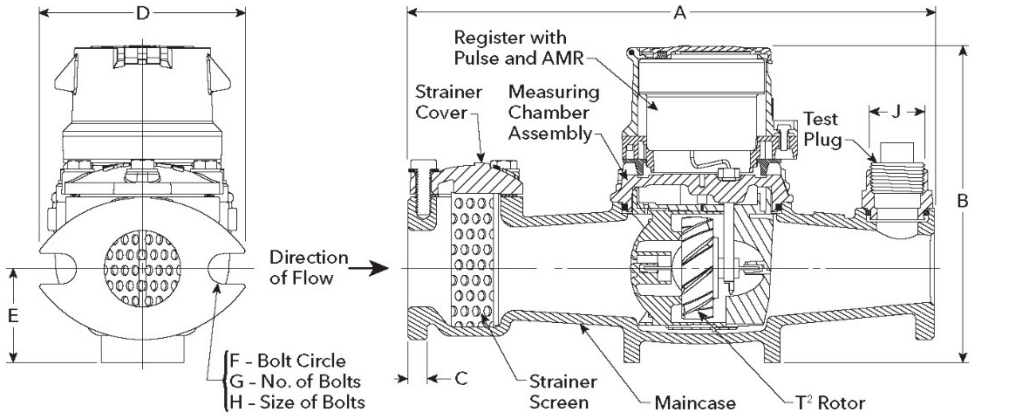
Maintenance

The OMNI+ T² meter is designed for easy maintenance. Should any maintenance be required, the measuring chamber and/or strainer cover can be removed independently. Replacement parts or complete measuring chambers are available for repairs. OMNI+ T² replacement measuring chambers may also be utilized to upgrade some third-party meters to achieve increased accuracy and extended service life.

OMNI T²: 1-1/2"



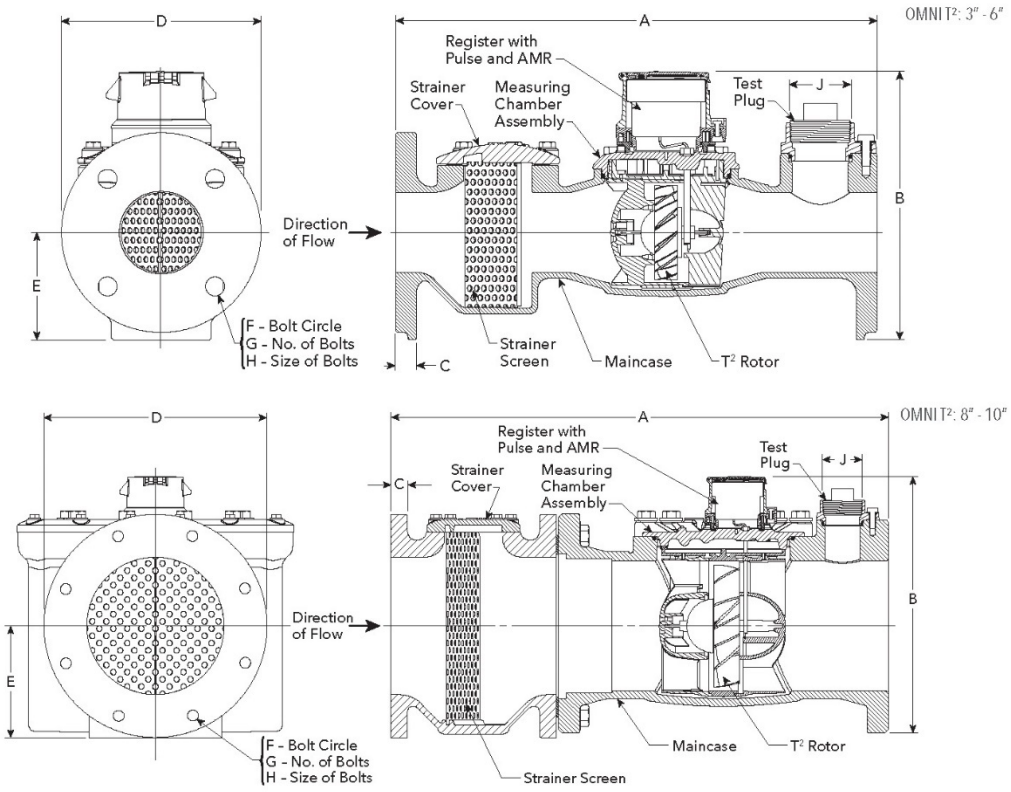
OMNI T²: 2"



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OMNI+ Turbo (T²) Water Meter

1-1/2", 2", 3", 4", 6", 8" and 10"



DIMENSIONS AND NET WEIGHTS

Meter and Pipe Size	Normal Operating Range		Connections	A	B	C	D	E	F	G	H	J	Net Weight	Shipping Weight
1-1/2" DN 40mm	1.25 gpm .28 m³/hr	200 gpm 45 m³/hr	Flanged	13" 330mm	7-7/8" 200mm	15/16" 24mm	5-7/16" 138mm	2-5/16" 59mm	4" 102mm	2	5/8" 16mm	1" 25mm	18.8 lbs. 8.53 kg.	22.5 lbs. 10.2 kg.
2" DN 50mm	1.5 gpm .34 m³/hr	250 gpm 57 m³/hr	Flanged	17" 432mm	7-7/8" 200mm	1" 25mm	5-3/4" 146mm	2-5/16" 59mm	4-1/2" 114mm	2	3/4" 19mm	1-1/2" 38mm	27.4 lbs. 12.4 kg.	34.5 lbs. 15.6 kg.
2" w/o Strainer DN 50mm	1.5 gpm .34 m³/hr	250 gpm 57 m³/hr	Flanged	10" 254mm	7-7/8" 200mm	1" 25mm	5-3/4" 146mm	2-5/16" 59mm	4-1/2" 114mm	2	3/4" 19mm	N/A	17.4 lbs. 7.9 kg.	24.5 lbs. 11.1 kg.
3" DN 80mm	2.5 gpm .57 m³/hr	650 gpm 148 m³/hr	Flanged	19" 483mm	8-3/4" 225mm	3/4" 19mm	7-7/8" 200mm	4-1/8" 105mm	6" 153mm	4	5/8" 16mm	2" 51mm	48.5 lbs. 22.0 kg.	57.4 lbs. 26.0 kg.
4" DN 100mm	3.0 gpm .68 m³/hr	1250 gpm 284 m³/hr	Flanged	23" 584mm	11-3/16" 284mm	15/16" 24mm	9-1/8" 232mm	4-3/4" 121mm	7-1/2" 191mm	8	5/8" 16mm	2" 51mm	67.9 lbs. 30.8 kg.	75.8 lbs. 34.4 kg.
6" DN 150mm	4 gpm .91 m³/hr	2500 gpm 568 m³/hr	Flanged	27" 686mm	13-1/4" 337mm	15/16" 24mm	11" 279mm	5-3/4" 146mm	9-1/2" 241mm	8	3/4" 19mm	2" 51mm	140 lbs. 63.5 kg.	165 lbs. 74.8 kg.
8" DN 200mm	5 gpm 1.1 m³/hr	3500 gpm 795 m³/hr	Flanged	30-1/8" 765mm	15" 381mm	11/16" 17mm	13-1/2" 343mm	6-3/4" 171mm	11-3/4" 298mm	8	3/4" 19mm	2" 51mm	471 lbs. 214 kg.	521 lbs. 236 kg.
10" DN 250mm	6 gpm 1.4 m³/hr	5500 gpm 1249 m³/hr	Flanged	41-1/8" 1045mm	19" 483mm	11/16" 17mm	16" 406mm	8-1/2" 216mm	14-1/4" 362mm	12	7/8" 22mm	2" 51mm	685 lbs. 311 kg.	745 lbs. 338 kg.

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OMNI+ Turbo (T^2) Water Meter

1-1/2", 2", 3", 4", 6", 8" and 10"

SPECIFICATIONS

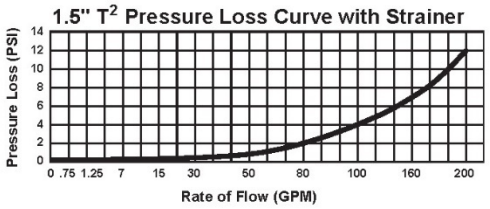
Service	Measurement of potable and reclaim water. Storage temperature: -22F (-30C) to 155F (68.3C)	Operating temperatures: Air: -22F (-30C) to 150F (65.6C) Water: 33F (0.6C) to 80F (26.7)
Operating Range (100% ± 1.5%)	1-1/2": 1.25 – 200 GPM (0.28 - 45 m^3/hr) 2": 1.5 – 250 GPM (0.34 - 57 m^3/hr) 3": 2.5 – 650 GPM (0.57 - 148 m^3/hr) 4": 3 – 1250 GPM (0.68 - 284 m^3/hr)	6": 4 – 2500 GPM (0.91 - 568 m^3/hr) 8": 5 – 3500 GPM (1.1 - 795 m^3/hr) 10": 6 – 5500 GPM (1.4 - 1249 m^3/hr)
Low flow (95% – 101.5%)	1-1/2": 0.75 GPM (0.17 m^3/hr) 2": 1.0 GPM (0.23 m3/hr) 3": 1.5 GPM (0.34 m^3/hr) 4": 2.0 GPM (0.45 m^3/hr)	6": 2.5 GPM (0.57 m^3/hr) 8": 4 GPM (0.91 m^3/hr) 10": 5 GPM (1.1 m^3/hr)
Maximum Continuous Operation	1-1/2": 160 GPM (36 m^3/hr) 2": 200 GPM (45 m^3/hr) 3": 500 GPM (114 m^3/hr) 4": 1000 GPM (227 m^3/hr)	6": 2000 GPM (454 m^3/hr) 8": 3500 GPM (795 m^3/hr) 10": 5500 GPM (1249 m^3/hr)
Maximum Intermittent Operation	1-1/2": 200 GPM (45 m^3/hr) 2": 250 GPM (57 m^3/hr) 3": 650 GPM (148 m^3/hr) 4": 1250 GPM (284 m^3/hr)	6": 2500 GPM (568 m^3/hr) 8": 4700 GPM (1067 m^3/hr) 10": 7000 GPM (1590 m^3/hr)
Pressure Loss	1-1/2": 6.9 psi @ 160 GPM (0.48 bar @ 36 m3/hr) 2": 7.0 psi @ 200 GPM (0.48 bar @ 45 m^3/hr) 3": 5.1 psi @ 500 GPM (0.35 bar @ 114 m^3/hr) 4": 8.7 psi @ 1000 GPM (0.60 bar @ 227 m^3/hr)	6": 8.2 psi @ 2000 GPM (0.57 bar @ 454 m^3/hr) 8": 5.1 psi @ 3500 GPM (0.35 bar @ 795 m^3/hr) 10": 7.2 psi @ 5500 GPM (0.50 bar @ 1249 m^3/hr)
Maximum Operating Pressure	200 PSI (13.8 bar)	
Flange Connections	U.S. ANSI B16.1 / AWWA Class 125	
Test Ports	NPT	
Register	Fully electronic sealed register with programmable registration (Gal. /Cu.Ft./ Cu. Mtr. / Imp. Gal. / Acre Ft.)	Programmable AMR/AMI reading and pulse outputs Guaranteed 10-year battery life
NSF Approved Materials	Maincase: Coated Ductile Iron Measuring Chamber: Thermoplastic Rotor "Floating Ball": Thermoplastic Radial Bearings: Hybrid Thermoplastic Thrust Bearings: Sapphire/Ceramic Jewel	Magnets: Ceramic Strainer Screen: Stainless Steel Strainer Cover: Coated Ductile Iron Test Plug: Stainless Steel

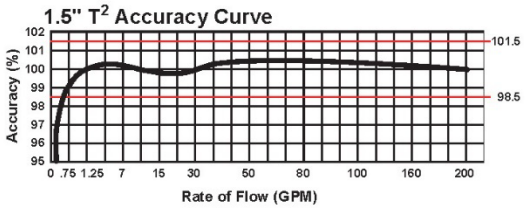
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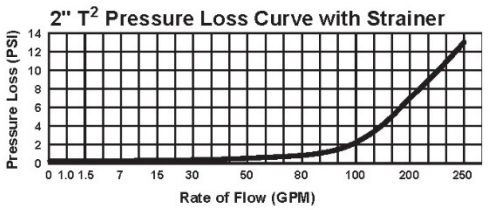
OMNI+ Turbo (T^2) Water Meter

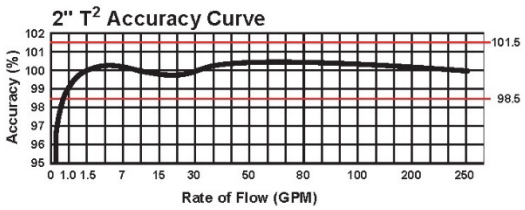
1-1/2", 2", 3", 4", 6", 8" and 10"

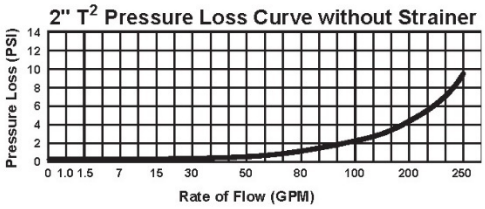
Headloss Curves

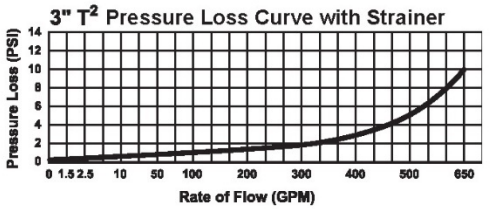


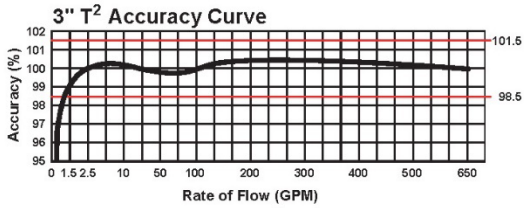


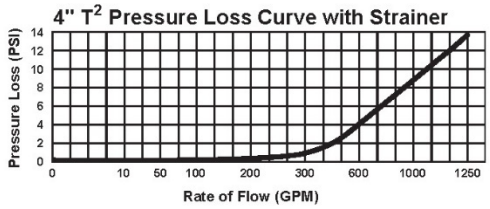


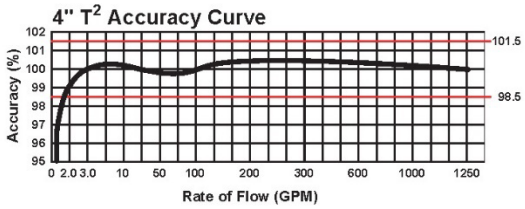










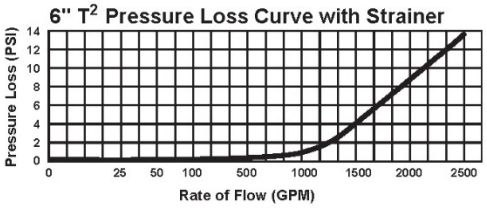


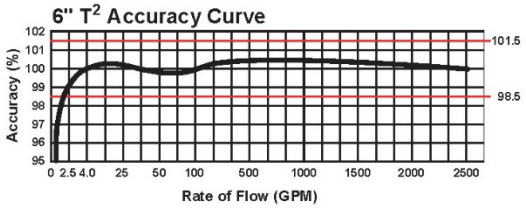
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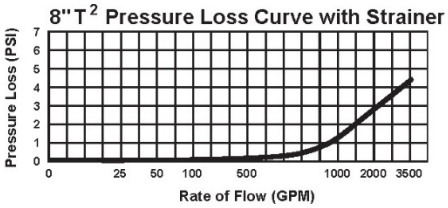
OMNI+ Turbo (T²) Water Meter

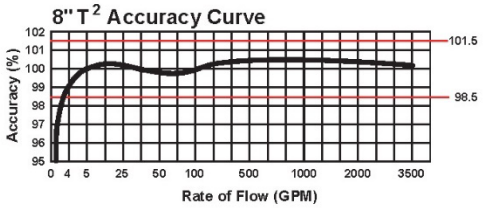
1-1/2", 2", 3", 4", 6", 8" and 10"

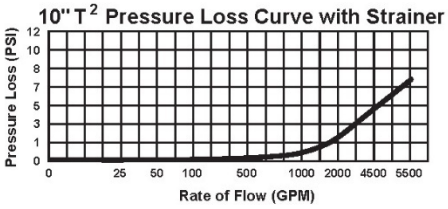
Headloss Curves

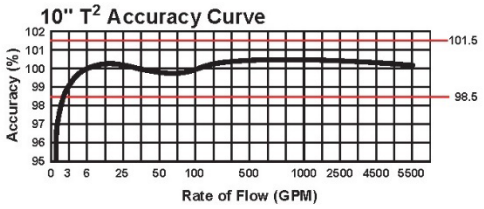












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Let's Solve Water

DATA SHEET
WDS-10017-07



OMNI+ Compound (C²) Water Meter

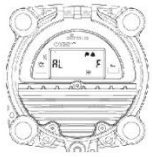
1-1/2", 2", 3", 4", 6", 8" and 10"

The OMNI™+ Compound (C²) Water Meter operation is based on advanced Floating Ball Technology (FBT).

OMNI™+ REGISTER DISPLAY


Segment Test View


Totalizer View


Notification View


Flow Rate View

Conformance to Standards

The OMNI+ C² meter meets and far exceeds the most recent revision of AWWA Standard C701 and C702 class II. Additionally, the meter does not require a valve to meet these standards. Each meter is performance tested to ensure compliance. All OMNI meters are NSF/ANSI Standard 61, Annex F and G approved latest standards.

Performance

The patented measurement principles of the OMNI+ C² meter ensure greater accuracy, expanded accuracy range and longer service life than any other comparable class meter. The OMNI+ C² meter has no restrictions on sustained flow rates within its continuous range. The floating ball measurement technology allows installation in any orientation and flows up to maximum rated capacity without undue wear or accuracy degradation.

Construction

The OMNI+ C² meter consists of two basic assemblies; the maincase and the measuring chamber. The measuring chamber assembly includes the "floating ball" impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all electronic programmable register with protective bonnet. The maincase is made from industry proven Ductile Iron with an approved NSF epoxy coating. Maincase features are; easily removable measuring chamber, unique chamber seal to the maincase using a high pressure o-ring, testing port and an AWWA compliant strainer.

OMNI+ Electronic Register

The OMNI+ electronic register is hermetically sealed with an electronic pickup containing no mechanical gearing. The OMNI+ register features a programmable totalizer registration, an optional digital pulse signal, AMI/ AMR reading digits, and a resettable test totalizer. The large, easy-to-read LCD also displays both forward and reverse flow directions. The OMNI+ tamper-proof security cover can be positioned in any of 270 degrees of rotation, with indexing points at each of the 90-degree customary register viewing positions.

Magnetic Drive

Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the "floating ball" impeller.

Measuring Element

The hydro-dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI+ C² meter.

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OMNI+ Compound (C²) Water Meter

1-1/2", 2", 3", 4", 6", 8" and 10"

Strainer

The OMNI+ C² with the AWWA compliant "V" shaped strainer uses a stainless steel screen along with Floating Ball Technology (FBT). This creates a design that greatly improves accuracy, even in difficult settings. A removable strainer cover permits easy access to the screen for routine maintenance.

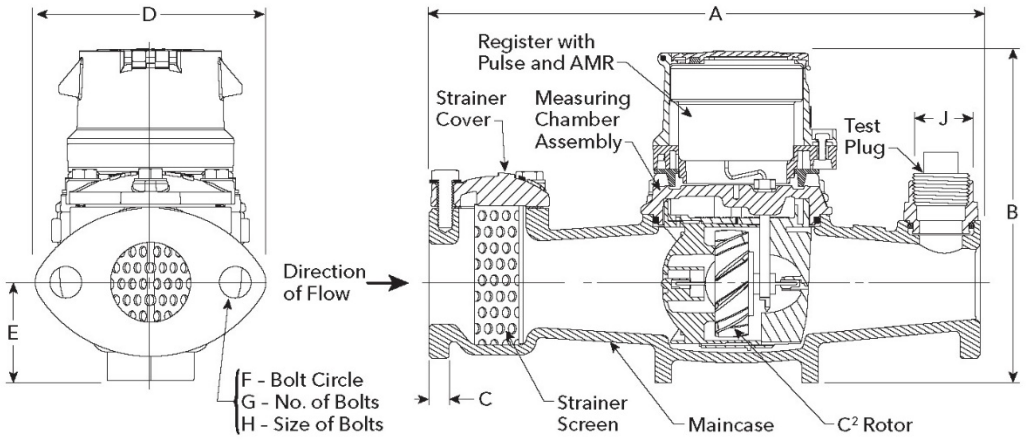
AMR/AMI Systems

Meters and Electronic Registers are compatible with current Sensus AMR/AMI systems and other AMI communication systems that use the Sensus UI1203 protocol.

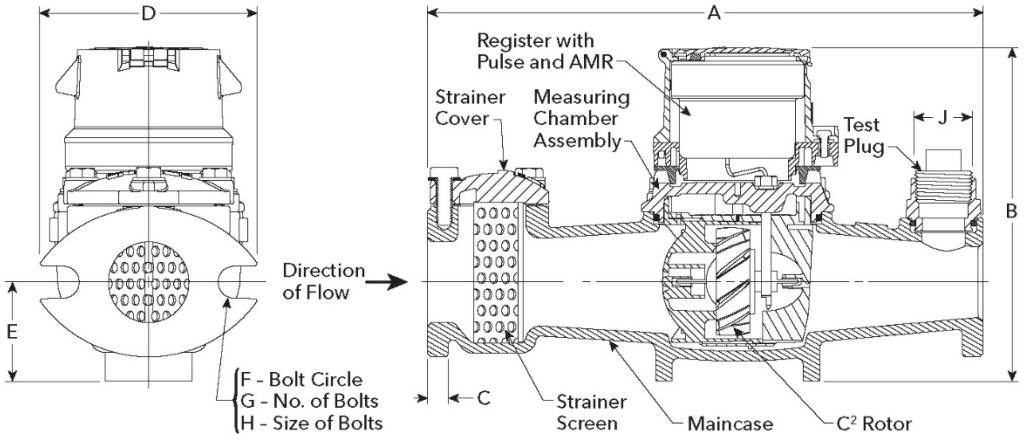
Maintenance

The OMNI+ C² meter is designed for easy maintenance. Should any maintenance be required, the measuring chamber and/or strainer cover can be removed independently. Replacement parts or complete measuring chambers are available for repairs. OMNI+ C² replacement measuring chambers may also be utilized to upgrade some third-party meters to achieve increased accuracy and extended service life.

OMNI C²: 1-1/2"



OMNI C²: 2"

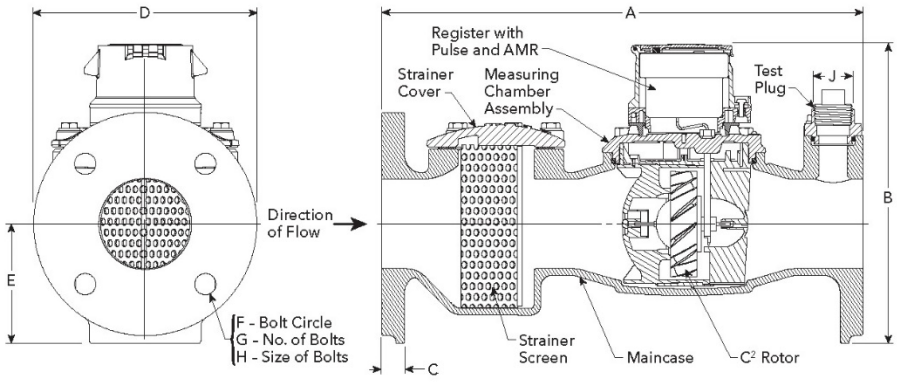


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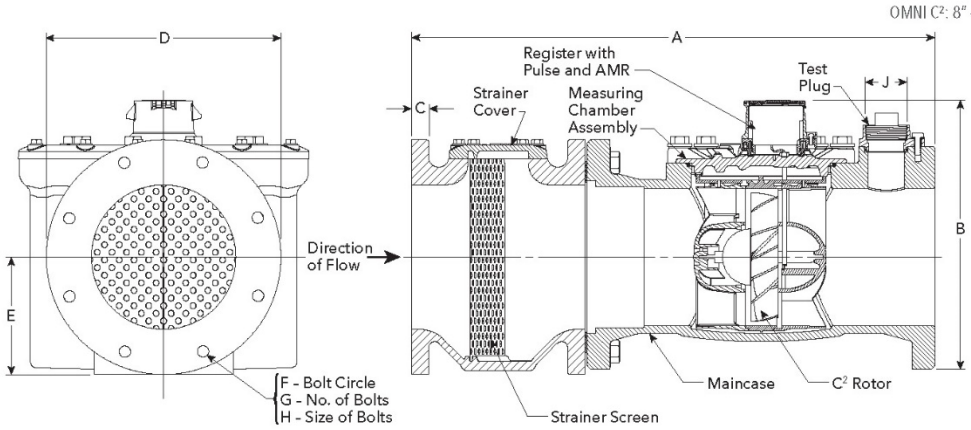
OMNI+ Compound (C²) Water Meter

1-1/2", 2", 3", 4", 6", 8" and 10"

OMNI C²: 3" - 6"



OMNI C²: 8" - 10"



DIMENSIONS AND NET WEIGHTS

Meter and Pipe Size	Normal Operating Range		Connections	A	B	C	D	E	F	G	H	J	Net Weight	Shipping Weight
1-1/2" DN 40mm	.5 gpm .11 m³/hr	200 gpm 45 m³/hr	Flanged	13" 330mm	7-7/8" 200mm	15/16" 24mm	5-7/16" 138mm	2-5/16" 59mm	4" 102mm	2	5/8" 16mm	1" 25mm	18.8 lbs. 8.53 kg.	22.5 lbs. 10.20 kg.
2" DN 50mm	.5 gpm .11 m³/hr	200 gpm 45 m³/hr	Flanged	15-1/4" 387mm	7-7/8" 200mm	1" 25mm	5-3/4" 146mm	2-5/16" 59mm	4-1/2" 114mm	2	3/4" 19mm	1" 25mm	25.4 lbs. 11.5 kg.	32.5 lbs. 14.74 kg.
3" DN 80mm	1 gpm .23 m³/hr	500 gpm 114 m³/hr	Flanged	17" 432mm	8-3/4" 225mm	3/4" 19mm	7-7/8" 200mm	4-1/8" 105mm	6" 152mm	4	5/8" 16mm	1" 25mm	45 lbs. 20.41 kg.	48.0 lbs. 21.8 kg.
4" DN 100mm	1.5 gpm .34 m³/hr	1000 gpm 227 m³/hr	Flanged	20" 508mm	11-3/16" 284mm	15/16" 24mm	9-1/8" 232mm	4-3/4" 121mm	7-1/2" 191mm	8	5/8" 16mm	1-1/2" 38mm	64.9 lbs. 29.44 kg.	72.8 lbs. 33.02 kg.
6" DN 150mm	3 gpm .68 m³/hr	2000 gpm 454 m³/hr	Flanged	24" 610mm	13-1/4" 337mm	15/16" 24mm	11" 279mm	5-3/4" 146mm	9-1/2" 241mm	8	3/4" 19mm	1-1/2" 38mm	130 lbs. 59.0 kg.	155 lbs. 70.3 kg.
8" DN 200mm	4 gpm .91 m³/hr	2700 gpm 614 m³/hr	Flanged	30-1/8" 765mm	15" 381mm	11/16" 17mm	13-1/2" 343mm	6-3/4" 172mm	11-3/4" 298mm	8	3/4" 19mm	2" 51mm	471 lbs. 214 kg.	521 lbs. 236 kg.
10" DN 250mm	5 gpm 1.1 m³/hr	4000 gpm 908 m³/hr	Flanged	41-1/8" 1045mm	19" 483mm	11/16" 17mm	16" 406mm	8-1/2" 216mm	14-1/4" 362mm	12	7/8" 22mm	2" 51mm	685 lbs. 311 kg.	745 lbs. 338 kg.

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OMNI+ Compound (C²) Water Meter

1-1/2", 2", 3", 4", 6", 8" and 10"

SPECIFICATIONS

Service	Measurement of potable and reclaim water. Storage temperature: -22F (-30C) to 155F (68.3C)	Operating temperatures: Air: -22F (-30C) to 150F (65.6C) Water: 33F (0.6C) to 80F (26.7C)
Operating Range (100% ± 1.5%)	1-1/2": 0.5 – 200 GPM (0.11 - 45 m3/hr) 2": 0.5 – 200 GPM (0.11 - 45 m3/hr) 3": 1.0 – 500 GPM (0.23 - 114 m3/hr) 4": 1.5 – 1000 GPM (0.34 - 227 m3/hr)	6": 3 – 2000 GPM (0.68 - 454 m3/hr) 8": 4 – 2700 GPM (0.91 - 614 m3/hr) 10": 5 – 4000 GPM (1.1 - 908 m3/hr)
Low flow (95% – 101.5%)	1-1/2": 0.25 GPM (.06 m3/hr) 2": 0.25 GPM (.06 m3/hr) 3": 0.5 GPM (0.11 m3/hr) 4": 0.75 GPM (0.17 m3/hr)	6": 1.5 GPM (0.34 m3/hr) 8": 2.5 GPM (0.57 m3/hr) 10": 3.5 GPM (0.8 m3/hr)
Maximum Continuous Operation	1-1/2": 160 GPM (36 m3/hr) 2": 160 GPM (36 m3/hr) 3": 400 GPM (91 m3/hr) 4": 800 GPM (182 m3/hr)	6": 1600 GPM (363 m3/hr) 8": 2700 GPM (614 m3/hr) 10": 4000 GPM (908 m3/hr)
Maximum Intermittent Operation	1-1/2": 200 GPM (45 m3/hr) 2": 200 GPM (45 m3/hr) 3": 500 GPM (114 m3/hr) 4": 1000 GPM (227 m3/hr)	6": 2000 GPM (454 m3/hr) 8": 3400 GPM (773 m3/hr) 10": 5000 GPM (1136 m3/hr)
Pressure Loss	1-1/2": 6.9 psi @ 160 GPM (0.48 bar @ 36 m3/hr) 2": 4.3 psi @ 160 GPM (0.30 bar @ 36 m3/hr) 3": 3.2 psi @ 400 GPM (0.22 bar @ 91 m3/hr) 4": 6.4 psi @ 800 GPM (0.44 bar @ 182 m3/hr)	6": 5.5 psi @ 1600 GPM (0.38 bar @ 363 m3/hr) 8": 4 psi @ 2700 GPM (0.28 bar @ 614 m3/hr) 10": 4.5 psi @ 4000 GPM (0.31 bar @ 908 m3/hr)
Maximum Operating Pressure	200 PSI (13.8 bar)	
Flange Connections	U.S. ANSI B16.1 / AWWA Class 125	
Test Ports	NPT	
Register	Fully electronic sealed register with programmable registration (Gal. /Cu.Ft./ Cu. Mtr. / Imp. Gal. / Acre Ft.)	Programmable AMR/AMI reading and pulse outputs Guaranteed 10-year battery life
NSF Approved Materials	Maincase: Coated Ductile Iron Measuring Chamber: Thermoplastic Rotor "Floating Ball": Thermoplastic Radial Bearings: Hybrid Thermoplastic Thrust Bearings: Sapphire/Ceramic Jewel	Magnets: Ceramic Strainer Screen: Stainless Steel Strainer Cover: Coated Ductile Iron Test Plug: Stainless Steel

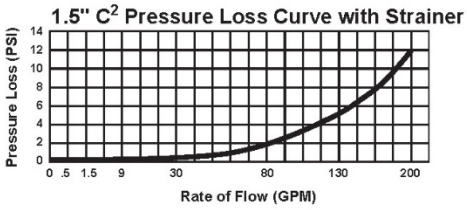
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OMNI+ Compound (C²) Water Meter

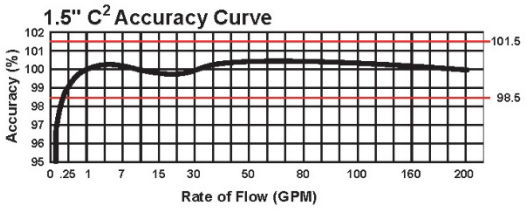
1-1/2", 2", 3", 4", 6", 8" and 10"

Headloss Curves

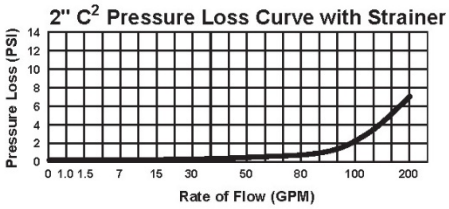
1.5" C^2 Pressure Loss Curve with Strainer



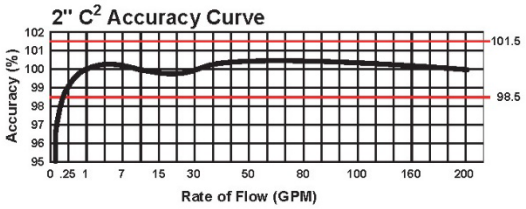
1.5" C^2 Accuracy Curve



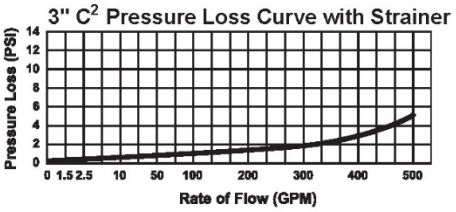
2" C^2 Pressure Loss Curve with Strainer



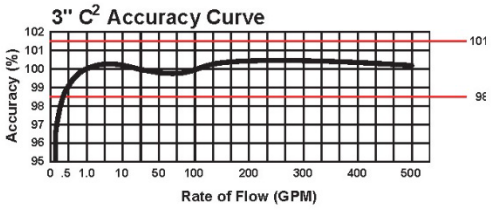
2" C^2 Accuracy Curve



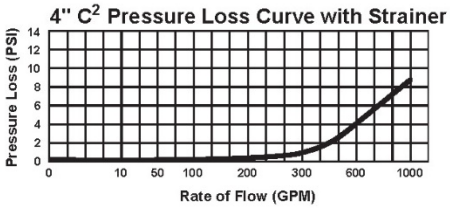
3" C^2 Pressure Loss Curve with Strainer



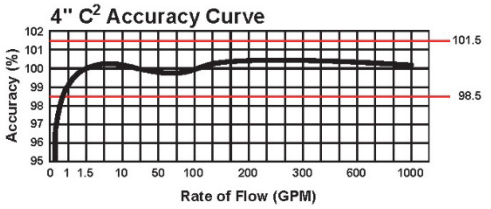
3" C^2 Accuracy Curve



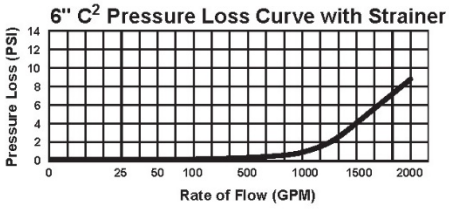
4" C^2 Pressure Loss Curve with Strainer



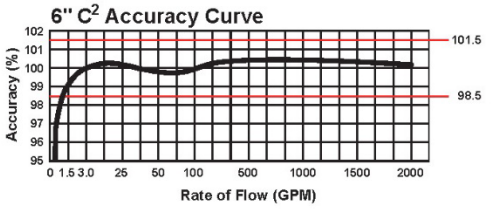
4" C^2 Accuracy Curve



6" C^2 Pressure Loss Curve with Strainer



6" C^2 Accuracy Curve

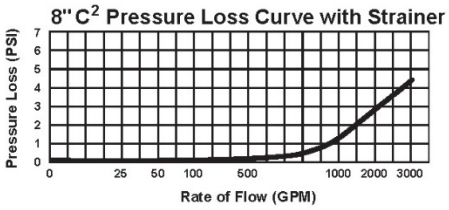


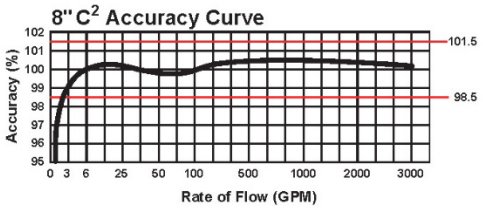
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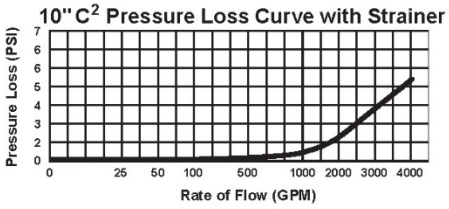
OMNI+ Compound (C²) Water Meter

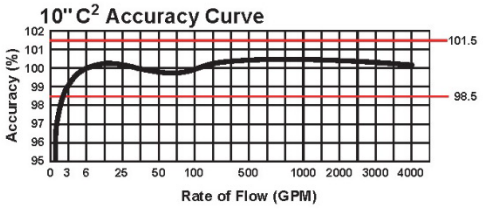
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Headloss Curves









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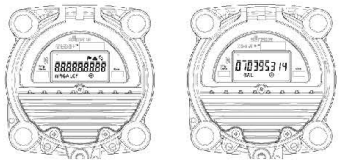


OMNI+ (R^2) Water Meter

1-1/2" and 2"

The OMNI™+ R^2 Water Water Meter operation is based on advanced Floating Ball Technology (FBT).

OMNI™+ REGISTER DISPLAY



Segment Test View | Totalizer View

Notification View | Flow Rate View

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The OMNI+ electronic register is hermetically sealed with an electronic pickup containing no mechanical gearing. The OMNI+ register features a programmable totalizer registration, AMI/ AMR reading digits, and a resettable test totalizer. The large, easy-to-read LCD also displays both forward and reverse flow directions. The OMNI+ tamper-proof security cover can be positioned in any of 270 degrees of rotation, with indexing points at each of the 90-degree customary register viewing positions.

Magnetic Drive

Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the "floating ball" impeller.

Measuring Element

The hydro-dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI+ R^2 meter.

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OMNI+ (R^2) Water Meter

1-1/2" and 2"

Strainer

The OMNI+ R^2 with the "V" shaped strainer uses a stainless steel screen along with Floating Ball Technology (FBT). This creates a design that greatly improves accuracy, even in difficult settings. A removable strainer cover permits easy access to the screen for routine maintenance.

AMR/AMI Systems

Meters and Electronic Registers are compatible with current Sensus AMR/AMI systems and other AMI communication systems that use the Sensus UI1203 protocol.

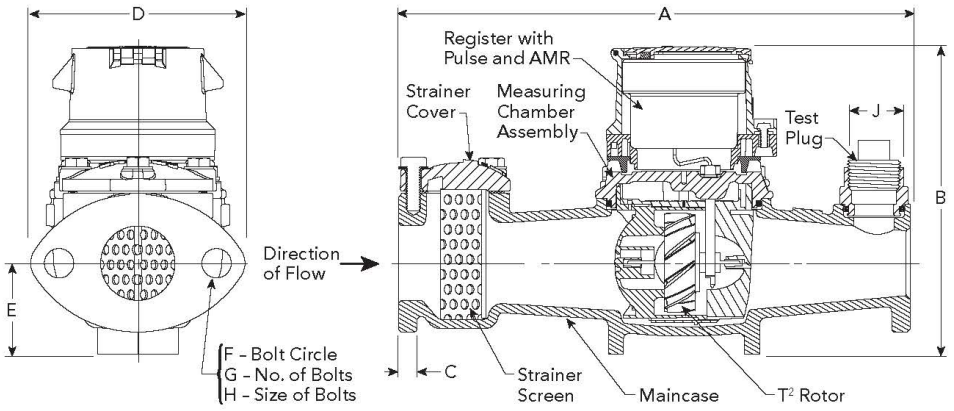
Maintenance

The OMNI+ R^2 meter is designed for easy maintenance. Should any maintenance be required, the measuring chamber and/or strainer cover can be removed independently. Replacement parts or complete measuring chambers are available for repairs. OMNI+ R^2 replacement measuring chambers may also be utilized to upgrade some third-party meters to achieve increased accuracy and extended service life.

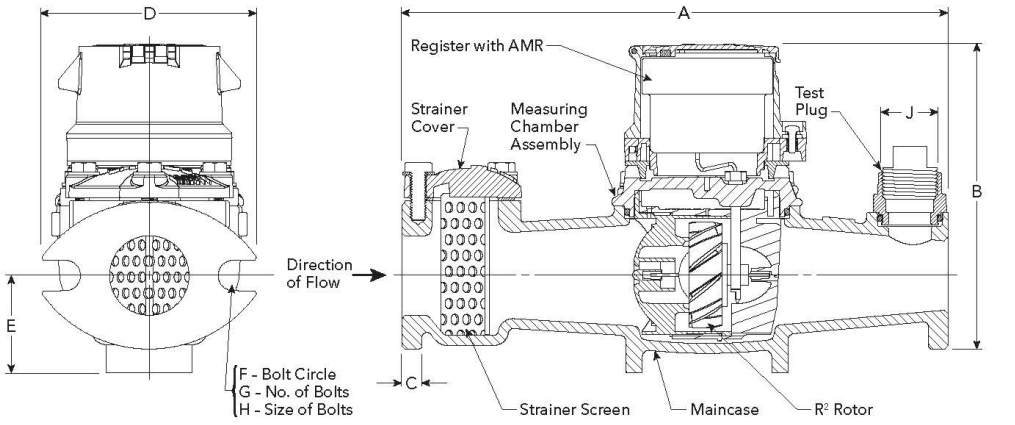
Data Logging

The OMNI+ R^2 meter logs 180 days of hourly consumption data.

OMNI R^2: 1-1/2"



OMNI R^2: 2"

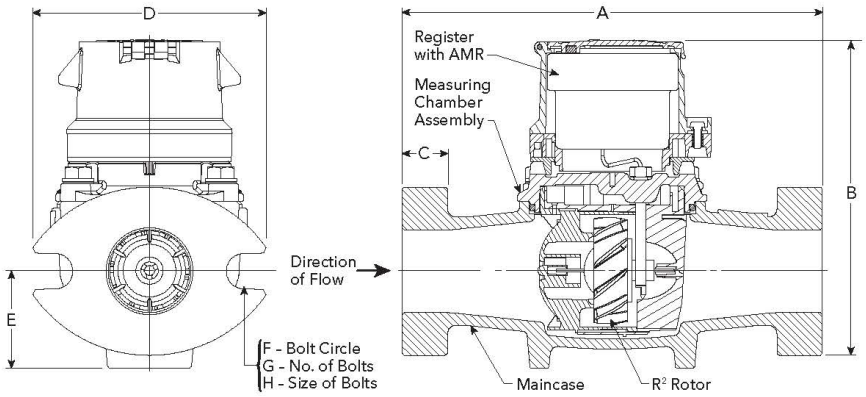


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OMNI+ (R^2) Water Meter

1-1/2" and 2"

OMNI R^2: 2" Without Strainer



DIMENSIONS AND NET WEIGHTS

Meter and Pipe Size	Normal Operating Range		Connections	A	B	C	D	E	F	G	H	J	Net Weight	Shipping Weight
1-1/2" DN 40 mm	2 gpm 0.45 m^3/hr	150 gpm 34 m^3/hr	Flanged	13" 330 mm	8-1/2" 216 mm	15/16" 24mm	5-7/16" 138 mm	2-5/16" 59 mm	4" 102 mm	2	5/8" 16 mm	1" 25 mm	18.8 lb 8.53 kg	22.5 lb 10.2 kg
2" DN 50 mm	2.5 gpm 0.57 m^3/hr	200 gpm 45 m^3/hr	Flanged	17" 432 mm	8-1/2" 216 mm	1" 25 mm	5-3/4" 146 mm	2-5/16" 59 mm	4-1/2" 114 mm	2	5/8" 16 mm	1-1/2" 38 mm	27.4 lb 12.4 kg	34.5 lb 15.6 kg
2" without Strainer DN 80 mm	2.5 gpm 0.57 m^3/hr	250 gpm 57 m^3/hr	Flanged	10" 254 mm	8-1/2" 216 mm	1" 25 mm	5-3/4" 146 mm	2-5/16" 59 mm	4-1/2" 114 mm	2	5/8" 16 mm	N/A	17 lb 7.9 kg	24.5 lb 11.1 kg

SPECIFICATIONS

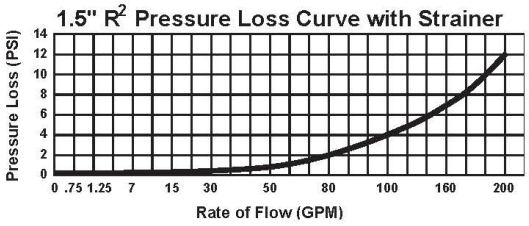
Service	Measurement of potable and reclaim water. IP68 Rated. Storage temperature: -22 °F (-30 °C) to 155 °F (68.3 °C)		Operating temperatures: Air: -22 °F (-30 °C) to 150 °F (65.6 °C) Water: 33 °F (0.6 °C) to 80 °F (26.7 °C)	
Operating Range (100% ± 1.5%)	1-1/2": 2 - 150 gpm (0.45 - 34 m^3/hr)		2": 2.5 - 200 gpm (0.56 - 45 m^3/hr) 2" without strainer: 2.5 - 200 gpm (0.56 - 45 m^3/hr)	
Low flow (95% - 101.5%)	1-1/2": 0.75 gpm (0.17 m^3/hr)		2": 1.0 gpm (0.23 m^3/hr) 2" without strainer: 1.0 gpm (0.23 m^3/hr)	
Maximum Continuous Operation	1-1/2": 120 gpm (27 m^3/hr)		2": 160 gpm (36 m^3/hr) 2" without strainer: 200 gpm (45 m^3/hr)	
Maximum Intermittent Operation	1-1/2": 200 gpm (45 m^3/hr)		2": 250 gpm (57 m^3/hr)	
Pressure Loss	1-1/2": 6.9 psi @ 160 gpm (0.48 bar @ 36 m^3/hr)		2": 7.0 psi @ 200 gpm (0.48 bar @ 45 m^3/hr)	
Maximum Operating Pressure	200 psi (13.8 bar)			
Flange Connections	U.S. ANSI B16.1 / AWWA Class 125			
Register	Fully electronic sealed register with programmable registration (Gal. / Cu. Ft. / Cu. Mtr. / Imp. Gal. / Acre Ft.)		Programmable AMR/AMI reading Guaranteed 10-year battery life	
NSF Approved Materials	Maincase: Measuring Chamber: Rotor "Floating Ball": Radial Bearings:	Coated Ductile Iron Thermoplastic Thermoplastic Hybrid Thermoplastic	Thrust Bearings: Magnets: Strainer Screen: Strainer Cover:	Sapphire/Ceramic Jewel Ceramic Stainless Steel Coated Ductile Iron

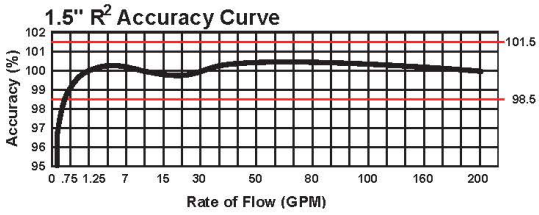
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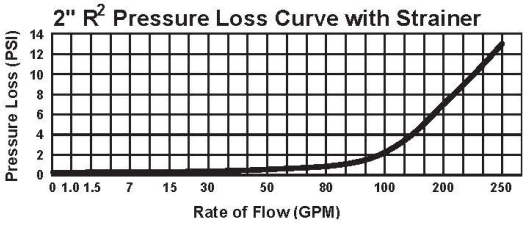
OMNI+ (R^2) Water Meter

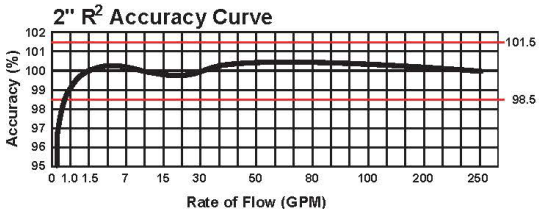
1-1/2" and 2"

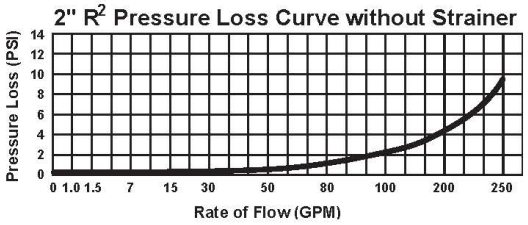
Headloss Curves











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Let's Solve Water

DATA SHEET
WDS-10006-06



iPERL Smart Water Meter

Electromagnetic Flow Measurement System

Sensus iPERL® smart water meters are designed to capture both lost water and lost revenue. The innovative magnetic technology delivers unmatched low flow registration and minimal pressure loss. With no moving parts, iPERL maintains its accuracy over a 20 year lifetime and is equipped with smart water alarms - delivering the intelligence you need to quickly resolve issues in the field.

FEATURES

- 5/8", 5/8" x 3/4", 3/4" and 1" sizes available in potable and reclaim versions
- 3/4" and 1" available in residential fire service (UL 327b)
- Starts registering flow as low as 0.03 gpm (0.007 m³/hr)
- Can be installed horizontally, vertically or diagonally
- Compatible with current Sensus AMI/AMR systems

BENEFITS

- Maximize investment with iPERL's electromagnetic technology, which delivers a 20-year accuracy warranty, with no required maintenance, and no loss in accuracy over 20 years
- Smart alarms detect issues such as leaks, reverse flow, empty pipe, etc.
- Improve low flow accuracy to drive additional revenue

Industry Leading Performance

The patented measurement technology of the iPERL water meter provides continuous and enhanced accuracy ranges at both low and high flows and perpetual accuracy over the life of the product. The iPERL meter has a 20-year accuracy warranty and a 20-year battery life guarantee. Over this 20-year lifespan, your iPERL will measure just as accurately as the day it was installed.

Construction

The iPERL meter body is made of composite alloy and contains no metal material. Inside the meter body is an electronic register and a measuring device that is comprised of a composite alloy flow tube.

Electronic Register

The 9-digit hermetically-sealed electronic register with LCD display was designed to eliminate dirt, water, and moisture contamination in pit settings. The large, easy-to-read display includes AMI/AMR digits, direction of flow, units of measure, and empty pipe detection. The AMI/AMR digits and units of measure are fully programmable. The register also provides user configurable data logging.

Solid State Electromagnetic Technology

By avoiding the use of a mechanical measuring element inside the flow tube, metering performance is linear over the entire flow range - ensuring no reduction in accuracy at any flow rate over the life of the meter. The iPERL meter uses our patented remanent magnetic field technology - requiring far less energy and delivering superior accuracy.

Tamperproof

The integrated construction of the iPERL water meter prevents removal of the register to obtain free water. The magnetic tamper and low field alarms will both indicate any attempt to tamper with the magnetic field of the iPERL meter. The meter communication alarm indicates a possible cut cable.

Alarms

Quick resolution of field issues is made possible with smart water alarms including leak detection, reverse flow, empty pipe, magnetic tamper and low battery. When integrated with our FlexNet® communication network, remotely gathering and transmitting data has never been more reliable or profitable.

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iPERL Smart Water Meter

Electromagnetic Flow Measurement System

Smart Alarms

iPERL meters have many configurable smart alarms designed to protect your utility's investment, enhance customer service, and monitor/optimize distribution systems. These alarms include:

- Empty Pipe
  Detects the absence of water in the flow tube and sends an alert. Allows you to identify main breaks downstream and water shortages for quicker resolution to ensure water availability. This alarm can also indicate the water meter has been removed from service, or notify you of potential tamper.
- Tampering
  Detect magnetic interference to reduce apparent water losses and protect against unauthorized activities.
- Customer Leak
  Detect continual consumption of water over a period of time to indicate downstream leaks. This protects your utility, infrastructure and customers through alarm notifications that can reduce water loss and leak adjustment costs.
- Low Battery
  Replace your meters before they stop recording consumption through alerts indicating battery capacity to the meter or valve is running low.
- Reverse Flow
  Keep untreated water from re-entering your distribution system and deter tampering attempts through an alarm triggered when reverse flow is detected at the meter.

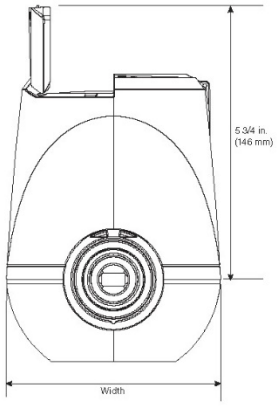
SPECIFICATIONS

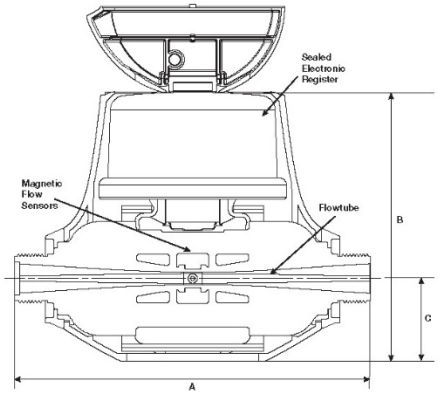
Service	Measurement of potable and reclaim water, and Residential Fire Service (UL 327b). 0-100% humidity. Fully submersible. IP68+ rated.			
Temperature Ranges	Water operating: Ambient air operating: Storage air:	33 °F (0.55 °C) to 80 °F (26.7 °C) -22 °F (-30 °C) to 140 °F (60 °C) -30 °F (-34.4 °C) to 158 °F (70 °C)		
Starting Flow	5/8" (DN 15 mm) size: 0.03 gpm (0.007 m3/h)	5/8" x 3/4" (DN 15x20 mm) size: 0.03 gpm (0.007 m3/h)	3/4" (DN 20 mm) size: 0.03 gpm (0.007 m3/h)	1" (DN 25 mm) size: 0.11 gpm (0.025 m3/h)
Low Flow Range (±3%)	5/8" (DN 15 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr)	5/8" x 3/4" (DN 15 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr)	3/4" (DN 20 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr)	1" (DN 25 mm) size: >0.3 gpm (0.068 m3/hr) to <0.4 gpm (0.09 m3/hr)
Normal Water Operating Flow Range (±1.5%)	5/8" (DN 15 mm) size: 0.18 to 25 gpm (0.04 to 5.7 m3/hr)	5/8" x 3/4" (DN 15x20 mm) size: 0.18 to 35 gpm (0.04 to 5.7 m3/hr)	3/4" (DN 20 mm) size: 0.18 to 35 gpm (0.04 to 8.0 m3/hr)	1" (DN 25 mm) size: 0.4 to 55 gpm (0.09 to 12.5 m3/hr)
Maximum Operating Pressure	5/8", 5/8" x 3/4", and 3/4" size: 200 psi (13.8 bar) 1" size: 175 psi (12.1 bar)			
Measurement Technology	Solid state electromagnetic flow			
Register	Hermetically sealed, 9-digit programmable electronic register			
Capacity	10,000,000 gallons, 1,000,000 cubic feet or 100,000 m3 capacity.			
Register Resolution	.01 gallons/imperial gallons, .001 cubic foot, or .0001 m3.			
Conformance to Standards	Meets the requirements of NSF 61, Annex G and NSF 372. Exceeds the most current revision of AWWA Standard C-715.			
Materials	External housing – Thermal plastic Flowtube – Polyphenylene sulfide alloy		Electrode – Silver/silver chloride Register cover – Tempered glass	

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iPERL Smart Water Meter

Electromagnetic Flow Measurement System





DIMENSIONS AND NET WEIGHTS

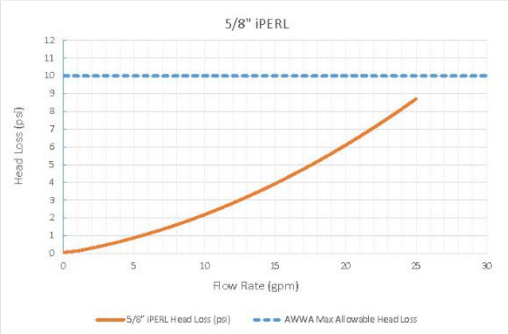
Meter Size	A	B	C	Spud Ends	NPSM Thread Size	Width	Net Weight
5/8″ (DN 15 mm)	7-1/2″ (190 mm)	6-1/10″ (155mm)	1-3/4″ (44 mm)	5/8″ (15 mm)	3/4″ (20 mm)	4-1/2″ (114 mm)	3.1 lb. (1.4 kg)
5/8″ x 3/4″ (DN 15mm x 20 mm)	7-1/2″ (190 mm)	6-1/10″ (155mm)	1-3/4″ (44 mm)	3/4″ (20 mm)	1″ (25 mm)	4-1/2″ (114 mm)	3.1 lb. (1.4 kg)
3/4″Short (DN 20 mm)	7-1/2″ (190 mm)	6-1/10″ (155 mm)	1-3/4″ (44 mm)	3/4″ (20 mm)	1″ (25 mm)	4-1/2″ (114 mm)	3.1 lb. (1.4 kg)
3/4″ (DN 20 mm)	9″ (229 mm)	6-1/10″ (155 mm)	1-3/4″ (44 mm)	3/4″ (20 mm)	1″ (25 mm)	4-1/2″ (114 mm)	3.2 lb. (1.45 kg)
1″ (DN 25 mm)	10-3/4″ (273 mm)	6-1/10″ (155 mm)	1-3/4″ (44 mm)	1″ (25 mm)	1-1/4″ (32 mm)	4-1/2″ (114 mm)	3.3 lb. (1.5 kg)

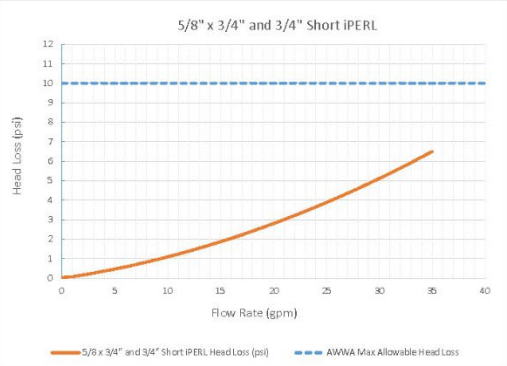
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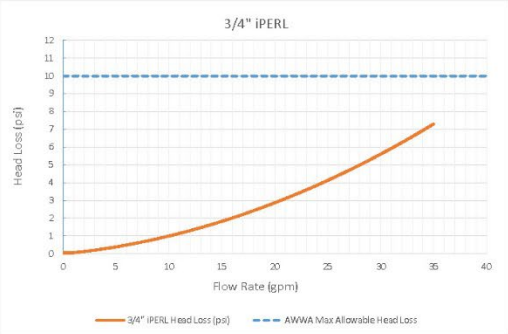
iPERL Smart Water Meter

Electromagnetic Flow Measurement System

Head Loss Curves









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Let's Solve Water

DATA SHEET
WDS-10063-02



Cordonel®

Ultrasonic C&I water meter

Cordonel® is an innovative ultrasonic C&I water meter with patented flow technology that measures low- to high-volume flow with unmatched accuracy. Equipped with pressure and temperature sensing, alarms, and data storage, it fills a critical need in commercial, industrial, and irrigation markets.

FEATURES

- Advanced U0D0 capability - zero straight pipe requirements
- Installation in horizontal and vertical pipe orientations
- LCD for consumption, flow, temperature, pressure (optional) and status information
- NFC wireless interface for readout of the last volume reading
- Optional pulse output with programmable weights and widths

BENEFITS

- Maintenance free
- No accuracy degradation
- Secure encrypted data transmission
- 20-year warranty in normal operating conditions

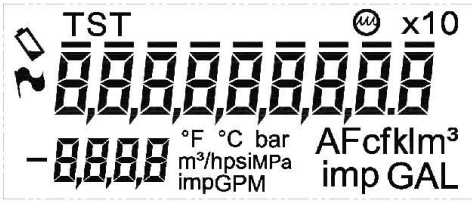
Superior accuracy

Cordonel's patented flow rate technology ensures that every drop of water passes through one of its three individual measuring paths. Cordonel's horizontal and vertical pipe orientations means no straight upstream and downstream pipe requirements; measurements are accurate even behind a 90-degree bend. With solid-state ultrasonic engineering and reliable readings over its 20-year battery life, Cordonel delivers accuracy unmatched in the industry.

Applications

- Residential, Irrigation, and Commercial
- AMI and AMR output
- Hot water measurement up to 122 °F
- High, low, and variable flow monitoring
- Leak detection
- Pulse output capability
- District Metering Area analysis

Display



Alarm is triggered

Low battery level is reached

TST System is set up in hydraulic testing mode

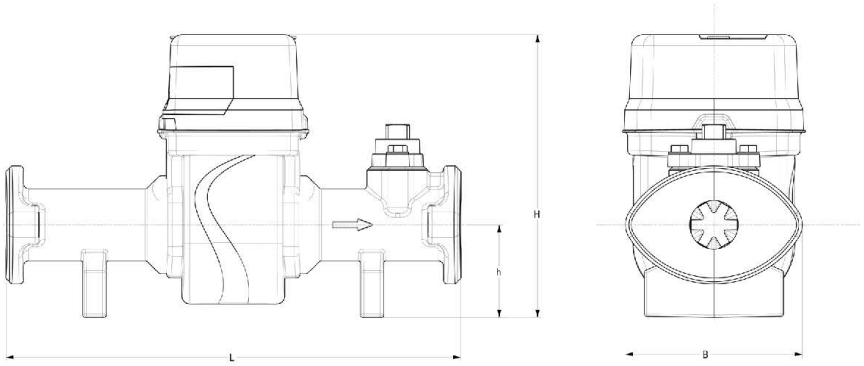
⊕⊖ Indicates positive or negative flow

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Cordonel®

Ultrasonic C&I water meter



DIMENSIONS AND NET WEIGHTS

Size	L (lay length)	B (width)	H (Height)	h (Height to pipe axis)	Net Weight (kg)
1.5″ (DN 40 mm)	13″ 330mm	6.22″ 158mm	9.6″ 244mm	3.15″ 80mm	11.4
2″ (DN 50 mm)	10″ 254mm	6.22″ 158mm	9.6″ 244mm	3.15″ 80mm	10.8
	15.25″ 387mm	6.22″ 158mm	9.6″ 244mm	3.15″ 80mm	12.6
	17″ 432mm	6.22″ 158mm	9.6″ 244mm	3.15″ 80mm	13.1
3″ (DN 80 mm)	17″ 432mm	7.87″ 200mm	10.8″ 275mm	3.74″ 95mm	23.8
	19″ 483mm	7.87″ 200mm	10.8″ 275mm	3.74″ 95mm	24.9
4″ (DN 100 mm)	20″ 508mm	9″ 229mm	12.2″ 310mm	4.37″ 111mm	34.0
	23″ 584mm	9″ 229mm	12.2″ 310mm	4.37″ 111mm	36.2

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Cordonel®

Ultrasonic C&I water meter

SPECIFICATIONS

Service	Measurement of potable and reclaim water.			
Temperature Ranges	Water operating: Ambient air operating: Storage air:	33 °F (0.55 °C) to 122 °F (50 °C) -22 °F (-30 °C) to 140 °F (60 °C) -30 °F (-34.4 °C) to 158 °F (70 °C)		
Starting Flow	1-1/2" (DN 40 mm) size: 0.05 gpm (0.012 m3/h)	2" (DN 50 mm) size: 0.05 gpm (0.012 m3/h)	3" (DN 80 mm) size: 0.15 gpm (0.033 m3/h)	4" (DN 100 mm) size: 0.24 gpm (0.054 m3/h)
Low Flow (±3%)	1-1/2" (DN 40 mm) size: 0.18 gpm (0.04 m3/hr)	2" (DN 50 mm) size: 0.18 gpm (0.04 m3/hr)	3" (DN 80 mm) size: 0.44 gpm (0.10 m3/hr)	4" (DN 100 mm) size: 0.70 gpm (0.16m3/hr)
Normal Water Operating Flow Range (±1.5%)	1-1/2" (DN 40 mm) size: 0.26 to 340 gpm (0.06 to 40 m3/hr)	2" (DN 50 mm) size: 0.26 to 395 gpm (0.06 to 40 m3/hr)	3" (DN 80 mm) size: 0.70 to 880 gpm (0.16 to 100 m3/hr)	4" (DN 100 mm) size: 1.14 to 1365 gpm (0.26 to 160 m3/hr)
Maximum Continuous Operation	1-1/2" (DN 40 mm) size: 220 gpm (50 m3/hr)	2" (DN 50 mm) size: 220 gpm (50 m3/hr)	3" (DN 80 mm) size: 550 gpm (125 m3/hr)	4" (DN 100 mm) size: 880 gpm (200 m3/hr)
Maximum Intermittent Operation	1-1/2" (DN 40 mm) size: 340 gpm (78 m3/hr)	2" (DN 50 mm) size: 395 gpm (90 m3/hr)	3" (DN 80 mm) size: 880 gpm (200 m3/hr)	4" (DN 100 mm) size: 1365 gpm (310 m3/hr)
Maximum Operating Pressure	200 PSI (13.8 bar)			
Register	Fully electronic sealed register with programmable registration (Gal. /Cu.Ft./ Cu. Mtr. / Imp. Gal. / Acre Ft.) Programmable		AMR/AMI reading and pulse outputs Guaranteed 20-year battery life	
Access Port	Stainless steel with optional NPT riser			
Flange Connections	U.S. ANSI B16.1 / AWWA Class 125			
Materials	Maincase – Epoxy coated ductile iron Measuring Transducers – High grade polymer Inner tube - High grade polymer; stainless steel		Battery – Lithium Gaskets – EPDM Other materials - Glass fiber reinforced polymer; stainless steel	

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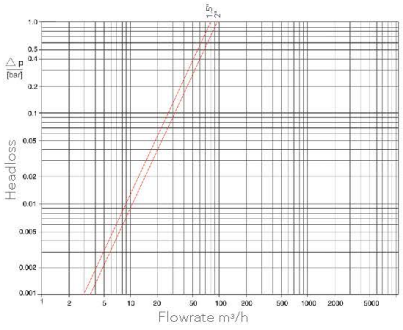
Ultrasonic C&I water meter

Smart Alarms

Cordonel meters have many configurable smart alarms designed to protect your utility's investment, enhance customer service, and monitor/optimize distribution systems. These alarms include:

- Empty Pipe
  Detects the absence of water in the flow tube and sends an alert. Allows you to identify main breaks downstream and water shortages for quicker resolution to ensure water availability. This alarm can also indicate the water meter has been removed from service, or notify you of potential tamper.
- Customer Leak
  Detect continual consumption of water over a period of time to indicate downstream leaks. This protects your utility, infrastructure and customers through alarm notifications that can reduce water loss and leak adjustment costs.
- Low Battery
  Replace your meters before they stop recording consumption through alerts indicating battery capacity to the meter or valve is running low.
- Reverse Flow
  Keep untreated water from re-entering your distribution system and deter tampering attempts through an alarm triggered when reverse flow is detected at the meter.
- High Flow
  Detect broken pipes and reduce property damage through an alert triggered by the detection of excessive flow rates.
- Pressure
  Get alerted when water pressure exceeds or falls below the pressure threshold to prevent potential disruptions of service. Standard in 3″ and above; optional in 1.5″ and 2″ sizes.
- Temperature
  Get alerted when water temperature exceeds or falls below the temperature threshold so you can take action to better protect your meter and water network assets.

Typical Headloss Curve



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Let's Solve Water

DATA SHEET
WDS-10026-05



ally® Smart Water Meter

Electromagnetic Flow Measurement with Remote Management Valve

The Sensus ally® water meter features an integrated 3-state valve, temperature and pressure sensors and alarms. ally has no moving parts and is based on our innovative electromagnetic flow measurement technology.

Industry Leading Performance

The patented measurement technology of the ally meter provides continuous and enhanced accuracy ranges at both low and high flows and perpetual accuracy over the life of the product. Accuracy is not effected by various flow conditions, disturbances, or particulates in the water system. The ally meter has a 15-year life cycle, along with a 15-year accuracy warranty.

Construction

The ally is an integrated unit that incorporates an electronic register, 3-state valve, temperature sensor, pressure sensor, and a measuring device encased in an external housing. The measuring device is comprised of a composite alloy flowtube with externally-threaded spud ends.

Electronic Register

The high resolution 9-digit electronic register was designed to eliminate dirt and moisture contamination in pit settings. The tempered glass register cover displays readings with the AMI digits highlighted. Direction of flow, rate of flow and units of measure are also easily readable on the register display. The ally register features programmable AMI resolution and unit of measure, and integral customer data logging of up to120 days. The display includes battery life, empty pipe, forward/ reverse flow, flow rate, leak and tamper, valve, pressure, and temperature indicators. Additionally, the register displays temperature and pressure values, valve state, and active and recent alarms.

Shut-Off Valve

The shut-off valve has 3 states–open, closed, and reduced flow. Reduced flow mode allows 1-2 GPM on average for life sustaining applications (based on 65 psig). The stainless steel ball valve is self cleaning and remains functional due to automatic seat exercising. The ally meter also contains a proprietary actuator to operate the valve.

Tamperproof

The integrated construction of the ally meter prevents removal of the register to obtain free water. The magnetic tamper and low field alarms will both indicate any attempt to tamper with the magnetic field of the ally meter. The meter communication alarm indicates a possible cut cable.

FEATURES

- 5/8", 5/8" x 3/4", 3/4", and 1" sizes available in potable and reclaim versions
- Starts registering flow as low as 0.03 gpm (0.007 m³/hr)
- Can be installed horizontally, vertically or diagonally
- Compatible with current Sensus AMI systems

BENEFITS

- Control three states of water flow remotely (on, off, reduced)
- Detect leaks to save money and conserve water
- Monitor pressure conditions and temperature conditions
- Smart alarms including empty pipe, high flow, reverse flow, low and high pressure and temperature, customer leak and tamper

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ally® Smart Water Meter

Electromagnetic Flow Measurement with 3-State Valve

Smart Alarms

ally meters have many configurable smart alarms designed to protect your utility's investment, enhance customer service, and monitor/optimize distribution systems. These alarms include:

- Empty Pipe
  Detects the absence of water in the flow tube and sends an alert. Allows you to identify main breaks downstream and water shortages for quicker resolution to ensure water availability. This alarm can also indicate the water meter has been removed from service, or notify you of potential tamper.
- Tampering
  Detect magnetic interference to reduce apparent water losses and protect against unauthorized activities.
- Customer Leak
  Detect continual consumption of water over a period of time to indicate downstream leaks. This protects your utility, infrastructure and customers through alarm notifications that can reduce water loss and leak adjustment costs.
- Low Battery
  Replace your meters before they stop recording consumption through alerts indicating battery capacity to the meter or valve is running low.
- Reverse Flow
  Keep untreated water from re-entering your distribution system and deter tampering attempts through an alarm triggered when reverse flow is detected at the meter.
- High Flow
  Detect broken pipes and reduce property damage through an alert triggered by the detection of excessive flow rates.
- Pressure
  Get alerted when water pressure exceeds or falls below the pressure threshold to prevent potential disruptions of service.
- Temperature
  Get alerted when water temperature exceeds or falls below the temperature threshold so you can take action to better protect your meter and water network assets.

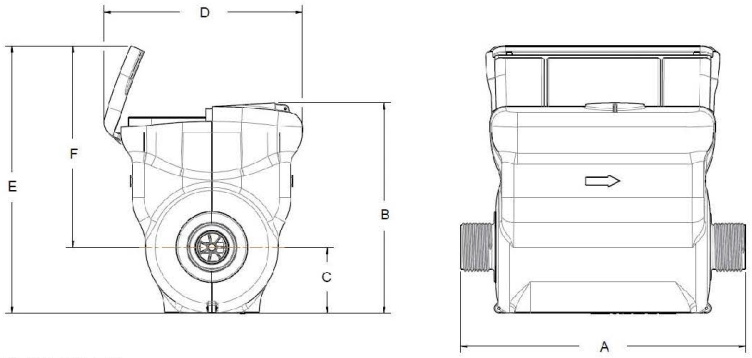
SPECIFICATIONS

Service	Measurement of potable and reclaim water. 0-100% humidity. Fully submersible. IP68+ rated.			
Temperature Ranges	Water operating: Ambient air operating: Storage air:	33 °F (0.55 °C) to 80 °F (26.7 °C) -22 °F (-30 °C) to 140 °F (60 °C) -30 °F (-34.4 °C) to 158 °F (70 °C)		
Starting flow	5/8" (DN 15 mm) size: 0.03 gpm (0.007 m^3h)	5/8" x 3/4" (DN 15x20 mm) size: 0.03 gpm (0.007 m^3h)	3/4" (DN 20 mm) size: 0.03 gpm (0.007 m^3h)	1" (DN 25 mm) size: 0.11 gpm (0.025 m3/h)
Low flow range (±3%)	5/8" (DN 15 mm) size: >0.10 gpm (0.025 m^3/hr) to <0.18 gpm (0.041 m^3/hr)	5/8" x 3/4" (DN 15x20 mm) size: >0.10 gpm (0.025 m^3/hr) to <0.18 gpm (0.041 m^3/hr)	3/4" (DN 20 mm) size: >0.10 gpm (0.025 m^3/hr) to <0.18 gpm (0.041 m^3/hr)	1" (DN 25 mm) size: >0.3 gpm (0.068 m3/h) to <0.4 gpm (0.09 m3/hr)
Normal operating flow range (±1.5%)	5/8" (DN 15 mm) size: 0.18 to 25 gpm (0.04 to 5.7 m^3/hr)	5/8" x 3/4" (DN 15x20 mm) size: 0.18 to 35 gpm (0.04 to 8.0 m^3/hr)	3/4" (DN 20 mm) size: 0.18 to 35 gpm (0.04 to 8.0 m^3/hr)	1" (DN 25 mm) size: 0.4 to 55 gpm (0.09 to 12.5 m3/hr)
Sensor Accuracy	Pressure Sensor: ± 1.25% full scale for water temp 35-100 °F (0-200psi) Temperature Sensor: ± 2.00% full scale for water temp 35-100 °F (0-200psi)			
Maximum operating pressure	200 psi (13.8 bar)			
Measurement technology	Solid state electromagnetic flow			
Register	Hermetically sealed, 9-digit programmable electronic register			
Capacity	10,000,000 gallons, 1,000,000 cubic feet or 100,000 m^3 capacity.			
Register Resolution	.01 gallons/imperial gallons, .001 cubic foot, or .0001 m^3			
Conformance to Standards	Meets the requirements of NSF 61, Annex G and NSF 372. Exceeds the most current revision of AWWA Standard C-715.			
Materials	External housing – Thermal plastic Flowtube – Polyphenylene sulfide polymer		Electrode – Silver/silver chloride Register cover – Tempered glass	

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ally® Smart Water Meter

Electromagnetic Flow Measurement with 3-State Valve



DIMENSIONS AND NET WEIGHTS

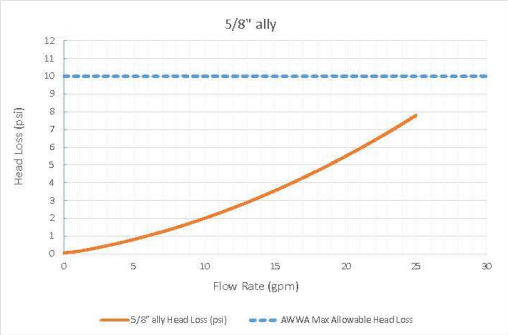
Size	A	B	C	D	E	F	Spud Ends	NPSM Thread Size	Width	Net Weight
5/8" (DN 15 mm)	7-1/2" (190 mm)	5-1/2" (140 mm)	1-3/4" (44 mm)	5-1/2" (140 mm)	7" (178 mm)	5-1/4" (133 mm)	5/8" (15 mm)	3/4" (20 mm)	4-3/4" (121 mm)	3.3 lb. (1.5 kg)
5/8" x 3/4" (DN 15 mm x 20 mm)	7-1/2" (190 mm)	5-1/2" (140 mm)	1-3/4" (44 mm)	5-1/2" (140 mm)	7" (178 mm)	5-1/4" (133 mm)	3/4" (20 mm)	1" (25 mm)	4-3/4" (121 mm)	3.3 lb. (1.5 kg)
3/4" Short (DN 20 mm)	7-1/2" (190 mm)	5-1/2" (140 mm)	1-3/4" (44 mm)	5-1/2" (140 mm)	7" (178 mm)	5-1/4" (133 mm)	3/4" (20 mm)	1" (25 mm)	4-3/4" (121 mm)	3.3 lb. (1.5 kg)
3/4" (DN 20 mm)	9" (229 mm)	5-1/2" (140 mm)	1-3/4" (44 mm)	5-1/2" (140 mm)	7" (178 mm)	5-1/4" (133 mm)	3/4" (20 mm)	1" (25 mm)	4-3/4" (121 mm)	3.4 lb. (1.54 kg)
1" (DN 25 mm)	10-3/4" (273 mm)	5-1/2" (140 mm)	1-3/4" (44 mm)	5-1/2" (140 mm)	7" (178 mm)	5-1/4" (133 mm)	1" (25 mm)	1-1/4" (32 mm)	4-3/4" (121 mm)	3.8 lb. (1.72 kg)

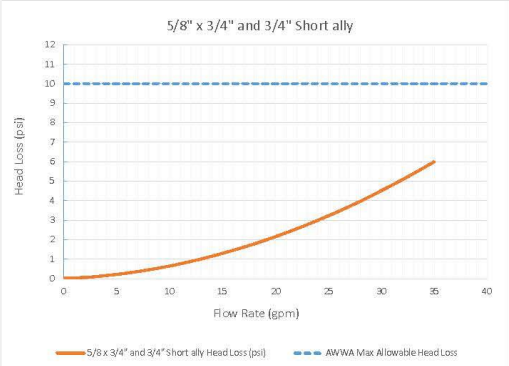
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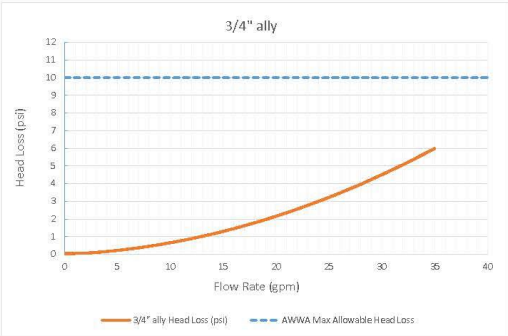
ally® Smart Water Meter

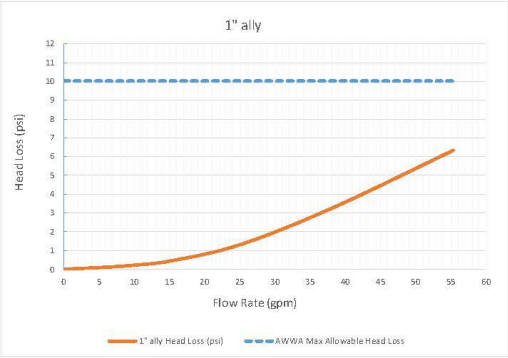
Electromagnetic Flow Measurement with 3-State Valve

Head Loss Curves









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DATA SHEET
EDS-10009-04



Stratus IQ™ Electricity Meter

Taking the Grid to Next-level Smart

Building upon the best-in-class Stratus® metering platform, the Stratus IQ combines grid edge intelligence with precise energy measurement into one powerful package. This meter provides utilities with the data visibility and control needed to quickly adapt to a rapidly evolving smart grid.

FEATURES

- Six energies and six demands
- Four quadrant metering
- By-phase energy reporting (12S/25S)
- Thirty-two load profile channels in four data sets
- Theft, tilt, and tamper detection
- Arc and loss of neutral detection
- Sag and swell logging
- Harmonics reporting (THD & TDD)
- Enhanced outage recording
- Persistent real-time clock maintains time for 24 hours following outage
- Optional optical port

BENEFITS

- C&I power in a residential meter
- Software defined metrology for future flexibility
- Flexible two-way communication via the FlexNet® Communication Network
- FCC approved communication over unshared, primary use licensed spectrum

Software-defined metrology

With the ability to make metrology adjustments over-the-air, utilities are prepared for whatever the future holds.

C&I power in a residential meter

Four-quadrant metering is just the beginning. By simultaneously measuring real, apparent and reactive energy, the Stratus IQ gives utilities the competitive knowledge necessary to be more efficient in the generation and distribution of power.

Data is the name of the game

The Stratus IQ has 32 channels of load profile data in four data sets along with line-side and load-side voltage reporting. This insight gives utilities the concrete data needed to make educated decisions. No other meter on the market has this type of system visibility.

Details

- kWh, kVAh, kVARh energy measurements
- Demand and load profile with load limiting (current or demand)
- AES 256-bit encryption security
- C12.19 utility industry end device ANSI Tables
- Full net metering and primary metering
- 20-year Time-of-Use calendar
- Patented temperature detection
- Best-in-class power outage and restoration notification
- Voltage measurement and configurable alarm reporting
- Remote ZigBee, radio and metrology firmware download
- 1 Wh internal and display resolution

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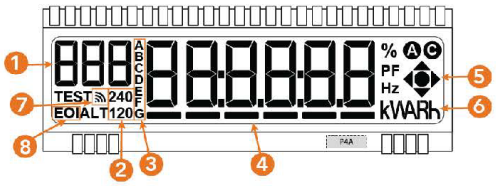
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Stratus IQ™

Electricity Meter

LCD display

The data display is composed of LCD segments arranged to display letters and digits. Typically, the total kilowatt-hours are displayed in whole numbers; the resolution may be selected at the time of order. You can control the number of digits displayed, the justification of the digits within the display, and the location of the decimal point.



Key: 1 = source list number, 2 = voltage, 3 = TOU indicators, 4 = data display and disk simulator, 5 = energy quadrant indicator, 6 = energy type, 7 = signal indicator, 8 = end of interval indicator

SPECIFICATIONS

Forms	1S, 2S, 3S, 4S, 12S, 25S, 1SRD, 2SRD, 12SRD, 25SRD, 2SCL320
Power Requirements	Voltage Rating: 120VAC and 240VAC Frequency: 60 Hz
Accuracy	Exceeds Accuracy Class 0.2 (ANSI C12.20-2015)
Burden	Power Supply 1.2W / 6.7VA @240VAC; 1.1W / 3.0VA @120VAC Current circuit per phase <0.01W
Device Type	FlexNet Device Type 96; Metrology Device Type 97, ZigBee Device Type 98
Model	Stratus IQ with FlexNet only: IDTB005, FCC ID: SDBIDTB005, IC: 2220A-IDTB005 Stratus IQ with FlexNet & Zigbee: IDTB006, FCC ID: SDBIDTB006, IC: 2220A-IDTB006
Remote Disconnect	Rating: 200A, 240 VAC, 60Hz, PF 0.75 lagging Endurance: Greater than 6000 cycles, 200A, 240 VAC, 60 Hz, PF 0.75 lagging Endurance: Greater than 30000 cycles at no load Overload: 50 OPS, 300A, 240 VAC, 60 Hz, PF 0.75 Current Withstand: Per ANSI C12.1: 7,000 A Peak (5,000 Amps rms) 240 VAC, 60 Hz, for 6 cycles with normal operation after exposure; 12,000 Amps rms for 4 cycles with fail safe conditions after exposure
Dimensions	6.95 in (17.65 cm) diameter; 5.06 in (12.86 cm) depth
Industry Standards	UL 2735 listed, ANSI C12.20 - 2015 (Class 0.2), ANSI C12.1 - 2014, ANSI C12.10 - 2011, ANSI C37.90.1 - 2002, FCC Part 15, Transient/Surge Suppression IEC 61000-4-4 - 2012 and IEEE C62.41.2 - 20002, Category B, Temperature Rise Specifications meets ANSI C12.1 Section 4.7.2.9, ANSI C12.18-R2006 (R2016).
Operating Environment	Temperature -40° to +85° C under the cover Humidity 0% to 95% non-condensing
Characteristic Data	Starting Current: 20mA (for CL200); 9mA (for CL20)
Hardware Options	ZigBee, Remote disconnect

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DATA SHEET
EDS-11000-03



Honeywell A3 ALPHA® Meter

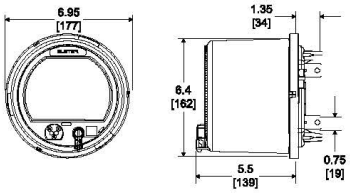
With Integrated FlexNet® SmartPoint® module

The Honeywell A3 ALPHA Meter brings advanced metering capabilities to commercial and industrial applications. The Sensus FlexNet Communication Network SmartPoint module is integrated into the A3 ALPHA providing secure and robust two-way communications capabilities. No special equipment is necessary because the SmartPoint module automatically establishes the communication path to the Sensus Base Station.

BENEFITS

- Robust two-way communication via FCC-approved FlexNet primary-use licensed spectrum network
- FlexNet communications network supports multiple applications
- Easy installation and connection
- Delivers data quickly and efficiently

DIAGRAMS



Approximate dimensions in inches [millimeters]

The data you need

Utilities today rely on big data to help make intelligent decisions about their energy needs. A3 ALPHA meters can collect six channels of load profile information (for example, kWh or kVARh) and up to 15 configurable snapshot registers delivering even more information. The SmartPoint module retrieves the data directly from the A3 ALPHA meter tables and transmits it over the secure FlexNet communications network.

No guessing required

The A3 ALPHA meter features a wide range voltage input. The meter may be used with any distribution voltage from 120 V to 480 V. The installer always has the meter with the correct voltage rating. The wide voltage range feature detects and operates accurately on the voltage applied.

The A3 ALPHA meter supports:

- kWh, kVARh, and kVAh bidirectional energy
- Demand
- Time-of-use (TOU)
- Power factor
- Instrumentation profiling (including quantities such as phase voltage)
- 6 channels load profile
- 15 snapshot registers
- Loss compensation
- 2-relay or 4-relay outputs and are fully programmable using Honeywell's meter support software
- History and event logs
- Voltage sag log
- Over-the-air (OTA) metrology firmware and configuration updates

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Honeywell A3 ALPHA® Meter

With Integrated FlexNet® SmartPoint™ module

OPTIONS

Service	2 wire	3 wire	3 wire	2 or 3 wire	3 wire	4 wire wye; 4 wire delta	3 wire delta; network	3 wire delta; network	4 wire wye; 4 wire delta	4 wire wye; 4 wire delta	3 or 4 wire delta, 4 wire wye; network	4 wire wye	3 or 4 wire delta, 4 wire wye; network
Class	200	200	320	20	20	20	200	320	200	320	20	20	20
Form	1S	2S	2S	3S	4S	9S	12S	12S	16S	16S	35S	36S	45S
Starting Current	100 mA	50 mA	80 mA	10 mA	5 mA	5 mA	50 mA	80 mA	50 mA	80 mA	5 mA	5 mA	5 mA

SPECIFICATIONS

Maximum Voltage/Current	Voltage: Continuous 528 VAC Current: Continuous at Class amperes; temporary (1 second) at 200% of meter maximum current
Voltage Range	Nameplate Nominal 120 V to 480 V Operating 96 V to 528 V
Surge Voltage Withstand	ANSI C62.41 6 kV at 1.2/50 µs, 10 strikes IEC 61000-4-4 4 kV, 2.5 kHz repetitive burst for 1 minute ANSI C12.1 insulation 2.5 kV, 60 Hz for 1 minute
Current Range	0 to Class amperes
Frequency Range	Nominal 50 Hz or 60 Hz ±5%
Operating Environment	Temperature: -40°C to +85°C (-40°F to 185°F) Humidity: 0% to 100% non-condensing
Power Supply Burden	Less than 4 W
Per Phase Current/Voltage Burden	Current: 0.1 milliohms typical at 25°C Voltage: .008 W at 120 V; 0.03 W at 240 V; 0.04 W at 480 V
Primary/Secondary Time Base	Primary: Power line frequency (50 Hz or 60 Hz) with selectable crystal oscillator. Secondary: Meets the ANSI limit of 0.02% using the 32.768 kHz crystal. Initial performance is expected to be equal to or better than ±55 seconds per month at room temperature.
Outage Carryover	6 hours at 25°C. Super capacitor rated at 0.1 Farads, 5.5 V. Battery included on all but A3D meters for additional carryover.
Communication Rates	Optical port: 300bps to 28,800 bps Remote port: 1,200 bps to 19,200 bps
Dimensions	Diameter: 17.70 cm (6.95 inches) Depth: 13.9 cm (5.5 inches)
Accuracy	Meets ANSI C12.20 for accuracy Typical accuracy within ±0.2%
Tamper Detection Options	If the meter is inverted, energy can be added to the total accumulation. The meter can be configured to alarm on reverse energy. FlexNet module-based vibration sensor.
Complies with Industry Standards	ANSI C12.1, ANSI C12.10, ANSI C12.18, ANSI C12.19, ANSI C12.20, FCC Part 15, UL 2735 Listed

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Honeywell
THE POWER OF CONNECTED

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DATA SHEET
EDS-10002-05



Aclara I-210+c Electric Meter

With Integrated FlexNet® SmartPoint® Module

Sensus has added the power of the FlexNet Communications Network to the Aclara I-210+c electric meter. The I-210+c is equipped with an internal SmartPoint module (DT-20 or DT-105), providing utilities with a meter platform that is able to utilize the unparalleled performance of FlexNet–a real-world tested, smart grid network.

FEATURES

DT-20 & DT-105:

- Under cover, fully-rated 200 amp connect/disconnect switch
- Daily self reads
- On-demand meter readings and status reports
- Meter tamper detection
- UL 2735 certified for additional safety, durability and protection

DT-105:

- Time and date stamped event log
- Full meter programming and firmware updates over the air
- Zigbee-equipped
- Voltage sag and swell log

BENEFITS

- Flexible two-way communication via FlexNet network
- FlexNet communications network supports multiple applications
- FlexNet communications network is FCC approved for operation on an unshared primary-use licensed spectrum

Overview

The integrated DT-20 and DT-105 radio modules provide secure point-to-multipoint communications, reducing the number of access points required to capture and transmit data. With an extensive inventory of licensed spectrum, the network has the bandwidth to support multiple applications as well as future data requirements.

With the addition of the SmartPoint modules, the I-210+c can leverage the power of a robust network while using meter features such as time-of-use, load profile data, power quality information, and an optional remote connect/disconnect switch. By combining these two technologies, cities are able to evolve into smart cities.

Metrology

- kWh, kVARh and kVAh energy measurements with associated demand values
- ANSI C12.20 Accuracy Class 0.5% with typical accuracy better than 0.2%
- Full net metering
- Demand reading options include block or rolling max demands and cumulative demands
- Enhanced performance with four channels of ANSI C12.19 load profile data and up to 15 snapshots
- All applicable ANSI tables supported ensuring reliable and accurate information for utility billing and analysis
- Under cover remote connect/disconnect switch

OPTIONS

Service	2 wire	3 wire	3 wire	2 wire	3 wire	3 wire	3 wire	3 wire	3 wire	3 wire
Class	100	200	320	20	20	20	200	320	200	320
Form	1S	2S	2S	3S	3S	4S	12S	12S	25S	25S
Voltage Rating (VAC)	120	240	240	120	240	240	120/208	120/208	120/208	120/208
Remote Disconnect Option	Yes	Yes	No	No	No	No	Yes	No	Yes	No

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Aclara I-210+c Electric Meter

With Integrated FlexNet® SmartPoint™ Module

SPECIFICATIONS

Power Requirements	Voltage Rating: See Options chart Voltage Range: ± 20% of nominal voltage Frequency: 60 Hz or 50 Hz
Operating Environment	Temperature: -40°C to +85°C (-40°F to 185°F) Humidity: 0% to 95% non-condensing
Dimensions	Diameter: 17.63 cm (6.94 inches) Depth: 13.34 cm (5.25 inches)
Accuracy	Meets ANSI C12.20 for accuracy class 0.5 Typical accuracy within ±0.2%
Tamper Detection Options	If the meter is inverted, energy can be added to the total accumulation. It can also alarm on inversion. The meter can be configured to alarm on reverse energy. FlexNet module-based vibration sensor.
Load Profile	Four channels of ANSI C12.19 load profile data. DT-20: up to 14 snapshots DT-105: up to 15 snapshots
Connect/ Disconnect Switch	Two pole, single throw, magnetically-latching. Rating: 200A, 240 Vac, 60 Hz Endurance: 5000 cycles @ 200A, 240 Vac, 60 Hz, 30,000 mechanical operations
Characteristic Data	Starting Watts: 12W @ 240V, 6W @ 120V Typical Watts Loss: 0.7 Watts
LCD Display	Six digit liquid crystal display User-definable scroll list Power flow and mechanical disk emulator kWh display with segment check option
Complies with Industry Standards	ANSI C12.1 ANSI C12.10 ANSI C12.20 ANSI C37.90.1 FCC Part 15 UL 2735 Listed

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DATA SHEET
EDS-10004-03



Aclara kV2c Electric Meter

Commercial & Industrial Meter with FlexNet® SmartPoint® Module

Aclara's premier commercial and industrial kV2c meter family has become even more powerful. The Gen 5 kV2c meter is now internally equipped with a Sensus SmartPoint module, giving utilities the power and performance of the FlexNet Communications Network coupled with revenue grade metering functionality and advanced power quality monitoring.

FEATURES

- Full meter programming and firmware updates over the air
- Customize advanced metering options including kWh, kVArh & kVAh
- 4-quadrant measurements
- Voltage and Current THD per phase, TDD (Total Demand Distortion), Distortion Power Factor, Distortion kVA, and Distortion kVAh
- Per phase AC instrumentation (amps, volts, and frequency)
- Programmable diagnostics for voltage imbalance, distortion, current imbalance, reversed polarity, high neutral current.
- Tamper detection tools and installation verification capabilities to automatically catch errors, wiring changes, tampering, and billing issues
- Voltage sag and swell log

BENEFITS

- Flexible two-way communication via FlexNet network
- FlexNet communications network supports multiple applications
- FlexNet communications network is FCC approved for operation on an unshared primary-use licensed spectrum

Overview

The kV2c meter moves beyond revenue metering to real time instrumentation, true power quality monitoring and real cost of service measurements. Whether you are metering the simplest energy rate or collecting critical quality of service and load analysis information on a polyphase or a single phase circuit, there is a kV2c meter configuration to meet your needs.

The Aclara kV2c meter family is one of the most widely accepted ANSI® commercial and industrial meters with over two million units deployed in the field since its introduction. The robust revenue-grade meter design is based on Aclara's cutting edge technology that provides high accuracy and reliability.

Metrology

- kWh, kVARh and kVAh energy measurements with associated demand values
- ANSI C12.20 Accuracy Class 0.2% with typical accuracy better than 0.2%
- Programmable sag and swell monitor that logs voltage sag and swell duration down to one cycle
- Time and date stamped meter event log
- Robust revenue-grade watt-hour and demand meter with advanced recording options.
- Versatile programming softswitches allowing the selection of advanced functionality such as expanded recording features, time of use, load profile and power quality measures.
- Powerful functional upgrades provide 8-channel 64 kb, 20-channel 192 kB, or 20-channel 384 kB recording for voltage, current, real and reactive energy, apparent energy, distortion kVAh, THD and TDD.

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Aclara kV2c Electric Meter

Commercial & Industrial Meter with FlexNet® SmartPoint®

OPTIONS

Service	1ϕ, 2 wire	1ϕ, 3 wire	1ϕ, 2 wire	1ϕ, 3 wire	3ϕ, 4 wire, Wye or Δ	Network or 3ϕ, 3 wire Δ	3ϕ, 4 wire, Wye or Δ	3ϕ, 4 wire, Wye	Network or 3ϕ, 3 wire Δ
Class	200	200 & 320	20	20	20	200 & 320	200 & 320	20	20
Form	1S	2S	3S	4S	9S	12S	16S	36S	45S

An optional form 16S, class 100, 120 volt meter with 3ϕ RCDC switch is available.
Form 36S replaces form 6S; form 45S replaces form 5S and form 35S meters.
Form 9S and 16S meters support Aclara's Fitzall™ feature.

SPECIFICATIONS

Power Requirements	Voltage Rating: 120 to 480 volts Voltage Range: ±20% of voltage rating Frequency: 50 or 60 Hz
Operating Environment	Temperature: -40°C to +85°C (-40°F to 185°F) Humidity: 0% to 95% non-condensing
Dimensions	Diameter: 17.63 cm (6.94 inches) Depth: 15.24 cm (6 inches)
Model	FLEXKV2C
FCC ID	SDBFLEXKV2C
ID	2220A-FLEXKV2C
Mechanical Design	Durable one piece Lexan™ cover Rugged single action reset lever Magnetic switch activates alternates Alternate and Site Genie displays
Accuracy	Meets ANSI C12.20 for accuracy class 0.2 Typical accuracy better than ±0.2%
Tamper Detection Options	Received kWh detection (optional) Demand reset counter FlexNet on-board vibration sensor
Load Profile	Up to 20 channels of ANSI C12.19 load profile data. Up to 15 snapshots
Connect/Disconnect Switch	Available on Form 16S, Class 100, 120 – 240, 50/60 Hz meter only Three pole, single throw, magnetically-latching Endurance: 5000 cycles @ 100A, 240Vac, 50/60 Hz, 30,000 mechanical operations
Characteristic Data	Starting current: Typically less than 0.1 amps for SC meters; 0.05 amps for TR meters Typical Watts Loss: < 0.8W @ 120V, Phase A; < 0.1W @ 120V, Phase B & C
LCD Display	Six digit liquid crystal display User-definable scroll list; 75 items total Power flow and mechanical disk emulator kWh display with segment check option

METER FUNCTIONALITY

Meter Features	Bi-directional real and reactive energy and demands Q-hour meter Real time pricing (CPP) TOU Meter Up to 20 channel load profile recorder Power quality meter (THD, TDD and distortion power) Current and Voltage recorder Transformer/Line loss and accuracy compensation Real time multifunction instrument Four quadrant meter Individual phase metering
Logging	Security Log Voltage sag and swell log Meter events log

Some functionality may require additional soft switches.

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DATA SHEET
ADS-10009-02



FlexNet M400B2 Base Station

Compact Point-to-Multipoint Base Station

The Sensus FlexNet® M400B2 Base Station offers a strategic communications option for public service providers with endpoints deployed in remote or densely populated areas.

The efficient transceiver can transmit and receive in a 200kHz band of spectrum. 200kHz enables more dedicated channels, resulting in higher network capacity, allowing more granular data and more channels of data. And the Sensus FlexNet communication network delivers double the transmit power of competitive systems over primary-use licensed spectrum – ensuring reliability for mission critical applications.

The tower-based architecture enables reliable communication of status and usage information with fewer access points than other network architectures. These compact, efficient base stations fit in space-constrained environments and require no air conditioning.

FEATURES

- GPS receiver for time synchronization
- Duplexer for single antenna
- IP-addressable power supply with hot-swap capability
- 8-hour battery backup
- Alarms and reporting capability
- Backhaul via Ethernet/IP
- Heated battery for cold weather environments
- Modular construction for easy serviceability

APPLICATIONS

- Two-way Advanced Meter Infrastructure (AMI)
- Distribution Automation (DA)
- Demand Response (DR)
- Home Area Networks (HAN)
- Sensus VantagePoint® Lighting Control

Licensed Radio Spectrum

In North America, FCC/IC protected primary-use spectrum avoids competition with other wireless services, interference from other radio devices and the risk of being taken over by emergency service providers.

Fewer Access Points

Our point-to-multipoint architecture directly connects base stations to endpoints over large geographic areas – greatly reducing the number of network backhaul connections as well as O&M costs.

Resilient Network Design

Sensus Base Stations continue to provide real time data during outages and emergencies because of eight hour plus battery backup – enabling better workforce management and faster service restoration.

Small Footprint

Flexible pole or wall-mounting options enable strategic deployment with a discreet appearance.

Industry Leading Security

Sensus has achieved GE/Wurldtech™ Achilles® communications certification for critical infrastructure security against cyber threats.

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FlexNet® M400B2 Base Station

Compact Point-to-Multipoint Base Station



PROPERTIES

Receive bandwidth	200 KHz
Transceivers	Single
Spectrum	Licensed 900 MHz PCS/MAS
Duplexing	Single transmit Sixteen receivers - simultaneous/dedicated
Applications	Single
Expandability	No
Compatibility	SNMP
FlexNet	Requires RNI 3.x or newer

ENCLOSURES - OUTDOOR - POLE/WALL MOUNT

Height	22" (55.9 cm)
Width x Depth	22" (55.9 cm) x 10.5" (26.7 cm)
Capacity	One transceiver
Temperature	-40° to +122° F (-40° to +50° C)
Voltage	120 VAC
Battery backup	8 hours
NEMA rating	4
Air conditioned	No

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Smart Gateway

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DATA SHEET
ADS-10003-06

Sensus Smart Gateway



Public service providers need timely data to make critical and prompt decisions for their communities. With the Sensus Smart Gateway, a battery-powered sensor interface, utilities can connect to a variety of applications in remote locations where there is no power or land-based communications available. Leveraging the FlexNet® communication network, the user interface application empowers utilites to remotely monitor pressures, temperatures, levels, and switches. Alarms can be transmitted and forwarded to utility systems or individuals allowing for expedient resolution. Additionally, data accumulation can be analyzed to develop new insights into operational conditions.

With two (2) 4-20 mA analog inputs and two (2) Form A digital inputs, the number of possible applications makes the Smart Gateway a flexible, powerful and cost effective device to gather information previously too difficult to obtain.

FEATURES

- Battery Powered
- FlexNet enabled
- Two (2) 4-20 mA analog inputs and two (2) Form A digital inputs per unit
- 15 minute data sampling reported six (6) times per day
- IP66 packaging for outdoor applications
- Mounting options for pipe or wall mounting
- Intrinsically Safe Class1 Div2
- Maintenance free for the life of the product
- Interfaces with other system infrastructure such as CMEP and Multispeak
- One (1) Year Warranty

Benefits

- Improves operational performance of the system.
- Enables proactive and preventative maintenance.
- Enables quick resolution of equipment failures.
- Decreases the need to deploy field crews.
- Maximizes return on investment.
- Supplements the existing SCADA system.
- Leverages the existing FlexNet network.
- No additional power line infrastructure is necessary.
- Prevents theft and tampering, and improves safety by communicating user-configured alarms.
- Facilitates flexible and scalable installation through the system, including remote locations.
- Cost-effective option for extensive data accumulation.

Applications

- Pressure readings
- Customer complaints resolution
- Hydraulic modeling
- Pressure modeling
- Fire flow testing
- Pressure reducing infrastructure monitoring
- Level measurements
- Tank/Aquifer/Reservoir monitoring
- Lift station monitoring
- Overflow monitoring
- Rain gauges
- Temperature readings
- Water and Gas Quality
- Security
- Vault doors
- Gates
- Valve positions
- Data Tracking
- Modeling
- Event responses
- Leak Detection

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Smart Gateway

SPECIFICATIONS

Physical Characteristics	6.4" W x 4"H x 2.8"D	
Weight	1.5 lbs	
Color	Grey	
Frequency Range	900-950 MHz, 8000 channels x 6.25 kHz steps	
Modulation	Proprietary Frequency Band	
Power	D Cell Lithium Thionyl Chloride battery	
Operating Temperature	-22 °F to +185 °F/-30 °C to 85 °C	
Installation Environment	The Smart Gateway is designed for installation on a wall or pipe where it is not subject to water submergence	
Installation Kits	Pipe/Wall-Mount Wall-Mount Only Optional Multi-Cable	
Wiring Requirements	See Installation Guide	
Installation Kits	Pipe/Wall-Mount Wall-Mount Only Optional Multi-Cable	
Wiring Requirements	See Installation Guide	
Approvals	United States FCC Title 47 CFR: Part 24D Part 101C, Part 15	Canada Industry Canada (IC) RS-134 RSS-119

SENSOR SPECIFICATIONS

Utility Type	Pressure Accuracy	Temperature Accuracy	Water Level Accuracy	Output Settling Time	Operating Voltage	Current Draw	Zero Offset
Water	+/- 1.5% PSI	+/-1 °F	+/-2"	≤ 200 milliseconds	≥ 12.5 volts	2-Wire: ≤ 30 mA 3-Wire: ≤ 100 mA	≤ 6% mA
Gas	+/- .25% PSI	N/A	N/A				

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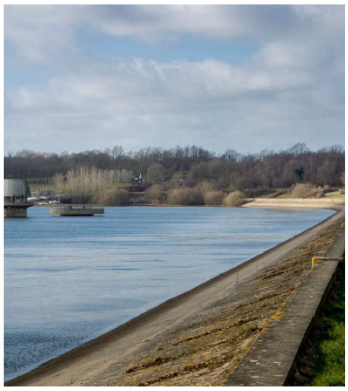
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Let's Solve Water

DATA SHEET
WDS-10038-03



Sensus Water Level Monitoring Kit

Remotely monitor and trend water levels in reservoirs, basins and more

Water level is a key piece of information for a water utility. With the Sensus Water Level Monitoring Kit combined with the Sensus® Smart Gateway Sensor Interface, utilities can now remotely monitor and trend the level of almost any water surface in their system.

Knowing the water level at the raw water intake can help an operator forecast and prepare for changes in treatment. Tracking seasonal raw water levels can identify low inflows upstream and help predict future water availability. And at other locations – such as reservoirs, holding tanks, open channels and treatment basins – water level can indicate the health of pumps and other mechanical features.

Leveraging the FlexNet® communication network through the Sensus® Smart Gateway Sensor Interface, this ultrasonic, non-contact solution empowers utilities to monitor the level of water at rivers, reservoirs, open channels, basins, and other remote water facilities. Customizable alarms can be set to alert utilities about high and low water levels. Alarms can be transmitted and forwarded to utility systems or individuals allowing for proactive resolution. Additionally, water level data can be accumulated and analyzed to develop new insights into the operation of the water system.

The Sensus Water Level Monitoring Kit transmits valuable level data through the Sensus Smart Gateway Sensor Interface. With two 4-20 mA analog inputs and two Form A digital inputs, the Sensus Smart Gateway Sensor Interface can cover multiple applications at a single site.

FEATURES

- Transmits data via the Sensus® Smart Gateway Sensor Interface
- Non-contact, ultrasonic level transmitter mounts above the wastewater level
- One year warranty

BENEFITS

- Provides remote liquid level status for key water surfaces
- Enables proactive operation and maintenance
- Decreases need to deploy field crews
- Leverages the FlexNet® communication network
- Improves system operation by communicating configurable alarms
- Provides a cost-effective option for data accumulation

KIT CONTENTS

- Transducer
- Transmitter
- Handheld Programmer

SPECIFICATIONS

Ultrasonic Transducer	
Range	1-ft to 50-ft total depth
Weight	2.8 lb, PVDF copolymer enclosure
Process Connection	1-inch NPT
Cable	30-ft
Transmitter Device	
Enclosure	NEMA 4X
Power Supply	100-230 VAC, 50/60 Hz
Display	Backlit Multi-field LCD
Output	4-20 mA
Sensor Handheld Programmer	Multi-key device for system setup

Note: The Sensus® Smart Gateway and the Sensus Field Tools handheld are both sold separately.

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Let's Solve Water

DATA SHEET
WDS-10042-03



Sensus Pressure Sensor Kit

Remotely monitor and profile your water system pressure

Water pressure is vital in the operation of a water system. The Sensus Pressure Sensor Kit combines with the Sensus® Smart Gateway Sensor Interface to provide utilities knowledge of water pressure at almost any point in their water system.

Knowing the water pressure at multiple locations can help determine where a main break has occurred, where a pump or valve has malfunctioned and where a system may have issues delivering water for fire protection and for public consumption.

Leveraging the FlexNet® communication network through the Sensus® Smart Gateway Sensor Interface, the pressure sensor kit empowers utilities to monitor pressure remotely. Customizable alarms can be set to alert utilities of high or low pressure conditions at remote locations. Alarms can be transmitted and forwarded to utility systems or individuals allowing for proactive resolution. Additionally, pressure data can be accumulated to develop new insights into the operation of the water system.

The Sensus Pressure Sensor Kit transmits pressure data through the Sensus Smart Gateway Sensor Interface. With two 4-20 mA analog inputs and two Form A digital inputs, the Sensus Smart Gateway Sensor Interface can cover multiple applications at a single site.

FEATURES

- Powered remotely by the Sensus® Smart Gateway Sensor Interface
- 316 Stainless Steel Construction
- Valve for sensor isolation
- One year warranty

BENEFITS

- Enables proactive water system operation and maintenance
- Decreases the need to deploy field crews
- Leverages the FlexNet® communication network
- Deploys quickly in a ¼-NPT threaded connection in pipe, valves, and other water system components
- Improves system operation by communicating configurable alarms
- Provides a cost-effective option for extensive data accumulation

SPECIFICATIONS

Pressure Range	0 to 300 psi
Accuracy	± 0.25%
Sensor Enclosure	IP68 (Suitable for Submersion)
Sensor Construction	316L Stainless Steel
Output	4-20 mA (2-wire)
Cable Length	25-ft
Ball Valve	316 Stainless Steel FNPT x FNPT, Locking Lever, ¼ -in pipe size
Pipe Nipple	316 Stainless Steel, Schedule 80, ¼-in pipe size x 2-in long

Note: The Sensus® Smart Gateway and the Sensus Field Tools handheld are both sold separately.

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Let's Solve Water

DATA SHEET
WDS-10060-01

Permalog+

FlexNet with Permalog+ Solution



Tighten up your distribution system and conserve millions of gallons of water – and just as many dollars in lost revenue – with the combination of two industry-leading solutions: FlexNet® and Permalog®+.

Reduce liability

Permalog+ uses sound waves to monitor distribution lines and localize leaks. Sensors activate overnight, listening to the distribution system when ambient noise is at its lowest, then report pipeline conditions back to the utility via the Sensus FlexNet communication network and SmartPoint® modules. Once flow conditions are reported back through the network, you can analyze the data to determine if a leak condition exists. Service crews can quickly investigate and make repairs before they become costly problems or prominent stories in the news.

Installation is fast and easy

Permalog+ sensors magnetically attach to gate valves throughout your distribution system. This allows them to be mounted temporarily or permanently. Permalog+ is an economical way to proactively address current and potential leak conditions. With as little as five data loggers per mile, far less than any other leak detection system, Permalog+ is a fast deployment.

FlexNet flexibility and dependability

FlexNet is the recognized AMI leader. The Sensus high power SmartPoint transceivers broadcast on FCC-protected, primary use frequencies, giving utilities the option to integrate a wide range of solutions without sacrificing network performance. Walk-by, drive-by or fixed base, FlexNet provides water companies with a comprehensive, evolutionary, two-way operations solution.

Acoustic monitoring application

The Sensus Analytics Acoustic Monitoring application combines the Permalog technology with the Sensus FlexNet® communication network and Sensus SmartPoints® to deliver a powerful, remote leak detection solution. Sensus SmartPoint modules carry real-time data via FlexNet to Sensus Analytics where flow conditions are reported. The Acoustic Monitoring application automatically analyzes the data and sends an alert if a leak condition exists.

FEATURES

- Remote leak detection
- Temporary or permanent mounting
- Seamless integration with FlexNet

BENEFITS

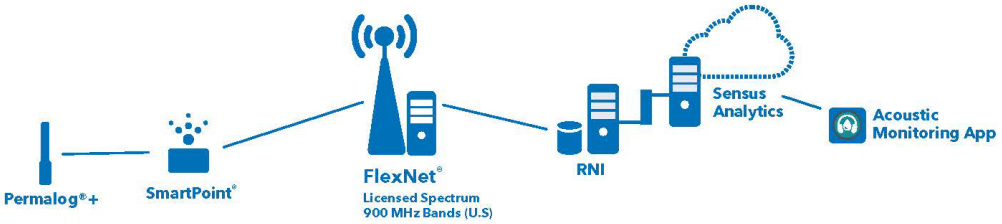
- Proactively detects leaks and other flow problems
- Conserves millions of gallons of water
- Discovers and regains lost revenue
- Leverages the flexibility and reliability of the Sensus FlexNet communication network
- Reduces liability
- Provides flexible and quick deployment options in permanent, semi-permanent or survey applications
- Uses a non-invasive method with no detrimental effects on water supply

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Permalog+

FlexNet with Permalog+ Solution



SPECIFICATIONS

Construction	Thermoplastic and Stainless Steel
Dimensions	7.25" x 2.0"
Weight	1.54 lbs.
Data storage	29 days
Batteries	Lithium/replaceable
Warranty	3 years (Fluid Conservation Systems)

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DATA SHEET
EDS-10005-01



EnTek Load Control Module

Reliably Reduce Load on Demand

The EnTek FC340A Load Control Module (LCM) is an advanced demand response switch that helps electric utilities quickly and reliably shed load during peak periods. This multi-function switch technology, jointly developed by Sensus and EnTek, controls power to energy-intensive appliances, such as HVAC units, pool pumps, water heaters and irrigation pumps. It's an ideal solution to reduce load for both residential and commercial operations.

FEATURES

- Multiple control functions
- Event randomization
- Event duty cycle
- Load sensing
- Cold load pickup
- Installation supported with FieldLogic™ connected handheld
- AES 256 encryption

BENEFITS

- Easy installation with multiple options
- Two-way, secure communications over FlexNet
- Peak load reduction
- Power fail alarm indicates when devices have been disconnected
- Over-the-air firmware downloads to keep equipment up to date
- 480V 10A option to support irrigation solutions

Direct Communication

Featuring a two-watt radio, this LCM has the power to talk directly to base station collectors over the FlexNet® communication network–eliminating any need for pairing to another meter or device. With two-way, direct communications, operators get confirmation that the module is handling the load control event as expected. The FC340A LCM radio module has been optimized for improved RF performance.

Multiple deployment options

The EnTek FC340A was purposely designed to give utilities options to simplify installation. For new deployments, it can be installed as a complete unit. However, it also has the ability to replace previously deployed LCMs by simply performing a "door swap." This unique adaptation works on several of the most commonly deployed LCMs installed over the last 20+ years–saving utilities time and money.

It also includes a wide variety of load controls depending upon the application. Operators can choose immediate, random start and timed operations. It supports three active channels with up to two 30 Amp relays and two 5 Amp relays.

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EnTek Load Control Module

Reliably Reduce Load on Demand

Specifications

Model	EnTek FC340A	
Relays	High Current (Optional)	30A 240 VAC / 25A 277 VAC
	Medium Current	5A 120 VAC
Power Supply	Standard	90-276 VAC 50/60Hz
	Low Voltage	24 VAC
	Irrigation	480VAC 60Hz
Operating Environment	Temperature	-40°C to +75°C
	Temporary excursions to +85°C	
Industry Standards	FCC part 15, UL 916, CSA C22.2 No. 205	

FlexNet Communications

Transmit Power	2W
Frequency	900 MHz, primary licensed
Encryption	AES 256

Enclosure

Dimensions	7.5" H x 6" W x 3" D (approx.)
Construction	High Impact Polycarbonate UV resistant Optional internal junction box and separate padlock seals

EnTek FC340A LCM Models

HAN Device TypeID	Device Model	Voltage Rating	Product Info	Relay Control 1	Relay Control 2	Relay Control 3
43	FC340A-F-LC-R-J-S-D	120/240	F 2 5A 120V 2 30A 240V	R1 5A 120V	R2 5A 120V	R3/R4 30A 240V
44	FC340A-F-LC-R-J-S-B	120/240	F 2 5A 120V 1 30A 240V	R1 5A 120V	R2 5A 120V	R3 30A 240V
45	FC340A-F-LC-R-J-I-D	480	F 2 5A 120V 2 10A 480V	R1 5A 120V	R2 5A 120V	R3/R4 10A 480V
46	FC340A-F-LC-R-J-I-B	480	F 2 5A 120V 1 10A 480 V	R1 5A 120V	R2 5A 120V	R3 10A 480V

EnTek FC340A LCM Door Swap

HAN Device TypeID	Device Model	Voltage Rating	Product Info	Relay Control 1	Relay Control 2	Relay Control 3
47	FC340A-F-DS-R	12 VAC 2.5VA	Door Swap with relays	R1 5A 120V	R2 5A 120V	R3/R4 30A 240V
48	FC340A-F-DS-J	12 VAC 2.5 VA	Door swap with Jumpers (support relays in base)	R1 5A 120V	R2 5A 120V	R3/R4 30A 240V

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DATA SHEET
DDS-10000-10



Sensus RTM II / RTM II+

Intelligent, secure, and fast grid communications

The Sensus Remote Telemetry Module™ II and II+ (RTM II/RTM II+) enable remote monitoring and control of smart SCADA field devices using the Sensus FlexNet® communication network or cellular communication networks. Both units are intelligently engineered to optimize communication traffic and provide real-time information to utilities.

These intelligent devices act as a communication gateway–easily connecting SCADA and Distribution Automation (DA) field devices via serial or Ethernet interfaces. By incorporating industry standard Modbus and DNP3/IEEE 1815 SCADA communication protocols, both devices are easily integrated with third-party Intelligent Electronic Devices and SCADA systems giving you end-to-end interoperability.

FEATURES

- Remote two-way monitoring and control over FlexNet and/or 4G/LTE cellular data networks
- Interoperability: Supports over a hundred different IED integrations
- Highly secure, encrypted SCADA interface

BENEFITS

- Real-time status of IEDs with configurable reporting, events, and alarms
- Communicates with 100+ IED application types from all leading manufacturers
- Communicates via standard RS-232 serial connection, RS-485 isolated serial connection, or Ethernet connection with IEDs
- Simple and easy installation with plug-and-play integration kits for most popular IEDs, including specific device point maps/profiles

Applications

The units are ideally suited for smart grid distribution automation applications requiring interoperability with critical assets such as reclosers, capacitor banks, distribution switches, faulted circuit indicators, voltage regulators, distributed generation, load control, and distribution substations. Similarly, the RTM II/RTM II+ can also integrate other intelligent SCADA controls to support water and gas automation applications.

- FlexNet® Model: Communicates using primary-use licensed spectrum over the Sensus FlexNet communication network. The units can be installed on any FlexNet system that is configured to support the AutomationControl™ application platform.
- Cellular Model: Communicates over the AT&T® 4G/LTE or Verizon™ 4G/LTE cellular data networks. The units are configured to support AutomationControl and can be installed anywhere in the United States where AT&T or Verizon service is available, including their roaming partners.

Communication

Communication is initiated in three ways:

- Automatic reporting upon digital and analog changes
- Configurable time-scheduled reports
- On-demand reporting through AutomationControl or the utility SCADA system

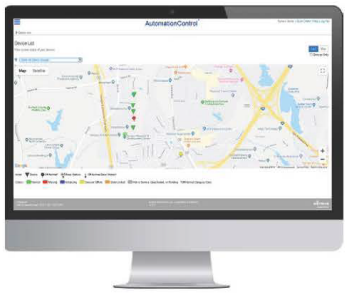
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Sensus RTM II / RTM II+

Intelligent, secure, and fast grid communications

AutomationControl



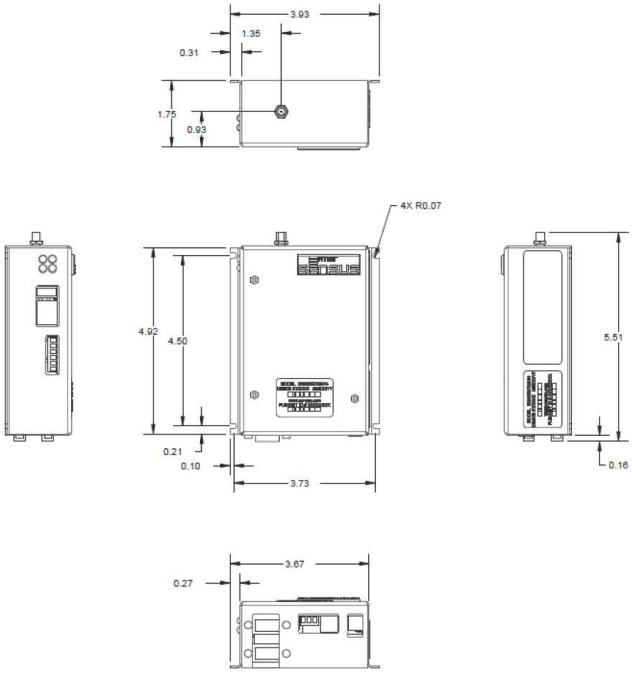
AutomationControl is a browser-based Software as a Service solution for real-time management of distribution and SCADA system assets. Through this platform, utilities can easily control intelligent communication devices giving operators the insight needed to effectively manage critical infrastructure.

Distribution, operations, maintenance and management personnel all appreciate the intuitive AutomationControl interface. The dashboard provides a real-time snapshot of system performance–turning low-level insight into high-level consumption. The interface visualizes your system, devices and network to simplify what was once complex.

To leverage automation, users can program autonomous control actions and commands to occur in the field. Intelligent field devices are then able to take action without having to wait for a utility operator to issue a command. If an action fails for any reason, the system has been designed to send notifications to a set of users.

With AutomationControl, utilities are able to securely control any distribution asset and deploy a deeper level of intelligence down to the edge.

The drawings below show an RTM II+ FlexNet model. All measurements are in inches with a +/- 0.01 inch tolerance.



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Sensus RTM II / RTM II+

Intelligent, secure, and fast grid communications

PRODUCT

Product	Model	Radio	Frequency	RS-232 Serial Port	RS-485 Serial Port	Ethernet
RTM II	539.65.537.00045	FlexNet	900 MHz	✓		
	539.65.537.00051	AT&T cellular 4G (LTE) with 3G fallback	700/850/1700/1900 MHz	✓		
	539.65.537.00058	Verizon cellular 4G (LTE)	700/850/1700/1900 MHz	✓		
RTM II+	539.65.537.00044	FlexNet	900 MHz	✓	✓	✓
	539.65.537.00050	AT&T cellular 4G (LTE) with 3G fallback	700/850/1700/1900 MHz	✓	✓	✓
	539.65.537.00057	Verizon cellular 4G (LTE)	700/850/1700/1900 MHz	✓	✓	✓

COMMUNICATIONS

General	Two-way communication	All communications are acknowledged for reliability
	Protocols	DNP and Modbus
Serial Ports	Local Configuration Port	USB 2.0 compliant; supports Microsoft® Windows® based local configuration and test program
	SCADA Communication Port	RS-232, DB-9 female or terminal block; supports DNP or Modbus
	Pass Through	RS-232, DB-9 female; IED maintenance port connection
	Isolated Serial Connection	RS-485
Ethernet Port (RTM II+ only)	SCADA Communication Port	RJ-45 female; supports DNP or Modbus
FlexNet network	Transmit power	2W
	Frequency	900 MHz, primary licensed
	Antenna	SMA antenna connector
Cellular network	AT&T	4G/LTE with 3G fallback
	Verizon	4G/LTE
	Transmit power	3G: 2W (GSM), 0.25W (WCDMA) 4G: 0.2W (LTE)
	Frequency	3G: 800/1900 MHz 4G: 700/850/1700/1900 MHz
	Antennas	2 SMA antenna connectors (Main and Diversity)

PROCESSOR

32 bit microcontroller running at 72 MHz
8 MB non-volatile Flash memory
32 MB SDRAM

ENVIRONMENTAL DATA

Operating temperature	FlexNet: -40° to 185°F (-40° to 85°C) Cellular: -40° to 158°F (-40° to 70°C)
Humidity	0% to 95% non-condensing
Radiated emissions	FCC 47 CFR Part 15B and ICES-003

ENCLOSURE

Intrusion rating	NEMA 1R or IP 20
Mounting	Integrated mounting flanges
Construction	Gray steel
Dimensions	See attached drawings

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DATA SHEET
DDS-10002-12



Sensus T866 MicroRTU

Reliable Management of Distribution Sensors and Controllers

The Sensus T866 MicroRTU monitors, controls, and operates remote equipment and sensors to help utilities realize the benefits of automation. By reading both digital and analog inputs of connected equipment, the T866 turns a simple sensor into a robust intelligent monitoring solution. The only limitation is your imagination.

FEATURES

- Multiple communication options: FlexNet communication network or 4G/LTE cellular data networks
- Provides status monitoring of eight digital inputs and six analog inputs; six digital outputs are available for controlling equipment
- Operating parameters are locally and remotely configurable
- Battery backup for outage conditions
- Automatic battery test for reporting low

BENEFITS

- Monitoring, controlling, and remote configuration of distribution assets
- Line voltage monitoring provides visibility into under and over voltage conditions, as well as momentary and continuing power outages
- Enables automation routines for power restoration
- Native integration with utility SCADA systems
- Real-time analog reporting with remote configurable reporting logic

Applications

Event-driven actions are based on rules defined by the operator. Real world use-cases demonstrate improved customer service, safety, and positive environmental impacts. Examples include:

- Automating the on/off switch of a generator during power outages
- Detecting reverse power flow from DERs and operating upstream reclosers for isolation
- Closing a natural gas valve when methane is detected
- Turning on a water pump when a tank is empty

The T866 reports events based on user-defined trigger times and can be queried for status on demand. It easily integrates with third-party SCADA software giving you end-to-end interoperability.

Communication

There are two models available. Each features an integrated two-way radio that is suited for applications requiring critical asset interoperability.

- FlexNet®: Communicates using primary-use licensed spectrum over the Sensus FlexNet communication network
- Cellular: Communicates over the AT&T® 4G/LTE or Verizon™ 4G/LTE cellular data networks

Reporting methods

- Automatic report upon status or analog changes
- Interval based time-scheduled reports configurable to the minute
- On-demand updates through AutomationControl™ and/or a utility SCADA system

Remote Configuration, Control, and User Notification

- Displays status and performs remotely configurable control operations
- Automates daily routines with easily configurable alarms, ranges, and reports
- Notifications based on user-specified conditions

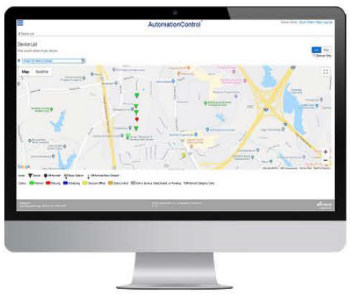
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Sensus T866 MicroRTU

Reliable Management of Distribution Sensors and Controllers

AutomationControl



AutomationControl is a browser-based Software as a Service solution for real-time management of distribution and SCADA system assets. Through this platform, utilities can easily control intelligent communication devices giving operators the insight needed to effectively manage critical infrastructure.

Distribution, operations, maintenance and management personnel all appreciate the intuitive AutomationControl interface. The dashboard provides a real-time snapshot of system performance–turning low-level insight into high-level consumption. The interface visualizes your system, devices and network to simplify what was once complex.

To leverage automation, users can program autonomous control actions and commands to occur in the field. Intelligent field devices are then able to take action without having to wait for a utility operator to issue a command. If an action fails for any reason, the system has been designed to send notifications to a set of users.

With AutomationControl, utilities are able to securely control any distribution asset and deploy a deeper level of intelligence down to the edge.

MODELS

Model	Radio	Frequency
539.65.537.00046	FlexNet	900 MHz
539.65.537.00052	AT&T cellular 4G (LTE with 3G fallback	700/850/1700/1900 MHz
539.65.537.00059	Verizon cellular 4G (LTE)	700/850/1700/1900 MHz

COMMUNICATIONS

General	Two-way communication	All communications are acknowledged for reliability
FlexNet network	Transmit power	2W
	Frequency	900 MHz, primary licensed
	Antenna	Phantom 3.0 dBi
Cellular network	AT&T	4G/LTE with 3G fallback
	Verizon	4G/LTE
	Transmit power	3G: 2W (GSM), 0.25W (WCDMA) 4G: 0.2W (LTE)
	Frequency	3G: 800/1900 MHz 4G: 700/850/1700/1900 MHz
	Antennas	• 3G/4G Multi-Band 3.0 dBi (transmitter and receiver) • Ultra Wide Band 5.0 dBi internal diversity (receiver only)
Local configuration port		USB 2.0 compliant

OPERATING POWER

General	120 VAC: 100-135 VAC 60 Hz
Fuse	250 V, 500 mA, Slow-Blow
Battery	12volt @ 5 amp hour non-spillable, sealed, lead-acid 5 year expected life with automatic charger
Battery fuse	250 V, 2.5 A, Slow-Blow

ENCLOSURE

Intrusion rating	NEMA 6R, IP 67 (International)
Construction	Fiberglass reinforced polyester
Mounting	Integrated mounting plate. An optional external mounting plate is available for purchase from Sensus.
Security	Hinged door with padlocking capability
Access	2 Conduit compatible cable entry holes
Weight	10.3 lb
Dimensions	See drawings on final page

ENVIRONMENTAL DATA

Operating temperature	FlexNet: -40° to 185°F (-40° to 85°C) Cellular: -40° to 158°F (-40° to 70°C)
Radiated emissions	FCC 47 CFR Part 15B and ICES-003

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Sensus T866 MicroRTU

Reliable Management of Distribution Sensors and Controllers

POINT COUNT

Digital Inputs	8, including 6 contact points and 2 AC voltage detects (present/absent)
Analog Inputs	6, including 4 transducer inputs and 1 dedicated temperature input
AC voltage monitor	1
Digital Outputs	6
Battery Monitor	1

ANALOG INPUTS

- 4 Configurable analog inputs
- +12VDC, 200mA output is provided for powering analog sensors
- Software selectable input ranges
  - 0 – 5 VDC
  - 1 – 10 VDC
  - 0 – 1 mA DC
  - 4 – 20 mA DC
  - 0 – 10 VAC, true RMS
  - 0 – 2 VAC, true RMS
- 12-bit A/D conversion
- 20 VAC control power monitoring input is standard on all AC powered models
  - Over and under voltage monitoring
  - Outage and power-on reporting
  - Configurable over and under voltage thresholds and trigger times

DIGITAL INPUTS

- 6 Dry contact (12VDC wetting voltage provided by MicroRTU)
- 2 - 120 VAC detects (present/absent)
- 4000 VDC Optical isolation
- Contact 'de-bounce' timer setpoint and trigger timers
- AC voltage monitor
- Reports the number of state changes per event
- Individually configurable as 5-digit counters and/or timers

DIGITAL OUTPUTS

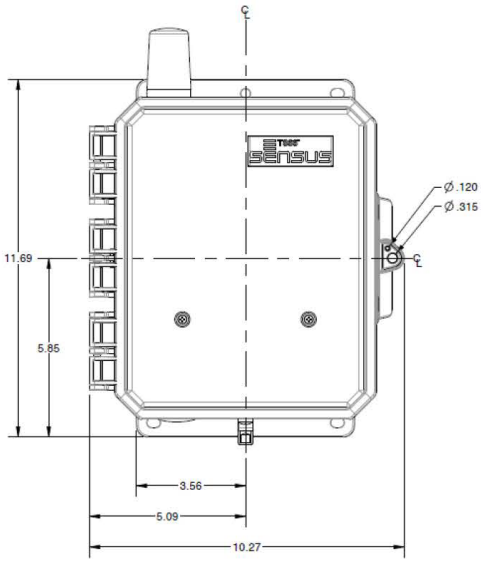
- 6 Mechanical relays:
  - Two Form "C" 30A @ 240VAC; 20A @ 30VDC
  - Four Form "A" 8A @ 240 VAC; 8A @ 30VDC
- Momentary or continuous operation
- Local/remote switches enable/disable remote control and provide a local test mode

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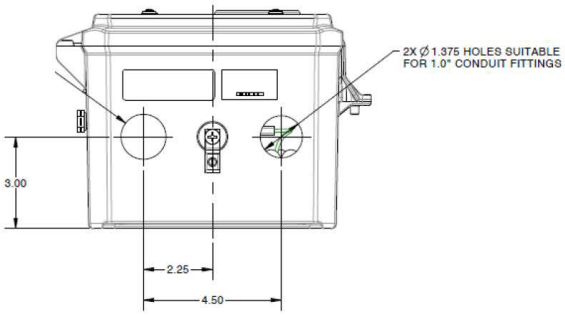
Sensus T866 MicroRTU

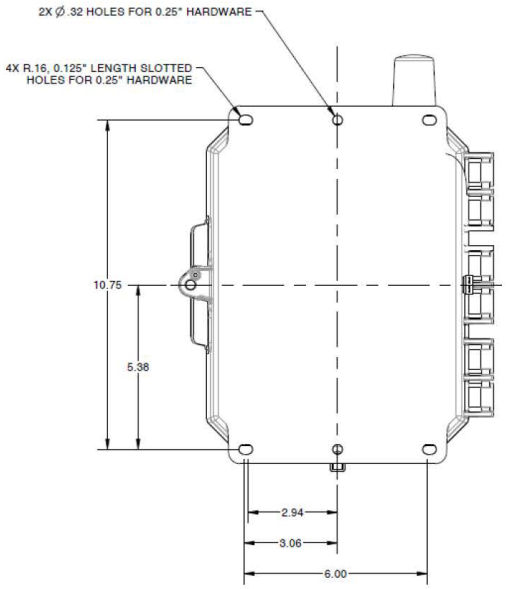
Reliable Management of Distribution Sensors and Controllers

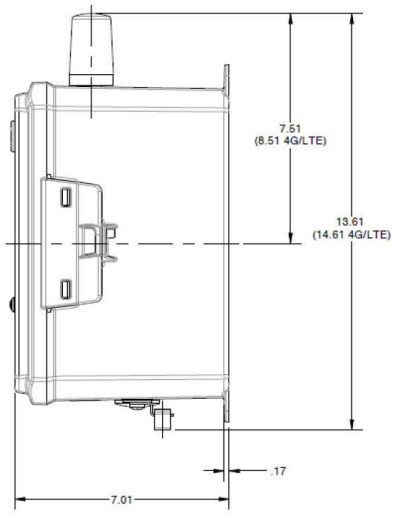
IP67 Enclosure Drawings



The T866 drawings show a FlexNet model.
All measurements are in inches with a +/- 0.01 inch tolerance.







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DATA SHEET
WDS-10024-04



SmartPoint 520M

Pit Set Module

The SmartPoint® 520M Pit Set Module is a radio transceiver that provides water utilities inbound and outbound access to water measurement and ancillary device diagnostics via radio signal. The SmartPoint 520M is designed for submersible, pit-set environments.

TouchCoupler Design

The SmartPoint 520M Module utilizes TouchCoupler, the patented Sensus inductive coupling communication platform, to interface with the encoded meter. With TouchCoupler, the SmartPoint 520M Module can connect to the meter using existing two wire AMR installations instead of requiring utilities to access the meter to install a new three-wire connection. This results in a fast, efficient and reliable connection at minimal cost.

BENEFITS

- Easily receives input from either walk-by/drive-by or fixed-base collection device
- Controls both deployment and lifetime operation costs
- Compact installation that saves time, space and money - without reducing system performance
- Delivers a fast, efficient and reliable connection at minimal cost
- Minimizes new infrastructure investment
- Enables effective leak detection

Operation

With its migratable, two-way communication ability, the M-Series SmartPoint functions as a walk-by/drive-by endpoint, fixed-base endpoint, or combination of the two. This flexibility increases utility data collection capabilities and streamlines operations. The SmartPoint 520M Module receives input from the meter register and remotely sends data to a walk-by/drive-by or fixed-base collection device. The SmartPoint 520M Module easily migrates from walk-by/drive-by to fixed base by simply installing a Base Station.

In walk-by/drive-by mode, the SmartPoint 520M Module collects data and awaits an activation signal from the Vehicle Gateway Basestation (VGB) or Hand-Held Device (HHD). Upon signal receipt, it transmits readings, the meter identification number and any alarms.

As a fixed-base endpoint, the SmartPoint 520M Module interacts with one or more strategically placed Base Stations located in the utility service area. Top of the hour readings and other diagnostics are instantly forwarded to the Regional Network Interface (RNI)™ at time of transmission. The FlexNet® communication network provides unmatched reliability by using expansive tower receiver coverage of metering end points, data/message redundancy, failover backup provisions and operation on FCC primary use (unshared) RF spectrum.

Powerful Transmission, Flexible Platform

The SmartPoint® 520M Pit Set Module offers several advantages that control both deployment and lifetime operation costs. Its powerful, industry-leading two watt transmitter broadcasts over large distances and minimizes collection infrastructure. And after the SmartPoint is installed, its migratable, two-way system platform can be updated without requiring personnel to visit each meter and/or inconveniencing customers.

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SmartPoint 520M

Pit Set Module

Additional Smartpoint 520M Module Features

The SmartPoint 520M Module obtains hourly readings and can monitor continuous flow over a programmable period of time, alerting the utility to leak conditions. In addition, the SmartPoint stores up to 840 consumption intervals (35 days of hourly consumption), providing the utility with the ability to extract detailed usage profiles for consumer information and dispute resolution. The SmartPoint also incorporates a two-port design, allowing the utility to connect multiple registers and ancillary devices (such as acoustic monitoring) to a single SmartPoint. This results in a compact installation that saves time, space and money - without reducing system performance.

SPECIFICATIONS

Service	Pit set installation interfacing the utility meter to the Sensus FlexNet communication network. Unit requires 1.75" diameter hole in pit lid; fits pit lid thicknesses up to 1.75"
Physical characteristics	Width: 4.43" x Height: 5.09" x Depth: 3"
Weight	1.0 lbs/16.0 oz
Color	Black
Frequency range	900 – 950 MHz, 8000 channels X 6.25 kHz steps
Modulation	Proprietary Narrow Band
Memory	Non-Volatile
Power	Lithium Thionyl Chloride batteries
Approvals	US: FCC CFR 47: Part 24D, Part 101C, Part 15 Licensed operation Canada: Industry Canada (IC) RSS-134, RSS-119
Operating temperature	- 22° F to +185° F - 30° C to + 85° C
Options	Dual or single port availability; TouchCoupler only, wired only
Installation environment	100% condensing, water submersible
Compatibility	TouchCoupler and Wired Version: Sensus Encoder Registers, Badger ADE water registers, Master Meter AccuLinx, and Hersey Translator (approved TR/PL Lead) Wired Version Only: Elster Encoder (Sensus protocol), Neptune ARB VI (ProRead), Hersey Translator, Zenner PMN Nitro 01, McCrometer flowcom FC100-00M, and Kamstrup flowIQ 2100 Refer to the 510M/520M SmartPoint® Module Water Meter and Ancillaries Compatibility Quick Guide for the latest compatibility information.
Warranty	20 years – Based on six transmissions per day. Refer to Sensus G-500 for warranty.

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Let's Solve Water

DATA SHEET
WDS-10006-08



iPERL Smart Water Meter

Electromagnetic Flow Measurement System

Sensus iPERL® smart water meters are designed to capture both lost water and lost revenue. The innovative magnetic technology delivers unmatched low flow registration and minimal pressure loss. With no moving parts, iPERL maintains its accuracy over a 20 year lifetime and is equipped with smart water alarms - delivering the intelligence you need to quickly resolve issues in the field.

FEATURES

- 5/8", 5/8" x 3/4", 3/4" and 1" sizes available in potable and reclaim versions
- 3/4" and 1" available in residential fire service (UL 327b)
- Starts registering flow as low as 0.03 gpm (0.007 m³/hr)
- Can be installed horizontally, vertically or diagonally
- Compatible with current Sensus AMI/AMR systems

BENEFITS

- Maximize investment with iPERL's electromagnetic technology, which delivers a 20-year accuracy warranty, with no required maintenance, and no loss in accuracy over 20 years
- Smart alarms detect issues such as leaks, reverse flow, empty pipe, etc.
- Improve low flow accuracy to drive additional revenue

Industry Leading Performance

The patented measurement technology of the iPERL water meter provides continuous and enhanced accuracy ranges at both low and high flows and perpetual accuracy over the life of the product. The iPERL meter has a 20-year accuracy warranty and a 20-year battery life guarantee. Over this 20-year lifespan, your iPERL will measure just as accurately as the day it was installed.

Construction

The iPERL meter body is available in two versions. The first version has a flow tube that is comprised entirely of composite polymer. The second version is comprised of lead-free bronze alloy with a composite polymer core. Both versions use the same thermal polymer shell with the same electronic register inside.

Electronic Register

The 9-digit hermetically-sealed electronic register with LCD display was designed to eliminate dirt, water, and moisture contamination in pit settings. The large, easy-to-read display includes AMI/AMR digits, direction of flow, units of measure, and empty pipe detection. The AMI/AMR digits and units of measure are fully programmable. The register also provides user configurable data logging.

Solid State Electromagnetic Technology

By avoiding the use of a mechanical measuring element inside the flow tube, metering performance is linear over the entire flow range - ensuring no reduction in accuracy at any flow rate over the life of the meter. The iPERL meter uses our patented remanent magnetic field technology - requiring far less energy and delivering superior accuracy.

Tamperproof

The integrated construction of the iPERL water meter prevents removal of the register to obtain free water. The magnetic tamper and low field alarms will both indicate any attempt to tamper with the magnetic field of the iPERL meter. The meter communication alarm indicates a possible cut cable.

Alarms

Quick resolution of field issues is made possible with smart water alarms including leak detection, reverse flow, empty pipe, magnetic tamper and low battery. When integrated with our FlexNet® communication network, remotely gathering and transmitting data has never been more reliable or profitable.

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iPERL Smart Water Meter

Electromagnetic Flow Measurement System

Smart Alarms

iPERL meters have many configurable smart alarms designed to protect your utility's investment, enhance customer service, and monitor/optimize distribution systems. These alarms include:

- Empty Pipe
  Detects the absence of water in the flow tube and sends an alert. Allows you to identify main breaks downstream and water shortages for quicker resolution to ensure water availability. This alarm can also indicate the water meter has been removed from service, or notify you of potential tamper.
- Tampering
  Detect magnetic interference to reduce apparent water losses and protect against unauthorized activities.
- Customer Leak
  Detect continual consumption of water over a period of time to indicate downstream leaks. This protects your utility, infrastructure and customers through alarm notifications that can reduce water loss and leak adjustment costs.
- Low Battery
  Replace your meters before they stop recording consumption through alerts indicating battery capacity to the meter or valve is running low.
- Reverse Flow
  Keep untreated water from re-entering your distribution system and deter tampering attempts through an alarm triggered when reverse flow is detected at the meter.

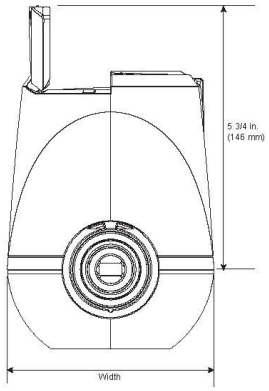
SPECIFICATIONS

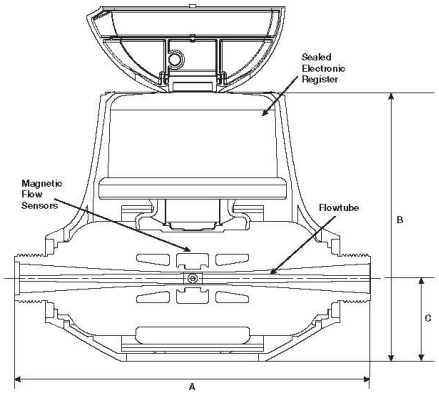
Service	Measurement of potable and reclaim water, and Residential Fire Service (UL 327b). 0-100% humidity. Fully submersible. IP68+ rated.			
Temperature Ranges	Water operating: Ambient air operating: Storage air:	33 °F (0.55 °C) to 80 °F (26.7 °C) -22 °F (-30 °C) to 140 °F (60 °C) -30 °F (-34.4 °C) to 158 °F (70 °C)		
Starting Flow	5/8" (DN 15 mm) size: 0.03 gpm (0.007 m3/h)	5/8" x 3/4" (DN 15x20 mm) size: 0.03 gpm (0.007 m3/h)	3/4" (DN 20 mm) size: 0.03 gpm (0.007 m3/h)	1" (DN 25 mm) size: 0.11 gpm (0.025 m3/h)
Low Flow Range (±3%)	5/8" (DN 15 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr)	5/8" x 3/4" (DN 15 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr)	3/4" (DN 20 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr)	1" (DN 25 mm) size: >0.3 gpm (0.068 m3/hr) to <0.4 gpm (0.09 m3/hr)
Normal Water Operating Flow Range (±1.5%)	5/8" (DN 15 mm) size: 0.18 to 25 gpm (0.04 to 5.7 m3/hr)	5/8" x 3/4" (DN 15x20 mm) size: 0.18 to 35 gpm (0.04 to 8.0 m3/hr)	3/4" (DN 20 mm) size: 0.18 to 35 gpm (0.04 to 8.0 m3/hr)	1" (DN 25 mm) size: 0.4 to 55 gpm (0.09 to 12.5 m3/hr)
Maximum Operating Pressure	5/8", 5/8" x 3/4", and 3/4" size: 200 psi (13.8 bar) 1" size: 175 psi (12.1 bar)			
Measurement Technology	Solid state electromagnetic flow			
Register	Hermetically sealed, 9-digit programmable electronic register			
Capacity	10,000,000 gallons, 1,000,000 cubic feet or 100,000 m3 capacity			
Register Resolution	.01 gallons/imperial gallons, .001 cubic foot, or .0001 m3			
Conformance to Standards	Meets the requirements of NSF 61, Annex G and NSF 372. Exceeds the most current revision of AWWA Standard C-715.			
Materials	External housing – Thermal polymer Flowtube – Composite polymer or a bronze alloy flowtube with a composite polymer internal core		Electrode – Silver/silver chloride Register cover – Hermetically sealed glass	

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iPERL Smart Water Meter

Electromagnetic Flow Measurement System





DIMENSIONS AND NET WEIGHTS

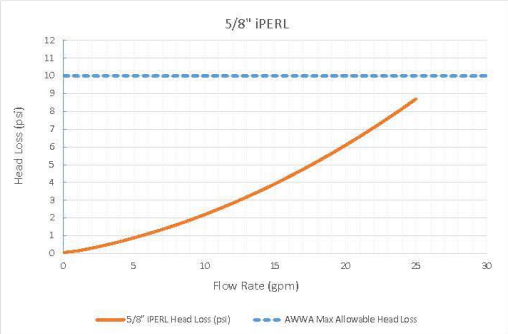
Meter Size	A	B	C	Spud Ends	NPSM Thread Size	Width	Net Weight
5/8" (DN 15 mm)	7-1/2" (190 mm)	6-1/10" (155mm)	1-3/4" (44 mm)	5/8" (15 mm)	3/4" (20 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
5/8" x 3/4" (DN 15mm x 20 mm)	7-1/2" (190 mm)	6-1/10" (155mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
3/4"Short (DN 20 mm)	7-1/2" (190 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
3/4" (DN 20 mm)	9" (229 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.2 lb. (1.45 kg)
1" (DN 25 mm)	10-3/4" (273 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	1" (25 mm)	1-1/4" (32 mm)	4-1/2" (114 mm)	3.3 lb. (1.5 kg)

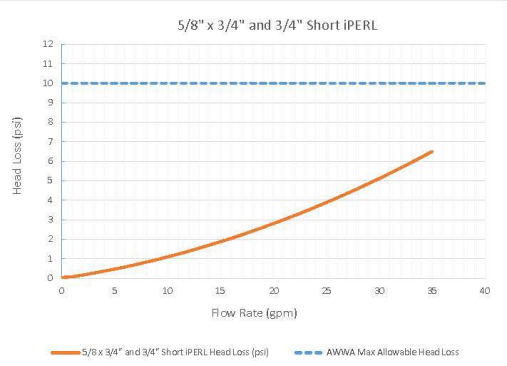
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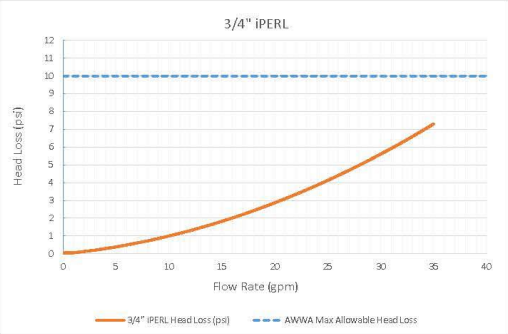
iPERL Smart Water Meter

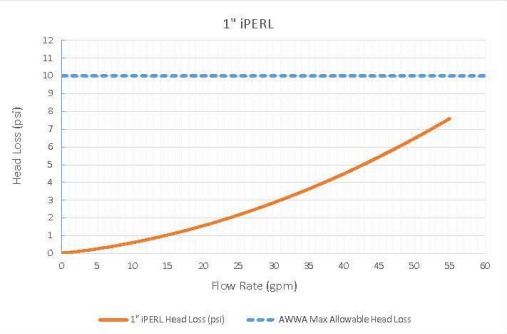
Electromagnetic Flow Measurement System

Head Loss Curves









xylem

Xylem.com | Sensus.com

SENSUS | 637 Davis Drive | Morrisville, NC 27560 | 800.638.3748

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DATA SHEET
ADS-10017-01

CommandLink® II

Wireless Interface



Seamless Communication

The CommandLink® II wireless interface provides access to a complete suite of functional controls within a gas, water or electric SmartPoint® transceiver. This Bluetooth® enabled device, coupled with a handheld, performs activations, deactivation, meter reads, on demand reads and can also readily audit the water, gas, or electric SmartPoint module.

CommandLink II provides instant access to any SmartPoint module's programmed and stored information. You can retrieve setup information, validate readings, and verify or reprogram settings for optimal performance.

The CommandLink II is a compact tool that is compatible with Sensus approved WIN mobile, WIN 10, Android and iOS programming devices.

FEATURES

- Compact size
- Rechargeable batteries included
- Bluetooth enabled
- Built-in antenna

BENEFITS

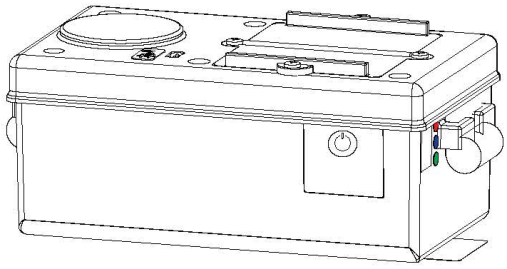
- Interacts with SmartPoint water, gas, and electric modules
- Performs on-demand interrogation
- Retrieves and reprograms settings

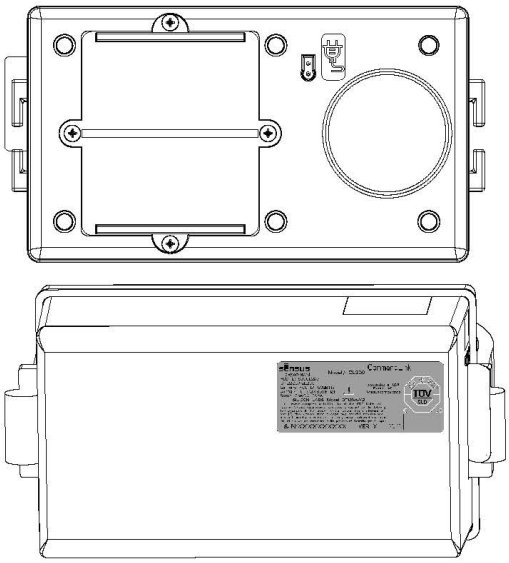
sensus
a xylem brand

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CommandLink® II

Wireless Interface





Specifications

Case	High-impact, injection-molded plastic
Dimensions	4.7" L x 2.37" H x 2.41" W
Weight	16 oz.
Operating Temp.	32°F to 122°F
Shock Temp.	-20°F to 103°F
Charging Temp.	-32°F to 104°F
Relative Humidity	65 +/- 20%y
Dust	Meets procedures IP5X (MIL-STD 810F), Method 510.4
Warranty	One year
Compliance	Complies with FCC Part 15, 24, and 101. Complies with Industry Canada ICES-003.
Safety Certification	CAN/CSA C22.2 No. 62368-1:2014 UL 62368-1:2014 EN 62368-1:2014/A11:2017

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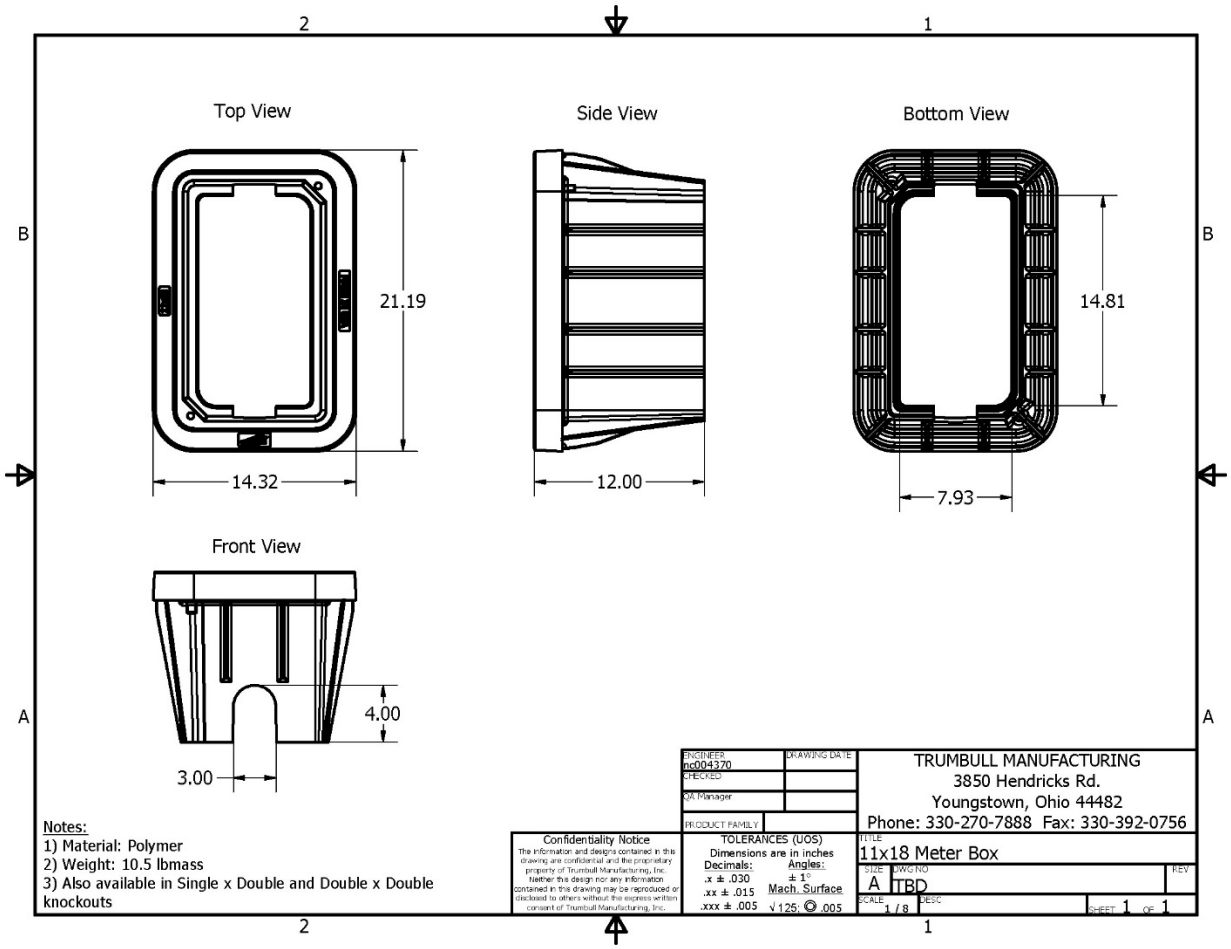
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Sensus Field Logic communicator

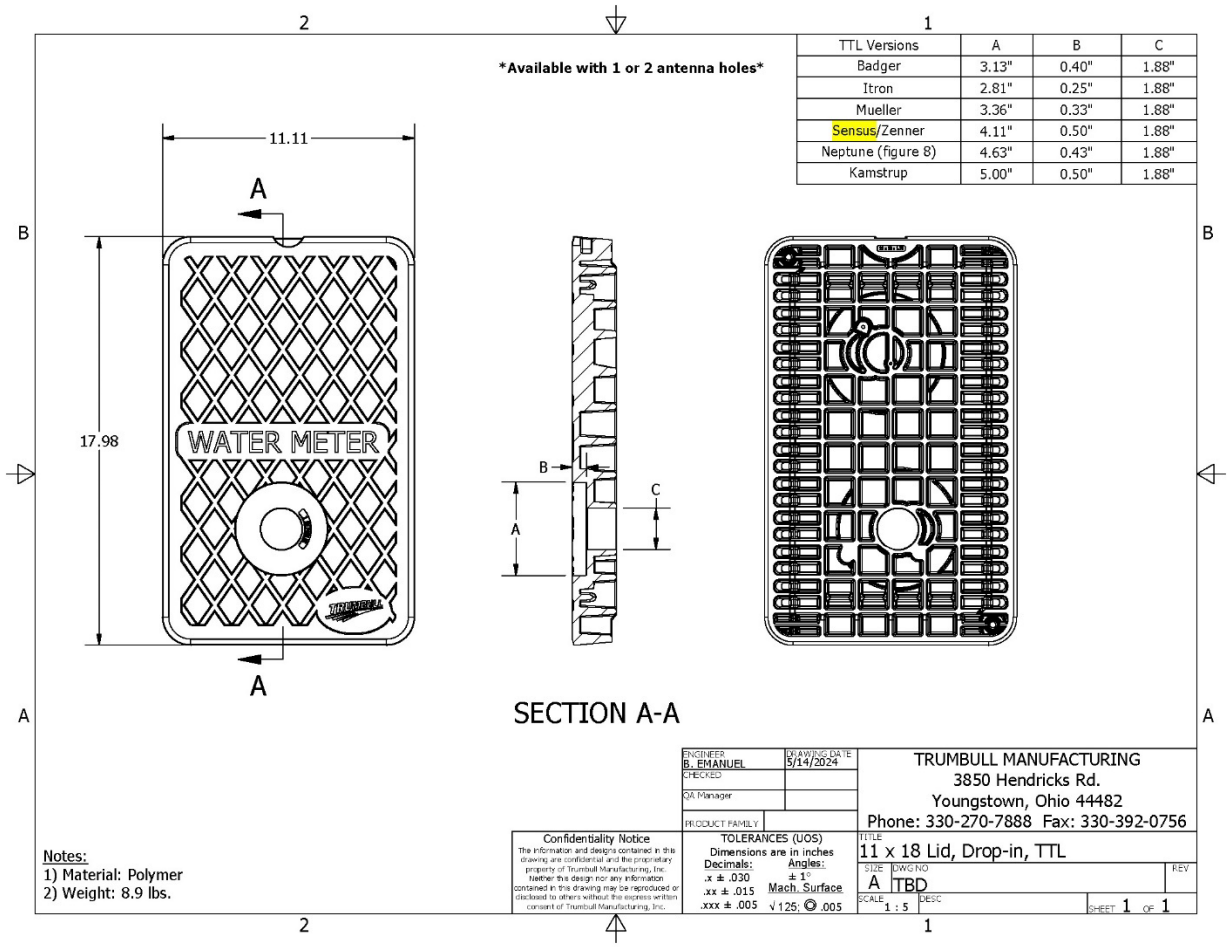
This product does not have a Data Sheet currently available.

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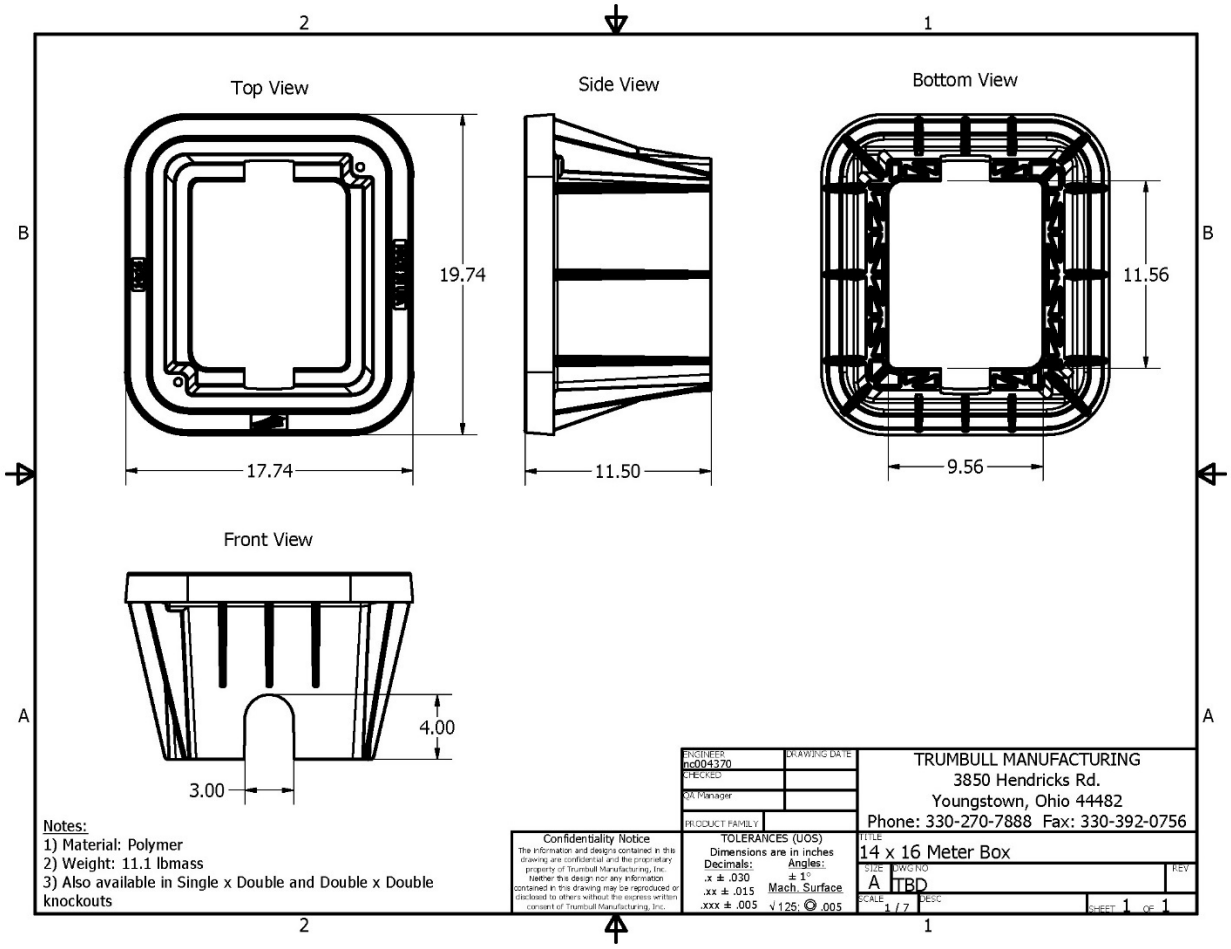
Trumbull Meter Box/Lids



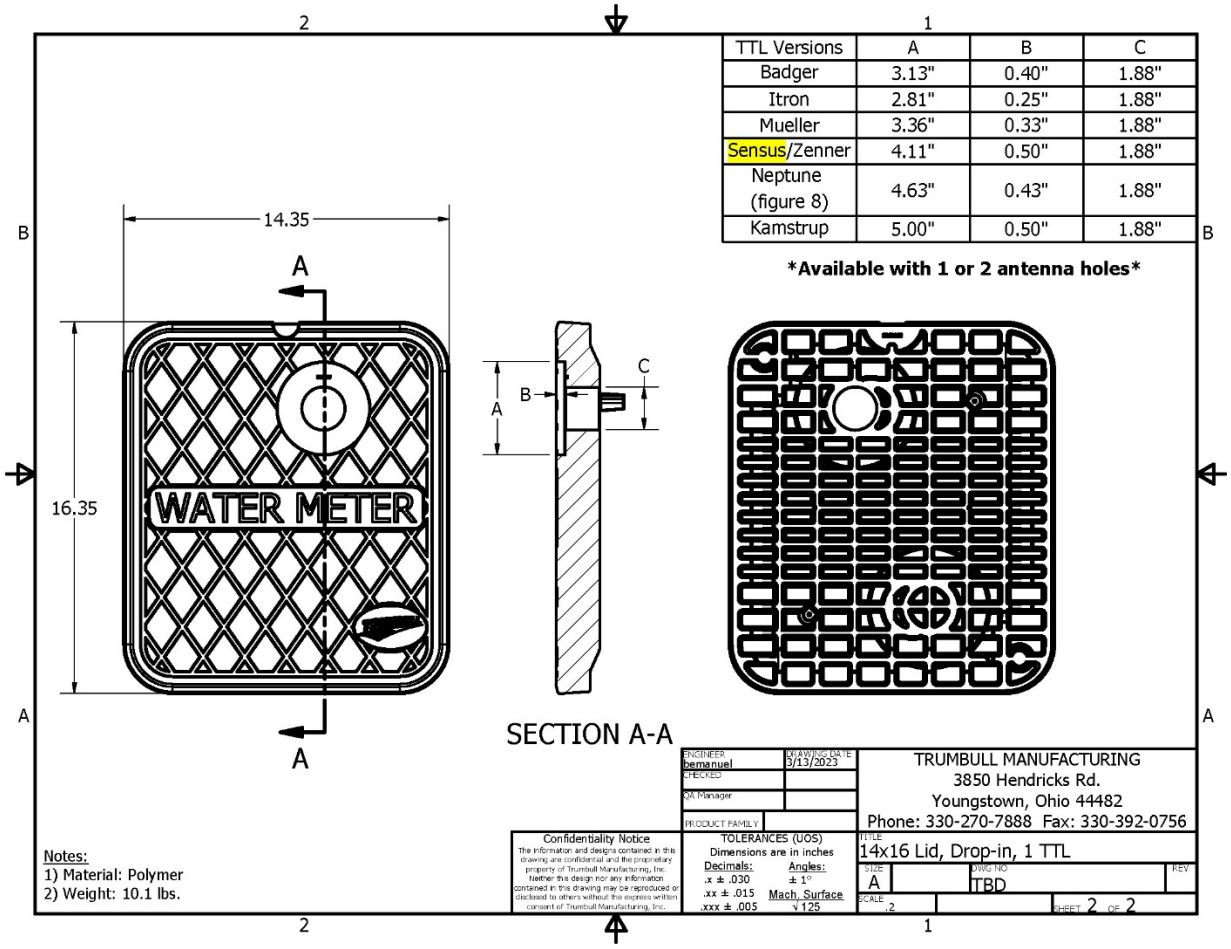
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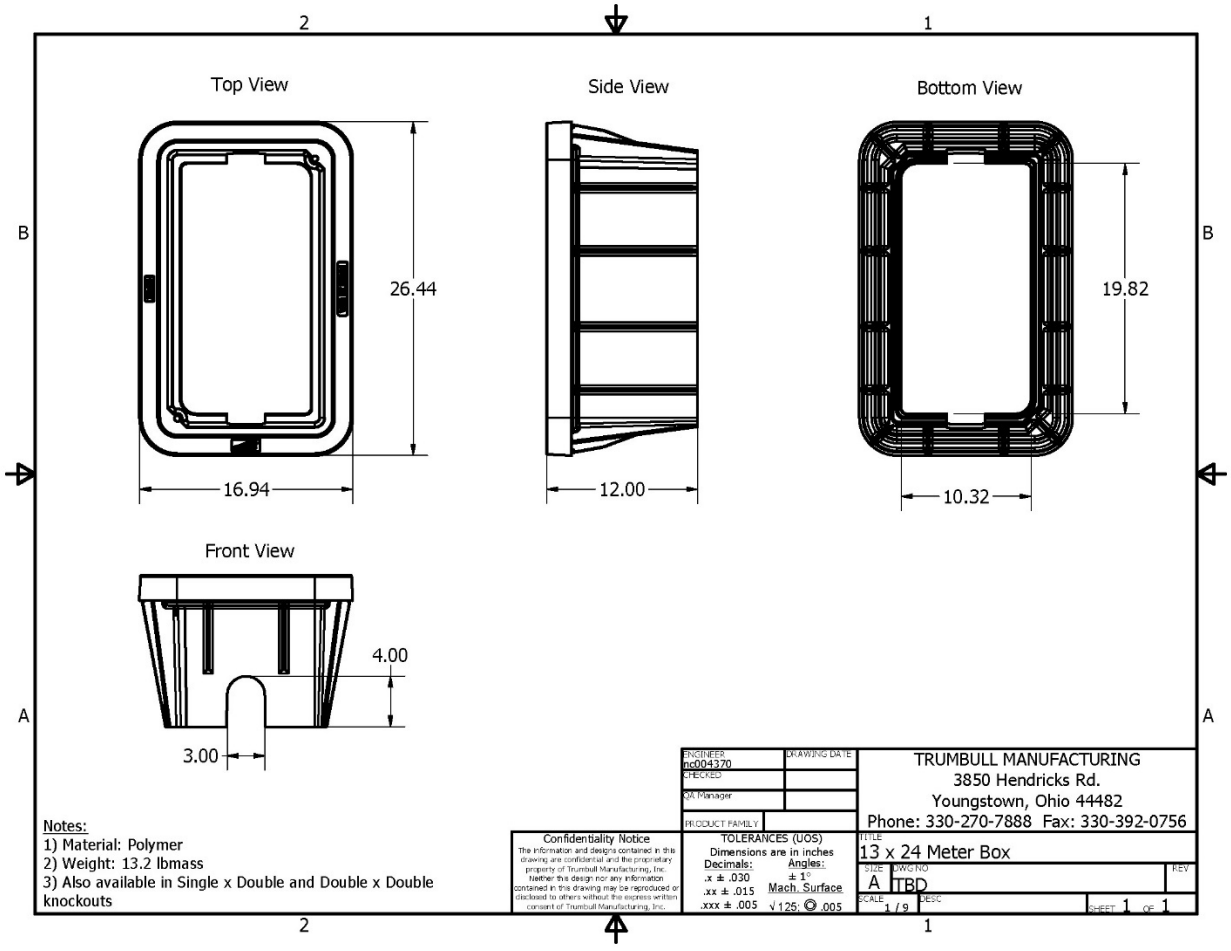


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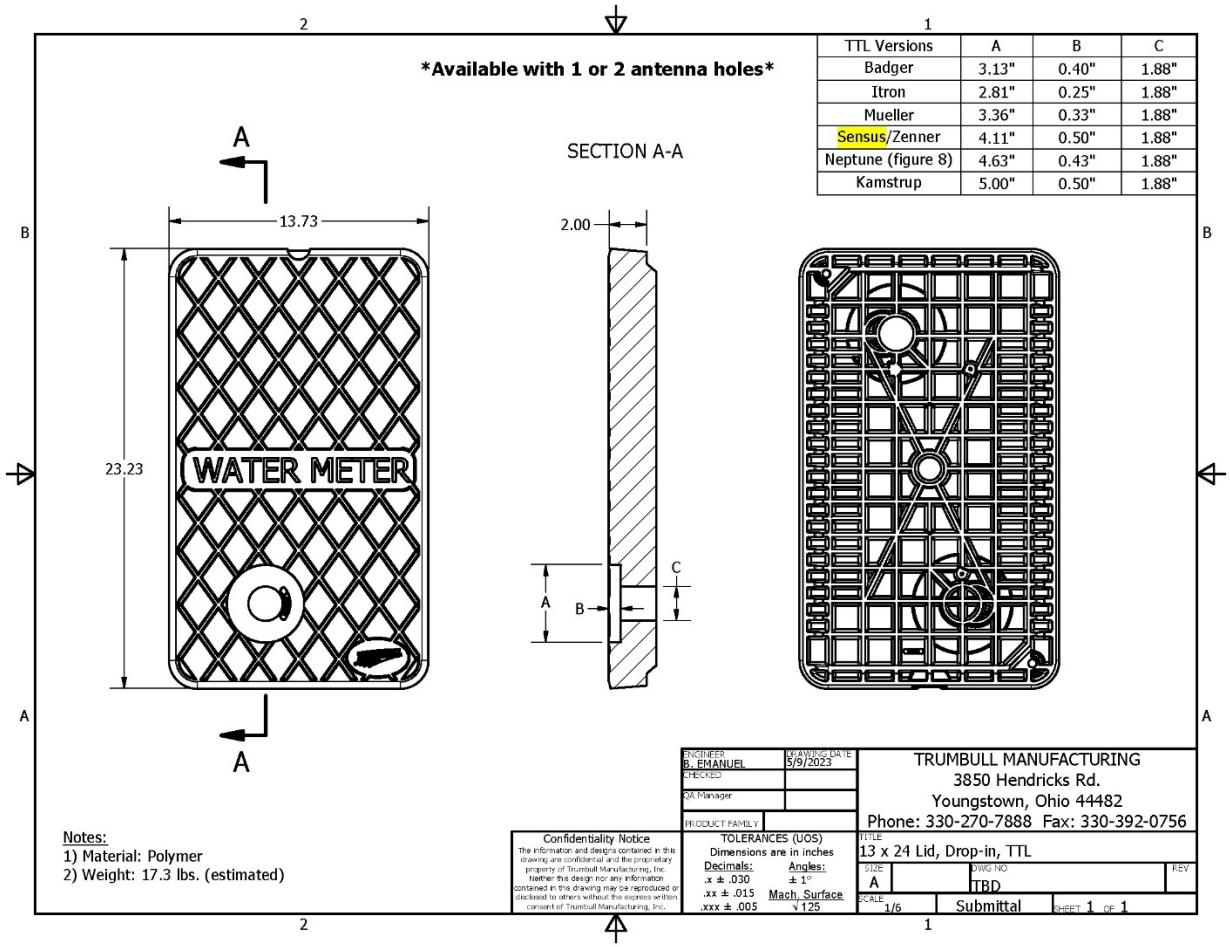


TTL Versions	A	B	C
Badger	3.13"	0.40"	1.88"
Itron	2.81"	0.25"	1.88"
Mueller	3.36"	0.33"	1.88"
Sensus/Zenner	4.11"	0.50"	1.88"
Neptune (figure 8)	4.63"	0.43"	1.88"
Kamstrup	5.00"	0.50"	1.88"

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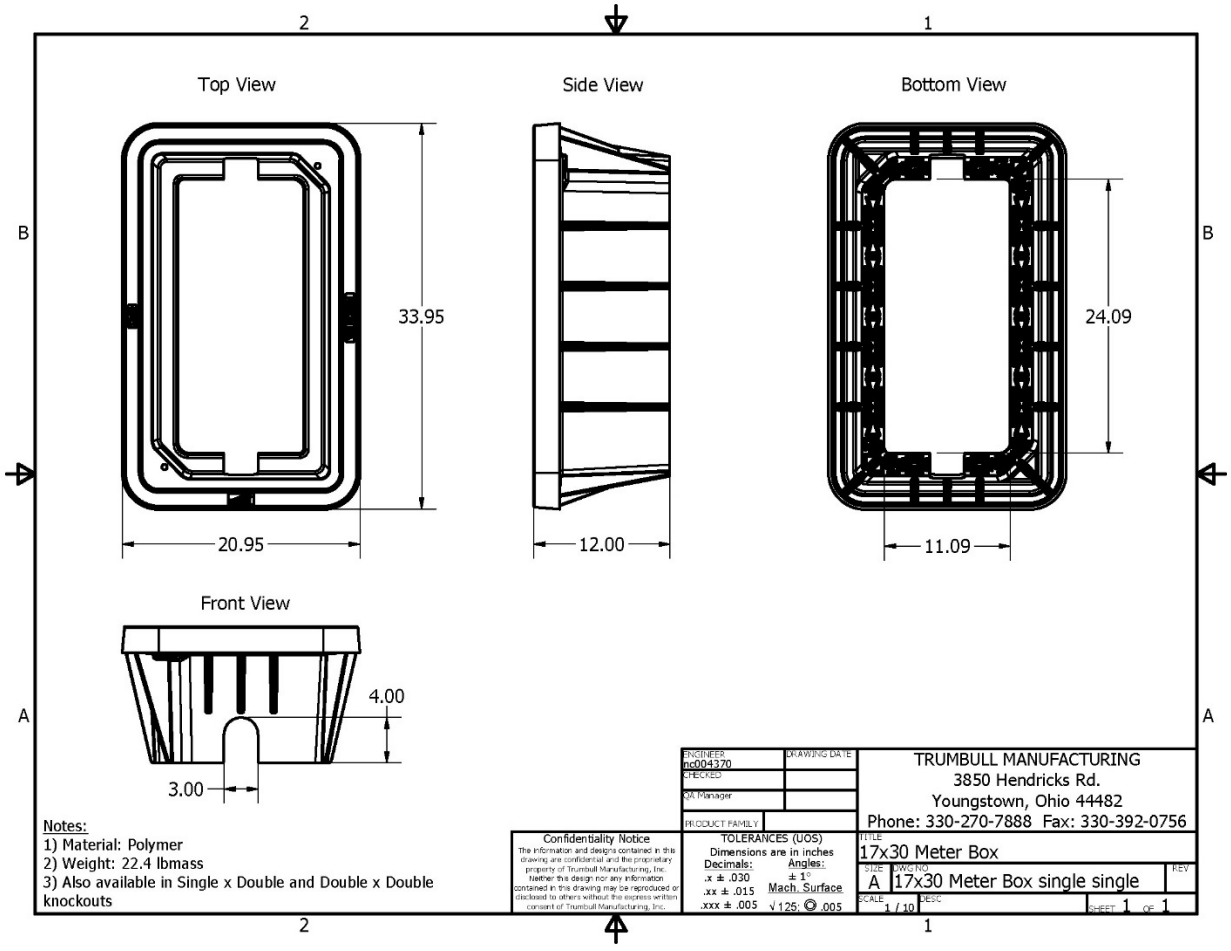


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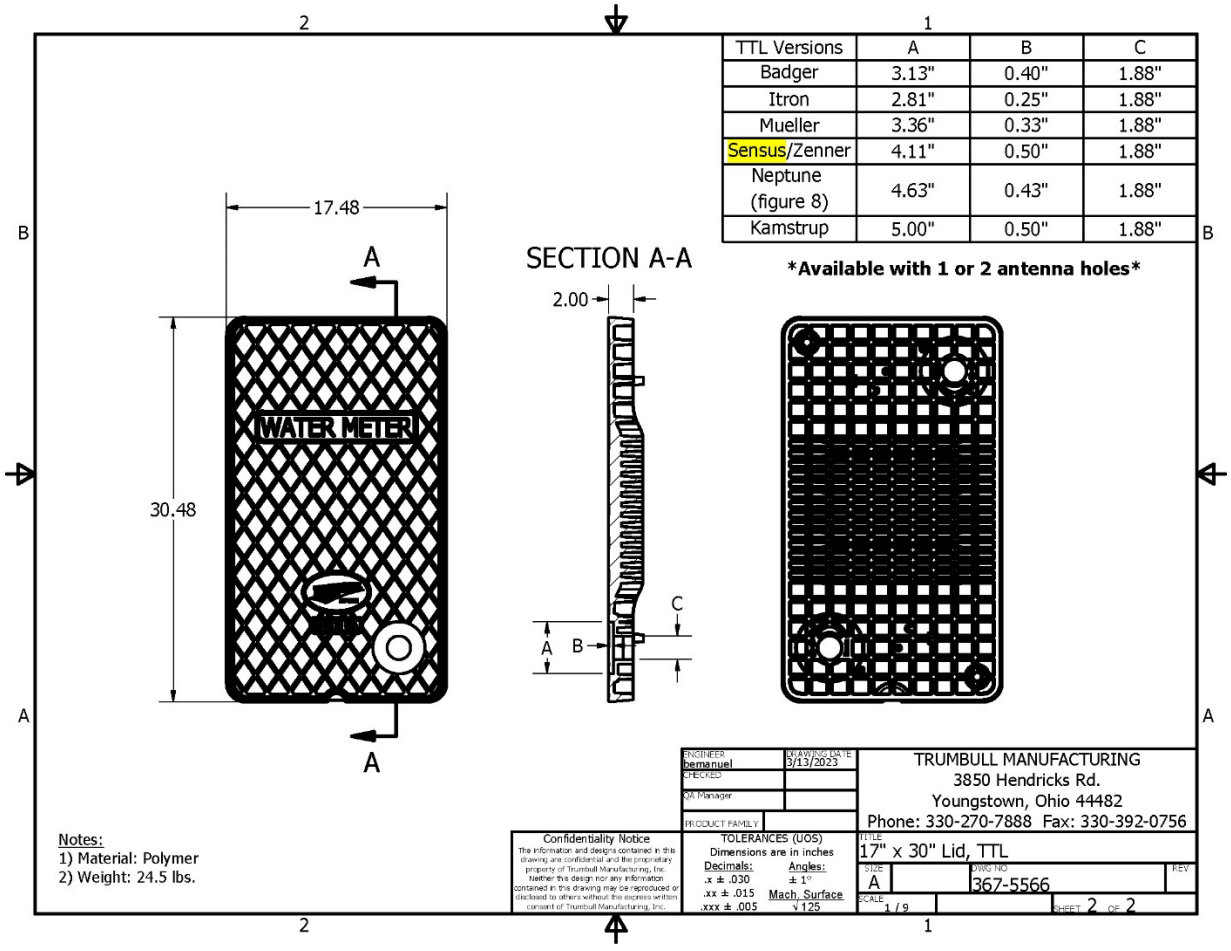


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Wilkins BF-700XL Backflow

ZURN Model 700XL
Dual Check Valve

Application
Ideal for use where Lead-Free* valves are required. Designed for installation on potable water lines to protect against both backsiphonage and backpressure of polluted water into the potable water supply. The Model 700XL shall provide protection where a potential health hazard does not exist.



Standards Compliance
- ASSE® Listed 1024
- CSA® Certified
- Meets the requirements of NSF/ANSI/CAN 61*

*(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

LEAD FREE

NSF/ANSI/CAN 61

Materials

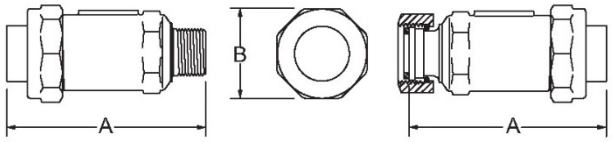
Main valve body	Low Lead Cast Bronze ASTM B 584
Elastomers	Buna Nitrile (FDA approved)
Polymers	Noryl ® (1/4"-1/2")
	Delrin ® (3/4"-1")
Springs	Stainless Steel, 300 Series

Features
Sizes: 1/4", 3/8", 1/2", 3/4", 1", 1-1/4"
Max. pressure: 175 PSI
Max. temp: 180°F
Connections:

Threaded	ANSI B 1.20.1
Copper sweat	ANSI B 16.22
Meter thread	ANSI B 1.20.7

Options
(Suffixes can be combined)
- ☑ - with female NPT connection (standard)
- ☐ C - with female copper sweat connection
- ☑ FMTC - with female meter thread connection
- ☐ M - with male NPT connection
- ☐ MMTC - with male meter thread connection
- ☐ CH - with chrome finish (1/4", 3/8" & 1/2" sizes)

Accessories
- ☐ Repair kit (RK14-700 and RK34-700)
- ☐ Thermal expansion tank (Model XT)



Dimensions & Weights (do not include pkg.)

MODEL SIZE		DIMENSIONS				WEIGHT	
		A		B			
in.	mm	in.	mm	in.	mm	lbs.	kg
1/4	6	3 3/16	81	1 3/4	45	1	0.5
3/8	9	3 3/16	81	1 3/4	45	1	0.5
1/2	15	3 3/16	81	1 3/4	45	1	0.5
✓ 3/4	20	4 1/2	114	2	51	2	0.9
1	25	4 1/2	114	2	51	2	0.9
1-1/4	32	4 3/4	121	2	51	2	0.9

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1747 Commerce Way, Paso Robles, CA U.S.A. 93446 Ph. 855-663-9876, Fax 805-238-5766
In Canada | **Zurn Industries Limited**
7900 Goreway Drive, Unit 10, Brampton, Ontario L6T 5W6, 877-892-5216
www.zurn.com

Rev. D
Date: 12/19
Document No. BF-700XL
Product No. Model 700XL
Patent zurn.com/patents

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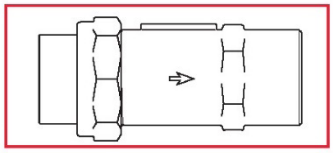
Model 700XL • Connections Legend

U = Indicates location of "union" connection
FNPT = Female National Pipe Tapered Thread
MNPT = Male National Pipe Tapered Thread
FC = Female Copper Sweat
FMTC = Female Meter Thread Connection (National Hose Straight Thread)
MMTC = Male Meter Thread Connection (National Hose Straight Thread)

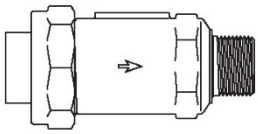
Meter Thread Connections
When ordering a Model 700XL with meter thread connections, order the connection one size larger than the water meter. For example, if your water meter is 1/2" or 5/8" your connection size would be a 3/4" meter thread. If the water meter is 5/8" x 3/4" or 3/4", your connection size would be 1" meter thread.

Configurations

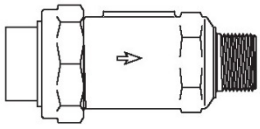
All Configurations Are Reversible



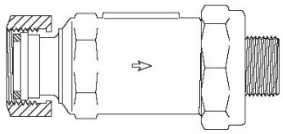
FEMALE UNION INLET X FEMALE OUTLET		
INLET (UNION)	OUTLET	PART NUMBER
3/4" FNPT	3/4" FNPT	34UFX34F-700XL
3/4" FMTC	3/4" FNPT	34UFMX34F-700XL
1" FNPT	1" FNPT	1UFX1F-700XL
1" FNPT	3/4" FNPT	1UFX34F-700XL
1" FMTC	1" FNPT	1UFMX1F-700XL
1" FMTC	3/4" FNPT	1UFMX34F-700XL



FEMALE UNION INLET X MALE OUTLET		
INLET (UNION)	OUTLET	PART NUMBER
3/4" FNPT	3/4" MNPT	34UFX34M-700XL
3/4" FNPT	3/4" MMTC	34UFX34MM-700XL
3/4" FMTC	3/4" MNPT	34UFMX34M-700XL
3/4" FMTC	3/4" MMTC	34UFMX34MM-700XL
3/4" FNPT	1" MMTC	34UFX1MM-700XL
3/4" FMTC	1" MNPT	34UFMX1M-700XL
1" FNPT	1" MNPT	1UFX1M-700XL
1" FNPT	1" MMTC	1UFX1MM-700XL
1" FMTC	1" MNPT	1UFMX1M-700XL
1" FMTC	1" MMTC	1UFMX1MM-700XL
1" FNPT	3/4" MNPT	1UFX34M-700XL
1" FNPT	3/4" MMTC	1UFX34MM-700XL
1" FMTC	3/4" MNPT	1UFMX34M-700XL
1" FMTC	3/4" MMTC	1UFMX34MM-700XL



FEMALE UNION "COPPER SWEAT" INLET X MALE		
INLET (UNION)	OUTLET	PART NUMBER
3/4" FC	3/4" MNPT	34UFCX34M-700XL
3/4" FC	1" MNPT	34UFCX1M-700XL
1" FC	1" MNPT	1UFCX1M-700XL



FEMALE "METER" UNION INLET X MALE UNION		
INLET (UNION)	OUTLET (UNION)	PART NUMBER
1" FMTC	1" MNPT	1UFMX1UM-700XL
1-1/4" FMTC	1" FNPT	114UFMX1UF-700XL

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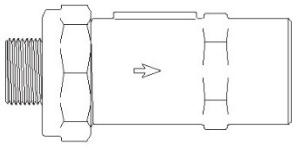
Model 700XL • How to Order

The Model 700XL is available in a variety of inlet and outlet sizes, thread types and connection types. Simply determine the inlet and outlet connection as well as the location of the union, then, select from the available configurations. The inlet connection will always be specified first in the model number. A union inlet connection with integral body outlet connection is standard. For connections other than shown below, such as BSP threads, contact your local WILKINS representative or factory.

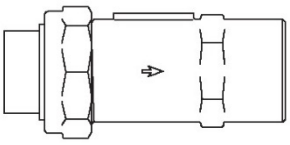
Example: A dual check valve is to be located on the outlet side of a 3/4" water meter with male inlet and outlet connections (see "Meter Thread Connections" on previous page). The union will be located on the inlet side of the valve. The outlet requires a 1" female NPT connection.

Inlet	Outlet	Model No.
1UFM	1F	**1UFMX1F-700XL**

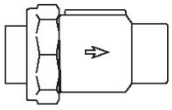
Configurations (cont.)



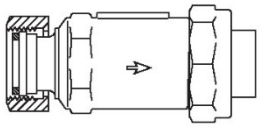
MALE UNION INLET X FEMALE OUTLET		
INLET (UNION)	OUTLET	PART NUMBER
1" MNPT	1" FNPT	1UMX1F-700XL



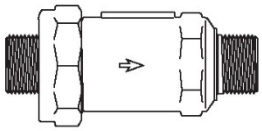
FEMALE UNION "COPPER SWEAT" INLET X FEMALE		
INLET (UNION)	OUTLET	PART NUMBER
3/4" FC	3/4" FNPT	34UFCX34F-700XL
3/4" FC	1" FNPT	34UFCX1F-700XL
1" FC	1" FNPT	1UFCX1F-700XL
1" FC	3/4" FNPT	1UFCX34F-700XL



FEMALE UNION INLET X FEMALE OUTLET		
INLET (UNION)	OUTLET	PART NUMBER
1/4" FNPT	1/4" FNPT	14UFX14F-700XL
3/8" FNPT	3/8" FNPT	38UFX38F-700XL
1/2" FNPT	1/2" FNPT	12UFX12F-700XL
1/2" FC	1/2" FC	12UFCX12FC-700XL



FEMALE "METER UNION INLET X FEMALE UNION		
INLET (UNION)	OUTLET (UNION)	PART NUMBER
1" FMTC	3/4" FNPT	1UFMX34UF-700XL
1" FMTC	1" FNPT	1UFMX1UF-700XL
1" FMTC	1" FMTC	1UFMX1UFM-700XL
1-1/4" FMTC	1" FNPT	114UFMX1UF-700XL



MALE UNION INLET X MALE OUTLET		
INLET (UNION)	OUTLET	PART NUMBER
1" MNPT	1" MNPT	1UMX1M-700XL

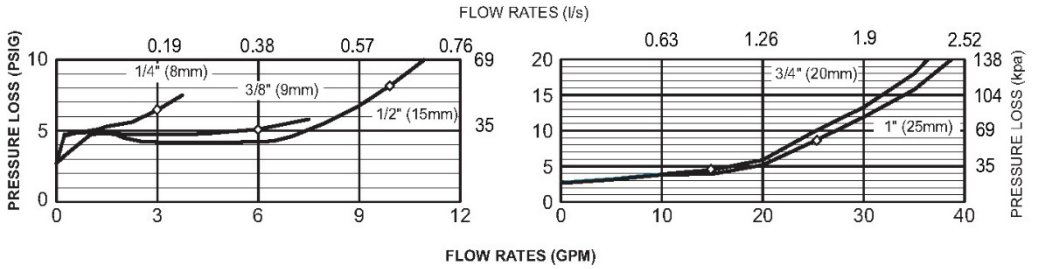
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Flow Characteristics

◇ Rated Flow (established by approval agencies)

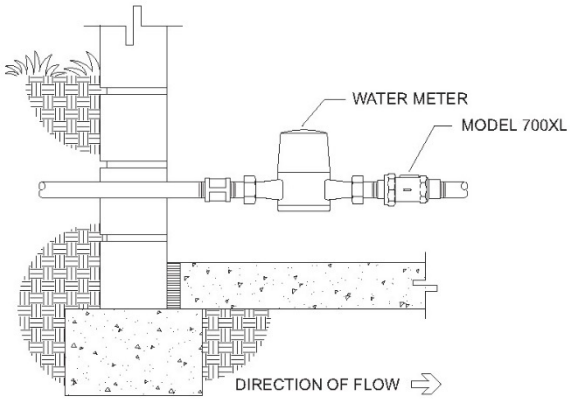
MODEL 700XL 1/4", 3/8", 1/2", 3/4" & 1" (STANDARD & METRIC)



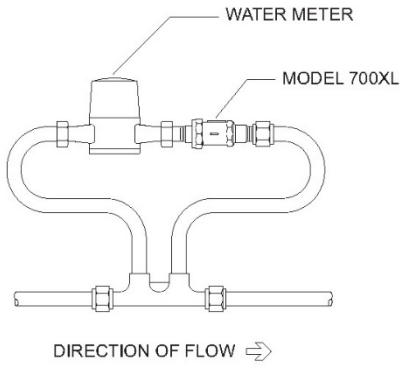
Typical Installation

Local codes shall govern installation requirements. Unless otherwise specified, the installation shall be in accordance with the manufacturer's instructions and the latest edition of the Uniform Plumbing Code. The installation shall be made so that no part of the unit can be submerged.

Capacity thru Schedule 40 Pipe				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
1/8"	1	1	2	3
1/4"	2	2	3	5
3/8"	3	4	6	9
1/2"	5	7	9	14
3/4"	8	12	17	25
1"	13	20	27	40
1 1/4"	23	35	47	70
1 1/2"	32	48	63	95
2"	52	78	105	167



INDOOR INSTALLATION



METER SETTER INSTALLATION

Specifications

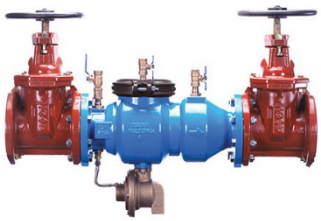
The Dual Check Valve Backflow Preventer shall be certified to NSF/ANSI/CAN 61, and ASSE® Listed 1024. The main body shall be low lead cast bronze (ASTM B 584), the check assemblies shall be NORYL ® (1/4"-1/2") or DELRIN® (3/4"-1"). The seal ring and o-rings shall be Buna Nitrile. The Dual Check Valve shall be a ZURN WILKINS Model 700XL.

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Model 375
Reduced Pressure Principle Assembly

Application
Designed for installation on potable water lines to protect against both backsiphonage and backpressure of contaminated water into the potable water supply. The Model 375 provides protection where a potential health hazard exists. Ideal for use where lead-free* valves are required.



LEAD FREE

NSF/ANSI/CAN 61

Standards Compliance
(Unless Otherwise Noted, Sizes 2 1/2" Thru 10")
- ASSE® Listed 1013
- cUPC® Listed
- CSA® Certified B64.4 (2 1/2" thru 8")
- AWWA Compliant C511, and C550
- FM® Approved
- UL® Classified
- C-UL® Classified
- NYC MEA 49-01-M Vol 2
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California.
- Meets the requirements of NSF/ANSI/CAN 61*

*(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

Materials

Main valve body	Ductile Iron ASTM A 536
Access covers	Ductile Iron ASTM A 536
Coatings	NSF Approved fusion epoxy finish
Internals	Stainless steel, 300 Series NORYL™
Fasteners	Stainless Steel, 300 Series
Seal rings	EPDM (FDA approved)
O-rings	Buna Nitrile (FDA approved)
Springs	Stainless Steel, 300 Series
Sensing line	Stainless Steel, braided hose

Features

Sizes: 2 1/2", 3", 4", 6", 8", 10"	
Maximum working water pressure	175 PSI
Maximum working water temperature	140°F
Hydrostatic test pressure	350 PSI
End connections (Grooved for steel pipe)	AWWA C606
(Flanged)	ANSI B16.42 Class 150

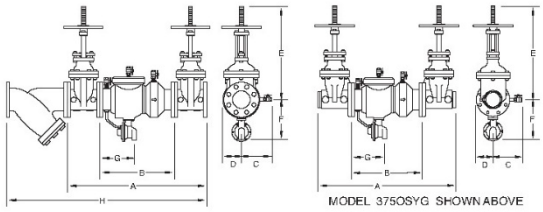
Attention:
Model 375 (flange body) and Model 375A (grooved body) have different lay lengths.

Options (Suffixes can be combined)
- ☐ - with NRS shut-off valves (standard)
- ☐ FSC - with epoxy coated wye type strainer (flanged only)
- ☐ G - with grooved end NRS gate valves
- ☐ GF - with grooved inlet connection and flanged outlet connection
- ☐ FG - with flanged inlet connection and grooved outlet connection
- ☐ L - less shut-off valves (flanged body connections)
- ☐ OSY - with OS&Y gate valves
- ☐ PI - with Post Indicator gate valve
- ☐ BG - with grooved end butterfly valves with integral supervisory switches

*New Connected Products. Search ZCSM-PF on Zurn.com for details.

Accessories
- ☐ Connected Pressure Monitor (Model ZCSM-PF)*
- ☐ Connected Flow Meter Option (Model ZCSM-BTM must be ordered with Model ZCSM-PF)*
- ☐ OS & Y Gate valve tamper switch (OSY-40
- ☐ Air gap (Model AG)
- ☐ QT-SET Quick Test Fitting Set
- ☐ Repair kit (rubber only)
- ☐ Thermal expansion tank (Model XT)
- ☐ Wireless Monitor Retrofit Kit for conversion of existing model 375 (212-6-RFK-375W1, 8-10-RFK-375W1)

Relief Valve discharge port:
2 1/2" - 6" - 2.75 sq. in.
8" - 10" - 3.69 sq. in.



MODEL 375OSYG SHOWN ABOVE

Dimensions & Weights (do not include pkg.)

MODEL 375 SIZE	DIMENSION (approximate)																						WEIGHT											
	A		A WITH BUTTERFLY VALVES		B LESS GATE VALVES		C		D		E OS&Y OPEN		E OS&Y CLOSED		E NRS GATE		E WITH BUTTERFLY VALVES		F		G		H		LESS SHUT-OFF VALVES		NRS GATE VALVES FLANGED		NRS GATE VALVES GROOVED		OS&Y GATE VALVES FLANGED		OS&Y GATE VALVES GROOVED		BUTTERFLY VALVES GROOVED	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
2 1/2	65	31	787	28	711	16 7/8	403	7 1/4	184	3 3/4	96	17 3/4	451	15 3/8	391	11 1/2	292	8 1/4	210	9 1/2	241	8 3/8	213	41 1/4	1048	60	27	162	73	144	65	170	77	152	69	132	60
3	80	32	813	28 1/2	724	16 7/8	403	7 1/4	184	3 3/4	96	20 1/4	514	17	432	12 3/4	324	8 1/2	216	9 1/2	241	8 3/8	213	42 3/4	1086	60	27	184	83	154	70	190	86	142	64	112	51
4	100	37 5/8	956	32 8/9	835	19 1/2	495	8	203	4 1/2	114	22 1/2	572	18 1/4	464	14 1/2	368	9	229	11	279	9 1/4	235	52 3/4	1340	98	44	278	126	260	118	288	131	274	124	182	83
6	150	44 5/8	1133	37 5/8	956	23 1/2	597	10	254	6	152	30 1/2	775	24 1/4	616	18	457	10 1/4	260	12 3/8	314	10 3/4	273	62 3/4	1594	175	79	459	208	431	196	475	215	449	204	293	133
8	200	60 7/8	1546	53 7/8	1369	37 3/4	959	11	279	10	254	37	940	28 1/2	724	21 1/8	537	12	305	15 3/8	391	16 3/4	425	85	2159	377	171	829	376	796	361	853	387	805	365	551	250
10	250	63 7/8	1622	57 7/8	1470	37 3/4	959	11	279	10	254	45 5/8	1159	34 3/4	883	24 3/4	629	13	330	15 3/8	391	16 3/4	425	93 1/4	2369	407	185	1167	529	1101	499	1225	556	1169	526	795	361

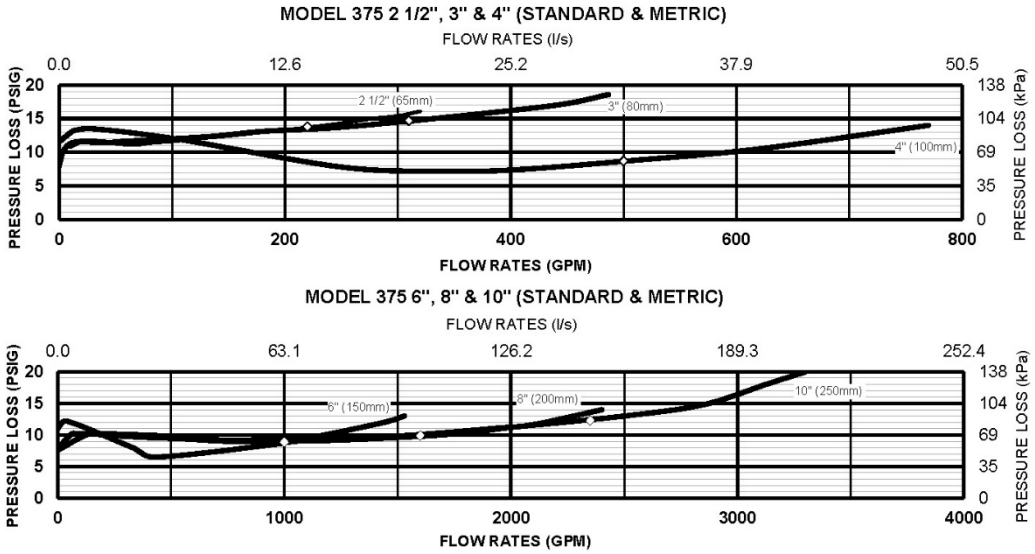
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Rev. M
Date: 12/22
Document No. BF-375
Product No. Model 375
Patent zurn.com/patents

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Flow Characteristics

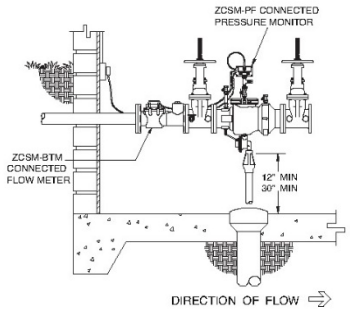
◇ Rated Flow (established by approval agencies)



Typical Installation

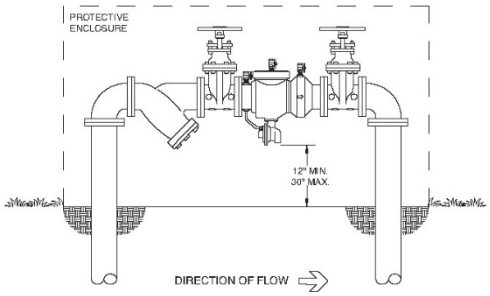
Local codes shall govern installation requirements. Unless otherwise specified, the assembly shall be mounted at a minimum of 12" (305mm) and a maximum of 30" (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.

Capacity thru Schedule 40 Pipe (GPM)				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
2 1/2"	**75**	**112**	**149**	**224**
3"	115	173	230	346
4"	198	298	397	595
6"	450	675	900	1351
8"	780	1169	1559	2339
10"	1229	1843	2458	3687
12"	1763	2644	3525	5288



INDOOR INSTALLATION

(375OSY with ZCSM-PF Connected Pressure Monitor and ZCSM-BTM Connected Flow Meter accessories)



OUTDOOR INSTALLATION

Specifications

The Reduced Pressure Principle Backflow Prevention Assembly shall be certified to NSF/ANSI/CAN 61, ASSE® Listed 1013, and supplied with full port gate valves. The main body and access cover shall be epoxy coated ductile iron (ASTM A 536), the seat ring and check valve shall be NORYL™, the stem shall be stainless steel (ASTM A 276) and the seat disc elastomers shall be EPDM. The checks and the relief valve shall be accessible for maintenance without removing the device from the line. The Reduced Pressure Principle Backflow Prevention Assembly shall be a ZURN WILKINS Model 375.

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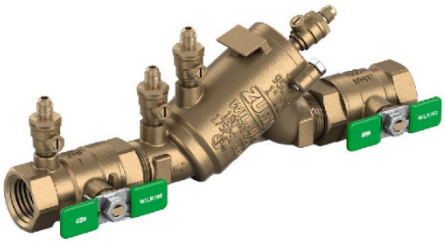
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Model 950XL3
Double Check Valve Assembly

Application
Ideal for use where Lead-Free* valves are required. Designed for installation on potable water lines to protect against both backsiphonage and backpressure of polluted water into the potable water supply. Assembly shall provide protection where a potential non-health hazard exists.

Standards Compliance (Horizontal and Vertical)
- ASSE® Listed 1015, Horizontal and Vertical Up
- cUPC® Listed
- CSA® Certified B64.5, Horizontal and Vertical Up
- AWWA Compliant C510
- UL® Classified (less shut-off valves)
- C-UL® Classified
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California
- Meets the requirements of NSF/ANSI/CAN 61 and 372*

*(Less than 0.25% Weighted Average Lead Content)



LEAD FREE NSF/ANSI/CAN 61

Materials

Main valve body	Low Lead Cast Bronze ASTM B 584
Access cover	Low Lead Cast Bronze ASTM B 584
Fasteners	Stainless Steel, 300 Series
Elastomers	Silicone (FDA Approved) Buna Nitrile (FDA Approved)
Polymers	Noryl™
Springs	Stainless Steel, 300 Series
Ball valve handles	Stainless Steel

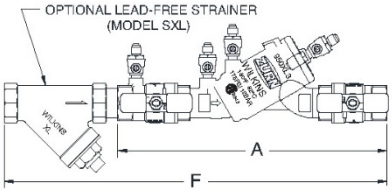
Features
Sizes: 3/4", 1", 1 1/4", 1 1/2", 2"

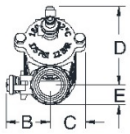
Minimum working water pressure	20 PSI
Maximum working water pressure	175 PSI
Minimum working water temperature	33°F
Maximum working water temperature	180°F
Hydrostatic test pressure	350 PSI
Threaded end connections (FNPT)	ANSI B1.20.1

Options
(Suffixes can be combined)
- ☐ - with full port QT ball valves (standard, 3/4" -2"), and with integral male 45° flare SAE test fitting (standard, 3/4" - 1")
- ☐ FT - with integral male 45° flare SAE test fitting (1 1/4" - 2", contact factory for approvals)
- ☐ S - with Model SXL lead-free bronze wye type strainer
- ☐ U - with union ball valves (3/4" - 2")

Accessories
- ☐ Repair kits (see repair kit guide for full list)
- ☐ Thermal expansion tank (Model XT)
- ☐ QT-SET Quick Test Fitting Set (1 1/4" - 2")

Repair Kit Part Numbers
RK34-950XL3
RK1-950XL3
RK114-950XL3 (1 1/4" & 1 1/2")
RK2-950XL3





Dimensions & Weights (do not include pkg.)

MODEL SIZE		DIMENSIONS (approximate)												WEIGHT	
		A		B		C		D		E		F		WITH BALL VALVES	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kg
3/4	20	9 15/32	241	1 9/16	42	1 5/16	34	3 3/16	82	11/16	18	14 3/16	358	3.4	1.5
1	25	11 3/4	299	1 15/16	49	1 1/2	39	3 7/16	87	7/8	22	17 9/16	446	5.2	2.4
1 1/4	32	15 1/4	387	2 1/2	64	1 5/8	42	4 1/4	109	1 3/16	29	20 3/8	518	10.2	4.6
1 1/2	40	15 15/16	405	3 1/16	79	1 5/8	41	4 5/16	110	1 1/4	33	21 9/16	548	11.9	5.4
2	50	17 11/16	449	3 1/2	89	1 15/16	49	5 1/16	128	1 5/8	41	24 5/8	626	18.0	8.2

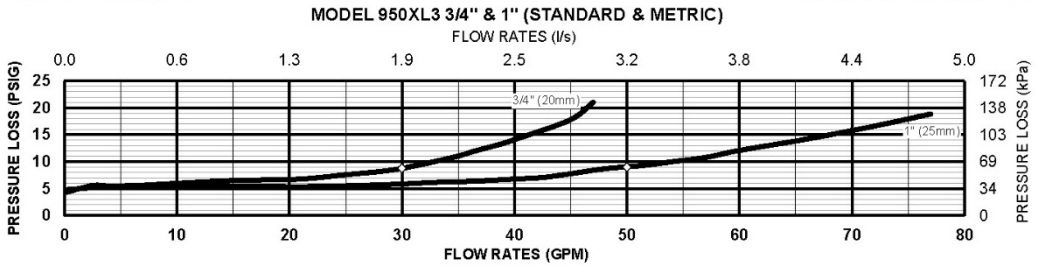
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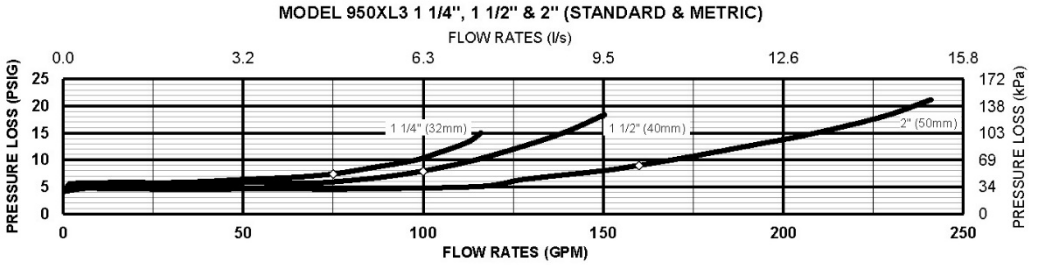
Rev. G
Date: 4/24
Document No. BF-950XL3
Product No. Model 950XL3
Patent zurn.com/patents

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Flow Characteristics

◇ Rated Flow (established by approval agencies)

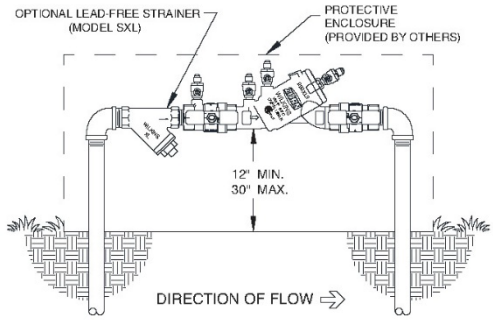




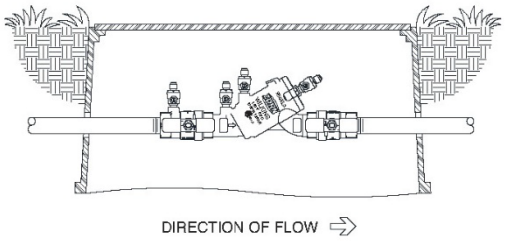
Typical Installation

Local codes shall govern installation requirements. To be installed in accordance with the manufacturer's instructions and the latest edition of the Uniform Plumbing Code. Unless otherwise specified, the assembly shall be mounted at a minimum of 12" (305mm) and a maximum of 30" (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.

Capacity thru Schedule 40 Pipe				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
1/8"	1	1	2	3
1/4"	2	2	3	5
3/8"	3	4	6	9
1/2	5	7	9	14
3/4"	8	12	17	25
1"	13	20	27	40
1 1/4"	23	35	47	70
1 1/2"	32	48	63	95
2"	52	78	105	167



OUTDOOR INSTALLATION



PIT INSTALLATION

Specifications

The Double Check Type Backflow Preventer shall be certified to NSF/ANSI/CAN 61, shall be ASSE Listed 1015, rated to 180°F, and supplied with full port ball valves. The main body and access cover shall be low lead bronze (ASTM B 584), the seat ring and all internal polymers shall be Noryl™ and the seat disc elastomers shall be silicone. The first and second check shall be located at an angle and accessible for maintenance from the top of the device, without removing the device from the line. The checks shall share a single access cover and test cocks shall be accessible from the top of the device. The Double Check Type Backflow Preventer shall be a ZURN WILKINS Model 950XL3.

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ATTACHMENT B: SENSUS PROPAGATION STUDY AND NETWORK DESIGN

PROPAGATION STUDY #1 – 2 BASE STATION LOCATIONS

Design Summary

SENSUS
a xylem brand

Design Summary

- Network Coverage
  - Total Endpoints Evaluated = 5,244
    - Electric Endpoints Evaluated = 2,612
    - Water Endpoints Evaluated = 2,632
  - Total Endpoints Covered = 5,244 or 100%
  - Endpoints Covered by (≥2 Base Stations) = 100%
  - Average Endpoints Covered per Base Station = 2,622

SENSUS CONFIDENTIAL / UTILITY CONFIDENTIAL 3

SENSUS
a xylem brand

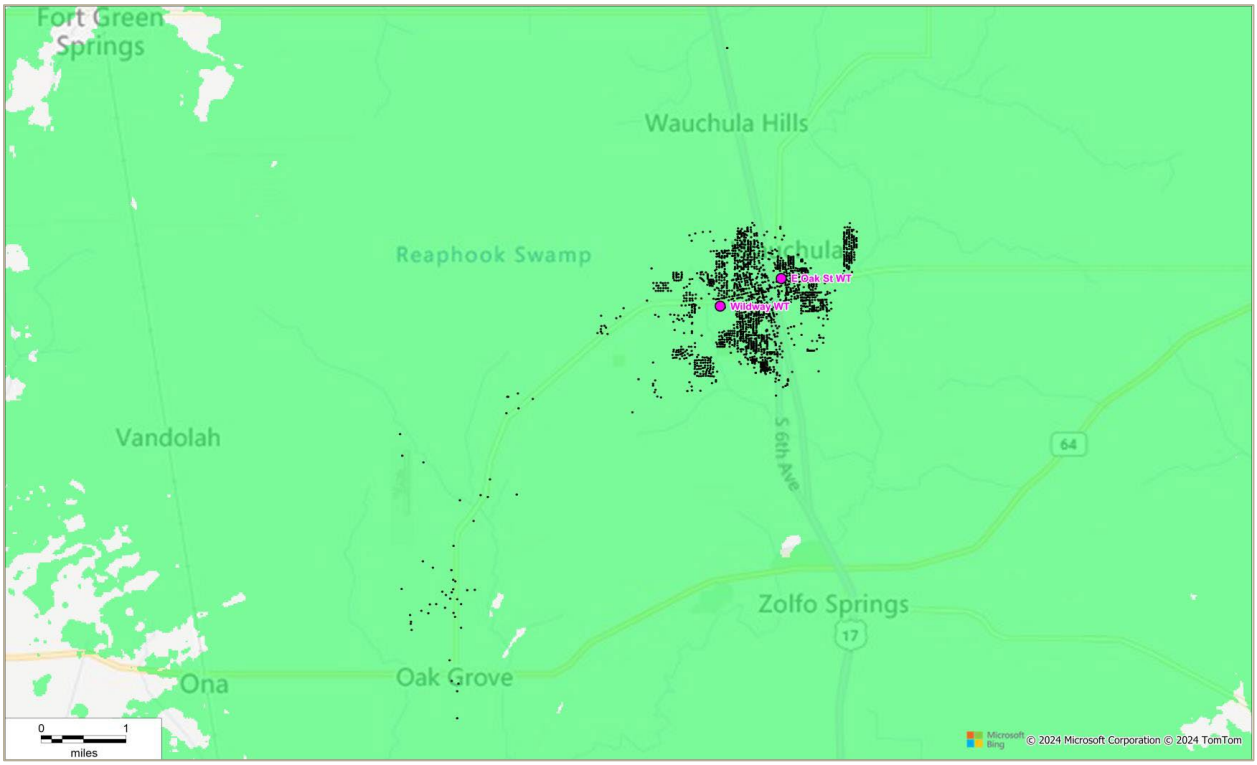
Design Summary (cont.)

- Sites and Equipment
  - Total Proposed Site Locations = 2
  - Base Stations Required = 2
- Site Details
  - Customer owned site locations proposed = 2 or 100%

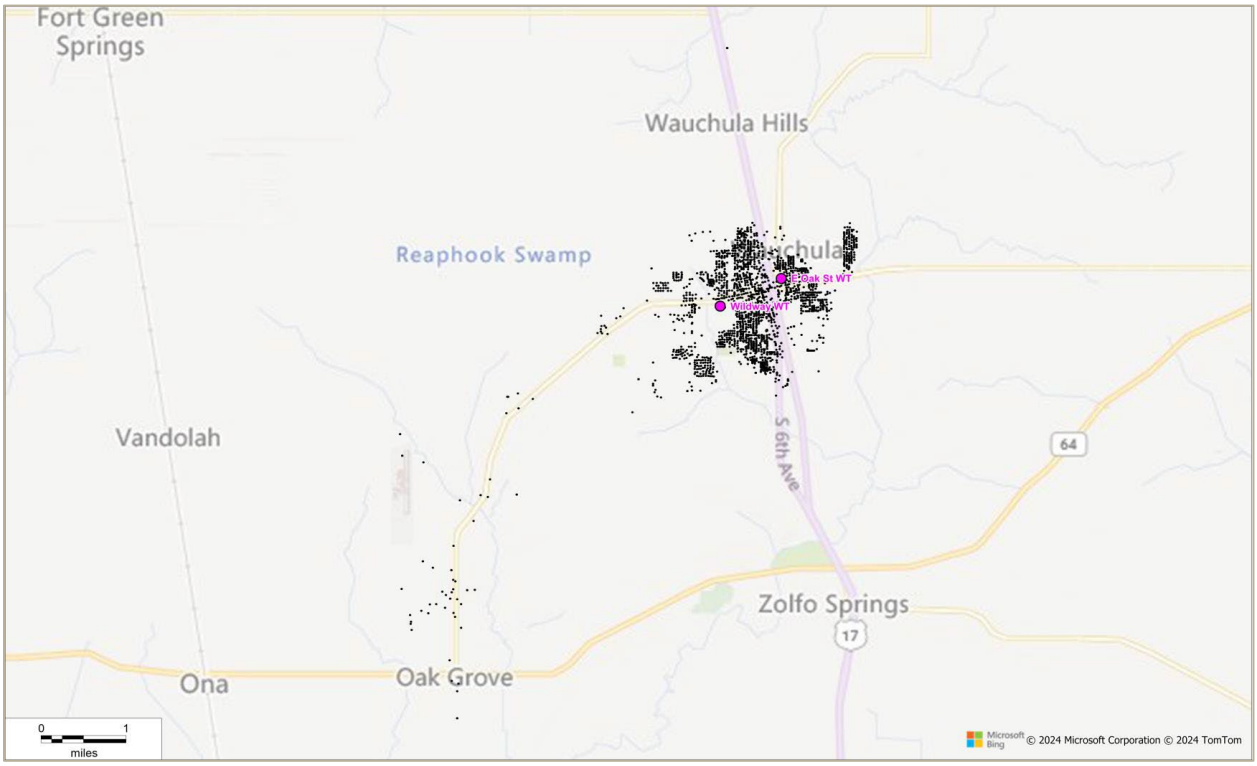
SENSUS CONFIDENTIAL / UTILITY CONFIDENTIAL 4

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Proposed Site Locations with Electric Coverage

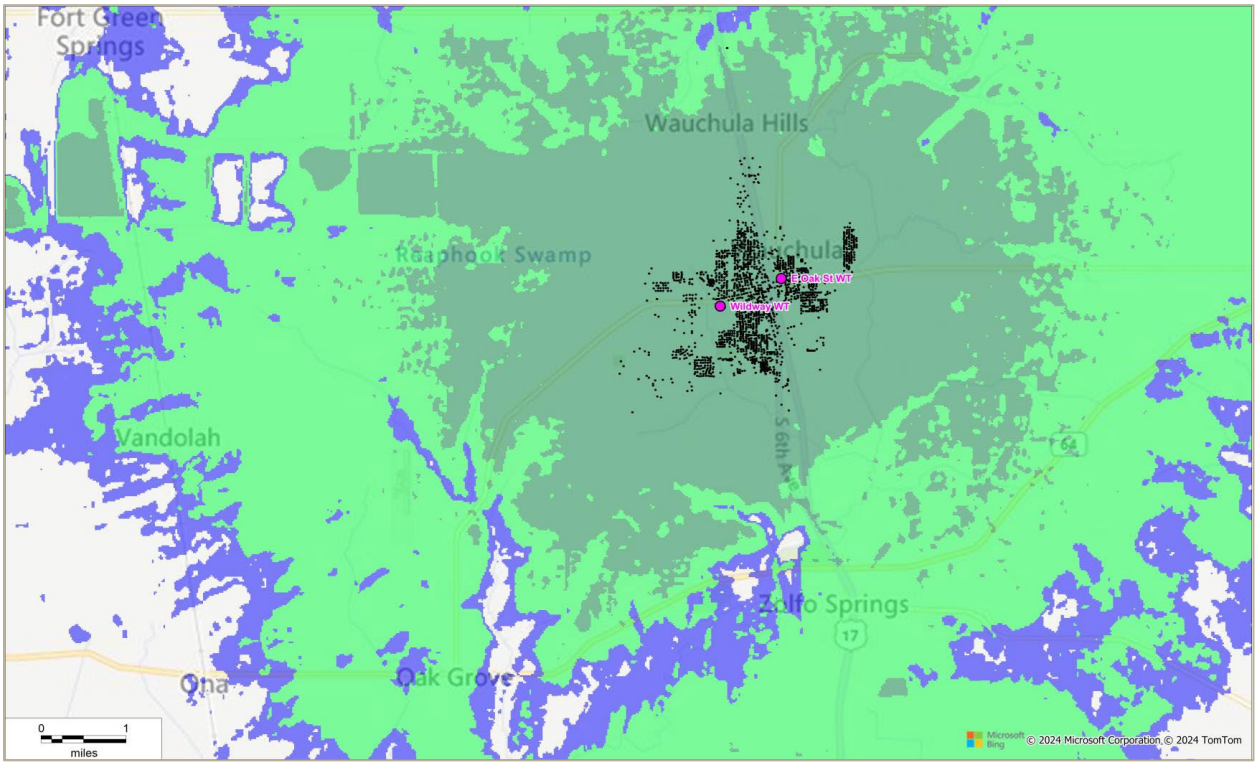


Proposed Site Locations with Electric Endpoints

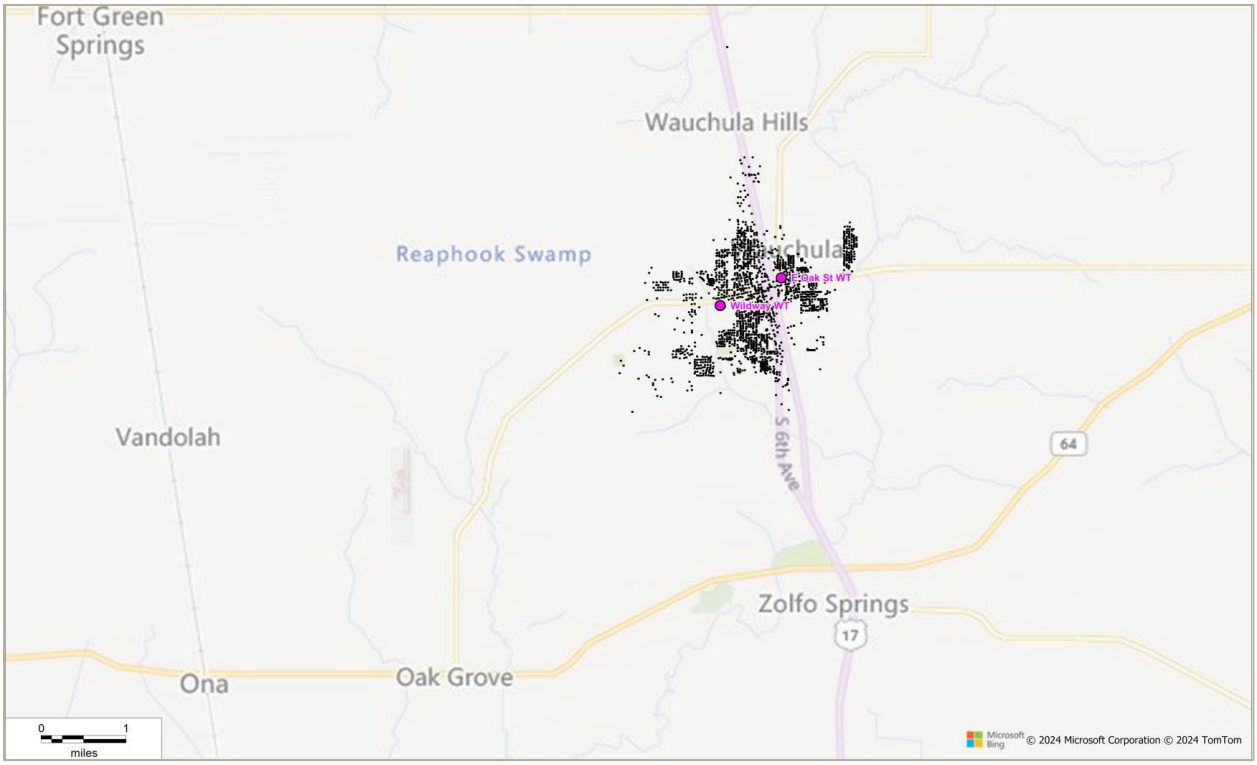


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Proposed Site Locations with Water Coverage



Proposed Site Locations with Water Endpoints



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Design Summary

Design Summary

- Network Coverage
  - Total Endpoints Evaluated = 5,244
    - Electric Endpoints Evaluated = 2,612
    - Water Endpoints Evaluated = 2,632
  - Total Endpoints Covered = 5,244 or 100%
  - Endpoints Covered by (≥2 Base Stations)
    - Water = 2,590 or 98.40%
    - Electric = 2,608 or 99.85%
  - Average Endpoints Covered per Base Station = 1,748

SENSUS CONFIDENTIAL / UTILITY CONFIDENTIAL 3

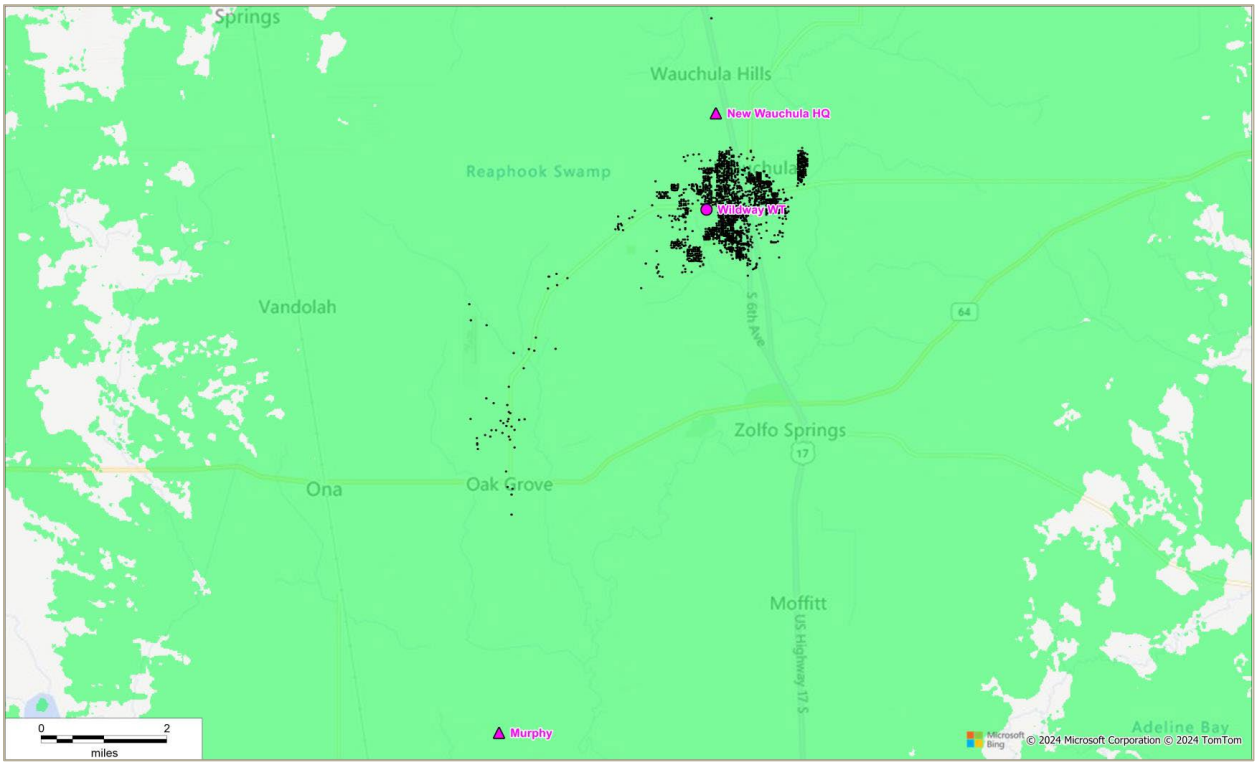
Design Summary (cont.)

- Sites and Equipment
  - Total Proposed Site Locations = 1
  - Base Stations Required = 1
  - Total Existing Site Locations = 2
  - Existing Base Stations Utilized = 2
- Site Details
  - Customer owned site locations proposed = 1 or 33.33%
  - Shared Network site locations utilized = 2 or 66.67%

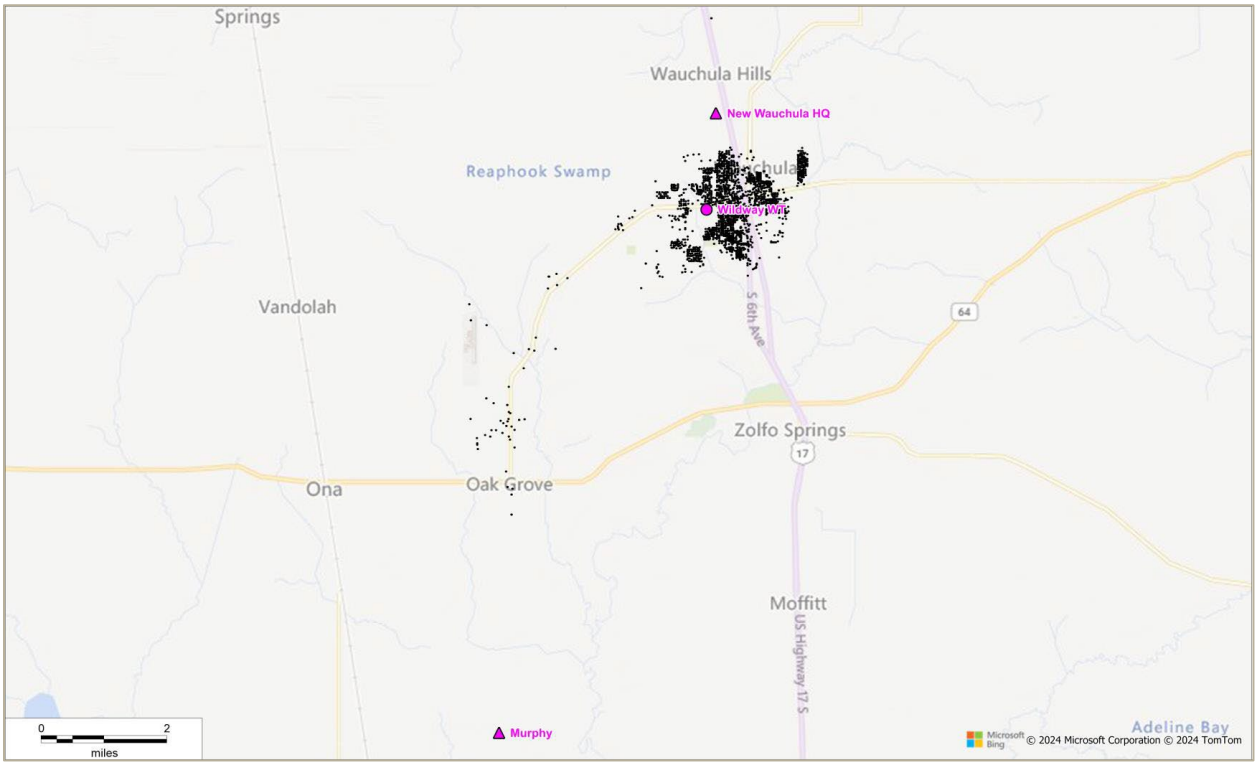
SENSUS CONFIDENTIAL / UTILITY CONFIDENTIAL 4

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Proposed Site Locations with Electric Coverage

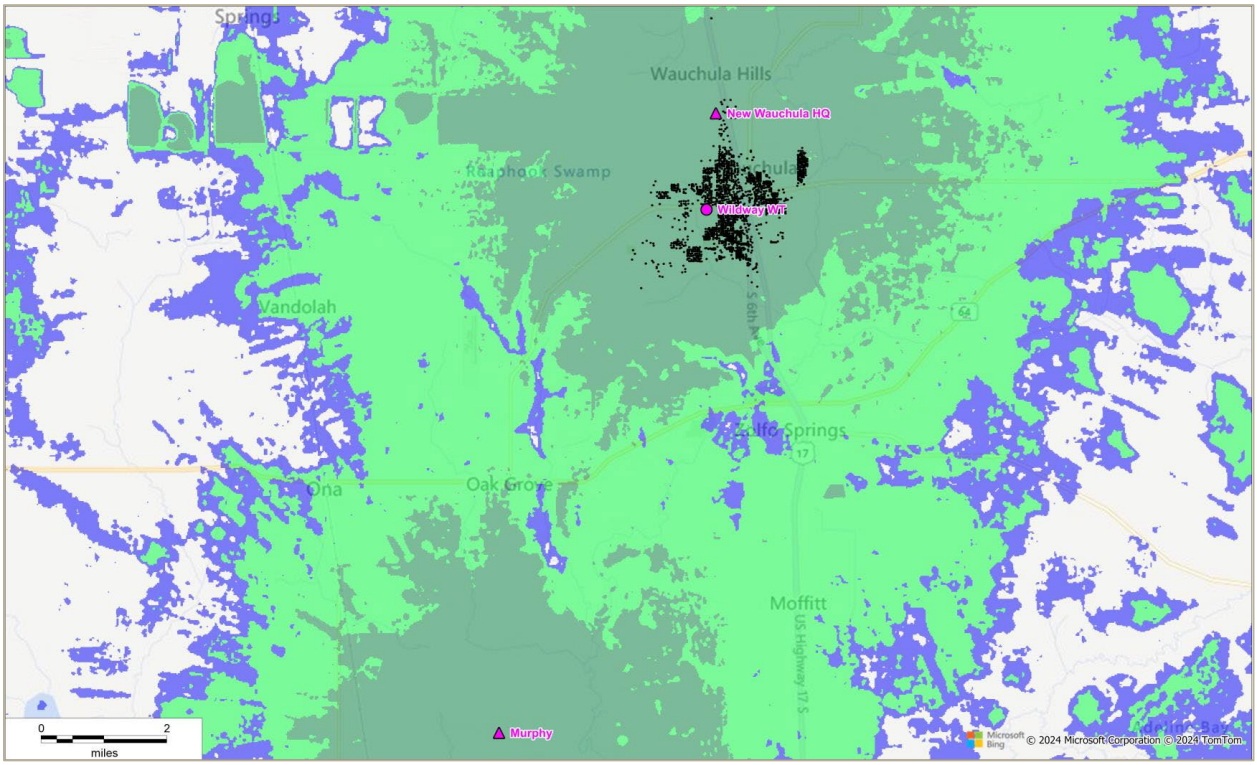


Proposed Site Locations with Electric Endpoints

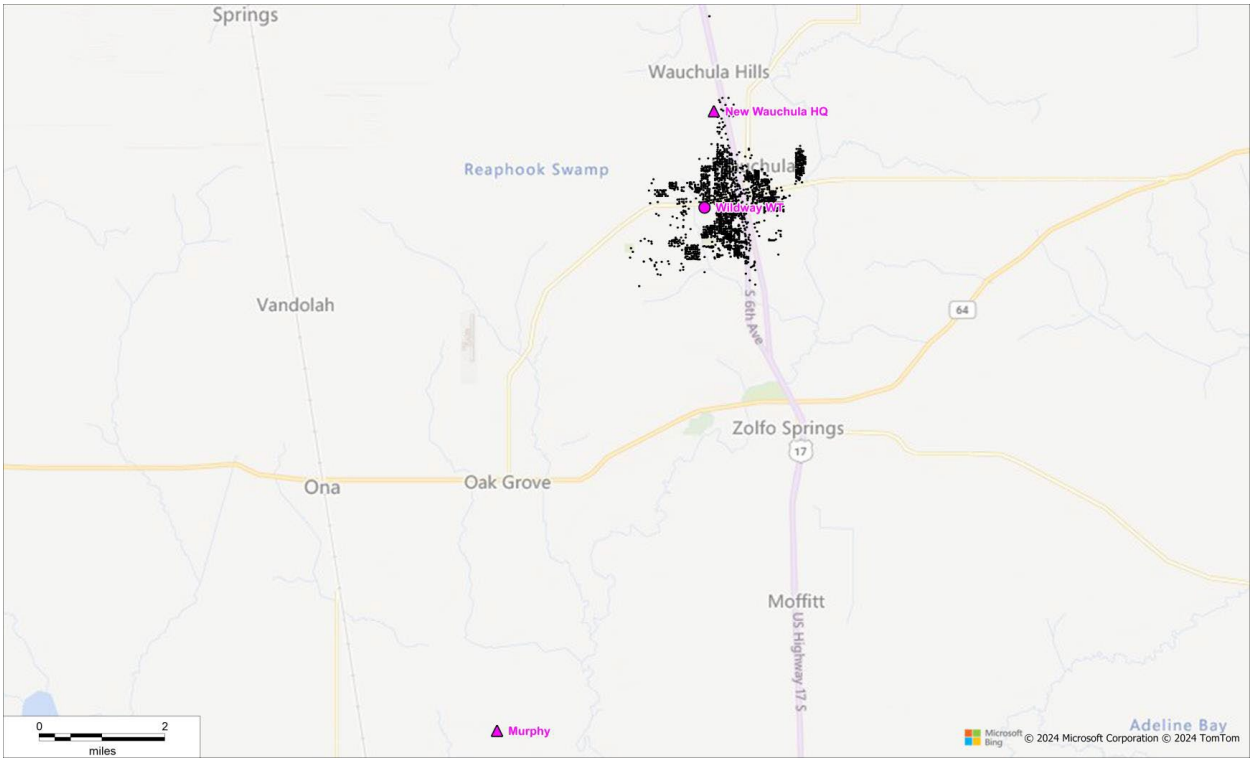


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Proposed Site Locations with Water Coverage



Proposed Site Locations with Water Endpoints



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ATTACHMENT C: SAMPLE AGREEMENTS

SENSUS SAMPLE AMI AGREEMENT

SENSUS SAAS AGREEMENT

Software as a Service and Spectrum Lease Agreement

between

CITY OF WAUCHULA
("Customer")

and
Sensus USA Inc.
("Sensus")

IN WITNESS WHEREOF, the parties have caused this Software as a Service and Spectrum Lease ("Agreement") to be executed by their duly authorized representatives as of the day and year written below. The date of the last party to sign is the "Effective Date."

This Agreement shall commence on the Effective Date and continue for/until: 5 Years ("Initial Term"). At the end of the Initial Term, this Agreement shall automatically renew for an additional term of 5 years ("Renewal Term"). The "Term" shall refer to both the Initial Term and the Renewal Term.

This Agreement contains two parts: Part (1) is The FCC Notification for Spectrum Manager Lease, to be filed with the FCC by Sensus on behalf of the Customer and Part (2) is a Software as a Service and Spectrum Lease between Sensus and Customer. Together, these two parts create the Agreement.

Sensus USA Inc.		**Customer: CITY OF WAUCHULA**	
By:	_____	By:	_____
Name:	_____	Name:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

Contents of this Agreement:

Part 1: Notification for Spectrum Manager Lease
Part 2: Agreement
Exhibit A Software
Exhibit B Technical Support

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Part 1: Notification for Spectrum Manager Lease

In order for Sensus to apply to the FCC on the Customer's behalf for a spectrum manager lease, Customer must complete the information below in boxes one (1) through ten (10) and certify via authorized signature. Customer's signature will indicate that Customer authorizes Sensus to file the spectrum manager lease notification on FCC Form 608 with the Customer as spectrum Lessee, and if Customer does not already have one, ownership disclosure information on FCC Form 602.

1.

Customer/Lessee Name:		
Attention To:	Name of Real Party in Interest:	
Street Address:		City:
State:	Zip:	Phone:
Fax:	Email:	

Is Customer contact information same as above? ☐Yes ☐No (If No, complete box 2 below)

2.

Additional Customer/Lessee Contact Information

Company Name:		
Attention To:		
Street Address:		City:
State:	Zip:	Phone:
Fax:	Email:	

3.

Customer/Lessee is a(n) (Select one): ☐Individual | ☐ Unincorporated Association | ☐Trust
☐Government Entity | ☐Corporation | ☐ Limited Liability Company | ☐General Partnership
☐Limited Partnership | ☐Limited Liability Partnership | ☐Consortium | ☐ Other _____

4.

FCC Form 602: FCC File Number of Customer's Form 602 Ownership Information: _____. If Customer has not filed a Form 602, Sensus will file one for Customer. Please complete questions 5, 6, and 7 below if Customer does not have a Form 602 on file.
Customer must complete items 8, 9 and 10 irrespective of whether Customer has an ownership report on file.

5.

Customer Tax ID:

6.

Individual Contact For FCC Matters

Please designate one individual (the Director of Public Works or similar person) who is responsible to the FCC for the operation of the FlexNet radio system.	
Name	
Title:	
Email:	Phone:

7.

Please list the names of the Board President and all Board Members below, as well as verify citizenship and ownership interests in any entity regulated by the FCC. Such ownership must be disclosed where a board member member owns 10% or more, directly or indirectly, or has operating control of any entity subject to FCC regulation. If any answer to Ownership question is Yes, or any answer to Citizenship question is No, provide an attachment with further explanation.

	US Citizen?	Ownership Disclosure?
Board President:	☐Yes ☐No	☐Yes ☐No
Board Member:	☐Yes ☐No	☐Yes ☐No
Board Member:	☐Yes ☐No	☐Yes ☐No

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Board Member:	☐Yes ☐No	☐Yes ☐No
Board Member:	☐Yes ☐No	☐Yes ☐No
Board Member:	☐Yes ☐No	☐Yes ☐No
Board Member:	☐Yes ☐No	☐Yes ☐No
Board Member:	☐Yes ☐No	☐Yes ☐No
Board Member:	☐Yes ☐No	☐Yes ☐No
Board Member:	☐Yes ☐No	☐Yes ☐No

8.

Alien Ownership Questions (if the answer is Yes, provide an attachment explaining the circumstances)

1) Is the Customer/Lessee a foreign government or the representative of any foreign government?	☐Yes ☐No

9.

Basic Qualification Information

1) Has the Customer or any party to this application had any FCC station authorization, license, or construction permit revoked or had any application for an initial, modification or renewal of FCC station authorization, license or construction permit denied by the Commission?	☐Yes ☐No
2) Has the Customer or any party to this filing, or any party directly or indirectly controlling the Customer or any party to this filing ever been convicted of a felony by any state or federal court?	☐Yes ☐No
3) Has any court finally adjudged the Customer or any party directly or indirectly controlling the Customer guilty of unlawfully monopolizing or attempting to unlawfully monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement, or any other means or unfair methods of competition?	☐Yes ☐No

10.

Customer/Lessee Certification Statements

1) The Customer/Lessee agrees that the Lease is not a sale or transfer of the license itself.	☐Yes
2) The Customer/Lessee acknowledges that it is required to comply with the Commission's Rules and Regulations and other applicable law at all times, and if the Customer/Lessee fails to so comply, the Lease may be revoked, cancelled, or terminated by either the Licensee or the Commission.	☐Yes
3) The Customer/Lessee certifies that neither it nor any other party to the Application/Notification is subject to a denial of Federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C § 862, because of a conviction for possession or distribution of a controlled substance (*See* Section 1.2002(b) of the rules, 47 CFR § 1.2002(b), for the definition of "party to the application" as used in this certification.)	☐Yes
4) The Customer/Lessee hereby accepts Commission oversight and enforcement consistent with the license and lease authorization. The Lessee acknowledges that it must cooperate fully with any investigation or inquiry conducted either by the Commission or the Licensee, allow the Commission or the Licensee to conduct on-site inspections of transmission facilities, and suspend operations at the direction of the Commission or the Licensee and to the extent that such suspension of operation would be consistent with applicable Commission policies.	☐Yes
5) The Customer/Lessee acknowledges that in the event an authorization held by a Licensee that has associated with it a spectrum leasing arrangement that is the subject of this filing is revoked, cancelled, terminated, or otherwise ceases to be in effect, the Customer/Lessee will have no continuing authority to use the leased spectrum and will be required to terminate its operations no later than the date on which the Licensee ceases to have any authority to operate under the license, unless otherwise authorized by the Commission.	☐Yes
6) The Customer/Lessee agrees the Lease shall not be assigned to any entity that is not eligible or qualified to enter into a spectrum leasing arrangement under the Commission's Rules and Regulations.	☐Yes
7)The Customer/Lessee waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by spectrum lease or otherwise.	☐Yes
8) The Customer/Lessee certifies that it is not in default on any payment for Commission licenses and that it is not delinquent on any non-tax debt owed to any federal agency.	☐Yes

The Customer/Lessee certifies that all of its statements made in this Application/Notification and in the schedules, exhibits, attachments, or documents incorporated by reference are material, are part of this Application/Notification, and are true, complete, correct, and made in good faith. The Customer/Lessee shall notify Sensus in writing in the event any information supplied on this form changes.

CITY OF WAUCHULA			
By:		Title:	
Name:		Date:	
FAILURE TO SIGN THIS APPLICATION MAY RESULT IN DISMISSAL OF THE APPLICATION AND FORFEITURE OF ANY FEES PAID.			

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WILLFUL FALSE STATEMENTS MADE ON THIS FORM OR ANY ATTACHMENTS ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001) AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. Code, Title 47, Section 312(a)(1)) AND/OR FORFEITURE (U.S. Code Title 47, Section 503).

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1. **General**

A. Agreement Generally. The scope of this Agreement includes Sensus providing the specified services, usage terms for Sensus' hosted Software solution, leased spectrum, technical support, and supporting terms and conditions for an advanced metering infrastructure solution in consideration of Customer's purchase and payment to Sensus' Authorized Distributor under separate agreement by and between Customer and Sensus' Authorized Distributor, for all such goods and services.

2. **Software.**

Software as a Service ("SaaS")

Sensus shall provide Customer with SaaS, as defined in Exhibit A, and Technical Support during the Term and only so long as Customer is current in its payments for such services. Upon the expiration or termination of this Agreement, Sensus will have no obligation to provide any further Services or Technical Support.

Sensus will provide Technical Support for any given Release in accordance with Exhibit B for four (4) years from the date Sensus issues the Release. Sensus will provide Engineering Support of any given release for two (2) years from the date Sensus issues the Release. Notwithstanding the foregoing, in the event of a critical security vulnerability (in Sensus' reasonable discretion), Customer acknowledges (i) that in order to receive particular vulnerability or defect corrections (whether by Patch, Update or Upgrade), Customer may need to move to a more recent supported Release of the Software, and (ii) Sensus reserves the right to discontinue supporting Releases of the Software, including in the event such Software has been identified by Sensus as end of life. Sensus may declare Software "end of life" upon either (i) the relevant window of Technical Support or Engineering Support ending or (ii) becoming aware of a security incident or vulnerability.

UCITA. To the maximum extent permitted by law, the Parties agree that the Uniform Computer Information Transaction Act as enacted by any state shall not apply, in whole or in part, to this Agreement.

3. **Spectrum**

A. **Definitions in this Section.** In this Section only, "Sensus" shall mean Sensus USA Inc. and its wholly owned subsidiary, Sensus Spectrum LLC.

B. **Spectrum Lease.** Sensus hereby grants to Customer, and Customer accepts, a spectrum manager lease ("Spectrum Lease") over the frequencies of certain FCC license(s) ("FCC License") solely within Customer's Service Territory. (The frequencies of the FCC License within Customer's geographic Service Territory are called the "Leased Spectrum"). Customer shall pay the Ongoing Fees for use of the Leased Spectrum.

C. **FCC Forms.** At the Federal Communications Commission ("FCC"), Sensus will; (1) obtain an FCC Registration Number ("FRN")) for Customer; (2) submit on behalf of Customer the FCC Form 602 Ownership Disclosure Information if Customer has not already done so; and (3) file a FCC Form 608, notification/application for long-term spectrum manager lease. This Lease becomes effective when the FCC accepts the FCC Form 608.

D. **Lease Application.** In order to complete the FCC lease application, Customer will promptly:

i. Complete and sign the representations in Part 1 of this Agreement such that Customer demonstrates it qualifies for a spectrum lease under FCC rules. Customer's signature will indicate that Customer authorizes Sensus to; (1) obtain an FRN on behalf of Customer; (2) submit the FCC Form 602 Ownership Disclosure Information on behalf of Customer if Customer has not already done so; and (3) file the spectrum manager lease notification on FCC Form 608 with the Customer as spectrum lessee.

ii. Give Sensus the coordinates of the boundaries of Customer's Service Territory or, alternatively, approve Sensus' estimation of the same.

iii. If Customer has not already done so; Customer hereby authorizes Sensus to apply on Customer's behalf and obtain for Customer a Federal Registration Number (FRN, the FCC's unique identifier for each licensee) and shall supply Sensus with Customer's Taxpayer Identification Number ("TIN").

iv. Provide any other information or other cooperation reasonably necessary for the Parties to perform as set forth herein.

E. **Permitted Use of Spectrum Lease and Equipment.** Customer may transmit or receive over the Leased Spectrum only in the Service Territory and only using FlexNet equipment manufactured by Sensus and used in accordance with Sensus' specifications. Customer may use the Leased Spectrum only to read and direct Field Devices or any other operation approved by Sensus in writing. Without limiting the foregoing, Customer is prohibited from reselling, subleasing or sublicensing the FlexNet Equipment and Leased Spectrum, and from transmitting voice communications over the Leased Spectrum. For each piece of RF Field Equipment used by Customer, Customer shall affix a Sensus-supplied label to the exterior of the RF Field Equipment cabinet or other appropriate visible place to indicate that RF operation is conducted under authority of FCC License(s) issued to Sensus.

F. **Term of Spectrum Lease.** Unless terminated earlier (because, for example, Customer stops using the FlexNet equipment or because this Agreement terminates or expires for any reason), this Spectrum Lease will have the same term as the FCC license. If Customer is operating in compliance with this Agreement and is current on any payments owed to Sensus, when the FCC License renews, the Parties will apply to the FCC to renew this Spectrum Lease.

G. **Termination of Spectrum Lease.** The Spectrum Lease will terminate: (a) two months after Customer stops transmitting with FlexNet equipment manufactured by Sensus; (b) upon termination, revocation or expiration of the FCC License; (c) upon Customer's breach of this Agreement; or (d) upon termination or expiration of this Agreement for any reason.

H. **FCC Compliance.** The following FCC requirements apply

i. Pursuant to 47 CFR 1.9040(a);

a. Customer must comply at all times with applicable FCC rules. This Agreement may be revoked by Sensus or the FCC if Customer fails to so comply;

b. If the FCC License is terminated, Customer has no continuing right to use the Leased Spectrum unless otherwise authorized by the FCC;

c. This Agreement is not an assignment, sale or other transfer of the FCC License;

d. This Agreement may not be assigned except upon written consent of Sensus, which consent may be withheld in its discretion; and

e. In any event, Sensus will not consent to an assignment that does not satisfy FCC rules.

ii. Referencing 47 CFR 1.9010, Sensus retains *de jure* and *de facto* control over the applicable radio facilities, including that,

a. Sensus will be responsible for Customer's compliance with FCC policies and rules. Sensus is responsible for engineering the FlexNet equipment and accompanying software and other programs to comply with FCC rules. Customer will operate the FlexNet equipment subject to Sensus' supervision and control and solely in accordance with Sensus' specifications. Sensus retains the right to inspect Customer's radio operations hereunder and to terminate this Agreement or take any other necessary steps to resolve

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a violation of FCC rules, including to order Customer to cease transmission. Sensus will act as spectrum manager in assigning spectrum under the FCC License so as to avoid any harmful interference or other violation of FCC rules. Sensus will be responsible for resolving any interference complaints or other FCC rule violations that may arise; and

b. Sensus will file any necessary FCC forms or applications and Customer agrees to reasonably assist Sensus with such filing by providing any necessary information or other cooperation. Sensus will otherwise interact with the FCC with respect to this Agreement, the FCC License or FlexNet equipment.

iii. Customer must continue operations on the spectrum during the Term of this Agreement. If Customer stops operations for any period of time, Customer must notify Sensus by sending an email to legal@xyleminc.com. Customer may not pause or discontinue operations for more than 180 days.

l. **Interference.** Customer agrees to report to Sensus promptly, and in no event later than 72 hours afterward, any incident related to the Leased Spectrum, including where Customer experiences harmful interference, receives a complaint or other notice of having caused harmful interference, or receives any type of communication from the FCC or other government agency regarding radio transmission.

4. Equipment.

A. Purchase of Equipment. Customer shall purchase all Field Devices, and other goods (collectively, "Equipment") from Sensus' authorized distributor pursuant to the terms and conditions (including any warranties on such Equipment) agreed by Customer and Sensus' authorized distributor. This Agreement shall not affect any terms and conditions, including any warranty terms, agreed by Customer and Sensus' authorized distributor. If Customer elects to purchase any equipment or services directly from Sensus, or if Customer pays any fees or other costs to Sensus, then Sensus' Terms of Sale shall apply. The "Terms of Sale" are available at: https://www.sensus.com/tc, or 1-800-METER-IT

B. THERE ARE NO WARRANTIES IN THIS AGREEMENT, EXPRESS OR IMPLIED. SENSUS EXPRESSLY DISCLAIMS ANY AND ALL REPRESENTATIONS, WARRANTIES AND/OR CONDITIONS, EXPRESSED, IMPLIED, STATUTORY OR OTHERWISE, REGARDING ANY MATTER IN CONNECTION WITH THIS AGREEMENT, INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, NON-INFRINGEMENT AND TITLE. WITHOUT LIMITING THE FOREGOING, SENSUS MAKES NO WARRANTIES OR PROMISE (I) THAT ITS SOFTWARE AS A SERVICE, SOFTWARE OR OTHER SERVICES WILL OPERATE IN CONJUNCTION WITH ANY SOFTWARE, SERVICES OR PRODUCTS PROVIDED BY THIRD PARTIES, (II) THAT THE OPERATION OF THE SOFTWARE AS A SERVICE OR ANY SENSUS SOFTWARE WILL BE UNINTERRUPTED OR ERROR OR VULNERABILITY FREE, OR (III) THAT ALL DEFECTS, BUGS, ERRORS OR VULNERABILITIES CAN OR WILL BE FIXED OR REMEDIATED. CUSTOMER ACKNOWLEDGES THAT SENSUS DOES NOT CONTROL THE TRANSFER OF DATA OVER THE INTERNET OR ACROSS OTHER NETWORKS, AND THE SOFTWARE AS A SERVICE MAY BE SUBJECT TO LIMITATIONS, DELAYS, AND OTHER PROBLEMS INHERENT IN THE USE OR OPERATION OF SUCH INTERNET OR NETWORKS. SENSUS IS NOT RESPONSIBLE FOR ANY DAMAGES, INCIDENTS, DELAYS, DELIVERY PROBLEMS, OR OTHER PROBLEMS RESULTING FROM SUCH INTERNET OR NETWORK PROBLEMS. IN NO EVENT IS SENSUS RESPONSIBLE OR LIABLE FOR ANY ISSUES RELATED TO THE PERFORMANCE, OPERATION OR SECURITY OF THE SOFTWARE AS A SERVICE OR ANY SENSUS SOFTWARE THAT ARISE FROM CUSTOMER'S OR ITS THIRD PARTIES' ENVIRONMENT; FAILURE TO IMPLEMENT PATCHES, UPDATES OR UPGRADES; SYSTEMS; CONTENT; NETWORKS; OR DEVICES. EXCEPT AS OTHERWISE EXPRESSLY STATED IN THIS AGREEMENT, CUSTOMER ASSUMES ALL RESPONSIBILITY AND RISK FOR ITS USE OF THE SOFTWARE AS A SERVICE, SENSUS SOFTWARE AND OTHER SERVICES PROVIDED UNDER THIS AGREEMENT.

5. Services.

A. Installation of Equipment. Installation services for Field Devices, other goods, and RF Field Equipment will be as agreed between the Customer and Sensus' authorized distributor. Sensus will not provide installation services pursuant to this Agreement. Sensus is not responsible for any problems that arise from the installation services (e.g., faulty configuration).

B. Technical Support. Sensus shall provide Customer the technical support set forth in Exhibit B.

C. Project Management. Sensus' authorized distributor will provide project management services to Customer. Any project management of the FlexNet System provided by Sensus shall be subject to a separate agreement which describes the scope and pricing for such work.

D. Training. Sensus' authorized distributor will provide Customer with training on the use of the FlexNet System. Any training provided by Sensus shall be subject to a separate agreement which describes the scope and pricing for such work.

E. IT Systems Integration Services. Except as may otherwise be provided herein, integration of the Software into Customer's new or existing internal IT systems is not included in this Agreement. Any integration work shall be subject to a separate agreement which describes the scope and pricing for such work.

F. WAN Backhaul connection services are not included in this Agreement.

6. General Terms and Conditions.

A. Infringement Indemnity. Sensus shall indemnify and hold harmless Customer from and against any judgment by a court of competent jurisdiction or settlement reached by Sensus from any litigation instituted against Customer in the United States by a third party to the extent alleging that the FlexNet System as provided hereunder infringes upon the patents or copyrights of such third party, provided that Sensus shall have the right to select counsel in such proceedings and control such proceedings and any settlement. Notwithstanding the foregoing, Sensus shall have no obligation or liability under this indemnity unless Customer cooperates fully with and assists Sensus in any such proceedings and gives Sensus written notice of any claim hereunder within fourteen (14) days of receiving it. Further, Sensus shall have no obligation or liability hereunder if such claim is related to; (i) any change, modification or alteration made to the FlexNet System by Customer or a third party, (ii) use of the FlexNet System in combination with any goods or services not provided by Sensus hereunder, (iii) Customer's failure to use the most recent version of the Software or to otherwise take any corrective action as reasonably directed by Sensus, (iv) compliance by Sensus with any designs, specifications or instructions provided by Customer or compliance by Sensus with an industry standard, or (v) any use of the FlexNet System other than for the Permitted Use or in a manner that exceeds the licenses and rights provided herein. In the event the FlexNet System is adjudicated to infringe a patent or copyright of a third party and its use is enjoined, or, if in the reasonable opinion of Sensus, the FlexNet System is likely to become the subject of an infringement claim, Sensus, at its sole discretion and expense, may at its option; (i) procure for Customer the right to continue using the FlexNet System or (ii) modify or replace the FlexNet System so that it becomes non-infringing. THIS SECTION STATES CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND SENSUS' ENTIRE LIABILITY AND OBLIGATION FOR ANY CLAIM OF INFRINGEMENT.

B. Limitation of Liability. Sensus' aggregate liability in any and all causes of action arising under, out of or in relation to this Agreement, its negotiation, performance, breach or termination (collectively "Causes of Action") shall not exceed the greater of; (a) the total amount paid by Customer directly to

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Sensus under this Agreement; or (b) ten thousand US dollars (USD 10,000.00). This is so whether the Causes of Action are in tort, including, without limitation, negligence or strict liability, in contract, under statute or otherwise. As separate and independent limitations on liability, Sensus' liability shall be limited to direct damages. Sensus shall not be liable for; (i) any indirect, incidental, special or consequential damages; nor (ii) any revenue or profits lost by Customer or its Affiliates, including from any End User(s), irrespective whether such lost revenue or profits is categorized as direct damages or otherwise; nor (iii) any In/Out Costs; nor (v) damages arising from maincase or bottom plate breakage caused by freezing temperatures, water hammer conditions, or excessive water pressure. The limitations on liability set forth in this Agreement are fundamental inducements to Sensus entering into this Agreement. They apply unconditionally and in all respects. They are to be interpreted broadly so as to give Sensus the maximum protection permitted under law.

C. Termination. Either party may terminate this Agreement earlier if the other party commits a material breach of this Agreement and such material breach is not cured within forty-five (45) days of written notice by the other party. Upon any expiration or termination of this Agreement, Sensus' and Customer's obligations hereunder shall cease and the software as a service and Spectrum Lease shall immediately cease.

D. Force Majeure. If Sensus becomes unable, either wholly or in part, by an event of Force Majeure, to fulfill its obligations under this Agreement, the obligations affected by the event of Force Majeure will be suspended during the continuance of that inability. The party affected by the force majeure will take reasonable steps to mitigate the Force Majeure. Notwithstanding anything herein to the contrary, in no event will Sensus be liable for the consequences or impact of any Force Majeure event.

E. Temporary Service Suspension. Sensus may suspend the Services without liability if: (i) Customer fails to pay Sensus or its authorized distributor when payment is due; (ii) Sensus reasonably believes that the Services are being used in violation of the Agreement; (iii) Sensus is required by applicable law or by a regulatory or government body to suspend Customer's access to the Services; (iv) a Force Majeure event requires Sensus to suspend Customer's access; or (v) there is another event for which Sensus reasonably believes that the suspension of Services is necessary to protect the Services. Sensus will give Customer advance notice of a suspension where reasonably possible under the circumstances. If a suspension is based on Customer's breach of Customer's obligations under the Agreement, Sensus may continue to charge Customer the fees for the Services during suspension.

F. Intellectual Property Rights.

i. Software and Materials. No Intellectual Property is assigned to Customer hereunder. Excluding Customer Data, Sensus shall own or continue to own all right, title, and interest in and to the Intellectual Property associated with the Software and related documentation, including any derivations and/or derivative works (the "Sensus IP"). To the extent, if any, that any ownership interest in and to such Sensus IP does not automatically vest in Sensus by virtue of this Agreement or otherwise, and instead vests in Customer, Customer agrees to grant and assign and hereby does grant and assign to Sensus all right, title, and interest that Customer may have in and to such Sensus IP. Customer agrees not to reverse engineer any Sensus Products purchased or provided hereunder.

ii. Customer Data. Notwithstanding the prior paragraph, as between Customer and Sensus, Customer remains the owner of all right, title or interest in or to any Customer Data. "Customer Data" means solely usage data collected by the Field Devices. To avoid doubt, Customer Data does not include non-End User usage data collected by the Field Devices, Software, or FlexNet System, such as network and equipment status information or the like. Customer represents to Sensus that Customer (i) has sufficient rights in all Customer Data, to hold the Customer Data and deliver it to Sensus as required for the Services to be performed as contemplated in the Agreement, and (ii) has obtained (and is responsible for maintaining) from all individuals, persons and third parties whose personal information is contained in the Customer Data all required consents and authorizations, and has provided to all individuals, persons, and third parties the notices with respect to the collection, retention, disclosure and use of the Customer Data as contemplated for the purposes of this Agreement that are required under applicable foreign, federal and state laws and regulations, including but not limited to relevant privacy laws and regulations.

iii. Consent to Use of Customer Data. Customer hereby irrevocably grants to Sensus a world-wide royalty-free, non-exclusive, irrevocable right and license to access, store, and use such Customer Data and any other data or information provided to Sensus, to (1) provide the Service; (2) analyze and improve the Service; (3) analyze and improve any Sensus equipment, software, or service; or (4) for any other internal use. As used herein, "Service" means Sensus' obligations under this Agreement, such as the Software as a Service.

iv. Access to Customer Data. Within 45 days of Customer's written request, Sensus will provide Customer a copy of the previous 24 months of data collected by the FlexNet System in a format of Sensus' discretion and deliver the file to a drop location specified by Customer.

G. Data Privacy. Customer acknowledges and agrees that Sensus and its Affiliates (collectively, "Xylem") may collect and process personal data for the purposes outlined in this Agreement and in Xylem's then-current privacy policy. Xylem's data privacy policy is available and maintained at https://www.xylem.com/en-us/support/privacy/ or any successor web page designated by Xylem from time-to-time. The collection and use of personal data by Customer, including providing necessary notices and obtaining required consents from end users, is Customer's sole responsibility.

H. Right to use Feedback. Customer grants Sensus a royalty-free, worldwide, irrevocable, perpetual license to use, aggregate, alter or incorporate into the Services any suggestions, enhancement requests, recommendations or other feedback provided by Customer or its employees and agents.

I. Confidentiality. Except as may be required under applicable law, court order, or regulation, or to the extent permitted under or required to perform and enforce this Agreement, both parties shall (and shall cause their employees and contractors to) keep all Confidential Information strictly confidential and shall not disclose it to any third party. Without limiting any other obligations in this Agreement, Customer shall not provide Sensus's Confidential Information to any person who designs or develops software products or services that compete with Sensus's software products and services. The Confidential Information may be transmitted orally, in writing, electronically or otherwise observed by either party. Notwithstanding the foregoing, "Confidential Information" shall not include; (i) any information that is in the public domain other than due to Recipient's breach of this Agreement; (ii) any information in the possession of the Recipient without restriction prior to disclosure by the Discloser; or (iii) any information independently developed by the Recipient without reliance on the information disclosed hereunder by the Discloser. "Discloser" means either party that discloses Confidential Information, and "Recipient" means either party that receives it. The receiving party will return or destroy the other party's Confidential Information upon receiving written notice from the other party, provided that such return or destruction does not interfere with the receiving party's rights and obligations under this Agreement, including Sensus' right to use Customer Data. The foregoing does not require the receiving party to search its archived electronic back-up files of its computer systems for the other party's Confidential Information to purge such Confidential Information from its archived files; provided, however, that the receiving party must: (i) maintain the confidentiality of such archived Confidential Information as if this Agreement were still in effect and (ii) not use such archived Confidential Information for any purpose.

J. Compliance with Laws. Customer shall comply with all applicable country, federal, state, and local laws and regulations, as set forth at the time of acceptance and as may be amended, changed, or supplemented. Customer shall not take any action or permit the taking of any action by a third

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party, which may render Sensus liable for a violation of applicable laws.

i. **Export Control Laws**. Customer shall; (i) comply with all applicable U.S. and local laws and regulations governing the use, export, import, re-export, and transfer of products, technology, and services; and (ii) obtain all required authorizations, permits, and licenses. Customer shall immediately notify Sensus, and immediately cease all activities with regards to the applicable transaction, if the Customer knows or has a reasonable suspicion that the equipment, software, or services provided hereunder may be directed to countries in violation of any export control laws. By ordering equipment, software or services, Customer certifies that it is not on any U.S. government export exclusion list.

ii. **Anti-Corruption Laws**. Customer shall comply with the United States Foreign Corrupt Practices Act (FCPA), 15 U.S.C. §§ 78dd-1, et seq.; laws and regulations implementing the OECD's Convention on Combating Bribery of Foreign Public Officials in International Business Transactions; the U.N. Convention Against Corruption; the Inter-American Convention Against Corruption; and any other applicable laws and regulations relating to anti-corruption in the Customer's county or any country where performance of this Agreement, or delivery or use of equipment, software or services will occur.

K. **Non-Waiver of Rights.** A waiver by either party of any breach of this Agreement or the failure or delay of either party to enforce any of the articles or other provisions of this Agreement will not in any way affect, limit or waive that party's right to enforce and compel strict compliance with the same or other articles or provisions.

L. **Assignment and Sub-contracting.** Either party may assign, transfer or delegate this Agreement without requiring the other party's consent; (i) to an Affiliate; (ii) as part of a merger; or (iii) to a purchaser of all or substantially all of its assets. Apart from the foregoing, neither party may assign, transfer or delegate this Agreement without the prior written consent of the other, which consent shall not be unreasonably withheld. Furthermore, Customer acknowledges Sensus may use subcontractors to perform RF Field Equipment installation, the systems integration work (if applicable), or project management (if applicable), without requiring Customer's consent.

M. **Amendments.** No alteration, amendment, or other modification shall be binding unless in writing and signed by both Customer and by a vice president (or higher) of Sensus.

N. **Governing Law and Dispute Resolution.** This Agreement shall be governed by, construed and enforced in accordance with the laws of the State of Delaware. Any and all disputes arising under, out of, or in relation to this Agreement, its negotiation, performance or termination ("Disputes") shall first be resolved by mediation between the Parties. TO THE MAXIMUM EXTENT PERMITTED BY LAW, THE PARTIES AGREE TO A BENCH TRIAL AND THAT THERE SHALL BE NO JURY IN ANY DISPUTES.

O. **Survival.** The provisions of this Agreement that are applicable to circumstances arising after its termination or expiration shall survive such termination or expiration.

P. **Severability.** In the event any provision of this Agreement is held to be void, unlawful or otherwise unenforceable, that provision will be severed from the remainder of the Agreement and replaced automatically by a provision containing terms as nearly like the void, unlawful, or unenforceable provision as possible; and the Agreement, as so modified, will continue to be in full force and effect.

Q. **Four Corners.** This written Agreement, including all of its exhibits, represents the entire understanding between and obligations of the parties and supersedes all prior understandings, agreements, negotiations, and proposals, whether written or oral, formal or informal between the parties. Any additional writings shall not modify any limitations or remedies provided in the Agreement. There are no other terms or conditions, oral, written, electronic or otherwise. There are no implied obligations. All obligations are specifically set forth in this Agreement. Further, there are no representations that induced this Agreement that are not included in it. The ONLY operative provisions are set forth in writing in this Agreement. Without limiting the generality of the foregoing, no purchase order placed by or on behalf of Customer shall alter any of the terms of this Agreement. The parties agree that such documents are for administrative purposes only, even if they have terms and conditions printed on them and even if and when they are accepted and/or processed by Sensus. Any goods, software or services delivered or provided in anticipation of this Agreement (for e.g., as part of a pilot or because this Agreement has not yet been signed but the parties have begun the deployment) under purchase orders placed prior to the execution of this Agreement are governed by this Agreement upon its execution and it replaces and supersedes any such purchase orders.

R. **Counterparts.** This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Additionally, this Agreement may be executed by facsimile or electronic copies, all of which shall be considered an original for all purposes.

7. **Definitions. As used in this Agreement, the following terms shall have the following meanings:**

A. **"*Affiliate*"** of a party means any other entity controlling, controlled by, or under common control with such party, where "control" of an entity means the ownership, directly or indirectly, of 50% or more of either; (i) the shares or other equity in such entity; or (ii) the voting rights in such entity.

B. "***Confidential Information***" means any and all non-public information of either party, including all technical or performance information about either party's products or services, pricing information, marketing and marketing plans, Customer's End Users' data, FlexNet System performance, FlexNet System architecture and design, FlexNet System software, other business and financial information of either party, and all trade secrets of either party. For the avoidance of doubt, information about the performance, operation, specifications, or features of the Services and FlexNet System is the Confidential Information of Sensus.

C. **"*End User*"** means any end user of electricity, water, and/or gas (as applicable) that pays Customer for the consumption of electricity, water, and/or gas, as applicable.

D. ***"Engineering Support"*** means providing Patches and Updates to Software.

E. "***Field Devices***" means the SmartPoint Modules .

identifies [redacted]

G. **"*FlexNet System*"** is comprised of the SmartPoint Modules, RF Field Equipment, Server Hardware, software licenses, Spectrum Lease, and other equipment provided to Customer hereunder. The FlexNet System only includes the foregoing, as provided by Sensus. The FlexNet System does not include goods, equipment, software, licenses or rights provided by a third party or parties to this Agreement.

H. "***Force Majeure***" means an event beyond a party's reasonable control, including, without limitation, acts of God, hurricane, flood, volcano, tsunami, tornado, storm, tempest, mudslide, vandalism, pandemic, illegal misconduct, sabotage, interruptions in power, communications or Internet service, acts of governments or government-backed actors, illegal or unauthorized radio frequency interference, strikes, lockouts, or other industrial disturbances, unavailability of component parts of any goods provided hereunder, acts of public enemies, wars, blockades, embargoes, insurrections, riots, epidemics, earthquakes, fires, restraints or prohibitions by any court, board, department, commission or agency of the United States or any States, any arrests and restraints, civil disturbances and explosion.

I. ***"Hosted Software"*** means those items listed as an Application in Exhibit A.

J. "***In/Out Costs***" means any costs and expenses incurred by Customer in transporting goods between its warehouse and its End User's premises and any costs and expenses incurred by Customer in installing, uninstalling and removing goods.

K. I means patents and patent applications, inventions (whether patentable or not), trademarks, service marks, trade dress, copyrights, trade secrets, know-how,

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data rights, specifications, drawings, designs, maskwork rights, moral rights, author's rights, and other intellectual property rights, including any derivations and/or derivative works, as may exist now or hereafter come into existence, and all renewals and extensions thereof, regardless of whether any of such rights arise under the laws of the United States or of any other state, country or jurisdiction, any registrations or applications thereof, and all goodwill pertinent thereto.

L. "***LCM***" identifies the load control modules.

M. ***"Licensed Software"*** means the Software licensed hereunder pursuant to the terms of the Agreement.

N. [redacted]

O. "***Patches***" means patches or other maintenance releases of the Software that correct processing errors and other faults, vulnerabilities and defects found in the Software. For clarity, Patches are not Updates or Upgrades.

P. "***Permitted Use"*** means only for reading and analyzing data from Customer's Field Devices in the Service Territory. The Permitted Use does not include reading third devices not provided by Sensus or reading Field Devices outside the Service Territory.

Q. ***"R100 Unit"*** identifies the Sensus standalone, mounted transceiver that takes the radio frequency readings from the SmartPoint Modules and relays them by radio frequency to the relevant FlexNet Base Station or directly to the RNI by TCP/IP backhaul communication, as the case may be.

R. **"*Release*"** means both Updates and Upgrades.

S. [redacted]identifies [redacted]

T. [redacted]

U. [redacted]

V. **"*RNI*"** identifies the regional network interfaces consisting of hardware and software used to gather, store, and report data collected by the FlexNet Base Stations from the SmartPoint Modules. The RNI hardware specifications will be provided by Sensus upon written request from Customer.

W. **"*RNI Software*"** identifies the Sensus proprietary software used in the RNI and any Patches, Updates, and Upgrades that are provided to Customer pursuant to the terms of this Agreement.

X. **"*Security Breach"*** means a cybersecurity incident whereby an unauthorized third party intentionally compromises the security of Customer's tenant environment in Sensus' Software as a Service solution and gains access to Customer's tenant environment and data.

Y. ***"Service Territory"*** identifies the geographic area where Customer utilizes Sensus equipment to provide services to End Users as of the Effective Date. This area will be described on the propagation study in the parties' Spectrum Lease filing with the FCC.

Z. **"*Server Hardware*"** means the RNI hardware.

AA. [redacted]identifies [redacted]

BB. **"*Software*"** means all the Sensus proprietary software provided as a service pursuant to this Agreement, and any Patches, Updates, and Upgrades that are provided to Customer pursuant to the terms of this Agreement. The Software does not include any third party software.

CC. ***"Technical Support"*** means the services set forth on Exhibit B.

DD. **"*Updates*"** means releases of the Software that constitute a minor improvement in functionality.

EE. **"*Upgrades*"** means releases of the Software which constitute a significant improvement in functionality or architecture of the Software.

FF. [redacted]

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Exhibit A
Software

Software as a Service

1. Description of Services.

This exhibit contains the details of the SaaS that Sensus shall provide to Customer if both; (i) pricing for the application of Software as a Service has been provided to the Customer; and (ii) the Customer is current in its payments to Sensus' authorized distributor for such application of Software as a Service.

A. Software as a Service Generally.

SaaS is a managed service in which Sensus will be responsible for the day-to-day monitoring, maintenance, management, and supporting of Customer's Software tenant in Sensus' (or its subcontractor's) data centers. In a Software as a Service solution, Sensus owns (or has third parties operate or provide on its behalf) all components of the solution (server hardware, storage, data center, network equipment, Sensus software, and all third-party software) required to run and operate the Applications listed below. These software applications consist of the following (each an "Application"):

- Regional Network Interface (RNI) Software
- Sensus Analytics Software
- Utility Data Lake

The managed application systems consist of the hardware, Sensus Software, and other third-party software that is required to operate the Applications. Each Application will have a production and disaster recovery (as described below) environment Test environments are not provided unless otherwise specifically agreed by Sensus in writing. Sensus will manage the Applications by providing 24 x 7 x 365 monitoring of the availability and performance of the Applications.

B. Use of Software as a Service. Subject to the terms of this Agreement, Sensus shall make Software as a Service available to Customer to access and use solely for the Permitted Use and solely for so long as Customer is current in its payments to Sensus or its authorized distributor for Software as a Service. The Software as a Service term commences on the date that Sensus first makes Software as a Service available to Customer for use and ends upon the earlier of: (i) the expiration or termination of the Agreement; (ii) breach by Customer of this exhibit or the Agreement; or (iii) Customer's termination of Software as a Service as set forth in paragraph (C) below.

C. Termination of an Application. Customer shall have the option at any time before the end of the Term to terminate any Application by giving Sensus one hundred twenty (120) days prior written notice. Such notice, once delivered to Sensus, is irrevocable. Should Customer elect to terminate any Application, Customer acknowledges that; (a) Customer shall pay all applicable fees, including any unpaid Software as a Service fees due in the current calendar year plus a ten percent (10%) early termination fee, where such fee is calculated based on the annual Software as a Service fee due in the current calendar year; and (b) Software as a Service for such Application shall immediately cease. If Customer elects to terminate the RNI Application in the Software as a Service environment but the Agreement has not expired or terminated, then upon delivery of the notice to Sensus, Customer shall purchase the necessary (a) RNI hardware from a third party and (b) RNI software license at Sensus' then-current pricing. No portion of the Software as a Service fees shall be applied to the purchase of the RNI hardware or software license.

D. Software as a Service means only the following services:

i. Sensus will provide the use of required hardware and or virtual environments, located at Sensus' or a third-party's data center facility (as determined by Sensus), that is necessary to operate the Application.

ii. Sensus will provide production and disaster recovery environments for Applications.

iii. Sensus will provide Patches, Updates, and Upgrades to latest Sensus Hosted Software release.

iv. Sensus will configure and manage the equipment (server hardware, routers, switches, firewalls, etc.) in the data centers:
   a. Network addresses and virtual private networks (VPN)
   b. Standard time source (NTP or GPS)
   c. Security access points
   d. Respond to relevant alarms and notifications.

v. Capacity and performance management. Sensus will:
   a. Monitor capacity and performance of the Application server and software applications 24x7x365 using KPI metrics, thresholds, and alerts to proactively identify any potential issues related to system capacity and/or performance (i.e., database, backspool, logs, message broker storage, etc.)
   b. If an issue is identified to have a potential impact to the system, Sensus will open an incident ticket and manage the ticket through resolution per Exhibit B, Technical Support.
   c. Manage and maintain the performance of the server and perform any change or configuration to the server, in accordance to standard configuration and change management policies and procedures.
   d. Manage and maintain the server storage capacity and performance of the Storage Area Network (SAN), in accordance to standard configuration and change management policies and procedures.
   e. Exceptions may occur to the system that require Sensus to take immediate action to maintain the system capacity and performance levels, and Sensus has authority to make changes without Customer approval as needed, in accordance to standard configuration and change management policies and procedures.

vi. Database management. Sensus will:
   a. Implement the data retention plan and policy and will provide the policy upon request.
   b. Monitor space and capacity requirements.
   c. Respond to database alarms and notifications.
   d. Install database software Upgrades and Patches.
   e. Perform routine database maintenance and cleanup of database to improve capacity and performance, such as rebuilding indexes,

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updating indexes, consistency checks, run SQL query/agent jobs, etc.

vii. Incident and Problem Management. Sensus will:
   a. Proactively monitor managed systems (24x7x365) for key events and thresholds to detect and identify incidents.
   b. Respond to incidents and problems that may occur to the Application(s).
   c. Maintain policies and procedures for responding to incidents and performing root cause analysis for ongoing problems.
   d. Correlate incidents and problems where applicable.
   e. Sensus personnel will use the self-service portal to document and track incidents.
   f. In the event that Sensus personnel is unable to resolve an issue, the issue will be escalated to the appropriate Subject Matter Expert (SME).
   g. Maintain responsibility for managing incident and problems through resolution (which may include workarounds) and will coordinate with Customer's personnel and/or any required third-party vendor to resolve the issue.
   h. Provide telephone support consistent with Exhibit B, Technical Support in the case of undetected events.

viii. Security Management. Sensus will:
   a. Monitor the physical and cyber security of the server and Application(s) 24x7x365 to ensure system is secure, consistence with NIST security standards.
   b. Perform intrusion prevention and detection of the data center network and firewalls and monitor logs and alerts.
   c. Conduct periodic penetration testing of the network and data center facilities.
   d. Conduct monthly vulnerability scanning by both internal staff and external vendors.
   e. Perform anti-virus and Malware patch management on systems.
   f. Install updates to virus protection software and related files (including virus signature files and similar files) on all servers from the update being generally available from the anti-virus software provider.
   g. Respond to threats found on the system and work to eliminate any virus or malware found.
   h. Adhere to and submit certification to NERC/CIP Cyber Security standards.
   i. Monitors industry regulations/standards regarding security – NERC, FERC, NIST, OpenSG, etc. through the Sensus security team.
   j. Provide secure web portal access (SSL) to the Application(s).

ix. Backup and Disaster Recovery Management. Sensus will:
   a. Perform daily backups of data providing one (1) year of history for auditing and restoration purposes.
   b. Back-up and store data (on tapes or other storage media as appropriate) off-site to provide protection against disasters and to meet file recovery needs.
   c. Conduct incremental and full back-ups to capture data, and changes to data, on the Application(s).
   d. Replicate the Application(s) environments to a geographically separated data center location to provide a full disaster recovery environment for the Application production system.
   e. Generate a report following each and any disaster measuring performance against the disaster recovery plan and identification of problem areas and plans for resolution.
   f. Maintain a disaster recovery plan. In the event of a disaster, Sensus shall provide the services in accordance with the disaster recovery plan.
   g. In the case of a disaster and loss of access to or use of the Application, Sensus would use commercially reasonable efforts per the Recovery Time Objectives ("RTO") and Recovery Point Objectives (RPO) specified herein to restore operations at the same location or at a backup location within forty-eight (48) hours.
   h. The Application shall have a "RTO" of forty-eight (48) hours.
   i. The RPO shall be a full recovery of the Application(s), with an RPO of one (1) hour, using no more than a twenty-four (24) hour old backup. All meter-related data shall be pushed from each Base Station/TGB restoring the database to real-time minus external interfaced systems from the day prior.
   j. Data from external interfaced systems shall be recreated within a forty-eight (48) hour period with the assistance of Customer personnel and staff, as needed.

E. Customer Responsibilities:

i. Coordinate and schedule any changes submitted by Sensus to the system in accordance with standard configuration and change management procedures.
ii. Participate in all required configuration and change management procedures.
iii. Customer will log incidents related to the managed Application with Sensus personnel via email, web portal ticket entry, or phone call.
iv. Responsible for periodic processing of accounts or readings (i.e., billing files) for Customer's billing system for billing or other analysis purposes.
v. Responsible for any field labor to troubleshoot any SmartPoint modules or smart meters in the field in populations that have been previously deployed and accepted.
vi. First response labor to troubleshoot FlexNet Base Station, R100s, Remote Transceivers or other field network equipment.
vii. Responsible for local area network security, configuration, management, and support.
viii. Identify and research problems with meter reads and meter read performance.
ix. Create and manage user accounts, and periodically change and update account credentials with strong passwords in accordance with security best practices.
x. Customize application configurations.
xi. Support application users.
xii. Investigate application operational issues (e.g., meter reads, reports, alarms, etc.).
xiii. Respond to alarms and notifications.
xiv. Perform firmware upgrades over-the-air, or delegate and monitor field personnel for on-site upgrades.
xv. Maintain industry standard cybersecurity controls, standards, and best practices.
xvi. Monitor for and promptly implement Patches, Updates, and Upgrades, both as provided by Sensus and other third-party software and hardware

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providers.

F. **Software as a Service** does not include any of the following services:

i. Parts or labor required to repair damage to any field network equipment that is the result of a Force Majeure event.

ii. Any integration between applications, such as Harris MeterSense, would require a Professional Services contract agreement to be scoped, submitted, and agreed in a signed writing between Sensus and all the applicable parties.

If an item is not listed in subparagraphs in item (D) above, such item is excluded from the Software as a Service and is subject to additional pricing.

2. Further Agreements

A. System Uptime Rate.

i. Sensus (or its contractor) shall manage and maintain the Application(s) on computers owned or controlled by Sensus (or its contractors) and shall provide Customer access to the managed Application(s) via internet or point to point connection (i.e., Managed-Access use), according to the terms below. Sensus endeavors to maintain an average System Uptime Rate equal to ninety-nine (99.0) per Month (as defined below). The System Uptime Rate, cumulative across all Applications, shall be calculated as follows:

$$\text{System Uptime Rate} = \frac{100 \times (\text{TMO} - \text{Total Non-Scheduled Downtime minutes in the Month})}{\text{TMO}}$$

ii. **Calculations**

a. ***Targeted Minutes of Operation*** or ***TMO*** means total minutes cumulative across all Applications in the applicable month minus the Scheduled Downtime in the Month.

b. ***Scheduled Downtime*** means the number of minutes during the Month, as measured by Sensus, in which access to any Application is scheduled to be unavailable for use by Customer due to planned system maintenance. Sensus shall provide Customer notice (via email or otherwise) at least seven (7) days in advance of commencement of the Scheduled Downtime.

c. ***Non-Scheduled Downtime*** means the number of minutes during the Month, as measured by Sensus, in which access to any Application is unavailable for use by Customer due to reasons other than Scheduled Downtime or the Exceptions, as defined below (e.g., due to a need for unplanned maintenance or repair).

iii. **Exceptions**. Exceptions mean the following events:

- Force Majeure;
- Emergency Work, as defined below; and
- Lack of Internet Availability, as described below.

a. **Emergency Work**. In the event that Force Majeure, emergencies, security incidents, dangerous conditions or other exceptional circumstances arise or continue during TMO, Sensus shall be entitled to take any actions that Sensus, in good faith, determines is necessary or advisable to prevent, remedy, mitigate, or otherwise address actual or potential harm, interruption, loss, threat, security or like concern to any of the Application(s) ("Emergency Work"). Such Emergency Work may include, but is not limited to: analysis, testing, repair, maintenance, re-setting and other servicing of the hardware, cabling, networks, software and other devices, materials and systems through which access to and/or use of the Application(s) by the Customer is made available (the "Managed Systems"). Sensus shall endeavor to provide advance notice of such Emergency Work to Customer when practicable and possible.

b. **Lack of Internet Availability.** Sensus shall not be responsible for any deterioration of performance attributable to latencies in the public internet or point-to-point network connection operated by a third party. Customer expressly acknowledges and agrees that Sensus does not and cannot control the flow of data to or from Sensus' networks and other portions of the Internet, and that such flow depends in part on the performance of Internet services provided or controlled by third parties, and that at times, actions or inactions of such third parties can impair or disrupt data transmitted through, and/or Customer's connections to, the Internet or point-to-point data connection (or portions thereof). Although Sensus will use commercially reasonable efforts to take actions Sensus may deem appropriate to mitigate the effects of any such events, Sensus cannot guarantee that such events will not occur. Accordingly, Sensus disclaims any and all liability resulting from or relating to such events.

iv. **System Availability.** For each month that the System Uptime Rates for the production RNI falls below 99.0%, Sensus will issue Customer the following Service Level Credits:

System Uptime Rate per calendar month	Service Level Credit
Less than 99.0% but at least 97.5%	5% of the monthly RNI SaaS Fees in which the service level default occurred (Note: SaaS fees are pre-paid annually and for purposes of Service Level Credits are computed on a monthly basis.)
Less than 97.5% but at least 95.0%	10% of the monthly RNI SaaS Fees in which the service level default occurred
Less than 95.0%	20% of the monthly RNI SaaS Fees in which the service level default occurred

Service Level Credits for any single month shall not exceed 20% of the RNI SaaS Fee associated with the month in which the service level default occurred. Sensus records and data will be the sole basis for all Service Level Credit calculations and determinations, provided that such records and data must be made available to Customer for review and agreement by Customer. To receive a Service Level Credit, Customer must issue a written request no later than ten (10) days after the Service Level Credit accrues. Sensus will apply each valid Service Level Credit to the Customer's invoice within 2 billing cycles after Sensus' receipt of Customer's request and confirmation of the failure to meet the applicable Service Level Credit. Service Level Credits will not be payable for failures to meet the System Uptime Rate caused by any Exceptions. No Service Level Credit will apply if Customer is not current in its undisputed payment obligations under the Agreement. Service Level Credits are exclusive of any applicable taxes charged to Customer or collected by Sensus. Sensus shall not refund an unused Service Level Credits or pay cash to Customer for any unused Service Level Credits. Any unused Service Level Credits at the time the Agreement terminates will be forever forfeited. THE SERVICE LEVEL CREDITS DESCRIBED IN THIS SECTION ARE THE SOLE AND EXCLUSIVE REMEDY FOR SENSUS'

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FAILURE TO MEET THE SYSTEM UPTIME REQUIREMENT OR ANY DEFECTIVE SAAS PERFORMANCE. IN NO EVENT SHALL THE AGGREGATE AMOUNT OF SERVICE LEVEL CREDITS IN ANY ANNUAL PERIOD EXCEED 20% OF THE ANNUAL RNI SAAS FEE.

B. Data Center Site-Security. Although Sensus may modify such security arrangements without consent or notice to Customer, Customer acknowledges the following are the current arrangements regarding physical access to and support of the primary hardware components of the Managed Systems:

i. The computer room(s) in which the hardware is installed is accessible only to authorized individuals.
ii. Power infrastructure includes one or more uninterruptible power supply (UPS) devices and diesel generators or other alternative power for back-up electrical power.
iii. Air-conditioning facilities (for humidity and temperature controls) are provided in or for such computer room(s) and can be monitored and adjusted for humidity and temperature settings and control. Such air systems are supported by redundant, back-up and/or switch-over environmental units.
iv. Such electrical and A/C systems are monitored on an ongoing basis and personnel are available to respond to system emergencies (if any) in real time.
v. Dry pipe pre-action fire detection and suppression systems are provided.
vi. Data circuits are available via multiple providers and diverse paths, giving access redundancy.

C. Responsibilities of Customer.

i. Customer shall promptly pay all Software as a Service fees.
ii. Customer may not (i) carelessly, knowingly, intentionally or maliciously threaten, disrupt, harm, abuse or interfere with the Application(s), Managed Systems or any of their functionality, performance, security or integrity, nor attempt to do so; (ii) impersonate any person or entity, including, but not limited to, Sensus, a Sensus employee or another user; or (iii) forge, falsify, disguise or otherwise manipulate any identification information associated with Customer's access to or use of the Application(s).
iii. The provisioning, compatibility, operation, security, support, and maintenance of Customer's hardware and software ("Customer's Systems") is exclusively the responsibility of Customer. Customer is also responsible, in particular, for correctly configuring and maintaining (i) the desktop environment used by Customer to access the Application(s) managed by Sensus; and (ii) Customer's network router and firewall, if applicable, to allow data to flow between the Customer's Systems and Sensus' Managed Systems in a secure manner via the public Internet.
iv. Upon receiving the system administrator account from Sensus, Customer shall create strong username and passwords for each of Customer's authorized users and complete the applicable Sensus registration process (Authorized Users). Such usernames, and passwords will allow Authorized Users to access the Application(s). Customer shall be solely responsible for maintaining the security and confidentiality of each user ID and password pair associated with Customer's account, and Sensus will not be liable for any loss, damage or liability arising from Customer's account or any user ID and password pairs associated with Customer. Customer is fully responsible for all acts and omissions that occur through the use of Customer's account and any user ID and password pairs. Customer agrees (i) not to allow anyone other than the Authorized Users to have any access to, or use of Customer's account or any user ID and password pairs at any time; (ii) to notify Sensus immediately of any actual or suspected unauthorized use of Customer's account or any of such user ID and password pairs, or any other breach or suspected breach of security, restricted use or confidentiality; and (iii) to take the Sensus-recommended steps to log out from and otherwise exit the Application(s) and Managed Systems at the end of each session. Customer agrees that Sensus shall be entitled to rely, without inquiry, on the validity of the user accessing the Application(s) application through Customer's account, account ID, usernames, or passwords. Customer will ensure that its user ID and passwords are regularly (at least monthly) changed, and that only strong user ID and password pairs are used.
v. Customer shall be responsible for the day-to-day operations of the Application(s) and FlexNet System. This includes, without limitation, (i) researching problems with meter reads and system performance, (ii) creating and managing user accounts, (iii) customizing application configurations, (iv) supporting application users, (v) investigating application operational issues, (vi) responding to alarms and notifications, and (vii) performing over-the-air commands (such as firmware updates or configuration changes).

D. Software Solution Components.

i. **Description of Software Solutions**. Sensus software consists of a core communication module and a set of applications. Some applications are required to perform basic solution capabilities, other applications are optional and add additional capabilities and function to the overall solution. As Customer's business process expands and/or new Sensus offerings are made available, additional applications and functionality can dynamically be added to the solution, provided Customer purchases such additional applications.
ii. **Regional Network Interface.** The Regional Network Interface (RNI) or Sensus head-end is the centralized intelligence of the FlexNet network; the RNI's primary objective is to transfer endpoint (such as meters) data to the Customer and the advanced feature applications. The RNI is adaptable to Customer configurations by simultaneously supporting a wide range of FlexNet enabled endpoints; including but not limited to meters (electric, water, gas) and other sensing devices.
iii. **Utility Data Lake**. Subject to the terms of this Agreement, Sensus will make the Utility Data Lake ("UDL") available to Customer to access and use solely for the Permitted Use and solely for so long as Customer is current in its payments to Sensus or its authorized distributor for Software as a Service. Sensus shall provide up to three (3) years of FlexNet System data and scan up to five hundred (500) GB per month of FlexNet System data. If Customer exceeds the allotment of five hundred (500) GB per month of scanned data (regardless of the access method) an overage charge will be assessed to Customer and be payable according to the terms outlined by Sensus' authorized distributor. Sensus will also provide Customer UDL training, which includes up to eight (8) hours of professional services consulting time.

3. Sensus Analytics

Sensus Analytics is a cloud-based solution and data platform that allows storage and retrieval of raw reads and data from other sources for analysis, exportation, and inquiry or reporting. The platform provides applications and reporting capabilities.

A. Integration of Sensus Analytics. Sensus shall provide integration support services to Customer only to the extent specifically provided below:

i. Sensus shall provide Customer with a simple flat file specification known as VFlex for the integration of the Customer's back-office system to the Sensus Analytics modules. The VFlex shall contain the following types of information: Device ids, end users in the system, end user status, end user account information, end username, and other end user details. This flat file may be delimited or fixed width. Customer shall produce this file and transmit it to the FTP location designated by Sensus. When sent to the Sensus FTP servers, this file exchange will enable the system to become operational with the Customer's systems. Customer shall produce this file and transmit it to the FTP location designated by Sensus. Sensus will provide reasonable support to explain to Customer the required vs. optional fields that are in the specification, testing and validation

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of the file format and content.

ii. In scope and included integration efforts: kick-off meeting to engage all required parties, mapping the Customer's fields to the VFlex specification, validation of expected output, and a two (2) hour system review of Sensus Analytics application and integration with the Customer's system (conducted remotely).

iii. Out of scope and subject to additional charges will be the transformation of data where business logic including code must be written to modify the field content or format of the data to meet the VFlex specification.

iv. Sensus' integration services consist of four (4) hours of assistance (remote or on-site, as determined by Sensus). If additional time is needed to complete the integration efforts, Sensus shall invoice Customer for additional fees on an actual time and materials basis.

v. **If an item is not listed in subparagraphs (i) or (ii) above, such item is excluded from the integration of Sensus Analytics Support and is subject to additional pricing.**

vi. **Data Import.** The Sensus Analytics Application contains adapters for the import of data from; (a) Customer's FlexNet System; and/or (b) AutoRead application for handheld and drive by systems, as applicable.

vii. **Customer Acknowledgements.**

a. Customer acknowledges that the Sensus Analytics Application provides up to fifty (50) user logins for Customer's use.

b. Customer acknowledges and agrees the Sensus Analytics Application is based upon the actual number of End Users within Customer's Service Territory. Pricing may increase if Customer's Service Territory or actual number of End Users expands.

c. Customer acknowledges that all data related to the Sensus Analytics Applications is geographically hosted within the United States of America. Customer accepts the geographic location of such hosting and indemnifies Sensus for any claims resulting therefrom.

d. Customer acknowledges and agrees that the Intellectual Property provisions of this Agreement apply in all respects to Customer's access to and use of the Sensus Analytics Applications.

e. Customer is responsible for validating the data analyzed by the Sensus Analytics Applications. Sensus makes no promises of improving Customer's operations or saving Customer money, nor is Sensus liable for any damages resulting from decisions made by Customer related to Customer's use of Sensus Analytics.

f. Customer acknowledges that data will be stored for three (3) years from upload and Sensus may delete the data after this time or upon termination of the Agreement.

4. Third Party Software.

A. Sensus incorporates various third-party software in its Software, and such third-party software may change from time to time. Sensus takes reasonable efforts to implement patches or other fixes as they become available in accordance with a particular version's Engineering Support policy. Upon written request by Customer. Sensus shall provide a software bill of materials (SBOM) in a file format of Sensus' discretion which lists the third-party software applications and versions incorporated in the Sensus Software. To the extent required by a third-party software provider. Customer hereby agrees to abide by a third-party's end-user license agreement (EULA).

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Exhibit B
Technical Support

1. **Introduction**

Sensus Technical Services provides utility customers with a single point of contact for Tier 1 support of technical issues as well as any coordination of additional resources required to resolve the issue. Requests that require specialized skills are to be forwarded to a senior support engineer or Technical Advisor within the team for further analysis. If Technical Services has exhausted all troubleshooting efforts for the product type, the issue will escalate to the Engineering Support Team. Occasionally, on-site troubleshooting/analysis may be required. The preferred order of on-site support is:

a. The Customer (for assistance with the easiest and lowest time-consuming activities such as power on/power off).

b. The local distributor.

c. Sensus employees or contracted personnel, if required to fulfill a contract commitment.

2. **Support Categories**

2.1. General questions regarding functionality, use of product, how-to, and requests for assistance on Sensus AMR, AMI, RF Network Equipment, Metering Products, Sensus Lighting Control, and Demand Response Management System (FlexNet Home).

2.2. Proactive reporting and resolution of problems.

2.3. Reactive reporting to isolate, document, and solve reported hardware/software defects.

2.4. Responding to service requests and product changes.

2.5. Addressing customer inquiries with printed or electronic documentation, examples, or additional explanation/clarification.

3. **Support Hours**

3.1. Standard Support Hours: Toll-free telephone support (1-800-638-3748 option #2) is available Monday thru Friday from 8:00 a.m. EST to 8:00 p.m. EST. After-hours, holiday and weekend support for Severity 1 and Severity 2 issues is available by calling 1-800-638-3748, option #8.

4. **Support Procedures**

4.1. Customer identifies an issue or potential problem and calls Technical Services at 1-800-638-3748 Option #2. The Customer Service Associate or Technical Support Engineer will submit a SalesForce ticket.

4.2. The Customer Service Associate or Technical Support Engineer will identify the caller name and utility by the assigned software serial number, city, and state based on where the call originated. The Customer Service Associate or Technical Support Engineer will require a brief description of the problem symptoms, or error messages depending on nature of the incident. The nature of the problem and severity levels will be mutually agreed upon by both parties (either at the time the issue is entered or prior to upgrading or downgrading an existing issue) using the severity definitions below as a guideline. The severity level is then captured into SalesForce for ticket creation and resolution processing. Any time during the processing of this ticket, if the severity level is changed by Sensus, the customer will be updated.

a. Severity Levels Description:

Sev1 Customer's production system is down. The system is unusable resulting in total disruption of work. No workaround is available and requires immediate attention.

Example: Network mass outage, all reading collection devices inoperable, inoperable head end software (e.g., FlexWare, Sensus MDM). Not able to generate billing files.

Sev2 Major system feature/function failure. Operations are severely restricted; there is a major disruption of work, no acceptable work-around is available, and failure requires immediate attention.

Examples: Examples: Network equipment failure (e.g., FlexNet Echo, FlexNet Remote, Base Station transceiver, or VGB); inoperable reading devices (e.g., AR5500, VXU, VGB, or CommandLink); head end software application has important functionality not working and cannot create export file for billing system operations.

Sev3 The system is usable and the issue doesn't affect critical overall operation.

Example: Minor network equipment failure (e.g., Echo/Remote false alarms or Base Station transceiver false alarms); head end software application operable but reports are not running properly, modification of view or some non-critical function of the software is not running.

4.3. The Customer Service Associate or Technical Support Engineer identifies whether or not the customer is on support. If the customer is not on support, the customer is advised of the service options as well as any applicable charges that may be billed.

4.4. Calls are placed in a queue from which they are accessible to Technical Support Engineers on a first-come-first-served basis. A 1st level Customer Service Associate may assist the customer, depending on the difficulty of the call and the representative's technical knowledge. Technical Support Engineers (Tier 1 support) typically respond/resolve the majority of calls based on their product knowledge and experience. A call history for the particular account is researched to note any existing pattern or if the call is a new report. This research provides the representative a basis and understanding of the account as well as any associated problems and/or resolutions that have been communicated.

1. Technical Services confirms that there is an issue or problem that needs further analysis to determine its cause. The following information must be collected: a detailed description of the issue's symptoms, details on the software/hardware product and version, a description of the environment in which the issue arises, and a list of any corrective action already taken.

2. Technical Services will check the internal database and product defect tracking system, to see if reports of a similar problem exist, and if any working solutions were provided. If an existing resolution is found that will address the reported issue, it shall be communicated to the customer. Once it is confirmed that the issue has been resolved, the ticket is closed.

3. If there is no known defect or support that defines the behavior, Technical Services will work with the customer to reproduce the issue. If the issue can be reproduced, either at the customer site or within support center test lab, Technical Services will escalate the ticket for further investigation / resolution.

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If the issue involves units that are considered to be defective with no known reason, the representative will open a Special Investigation RMA through the SalesForce system. If it is determined that a sample is required for further analysis, the customer will be provided with instructions that detail where to send the product sample(s) for a root cause analysis. Once it is determined that the issue cannot be resolved by Tier 1 resources, the ticket will be escalated to Tier 2 support for confirmation/workarounds to resolve immediate issue. Technical Services will immediately contact the customer to advise of the escalation. The response and escalation times are listed in Section 5. At this time, screen shots, log files, configuration files, and database backups will be created and attached to the ticket.

5. **Response and Resolution Targets.**

Sensus Technical Support will make every reasonable effort to meet the following response and resolution targets:

Severity	Standard Target Response	Standard Target Resolution	Resolution (one or more of the following)
1	30 Minutes	Immediately assign trained and qualified Services Staff to correct the error on an expedited basis. Provide ongoing communication on the status of a correction (24 hours).	• Satisfactory workaround is provided. • Program patch is provided. • Fix incorporated into future release. • Fix or workaround incorporated into SalesForce Knowledge Base.
2	4 hours	Assign trained and qualified Services Staff to correct the error. Provide communication as updates occur (48 hours).	• Satisfactory workaround is provided. • Program patch is provided. • Fix incorporated into future release. • Fix or workaround incorporated into SalesForce Knowledge Base.
3	1 Business Day	30 business days	• Answer to question is provided. • Satisfactory workaround is provided. • Fix or workaround incorporated into SalesForce Knowledge Base. • Fix incorporated into future release.

6. **Problem Escalation Process**.

6.1. If the normal support process does not produce the desired results, or if the severity has changed, the issue may be escalated as follows to a higher level of authority.

6.1.1.1. Severity 1 issues are escalated by Sales or Technical Services to a Supervisor if not resolved within 2 hours; to the Manager level if not resolved within 4 hours; to the Director level if not resolved within the same business day; and to the VP level if not resolved within 24 hours.

6.1.1.2. A customer may escalate an issue by calling 1-800-638-3748, Option 2. Please specify the SalesForce ticket number and the reason why the issue is being escalated.

6.1.1.3. In the event that a customer is not satisfied with the level of support or continual problem with their products, they may escalate a given SalesForce ticket to Manager of Technical Services (1-800-638-3748, Option 2).

7. **General Support Provisions and Exclusions**.

7.1. Sensus provides online documentation for Sensus products, and all Sensus customers are provided access to this online database, which includes operation, configuration and technical manuals. The customer shall provide names and email accounts to Sensus so Sensus may provide access to the product documentation.

7.2. Specialized support from Sensus is available on a fee basis to address support issues outside the scope of this support plan or if not covered under another specific contract or statement of work. For example: specialized systems integration services or out of warranty network equipment repair.

7.3. In the event customer submits a ticket for a version of the Software outside of the Engineering Support window and is not able to resolve the problem without engineering resources. Sensus shall have no obligation to provide Engineering Support and Customer shall upgrade to the most current version of the Software.

7.4. Customer acknowledges that not all problems and bugs with the Software may or can be fixed. The Software and Software as a Service (including third party software used in connection with the Software as a Service) may have security vulnerabilities. Sensus may address vulnerabilities with its Software through Patches, Updates or Upgrades that it makes available from time-to-time. As between the parties, Customer has the obligation to timely implement Patches, Updates and Upgrades.

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ATTACHMENT D: CYBERSECURITY RISK MITIGATION CONTROLS DOCUMENT

TABLE 1: SECURITY CONTROLS FOR CYBERSECURITY

Threat	Security Control
Spoofing – Impersonating an authorized user or asset.	All users and endpoints are validated using authentication and cryptographic keys before performing any actions within the system. This prevents spoofing by unauthorized entities.
Brute Force Attacks – Performing an exhaustive search of all possible values for a security credential or attribute (such as a key, password, or passphrase).	**Endpoint** – The FlexNet system operates on FCC-licensed spectrum. This provides a control against unauthorized communication within Sensus radio space. **FlexNet Base Station and FlexNet Head End System** – Each system is configured with account lockouts and firewall rules to prevent brute force attacks. In addition, third-party controls can be implemented to augment Sensus security controls.
Bypass – Bypassing system security functions and mechanisms.	Validation and verification is performed within the system for functions before the operation can be performed. This includes sessions, authentication, and authorization.
Denial of Service – Overloading the network or system resources.	**Endpoint** – The FlexNet system operates on FCC-licensed spectrum. This provides a control against unauthorized communication within Sensus radio space. **FlexNet Base Station and FlexNet Head End System** – Each system is configured with firewall rules to prevent DOS attacks. In addition, third-party controls can be implemented to augment Sensus security controls.
Hijack – Commandeering one side of an existing authenticated connection.	Session, authentication, and authorization are validated at an application layer to prevent session hijacking. At a network layer, AES-CCM provides a cryptographically verifiable CBC-MAC to ensure the communications have not been altered during transmission. Electric meters and the SonixIQ gas meter support digital signatures to provide an additional layer of protection.
Malware – Deploying malicious software developed for the purposes of doing harm to a computer system or network (such as viruses, Trojan horses, and backdoors).	All Sensus systems running on general-purpose operating systems support the use of antivirus software.

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Threat	Security Control
Man-in-the-Middle (MIM) Attacks – Inserting undetected between two connections, where the attacker can read, insert, and modify messages at will.	Communications at the application layer are secured using TLS, which provides protection for MIM attacks. Communication at the network layer uses AES encryption and CBC-MAC to ensure the integrity of the messages across the network, thereby preventing MIM attacks. Electric meters and the SonixIQ gas meter support digital signatures to provide an additional layer of protection.
Unauthorized Physical Access – Leading to physical damage to or destruction of an asset.	Physical tamper alarms, locks, and seals are available on endpoints and network access points to ensure the physical integrity of the devices.
Privilege Escalation – Causing an unauthorized elevation of privilege.	Role-based access control (RBAC) and integration with well-established authentication/authorization sources (for example, LDAP/Active Directory) provide control over what access is granted. In addition, the application maintains verification of sessions, authentication, and authorization for each request made.
Replay – Creating an unauthorized replay of captured traffic.	All encrypted messages across the network use a time-based quantum to prevent replay. This prevents a malicious attacker from capturing encrypted messages and replaying them at a later time.
Tampering – Modifying, in an unauthorized manner, system data, business data, or configuration information.	Physical tamper alarms, locks, and seals are available on endpoints and network access points to ensure the physical integrity of the devices. Sensitive data is encrypted in the system to prevent tampering or destruction of data.

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Water Meter Events and Alarms

Interval and Register Data

The following fields are included with the interval read. With the exception of the FlexNet ID, these fields are also configurable using field tools.

- **FlexNet ID:** The factory-configured code used to uniquely identify the endpoint.
- **Firmware Version:** The design control number used to uniquely identify the version of the firmware loaded into the endpoint.
- **Latitude/Longitude (LAT/LONG):** The GPS position of the installed endpoint.
- **Top Level State (TLS) or Mode:** The TLS is the setting that determines how the endpoint functions.
    - The three options are: Walk By/Drive By (WB/DB), Fixed Base-Listen after Talk (FB- LAT), Fixed Base-Middle of Minute Communication (FB-MOMComm).
- **Reading Units (cubic feet, cubic meters, liters):** The volumetric units associated with the meter.
- **Index Scale (CCF, MCF, M3):** Identifies the scale on which the meter reading is reported.
- **Reverse Flow threshold (1, 2, 5, 10, 100):** The water SmartPoint communication module can determine the direction of water flow. When the endpoint detects a reverse flow condition, it will accumulate the reverse pulses. When the number of reverse pulses detected exceeds the programmed reverse flow threshold values shown above, the backflow alarm is triggered.
- **Transmit Mode/Rate:** Specifies the format and the rate that reading messages are transmitted from the endpoint to the FlexNet Base Station.
- **Meter Sample Rate (15 minutes; 1, 6, 12 or 24 hours):** specifies how often the endpoint records the current meter reading. These recordings are also known as interval data.

Triggered Alarms

- **High Flow:** The High Flow alarm indicates that the endpoint detects an excessive flow rate of water for a specified duration.
- **Reverse Flow:** The Reverse Flow alarm indicates that the endpoint detects water flowing in the reverse direction through the meter.
- **Low Battery:** Battery voltage is sampled immediately prior to every transmission. If the voltage is less than the threshold (as a default, 3.3 volts), then the Low Battery alarm is raised.

Events and Alarms

Our meter portfolio provides several available smart alarms, enabling you to address issues before they become more costly:

- **Tampering**: Detect register removal as well as magnetic interference to reduce apparent water losses and protect against unauthorized activities.

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- **Low Battery**: Replace your meters before they stop recording consumption through alerts indicating battery capacity to the meter is running low.
- **Customer Leak**: Detect continuous consumption of water over a period of time to indicate downstream leaks. This can reduce water loss and leak adjustment costs.
- **Reverse Flow**: Keep untreated water from re-entering your distribution system or deter tampering attempts when reverse flow is detected.
- **High Flow**: Detect broken pipes, high usage, and reduce property damage through an alert triggered when excessive flow rates are recorded.
- **Empty Pipe**: By alerting to the absence of water in the flow tube, you can identify main breaks downstream and water shortages for quicker resolution to ensure water availability. This alarm can also indicate the water meter has been removed from service.
- **Pressure**: Get alerted when water pressure exceeds or falls below the pressure threshold to prevent potential disruptions of service.
- **Temperature**: Get alerted when water temperature exceeds or falls below the temperature threshold so you can take action to better protect your meter and water network assets.

Additional Alarms and Capabilities

Any alarm or event from any endpoint can be reported, filtered, and sorted.

Water SmartPoint Alarms and Events

Sensus FlexNet SmartPoint communication modules provide the following alarms for water meters.

Swapped Meter

Indicates the endpoint has detected that the register has been changed without a proper installation. Swapped Meter is detected by comparing the register serial number from one reading to the next. If it differs, the register has been swapped. Additionally, the alarm can be triggered if the number of reading digits reported from the register differs from one read to the next. That is, if the last read was reporting six digits and the next read reported seven digits, this would be interpreted as a swapped meter.

Leak

Indicates that the endpoint has detected continuous flow for an extended time period: that is, a leak.

High Flow

Indicates that the endpoint has detected an excessive flow rate (high flow).

Meter Comm. Fail

Indicates that the endpoint failed to successfully read the water register – either there was no response from the register, or the reading string was corrupted. Possible causes may be an incorrect or poor connection to the register, a malfunctioning register, or no register connected at all.

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Non-Numeric Read (or meter read malfunction)
Indicates that the endpoint successfully read the water register, but the register indicated an error condition: for example, a stuck encoder wheel.

Backflow

Indicates that the endpoint has detected reverse flow (decreasing reading values) for a specified period of time.

Every four hours, as part of its normal transmission process, the FlexNet SmartPoint communication module measures its battery voltage and temperature under load. This information is then transmitted to the FlexNet Head End System, where the data is stored. The current battery voltage for each SmartPoint is also displayed on its individual meter information page in the FlexNet software, along with other important information.

If the battery voltage is less than 2.7 volts, a Low Battery alarm is triggered at the SmartPoint. This alarm is transmitted to the FlexNet Head End System, where it can generate a Low Battery report. The Low Battery alarm field can be monitored on a daily basis.

Tamper Exception Report

The Tamper Exception report is generated if tampering is detected at the transmitter or at the wire between the meter and transmitter. The SmartPoint transmits an alarm advising the utility that the connection between the register and the SmartPoint has been disabled. This allows the utility to investigate a tamper situation that may be present. The alarm is transmitted during the preprogrammed transmit intervals.

ally Water Meter

ally meters have several smart alarms designed to protect utilities' investments and enhance customer service. These alarms include:

- Empty Pipe
  - By alerting to the absence of water in the flow tube, the Empty Pipe alarm helps utilities identify main breaks downstream and water shortages for quicker resolution to ensure water availability to end consumers. This alarm can also indicate the water meter has been removed from service.
- Tampering
  - The ally meter detects magnetic interference and alerts the utility to help reduce apparent water losses and better protect against unauthorized activities.
- Low Battery
  - The Low Battery alarm prompts the utility to replace its meters before they stop recording consumption through alerts indicating that battery capacity to the meter or valve is running low. The ally meters battery is warranted for 15 years.
- Continuous Flow

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- The ally meter detects continuous consumption of water over a period of time to indicate downstream leaks. This protects the utility's infrastructure, as well as end consumers, by helping utilities identify leaks and thus reduce leak adjustment costs.

- Reverse Flow
  - The ally meter helps keep untreated water from re-entering the distribution system and deters tampering attempts through an alarm triggered when reverse flow is detected at the meter.
- High Flow
  - The ally meter detects broken pipes and reduces property damage through an alert triggered by the detection of excessive flow rates.
- Pressure
  - The Pressure alarm alerts the utility when water pressure exceeds or falls below the set pressure thresholds, preventing potential disruptions of service.
- Temperature
  - The Temperature alarm alerts the utility when water temperature exceeds or falls below the temperature thresholds, so that action can be taken to protect meter and water network assets.

iPERL Water Meter

Quick resolution of field issues is made possible with Sensus' iPERL water meter, which transmits configurable smart water alarms, including the following.

- Low Battery (Voltage)
  - When battery voltage drops below 2.5 volts, the Low Battery alarm alerts the utility that the battery will expire soon and that the meter needs to be changed. The iPERL meter battery is warranted for 20 years.
- Low Battery (Time)
  - When a meter has been deployed for more than 19 years, the meter sends alerts at the 19-year mark and the 19.5-year mark that the battery will expire soon and the meter needs to be replaced.
- Magnetic Tampering
  - This alarm alerts the utility if the meter cannot regulate its magnetic field in a 15-minute timeframe, so that the utility can investigate whether a strong magnet or magnetic interference is being used to tamper with the meter.
- Empty Pipe
  - The Empty Pipe alarm alerts the utility if no water is detected for 1 minute. This could happen, for example, if a water main breaks and causes an empty pipe.
- Reverse Flow

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- The meter detects whether water is flowing in reverse in the pipe, and if continuous reverse flow at any rate occurs for 15 minutes, the Reverse Flow alarm is triggered. Reverse flow may occur due to a water main break.

- Continuous Flow
  - If the meter identifies a leak, the continuous flow alarm is triggered to alert the utility. A leak is defined as continuous forward flow at any rate for 24 to 180 hours (programmable).

SR II Water Meter

The SR II's Electronic Register+ supports alarms that alert the utility to potential issues before they become more costly:

- Tampering
  - The Tampering alarm detects register removal, as well as magnetic interference, to reduce apparent water losses and protect against unauthorized activities.
- Low Battery
  - The Low Battery alarm advises the utility to replace its meters before they stop recording consumption by indicating that the battery capacity to the meter is running low. The SR II meter battery is warranted for 20 years.
- Continuous Flow
  - The Continuous Flow alarm detects continuous consumption of water over a period of time to indicate downstream leaks, providing utilities with the ability to reduce water loss and leak adjustment costs.
- Reverse Flow
  - The Reverse Flow alarm helps prevent untreated water from re-entering the distribution system and deter tampering attempts when reverse flow is detected.
- High Flow
  - The SR II meter detects broken pipes and high usage, and reduces property damage through an alert triggered when excessive flow rates are recorded.

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Electric Meter Alarms

Electric meters have been designed to be the utility's eyes and ears in the field, and they monitor their services 24x7x365 for a variety of conditions and quickly transmit alarms to the FlexNet Head End System when they spot a condition that should be reported to alert your team of potential issues. Critical alarms are transmitted immediately to the FlexNet Head End System when they occur to ensure that the utility is informed on field conditions as quickly as possible.

Alarms are visible on the Alerts tab of the FlexNet Head End System dashboard and can easily be identified and reported on for quick analysis and action.

The head end supports the ability to send email and SMS notifications to designated utility personnel to provide immediate notification. In addition, alarms can also be passed along to existing downstream systems via integrations so your team can view them in the software they are familiar with.

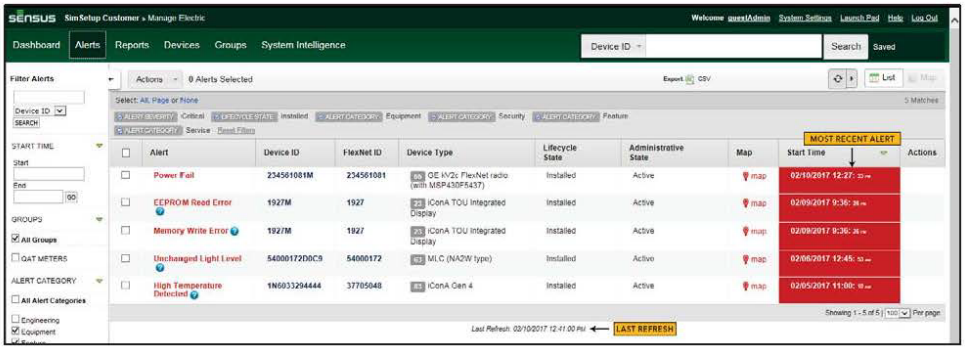


FIGURE 1: ALERTS DISPLAYED IN THE FLEXNET HEAD END SYSTEM

Stratus IQ Electric Meter Alarms

The following table describes alarms, errors, warnings, frequencies, and resolutions generated by a Sensus Stratus IQ electric meter.

TABLE 1: SENSUS STRATUS IQ ALARMS GENERATED BY METER

Alarm	Meaning	Frequency
Brownout	Voltage Sag. Set if the minimum voltage level is less than the configured Low Voltage threshold.	One alarm message is sent; the alarm stays enabled until reset of the voltage averaging window (VAW).

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Alarm	Meaning	Frequency
Calibration Data Read Error	The meter cannot access the calibration data.	One alarm message is sent, repeated each Voltage Average Window.
Clink Count	Count of the number of short power outages that last a few line cycles – called clicks. Minimum duration is configurable; most utilities use 1/10th of a second.	Click Count can be transmitted several ways: - in a snapshot and sent with every load profile message - once per day - can configure click count as a Load Profile channel and sent with every load profile message
Current Auto-Open (CAO)	Current above set threshold. Service switch opened.	Alarm sent upon occurrence.
Disconnect Corrected	When enabled in the meter's program, the meter will automatically auto-correct its service switch back to its previous position. Often the service switch has had its position changed due to tampering.	Alarm sent upon occurrence.
Disconnect Fail	There is a problem with the meter's service switch.	Alarm sent upon occurrence.
High Temperature	Socket temperatures exceed high temperature thresholds	Alarm sent upon occurrence.
Over Voltage	Voltage Swell. Set when the maximum voltage level exceeds the configured High Voltage threshold.	One alarm message is sent; the alarm stays enabled until reset of the voltage average window.

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Alarm	Meaning	Frequency
RD (Remote Disconnect) Error	This alarm is sent when one of the following conditions occur: The meter's internal service switch did not move to the correct position after a command or the meter's service switch auto-correct alarm message was sent. The RD switch moved to an unexpected position. The RD switch has been bypassed or bridged. The RD switch is open but current is flowing.	Alarm sent upon occurrence.
RD Position Changed	The Remote Disconnect position changed but not by a user command.	Alarm sent upon occurrence.
Reverse Energy	Reverse Power has been detected continuously for five minutes. The time is configurable.	One alarm message is sent, and the alarm stays enabled until reset of the voltage average window.
Power Outage	Power Outage Alarm. No power detected for longer than the configured Outage Time threshold.	The meter transmits alarm messages upon loss of power. Outage alarm messages are sent randomly over ten minutes. The initial outage alarm is sent from 0 to 32 seconds following confirmation of a permanent outage.

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Alarm	Meaning	Frequency
Power Restoration	Power Restoration Alarm. AC power is detected for a longer period than the configured Restore Time threshold (after a loss of power occurred).	The meter transmits alarm messages upon power restoration.
Tamper	Activated when meter's accelerometer detects motion in conjunction with a power outage.	Alarm sent upon occurrence.
Temperature Auto Open (TAO)	The temperature has exceeded the configurable Temperature Auto Open threshold. If enabled, the service switch (if available) will be opened to ensure safety.	Alarm sent upon occurrence.

Aclara I-210+c Electric Meter Alarms

The following table describes alarms, errors, warnings, and resolutions generated by an Aclara I-210+c electric meter.

TABLE 2: ACLARA I-210+C ALARMS GENERATED BY METER

Alarm	Meaning	Frequency
Clock Error	The meter's clock failed.	Weekly alarm message.
Configuration Error	The checksum of the configuration data table cannot be verified.	Weekly alarm message.
Cover Error	The meter's cover is open.	Weekly alarm message.

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Alarm	Meaning	Frequency
Demand Overload	The demand value is higher than the programmed value.	Weekly alarm message.
High Line Current Error	The meter has high current.	Weekly alarm message.
Low Battery	The meter's battery has low voltage. This will also appear if the battery is missing.	Weekly alarm message.
Low Loss Potential	The meter is missing phase.	Weekly alarm message.
Measurement Error	Measurement error detected	Weekly alarm message.
Meter Unprogrammed	The meter is not currently programmed.	Weekly alarm message.
NONVOL Error	The meter cannot access the EEPROM.	Weekly alarm message.
Power Failure	The meter has lost power.	Status message.
Processor Resets	The number of times the meter's processor has been reset.	Weekly alarm message.
RAM Failure	The RAM checksum test failed during bootup.	Weekly alarm message.
ROM Failure	The meter cannot access the EEPROM.	Weekly alarm message.
RX Calibration Errors/Receiver Calibration	The number of times the receiver could not calibrate.	Weekly alarm message.

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Alarm	Meaning	Frequency
Self-Check Error	The meter failed the self-check during a reboot.	Weekly alarm message.
Tamper Error	Meter tampering has been detected.	Weekly alarm message.
Transmitter (TX Lock Errors)/ Synthesizer Lock Failures	The number of times the transmitter could not lock to a frequency.	Weekly alarm message.

Aclara kV2c Electric Meter Alarms

The Aclara kV2c electric meter captures operational events in the meter's event log, including power-up and power-down, test mode activation and deactivation, and demand reset. The following table describes alarms, errors, warnings, and resolutions generated by an Aclara kV2c electric meter.

TABLE 3: ACLARA KV2C ALARMS GENERATED BY METER

Alarm	Meaning	Frequency
Bad password	The number of allowable password attempts has been exceeded.	Weekly alarm message.
Battery and Potential fail	Meter lost voltage and a battery is not connected or has failed. (This warning is expected on meters without a battery.)	Weekly alarm message.
Clock Error	The meter's clock stopped.	Weekly alarm message.
Demand Overload	The demand value is higher than the programmed value.	Weekly alarm message.
DSP Error	The digital signal processor cannot process voltage and current data.	Alarm sent upon occurrence.
EEPROM	The meter has detected an error in stored data and configurations.	Weekly alarm message.

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Flash Code Error	Error occurred in code stored in flash memory.	Alarm sent upon occurrence.
Flash Data Error	Error occurred in data stored in flash memory.	Alarm sent upon occurrence.
Leading kVARh	The meter has detected a leading KVAr condition.	Weekly alarm message.
Loss of Program	The meter configuration process did not complete as expected.	Weekly alarm message.
Low Battery Error	The meter's battery has low voltage. Also displayed if the battery is missing. (Battery not required in FlexNet system.)	Weekly alarm message.
Low Loss Potential (Sag)	The meter voltage has dropped below the programmable threshold.	Weekly alarm message.
Measurement Error	Measurement error detected	Weekly alarm message.
Meter Chip Error	The meter detected an error with the metering chip.	Alarm sent upon occurrence.
Meter Unprogrammed	The meter is not currently programmed.	Weekly alarm message.
NONVOL Error	The meter cannot access the EEPROM.	Weekly alarm message.
Power Outage	Power Outage Alarm. No power detected for longer than the configured Outage Time threshold.	The meter transmits alarm messages upon loss of power. Outage alarm messages are sent randomly over ten minutes. The initial outage alarm is sent from 0 to 32 seconds following confirmation of a permanent outage.

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Power Restoration	Power Restoration Alarm. AC power is detected for a longer period than the configured Restore Time threshold (after a loss of power occurred).	The meter transmits alarm messages upon power restoration.
RAM Failure	The RAM checksum test failed during bootup.	Alarm sent upon occurrence.
Received kWh	Energy has been detected coming from the load side of the meter (reverse energy)	Alarm sent upon occurrence.
ROM	The meter cannot access the ROM.	Alarm sent upon occurrence.
ROM Failure	The meter cannot access the EEPROM.	Alarm sent upon occurrence.
Time Changed	The time in the meter has changed.	Weekly alarm message.

Honeywell A3 ALPHA Electric Meter Alarms

The following table describes alarms, errors, warnings, and resolutions generated by a Honeywell A3 ALPHA meter with a SmartPoint communication module.

TABLE 4: HONEYWELL A3 ALPHA ALARMS GENERATED BY METER

Alarm	Meaning	Transmitted By
Clock Error	The meter's clock failed.	Weekly alarm message.
Config Error	The checksum of the configuration data table cannot be verified.	Weekly alarm message.
Demand Overload	The demand value is higher than the programmed value.	Weekly alarm message.

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Alarm	Meaning	Transmitted By
Low Battery	The meter's battery has low voltage. This will also appear if the battery is missing.	Weekly alarm message.
Low Loss Potential	The meter is missing phase.	Weekly alarm message.
Measurement Error	Measurement error detected	Weekly alarm message.
Meter Unprogrammed	The meter is not currently programmed.	Weekly alarm message.
NONVOL Error	The meter cannot access the EEPROM.	Weekly alarm message.
Processor Resets	The number of times the meter's processor has been reset.	Weekly alarm message.
RAM Failure	The RAM checksum test failed during bootup.	Weekly alarm message.
ROM Failure	The meter had a problem accessing its nonvolatile EEPROM.	Weekly alarm message.
Self-Check Error	The meter failed the self-check during a reboot.	Weekly alarm message.

Temperature Alarms

The Stratus IQ meter features temperature sensors on the two load side meter spades and at the top of the meter, providing superior temperature detection and measurement in the meter. With three temperature sensing locations, the Stratus IQ can gather more accurate temperature data.

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Aclara and Honeywell electric meters support High Temperature detection using the capability on their FlexNet transceiver.

Tamper Alarms

Sensus employs several methods of detecting physical tampering of electric meters, including the Sensus-patented electronic tamper detection that identifies when an energized Stratus IQ meter is removed from the meter socket. This alarming condition is very accurate in reporting instances of tamper. 3rd party electric meters support tamper detection too, like reverse power flow.

Alarms may be passed along to downstream systems, including a Meter Data Management System. Examples of tamper alarms delivered immediately when they occur include loss of power, meter removal, restoration of voltage, and reverse energy flow (if the meter is not configured for net metering).

A valuable feature of the FlexNet system is its ability to remotely find meters that have been stolen and moved to another location. Illegally relocated meters are found using a unique Sensus algorithm and GPS to triangulate the position of an energized meter within approximately 100 feet.

FlexNet Transceiver Alarm Support for Electric Meters

All FlexNet-supported electric meters provide alarms for voltage sags and swells using their on-board FlexNet transceiver. A voltage alarm is triggered when the voltage crosses a utility-configured threshold for sag or swell.

Electric meters continuously monitor the energy flowing through to the load. Voltage, current, and energy thresholds are configurable. When any of the thresholds are reached, the meter sends an alert.

Power Restore and Power Fail

The meter monitors line voltage and transmits power outage alarm when the meter loses power. Power restoral alarms are transmitted upon restoral of power to the meter.

When the power fails, the meter goes into a low power state for a holding period. This holding period, called Outage Time Threshold, is configurable in the meter program from eight to 120 seconds. The meter continues to monitor the power while in the low power state. If power returns to normal during the holding period, the meter goes back to normal operation and no power outage alarm is sent. If the power is still not restored at the end of the configured holding period, the meter sends a permanent outage alarm message to the head end.

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Similarly, when power to the meter is restored, the meter enters holding period. This holding period, called the power Restoral Time Threshold, is configurable from eight to 120 seconds. When the holding period is done, if power is still on, the meter sends three power restored alarms. This waiting period helps ensure that power is fully restored and is not a momentary power on state prior to sending the power restoral alarm.

Voltage Messages

The FlexNet communication module reports the following parameters in each standard voltage message:

- Current voltage
- Average voltage
- Minimum voltage
- Maximum voltage

The FlexNet transceiver checks the voltage every 90 seconds. The maximum, minimum, and average voltages reset every time the voltage average window resets. The voltage monitoring window (VAW) is configurable in the meter program for reset to 1 hour, 6 hour, 12 hour, or 24 hour increments. The voltage monitoring window always resets at midnight in addition to the configured time.

Low Voltage Threshold (Brownout Detection)

Each time the SmartPoint communication module samples the voltage registers from the meter, the minimum voltage is compared to the brownout voltage threshold. If the minimum voltage is lower than the threshold, the brownout bit is set. The brownout bit is cleared when the voltage average window resets.

The first sample time in which the FlexNet communication module reads a voltage that sets the brownout condition, an optionally configured alarm message is sent. In addition, the brownout bit is set in each meter read message until the voltage average window expires, even if the brownout line condition has already cleared.

High Voltage Threshold

The high voltage alarm is set when the voltage exceeds the selected value. Valid values are 96 to 606 VAC in 2 volt increments.

Over Voltage Detection

Each time the SmartPoint communication module samples the voltage registers from the meter, the maximum voltage is compared to the High Voltage Threshold. If the maximum voltage is greater than the threshold, the over voltage bit is set. The over voltage bit is cleared when the voltage average window resets.

The first sample time the FlexNet communication module detects an over voltage condition, an optionally configured alarm message is sent. In addition, the over voltage bit is set in each meter read message until the voltage average window expires, even if the over voltage condition has already cleared.

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Over Class-Rated Amperage Detection

Sensus Stratus IQ meters also support over class amperage detection. Each time the FlexNet communication module samples the voltage registers from the meter, the over class amps alarm flag is checked. If the bit is set, a corresponding over class amps bit is set in the on-air FlexNet message. The over class amps bit is cleared when the voltage average window resets.

The first sample time in which the FlexNet communication module detects an over class amps bit, an optionally configured alarm message is sent. In addition, the over class amps bit is set in each meter read message, until the voltage average window expires – even if the over class amps condition has already cleared.

Optionally, a Stratus IQ meter equipped with a service switch can be set to open its switch for safety is class amps is exceeded – for instance 200 amps for a form 2S meter.

Current and Line Frequency Measurement

The FlexNet communication module reports the instantaneous current and instantaneous line frequency in each enhanced alarm message.

Reverse Energy Detection

Reverse energy detection is a configurable feature. The meter will set a flag indicating reverse energy flow when reverse energy detection is enabled and the condition occurs.

- If the flag is set, a corresponding reverse energy bit will be set in the on-air FlexNet transmission. The reverse energy bit is cleared when the voltage average window resets.
- When the meter initially detects reverse flow an optionally configured alarm message is sent.

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ATTACHMENT F: SENSUS WATER SMARTPOINT COMPATIBILITY GUIDE

QUICK GUIDE

510M/520M SmartPoint® Module

Water Meter and Ancillaries Compatibility Quick Guide

Sensus

Register Type	Model	Meter Type
ICE & ICE Opto	All meters that accept ICE & ICE Opto 3-wire.	Positive Displacement, Multi-jet, Compound, Turbine, Propeller, Fire Service
OMNI™	T2, C2, F2, R2	Floating Ball Technology
accuMAG™	accuMAG	Mag
iPERL®	iPERL	Mag
Permalog	Permalog+	Acoustic Technology
Sensus® Electronic Register+™ and E-Register	accuSTREAM, SR II	Positive Displacement
ally	ally	ally
Hydroverse	Hydroverse	Mag

Badger

Register Type	Model	Meter Type
ADE	All meters that accept ADE 3-wire and TouchCoupler support, Sensus Approved TR/PL lead, up to 8 wheels.	Disc, Turbine, Compound, Fire Service
HR-E LCD	All meters that accept HR-E LCD 3-wire, up to 8 wheels. Must be at least SmartPoint firmware version R1.2.1f or higher.	Disc, Turbo Series, Compound Series, Combo Series, Fire Service
E-SERIES 8 digits	All models with firmware version 1.36. 3-wire**	Ultrasonic

Neptune

Register Type	Model	Meter Type
Proread 4 wheel	All meters that accept Proread registers. 3-wire support	Positive Displacement, Turbine, Compound, Fire Service
E-coder with TouchCoupler 4 wheel	All meters with firmware version 01.02. Manufactured after 1/2016.	Positive Displacement, Turbine, Compound, Fire Service
Proread 6 wheel	All meters that accept Proread registers. 3-wire support	Positive Displacement, Turbine, Compound, Fire Service
E-coder 6 wheel	All meters that accept E-coder registers. 3-wire support (Proread protocol only)	Positive Displacement, Turbine, Compound, Fire Service
E-coder with TouchCoupler 6 wheel	All meters with firmware version 01.02. Manufactured after 1/2016.	Positive Displacement, Turbine, Compound, Fire Service
E-coder 8 wheel	All meters that accept E-coder registers. 3-wire support*	Positive Displacement, Turbine, Compound, Fire Service
E-coder with TouchCoupler 8 wheel	All meters with firmware version 01.02. Manufactured after 1/2016.	Positive Displacement, Turbine, Compound, Fire Service
ProCoder 8 wheel	All meters with firmware version 63.16. Manufactured after 7/2018. TouchCoupler and 3-wire**	Positive Displacement, Turbine, Compound, Fire Service

*SmartPoint firmware version 1.2 and above only
**SmartPoint firmware version 1.7 and above only

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Elster/Amco

Register Type	Model	Meter Type
Scancoder	All meters that accept Scancoder 3-wire support (Sensus protocol only).	Positive Displacement, Turbine, Multi-jet, Bulk combo, Fire service
InVision	All meters that accept InVision 3-wire support (Sensus protocol only).	Positive Displacement, Turbine, Multi-jet, Bulk combo, Fire service

Master Meter

Register Type	Model	Meter Type
AccuLinx V1.19	All meters that accept AccuLinx 3-wire and TouchCoupler, Sensus approved TR/PL lead.	Positive Displacement
Sonata 8 digits	3-wire and TouchCoupler, firmware version 5.01 or greater.**	Ultrasonic
Octave 8 digits	3-wire only.**	Ultrasonic

McCrometer

Register Type	Model	Meter Type
McCrometer flowcom FC100-00M 8 digits	3-wire reading. Firmware 2.4. Manufactured after 4/2015.	Propeller
ML255 battery powered register 8 digits	3-wire reading only. Firmware 5.09 or greater.**	Propeller
ML Series converter, AC powered 8 digits	3-wire reading only. Firmware 3.03 or greater.**	Propeller

Kamstrup

Register Type	Model	Meter Type
flowIQ 2100 4, 6 and 8 wheel	3-wire reading. Version C1.	Ultrasonic
flowIQ 2100 4, 6, and 8 wheel	3-wire and TouchCoupler version H1.**	Ultrasonic

Diehl

Register Type	Model	Meter Type
Hydrus 8 digits	3-wire support only.** Manufactured after 4/2018.	Ultrasonic

Zenner

Register Type	Model	Meter Type
PMN Nitro 01 4 wheel, 6 wheel	3-wire support only. Manufactured after 8/2015.	Multi-jet

Hersey/Mueller Systems

Register Type	Model	Meter Type
Translator	All meters that accept Translator 3-wire and TouchCoupler support, Sensus approved TR/PL lead.	Positive Displacement, Mag

*SmartPoint firmware version 1.2 and above only
**SmartPoint firmware version 1.7 and above only

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FlexNet Distribution Automation Solution

Sensus has been providing Distribution Automation (DA) solutions to utilities for over ten years. Our dedicated DA support team works in partnership with each utility to set up the FlexNet DA solution easily and quickly. Our DA customers use FlexNet for both their DA needs and their AMI needs, and these solutions are improving the utility system operations and performance. We have invested millions of R&D dollars into creating a highly available system that provides you with superior performance day in and day out – just like you do for your customers.

FlexNet stands alone in its ability to support mission-critical AMI meter billing data, DA solutions, and smart grid applications on a single communication network. The FlexNet system can be configured to read AMI meters on separate RF communications channels to ensure that each application is fully supported and does not impact the performance of other channels. Our point-to-multipoint AMI system design enables this by allowing each FlexNet-enabled endpoint in the field to communicate directly with the FlexNet Base Stations in the network.

Because of the expansion of intelligent devices in grid infrastructure and the need for improved real-time monitoring and remote control capabilities, utilities are being asked to look at their distribution system for solutions such as voltage regulators, automated feeder switches, reclosers, and capacitor banks. Utilities are evaluating strategies to address these challenges through the design and deployment of DA systems. We have been offering DA solutions to our utility customers for several years and have long-standing expertise in developing and deploying end-to-end DA systems with established, field-proven solutions that address everything from the back office to the distribution network edge. Our DA solutions comprise three main elements:

1. Intelligent communications/automation devices
2. A reliable low-latency FlexNet network communications backbone
3. SCADA-DA device management tools

Our SCADA-DA device management tools include AutomationControl and the SCADA-Xchange software suite for field device control, network management, and easy third-party SCADA integration. Collectively, these elements provide a powerful solution for real-time monitoring and control of utility distribution assets, users, and communications.

We designed our DA solution with interoperability in mind. It interfaces with any DNP3- or Modbus-enabled Intelligent Electronic Device (IED) using the Sensus Remote Telemetry Module (RTM II). In addition to building our DA system on open standards and protocols, our DA SCADA-Xchange software provides a powerful, open standards-based interface that supports all popular SCADA system suppliers via a DNP3 interface. Our DA technology integrates seamlessly with existing distribution systems, ensuring reliable and real-time, two-way communication. It works with legacy systems, industry- standard network protocols, and both old and new technologies to facilitate true end-to-end system interoperability. We have integrated our DA solution with hundreds of equipment types over the years.

Our intelligent DA field devices, enabled with FlexNet SmartPoint modules, communicate with a complete line of intelligent communication devices. Utilizing the capabilities of AutomationControl, every field device

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provides engineers, planners, and troubleshooters with easy access to a large volume of information. Our DA solutions help utilities get the best value out of their distribution assets by enhancing system reliability for reduced outage times, optimizing grid efficiency, and reducing costs. Sensus DA delivers cost-effective wireless communication and control solutions for a wide range of DA-enhancing power delivery reliability and efficiency applications. Examples of these applications include the following:

- Recloser controller communications to enable better voltage optimization
- Capacitor bank controllers to improve distribution grid efficiency
- Automated line switches to improve distribution reliability
- Industrial and commercial load management to extend the utility's SCADA system to these critical loads
- Substation automation remote monitoring and control support for substations not already tied in to the SCADA system
- Faulted circuit indicators (FCIs) and current sensor monitoring for improved outage and restoration management
- Line voltage monitoring to improve reliability monitoring and outage reporting
- Power reliability monitoring at key points in the distribution network to detect problems before they grow bigger

Our field-proven DA solutions provide electric utilities with secure, robust, and cutting-edge solutions for remote monitoring and control of distribution systems and assets.

Sensus DA Differentiators

Our SCADA automation solution provides unique market differentiators by integrating three key solutions:

1. Dedicated & Secure Wireless Infrastructure: The FlexNet-enabled, smart-utility dedicated, point-to-multipoint wireless communication network incorporates key functional elements:

- It supports multiple applications.
- It provides prioritized low-latency messaging for mission-critical smart utility applications.
- It is simple and cost effective to add endpoints or applications.
- Data transmission is secured with AES-256 encryption and authentication.

2. System Interoperability: We provide an expanding suite of utility system applications and solutions that enables end-to-end system interoperability.

3. Smart Automation Endpoints: We offer a powerful portfolio of FlexNet-enabled smart utility SCADA endpoints to enhance easy third-party smart endpoint integration in addition to smart field device monitoring, alarming, and reporting.

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What Do These Differentiators Actually Offer?

As previously outlined, we provide differentiating elements that are enabled by each of the three key smart utility solutions areas:

FlexNet Communications Infrastructure

The FlexNet-enabled wireless point-to-multipoint technology is ideal for DA applications, which require low latency and high reliability. Key features include the following:

- Operates exclusively on licensed, clear-channel spectrum to reduce interference from other wireless devices.
- Point-to-multipoint technology allows utilities to segment available spectrum into separate channels so that mission-critical automation applications and devices have a dedicated pathway. For example, DA communications are put on their own RF channel with FlexNet, enabling prioritization for SCADA automation data streams.
- Routing and command and control intelligence is centralized to leverage available spectrum bandwidth more efficiently when harvesting critical data from DA devices. This network architecture enhances security because there are fewer access points from which to hack into the network.
- Supports 4G cellular communications on AT&T's 4G cellular network and Verizon's 4G cellular network.

AutomationControl/SCADA-Xchange/SCADA Interoperability

Our AutomationControl software platform, combined with the integrated SCADA-Xchange data interface, provides a uniquely powerful platform for enabling three elements that are integral to enabling smart utility applications:

1. Third-party device interoperability: The AutomationControl software platform provides a uniquely powerful interface for integrating with both legacy and new third-party intelligent electronics devices (IEDs). When paired with our RTM II smart communication gateway, AutomationControl acts as a toolkit for utilities to easily integrate third-party SCADA controls, providing effective and secure "end-to-end" device application connectivity.

2. Third-party data interoperability: In addition to providing a powerful set of device integration tools, the SCADA-Xchange software tool provides a uniquely flexible means to easily map both third-party SCADA control data and Sensus smart utility SCADA endpoints into third-party SCADA systems. SCADA-Xchange software is a powerful means of integrating our control and data acquisition functionality into distribution SCADA systems. It allows a third-party SCADA system to poll any endpoint in the field via our DA solution as if it were connected directly to the SCADA system.

3. Actionable Intelligence: As an added benefit, the AutomationControl software platform incorporates the unique ability to leverage device data and events into actionable intelligence. This ability to act on device data differentiates AutomationControl from competitive offerings that passively move device data without

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the ability to act or intelligently discern critical system conditions.

Smart Utility SCADA Automation Endpoints

To complete our automation solutions offering, we also provide a powerful portfolio of smart utility SCADA endpoints to further enhance and enable smart utility applications to more effectively meet the objectives of automating and addressing critical business needs. Our smart utility endpoints include:

Intelligent Communication Field Protocol Gateway – RTM II Remote Telemetry Module: This is a powerful plug-and-play solution that enables end-to-end field interoperability with any compatible third-party intelligent electronic control (IED) that supports either the DNP3 or Modbus automation protocols.

Flexible Input/Output SCADA Control MicroRTU – TC866: This is a flexible hardware platform for enabling and addressing a wide range of SCADA automation needs across DA applications. This DA endpoint supports digital state input and outputs and analog inputs and is an ideal solution for water DA applications because the equipment in the field often supports only input and output signals.

DA Capacitor Bank Control MicroRTU – TC032: This endpoint is ideally suited for DA applications such as Volt-VAR optimization or central control applications for switched capacitor banks.

DA NaviComm Faulted Circuit Indicator Monitor: This is a solution that enables as many as 12 Horstmann Smart Navigators to be integrated with our NaviComm endpoint to monitor and control faulted circuit indicators (FCIs), which provide fault current magnitude and load metrics. Its unique load-monitoring and reporting capabilities provide utilities with access to critical operational and planning information in real-time along with traditional fault indication.

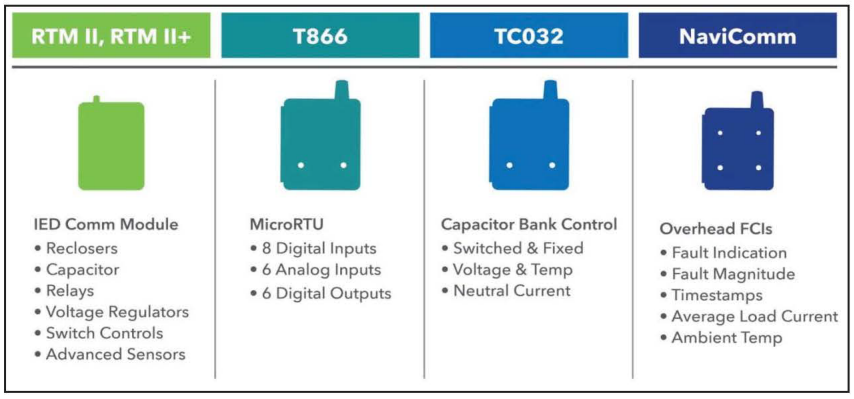


FIGURE 14: DA ENDPOINTS

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The RTM II+ endpoint uses RS-232, RS-485, or Ethernet physical connections and DNP3 or Modbus protocols to communicate with several diverse distribution devices. More equipment types are added to this list as our utility customers ask us to work on newly selected equipment.

TABLE 4: LIST OF IEDS

Manufacturer	IED	Application	Protocol
Cooper	Form 5	Recloser Control	DNP
Cooper	Form 5 - LS	Recloser Control	DNP
Cooper	Form 5 - TS	Recloser Control	DNP
Cooper	Form 6	Recloser Control	DNP
Cooper	Form 6 - LS	Recloser Control	DNP
Cooper	Form 6 - TS	Recloser Control	DNP
Cooper	SMP4 Gateway	Data Concentrator	DNP
DirectLogic	DL05	PLC	Modbus
Eaton Cutler Hammer	MPCV	Network Protector	DNP
Eaton Cutler Hammer	VaultGard	Network Protector	DNP
Electro Industries	DMSS300 Series	Meter	DNP
Electro Industries	Nexus 1250	Meter	Modbus
Electro Industries	Nexus 1250	Meter	DNP
ETI	MNPR	Network Protector	DNP
GE	DART	Power Quality Monitor	DNP
GE	Kelman TRANSFIX	Transformer Monitor	DNP
GE Harris	D25	Substation Control	DNP
GridSense	DataPAC	Faulted Circuit Indicator	DNP
GridSense	Transformer IQ	Transformer Monitor	DNP
HD Electric	VARCOM 1600	Capacitor Bank Control	DNP
ICMI	UVR-1	Voltage Regulator Control	DNP
Itron	Q1000	Meter	DNP
Landys & Gyr	MAXSys Elite	Meter	DNP
Lindsey	SmartPin	Faulted Circuit Indicator	DNP
Maysteel	100 Series	Capacitor Bank Control	DNP
Maysteel	ProCap	Capacitor Bank Control	DNP
Morgan Schaffer	Calisto 2	Environmental Monitor	DNP
MPE	ISD	Pump Control	Modbus
Multitrode	MultiSmart	Pump Control	Modbus
Novexia	Auguste	Switch Control	DNP
NOJA	RC01	Recloser Control	DNP
NOJA	RC10	Recloser Control	DNP
Nulec	ACO	Recloser Control	DNP
Nulec	ACR	Recloser Control	DNP
OptiSense	OSP	Power Quality Monitor	DNP

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PowerLogic	ION8600	Meter	DNP
PV Powered	PVP100kW	Inverter	Modbus
PV Powered	PVP30kW	Inverter	Modbus
PV Powered	PVP75kW	Inverter	Modbus
QEI	6ACP5	Switch Control	DNP
QEI	eCAP II	Capacitor Bank Control	DNP
Red Lion	Data Station Plus	PLC	Modbus
Reliatronics	RTU2000	Switch Control	DNP
S&C	4801	Switch Control	DNP
S&C	5801	Switch Control	DNP
S&C	5802	Switch Control	DNP
S&C	5803	Switch Control	DNP
S&C	6801	Switch Control	DNP
S&C	5801 IntelliTeam II	Switch Control	DNP
S&C	5802 IntelliTeam II	Switch Control	DNP
S&C	EnergyLine 1000	Capacitor Bank Control	DNP
S&C	IntelliCap Plus	Capacitor Bank Control	DNP
S&C	IntelliRupter PulseCloser	Switch Control	DNP
S&C	M-series	Switch Control	DNP
S&C	Vista	Switch Control	DNP
Sage	1450	PLC	DNP
Sage	2100	PLC	DNP
SATEC	PM130	Meter	DNP
SATEC	PM172	Meter	DNP
Schneider Electric	Bardin G200	Faulted Circuit Indicator	DNP
Schneider Electric	MUCM	PLC	DNP
Schneider Electric	PowerLogic ION7300	Meter	DNP
SEL	SEL-2032	Data Concentrator	DNP
SEL	SEL-2414	Transformer Monitor	DNP
SEL	SEL-2431	Voltage Regulator Control	DNP
SEL	SEL-321	Feeder Protection Relay	DNP
SEL	SEL-351-6	Feeder Protection Relay	DNP
SEL	SEL-351J	Recloser Control	DNP
SEL	SEL-351P	Recloser Control	DNP
SEL	SEL-351R	Recloser Control	DNP
SEL	SEL-351R-1	Recloser Control	DNP
SEL	SEL-351R-2	Recloser Control	DNP
SEL	SEL-351RS	Recloser Control	DNP
SEL	SEL-351S	Recloser Control	DNP
SEL	SEL-3530 RTAC	Substation Control	DNP
SEL	SEL-451R	Recloser Control	DNP

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SEL	SEL-451S	Recloser Control	DNP
SEL	SEL-487V	Capacitor Bank Control	DNP
SEL	SEL-651R	Recloser Control	DNP
SEL	SEL-700GW	Wind Generator Relay	DNP
SEL	SEL-734B	Capacitor Bank Control	DNP
SEL	SEL-751A	Feeder Protection Relay	DNP
Siemens	HydroRanger 200	Pump Control	Modbus
Siemens	Intra-Link LC150	Pump Control	Modbus
Siemens	MJRL	Recloser Control	DNP
Siemens	MJXL	Voltage Regulator Control	DNP

Sensus Water SCADA Solution Overview

The Sensus solution supports many different solutions on one AMI network. One of the advanced solutions that the FlexNet system offers is our SCADA / Distribution Automation solution. This capability can be used to extend the utility's SCADA system's capabilities of equipment in the field using the FlexNet AMI system.

Two main classes of water applications are supported. The RTM II products integrate to your smart IEDs in the field supporting real time communication to these powered equipment types. The T866 endpoint supports multiple inputs and outputs for integrating to IEDs with these communication options.

Key advantages of the Sensus SCADA solution are:

- Provide both real time control and monitoring capabilities for pumps, lift stations, valves, gates, grinder pumps, and pressure and flow monitors
- Customizable alarming conditions and reporting
- Real Time, Low latency communication
- "No message left behind" philosophy
- Easy interfacing with utility SCADA system
- Full duplex, two-way communication
- Automation of Commands on logical field states
- Group Command support
  - 13 month data history
  - Over the Air Configuration support

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The following screenshots depict the types of data that are available with the Water SCADA solution.

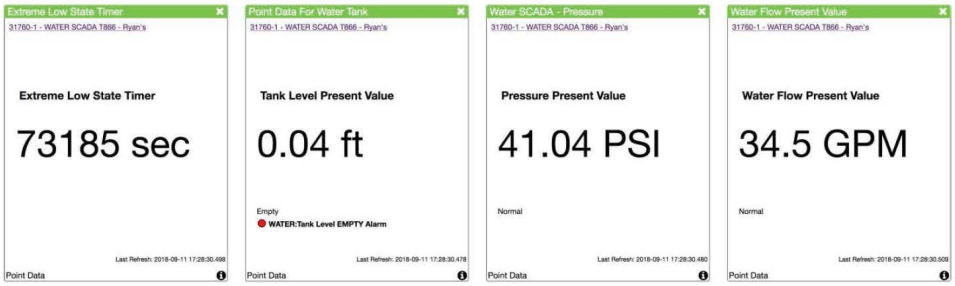


Figure 1. SCADA Dashboard Key Metrics

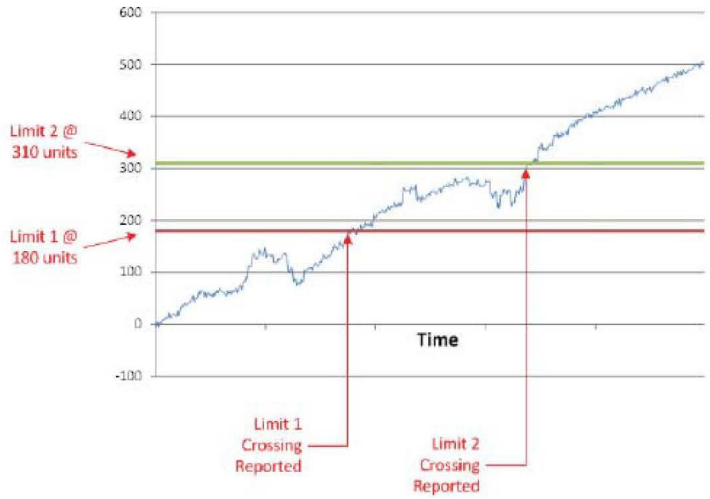


Figure 2. Rules Based Reporting

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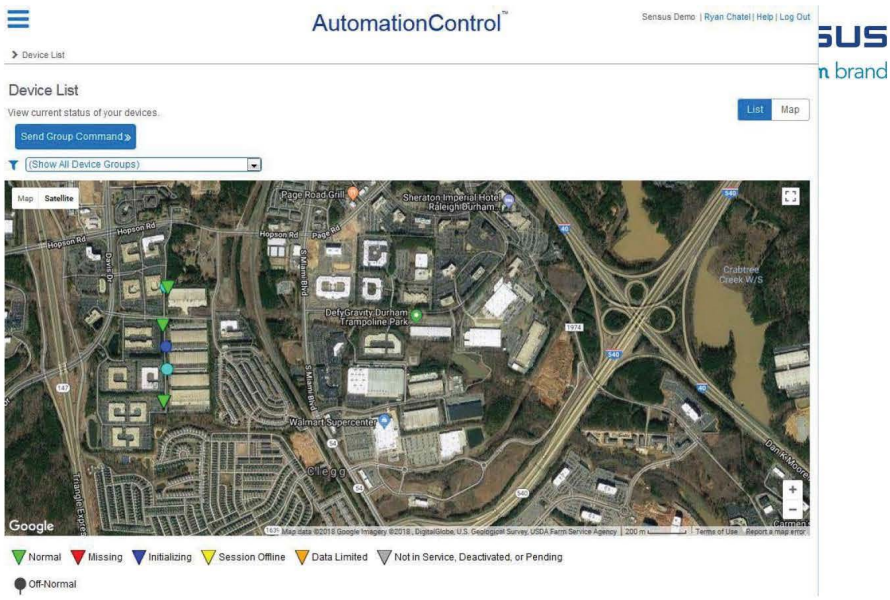


Figure 3. Smart Field Information



Figure 4. Advanced Analysis Graphing

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Interoperable Home Area Network (HAN) Functionality

Sensus offers utilities a range of interoperable HAN functionality to integrate with third-party in- home devices. Home Area Network devices and support information is included in the previous answer, but additional information is included below. Sensus focuses on industry standards and interoperability for HAN solutions to offer utilities the greatest amount of flexibility when implementing HAN. HAN solutions are supported through electric meters with an integrated Zigbee interface. Supported HAN devices include:

- Programmable Communicating Thermostats (PCT)
- In-Home Displays (IHD)

In addition, the FlexNet system supports load control modules (LCMs), enabling the utility to control up to three loads directly from the FlexNet communication network. Sensus offers LCMs for residential, 480-volt irrigation, and Comverge Door Swap applications. The following figure illustrates the system design for a Demand Response Management System (DRMS) using both HAN and LCM devices.

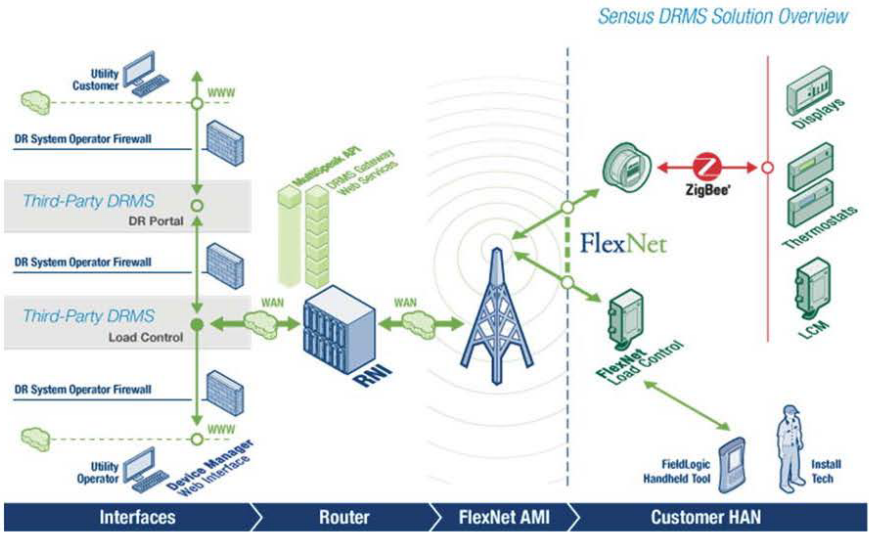


Figure 1. FLEXNET DEMAND RESPONSE MANAGEMENT AND HAN OVERVIEW

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HAN Devices

Certified HAN devices supported by the FlexNet system are listed in the following table.

Table 1. CERTIFIED HAN DEVICES

Device Name	Features	Manufacturer	Model Number / Part Number	Device Type
HAI PCT (Programmable Communicating Thermostats) Zigbee Smart Energy	**Omnistats2 Thermostats:** • Communicate with the utility company for load-shedding applications • View real-time energy bills (usage and price), graphical displays of energy cost per week, and real-time energy cost • LCD displays color changes to indicate tier and real-time kWh price • Displays HAN text messages	HAI	RC-2000 RC-1500 RC-1000	Thermostat
HAI IHD Zigbee Smart Energy	• Tracks energy usage; view information in chart or graph form based upon kWh used during time frames • LCM view allows for monitoring and control of high-load devices • View thermostats and adjust set points	HAI	81A00-1	In Home Display
HAI LCM Zigbee Smart Energy	• Controls power consumption for high-wattage loads (such as pool pumps and hot water heaters)	HAI	73A00-3 (30A) 73A00-4 (5A)	Load Control Module
Energate PCT Zigbee Smart Energy	**Foundation home energy gateway and smart thermostat:** • Set-and-forget, energy management options • Supports load control programs • Offers dynamic pricing programs (TOU & CPP) • OTA upgradable firmware	Energate	FZ100	Thermostat
Energate IHD Zigbee Smart Energy	**ZEV110 and ZEV110 In-Home Displays (PowerTab):** • Presents real-time energy use, price and billing data, and utility text messages, as communicated from a Zigbee-enabled smart meter	Energate	PTMK2UART	In Home Display

Energate LCM Zigbee Smart Energy	**Energate LC301Z Load Control Switch:** • Allows consumers and utilities to manage energy use and reduce peak demand • Disables major loads (such as AC compressor, pool pumps, and hot water heaters) • Communicates with the Zigbee- enabled smart meters • OTA upgradable firmware	Energate	LC301Z	Load Control Module
EnTek family of FlexNet LCMs (TC-FlexNet 2 Watt Remote Appliance Controller)	• Multiple relays (one 30-amp and up to two 5-amp relays) • 30-amp relay used for direct control of water heaters or other larger loads • 5-amp relays used for control circuit switching • Operates on standard Sensus FlexNet system (no Zigbee) **LCM options include:** • A standard 240 V residential A full-size 480 V model • A full-size Comverge door swap • A full-size 240 V Comverge replacement	EnTek	various	Load Control Module

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ATTACHMENT I: USER INTERFACE SCREENSHOTS

User Interfaces

Due to the vast capabilities of the system and therefore the number of the potential screenshots, Sensus' response to this section is to focus on the area's Clewiston requested screenshots. If there are additional user interfaces in question, Sensus can provide more screenshots; however also consider a live demonstration of our system. Sensus maintains a live system that we can demonstrate any aspect of the system. Due to COVID-19, we are restricting onsite visits; however the lab is configured with video cameras to present the system and enable the customer to see the change to the endpoint in real time.

Disconnect/Reconnect Management

The system management application (SMA) manages large meter requests for the utility and its users. SMA tracks current state and queued actions in real time. SMA currently works with water meters and gas and electric meters are on the roadmap.

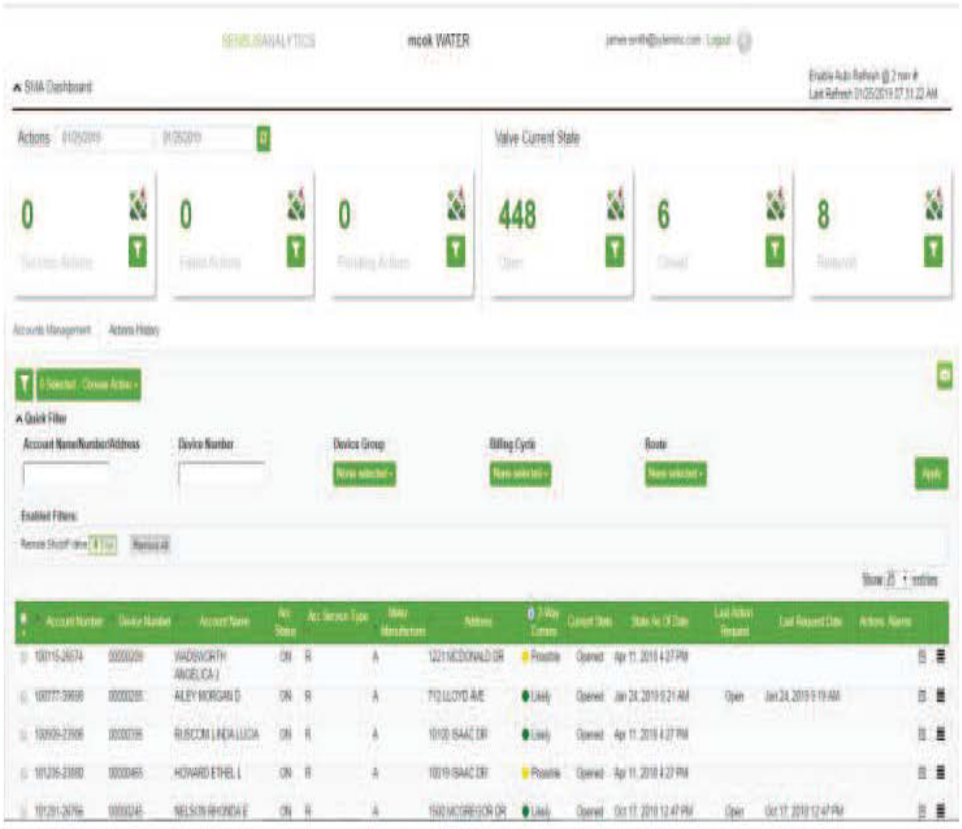


Figure 1: SMA (Example of valve management)

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Outage Tracking in Network Command Suite

The outage management application provides an instant view of the grid; data can be presented on a map or in tabular form. If raw outage data is needed in another application, all outage information can be exported out of the system.

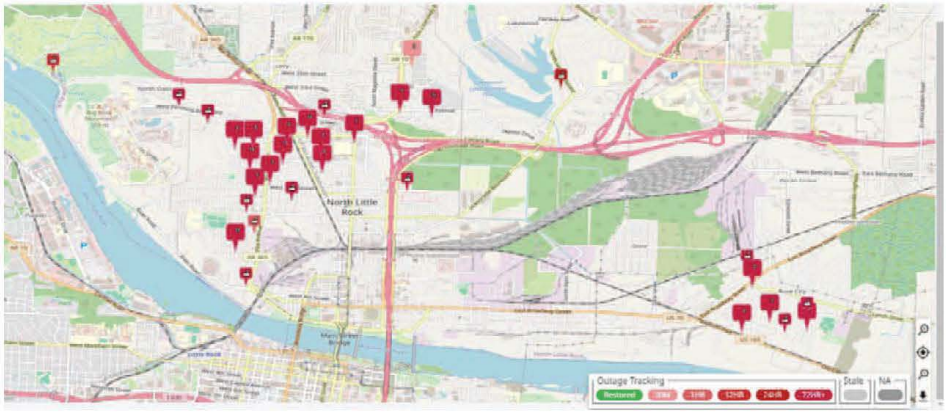


Figure 2: (Example of outages on map)

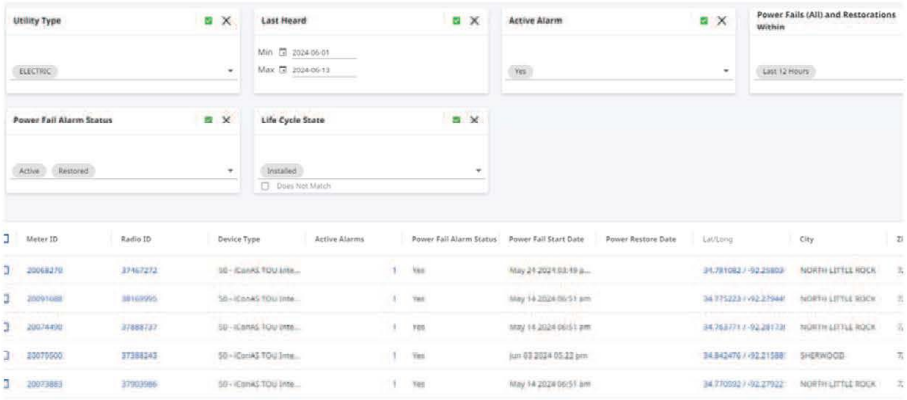


Figure 3: (Example of outages in table) (with filters)

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Network Equipment Issues

The Base Stations page displays a list of base stations in your FlexNet communication network. The page can be toggled between a table or graph view of base station statistics and status. It monitors the condition of base stations on the network, and enables you to monitor base station performance. The Base Stations page displays all base stations in a table and graph view. You can customize the table view using available filters and columns. You can also customize the Base Stations Dashboard.

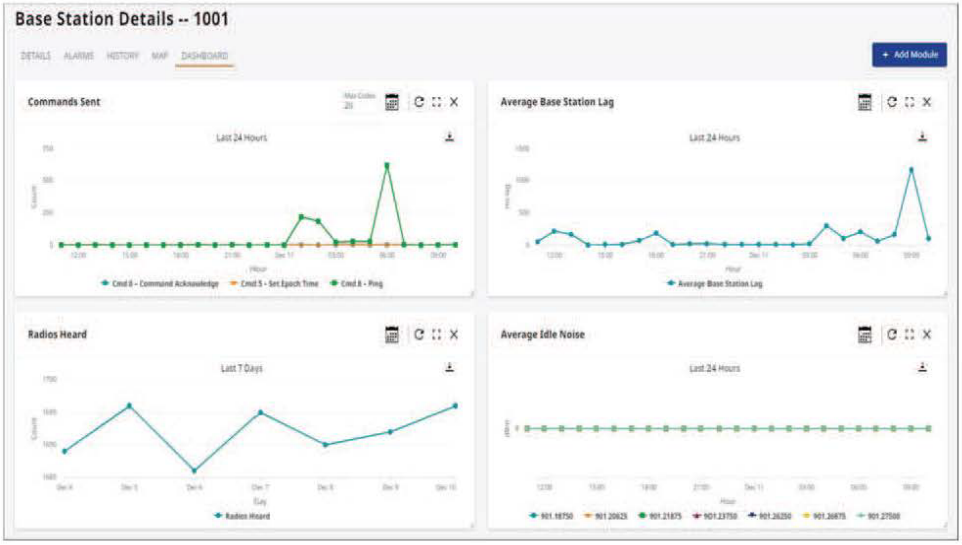


FIGURE 4: BASE STATION DETAILS

Leak Summary

The alarm insight application reports on alarming occurring within meters. The scenario provided is around leak notification at the meter. The user started with the alarm dashboard, then drilled into leak alarms in real time, followed by trending data, and concluding with meter details.

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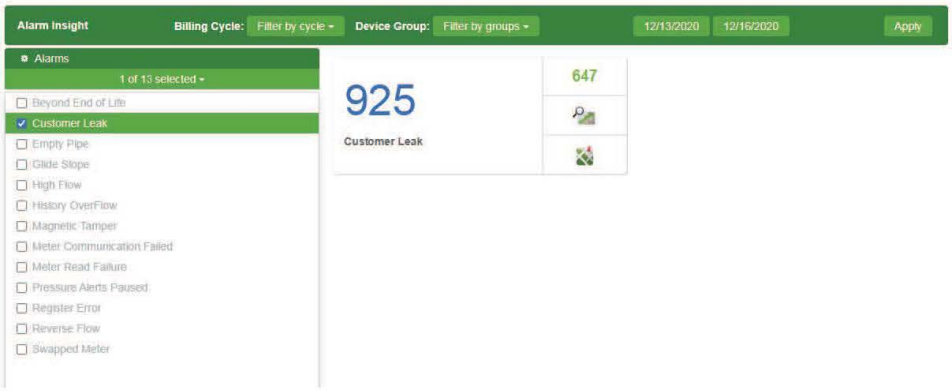


Figure 5: Alarm Insight (Example Dashboard)

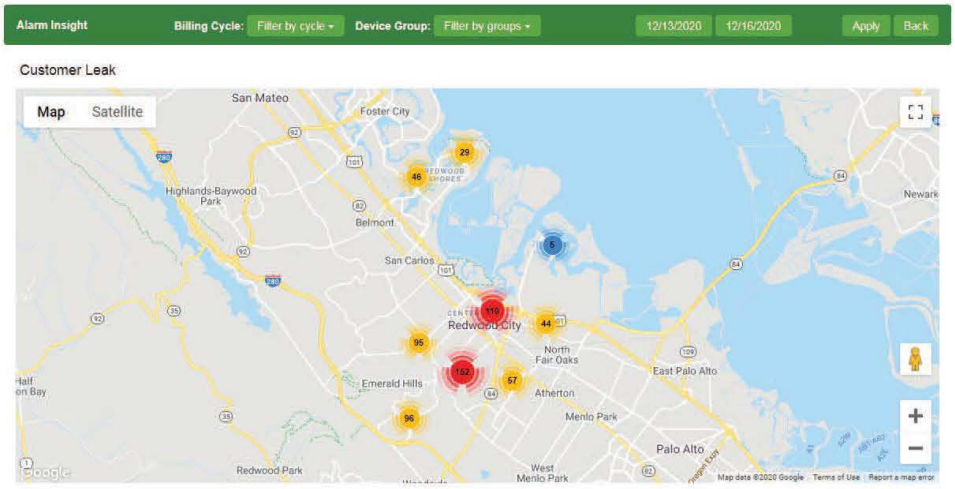


Figure 6: Alarm Insight (Example leak mapping)

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Figure 7: Alarm Insight (Example leak trending)

Alarm Insight | Billing Cycle: Filter by cycle | Device Group: Filter by groups | 12/13/2020 | 12/16/2020 | Apply | Back

Customer Leak

Copy | Excel | CSV | PDF | Print | Search: | Show 100 entries

Meter Id	Radio Id	Account	Customer	Address	Service Type	Zone	Cycle	Occurrences
18204140	13437036	1002755-00	Alan/Marie Drago	383-385 Roble Ave	MFR Water	UNAVAILABLE	E11	1
49036259	11512890	1008283-00	Westpoint Harbor	101 Westpoint Harbor Dr	Commercial	UNAVAILABLE	M26	16
56915201	10066350	1002324-00	Alverno Hills	10 Alverno Ct	Irrigation Res	UNAVAILABLE	M28	25
56915407	10046630	1000961-00	R.C.School Dist-Roosevelt	2400-BLK Mcgarvey Ave	Irrigation Com	UNAVAILABLE	M28	18
59393859	86107748	3002028-00	Westport Office Park	3600 Bridge Pkwy B	RW Irrigation Com	UNAVAILABLE	M28	1
60712154	10677336	1002371-00	Sequoia Health Svc., Site # 240	2951 Whipple Ave	Irrigation Com	UNAVAILABLE	M28	18
60712168	10036184	1000061-00	Kaiser Permanente, Site #cn3701	1000-BLK Veterans Blvd	Irrigation Com	UNAVAILABLE	M28	23
60712422	10681106	1007685-00	Stanford Hospital & Clinics	420 Broadway	Irrigation Com	UNAVAILABLE	M28	16
60712423	10256762	1011381-00	Bristol Meyers Squibb	740 Bay Rd	Commercial	UNAVAILABLE	M28	11
60712448	10119032	3000736-00	Ventana Del Mar HOA	700 Baltic Cir	Irrigation Res	UNAVAILABLE	M28	14
61103496	10044876	1003972-00	RWC-65175 - Parking Street System	750 Marshall St	Irrigation Com	UNAVAILABLE	M28	12
61103507	10671644	1009145-00	Jack-In-The-Box #525	1205 Broadway	Irrigation Com	UNAVAILABLE	M28	1
61538258	83831642	3002666-00	Hudson 555 Twin Dolphin Plaza, LLC	555 Twin Dolphin Dr	RW Irrigation Com	UNAVAILABLE	M28	1
62240298	13582532	1001219-00	Farm Hill Vista HOA	4004 Farm Hill Blvd	MFR Water	UNAVAILABLE	O26	1
62749011	10043552	3000315-00	Sunrise HOA	20-BLK Cadiz Cir	Irrigation Res	UNAVAILABLE	M28	16
62962777	17770442	1012358-00	Hsiangyi Chiang	493 Cypress St	SFR Water	UNAVAILABLE	E11	1
62977502	13593574	3002350-02	Erp Operating Limited Partnership	500-BLK Shell Pkwy	RW Irrigation Res	UNAVAILABLE	M28	1
62977515	10693540	3001988-00	The Bay Club Company	200 Redwood Shores Pkwy	RW Irrigation Com	UNAVAILABLE	M28	1
63110851	17576794	1010903-00	Julie Xie	275 Poplar Ave	MFR Water	UNAVAILABLE	E06	1
63110872	17578050	4001063-00	Randolph Charlton	928 Far Creek Way	SFR Water	UNAVAILABLE	E24	1
63110878	17707994	1004176-00	Gordon Manor	1616 Gordon St	Commercial	UNAVAILABLE	M28	1
64978239	11469378	1008891-00	Kainos Home & Training Center	1122 Valota Rd	SFR Water	UNAVAILABLE	O21	1
65611678	86101616	2000122-00	Parca	124 Alameda de las Pulgas	SFR Water	UNAVAILABLE	E19	1
65612955	10749556	1002665-01	Karen Regnier	1914 Redwood Ave	SFR Water	UNAVAILABLE	E06	1
66950234	13326038	4001088-00	Lawrence Onyejekwe	2450 Park Rd	SFR Water	UNAVAILABLE	E22	1
69674634	13735894	1011492-00	Steven Cheng	916 Wilmington Way	SFR Water	UNAVAILABLE	E22	1

Figure 8: Alarm Insight (Example leak drill down)

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Alarms/Events

The alert manager enables users to set up automatic notification events. An event will trigger either a text or email message; the notifications are configurable. The alert manager is an extension to the alarm insight application; by configuring alerts, the user does not have to be monitoring alarm reports but rather is notification when exceptions occur.

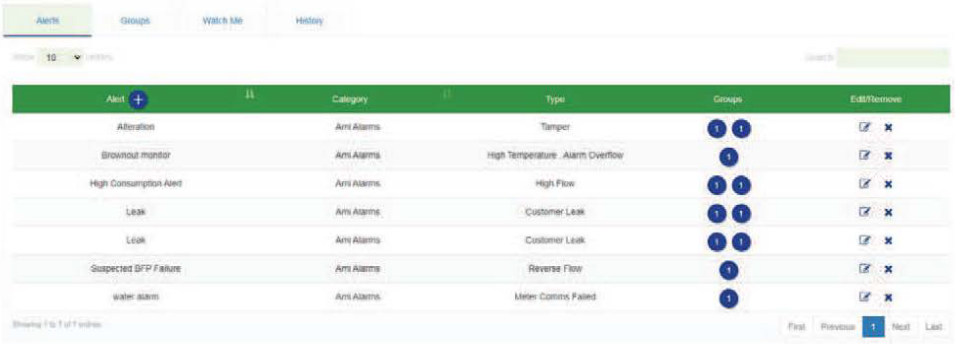


Figure 9: Alert Manager (Example alerts)

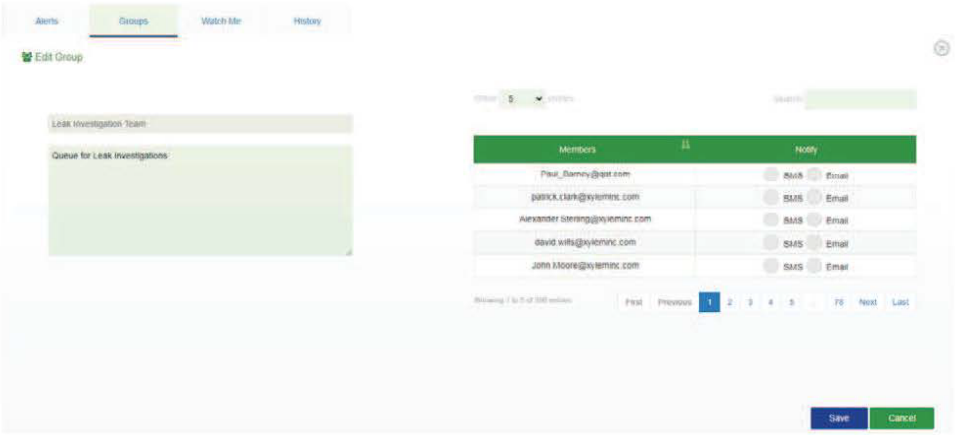


Figure 10: Alert Manager (Example notification group)

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Dashboard Level of Critical System Information

The Network Metrics application helps you fully utilize the capabilities of your Sensus FlexNet communication network. Network Metrics is a network management application that reports the health of your FlexNet network using charts, tables, graphs, and statistics. Network Metrics offers a fully customizable dashboard which displays many different metrics to help you monitor the health of your Sensus FlexNet communication network.

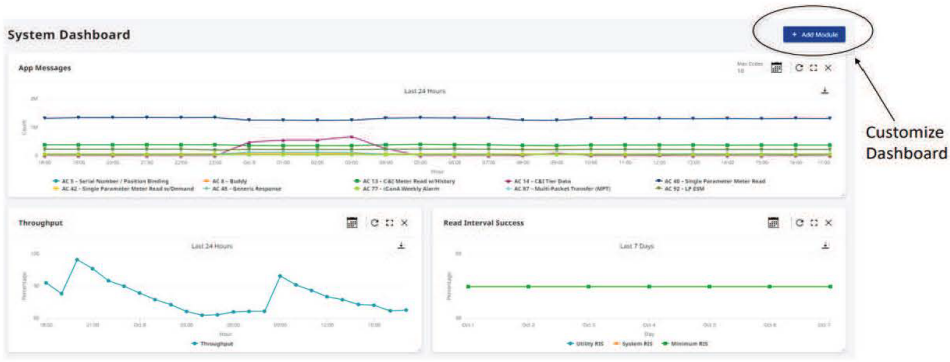


FIGURE 11: NETWORK METRICS SYSTEM DASHBOARD

Customer Portal Screen Showing Usage History

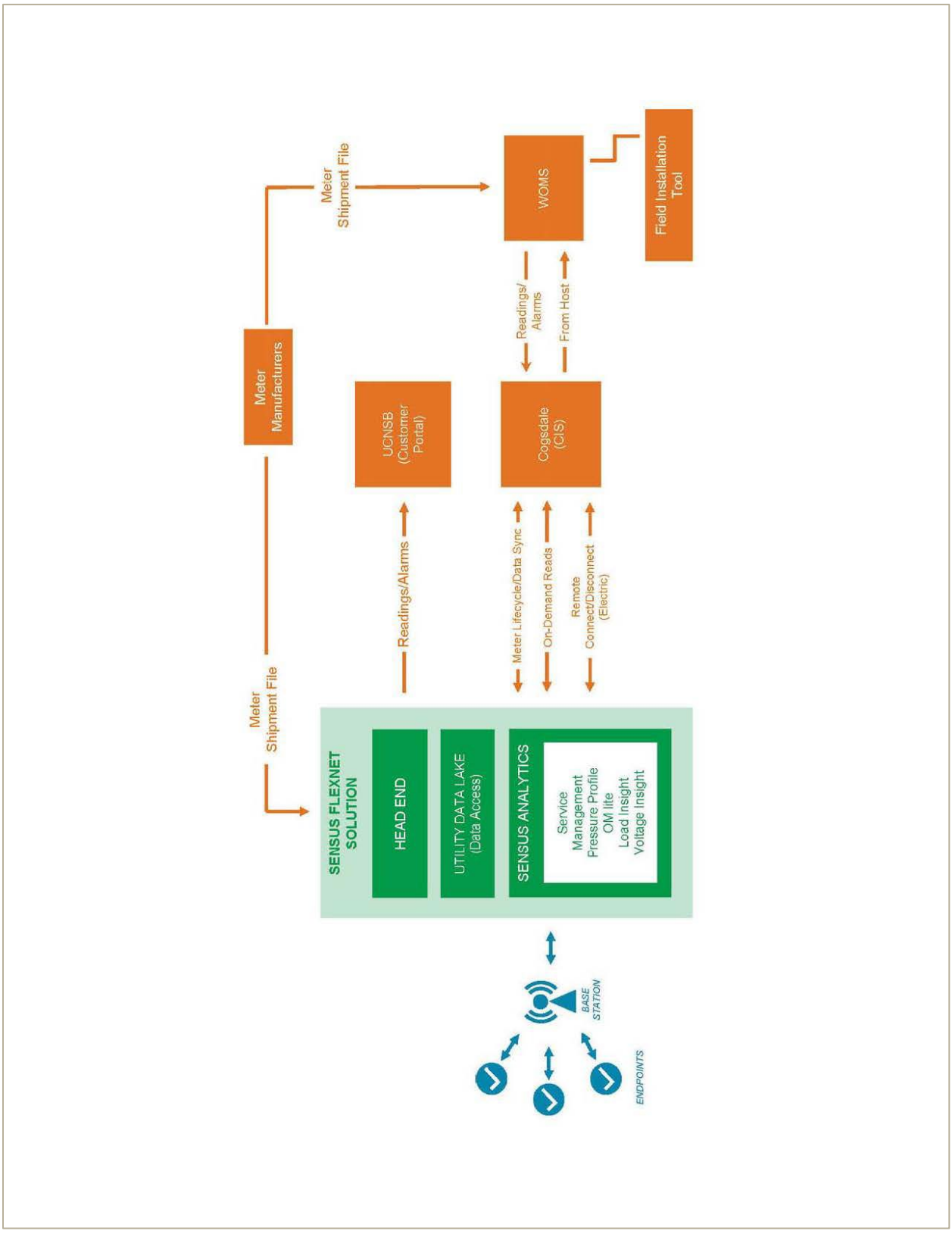
The customer portal is highly configurable to meet utility demands; not only is usage history available, but other data points can be mapped to the same graph. In this case temperature and rainfall are mapped in conjunction with usage.



FIGURE 12: SENSUS ANALYTICS CUSTOMER PORTAL USAGE

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ATTACHMENT J: VISIO SYSTEM DIAGRAM



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ATTACHMENT K: SUPPLEMENTAL ELECTRIC INFORMATION

Sensus Stratus IQ+

(Device Type 96)

TABLE 1: SENSUS STRATUS IQ+ METER SPECS

Form	Class Amps	Voltage Volts	Service Switch
1S	200	120	
2S	200	240	
3S	20	120, 240	
4S	20	240	
12S	200	120	
25S	200	120	
1SRD	200	120	X
2SRD	200	240	X
12SRD	200	120	X
25SRD	200	120	X

Aclara I-210+c

(Device Type 105)

TABLE 2: ACLARA I-210+C METER SPECS

Form	Class Amps	Voltage Volts	Service Switch	Zigbee (Optional)
1S	100	120, 240		X
2S	200	240		X
2S	320	240		X
3S	20	120, 240		X
4S	20	120, 240		X
12S	200	120/208		X
12S	320	120/208		X
25S	200	120/208		X
25S	320	120/208		X
1SRD	200	120	X	X
2SRD	200	240	X	X
12SRD	200	120	X	X
25SRD	200	120	X	X

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Honeywell A3 ALPHA

(Device Type 110)

TABLE 3: HONEYWELL A3 ALPHA METER SPECS

ANSI Form	Class Amps	Voltage Volts	Pulse Output Board (Optional)
1S	200	120 - 480	X
2S	200	120 - 480	X
3S	20	120 - 480	X
4S	20	120 - 480	X
9S (8S, 10S)	20	120 - 480	X
12S	200	120 Network	X
16S (14S, 15S)	200	120 - 480	X
35S (5S)	20	120 - 480	X
36S (6S, 46S)	20	120 - 480	X
56S	20	120 - 480	X

Aclara kV2c

(Device Type 109)

TABLE 4: ACLARA KV2C METER SPECS

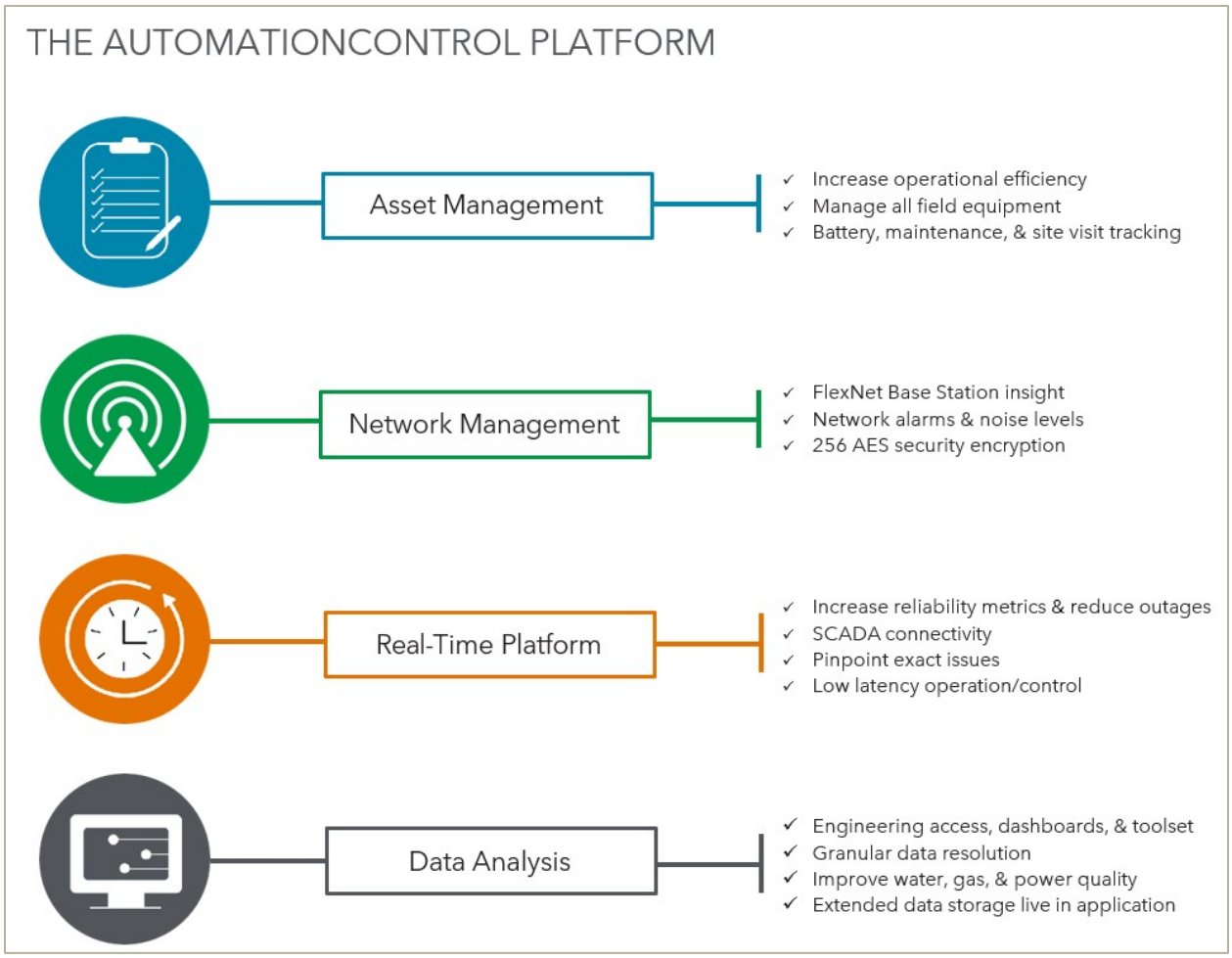
ANSI Form	Class Amps	Voltage Volts	Pulse Output Board (Optional)
1S	200	120 - 480	X
2S	200	120 - 480	X
3S	20	120 - 480	X
4S	20	120 - 480	X
9S (8S, 10S)	20	120 - 480	X
12S (13S)	200	120 - 480	X
16S (14S, 15S)	200	120 - 480	X
35S (5S, 45S)	20	120 - 480	X
36S (6S, 46S)	20	120 - 480	X

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Figure 5



Figure 6



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Figure 7:

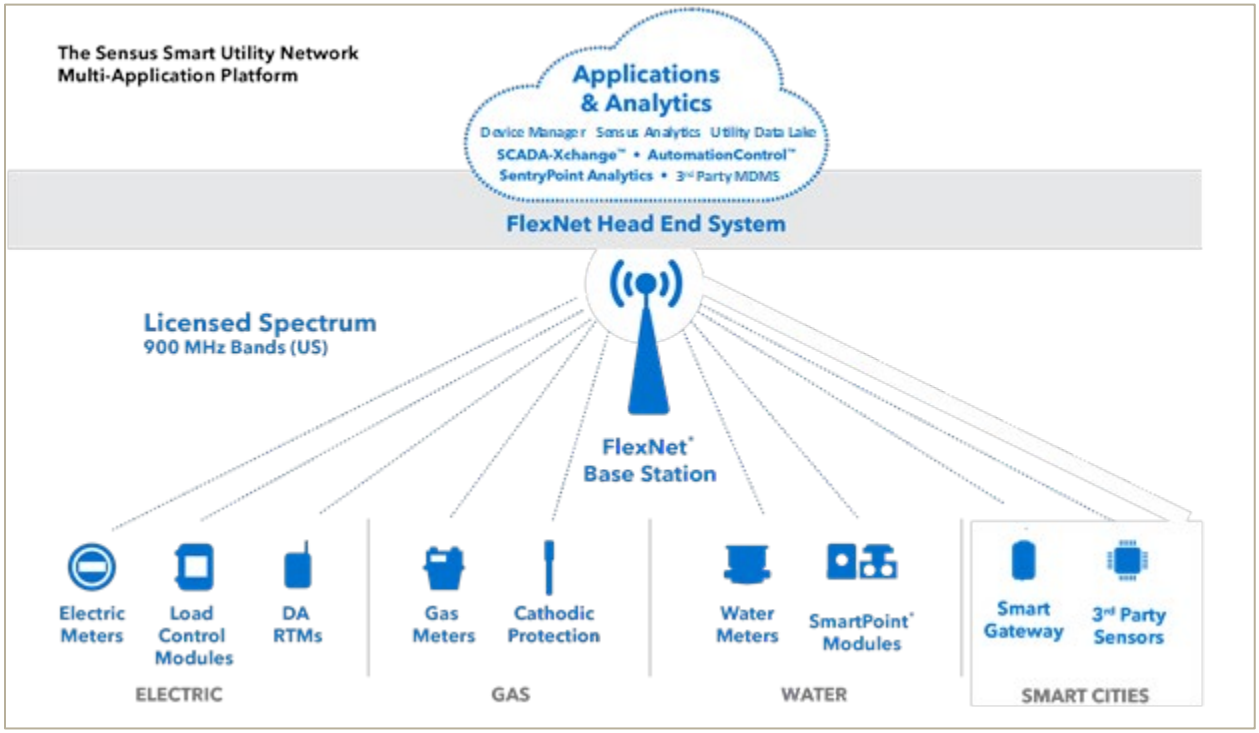


Figure 8:

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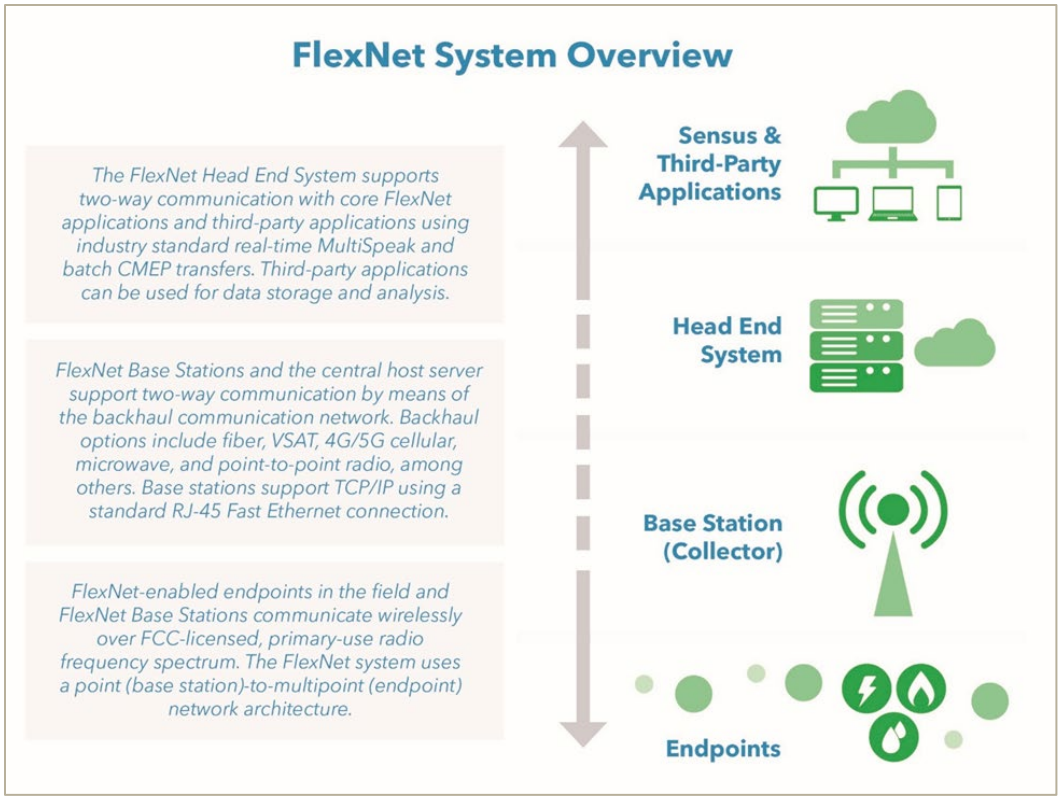
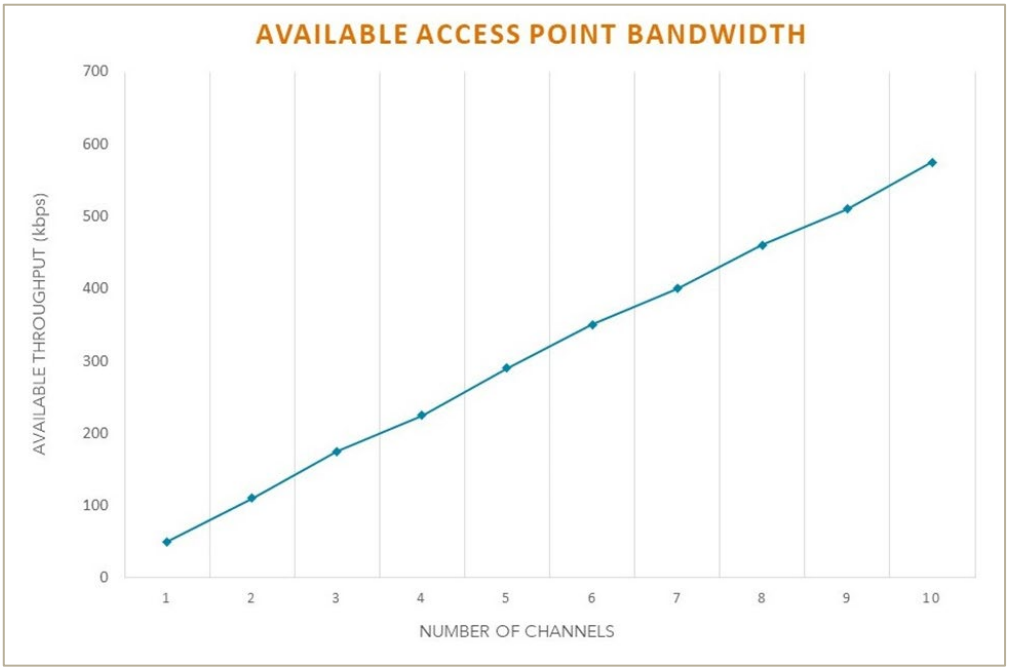


Figure 9:



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ATTACHMENT L: SENSUS TRAINING COURSE CATALOG

Sensus Education & Training

COURSE CATALOG



Summary of Available Education

- FlexNet® Introductory Series
- FlexNet® for Operators
- FlexNet® for Administrators
- Meter Installation
- Sensus Analytics
- R100NA Collector
- M400D Base Station
- Automatic Meter Reading (AMR)
- VantagePoint® Lighting Control

sensus
a xylem brand

C-ED-AMRAMI-A-1070-01

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FlexNet® Introductory Series

This series of modules gives new customers a basic understanding and appreciation of the components and applications within the Sensus FlexNet® communication network.

AUDIENCE	New Customers
METHOD	Instructor-led
	eLearning
DURATION	6 hours

Topics include:

- FlexNet® Network
- FlexNet® Roles & Responsibilities
- Regional Network Interface (RNI)™
- Sensus Launch Pad Applications
- Device Manager
- Network Pulse Application
- System Administration Application
- Sensus® Analytics™

FlexNet® for Operators

This series of modules is designed to familiarize new customers in the operator role with the fundamental tasks required to monitor the Sensus FlexNet® communication network.

AUDIENCE	FlexNet® Operators
METHOD	Instructor-led
	eLearning
DURATION	8 hours

Topics include:

- Monitoring Overview
- Monitoring Network Performance
- Monitoring RNI Operation
- Monitoring Meter Operation

FlexNet® for Administrators

This series of modules is designed to familiarize new customers in the administrator role with the fundamental tasks required to monitor and maintain the Sensus FlexNet® communication network.

AUDIENCE	FlexNet® Administrators
METHOD	Instructor-led
DURATION	4 hours

Topics include:

- RNI Component Review
- Monitoring Overview
- Security: User Access Control
- Security: System Access Control
- Security: Data Access Control
- System Operation
- Firmware Download

Meter Installation Series

(Water / Gas / Electric)

This series of modules gives new customers installation recommendations for meters and their associated SmartPoints.

AUDIENCE	New Customers
METHOD	Instructor-led
	eLearning
DURATION	6 hours

Topics include:

- FieldLogic™ Hub
- Field Device Setup
- FieldLogic™ Tools Connect
- Field Installation
- FieldLogic™ Tools Additional

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Sensus Analytics

This self-paced eLearning series of modules gives new customers the essentials of the Sensus Analytics (SA) meter data management software.

AUDIENCE	New Customers
METHOD	eLearning
DURATION	Self-paced

Topics include:

- Introduction to SA
- Device Access
- Billing Access
- Report Access
- Meter Insight
- Alarm Insight
- Administration
- Customer Portal

R100NA Collector

This series of modules is designed to familiarize the participants with the R100NA Collector.

AUDIENCE	New Customers
METHOD	Instructor-led
DURATION	1 day

Topics include:

- Hardware, Software and System Overview
- Installation
- Transceiver Login
- Software Configuration
- tgbmenu
- Monitoring
- Maintenance
- Troubleshooting

M400D Base Station

This series of modules is designed to familiarize the participants with the M400D Base Station.

AUDIENCE	New Customers
METHOD	Instructor-led
DURATION	1 1/2 days

Topics include:

- Introduction
- Hardware Overview
- Transceiver Chassis Overview
- Installation Procedure
- Operating System
- Transceiver Log In Procedure
- Power On/Off
- Transceiver Power Cycling
- Software Configuration
- tgbmenu
- Configuring the Power Supply
- Maintenance
- Troubleshooting

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Automatic Meter Reading (AMR)

Walk-By

This three-part series of education is designed to familiarize the participants with the AMR Walk-By solution.

AUDIENCE	▪ AMR Utility personnel
METHOD	▪ Remote (Consultation) ▪ Instructor-led ▪ Field Skills Verification
DURATION	▪ 4 hours (remote) ▪ 1 day On-site

Topics include:

- Remote Set-up Consultation
- Introduction to AMR
- Introduction to AutoRead®
- Meter Reading Functions in AutoRead®
- AutoRead® Troubleshooting
- HandHeld Operations
- Field Skills Verification

Walk-By / Drive-By (WBDB)

This three-part series of modules is designed to familiarize the participants with the AMR Walk-By/Drive-By solution.

AUDIENCE	▪ AMR Utility personnel
METHOD	▪ Remote (Consultation) ▪ Instructor-led ▪ Field Skills Verification
DURATION	▪ 4 hours (remote) ▪ 1 day On-site

Topics include:

- Remote Set-up Consultation
- Introduction to AMR
- Introduction to AutoRead®
- Meter Reading Functions in AutoRead®
- AutoRead® Troubleshooting
- HandHeld Operations
- Vehicle Gateway Base Station
- Meter-reading in AutoVu®
- Field Skills Verification

VantagePoint® Lighting Control

This series of modules is designed to familiarize new customers with the VantagePoint® software used to monitor and control lighting modules in the Sensus FlexNet® communication network.

AUDIENCE	▪ New Customers
METHOD	▪ Instructor-led
DURATION	▪ 1 day

Topics include:

- Introduction
- Monitoring the Lights
- Controlling the Lights
- Managing the Lights
- System Administration

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CLASS DESCRIPTION

FlexNet® for Administrators

RNI 4.7 RELEASE

FlexNet

The FlexNet Administrator class provides guidance and instruction to new customers in the administrator role in water, gas, and/or electric service utilities, on performing daily monitoring and maintenance tasks for a FlexNet® communication network, including those for securing the FlexNet network, and configuring and managing RNI system operation and FlexNet components.

METHOD

- Instructor-led class (customer's site)
- eLearning

PREREQUISITES

- FlexNet Introductory Series

AUDIENCE

- FlexNet Administrators

DURATION

- 1/2 day

RESOURCES

- sensus-training.com
- My Sensus
- 1-800-638-3748

WHAT'S NEXT

- FlexNet for Operators
- Sensus Analytics

CONTENT SUMMARY:

Module 1: RNI Component Review

- Describe the primary functions of the software application servers.
- Recognize that third-party software is required.
- State the purpose of the MultiSpeak interfaces in the RNI.
- Describe the type and format of reports available from the Reporting Component.
- Describe the high-level flow of data through the RNI.

Module 2: Monitoring Overview

- List the three key areas of the monitoring process.
- Describe some of the tasks performed in each of the three areas of the monitoring process.

Module 3: Security: User Access Control

- Identify the process for creating secure user accounts.
- Explain the difference between a service role and a functional role.
- Create a custom role.
- Define the password policy parameters.
- Create and delete user accounts.

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CONTENT SUMMARY CONTINUED

Module 4: Security: System Access Control

- Recognize the actions taken by Sensus to secure the RNI servers.
- Describe why using Transport Layer Security (TLS) certificates are important.

Module 5: Security: Data Access Control

Sensus Encryption Solution Overview

- List the primary methods used for controlling access to data.
- Describe the overall encryption process for existing and new endpoints.
- Describe the five stages of key management.

Planning for Encryption

- Name the three stages of encryption planning.
- Identify the major components of each planning stage.

Configuring Encryption Settings in the RNI

- Identify the encryption settings in the RNI.
- Recall the steps to enable encryption on an installed device in Device Manager.

Module 6: RNI Operation

Introduction to the RNI Reporting Component

- Describe the role of the RNI reporting component.
- Identify the output file formats.
- Recognize the reports created by the reporting component.

Managing Scheduled Jobs

- Identify the tools used to manage scheduled jobs.
- Verify reports are being generated in a timely fashion.
- Describe the procedure used to investigate failed jobs.

Setting Notifications

- Identify the process for setting soft alarm notifications.

Module 7: Electric Firmware Downloads

Firmware Download Overview

- Explain why to use the meter firmware download process.
- List the components that can be upgraded.

FlexNet V1

- Identify which protocol version is used based on meter type and firmware version.
- Describe the functions of the various download steps.
- List the order in which the steps are performed.
- Describe the difference between protocol version 1 and protocol version 2.

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CONTENT SUMMARY CONTINUED

FlexNet V2

- Identify the meter types which use the FlexNet Version 2 file transfer protocol.
- Describe the functions of the various download steps.
- List the order in which the steps are performed.

Firmware Download Considerations

- Identify network bandwidth and other issues to consider before performing a firmware download.

Performing Electric Meter Firmware Downloads

- Describe the preparations for and initiation of an electric meter firmware download.
- Indicate where to follow the download process as it runs.
- Determine which meters have failed to update their firmware.

Module 8: Water / Gas Firmware Downloads

Firmware Download Overview

- Explain why to use the meter firmware download process.
- List the components that can be upgraded.

Firmware Download Process

- Describe the overall download process.
- Identify network bandwidth and other issues to consider before performing a firmware download.

Performing Water/Gas Firmware Downloads

- Describe the preparations for and initiation of a water or gas meter firmware download.
- Indicate where to follow the download process as it runs.
- Determine which meters have failed to update their firmware..

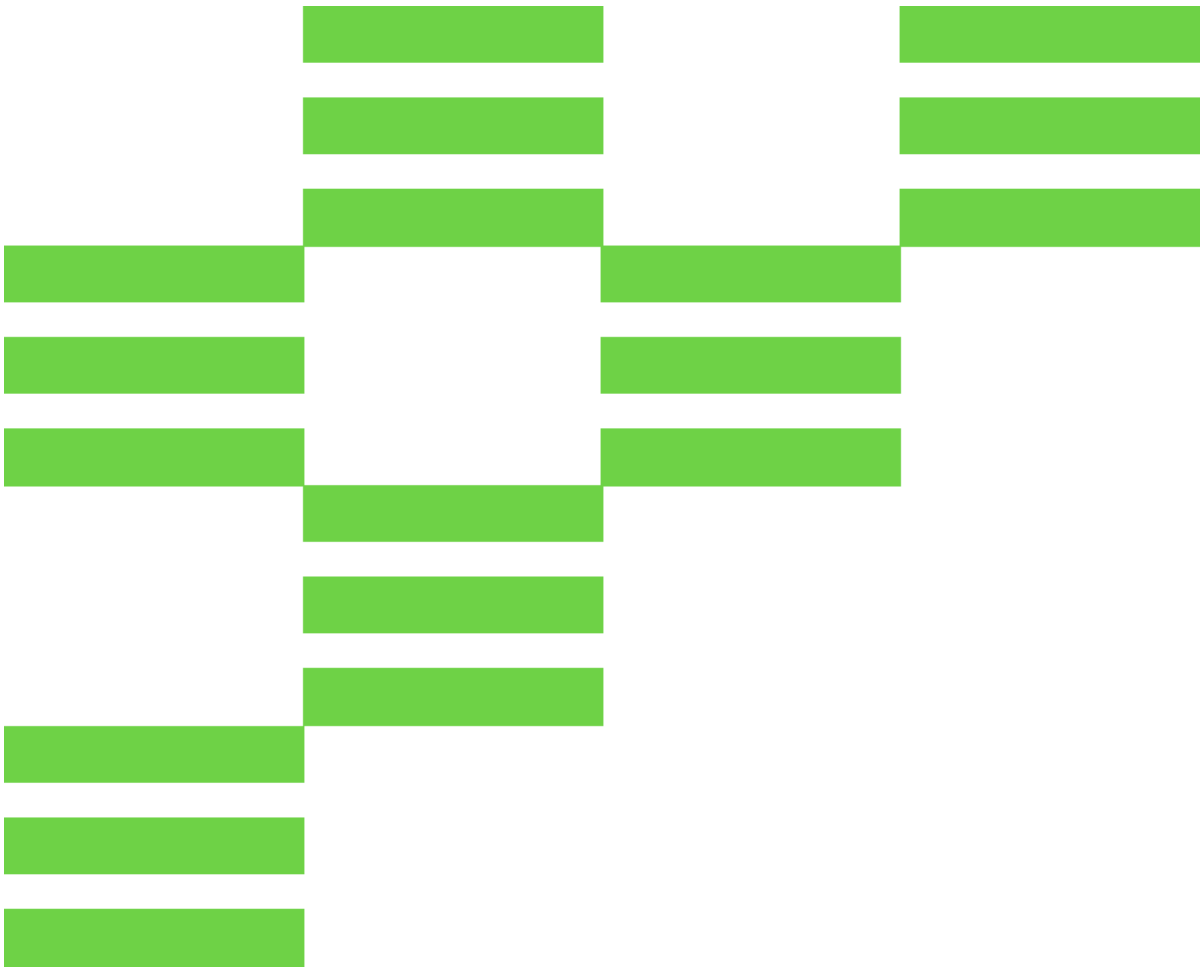
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M400B2

User Guide
AUG-10076-01



Revision History

Rev No.	Date	Description
Rev 01	JUL-2020	Updated for Unified v2.7. This User Guide replaces the previous Installation Guide, AIG-10014-xx. Updated Compliance statements.

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Document: M400B2 User Guide

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1 The M400B2 Base Station

The M400B2 Base Station is an M400 transceiver installed in a custom-configured Alpha Technologies enclosure designed specifically for Sensus that provides power for radio equipment located at an outdoor site.

Designed for localized or high endpoint density use, the M400B2 is typically mounted outside on various types of utility poles and connected to an antenna mounted on the same pole.The M400B2 transceiver offers up to 200KHz of channelized receive bandwidth with a single channel transmitter.

An M400B2 enclosure includes battery back-up provisions and provides 24 VDC power to the transceiver and ancillary equipment. When mounted on a utility pole, the M400B2 does not require any additional ground space footprint.



Sensus FlexNet communication network

The Sensus FlexNet® communication network is a long-range radio network that provides scalable and reliable two-way infrastructure.

The FlexNet system operates in the 900MHz spectrum owned by Sensus. This dedicated bandwidth ensures reliable communication for a wide variety of devices and meters including electric, water, gas, and lighting systems.

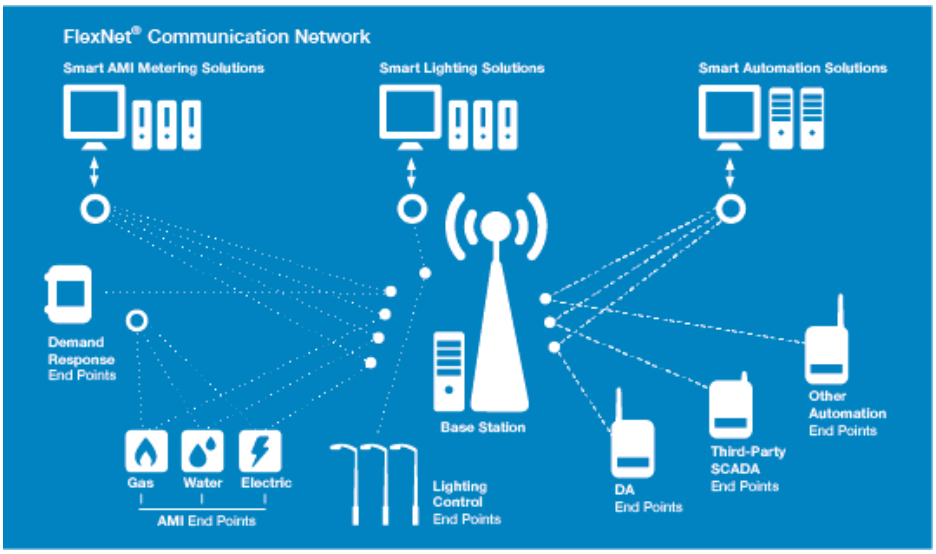
The FlexNet communication network can read devices with a FlexNet SmartPoint® module using a common AMI platform. The SmartPoint modules transmit information such as meter consumption and device status at regular intervals to one or more Base Stations. The Base Stations then forward the data to a database. The data is then accessible by multiple applications hosted by Sensus or hosted by a utility. The system supports two-way radio frequency (RF) transmissions, including on-demand readings, and remote disconnects and reconnects.

The FlexNet Base Station contains a long-range radio transceiver. It simultaneously supports communication for AMI meter reading systems and other high-value applications. FlexNet Base Stations are available with single or dual transceivers, in a variety of indoor and outdoor cabinets. A single T1/E1 backhaul line can support more than one hundred FlexNet Base Stations. Mounting FlexNet Base Stations in NEMA-certified enclosures at strategic locations within a service territory ensures optimal coverage over large geographic areas.

The Sensus FlexNet SmartPoint module is a radio transceiver that provides wireless communication capability to a variety of devices. If the device is a meter, the SmartPoint

module interrogates the meter registers on a configurable interval from once every five minutes to once daily. The SmartPoint module then transmits the meter consumption and status information at regular intervals. The number of times the SmartPoint module transmits is separate from the read setting, providing flexibility for a greater number of transmissions per read or fewer.

The Sensus FlexNet Regional Network Interface (RNI)™ provides customer functions such as billing and account management, network management functions, and data warehousing. The RNI provides sufficient network capacity for all of the Base Stations in one local RF network. The SmartPoint module data transmission packets route through the selected backhaul to the applicable RNI. The RNI's Network Controller (NC) determines where to send those data packets. Each packet contains a unique identifier consisting of a customer identification combined with a Base Station identification. The RNI is interconnected via dedicated switches for both the customer and Sensus to provide monitoring.



FlexNet system

Enclosure

Each M400B2 enclosure is based on a custom-configured Alpha Technologies Ltd. enclosure designed specifically for Sensus that provides power and environmental control for radio equipment located at a remote outdoor site.

The enclosure provides 24 Volt DC power to the transceiver and ancillary equipment and is battery backed-up.

The M400B2 enclosure is designed for pole or wall mounting.

Category	Specification
Mechanical	
Dimensions	560mm x 560mm x 246mm (22in. x 22in. x 10in.)
Weight	34 kg (75 lbs.) without batteries
Connections	AC input: screw terminal, 14-10AWG, 90°C wire
Electrical	

Category	Specification
Input	120 VAC operating voltage, 45 to 65 Hz frequency, 535 W maximum input power
Output	22-29.4 VDC (24 V Nominal) Voltage, 14A maximum Current, 400 W maximum DC power output
Power	400W
Environmental	
Temperature	Operating: -40°C to +50°C (-40°F to 122°F)
	Storage: -40°C to 85°C (-40°F to 185°F)
Altitude	-500 to 3000 meters operating (-1640 to 9840 feet)
Humidity	0 to 100% RH non-condensing
Weather tightness	NEMA Type 4

Transceiver

The M400B2 transceiver is a multi-channel, high-performance burst data radio system configured to receive a combination of multiple modulation schemes in the 896 to 960 MHz range. The transceiver unit mounts within a cabinet assembly or chassis designed specifically for it.

The transceiver RF transmitter operates on a single configurable channel (depending on the channel and regulations) in the 930 to 960 MHz frequency ranges.

The transceiver assembles the received messages and forwards them to the RNI Network Controller via a high-speed link (such as ISDN or T1/E1). The Network Controller (NC) eliminates redundant messages (for example, messages from endpoints that were received by more than one Base Station) before forwarding them to the database server.

The transceiver also notifies the RNI of any alarm indications such as low battery, loss of power, an open door, or low AC power.

M400B2 transmitter specifications

Category	Specification
Dimensions	10"W x 5.25"D x 1.75"H
Temperature	-40°C to +60°C Operating, -40°C to +70°C Storage
Humidity	95% non-condensing, Operating & Storage
Operating Voltage	20V to 32V
Output Power	+39-42 dBm nominal (cabinet antenna port)
TX Frequency Stability	1 ppm
Compliance	FCC CFR47 Part 15, Part 24 and Part 101 IC RSS 119 and RSS 134 UL/CSA 62368-1 – Standard for Safety Audio/Video, information and communication technology equipment
Emission Designator	5K90F1D/11K8F1D/8K75F1D/17K5F1D
Authorized Bandwidth	Part 24/RSS134 = Mask 10 kHz and 20 kHz

Category	Specification
	Part 101/RSS119 = 25 kHz

M400B2 receiver specifications

Category	Specification
Ambient Temperature	-40°C to +60°C Operating, -40°C to +70°C Storage
Sensitivity	Normal Mode: -122 dBm
	Half Baud (C&I): -125 dBm
	Boost Mode: -132 dBm
Noise Figure	<3dB typical @25C
Adjacent Rejection (referenced from RX frequency)	<100kHz: >40dBm
	100-1000kHz: >50dBm
	>1MHz: >70dBm
Receiver Overload exclusive of preselector (referenced from RX frequency) (assumes clean CW source)	-50dBm
Non-operational Front-end Overload	+10dBm
Receiver IF (non-DSP) Passband	> 200 kHz
Receiver Preselector/ Duplexer	> 1 MHz
Number of Independent Receive Channels	Up to sixteen 12.5 kHz channels or eight 25 kHz channels
Tuning Frequency Resolution	RF Frequency = <100Hz
	CPC Channel = 6.25 kHz

M400B2 additional components

The M400B2 enclosure includes these components in addition to the transceiver.

Duplexer

The duplexer combines the transmit and receive signals so that only one antenna is necessary. The duplexer routes the transmit and receive signals to the respective ports on the transceiver.

External RF power amplifier

An external power amplifier, mounted separately in the enclosure, connects to the transceiver for power supply.

Battery

The M400B2 enclosure utilizes two (2) Enersys XE-40 12 Volt lead acid batteries.

These batteries connect in series to provide the 24 volts of DC backup power for the transceiver. These batteries, when new, should provide approximately 40 hours of backup power when the transceiver is idle or in receive-only, and at least 8 to 10 hours of backup power when the transceiver is transmitting at the maximum rate

Power supply

An IP-addressable Cordex power supply comes standard in the M400B2. The power supply consists of a controller and a single rectifier which supplies 400 Watts of power to the unit as well as charging the 24-volt string of backup batteries. The power supply can be connected to a PC via the ethernet cable attached to the unit and configured or monitored via the PC if desired. Units are pre-configured at the factory with a standard configuration profile; however, unit configuration should be modified when installed with the appropriate network information.

SPM-900 (optional)

The Sensus Power Monitor (SPM-900) is an optional component that monitors for antenna damage and RF power output failures in the Base Station.

The SPM-900 is inserted in the RF path between the duplexer output and the coaxial cable feed line, mounting directly on the inside of the M400B cabinet.

The device reports on forward and reflected power for the last RF signal applied as well as communicating an antenna fault alarm when that signal's reflected power is above a threshold that would indicate antenna or cable damage.

SPM-900 specifications

Category	Specification
Frequency Range	896-960 MHz RX and TX Path, 928-960 MHz TX Measurement Path
RF Input Power	20-50 dBm
RF Power Accuracy	± 1.0 dBm
Insertion Loss	1.0 dB Maximum

GPS antenna

A Trimble Bullet III GPS antenna is supplied with the Base Station.

The antenna is mounted to a pipe with a standard 3/4" NPT pipe thread. Sensus does not supply equipment or cables for remote mounting the antenna.

The antenna is an active GPS antenna with a 35 dB preamp; the required 5 VDC is supplied from the Base Station transceiver.

2 Pre-installation guidelines

There are roles, responsibilities, processes, workflow, personnel identification, and communications between working groups that ensure the successful installation and necessary hand-offs between specific entities associated with the M400B2.

These guidelines discuss on-site prospecting and propagation studies and provide general site requirements. This following information assumes that the initial customer data has been entered into the FlexNet Solution Request (FSR) system.

Kickoff meeting and Scope of Work (SOW)

A kickoff meeting is held at the beginning of the project and a Scope of Work is completed.

1. Frequency and Utility Code assignment—The FSR process will be updated and reflected accordingly after Sensus Marketing Technical Sales (MTS) or purchasing has notified the Spectrum Manager. At the time of frequency and utility code assignment, the Spectrum Manager will notify the Sensus Project Manager (PM) and any associated Field Engineers.
2. Kickoff meeting—The PM assigned to the project will coordinate the initial kickoff meeting either internally or externally to help set the stage for site walks themselves. The PM should include the general contractor, utility personnel, site representative, and decision makers to create an SOW during the visit. It will be important to solidify the SOW in a single visit. A Sensus PM or Field Engineer will contact a General Contractor (GC) to acquire site information such as availability if it is a leased facility, and proposed lease cost. (For customer-owned sites the Sensus PM will contact GC and provide site information.) The GC will turn site information over to the leasing department to determine available antenna heights, building floor space availability, or outdoor ground space availability.
3. Site Visit SOW—A Sensus standard template for the SOW will be completed by the assigned group which may be assigned to the Sensus Field Engineer or GC during the visit. The current form will be forwarded to all agreed to parties for completeness once completed. The completed SOW will be presented to the PM and Field Engineer (if one is present). The PM will verify the SOW against the original FSR design and make recommendations if a rerun of the design is warranted based upon the actual sitewalk specifics captured. The PM will be concerned with the antenna type used, cable types or lengths, and eventual centerline of the antenna or any other specific changes that may affect the overall design or eventual coverage of the Base Stations.
4. Notice to Proceed—The assigned Field Engineer will send a notice to proceed to the PM after the SOW has been approved. The PM will share the SOW with all associated parties. A schedule will then be presented to the PM for distribution to the utility once the contractor has received a timeline from all general contractors associated with the installation group. If the Sensus PM authorizes the site as a potential project and authorizes the GC to pursue the lease, then the GC will submit a site application form to the leasing department with the needed information (address, antenna make and model and height, coax type, grounding requirements, electrical requirements, mounting specifics, and so on). Site leases are typically provided by the utility or through negotiations between the utility and a third-party site owner.

5. Installation coordination—The PM will have ultimate responsibility for the overall coordination and timing of the installation with support from the assigned installation contractors as well as an associated Field Engineer, if applicable, to the project.
6. Requisitions are submitted to purchasing to acquire purchase orders for site hardware and tower crew.

Site walk and SOW process

The following describes the site walk and statement of Work process for both leased and customer owned sites.

1. Site walks will be performed by an Installation Contractor and/or Sensus Project Manager, who will ensure a digital camera is available for the site walk.
2. nstallation requirements include the following:
    - Base Station or R100NA location inside of building, or pole space for Base Station or R100NA installation.
    - Confirm electrical requirements.
3. When the site walk is complete, the GC will create the SOW document for Sensus review. The SOW is to include the following information:
    - Customer Name and contact information.
    - CMS Project Number.
    - Site Name.
    - Leased or Customer Owned.
    - FCC Registration number (if applicable).
    - Address, City and State.
    - Latitude and Longitude.
    - Height of antenna.
    - Site Type (Tower - Water Tank - Building).
    - Contributing Departments:
        - Sensus PM name and contact information.
        - GC PM name and contact information.
        - Tower Crew and contact information.
        - Customer name and contact information.
    - Project Scope detailing responsibilities on site installation including pictures. Narrative clearly describing all work to be performed at site (antenna mounting, cable route and clamping, terminations, grounding, surge arrestors, Base Station placement, and so on.)
    - Equipment List Detail:
        - GC to provide.
        - Tower Crew to provide.
        - Customer to provide.
        - Clean up procedures.
        - Safety statement.

4. SOW shall be submitted to Sensus PM, Tower Crew (if separate from GC), Sensus Field Engineer (if applicable), and Customer (if applicable), for review.
5. Changes shall be made to the SOW if required.
6. The Sensus PM and GC PM, and if applicable, the Sensus Field Engineer, Tower Crew and Customer, shall all agree on the SOW.
7. Sensus requires a project cost estimate to include hardware, installation, administrative, and travel costs. The estimate is to be submitted to the PM per site.
8. If the site is still needed for the Base Station or R100NA project, the Sensus PM shall provide purchasing approval to the GC PM for the site installation materials and contractor work. This purchasing approval needs to be after an estimate of the total cost for the project is obtained.
9. The GC submits a quote for installation of antenna and associated hardware.
10. The GC PM submits material requisitions and quote for hardware to purchasing for internal processing approval.
11. The GC PM submits contractor requisitions and quote for installation to purchasing for internal processing approval.
12. Purchasing issues purchase orders for materials and contractors.
13. The GC PM coordinates with the Sensus PM on installation dates.

Site walk considerations

Input on variables addressed in the steps below could prove invaluable to the engineer performing the propagation study. The information obtained from the site walk should be forwarded to the engineer providing the propagation study.

1. What variables may impact antenna installation and operation?
    - At the specified height of the antenna, are there other antennas in the same horizontal plane that have emissions within 50 MHz of the proposed M400B2 or operating frequency? What is the radiated power of the antennas in the same plane as the M400B2 antenna? What are the frequencies of the antennas in the same plane as the M400B2 antenna? Can the M400B2 antenna be mounted at a different height than others that radiate at frequencies close to the M400B2's receive frequency?
    - Is the antenna's path unobstructed in all directions if an omni-directional antenna is wanted for the installation?
    - If the antenna cannot be mounted on the top of the tower, or in a 360° field of view on a structure, does the available antenna placement constrain the antenna's omni-directionality (if the proposed antenna is omni-directional) due to antenna shading by the tower or the structure it is mounted to?
    - Will the site owner require the antenna to be mounted "upside down"? If so, an inverted pattern antenna will need to be ordered.
    - For installations where directional antennas are specified, is there enough space to mount the antennas?
    - Will the antennas be able to point in the wanted direction with a clear field of view?
    - Are there any special mechanical needs that have to be addressed due to antenna weight, size, and wind loading?

2. What constraints may be placed on an individual site due to the type of coaxial cable specified?
    - Inquire if the coaxial cable to be specified by the propagation study engineer would need any special mechanical changes to the tower or the mounting structure.
    - Inquire if the hangers required, and the coax size will fit through the existing openings of the equipment shed or building and if additional cost will be added to enlarge openings if needed.
3. Local RF Environment Study
    - Walk the equipment site and log any transmitter frequencies that may be operating within 50 MHz of the M400B2 receive frequencies.
    - Log the type of transmitters that you may have found in the last step (such as pagers, two-way radios, SMR, MAS).
    - If available on the equipment cabinets, log the output power of the transmitters you have found within 50 MHz of the M400B2 operating frequency.
    - Perform a Latitude/Longitude and Frequency search on the FCC ULS website and determine if other potential interferers may be in the general area of the prospective site. Check frequencies that are sub-harmonics of your operating frequency (i.e. for a 901.125 NBPCS installation, check 450.5625 ±1 MHz).
4. Local RF Noise Study
    - If possible, perform a noise sweep with a spectrum analyzer to determine if any broadband noise is seen in the M400B2 receive frequency band. You may have to rely on a hand held antenna (worst case).
    - If possible, perform an interference study with a spectrum analyzer to determine any transmitters on the tower are within 50 MHz of the M400B2 receive frequency. Coordinate this data with the lists you generated above by reading the frequencies off of the equipment installed on site.

Propagation study

The propagation study, along with the data collected earlier in the process, will determine if a site is applicable for deployment.

Your propagation study will include antenna type and mounting locations. If the identified mounting location is not feasible, you must contact Sensus Engineering for further instructions.

This section does not address propagation study details but the following steps should be performed based on the site survey:

- Report information gathered above to the engineer performing the propagation study and to the party specifying the M400B2 for the customer.
- Tweak and re-run the propagation study to determine if variables collected in the site survey are important to site selection.

Base Station antenna types and specification

Base Station installations may utilize several types of antennas. The antenna type, gain, and performance will be specified by the engineering team that provides the propagation study.

Antennas can be directional (“see” in one direction better than others), or omni-directional (“see” in all directions equally well).

The following generic specifications must be confirmed for acceptable coverage with a propagation study.

Type	Requirement
Antenna Frequency Range	Must cover 896 to 960 MHz . Antenna may cover wider frequency range if necessary.
Antenna Impedance	50 Ohms
Antenna VSWR	1.5 to 1 or better
Antenna Polarization	Vertical (Standard Installation)
Antenna Pattern	Omni-Directional Direction if required by Propagation Study

Note: Individual Specifications may change due to the outcome of the propagation study.

Note: Due to mounting constrains, the antenna may have additional specifications to use on an inverted mounting pattern.

Permits and licenses

It is the responsibility of the Sensus Project manager to ensure that the tasks of obtaining all permits, licenses, and so on are accomplished.

The parties responsible for actually preforming the duties of application depends on the owner of the site:

1. If the tower is owned by the customer, it is the customer's responsibility to apply for all permits, licenses, and so on.
2. If the tower is owned by a third party, it is the tower owner or lessee's responsibility to apply for all permits, licenses, and so on.

3 M400B2 installation

Remove all packaging material from the enclosure. Inspect the packing slip to verify that all equipment is there. Inspect moving parts, hardware, connectors, and installed equipment, including any mounting plates for pole or wall mounting and the mounting bolts sets if applicable.

Note: Report any damage to Sensus immediately.

Note: For the full installation guide, including configuration and safety instructions, please see the latest version of AUG-10071-xx, available on My Sensus.

Site considerations

The information in this section is intended as a guideline; there may be site-specific requirements and other factors that will require individual attention, such as regulatory jurisdictional codes and construction covenants.

The M400B2 enclosure has been designed to hang on a pre-existing utility pole, though other configurations are possible. The supporting structure must be designed to support a fully configured enclosure. In addition, the mounting site must be designed and installed in accordance with local building practices and codes.

Any mounting site must be designed and installed in accordance with local building practices and codes.

Any antenna mounting site must be determined by a Sensus propagation study and approved by Sensus Engineering.

Site consideration should include:

- Enough space for transportation and installation is available.
- A proper grounding connection is available.
- Access to mains power (AC).

Note: Sensus must have continuing remote access to the power system. Updates and other changes to the power system, as well as monitoring and management, can only be performed by Sensus at this time. Therefore, if the power system access is placed behind a private network, there must be a provision made to give Sensus access to the power system.

CAUTION: High Leakage Currents are present. An improperly grounded enclosure presents an electrical hazard.

CAUTION: Verify electrical codes prior to installation. Codes may vary and contain specific conduit and wire sizes for connection to the AC load center. Connection to utility power must be approved by the local utility before installing the power supply.

Grounding

Minimum requirements for grounding are established in this section in order to ensure equipment and personnel safety in the case of lightning strikes. Good grounding practices also provide some measure of RF shielding from outside interference which could hamper the proper operation of the unit.

A common cause of equipment failure is lightning damage due to insufficient grounding protections. Tower sites are frequently struck by lightning because they typically point higher than the surrounding terrain and other nearby structures. When struck, the voltage drop from the top to the bottom of the tower can be extremely high. Unless bonded to the tower, coaxial cables and other equipment installed on a tower struck by lightning will be at a low voltage potential compared to the tower at the instant of a strike, thus causing a high voltage potential across the cable insulating sheath, which can cause voltage breakdown of the sheath material (pin holing).

Proper site grounding disperses the energy of a lightning strike such that on-site personnel are not harmed and equipment is not damaged.

CAUTION: High Leakage Currents are present. An enclosure that is not properly earth grounded can present an electrical hazard.

Site grounding

Site grounding should be addressed as a part of the civil works associated with the construction of a tower or mast, equipment building and the provisioning of AC power. For new sites or where existing sites have a history of equipment being damaged by lightning strikes, a company specializing in lightning protection services and site earthing should be consulted.

A continuous earth ground system must interconnect all site grounds, ideally with a radial ground system at the tower, a perimeter ground around the equipment building, and a single interconnect point for the tower and perimeter grounds at the base of the cable-entry master ground bar. This will disperse lightning energy into the earth most effectively and ensure ground voltage differentials at the site are kept to minimum levels.

A continuity test checks the effectiveness of ground wires and their bonding. Measurements are usually measured from a reference ground conductor, such as the master ground bar.

The effectiveness of a ground connection to earth also should be checked. The most reliable method is a 3-point test, based on IEEE Standard 81-1983. It references three points of earth contact; the ground conductor under test, and two probes inserted into the ground at an applicable distance, one a current probe, the other a potential probe. However, for good accuracy, the 3-point test requires the ground conductor to be isolated from the equipment and /or tower, which in most instances will not be permitted for an operating site.

Note: To verify proper grounding installation, the system needs to have a resistance to ground value of 5.0 Ohms or less.

In situations where a three point test is not possible, a clamp-on resistance tester is recommended, providing the ground wire or strap location and size permits clamp-on access. While not providing the same accuracy as a three point test, it does permit a quick and easily repeatable test for routine maintenance visits.



CAUTION: Grounds must not be disconnected at operational sites. High Leakage Currents are present. The AC mains ground must not be disconnected except by a registered electrical engineer authorized by the site owner or operator.

Single point building grounding

Single point grounding is when all equipment within the building is at the same ground potential. This includes grounds for the mains and telco terminations into the building and for power supplies.

Optimum equipment grounding is provided by a single point ground using a master ground bar at the feeder entrance point; the master ground bar is connected directly to the site or tower ground system using heavy gauge copper wire or strap. The wire size should not be less than 52 mm2 (0 AWG). Effective single point grounding will also be achieved where there are multiple ground connections into the building providing these grounds are directly bonded to a common perimeter ground for the building.

The master ground bar is the ground point for:

- All equipment within the building
- Service mains ground
- Telco ground
- Cable sheath ground
- Building-entry lightning surge suppressor (coaxial feeders)

A single point ground eliminates the potential for damaging voltage differences that would otherwise occur between different grounding points. In effect, with single point grounding the ground referenced voltage for all equipment in the building rises and falls at the same level as the strike induced voltage gradient passes through the earth, thereby removing the possibility of damaging currents flowing between equipment.

Multipoint building grounding

Multipoint grounding is where the AC and telco grounds are not bonded to the site and tower ground. Instead their grounding is provided by separately installed ground rods or similar.

With such an installation, strike induced voltage gradients in the ground can cause damaging current flows in equipment connected to the different ground points. The primary objective at such sites is to reduce ground path impedance between the ground attachment points, between the equipment, and between the equipment and the grounds to minimize the magnitude of lightning induced voltage gradients between these points.

At existing sites where a single point ground system has not been implemented and cannot be cost-effectively introduced, the effects of a multiple grounded building can be mitigated by following these guidelines:

- Survey the building to determine what different external ground connections come into the building and how and where they may be interconnected. A prerequisite is a properly installed ground bar at the cable entry point to the building, to which all cables from the tower are grounded. This ground bar must connect directly to the site or tower ground system.
- Check AC power grounding and the grounding provided for incoming telco lines or similar, and if racks and other ground bonded equipment are anchor bolted onto a concrete floor, which has been poured directly onto ground.

- Different ground connections into the building must be directly bonded within the building using heavy gauge wire or copper strip (minimum 21mm2, 4AWG). The wire runs must be as direct as possible and connect between each point directly - do not connect in series. Bear in mind that what is needed is a ground-ring inside the building.
- Check that all existing equipment installed in a rack or cabinet is correctly grounded to its ground bar.

Enclosure grounding

Each enclosure must be properly grounded.

In indoor installations, each equipment rack or equipment cabinet should be grounded to a site ground via the inner building halo ground. In the case of communications shelters, the equipment enclosures should be attached in the same manner to this system halo ground. Attachments from the equipment cabinets and racks to the internal ground halo are made using number six (or larger) stranded copper wire. Ground wires must be kept as short as possible with no looping of the wire.

Connections from these enclosures to the halo ground should be made using the shortest path length to diminish inductance. If using a master ground bar, wire directly to it and DO NOT connect to another ground-wire connection on near-by equipment. Do not connect the enclosure-to-master ground bar ground wire directly to the enclosure; terminate the ground wire to the ground bar located in the enclosure, and individually connect each item of equipment installed in the enclosure to the same enclosure ground bar.

When connecting each item of equipment to the enclosure ground bar, avoid stacking multiple ground lugs on a single ground bar connection. If it becomes necessary to replace equipment and its ground wire, and its ground lug is towards the bottom of the stack, other grounds must be disconnected to remove the needed one, which will disrupt ground connectivity to other equipment.

Required tools & equipment

The following items are required for a successful installation.

- Basic tools such as a multimeter, SMA torque wrench, flat and Phillips head screwdrivers, sidecutter, socket wrench set (Metric and SAE), spirit level and a tape measure.
- **17mm socket with extension**—for the bolts that attach the cabinet to the mounting bracket.
- **Auger or drill**—for boring 9/16" diameter holes in the pole.
- **Laptop computer**—equipped with a USB port, USB-A to USB-B type cable, and a terminal program capable of emulating a VT100 terminal, like Tera Term Pro or PuTTy.
- **Sensus Handheld Field Tool** (optional)—Provides an easy way to check for proper basic reception or transmission from the transceiver.



Note: The Sensus Handheld Field Tool verifies basic antenna connectivity only and does not guarantee full antenna operation.

The site's transmission line, surge suppressor, antenna, and associated gear are assumed to be properly installed and previously checked for proper operation. Diagnostic gear and procedures for troubleshooting the receive/transmit chain are not covered in this document.

Quantity	Description
1	M400B2 Enclosure equipped with all hardware needed for installation as specified by Operations or Engineering.
1	Network Communications Cable (depends on network connection specified). For internet communications, an Ethernet cable, standard CAT-5 RJ-45 to RJ45.
1	AC power supply cable.
1	Ground conductor—#6 or better stranded or equivalent braided cable—#4 or #2 preferred.
2	½" diameter machine bolts (UNC thread), SAE (Grade 5 or better) length to suit the pole
2	½" diameter (I.D.) zinc-plated flat washers
2	½" diameter (I.D.) hex nuts (UNC thread)
1	N-Female RF jumper cable and sealant
1	RF Dummy Load (at least 10 watts) if needed for shop testing and configuration.

Base Station antenna requirements

The following are the cabling requirements for the Base Station antenna.

RF Jumpers for Antenna and Base Station Connections to Main Cable	
Coaxial Cable Type	Andrew LDF Series Heliax
Coaxial Cable for Indoor Jumpers	½ inch Andres LDF4-50A (or Times Microwave LMR400)
Coaxial Cable for Outdoor Jumpers	½ inch Andrew LDF4-50A or ½ in. hardline instead of Heliax
Standard Jumper Length	6 feet (each Jumper)
Maximum Jumper Length	10 feet (one Jumper)
Combined Jumper Length	20 feet (both Jumpers)
Combined Jumper Loss (with Connectors)	1 dB

Main RF Transmission Line to Antenna		
Transmission Line Type	**Coax Length**	**Maximum Loss**
Andrew AVA5-50, 7/8"	0 to 200 feet	2.4 dB @200 feet
Andrew AVA6-50, 1-1/4"	200 to 300 feet	2.5 dB @300 feet
Andrew AVA7-50, 1-5/8"	300 feet +	0.725 dB per 100 feet
Connector Loss (All Transmission Line Types)		0.5 dB maximum

Maximum Loss from Base Station RF Connector to Antenna (for less than or equal to a 300 ft. transmission line run inclusive of connectors and transmission line)	
RF Jumpers + Connectors	1.0 dB
Transmission Line + Connectors	3.0 dB
Total	4.0 dB

Note: Lower loss Heliax cable may be substituted on run lengths greater than those specified for a given diameter if the maximum loss of the transmission line is equal to or less than that specified originally for that diameter at the maximum length.

Note: Endeavor to use the shortest jumper cable lengths as possible.

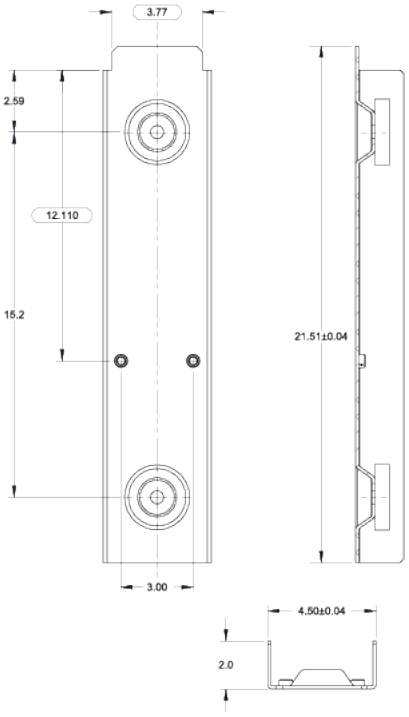
Other conditions and requirements on Coaxial Cable installations:

- Press to fit and crimped coaxial connectors are not allowed.
- Coaxial connectors must mechanically attach using screw threaded mating and torqued to manufacturers specifications.
- Coaxial connectors must be waterproof.
- Antenna connection of coaxial connector from cable must be waterproof and weatherproof.

Pole mount the M400B2

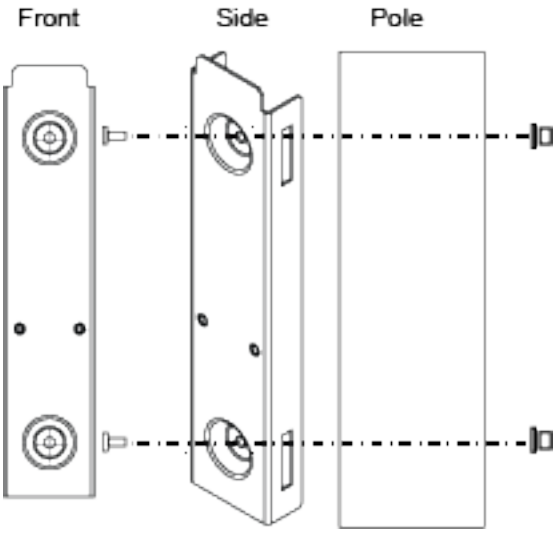
The M400B2 mounting hardware will accommodate varying pole types.

Pole installations should be on a minimum nine inch wood, metal, or concrete type pole. The pole mounting bracket can accommodate bolts, stainless steel strapping or a combination of both.

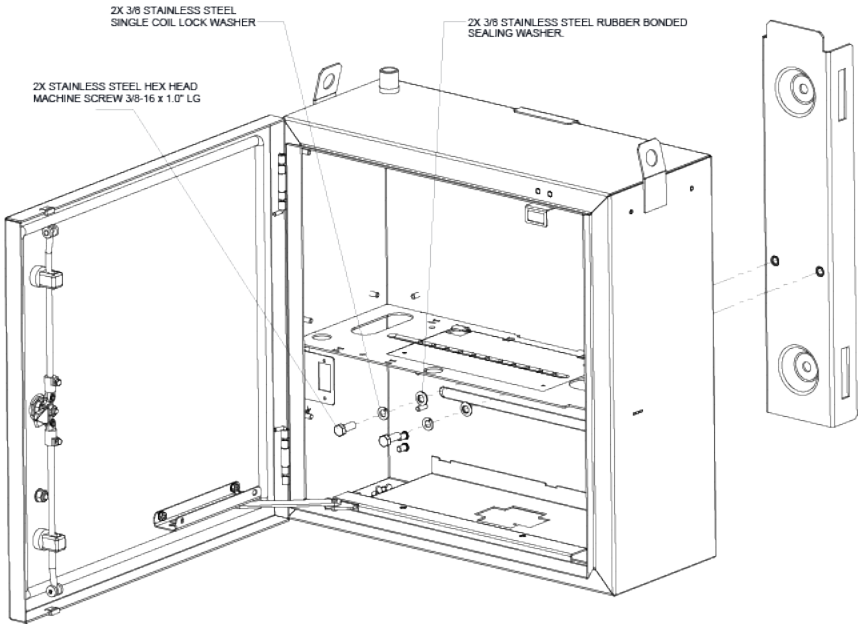


1. Remove the pole mounting bracket from the enclosure and use it as a template to drill two holes into the pole. Follow local practices for drilling the holes.

2. Secure the mounting bracket to the pole with the specified machine bolts. Torque as required.



3. Hook the top of the mounting bracket under the enclosure attachment fitting.
4. Secure the cabinet to the mounting bracket with the provided equipment. Torque the 3/8-16 bolts to 90 in./lbs.



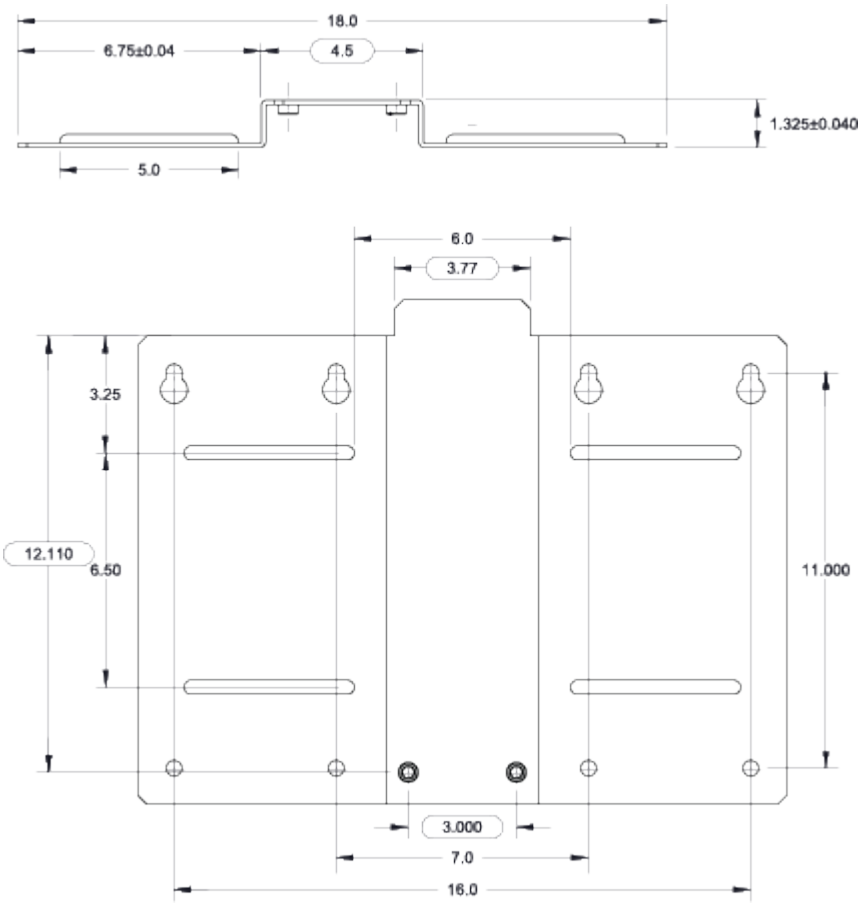
5. As an option, you can use utility grade stainless steel pole straps to thread through the provided slots. The straps should be up to 2½" wide with a minimum of three (of the wide type) if this is the primary support.

CAUTION: All local safety practices and guidelines must be followed while lifting the enclosure. All personnel involved with lifting and placing the enclosure should wear head and eye protection and gloves when required.

Wall mount the M400B2

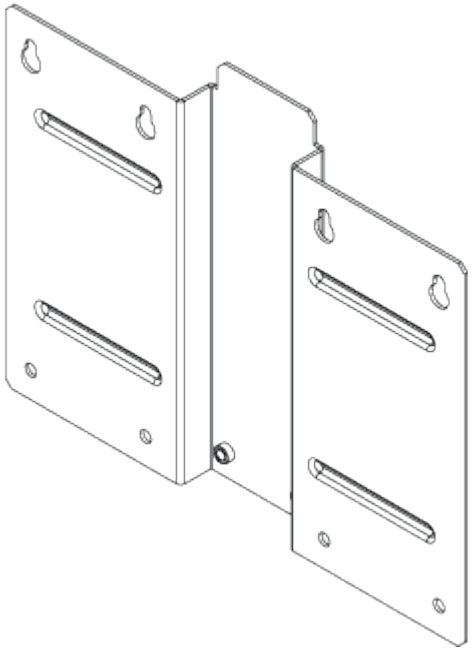
The M400B2 mounting hardware will accommodate varying wall applications.

- Hollow wall construction must be avoided as a mounting location.
- Toggle or molly anchors rated at 75 lbs. each are recommended with a two anchor minimum.
- The top wall mounting bracket holes should be located between 64" and 72" from the ground.



1. Use a standard construction level to ensure the cabinet will set plumb and level. Take the wall mounting bracket and use it as a template to drill four holes into the wall. Follow local practices for drilling the holes.

2. Secure the mounting bracket to the wall with the specified machine bolts. Torque as required.



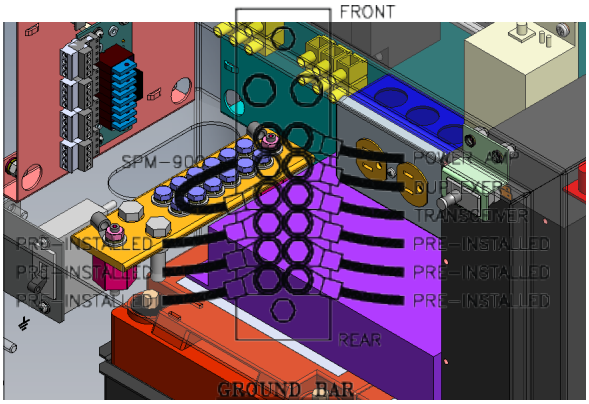
3. Hook the top of the mounting bracket under the enclosure attachment fitting.
4. Secure the cabinet to the mounting bracket with the provided equipment. Torque as required.

CAUTION: All local safety practices and guidelines must be followed while lifting the enclosure. All personnel involved with lifting and placing the enclosure should wear head and eye protection and gloves when required.

Ground the M400B2 enclosure

Each M400B2 enclosure is equipped with a Master Ground Bar that should be used for all ancillary non-AC type (lightning ground) bonding connections. This ground bar MUST be grounded to earth ground.

Equipment grounding terminations may be added to this bar for single point grounding terminations.

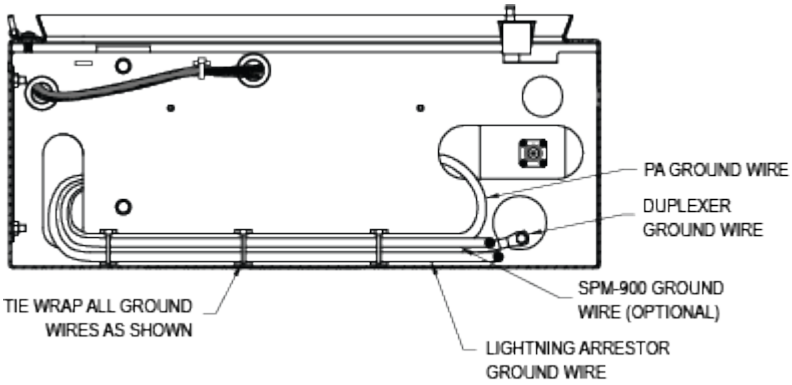


1. After the cabinet is mounted, attach a #6 minimum (#2 preferred) stranded or equivalent braided ground conductor using a 3/8" diameter double-hole lug on a 1" inch center with hex bolts. Torque as required.
2. There are three pre-cut conduit openings (1/2", 3/4", and 1") located in the base of the enclosure, sized to accommodate industry standard Seal-Tite® conduit fittings, and three watertight plugs. Remove one of these three water tight plugs and run the #6 minimum (#2 preferred) stranded or equivalent braided ground conductor that you attached in step 1 through the opening using the desired conduit type and size.

Note: Coated or jacketed lightning ground cabling can be run without using a conduit if desired.



3. Connect the opposite end to the appropriate lightning ground system; a ground source of 5 ohms or less is recommended. The enclosure and the master ground bar connection must be attached to the same source of ground wire.
4. Connect another ground conductor to the 1/4" diameter double-hole lug on a 5/8" center located on the back of the cabinet at the lower rear and then connect it to the appropriate lightning ground system. The cabinet and the master ground bar connection must be attached to the same ground wire source.
5. All grounding wires should then be tie wrapped flat to the back wall of the cabinet, underneath the shelf.



Cabling and connections

Follow these instructions for M400B2 connections.

1. Connect the backhaul to the front of the transceiver using the provided ethernet cable.

2. There are two bulkhead connectors located to the right of the battery shelf. The rear connector is for the lightning arrestor for the FlexNet transceiver. If the antenna cable is not already connected to this connector, connect it at this time, unless you are also installing a SPM-900.
3. The front bulkhead connector is for optional use when connecting auxiliary equipment. If this is applicable to your installation, install the necessary lightning arrestor and any other hardware as needed and connect at this time. You can also use this second connection to remotely mount the GPS antenna.
4. In the top back of the cabinet, there is a small location (4"x4"x4") where a router or DIN rail mounted modem can be mounted. Please note that the AC power plug is not battery backed so only the 24V DC is available if there is an AC outage.
5. Connect the antenna as applicable.
6. Set up your internet connections.

   There are two Internet-connected pieces of equipment within the enclosure: the transceiver and the power system. Two unique IP addresses are required. The power system is a standard web browser interface, and uses standard web browser access methods.

   You can set up port forwarding, which will allow traffic sent to a single public IP address to be sent to either the power controller or the transceiver, based on the TCP port.

   The M400B2 transceiver contains a built-in Ethernet switch which provides connectivity to the Power Supply Unit via a single connection without having to install a separate Ethernet switch.

Power connection

The M400B2 AC system is designed to operate on 120V AC single phase and the load center is rated at 15 Amps.

1. Ensure that all three AC breakers are in the off position prior to any terminations.
2. There are three conduit openings in the bottom of the cabinet for seal tight type terminations. Choose the size you want (½ in., ¾ in., or 1 in.), remove the plug, and leave the other two sealed to avoid water penetration. These conduit openings also can be used for ground wire or backhaul.
3. Install the appropriate size and type of conduit to the desired entry opening.
4. Base the input wiring size on voltage drop considerations and NEC table 310-16 for copper wire. The AC power conductor size must be in the #10-#16 range. Install according to code. A 120 Volt, 15 Amp minimum circuit is required.

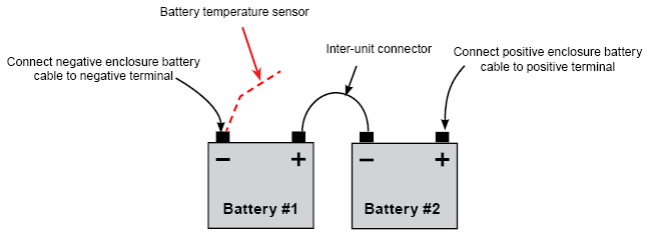
   

   CAUTION: Electrical service to the M400B2 cabinet should be installed by a licensed electrician in accordance with local codes. Verify electrical codes prior to installation. Codes may vary and contain specific conduit and wire sizes for connection to the AC terminal block. Connection to utility power must be approved by the local utility before installing the AC service connection.
5. Connect the AC feed to the AC Input terminal block. Attach to the lugs marked L, N, and G as applicable.

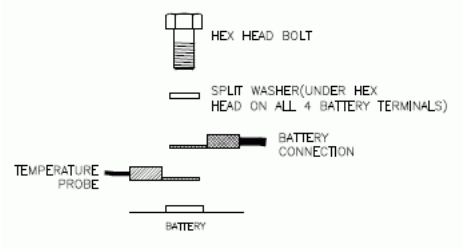
Battery connection

The M400B2 batteries should be installed in the bottom of the cabinet.

1. If not already off, turn off the battery breaker.
2. The batteries come with a plastic bag that should be placed in the bottom of the cabinet. If not pre-installed, place the batteries inside this plastic bag inside the cabinet; the plastic bag is there to catch any battery fluid in case a leak occurs.
3. Connect the battery cables leading from the Anderson-style connector to the corresponding battery terminals.



4. The temperature sensor probe should be pre-installed. If not, connect the temp sensor to the battery.



5. Torque all connections according to the battery specifications.
6. Connect the Anderson-style connector.
7. Turn the battery breaker on.

M400B2 alarm terminations

The transceiver supports eight alarm inputs. All alarms have been pre-wired at the factory; no customer wiring is necessary.

If customized alarm wiring is necessary, refer to the documentation package that comes with the components.

All system and ancillary alarms are connected via a punchdown “66 block” from the local alarm-sending unit. All alarms are Normally Open (NO) on alarm with the exception of the Intrusion Alarm, which is wired Normally Closed (NC) on alarm.

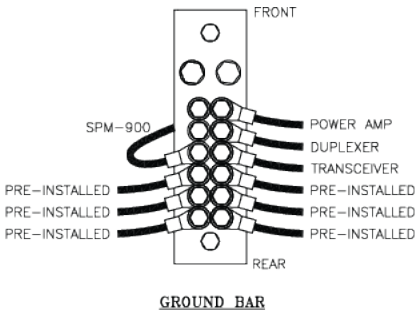
Optional SPM-900 Installation

The SPM-900 is installed on the right hand side of the cabinet, directly to the right of the batteries and underneath the duplexer.

If you are installing into a previously deployed M400, power down the unit before installation.

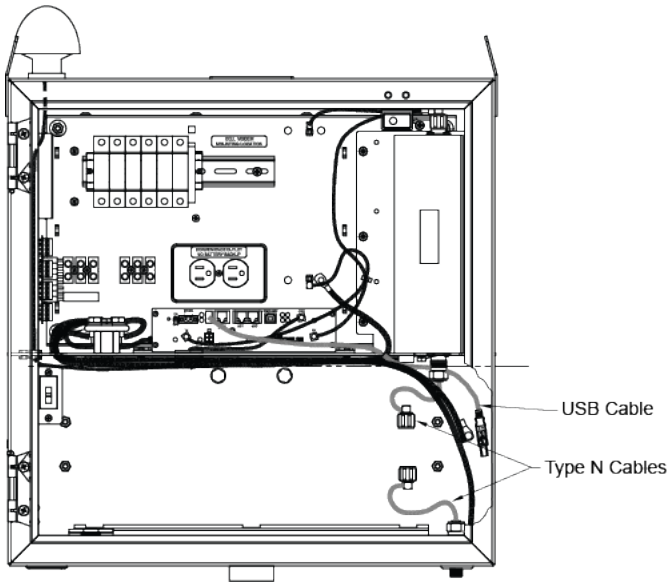
1. If already installed, remove the output cable that runs from the duplexer to the antenna feed.

2. Attach a #6 minimum (#2 preferred) stranded or equivalent braided ground conductor using a 3/8" diameter double-hole lug on a 1" inch center with hex bolts to the master ground bar. Torque as required.



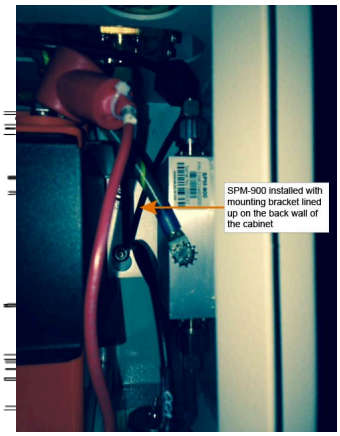
GROUND BAR

3. Run this ground cable through the bottom of the top shelf and pull through towards the front of the cabinet.
4. If you have already tie wrapped the other ground cables, you may need to cut the tie wrap(s) and move the ground cables slightly towards the front in order to install the SPM-900.
5. Plug in one end of the SPM USB cable to the USB port on the M400 transceiver and feed it through the hole next to the duplexer.



6. Attach the straight end of one of the SPM Type N cables to the duplexer output. Attach the straight end of the other SPM Type N cable to the antenna feed.
7. Loosen the bolts on the battery retention bracket. DO NOT REMOVE the battery retention racket from the cabinet as it will be quite difficult to reinstall once the SPM-900 is mounted in the cabinet.
8. Mount the SPM-900 on to the mounting bracket using the provided screws. The SPM-900 should be mounted such that the ethernet port is facing up when the plate with the holes is towards the back.
9. Plug the USB cable into the appropriate slot on the top of the SPM-900.
10. Connect the right angle end of the Type N cable from the antenna feed to the RF OUT of the SPM-900.
11. Connect the right angle end of the Type N cable from the duplexer to the RF IN of the SPM-900.

12. Carefully slide the SPM-900 into the cabinet to the right of the batteries, lifting slightly up and over the Type N cable, then drop it slightly back down.
13. Slide the unit back into place such that the bracket holes on the back mounting plate line up with the battery retention bracket on the back wall of the M400 cabinet.
14. Tighten the bolts on the battery retention bracket.



4 Configuration & power

Power up the M400B2

1. Turn all three AC breakers to the ON position.
2. Verify that the Anderson-style connector is connected.
3. Flip on the battery switch located by the batteries if not already on. Wait until the light on the Rectifier is green. The OK light on the Controller should illuminate green as well, but if any alarms are present one of the alarm lights will be lit instead.
4. Turn the transceiver on. To turn it on, you must first pull the switch slightly out and then flip it to ON.

Transceiver boot sequence

Once turned ON, the M400B2 transceiver should run the boot sequence.

- The external power LED will light green once the power switch is flipped.
- Immediately following, the Receiver status LED and PA voltage indicator will light GREEN.
- The CPC status LEDs will light RED, then change to GREEN once the CPC processors all boot.
- The RF card PPS lock LED will blink GREEN at 1/2 Hz; once the GPS locks the RF card LED will switch to a 1 Hz blink rate.
- Within a minute of power ON, the GPS LED will blink at 1 Hz.
- The CPU status LED will turn RED when Linux begins to load. Once the unit has booted completely and detected no errors, the LED will blink GREEN in a double-blink pattern.
- The RX LED will blink GREEN briefly when receiving an on-air message; the TX LED will light up RED through the duration of a transmission.
- Once the CPU has booted, the CPC status LEDs will turn RED then change back to GREEN indicating that they have received a new configuration from the CPU.

Connection

The USB port on the front of the transceiver is used as the diagnostic port. Connect a USB to USB cable from this diagnostic port to your PC.



Note: Please be aware that it may take a few seconds after power-on for the USB interface to enumerate.

Microsoft Windows™ will automatically download and install a suitable USB device driver from the internet. If you are connecting to a PC in a field setting where an internet connection is not available you must ensure that you have downloaded and installed the correct drivers to your PC before arrival.

Once the driver is installed, using a terminal emulation program such as TeraTerm or PuTTY, log in as described in *Log into the M400B2* on page 40. Connect to the COM

port where the unit is connected. Once connected you may see a login prompt or you may need to press enter to get the login prompt.

Unified configuration file

The M400B2 configuration files use the Unified code base.

Note: The information in this section is for Unified firmware. If you are running Legacy, please see *Legacy configuration file* on page 56

CAUTION: You should use extreme caution when editing the configuration file, as any typographical error will cause issues.

Use the tgbconfig utility to edit the configuration file. The tgbconfig utility is located in the "/opt/tgbprogs/sbin" directory. When run with no parameters, this utility will verify there are no syntax errors in your configuration file and will display the current configuration data. When updating one parameter, the full json path to the parameter and its new value must be provided.

To eliminate duplicate Base Station device errors on the network and the RNI, you must make sure certain fields in the configuration file are unique. These fields are listed below:

- base_station_id
- hostname
- network.eth0.ip

Set up JSON file

This describes the basic setup using the Unified JSON code.

The following walks you through the basic setup commands for the configuration file that need to be edited.

If your FlexNet network includes a Network Management System (NMS), configure the Base Station with only the minimum network settings that enable communication with the NMS. The minimal set of parameters is network and optionally vpn, firewall, and management. Additional configuration occurs via NMS operations. Refer to your company's internal processes to determine which parameters to configure upon initial Base Station installation.

These basic commands are provided as a reference; no changes should be made to the JSON files unless authorized to do so.

CAUTION: This assumes that you will use the tgbconfig utility and edit one line at a time. If you choose to view the entire file, you will see other options not mentioned below. These options should be left in their default state unless instructed otherwise!

- To make configuration edits, type

  ```
  tmadmin
  ```

  at the login prompt. You will be prompted for a password. If you do not know your password, contact your assigned Sensus PM.

- To display the entire configuration file, type

  ```
  tgbconfig
  ```

  at the prompt.
- To display a specific value, type

  ```
  tgbconfig
  ```

  and then the configuration item. Example:

  ```
  tgbconfig network.eth0.enabled
  ```
- To add a key and value or edit a value, type

  ```
  tgbconfig
  ```

  then the configuration item, then the value. Example:

  ```
  tgbconfig network.eth0.enabled 1
  ```
- To delete a specific value, type

  ```
  tgbconfig -r
  ```

  and then the configuration item.

  CAUTION: Make sure that you really want to delete an item before using tgbconfig - r. If you delete an item by mistake you will have to go back through and re-enter everything you deleted.

1. Login as tmadmin and change the password if you are still using the default password.

   ```
   passwd
   ```
2. Elevate your privileges to enable parameter changes.

   ```
   sudo -i
   ```
3. Set the Base Station ID. This must be a unique number.

   ```
   tgbconfig base_station_id xxxxxxxx
   ```
4. Set the host name. This must be a unique name.

   ```
   tgbconfig hostname xxxxxxxx
   ```
5. Set the timezone. US/Eastern is the default. For all the possible options, go to *http://en.wikipedia.org/wiki/List_of_tz_database_time_zones*.

   ```
   tgbconfig timezone xxxxxxxx
   ```
6. Configure the network by setting the following keys for this unit.

   ```
   tgbconfig network.eth0.ip xxx.xxx.xxx.xx
   tgbconfig network.eth0.netmask xxx.xxx.xxx.xxx
   tgbconfig network.eth0.gateway xxx.xxx.xxx.xxx
   ```
7. Set the DNS nameserver.

   ```
   tgbconfig network.nameserver xxx.xxx.xxx.xxx
   ```
8. If you are using a firewall:

   tgbconfig firewall_enabled x, where 0 is the default and disabled and 1 is enabled. If you activate a firewall, you also must configure a host or subnet that will be allowed to establish ssh connections to this unit:

   ```
   tgbconfig network.management_console.ip xxx.xxx.xxx.xxx
   ```

```
tgbconfig network.management_console.netmask xxx.xxx.xxx.xxx
```

Leaving the netmask at the default of 255.255.255.255 will restrict the incoming ssh connections to originate from a single IP address. A netmask of 0.0.0.0 will allow ssh from any IP address.

9. Configure your ntp time servers. You have the option to enter one or two servers; the default is two (Sensus recommendation). You should set the ntp IP address to either the address of your internal time servers or an applicable time server for your geographic location.

```
tgbconfig ntp.servers.0 xxx.xxx.xxx.xxx
tgbconfig ntp.servers.1 xxx.xxx.xxx.xxx
```

10. Configure the Base Station to talk to the RNI.

Set the IP address of the NC:

```
tgbconfig rni.rnis.0.data_ip xxx.xxx.xxx.xxx
tgbconfig rni.rnis.0.command_ip xxx.xxx.xxx.xxx
```

Set the HTTP mode:

```
tgbconfig rni.rnis.0.http_mode x
```

where 0 is for North America.

Set the ports:

```
tgbconfig rni.rnis.0.data_port xxxx
tgbconfig rni.rnis.0.command_port xxxx
```

where 9600/9800 is for North America.

11. Configure the Receiver radio frequency and modulation.

The M400B2 has one CPC which in turn has two FPGA/DSP chains that can support up to twelve virtual receivers each. You will need to configure chains and virtual receivers as assigned by your frequency plan.

```
tgbconfig rfcards.cards.0.rx_frequency xxxxxxxx
tgbconfig receivers.cpcs.0.chains.0.fpga_freq x
tgbconfig receivers.cpcs.0.chains.0.demod fnv1
tgbconfig receivers.cpcs.0.chains.0.rcvs.0.dsp_freq x
tgbconfig receivers.cpcs.0.chains.0.rcvrs.0.modulation x
```

rx_frequency

This is the center RF frequency of the RFC ADC receive bandwidth that is fed into the CPCs. This is specified as an integer in Hz, for example 932186500.

fpga_freq

This indicates, in an integer value, the offset between the IF center (rx_frequency) and the center of the CPC chain frequency. The M400B2 FPGA is tunable over -100KHz to 100KHz using the values in the range of -8 to 8.

demod

The demod is used by the package update scripts to determine which type of DSP firmware image should be loaded for that chain. The setting can be either fnv1, fnv2, fnv2-uk, or fnv2-sec. The set of modulations desired for a given chain will determine which choice to make for this parameter. If a configured modulation is not supported by the DSP firmware, an error will be displayed in the third transmitter screen in tgbmenu. After changing the demod parameter, you will need to run the firmware update script to load the required DSP

firmware. This script is run automatically when upgrading to a new Base Station version.

```
/opt/tgbprogs/firmware/firmware-update.sh
```

dsp_freq

This is the designation within the CPC chain, in an integer value, that indicates the center frequency of the virtual receiver. The M400B2 DSP allows values from -11 to 11.

The current modulation types:

Modulation Types for the M400B2

Value	Modulation Type	Value	Modulation Type	Value	Modulation Type
0	Receiver Disabled	8	2-level SFSK (12.5 kbps 2GMSK BT=0.36)	16	mPass (5kbps filtered-2GFSK or 2GMSK)
1	Normal (full-baud 7FSK)	9	4-level SFSK (25 kbps 4GMSK BT=0.36)	17	mPass2 (10kbps filtered-2GFSK or 2GMSK)
2	Double Density (full-baud 13FSK ½ coded)	10	8SFSK	18	m4Pass (10kbps 4GMSK
3	13 FSK (¾ FEC)	11	16SFSK	19	m4Pass2 (20kbps 4GMSK)
4	C&I (half-baud 7FSK)	12	2-level half-baud SFSK (6.25 kbps 2GMSK BT=0.36)	20	mPass12k (12.5kbps filtered-2GFSK or 2GMSK)
5	Priority (half-baud 13FSK)	13	4-level half-baud SFSK(12.5 kbps 4GMSK BT=0.36)		
6	Boost	14	8-level half-baud SFSK(12.5 kbps 8GMSK BT=0.36)		Radio-SFSK4

Value	Modulation Type	Value	Modulation Type	Value	Modulation Type
7	13 FSK (Both)	15	16-level half-baud SFSK(12.5 kbps 16GMSK BT=0.36)	23	SFSK-Boost

To modify the second chain, change the JSON array index to 1:

```
tgbconfig receivers.cpcs.0.chains.1.demod FNv1
```

To modify the second virtual receiver on chain 1:

```
tgbconfig receivers.cpcs.0.chains.1.rcvs.1.dsp_freq x
```

To apply changes to the receiver chains made with tgbconfig, you need to restart the TGB Services but you do not need to run tgbconfig-apply.sh.

```
sudo tgbprogs restart
```

Confirm successful receiver configuration using tgbmenu's third transmitter screen. Verify that it displays the correct frequencies, modulations, and does not shown an Error status.

```
                    RF Transmitters/Receivers              Tue Feb 26 15:18:23 2019
Chain   Fpga   Dsp    Modulation    IN RS AV  Frequency    MsgCnt   Status   Type
0.0.0      8     -6   7FSK-Normal   10 10 99   941.250000        0   OK       CPC2
0.0.1      8     -6   13FSK-DD      10 10 99   941.250000        0   OK       CPC2
0.0.2      8     -1   7FSK HB        7  7 99   941.281250        0   OK       CPC2
0.0.3      8     -3   FSK-Priority   8  8 99   941.268750        0   OK       CPC2
0.0.4      8     -6   7FSK-Normal   10 10 99   941.250000        0   OK       CPC2
0.0.5      8     -6   13FSK-DD      10 10 99   941.250000        0   OK       CPC2
0.0.6      8      4   7FSK-Normal   10 10 99   941.312500        0   OK       CPC2
0.0.7      8      4   13FSK-DD      10 10 99   941.312500        0   OK       CPC2
0.0.8      8      4   7FSK-Normal   10 10 99   941.312500        0   OK       CPC2
0.0.9      8      4   13FSK-DD      10 10 99   941.312500        0   OK       CPC2
0.0.10     8      4   7FSK-Normal   10 10 99   941.312500        0   OK       CPC2
0.0.11     8      4   13FSK-DD      10 10 99   941.312500        0   OK       CPC2
0.1.0      0      0   2SFSK         11 11 100  941.237500        0   OK       CPC2
0.1.1      0      0   2SFSK         11 11 100  941.237500        0   OK       CPC2


Inoise 000  001  002  003  004  005  006  007  008  009  00A  00B  010  011
       10   10   07   08   10   10   10   10   10   10   10   11   11   11
  1) RF Card, 2) Transmit Channels, 3) Receivers
  Currently displaying page #1 in window.
  Use '+' or '=' to scroll down and '-' or '_'to scroll up. Press 'r' to refresh
. Press any key to return to main menu.
```

12. Configure the transmit channels. The channel number is just the name of that block while the frequency id is the identifying name of that frequency. For example, you could have three channels where the names are channel0, channel1, and channel 2 but the frequency id numbers are 0, 2, and 3. The channel frequency is specified by base and offset.

```
tgbconfig transmit_channels.channels.0.frequency_id x
tgbconfig transmit_channels.channels.0.base xx
tgbconfig transmit_channels.channels.0.offset xxx
```

13. Configure your transmit options. The default transmit_mode is 3.

```
tgbconfig transmit_options.transmit_mode x
```

Transmit mode sets the operating mode for transmitting on the network. The options are 0 for dithered, 1 for basic synchronized, 2 for strict synchronized, or 3 for multi-channel synchronized (default). If you select dithered you will need to set the dither parameters as well.

14. The Base Station has OpenVPN included in the operating system. You can attach the Base Station to an OpenVPN server as if it were in the customer network.

    If you are using VPN, for each client:

    ```
    tgbconfig network.vpn.clients.0.enabled x
    ```

    where 0 is the default and disabled and 1 is enabled.

    Enter the number of clients.

    ```
    tgbconfig network.vpn.client_count x
    ```

    If you enable VPN, you also must configure the following items for each client:

    ```
    tgbconfig network.vpn.clients.0.name xxxxxxx
    tgbconfig network.vpn.clients.0.host xxx.xxx.xxx.xxx
    tgbconfig network.vpn.clients.0.port xxxx
    tgbconfig network.vpn.clients.0.ca "location of ca file"
    tgbconfig network.vpn.clients.0.cert "location of cert file"
    tgbconfig network.vpn.clients.0.key "location of key file"
    tgbconfig network.vpn.clients.0.cipher "name of encryption cipher"
    ```

    The key and cert files must be uploaded to the Base Station folder /opt/tgbprogs/openvpn/. Please refer to the Base Station Security Guide for further instruction if needed.

15. Configure the time broadcasts. You will need to set the timezone offset for your region. Leave the max_clock_drift at the default value of 0.450. The following is an example:

    ```
    tgbconfig time_broadcasts.timezone_offset 0
    tgbconfig time_broadcasts.max_clock_drift 0.450
    ```

    (in seconds)

    For each time broadcast operation, configure the transmit interval in seconds, the modulation bitrate, and the transmit channel (frequency_id) that it will be sent on.

    ```
    tgbconfig time_broadcasts.broadcasts.0.interval 900
    tgbconfig time_broadcasts.broadcasts.0.bitrate 1
    tgbconfig time_broadcasts.broadcasts.0.channel 0
    ```

    The modulation modes in bitrate value:

Value	Modulation Mode
0	5 kbps mPass
1	10 kbps mPass2
2	Both 0 & 1 bitrates will go out in two broadcasts
3	10 kbps 4GFSK m4Pass
4	20 kbps 4GFSK m4pass2

16. If you have a SPM installed and want to monitor, enable the power monitor:

    ```
    tgbconfig power_monitor.enabled 1
    ```

    In addition, to view the monitoring you will want to turn on alarm logging.

17. To apply the configuration changes type:

    ```
    sudo -i tgbconfig-apply.sh
    ```

18. If the demod parameter was set or changed, run the following command to update the DSP firmware:

```
/opt/tgbprogs/firmware/firmware-update.sh
```

19. Restart any affected services or reboot the unit.

Power Down the M400B2

You must halt the transceiver operations before powering down.



CAUTION: Failure to halt the transceiver before power down may result in corruption or data loss.

1. Connect a USB cable from a PC to the diagnostic port on the transceiver and login to the transceiver.
2. Type

```
mount -o remount,ro
e2fsck /dev/mmcblk0p3
mount -o remount,rw
halt
```

   and press Enter to stop all transceiver operations. Wait until the system notifies you that it is safe to proceed before initiating any power down steps.

The controller should be shut down any time the power system is to be powered off completely. Not doing so can result in lost log entries or other problems.

1. Login to the power system and select Controller > Reset.
2. When prompted by the power system, click OK. The controller will prepare for shutdown; wait until the controller states "it is now safe to reset the controller" and the Reset button appears. Once these appear, the controller is in a safe state for shutdown and may have the power disconnected. Power off must be performed within 1 minute. Do not power off until the controller states that it is safe to do so as the controller is defragmenting its files and disk corruption could occur.
3. Do not select **Reset**, as the controller will reset instead of remaining shut down.



Note: 2.x software versions will remain in a safe state for only 1 minute before automatically restarting. Power MUST be disconnected before the controller attempts to reboot. If you miss the 1 minute window when using a 2.x software version, perform the reset procedure again. Powering off a controller during boot up can result in disk corruption.

1. Turn all three AC breakers to the OFF position.
2. Flip the power switch on the transceiver to OFF. To turn it off, you must first pull the switch slightly out and then flip it to OFF.
3. Flip the battery switch located to the side of the batteries to OFF.

Leaving the site

Once the Base Station has been installed and configured a final inspection should be performed.

Before you leave the site, ensure the following:

- Make sure all RF cables are tight and torqued to proper specifications.

- Verify that the Base Station is properly grounded.

  Note: If you do not have a SMA torque wrench, the specification is 8 inch-pounds so a light torquing is needed.

- Insure all data cables are secure.
- Make sure all Base Station breakers are in the ON position.
- Check the lights and switches on the Base Station battery charger.
  - Make sure none of the charger lights turn red when the Base Station transmits (if possible).
  - Make sure the charger switch is set to the "charge" position (Victron Chargers only).
  - Make sure the charger LED marked "float" is illuminated (Victron Chargers only).
- Check all lights on the front panel of the Base Station transceiver.
  - All lights must be green.
  - If the Transceiver is transmitting, make sure the TX lights are green.
  - Make sure the power supply lights are green.
- Close the door on the Base Station enclosure and lock it with the key.

Site verification

Once installed and configured, a final verification of the Base Station site's operational status should be performed.

It is vital that you make sure the Base Station Site Certification form is completed for each Base Station and system installation. Only when this checklist is completed can you certify the Base Station and document that the FlexNet system has been completely verified and tested.

5 Base Station monitoring and maintenance

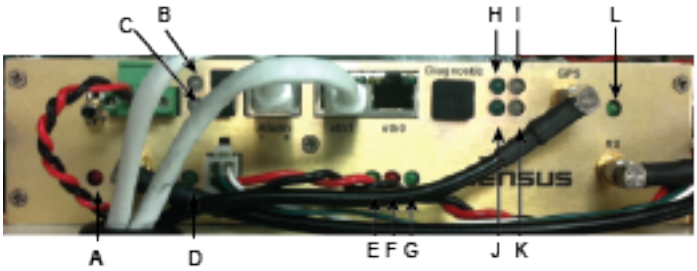
The following information is designed to assist with monitoring and maintenance of the M400B2.

M400B2 transceiver LEDs

The M400B2 transceiver incorporates LEDs to provide a visual indication of device health.

LED indicators include:

- **External Power**: Indicates that the unit currently has power.
- **CPU Status**: Indicates the CPU status.
- **CPC1/CPC2 Signal Chain Status**: Indicates the signal chain status.
- **CPC1/CPC2 Signal Chain RX**: Indicates when a message is received on the signal chain.
- **GPS PPS**: Blinks at a 1Hz rate synchronized to the GPS time.
- **RF Card PPS lock**: Indicates if the RF card is synchronized to GPS time.
- **Receiver Status**: Indicates if the Receive section is locked.
- **Receiver Overload**: Indicates if the Receive section is overloaded.
- **TX Status**: Lights during an RF transmission.
- **PA Voltage indicator**: Indicates if an external PA VCC is present.



M400B2 alarms

M400B2 alarms are accessible from the alarm port, are inputs, and are activated by shorting to ground.

The M400B2 sends both RNI alarms and SNMP traps. In the operating system, the alarm bits are indicated as Bits 1 through 8. For more information please refer to the Base Station Alarm Quick Guide.

Bit No.	Alarm Port Pin	Type	Description
1	Alarm1	Intrusion Alarm	Cabinet Door Open
2	Alarm2	Over Temperature Thermostat	The temperature in the cabinet is over the threshold.

Bit No.	Alarm Port Pin	Type	Description
3	Alarm3	Under Temperature Thermostat	The temperature in the cabinet is under the threshold.
4	Alarm4	Rectifier Major	Power System Fail or Battery Test
5	Alarm5	AC Power Fail	Indicates when the AC power has failed. Can indicate high-voltage situations as well.
6	Alarm6	Rectifier Minor	Power System Fault
7	Alarm7	Low Battery Alarm	Battery needs to be charged or changed.

Scheduled Base Station maintenance

Sensus recommends scheduling an initial checkup six months after installation, and after that, inspection at six month intervals.

Following the initial visit, the M400B2 should be checked, at minimum, as outlined above. However, the following factors may alter the length of time between service visits:

1. The maintenance required on the initial visit.
2. The environmental conditions.
3. Existing customer policies for equipment maintenance.

Maintenance checklist for Base Stations

Follow this checklist when inspecting Base Stations as part of the maintenance routine.

1. To ensure compliance with regulatory requirements, verify that copies of all required documentation are located at the M400B2 site. Printed copies should be stored in a water-tight bag; electronic copies may be stored at the site on a USB-style flash drive.
2. Tighten any loose bolts and screws.
3. Confirm that cabling and any electrical earthing cables are securely attached.
4. Check for any signs of water intrusion.
5. Check the integrity of the GPS antenna seal, if equipped.
6. Check the integrity of the cell antenna, if installed.
7. Visually inspect the antenna with binoculars to ensure secure mounting and the presence of other antennas added since installation.
8. Ensure the latest firmware is installed and that warning lights are not illuminated.
9. Check the battery pack for corrosion on the terminals or other anomalous conditions including leaking acid or loose battery bolts. Schedule replacement of any battery exhibiting signs of acid leakage.
10. Schedule the next service visit based on the observations and anticipated conditions.

Appendix A: Log into the M400B2

The M400B2 requires a terminal emulation program for login.

If you do not have a Virtual COM port (VCP) driver on your PC, download one now. (Available at *http://www.ftdichip.com/Drivers/VCP.htm*).

1. Connect a USB cable to the Diagnostic Port on the front of the transceiver.
2. Connect the other end of the cable to your PC.

   If asked for a driver, point to the previously installed VCP driver.

Connect the M400B2 to your laptop

If you do not have a Virtual COM port (VCP) driver on your PC, download one now. (Available at *http://www.ftdichip.com/Drivers/VCP.htm*).

1. Connect a USB-B cable to the Diagnostic Port on the front of the transceiver.
2. Connect the other end of the cable to your PC.

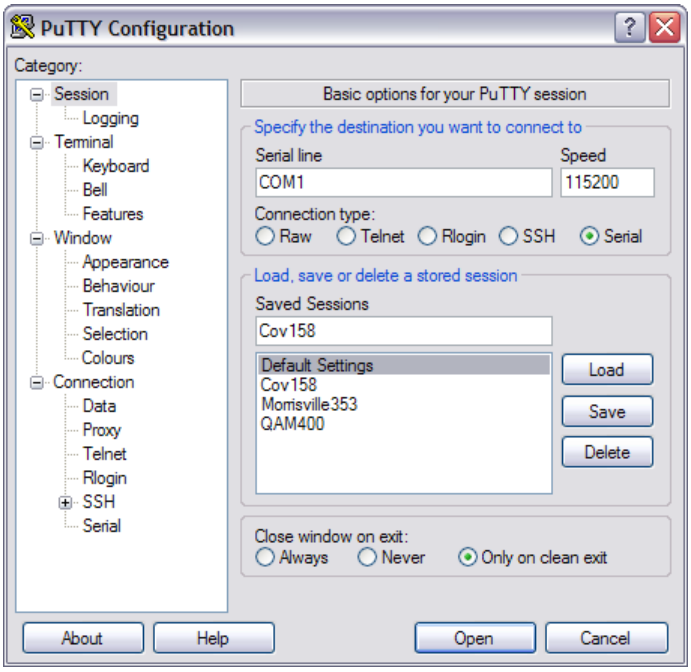
   If asked for a driver, point to the previously installed VCP driver.

Use PuTTY to establish a connection

Sensus suggests using PuTTY or Tera Term Pro as the terminal emulation program. Follow these steps to use PuTTY.

1. Using a PC, download the PuTTY program via the following internet link, if not already installed on your machine: *http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html*.
2. Download the latest version exe file for your Windows operating system to a convenient directory on the PC.
3. Double-click the putty.exe icon in the directory you installed it in (you may want to make a desktop shortcut to the program at this time.

4. The PuTTY Configuration screen is displayed.



5. Select the Serial radio button as the Connection Type.
6. In the Serial Line field, enter the COM port you are using. In the Speed field, type 115200.
7. Turn on the unit (if off) and allow it to boot up.
8. Click the Open button in the PuTTY window.
9. At the login prompt, type tmadmin. If you are using a version prior to Unified, you will need to type root at the login prompt.
   - The name in front of the login prompt will vary depending on how your particular unit has been set up.
10. Type the password when the unit returns the password prompt, then press the Enter key. The password does not echo on the screen. You are now at the Linux command prompt and ready to perform programming tasks.

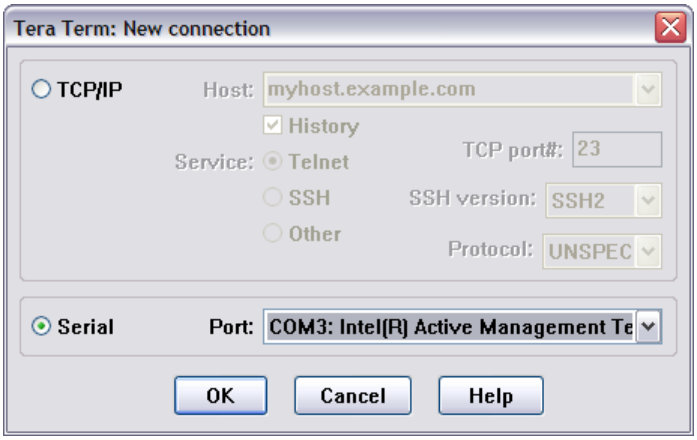
Note: If this is the first time you have logged in, you may be prompted to change the password; if so, enter passwd to change the password.

Use Tera Term to establish a connection

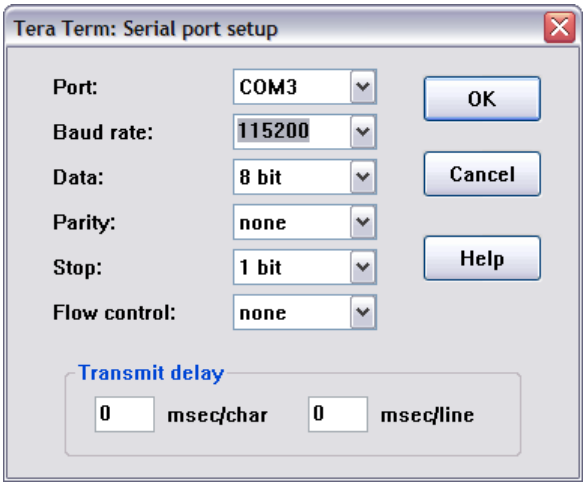
Sensus suggests using PuTTY or Tera Term Pro as the terminal emulation program. Follow these steps to use Tera Term Pro.

1. Download the Tera Term Pro program to your PC if it is not already installed on your machine. The program is available free from a number of internet sites.
2. Double-click the Tera Term Pro icon in the directory you installed it in (you may want to make a desktop shortcut to the program at this time).

3. The New connection screen is displayed.



4. Select the Serial radio button as the Connection type.
5. In the Port field, select the COM port you are using.
6. Click the OK button. The VT screen is displayed.
7. From the Setup menu, select the Serial Port command. The Serial port setup window is displayed.



8. In the Baud rate field, select 115200.
9. Verify the following settings and change if necessary:
   - Data: 8 bit
   - Parity: none
   - Stop: 1 bit
   - Flow control: none
10. Click the OK button.
11. Turn on the unit (if off) and allow it to boot up.
12. At the login prompt, type tmadmin. If you are using a version prior to Unified, you will need to type root at the login prompt.
    - The name in front of the login prompt will vary depending on how your particular unit has been set up.

13. Type the password when the unit returns the password prompt, then press the Enter key. The password does not echo on the screen. You are now at the Linux command prompt and ready to perform programming tasks.



Note: If this is the first time you have logged in, you may be prompted to change the password; if so, enter passwd to change the password.

Appendix B: Using tgbmenu

The program tgbmenu is a software routine which runs on the LINUX processor residing inside the M400B2.

You can connect directly to the unit through the front panel diagnostic port or access tgbmenu remotely through a Sensus server or the internet. For details on how to log in remotely contact the IT project manager assigned to your installation.

Commands described are current as of this writing. If future versions are generated newer commands may be available which are not discussed herein.

Run tgbmenu

Accessing tgbmenu requires certain hardware and a password.

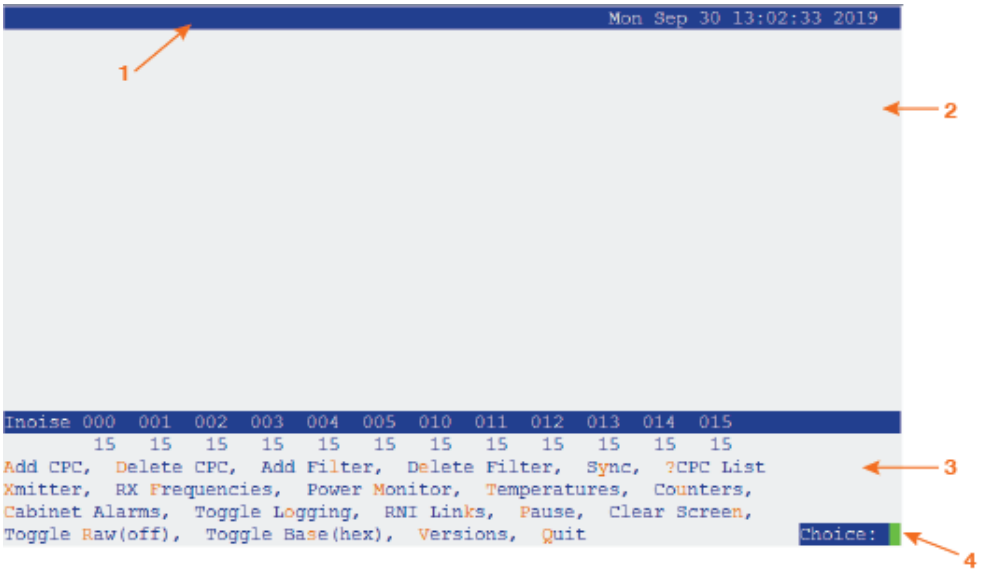
You will need the following materials:

- A PC with at least one USB port.
- A terminal emulation software such as PuTTY or Tera Term. Other TTY programs are acceptable; for instructions on PuTTY see *Use PuTTY to establish a connection* on page 40 and for Tera Term see *Use Tera Term to establish a connection* on page 41.
- USB cable.

1. Log in to the M400B2 operating system by typing `tmadmin` at the login prompt.
2. Type the password when the unit returns the password prompt, then press the Enter key.
3. At the prompt, type `tgbmenu` and press the Enter key.

tgbmenu display

The tgbmenu display lists the possible commands at the bottom of the screen. Use the highlighted letter to invoke the command. Data for each command displays in the main pane.



Key:
1: Header - Displays the name of the command screen
2: Data Area
3: Command Description and Data Entry Area - Shows the available commands at any given time. In data entry mode, various prompts and data are displayed in this area.
4: Command Prompt - Echoes any command entered

tgbmenu commands

The highlighted character in each command is the key entered at the Choice prompt to invoke that command.

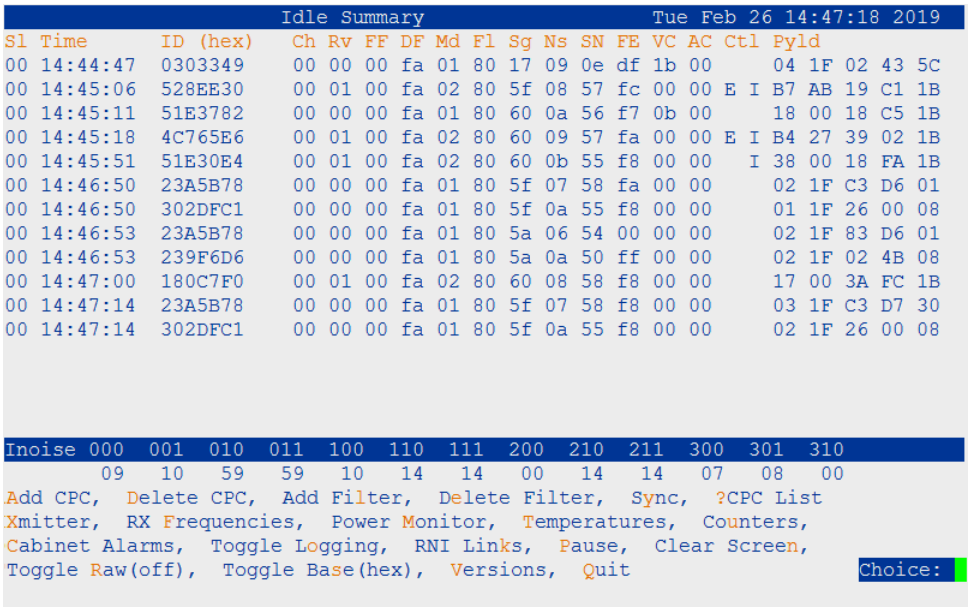
Depending on your TTY program the highlighting will be different, or may appear as bold.

Add CPC and delete CPC

Base Station transceivers can have multiple CPC cards; these commands are used when one or more CPC card is present.

Add CPC slot is invoked by pressing the **A** key; **D**elete CPC slot is evoked by pressing the **D** key. The M400B2 has only one CPC card so this entry will always be "0".

The CPC slot selection controls what sources of idle data display in the Idle Summary screen.



Add Filter and Delete Filter

The Add Filter and Delete Filter commands enable you to enter FlexNet endpoint IDs so that only those endpoints are displayed.

The command will accept hex or decimal IDs, depending on the state of the Toggle Base (status) command. (See *Toggle Base (status)* on page 53.) These commands are useful when you are trying to receive the messages from one or a few distinct endpoints and you do not want to see all the other endpoint traffic that the unit is receiving.

Note that if ANY endpoint ID filter is added, the tgbmenu screen will stop displaying all other endpoint data except for those endpoints selected by the Add Filter command. You must delete all added filter ID numbers using Delete Filter before tgbmenu will start to display all of the received endpoint IDs again.

To **ADD** a FlexNet endpoint ID filter:

1. Press the **I** key.
2. Enter the endpoint ID number you wish to display data for, filtering out all the other endpoint data received. Press the Enter key to enter the endpoint ID into tgbmenu.

The tgbmenu screen will now only display messages from the endpoint ID you entered.

To **DELETE** a FlexNet endpoint ID filter:

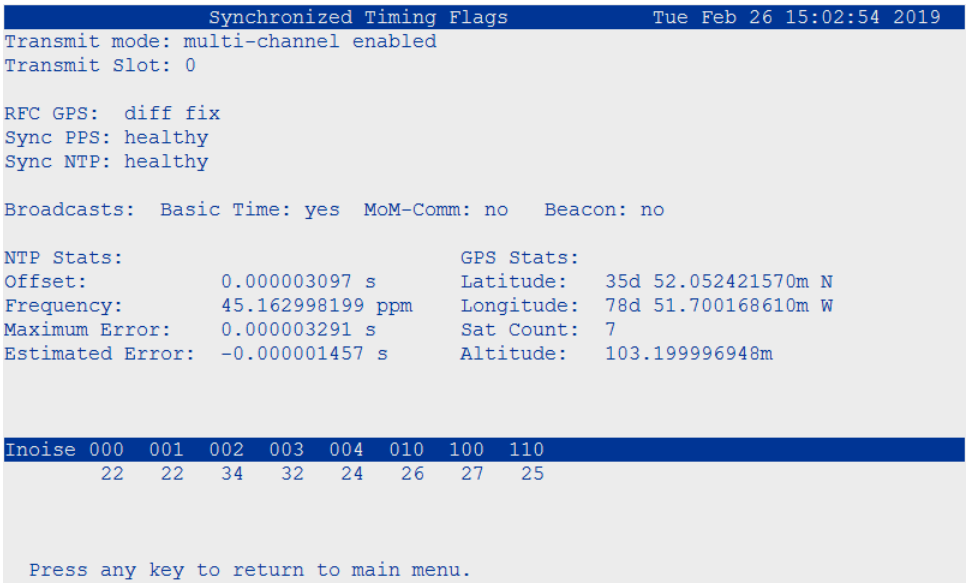
1. Press the **e** key.
2. Enter the endpoint ID to stop filtering and press the Enter key.

The other endpoint data should now display. If the tgbmenu screen does not update with the other endpoints, make sure you do not have another endpoint ID set to be filtered with tgbmenu.

Sync

The Sync command displays the current synchronization mode.

The Sync command is invoked by pressing the **y** key.



Press any key to exit the Sync command.

CPC List

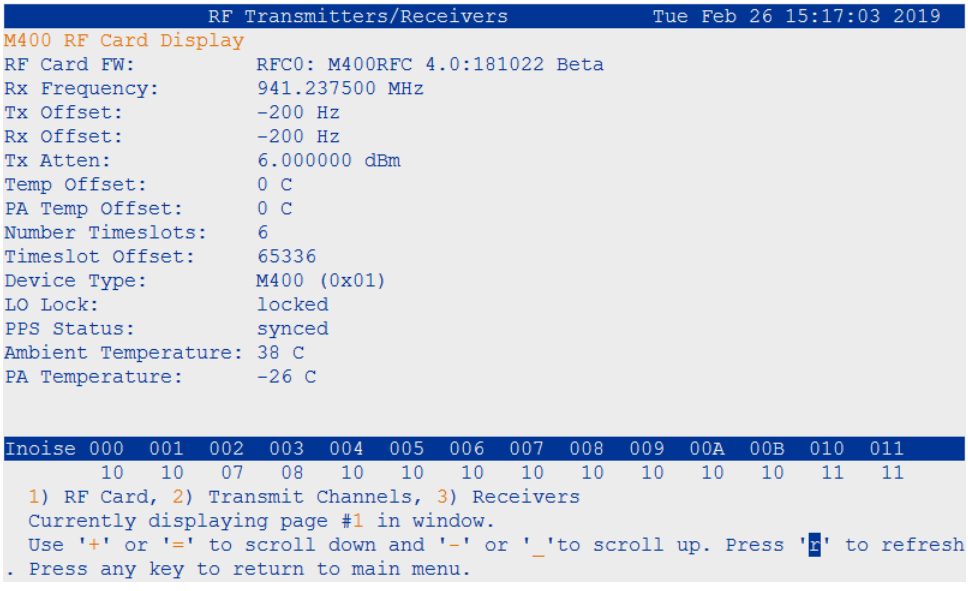
The CPC List command displays the defined slots.

If you have added CPC slots, the CPC List command displays the status of those slots and any associated messages.

Xmitter

The Xmitter command displays the RF Card, Transmit Channels, and Receive Channels.

The Xmitter command is invoked by pressing the **X** key. If you press the 1, 2, or 3 key you will cycle through the different configuration screens.



```
                RF Transmitters/Receivers            Tue Feb 26 15:17:34 2019
  ID   Frequency   MsgCnt
  00   940.237500       1
  01   disabled
  02   disabled
  03   disabled
  04   disabled
  05   disabled
  06   disabled
  07   disabled
  08   disabled
  09   disabled
  10   disabled
  11   disabled
  12   disabled
  13   disabled
  14   disabled
  15   disabled
Inoise 000  001  002  003  004  005  006  007  008  009  00A  00B  010  011
        10   10   07   08   10   10   10   10   10   10   10   10   11   11
  1) RF Card, 2) Transmit Channels, 3) Receivers
  Currently displaying page #1 in window.
  Use '+' or '=' to scroll down and '-' or '_'to scroll up. Press 'r' to refresh
. Press any key to return to main menu.
```

```
                RF Transmitters/Receivers            Tue Feb 26 15:18:23 2019
Chain  Fpga  Dsp   Modulation   IN RS AV  Frequency   MsgCnt  Status  Type
0.0.0    8   -6   7FSK-Normal  10 10 99  941.250000       0  OK      CPC2
0.0.1    8   -6   13FSK-DD     10 10 99  941.250000       0  OK      CPC2
0.0.2    8   -1   7FSK HB       7  7 99  941.281250       0  OK      CPC2
0.0.3    8   -3   FSK-Priority  8  8 99  941.268750       0  OK      CPC2
0.0.4    8   -6   7FSK-Normal  10 10 99  941.250000       0  OK      CPC2
0.0.5    8   -6   13FSK-DD     10 10 99  941.250000       0  OK      CPC2
0.0.6    8    4   7FSK-Normal  10 10 99  941.312500       0  OK      CPC2
0.0.7    8    4   13FSK-DD     10 10 99  941.312500       0  OK      CPC2
0.0.8    8    4   7FSK-Normal  10 10 99  941.312500       0  OK      CPC2
0.0.9    8    4   13FSK-DD     10 10 99  941.312500       0  OK      CPC2
0.0.10   8    4   7FSK-Normal  10 10 99  941.312500       0  OK      CPC2
0.0.11   8    4   13FSK-DD     10 10 99  941.312500       0  OK      CPC2
0.1.0    0    0   2SFSK        11 11 100 941.237500       0  OK      CPC2
0.1.1    0    0   2SFSK        11 11 100 941.237500       0  OK      CPC2


Inoise 000  001  002  003  004  005  006  007  008  009  00A  00B  010  011
        10   10   07   08   10   10   10   10   10   10   10   10   11   11
  1) RF Card, 2) Transmit Channels, 3) Receivers
  Currently displaying page #1 in window.
  Use '+' or '=' to scroll down and '-' or '_'to scroll up. Press 'r' to refresh
. Press any key to return to main menu.
```

Press any key besides 1, 2, or 3 to exit the Xmitter command.

Frequencies

This command is used for other versions of the Base Station and is not applicable to the M400B2.

The CPC slot has multiple frequencies and receivers, so this command is mapped to page three of the Xmitter command.

Power Monitor

Displays the power management details.

The Power Monitor command is invoked by pressing the **M** key. The Power Monitor displays the VSWR alarm status, Forward Power, Reflected Power, and VSWR ratio. This data only displays if you have an active power monitor attached to the Base Station.

```
                  Power Monitor: SPM-900              Tue Feb 26 15:27:53 2019

Firmware Version: 2.2
Status:           [0] normal
Forward Power:    29.600 dBm (0.912 Watts)
Reflected Power:  18.660 dBm (0.073 Watts)
VSWR:             1.792

Inoise 000  001  002  003  004  005  006  007  008  009  00A  00B  010  011
        10   10   07   08   10   10   10   10   10   10   10   10   11   11


  Press any key to return to main menu.
```

Temperatures

The Temperatures command displays the unit temperature in Celsius.

The Temperatures command is invoked by pressing the **T** key. The Temperatures display shows the ambient and PA temperatures of the RF cards in degrees C.

```
                Current Temperatures (C)          Tue Feb 26 15:20:26 2019

  RFC          0
              ---
  Ambient:     38
  PA:         -26

Inoise 000  001  002  003  004  005  006  007  008  009  00A  00B  010  011
        10   10   07   08   10   10   10   10   10   10   10   10   11   11


  Press any key to return to main menu.
```

Counters

The Counters command displays the status of several unit processes, messages, and communications.

The Counters command is invoked by pressing the **u** key.

```
                    Current Counters                Tue Feb 26 15:26:00 2019
Last Reset:       Feb 26 15:25:20
Unique Ackables:  0                       CMD Success:              0
Duped Ackables:   0                       CMD Success (bit force):  0
Commands In:      0                       CMD Success (1 ACK):      0
Commands Out:     0                       CMD TX Naked:             0
Piped messages:   0                       CMD Bad Channel:          0
Reports queued:   6                       CMD Bad Modulation:       0
Reports sent:     6                       CMD No TX NAK:            0
                  Msgs     Idle           CMD TX Not Responding:    0
    CPC Slot 0:   0        0              CMD TX Bad Response:      0
                                          ACK Success:              0
                                          ACK Success (1 ACK):      0
                                          ACK TX Not Repsonding:    0
                                          ACK Quantum Expired:      0
                                          ACK Age Expired:          0
                                          Unknown TX Error:         0

Inoise 000  001  002  003  004  005  006  007  008  009  00A  00B  010  011
        10   10   07   08   10   10   10   10   10   10   10   10   11   11


  Press any key to return to main menu.
```

Press any key to exit the Counters command.

Cabinet Alarms

The Cabinet Alarms command enables you to display various M400B2 status and alarm indications.

The display for the alarms will differ depending on the individual unit installation and type.

```
                    Cabinet Alarms                Fri Oct  4 12:36:56 2019

    ENCLOSURE: M400B
  PIN POSITION: 12345678
    RAW STATUS: 00000000

  Pin   Alarm                    Status
  ---   ----------------------   ------
   1    Cabinet door:            OPEN
  2,3   Cabinet temperature:     NORMAL
  4,6   Rectifier system status: NORMAL
   5    AC line power:           ON
   7    Battery charge status:   NORMAL

Inoise 000  001  002  003  004  005  010  011  012  013  014  015
        15   15   15   15   15   15   15   15   15   15   15   15


  Press any key to return to main menu.
```

Please contact the IT Project Manager if you need further information on cabinet alarms or if any of the displayed values in tgbmenu denote a FAILED condition.

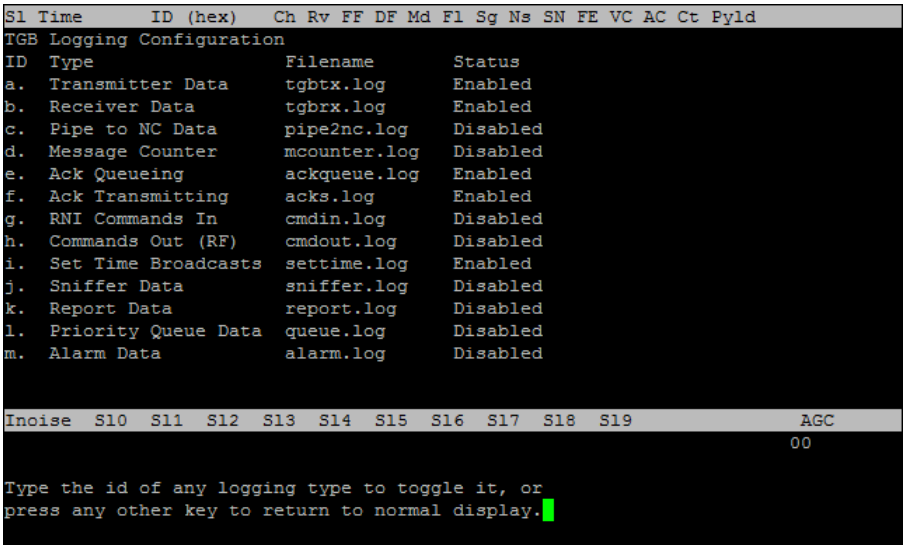
Toggle Logging

The Toggle Logging command enables various transceiver data to be logged to internal disk space on the transceiver LINUX processor.

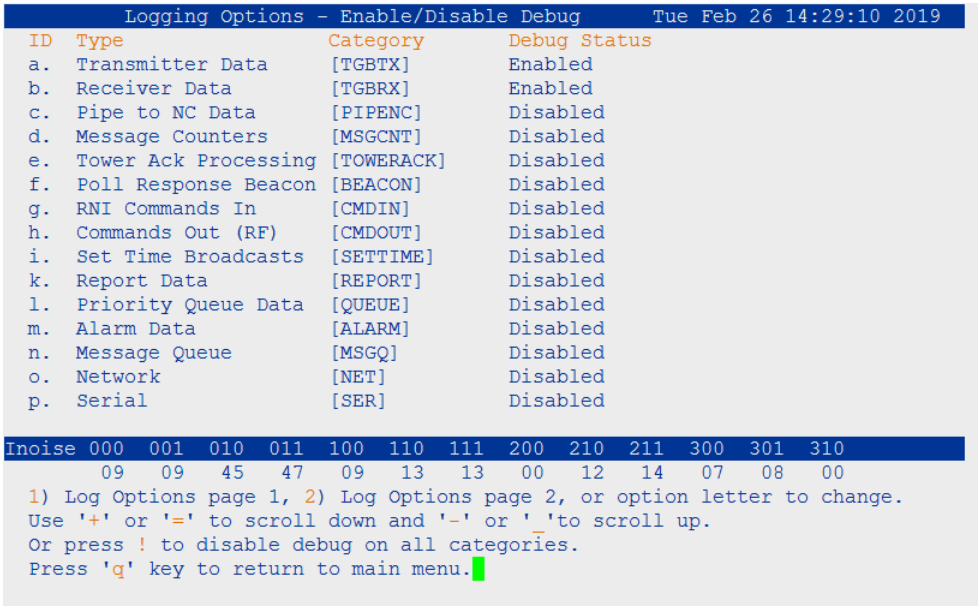
Logging is invoked by first pressing the **o** key. The logging screen has two pages unless you are running Legacy, in which case there is only one page. Press the **1** key for the first page or the **2** key for the second page.

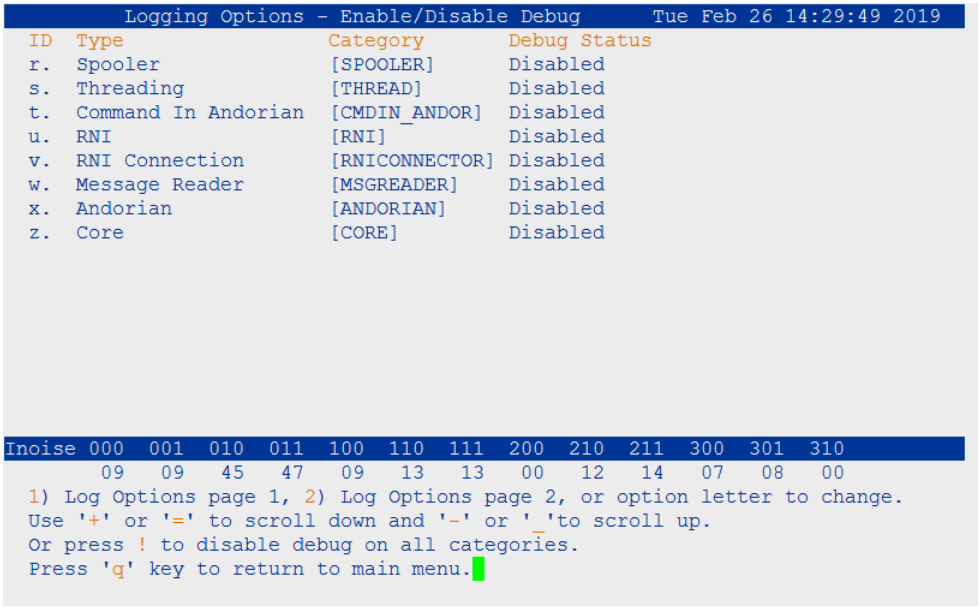
CAUTION: Enabling logging for an extended period of time, such as a month, will shorten the life of the internal data storage.

If running Legacy:



If running Unified:



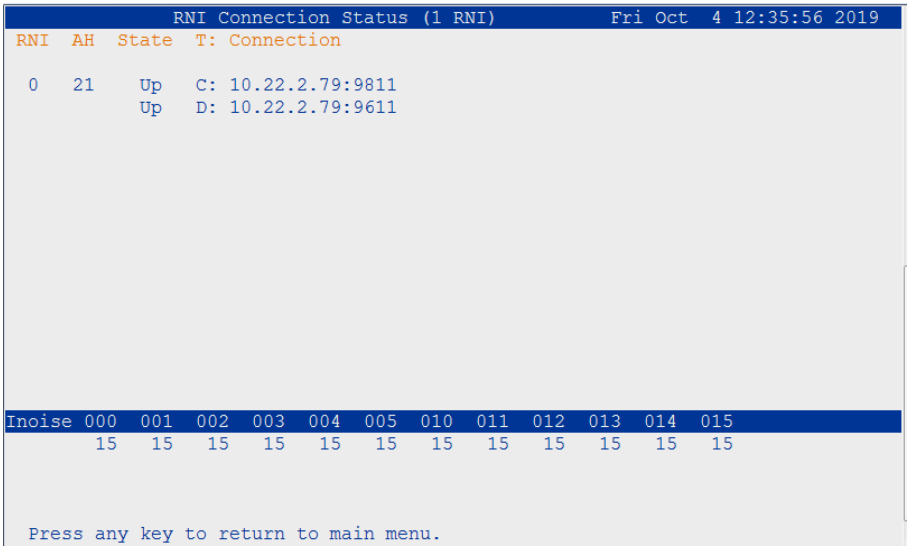


This command writes files to the internal unit hard drive so caution should be taken to prevent the drive from becoming full due to logging.

RNI links

The RNI links command displays the status of the RNI connection for all configured RNIs.

The RNI links command is invoked by pressing the **k** key.



Pause

The Pause command enables suspension of the tgbmenu display data update.

This command is useful when you need to log data by hand or you are trying to look at individual endpoint data before it scrolls off the screen. Evoking the **P** key will suspend the update of the tgbmenu screen data. Evoking **P** again will enable the screen to update as normal.

While the screen update is paused, the Pause command label in the command area will change to UnPause showing that the screen update has been paused.

Clear Screen

The Clear Screen command enables you clear the data portion of the tgbmenu screen.

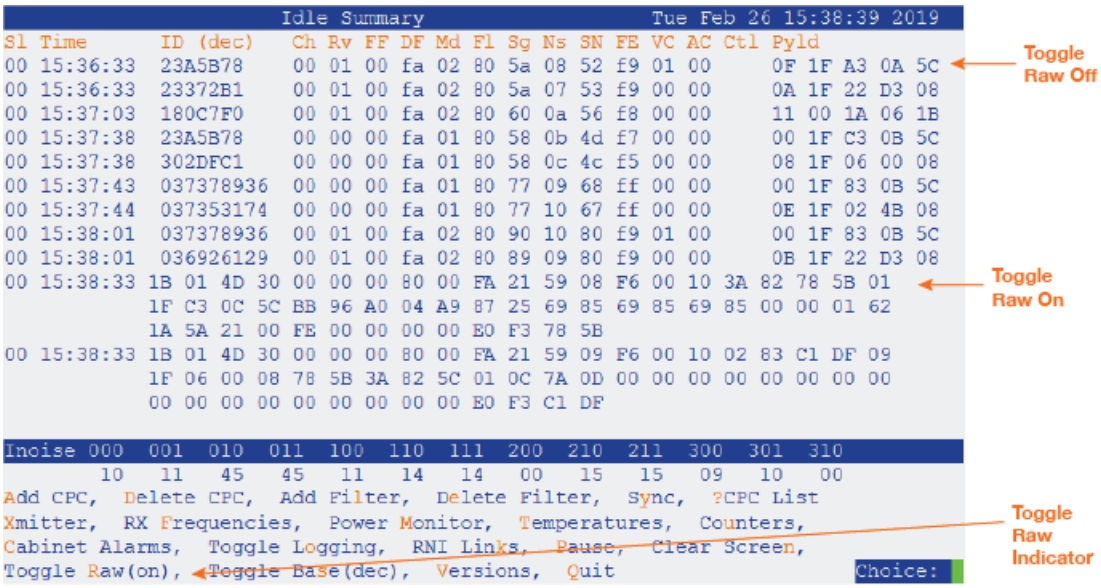
To clear the screen of data, enter the **n** key.

Toggle Raw (state)

The Toggle Raw command toggles the way the data is displayed.

Toggle **R**aw is invoked by pressing the **R** key. The state of the Toggle Raw command is shown in parenthesis after the command. If Toggle Raw is activated, the display will read Toggle Raw (on). If Toggle Raw is deactivated, the display will read Toggle Raw (off).

If Toggle Raw is activated, the endpoint data displayed will change. The screen seen here shows an example of the data area when Toggle Raw is activated (top of the data area) and deactivated (bottom of the data area).



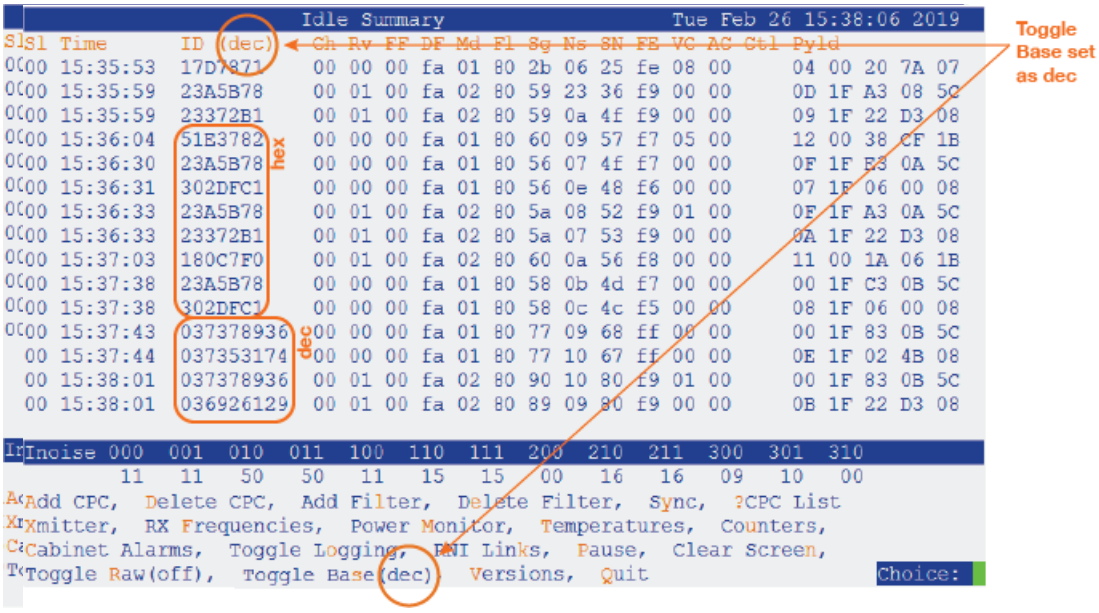
Raw data is convenient to display for code debugging and other development tasks.

Note: It is suggested that the Toggle Raw command be set to the off state for all routine transceiver field tasks.

Toggle Base (status)

The Toggle Base command enables you to toggle the endpoint ID display and FlexNet ID entry between Hexadecimal and Decimal (Hexadecimal is the default).

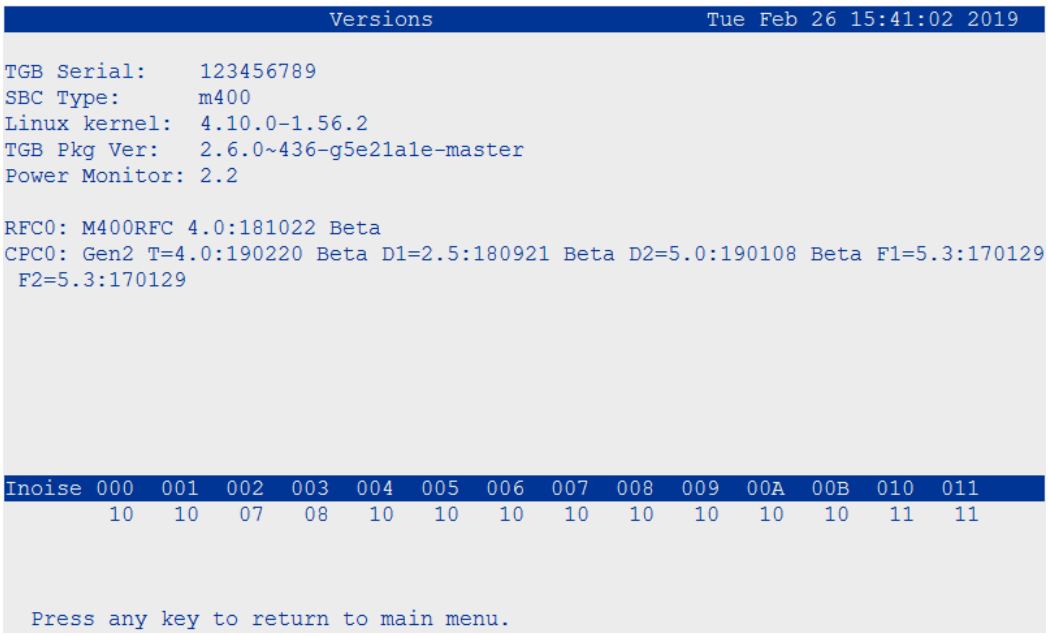
Press the **s** key to toggle between Hex and Decimal display mode.



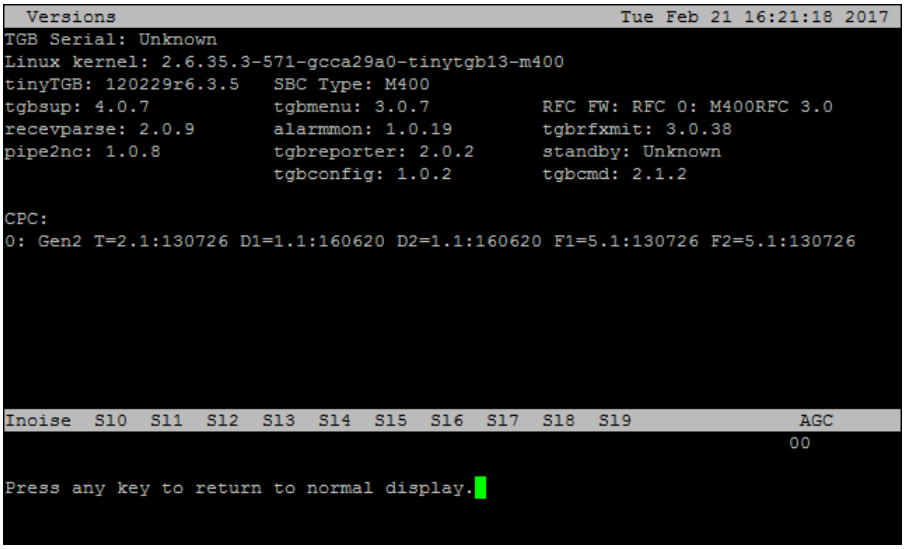
Versions

The versions command enables you to identify the software version status of the various programs that reside on the transceiver. It also shows the CPC firmware versions.

To invoke the Versions display, press the **V** key and then the **Enter** key.



M400B2 running Unified



M400B2 running Legacy

The IT Project Manager who is supervising the installation will be able to assist you on what the current software versions should be for all the software listed in the display.

Quit

The Quit command terminates the tgbmenu program and returns the user to the LINUX prompt.

The Quit command is invoked by pressing the **Q** key. If you are finished using tgbmenu, you should use the logout command at the LINUX prompt before you disconnect the cable from the unit.

Appendix C: Legacy configuration file

The information in this section is for Legacy firmware. If you are running Unified, please see *Unified configuration*.

Note: Important: There is only one configuration file: /opt/tgbprogs/etc/main.json. All field programmable values are configured in this file.

There are two ways to configure the json file. (1) Use the tgbconfig utility to edit the configuration file when you need to change one field in the configuration or to verify the entire file. This is the preferred method. (2) Use the vi command to make multiple changes to the configuration file.

CAUTION: You should use extreme caution when editing the configuration file, as any typographical error will cause issues. Sensus recommends creating a backup copy of the json file before editing.

The tgbconfig utility is located in the "/opt/tgbprogs/sbin" directory (although it is also in the bash shell path). When run with no parameters, this utility will verify there are no syntax errors in your configuration file and will display the current configuration data. When updating one parameter, the full json path to the parameter and its new value must be provided.

To eliminate duplicate device errors on the network and the RNI, you must make sure certain fields in this configuration file are unique. These fields are listed below:

- base_station_id
- hostname
- network.eth0.ip

Basic setup

The following walks you through the basic setup commands for the configuration file that need to be edited. In order to make the necessary configuration edits, you will need to access a root shell.

These basic commands are provided as a reference; no changes should be made to the json files unless authorized to do so.

CAUTION: This assumes that you will use the tgbconfig utility and edit one line at a time. If you choose to view the entire file, you will see other options not mentioned below. These options should be left in their default state unless instructed otherwise!

- To display the entire configuration file, type tgbconfig at the prompt.
- To display a specific value, type tgbconfig and then the configuration item. Example: tgbconfig network.eth0.enabled
- To add a key and value or edit a value, type tgbconfig, then the configuration item, then the value. Example: tgbconfig network.eth0.enabled 1

1. Set the Base Station ID. This must be a unique number.

```
tgbconfig base_station_id xxxxxxxx
```

2. Set the host name. This must be a unique name.

```
tgbconfig hostname xxxxxxxx
```

3. Set the timezone. US/Eastern is the default. for all the possible options, go to *http://en.wikipedia.org/wiki/List_of_tz_database_time_zones*.

```
tgbconfig timezone xxxxxxxx
```

4. Configure the network by setting the following keys.

```
tgbconfig network.eth0.ip xxx.xxx.xxx.xx
tgbconfig network.eth0.netmask xxx.xxx.xxx.xxx
tgbconfig network.eth0.gateway xxx.xxx.xxx.xxx
```

   for this transceiver.

5. If you are using a firewall:

   tgbconfig firewall_enabled x, where 0 is the default and disabled and 1 is enabled. If you enable a firewall, you also must configure a host or subnet that will be allowed to establish ssh connections to this M400B2:

```
tgbconfig network.management_console.ip xxx.xxx.xxx.xxx
tgbconfig network.management_console.netmask xxx.xxx.xxx.xxx
```

   Leaving the netmask at the default of 255.255.255.255 will effectively void the management console feature of the firewall.

6. Configure your ntp time servers. You have the option to enter up to four servers; the default is two (Sensus recommendation). You should set the ntp IP address to either the address of your internal time servers or an appropriate time server for your geographic location.

```
tgbconfig ntp.server_count 2
tgbconfig ntp.ntpservers0 xxx.xxx.xxx.xxx
tgbconfig ntp.ntpservers1 xxx.xxx.xxx.xxx
```

7. If configuring to talk to a RNI, enter the data and command IP addresses.

```
tgbconfig rni.data_ip xxx.xxx.xxx.xx
tgbconfig rni.command_ip xxx.xxx.xxx.xx
```

   The default for these fields is 127.0.0.1. It is recommended that you leave these defaults in place until the Base Station is assigned to an RNI.

8. Configure the RF card. The RF card count will always be 1 and is named rfcard0. The type, path, and speed will not change. The rx_frequency should be the center frequency of the RF card in hertz, and should be assigned by Sensus. It is recommended that you leave the number of timeslots at the default of 6.

```
tgbconfig rfcards.rfcard_count 1
tgbconfig rfcards.rfcard0.rx_frequency xxxxxxxx
tgbconfig rfacrds.rfcard0.number_of_timeslots 6
```

9. Configure the Receiver radio frequency and modulation.

   The CPC count is 1 and the node is named cpc0. The type, path, and speed will not change. There are 2 hardware chains for each CPC; each begins with an FPGA and covers a bandwidth of 100 kHz. Both chains must be utilized in a back-to-back frequency range to use the full 200 kHz option in a M400B2.

   The FPGA frequency sets the receive bandwidth. This is calculated in 6.25 kHz steps, so if you set the rx_frequency to 901100 kHz, then set the fpga_freq to 8, you are

adding 50 kHz so the FPGA will be centered on 901150. In the same manner, set the dsp_freq for the channel that the receiver processes. Using the above numbers, if you set the DSP frequency to -6, you are subtracting -37.5 kHz from the FPGA number, meaning you end up with the center frequency of 901112500.

```
tgbconfig receivers.cpc0.chain0.fpga_freq x
tgbconfig receivers.cpc0.chain0.recv_count x
tgbconfig receivers.cpc0.chain0.rcvr0.dsp_freq x
tgbconfig receivers.cpc0.chain0.rcvr0.modulation x
tgbconfig receivers.cpc0.chain0.rcvr0.width x
```

You will also need to set the assigned modulation and width; it should be noted that each receiver can have only one modulation so you need to set the recv_count to the appropriate number to accommodate the number of modulations you want to employ. The current modulation types can be seen in the following table. For combination modulations, you must still have only one modulation for each receiver, but put each modulation you want in combination on the same DSP frequency.

The current modulation types:

Value	Modulation Type	Value	Modulation Type
0	Receiver Disabled	12	2-level half-baud SFSK (6.25 kbps 2GMSK BT=0.36)
1	Normal (full-baud 7FSK)	13	4-level half-baud SFSK(12.5 kbps 4GMSK BT=0.36)
2	Double Density (full-baud 13FSK ½ coded)	16	mPass (5 kbps filtered 2GFSK or 2GMSK)
4	C&I (half-baud 13FSK)	17	mPass2 (10 kbps filtered 2GFSK or GMSK)
5	Priority (half-baud 13FSK)	18	m4Pass (10 kbps 4GMSK)
8	2-level SFSK (12.5 kbps 2GMSK BT=0.36)	19	m4Pass2 (20 kbps 4 GMSK)
9	4-level SFSK (25 kbps 4GMSK BT=0.36)	20	mPass12k (12.5 kbps filtered 2 GFSK or 2GMSK)

For width you have three options: 0-12.5 kHz, 1=25 kHz, 2=50kHz.



Note: It is very important that all keys entered under Receivers match those on the Sensus Base Station Site Configuration sheet. If you enter these keys incorrectly, the Base Station will not receive correctly.

10. Configure the transmit channels. The default channel count is set to 3 though it can be set to any number from 0-15. It is also important to note that the channel number is just the name of that block while the frequency id is the identifying name of that frequency. For example, you could have 3 channels where the block names are channel0, channel1 and channel2, but the frequency id numbers are 0, 2, and 3. The channel frequency is specified by base and offset.

```
tgbconfig transmit_channels.channel_count x
tgbconfig transmit_channels.channel0.frequency_id x
tgbconfig transmit_channels.channel0.base xx
tgbconfig transmit_channels.channel0.offset xxx
```

11. If desired, configure a frequency identifier wildcard to support broadcast messages during firmware download.

```
tgbconfig transmit_channels.wildcard_count x
```

```
tgbconfig transmit_channels.wildcard0.source x
tgbconfig transmit_channels.wildcard0.target_count x
tgbconfig transmit_channels.wildcard0.target0 x
```

12. Configure your transmit options.

```
tgbconfig transmit_options.transmit_mode x
```

Transmit mode sets the operating mode for transmitting on the network. The options are 0 for dithered, 1 for basic synchronized, 2 for strict synchronized, or 3 for multi-channel synchronized. If you select dithered you will need to set the dither parameters as well.

13. Configure the time broadcasts. You will need to set the timezone offset and the broadcast count. The following is an example (in seconds):

```
tgbconfig time_broadcasts.timezone_offset 0
tgbconfig time_broadcasts.broadcast_count 3
tgbconfig time_broadcasts.max_clock_drift 0.450
```

Clock drift is the difference between local time and NTP/GPS time in seconds. If the time clock drift is greater than max_clock_drift, time sync messages will not be sent.

You will also need to configure the modulation, which is set by the bitrate under time broadcast.

```
tgbconfig time_broadcasts.broadcast0.bitrate 1
```

The modulation modes in bitrate value:

Value	Modulation Mode
0	5k bps mPass
1	10k bps mPass2
2	Both 0 & 1 bitrates will go out in two broadcasts
3	10 Kbps 4GFSK m4Pass
4	20 Kbps 4GFSK m4pass2

14. If you want to use momcomm, enable it (1=enable, 0=disable) and select the channel and transmit slot. Please note that momcomm cannot be on the same channel as electric.

```
tgbconfig momcomm.enabled 1
tgbconfig momcomm.channel x
tgbconfig momcomm.transmit_slot x
```

15. If you have a SPM-900 installed and want to monitor, enable the power monitor:

```
tgbconfig power_monitor.enabled 1
```

In addition, to view the monitoring you will want to turn on alarm logging.

16. Reboot the Base Station (so it accepts the information you have just entered) by typing reboot at the # prompt and pressing Enter.
17. When the reboot is complete, log in and perform the following:
    - Issue the tgbconfig command to validate the changes.
    - Stop tgbprogs (tgbprog stop).
    - Remove aspdiskspool.dat (rm /opt/tgbprogs/diskspools/aspdiskspool.dat).
    - Start tgbprogs (tgbprog start).

18. You can now perform other tasks or remove the USB cable from the diagnostic port and exit your terminal emulation program.

Configure the RNI for M400B2 communication

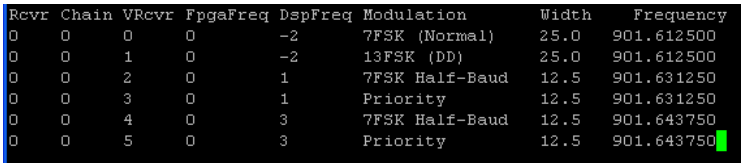
There is a file on the NC box, translationv2tov1.cfg, that needs to be edited in order for the RNI to recognize messages coming from the M400B2. This file should only need to be edited at initial installation.

The transceiver must point to the specific NC box. If you did not enter the data and command IP addresses when configuring the transceiver you must do so now. These IP addresses must be the correct values for your M400B2 installation and not the default of 127.0.0.1.

```
tgbconfig rni.data_ip xx.xxx.xxx.xx
tgbconfig rni.command_ip xx.xxx.xxx.xx
```

For further information on RNI configuration as it pertains to the M400B2 please refer to the FlexNet™ RNI Base Station Security User Guide (AUG-10024-xx).

1. Login to the M400B2 transceiver and at the prompt type tgbmenu (see *Using tgbmenu* on page 44).
2. Enter **V** or **v** for versions and note the version of the RF card firmware.
3. Enter **X** or **x** for transmitter, then option **3** for Receive Channels. You should get a screen that looks something like the following:



Rcvr	Chain	VRcvr	FpgaFreq	DspFreq	Modulation	Width	Frequency
0	0	0	0	-2	7FSK (Normal)	25.0	901.612500
0	0	1	0	-2	13FSK (DD)	25.0	901.612500
0	0	2	0	1	7FSK Half-Baud	12.5	901.631250
0	0	3	0	1	Priority	12.5	901.631250
0	0	4	0	3	7FSK Half-Baud	12.5	901.643750
0	0	5	0	3	Priority	12.5	901.643750

   Note the center frequency (far right), the modulation, and the fpga/dsp frequencies. You will need to match these with the values in the NC .cfg file.
4. Login to the NC box of your RNI. The file is located in /opt/ncprogs/etc/translationv2tov1.cfg. Open this file for editing using the vi command.
5. This configuration file is divided into sections. The first section is the RF card firmware version. This number should match the number you noted in step 2 (the version number noted from tgbmenu is in hexadecimal but the version number in the NC box is in decimal—so rf version 7.9=121, and so on).
6. The second section is the RX center frequency. This number needs to match the number that was entered as the center of the RF frequency in the .json file.
7. The third section is the RF card RX bandwidth. For the M400B2, this number will most likely be 2, which equals 100 kHz; 1 equals 50 kHz.
8. The fourth section is the CPC card emulation. This shows the modulation, the channel, and the frequency, which need to match what you noted in step 3. However, the modulation and channel numbers in this file are based on the scheme used in S/D/T base stations so you will need to carefully check the numbers. The following table and picture provide a comparison of modulation types and a graphic representation of how the channel steps line up (legacy = S/D/T).

M400B2 Value	S/D/T Value	Modulation Type
0	0	Receiver Disabled
1	1	7FSK (Normal Mode)

M400B2 Value	S/D/T Value	Modulation Type
2	5	13FSK (Double Density)
3		13FSK Rate ¾ FEC
4	3	7FSK Half-Baud (C&I)
5	4	Priority Mode
6	2	Boost Mode

Compliance Statements

Warning: Sensus devices are for professional installation only. They are to be serviced by professional personnel only. This product is NOT for consumer installation or servicing.

Radiation Hazard: In order to satisfy the FCC RF exposure limit for transmitting devices, a separation distance of 3 m (9.8 ft.) or more should be maintained while operating the Sensus M400 transceiver with a 12.15 dBi antenna. To ensure compliance, operation at closer than this distance is not recommended. This minimum safe distance is required between personnel and this antenna of this device.

Radiation Hazard: In order to satisfy the ISED RF exposure limit for transmitting devices, a separation distance of 4.4 m (14.4 ft.) or more should be maintained while operating the Sensus M400 transceiver with a 12.15 dBi antenna. To ensure compliance, operation at closer than this distance is not recommended. This minimum safe distance is required between personnel and this antenna of this device.

Afin de satisfaire à la limite d'exposition RF pour les appareils de transmission, une distance de séparation de 4.4 m (14.4 pieds) ou plus doit être maintenu pendant le fonctionnement du Sensus appareil (M400/12.15 dBi antenne). Pour assurer la conformité, un fonctionnement à distance inférieure à celle est pas recommandée. Cette distance minimale de sécurité est nécessaire entre le personnel et l'antenne de cet appareil.

Radiation Hazard: In order to satisfy the FCC RF exposure limit for transmitting devices, a separation distance of 7.5 m (24.6 ft.) or more should be maintained while operating the Sensus M400 transceiver with a 20.15 dBi antenna. To ensure compliance, operation at closer than this distance is not recommended. This minimum safe distance is required between personnel and this antenna of this device.

Note: CFR 47 Part 101 limits the radiated power to 1,000W in the 941.0 MHz to 941.5 MHz frequency band. Use of a 20.15 dBi antenna may require the use of an inline RF attenuator. Professional installation required.

Radiation Hazard: In order to satisfy the ISED RF exposure limit for transmitting devices, a separation distance of 11 m (36.1 ft.) or more should be maintained while operating the Sensus M400 transceiver with a 20.15 dBi antenna. To ensure compliance, operation at closer than this distance is not recommended. This minimum safe distance is required between personnel and this antenna of this device.

Afin de satisfaire à la limite d'exposition RF pour les appareils de transmission, une distance de séparation de 11 m (36.1 pieds) ou plus doit être maintenu pendant le fonctionnement du Sensus appareil (M400/20.15 dBi antenne). Pour assurer la conformité, un fonctionnement à distance inférieure à celle est pas

recommandée. Cette distance minimale de sécurité est nécessaire entre le personnel et l'antenne de cet appareil.

Note: SRSP-505 limits the radiated power to 250W, 600W, or 2,500W depending on the use case in the 941.0MHz to 941.5MHz frequency band and in the 952.0MHz to 953.0MHz frequency band. SRSP-509 limits the radiated power to 2,500W in the 930.0MHz to 931.0MHz frequency band and in the 940.0MHz to 941.0MHz frequency band. Use of a 20.15 dBi antenna may require the use of an inline RF attenuator.

Warning: The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

Attention: For Class B - Unintentional Radiators:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Shock Warning: Hazardous voltages are present: To reduce the risk of electric shock and danger to personal health, follow the instructions.

Warning: Any modifications made to this device that are not approved by Sensus may void the authority granted to the user by the FCC to operate equipment.

Attention: ICES-003 Class B Notice-Avis NMB-003, Classe B

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numerique de la classe B est conforme à la norme NMB-003 du Canada.

Warning: When applicable, there is danger of explosion if batteries are mishandled or incorrectly replaced. On systems with replaceable batteries, replace only with the same manufacturer and type or equivalent type recommended per the instructions provided in the product service manual.

Do not disassemble batteries or attempt to recharge them outside the system. Do not dispose of batteries in fire.

Dispose of batteries properly in accordance with the manufacturer's instructions and local regulations.



Shock Warning: For products with multiple power cords, all power cords must be disconnected to completely remove power from the system.



Shock Warning: For products that use power cords, not all power cords have the same current ratings. Do not use the power cord provided with your equipment for any other use. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with your Sensus product.



Warning: Do not dispose in fire, mix with other battery types, charge above specified rate, connect improperly, or short circuit, which may result in overheating, explosion or leakage of cell contents.



Warning: This radio is intended for use in occupational/controlled conditions, where users have full knowledge of their exposure and can exercise control over their exposure to meet FCC limits. This radio device is NOT authorized for general population, consumer or any other use.



Shock Warning: Sensus products are designed to be connected only to a grounded main circuit outlet. Do not defeat the plug grounding pin and do not plug these products into a non-grounded main power circuit.



Attention: This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



Attention: This radio transmitter M400 Transceiver has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio M400 Transceiver a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

- DIPOLE 10 dBd (12.15 dBi)
- DIPOLE 18 dBd (20.15 dBi)

Attention: Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Warning:

ANTENNAS:

An outdoor antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can come in contact with such power lines or circuits as death or serious injury can occur. Be sure the antenna system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electric Code (NEC) in the U.S.A. provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes and requirements for the grounding electrode. Antenna grounding shall be according to the National Electrical Code, ANSI/NFPA 70.

Warning:

This product can expose you to chemicals including Di(2-ethylhexyl)phthalate (DEHP), which are known to the State of California to cause cancer or birth defects or other reproductive harm. For more information, visit www.P65Warnings.ca.gov.

CITY OF WAUCHULA WARRANTY

The warranties on meters included in Project Materials and Supplies, and on Work, and Services shall be as follows:

1. Project Materials and Supplies.

(a) General. Meters and equipment included in Project Materials and Supplies that Client purchases from Core & Main LP ("Core & Main") are warranted by the manufacturer to be free from Manufacturers' Defects for the period specified in the manufacturer's warranty. A copy of the present warranty of each manufacturer that will supply meters and equipment as part of the Project Materials and Supplies is attached hereto. The term of such manufacturer's warranty shall be as set forth in such attached manufacturer's warranty (as the same may be changed from time to time during the course of the performance of the Agreement, but with changes to apply only to purchases of meters or equipment occurring after the change becomes effective), but generally the start date for warranties is the date of the manufacturer's shipment of such meters or equipment as noted in the applicable Acceptance Certificate ("Manufacturer's Warranty Period"). PROJECT MATERIALS AND SUPPLIES OTHER THAN METERS AND EQUIPMENT ARE NOT WARRANTED. CORE & MAIN DOES NOT PROVIDE ANY SEPARATE WARRANTY FOR PROJECT MATERIALS AND SUPPLIES.

(b) Core & Main's Responsibility. Upon any breach of the manufacturer's warranty on meters or equipment noticed to Core & Main during the applicable Manufacturer's Warranty Period, Core & Main's sole responsibility shall be to cooperate with Client in arranging for the manufacturer to repair or replace any defective meters or equipment.

2. Installation Work and Services.

(a) General. Core & Main warrants that all installation Work and Services provided by Core & Main shall be performed by Core & Main in a workmanlike manner and in compliance with any specifications set forth in this Agreement, with such warranty to expire one year from the date when such installation Work was performed or such Services were provided (the "Warranty Period").

(b) Exclusive Remedy. Upon any breach of Core & Main's warranty as to installation Work or Services during the applicable Warranty Period, Core & Main's sole responsibility shall be to perform any corrective installation Work or Services necessary to bring Core & Main's installation Work and Services into compliance with such requirements.

3. DISCLAIMER OF FURTHER LIABILITIES. EXCEPT FOR THE FOREGOING EXPRESS WARRANTY, CORE & MAIN DISCLAIMS ALL EXPRESS AND IMPLIED WARRANTIES INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT, WHETHER ARISING OUT OF WARRANTY, INDEMNITY, TORT, CONTRACT OR OTHERWISE, SHALL CORE & MAIN BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES OF ANY KIND.

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SENSUS

Sensus Terms of Sale

FEB 2023

1. **DEFINITIONS**. "Customer" means the party purchasing goods or services pursuant to these Terms of Sale ("Terms"). "Sensus" means Sensus USA Inc., a Delaware corporation. "Deliverables" means the Sensus goods and services sold or otherwise provided pursuant to this Agreement. Software licenses are provided solely through a separate Sensus software license.
2. **CONTRACT OF SALE**. All Sensus Deliverables are offered for sale subject to the prices and other terms specified in (a) the applicable Sensus quotation, proposal or pricelist, and (b) these Terms (together, the "Proposal"), all of which are subject to the correction of clerical errors. A Customer's purchase order or similar writing shall constitute an acceptance of the offer to sell; however, any inconsistent, additional or different terms to the Proposal contained in a Customer's request for quotation or purchase order (collectively, "Additional Terms") are hereby objected to and rejected by Sensus. Such Additional Terms will not become part of the contract of sale unless accepted by Sensus in a writing signed by a vice president (or higher) of Sensus.
3. **ENTIRE AGREEMENT**. These Terms, the General Limited Warranty, Customer's purchase order (except any Additional Terms), Sensus' Acknowledgement Form (if any), and Sensus' invoice constitutes the entire agreement ("Agreement") between the parties hereto with respect to the subject matter hereof and supersedes any and all prior agreements, understanding or other communications, whether written or oral, formal or informal, between them in respect of the order. No consent, waiver, alteration, amendment, or modification shall be binding unless in writing and signed by a vice president (or higher) of Sensus.
4. **PRICES**. All prices are subject to change based on Sensus' selling prices in effect as of date of shipment. Prices quoted for blanket orders are subject to review and retroactive adjustment, if necessary, based on actual quantities shipped.
5. **TAXES**. All prices quoted are exclusive of federal, state and municipal taxes. Customer shall be liable for all sales, use and other taxes (whether local, state or federal) imposed on this Agreement or on the Deliverables.
6. **TITLE AND RISK OF LOSS**. All Deliverables are shipped Ex Works shipping point, prepay freight and add. Title to, and property in, the Deliverables shall pass to Customer upon shipment. Risk of loss of the Deliverables shall also pass to Customer upon shipment.
7. **PAYMENT TERMS**. Customer shall pay all invoices in USD within thirty (30) days of the invoice date. No deductions, whether by way of set-off, counterclaim, withholding, or otherwise, shall be made by the Customer. Sensus reserves the right to establish credit limits for Customer and may require full or partial payment prior to provision of any Deliverables. All payments shall be made via electronic payment according to instructions provided by Sensus. The Customer must notify Sensus, in writing, within seven days of receipt of an invoice if the Customer disputes such invoice. In the absence of such notice the Customer shall not be entitled to dispute an invoice. Save for any invoices disputed in good faith in accordance with the previous sentence, if the Customer does not pay within the time provided in this Agreement, the amount due shall bear interest at the lower of (i) one and a half percent (1.5%) per month up to a maximum of eighteen percent (18%) per year; or (ii) the highest rate permitted by applicable law. Should Customer become delinquent in payment of sums due hereunder, Sensus shall not be obligated to continue performance.
8. **PACKAGING**. Sensus reserves the right to select the manner in which Deliverables are packaged. Quoted prices include regular packaging. Special requirements for packaging will be subject to extra charges.
9. **DELIVERY**. Shipping dates and other dates quoted by Sensus are made in good faith but are not guaranteed. Dates cited for delivery are approximate only. If no dates are specified, Sensus will use its discretion to determine the shipping date. Sensus reserves the right to extend shipping dates and/or to make partial shipments as Sensus deems necessary in its sole discretion, without liability to Customer. In the absence of shipping instructions from Customer, Sensus will use its discretion as to the selection of shipping services and routings. If the Customer fails to take delivery of the Deliverables within seven (7) days of notification that the Deliverables are ready for delivery, Sensus shall be entitled, but is not required, on behalf of the Customer to put the relevant Deliverables into storage at the Customer's expense and risk. Delivery to storage shall constitute delivery to the Customer. Installation of Deliverables is the responsibility of the Customer unless otherwise agreed in writing.
10. **FORCE MAJEURE**. If Sensus becomes unable, either wholly or in part, by an event of Force Majeure, to fulfill its obligations under this Agreement, the obligations affected by the event of Force Majeure will be suspended during the continuance of that inability. "Force Majeure" means an event beyond the reasonable control of Sensus, including without limit acts of God, hurricane, flood, volcano, tsunami, tornado, storm, tempest, mudslide, vandalism, illegal or unauthorized radio frequency interference, strikes, lockouts, or other industrial disturbances, immigration, unavailability of component parts of any Deliverables provided hereunder, acts of public enemies, border disputes, border disruptions, delivery vehicle impound, wars, blockades, insurrections, riots, epidemics, earthquakes, fires, restraints or prohibitions by any court, board, department, commission or agency of the United States or any States, any arrests and restraints, civil disturbances and explosions.
11. **CANCELLATION**. Orders submitted to Sensus may not be canceled or amended, or deliveries deferred, by Customer except with Sensus' prior written consent, and then only upon such terms as shall be acceptable to Sensus.
12. **WARRANTIES**. Sensus' sole warranty and remedies associated therewith are set forth in the General Limited Warranty found at: sensus.com/tc, or available at 1-800-METER-IT, which General Limited Warranty is hereby incorporated into these Terms. THE WARRANTIES IN THIS SECTION ARE THE ONLY WARRANTIES GIVEN WITH RESPECT TO DELIVERABLES SOLD OR OTHERWISE PROVIDED BY SENSUS. SENSUS EXPRESSLY DISCLAIMS ANY AND ALL OTHER REPRESENTATIONS, WARRANTIES, CONDITIONS, EXPRESSED, IMPLIED, STATUTORY OR OTHERWISE, REGARDING ANY MATTER IN CONNECTION WITH THESE TERMS OF SALE, INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, NON-INFRINGEMENT AND TITLE.
13. **INTELLECTUAL PROPERTY**. No Intellectual Property is assigned to Customer hereunder. Sensus shall own or continue to own all Intellectual Property used or created in the course of performing this Agreement. To the extent, if any, that any ownership interest in and to such Intellectual Property does not automatically vest in Sensus, and instead vests in Customer, Customer agrees to grant and assign and hereby does grant and assign to Sensus all right, title, and interest that Customer may have in and to such Intellectual Property. Customer agrees not to reverse engineer any Deliverables purchased or provided hereunder. "Intellectual Property" means patents and patent applications, inventions (whether patentable or not), trademarks, service marks, trade dress, copyrights, trade secrets, know-how, data rights, database rights, specifications, drawings, designs, maskwork rights, moral rights, author's rights, and other intellectual property rights, as may exist now or hereafter come into existence, and all renewals and extensions thereof, regardless of whether any of such rights arise under the laws of the United States or of any other state, country or jurisdiction, any registrations or applications thereof, and all goodwill pertinent thereto. The Customer waives any moral rights they may have in the Intellectual Property.
14. **LIMITATION OF LIABILITY**.
    (a) SENSUS' AGGREGATE LIABILITY IN ANY AND ALL CAUSES OF ACTION ARISING UNDER, OUT OF OR IN RELATION TO THIS AGREEMENT, ITS NEGOTIATION, PERFORMANCE, BREACH OR TERMINATION (COLLECTIVELY "CAUSES OF ACTION") SHALL NOT EXCEED THE TOTAL AMOUNT PAID BY CUSTOMER TO SENSUS UNDER THIS AGREEMENT. THIS IS SO WHETHER THE CAUSES OF ACTION ARE IN TORT, INCLUDING, WITHOUT LIMITATION, NEGLIGENCE OR STRICT LIABILITY, IN CONTRACT, UNDER STATUTE, OR OTHERWISE.
    (b) AS A SEPARATE AND INDEPENDENT LIMITATION ON LIABILITY, SENSUS' LIABILITY SHALL BE LIMITED TO DIRECT DAMAGES. SENSUS SHALL NOT BE LIABLE FOR: (I) ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES; NOR (II) ANY REVENUE OR PROFITS LOST BY CUSTOMER OR ITS AFFILIATES FROM ANY END USER IRRESPECTIVE OF WHETHER SUCH LOST REVENUE OR PROFITS IS CATEGORIZED AS DIRECT DAMAGES OR OTHERWISE; NOR (III) ANY IN/OUT COSTS; NOR (IV) CLAIMS MADE BY A THIRD PARTY; NOR (V) MANUAL METER READ COSTS AND EXPENSES. "IN/OUT COSTS" MEANS ANY COSTS AND EXPENSES INCURRED BY CUSTOMER IN TRANSPORTING GOODS BETWEEN ITS WAREHOUSE AND ITS END USER'S PREMISES AND ANY COSTS AND EXPENSES INCURRED BY CUSTOMER IN INSTALLING, UNINSTALLING AND REMOVING GOODS. "END USER" MEANS ANY END USER OF ELECTRICITY/WATER/GAS THAT PAYS CUSTOMER FOR THE CONSUMPTION OF ELECTRICITY/WATER/GAS, AS APPLICABLE.
    (c) The limitations on liability set forth in this Agreement are fundamental inducements to Sensus entering into this Agreement. They apply unconditionally and in all respects. They are to be interpreted broadly so as to give Sensus the maximum protection permitted under law.
    (d) To the maximum extent permitted by law, no Cause of Action may be instituted by Customer against Sensus more than TWELVE (12) MONTHS after the Cause of Action first arose. In the calculation of any damages in any Cause of Action, no damages incurred more than TWELVE (12) MONTHS prior to the filing of the Cause of Action shall be recoverable.
    (e) If Customer is not the sole end user and ultimate owner of the Deliverables, then Customer shall ensure by its contract with the end user and ultimate owner (collectively, "Owner") that Sensus is given the benefit of the exclusions and limitations set out in these Terms. Customer agrees to indemnify, defend, and hold harmless Sensus from and against all Losses (defined below) alleged by any Owner to the extent that Sensus would not be liable to Customer under these Terms if the claim had been made by Customer.
15. **INDEMNIFICATION**. Customer agrees to defend, indemnify and hold harmless Sensus from and against all claims, liabilities, demands, damages, losses, costs and expenses, in law or in equity, of every kind and nature whatsoever (collectively, "Losses"), to the extent arising out of Customer's use of the Deliverables,, except to the extent such Losses arise out of a breach of this Agreement by Sensus.
16. **CONFIDENTIALITY**. Customer shall (and shall cause its employees, contractors and any Owner to) keep all Sensus Confidential Information strictly confidential and shall not disclose it to any third party or use it, except to the extent reasonably required to perform and enforce this Agreement or as required under applicable law, court order or regulation. As used herein, "Sensus Confidential Information" means any and all non-public information disclosed by Sensus, including without limitation, all technical information about products or services, pricing information, marketing and marketing plans, provision of Deliverables, performance of the Deliverables, Deliverables architecture and design, other business and financial information, software and all trade secrets. Sensus Confidential Information may be transmitted orally, in writing, electronically or otherwise observed by Customer. Notwithstanding the foregoing, "Sensus Confidential Information" shall not include: (i) any information in the public domain other than due to Customer's breach of this Agreement; (ii) any information in the possession of the Customer without restriction prior to disclosure by Sensus; or (iii) any information independently developed by the Customer without reliance on or access to the information disclosed hereunder by Sensus.
17. **RETURNS**. No Deliverables may be returned for credit or repair without the prior written authorization of Sensus. Authorized return shipments must be returned in good condition to Sensus' designated receiving point, must be shipped in suitable packaging, must be accompanied by a packing slip, including Sensus' Return Authorization Number, and must have transportation charges prepaid. Deliverables are deemed returned upon Sensus' receipt of the relevant Deliverable (in compliance with this section) at the address designated by Sensus. Correspondence concerning all returned Deliverables must be addressed to the appropriate Sensus office. Sensus reserves the right to deduct an adequate service charge to cover all inspection, testing and handling from any credit.

639 Davis Drive
Morrisville, NC 27560
1-800-638-3748

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a xylem brand

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18. **ASSIGNMENT**. Customer may not assign, transfer or delegate this Agreement or any part of Customer's rights or duties without prior written consent of Sensus. Any attempted assignment in violation of this section shall be null and void.

19. **GOVERNING LAW AND DISPUTE RESOLUTION**. This Agreement shall be governed by, construed and enforced in accordance with the laws of the State of Delaware, without regard to conflicts of law principles. Any and all disputes arising under, out of, or in relation to this Agreement or its performance ("Disputes") shall first be resolved by the Parties attempting mediation in Delaware. If the Dispute is not resolved within sixty (60) days of the commencement of the mediation, it shall be litigated in the state or federal courts located in the State of Delaware. TO THE MAXIMUM EXTENT PERMITTED BY LAW, THE PARTIES AGREE TO A BENCH TRIAL AND THAT THERE SHALL BE NO JURY IN ANY DISPUTES.

20. **COMPLIANCE WITH LAWS, INCLUDING ANTI-CORRUPTION LAWS**. Customer shall comply with all applicable laws and regulations, as set forth at the time of acceptance and as may be amended, changed, or supplemented. Customer shall not take any action, or permit the taking of any action by a third party, which may render Sensus liable for a violation of applicable laws. (a) *EXPORT CONTROL LAWS*. Customer shall; (i) comply with all applicable U.S., state, and local laws and regulations governing the use, export, import, re-export, and transfer of products, technology, and services; and (ii) obtain all required authorizations, permits, and licenses. Customer shall immediately notify Sensus, and immediately cease all activities with regards to the applicable transaction, if the Customer knows or has a reasonable suspicion that the Deliverables may be directed to countries in violation of any export control laws. By ordering Deliverables, Customer certifies that it is not on any U.S., or other applicable, government export exclusion list. (b) *ANTI-CORRUPTION LAWS*. Customer shall comply with the United States Foreign Corrupt Practices Act (FCPA), 15 U.S.C. §§ 78dd-1, et seq.; laws and regulations implementing the OECD's Convention on Combating Bribery of Foreign Public Officials in International Business Transactions; the U.N. Convention Against Corruption; the Inter-American Convention Against Corruption; and any other applicable laws and regulations relating to anti-corruption in the Customer's county or any country where performance of this Agreement, or delivery or use of Deliverables will occur.

21. **SEVERABILITY**. In the event any provision of this Agreement is held to be void, unlawful or otherwise unenforceable, that provision will be severed from the remainder of the Agreement and replaced automatically by a provision containing terms as nearly like the void, unlawful, or unenforceable provision as possible; and the Agreement, as so modified, will continue to be in full force and effect.

22. **NON-WAIVER**. Failure or delay of Sensus to exercise a right or power under this Agreement shall not operate as a waiver thereof, nor shall any single or partial exercise of a right or power preclude any other future exercise thereof.

639 Davis Drive
Morrisville, NC 27560
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SENSUS G-500 LIMITED WARRANTY

REVISED JUNE 2024

1. **General Product Coverage**. Unless otherwise provided herein, Sensus USA Inc. ("Sensus") warrants its products and parts to be free from defects in material and workmanship for one (1) year from the date of Sensus shipment and as set forth below. All products are sold to customer ("Customer") pursuant to Sensus' Terms of Sale, available at xylem.com

2. **SR II® and accuSTREAM™ 5/8", 3/4" & 1" Meters** are warranted to perform to new meter accuracy level set forth in the SR II and accuSTREAM Data Sheets available at sensus.com for five (5) years from the date of Sensus shipment or until the registration shown below, whichever occurs first. Sensus further warrants that the SR II and accuSTREAM meters will perform to at least AWWA Repaired Meter Accuracy Standards for fifteen (15) years from the date of Sensus shipment or until the registration shown below, whichever occurs first:

	New Meter Accuracy	Repair Meter Accuracy
5/8" SR II Meter and accuSTREAM Meter	500,000 gallons	1,500,000 gallons
3/4" SR II Meter and accuSTREAM Meter	750,000 gallons	2,250,000 gallons
1" SR II Meter and accuSTREAM Meter	1,000,000 gallons	3,000,000 gallons

3. **SR II maincases** are warranted to be free from defects in material and work-manship for twenty-five (25) years from the date of Sensus shipment. accuSTREAM maincases will be free from defects in material and workmanship for fifteen (15) years from the date of Sensus shipment.

4. **ally® Meters** that register water flow are warranted to perform to the accuracy level set forth in the ally data sheet available at sensus.com for fifteen (15) years from the Date of Installation, but no longer than sixteen (16) years from date of manufacture, not including the meter's sensors, valve, and gear motor, which are warranted under different terms described below. As used herein, "Date of Installation" means the date after which the ally Meter has been out of empty pipe for seven (7) consecutive days, as those days are measured by the ally Meter and stored in the meter's nonvolatile memory.

5. **ally® Meter Batteries and Components**, including SmartPoint 510M/520M Modules are warranted to be free from defects in material and workmanship from the Date of Installation, as defined in Section 4, for the period stated below:

Batteries	15 years[1]
Sensors	5 years
Valve & Gear Motor	5 years[2]
SmartPoint 510M/520M modules and batteries in service w/ally	15 years[1]

6. **iPERL® Meters** that register water flow are warranted to perform to the accuracy levels set forth in the iPERL data sheet available at sensus.com for twenty (20) years from the date of Sensus shipment. The iPERL System Component warranty does not include the external housing.

7. **iPERL, ally, OMNI+, and Cordonel Connectors and Cables** are warranted to be free from defects in materials and workmanship, under normal use and service, for ten (10) years from the date of Sensus shipment. Nicor or Itron connectors included with a Sensus product are warranted according to the terms for Third-Party Devices in Section 16.

8. **Sensus OMNI™, OMNI+ Meters and Propeller Meters** are warranted to perform to as set forth in OMNI and Propeller data sheets for eighteen (18) months from the date of Sensus shipment.

9. **Sensus Cordonel Meters** are warranted to perform to the accuracy levels as set forth in the Cordonel data sheet available at sensus.com for twenty (20) years from the date of Sensus shipment. The Cordonel System Component warranty does not include the external housing.

10. **Sensus Cordonel maincases** are warranted to maintain their structural integrity for a period of twenty (20) years from the date of Sensus shipment.

11. **Cordonel Meter Batteries and Components** are warranted to be free from defects in material and workmanship from the Date of Installation, as defined in Section 9, for the period stated below:

Batteries	20 years[3]
Sensors	5 years
SmartPoint 510M/520M modules and batteries in service w/ Cordonel models with pressure	15 years[4]

12. **Sensus accuMAG™ and Hydroverse™ Meters** are warranted to be free from defects in material and workmanship, under normal use and service, for 18 months from the date of Sensus shipment or 12 months from startup, whichever occurs first.

13. **Sensus Registers** are warranted to be free from defects in material and workmanship from the date of Sensus shipment for the periods stated below or until the applicable registration for AWWA Repaired Meter Accuracy Standards, as set forth above, are surpassed, whichever occurs first:

5/8" thru 2" SR II, accuSTREAM Standard Registers	25 years
5/8" thru 2" SR II, accuSTREAM Encoder Registers	10 years
All HSPU, IMP Contactor, R.E.R. Elec. ROFI	1 year
OMNI and OMNI+ Registers with Battery	10 years
Standard and Encoder Registers for Propeller Meters	1 year

14. **Sensus Electric and Gas Meters** are warranted pursuant to the General Limited Warranty available at sensus.com/TC.

15. **Batteries, iPERL System Components, AMR and FlexNet® Communication Network AMI Interface Devices** are warranted to be free from defects in material and workmanship from the date of Sensus shipment for the period stated below:

7500 series Hand-Held Device	2 years
Act-Pak® Remote Monitoring Instruments	1 year
CPTP100	20 years[4]
EasyLink Reader	1 year
Electronic TouchPad	10 years
FlexNet Base Station (including the R100NA and M400 products)	1 year
Gas SmartPoint® Modules and Batteries	20 years[5]
iPERL System Battery and iPERL System Components	20 years[3]
RM4160	1 year

1 If applicable, any SmartPoint 510M/520M Modules ever paired with an ally meter or Cordonel with pressure meter are warranted with the following limitations:
- When configured to the default installation setting of six transmissions of metrology and pressure per day and one update of temperature per day, the SmartPoint module is warranted to perform up to five (5) firmware upgrades for the SmartPoint module and up to five (5) firmware upgrades for the ally meter or Cordonel (with pressure) meter;
- 2500 Operational Commands, where "Operational Commands" include on demand reads (such as consumption, pressure, temperature), an ally meter valve command, or a configuration command; and
- 15 Diagnostic Commands, which includes two-way communications tests and installations

for the first ten (10) years from Date of Installation at no cost. For the remaining five (5) years, Customer will pay the reduced Replacement Price of the then-current list price in effect at the time the product is accepted for return in accordance with the following schedule:

Years	Replacement Price	Years	Replacement Price	Years	Replacement Price
1-10	0%	13	55%	15	75%
11	35%	14	65%	>15	100%
12	45%				

2 Notwithstanding the foregoing, valve and gear motor components of ally meters are not warranted beyond two thousand (2000) Valve State Operations, even if the warranty period provided herein has not yet expired. As used herein, "Valve State Operations" means adjustments of the Meter to open, close, or reduce flow.

3 Sensus will repair or replace non-performing:
- iPERL System Batteries, and/or the iPERL System flowtube, the flow sensing and data processing assemblies, and the register ("iPERL System Components") with hourly reads manufactured after April 2018
- Cordonel System Batteries, the flow sensing and data processing assemblies, and the register ("Cordonel System Components")
- SmartPoint 510M/520M/515M/512M-PLS/522M Modules manufactured after April 2018 (configured to the factory setting of six transmissions per day under normal system operation of up to one demand read to each SmartPoint Module per month and up to five firmware downloads during the life of the product) and batteries, unless the SmartPoint 510M/520M/522M Module is ever paired with an ally Meter, which immediately amends the warranty terms to those described in Section 13 at no cost for the first fifteen (15) years from the date of Sensus shipment, and for the remaining five (5) years at a prorated percentage, applied towards the published list price in effect for the year the product is accepted by Sensus under the warranty conditions according to the following schedule:

Years	Replacement Price	Years	Replacement Price	Years	Replacement Price
1-15	0%	18	50%	20	70%
16	30%	19	60%	>20	100%
17	40%				

4 Sensus will repair or replace non-performing CPTP100 modules (configured at factory setting of four transmissions per day under normal system operations of up to one demand read per month and up to five firmware downloads during the life of the product) and batteries.

5 Sensus will repair or replace non-performing Gas SmartPoint Modules (configured to the factory setting of six transmissions per day under normal system operation of up to one demand read to each SmartPoint Module per month and up to five firmware downloads during the life of the product) and batteries, for the first ten (10) years from the date of Sensus shipment, and for the remaining ten (10) years, at a prorated percentage, applied towards the published list prices in effect for the year product is accepted by Sensus under warranty conditions according to the following schedule:

Years	Replacement Price	Years	Replacement Price	Years	Replacement Price
1-10	0%	14	45%	18	65%
11	30%	15	50%	19	70%
12	35%	16	55%	20	75%
13	40%	17	60%	>20	100%

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Sensus® Electronic Register+™	20 years[6]
Sensus® Smart Gateway Sensor Interface	1 year[7]
SmartPoint® 510M/520M/515M/512M Modules and Batteries	20 years[1]
Vehicle Gateway Base Station (VGB) and other AMR Equipment	1 year

16. **Third-Party Devices** are warranted to be free from defects in materials and workmanship, under normal use and service, for one (1) year from the date of Sensus shipment. As used in this Sensus Limited Warranty, "Third Party Devices" means any product, device, or component part used with a Sensus product that is manufactured or sold by any party that is not Sensus. Failure of a Third-Party Device which subsequently causes failure to a Sensus device shall be the responsibility of the manufacturer of the Third-Party Device.

17. **Software**. Software supplied and/or licensed by Sensus is supported accord¬ing to the terms of the applicable software license or usage agreement. Sensus warrants that any network and monitoring services shall be performed in a professional and workmanlike manner.

18. **Return**. Sensus' obligation, and Customer's exclusive remedy, under this Sensus Limited Warranty is, at Sensus' option, to either (i) repair or replace the product, provided the Customer (a) returns the product to the location designated by Sensus within the warranty period; and (b) prepays the freight costs both to and from such location; or (ii) deliver replacement components to the Customer, provided the Customer installs, at its cost, such components in or on the product (as instructed by Sensus), provided, that if Sensus requests, the Customer (a) returns the product to the location designated by Sensus within the warranty period; and (b) prepays the freight costs both to and from such location. In all cases, if Customer does not return the product within the time period designated by Sensus, Sensus will invoice, and Customer will pay within thirty days of the invoice date, for the cost of the replacement product and/or components.

    The return of products for warranty claims must follow Sensus' Returned Materials Authorization (RMA) procedures. Water meter returns must include documentation of the Customer's test results. Test results must be obtained according to AWWA standards and must specify the meter serial number. The test results will not be valid if the meter is found to contain foreign materials. If Customer chooses not to test a Sensus water meter prior to returning it to Sen-sus, Sensus will repair or replace the meter, at Sensus' option, after the meter has been tested by Sensus. The Customer will be charged Sensus' then current testing fee. All products must be returned in accordance with the RMA process. For all returns, Sensus reserves the right to request meter read¬ing records by serial number to validate warranty claims.

    For products that have become discontinued or obsolete ("Obsolete Product"), Sensus may, at its discretion, replace such Obsolete Product with a different product model ("New Product"), provided that the New Product has substantially similar features as the Obsolete Product. The New Product shall be warranted as set forth in this Sensus Limited Warranty.

    THIS SECTION 18 SETS FORTH CUSTOMER'S SOLE REMEDY FOR THE FAILURE OF THE PRODUCTS, SERVICES OR LICENSED SOFT¬WARE TO CONFORM TO THEIR RESPECTIVE WAR¬RANTIES.

19. **Warranty Exceptions and No Implied Warranties**. This Sensus G-500 Limited Warranty does not include costs for removal or installation of products, or costs for replacement labor or materials, which are the responsibility of the Customer. The warranties in this Sensus G-500 Limited Warranty do not apply to and Sensus has no liability for goods that have been: installed improperly or in non-recommended installations; installed to a socket that is not functional, or is not in safe operating condition, or is damaged, or is in need of repair; tampered with; modified or repaired with parts or assemblies not certified in writing by Sensus, including without limitation, communication parts and assemblies; improperly modified or repaired (including as a result of modifications required by Sensus); converted; altered; damaged; read by equipment not approved by Sensus; for water meters, used with substances other than water, used with non-potable water, or used with water that contains dirt, debris, deposits, or other impurities; subjected to misuse, improper storage, improper care, improper maintenance, or improper periodic testing (collectively, "Exceptions."). If Sensus identifies any Exceptions during examination, troubleshooting or performing any type of support on behalf of Customer, then Customer shall pay for and/or reimburse Sensus for all expenses incurred by Sensus in examining, troubleshooting, performing support activities, repairing, or replacing any Equipment that satisfies any of the Exceptions defined above. The above warranties do not apply in the event of Force Majeure, as defined in the Terms of Sale.

    THE WARRANTIES SET FORTH IN THIS SENSUS G-500 LIMITED WARRANTY ARE THE ONLY WARRANTIES GIVEN WITH RESPECT TO THE GOODS, SOFTWARE, SOFTWARE LICENSES AND SERVICES SOLD OR OTHERWISE PROVIDED BY SENSUS. SENSUS EXPRESSLY DISCLAIMS ANY AND ALL OTHER REPRESENTATIONS, WARRANTIES, CONDITIONS, EXPRESSED, IMPLIED, STATUTORY OR OTHERWISE, REGARDING ANY MATTER IN CONNECTION WITH THIS SENSUS G-500 LIMITED WARRANTY OR WITH THE TERMS OF SALE, INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, NON-INFRINGEMENT AND TITLE.

    SENSUS ASSUMES NO LIABILITY FOR COSTS OR EXPENSES ASSOCIATED WITH LOST REVENUE OR WITH THE REMOVAL OR INSTALLATION OF EQUIPMENT. THE FOREGOING REMEDIES ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES FOR THE FAILURE OF EQUIPMENT, LICENSED SOFTWARE OR SOFTWARE SERVICES, AND OTHER SERVICES TO CONFORM TO THEIR RESPECTIVE WARRANTIES.

20. **Limitation of Liability**.

    a. SENSUS' AGGREGATE LIABILITY IN ANY AND ALL CAUSES OF ACTION ARISING UNDER, OUT OF OR IN RELATION TO THIS AGREEMENT, ITS NEGOTIATION, PERFORMANCE, BREACH OR TERMINATION (COLLECTIVELY "CAUSES OF ACTION") SHALL NOT EXCEED THE TOTAL AMOUNT PAID BY CUSTOMER TO SENSUS UNDER THIS AGREEMENT. THIS IS SO WHETHER THE CAUSES OF ACTION ARE IN TORT, INCLUDING, WITHOUT LIMITATION, NEGLIGENCE OR STRICT LIABILITY, IN CONTRACT, UNDER STATUTE OR OTHERWISE.

    b. AS A SEPARATE AND INDEPENDENT LIMITATION ON LIABILITY, SENSUS' LIABILITY SHALL BE LIMITED TO DIRECT DAMAGES. SENSUS SHALL NOT BE LIABLE FOR: (I) ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES; NOR (II) ANY REVENUE OR PROFITS LOST BY CUSTOMER OR ITS AFFILIATES FROM ANY END USER(S), IRRESPECTIVE OF WHETHER SUCH LOST REVENUE OR PROFITS IS CATEGORIZED AS DIRECT DAMAGES OR OTHERWISE; NOR (III) ANY IN/OUT COSTS; NOR (IV) MANUAL METER READ COSTS AND EXPENSES.

    c. The limitations on liability set forth in this Agreement are fundamental inducements to Sensus entering into this Agreement. They apply unconditionally and in all respects. They are to be interpreted broadly so as to give Sensus the maximum protection permitted under law.

    d. To the maximum extent permitted by law, no Cause of Action may be instituted by Customer against Sensus more than TWELVE (12) MONTHS after the Cause of Action first arose. In the calculation of any damages in any Cause of Action, no damages incurred more than TWELVE (12) MONTHS prior to the filing of the Cause of Action shall be recoverable.

6 Sensus will repair or replace non-performing Sensus Electronic Register+with hourly reads for the first ten (10) years from the date of Sensus ship¬ment, and for the remaining ten (10) years, at a prorated percentage, applied towards the published list prices in effect for the year product is accepted by Sensus under warranty conditions according to the following schedule:

Years	Replacement Price	Years	Replacement Price	Years	Replacement Price
1-10	0%	14	45%	18	65%
11	30%	15	50%	19	70%
12	35%	16	55%	20	75%
13	40%	17	60%	>20	100%

7 Sensus® Smart Gateway Sensor Interface warranty valid only for analog Meter Sample Rates of four times per hour with a Standard Transmit Rate of hourly or greater for the analog channel(s).

xylem.com

SENSUS | 639 Davis Drive | Morrisville, NC 27560 | 1-800-638-3748

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SENSUS GENERAL LIMITED WARRANTY

REVISED JUNE 2024

1. **Terms of Sale**. Sensus USA Inc. ("Sensus") warrants its products and parts as set forth below. All products are sold to customer ("Customer") pursuant to Sensus' Terms of Sale, available at xylem.com.

2. **Electric Meters and Electric SmartPoint™ Modules.** Sensus warrants electric meters provided by Sensus, as well as the embedded Sensus electric SmartPoint Modules, to be in compliance with their respective specifications under normal use and service, and to be free from material defects in materials and workmanship for a warranty period of twelve (12) months from the date of the installation or eighteen (18) months from the date of shipment, whichever occurs first. The warranty period for new spare parts and components sold by Sensus is twelve (12) months from the date of shipment. The warranty period for repaired or refurbished parts repaired by Sensus is ninety (90) days from the date of shipment, unless repaired pursuant to a warranty, in which case the repair is warranted for the time remaining of the original warranty period.

3. **Gas Products and Gas SmartPoint Modules.**

   a. Except for the Sonix line of meters, Sensus warrants the Sensus gas products to be in compliance with their respective specifications under normal use and service, and to be free from material defects in materials and workmanship for a warranty period of twelve (12) months from the date of the installation or eighteen (18) months from the date of shipment, whichever occurs first.

   b. Sensus warrants the Sensus Sonix and SonixIQ meters to be in compliance with their respective specifications under normal use and service, and to be free from material defects in materials and workmanship for a warranty period of fifteen (15) years from the date of shipment. Sensus warrants the batteries in the Sensus Sonix meters to be free from material defects in materials and workmanship for a warranty period of ten (10) years from the date of shipment. For the SonixIQ meter only, Sensus warrants the battery for an additional 10 years on a prorated basis, subject to the replacement fees below for years 11 – 20.

Years	Discounted Replacement Price	Years	Discounted Replacement Price
1-10	100%	16	40%
11	90%	17	30%
12	80%	18	20%
13	70%	19	10%
14	60%	20	0%
15	50%	>20	0%

   c. For all gas products, the warranty period for new spare parts and components sold by Sensus is twelve (12) months from the date of shipment. The warranty period for repaired or refurbished parts repaired by Sensus is ninety (90) days from the date of shipment, unless repaired pursuant to a warranty, in which case the repair is warranted for the time remaining of the original warranty period.

   d. Sensus warrants the standalone Sensus gas SmartPoint Modules as set forth in the "G500" warranty, as set forth at: xylem.com, or available at 1-800-638-3748.

4. **Water Meters and Water SmartPoint Modules.** Sensus warrants the Sensus water meters and Sensus water SmartPoint Modules as set forth in the "G500" warranty, as set forth at: xylem.com, or available at 1-800-638-3748.

5. **VantagePoint® Lighting Control Module.** Sensus warrants the Sensus VantagePoint® Lighting Control Module to be in compliance with their respective specifications under normal use and service, and to be free from material defects in materials and workmanship for a warranty period of ten (10) years from the date of shipment. The warranty period for new spare parts and components sold by Sensus is twelve (12) months from the date of shipment. The warranty period for repaired or refurbished parts repaired by Sensus is ninety (90) days from the date of shipment, unless repaired pursuant to a warranty, in which case the repair is warranted for the time remaining of the original warranty period.

6. **DA Devices and HAN Devices.** Sensus warrants the Sensus DA Devices and Sensus HAN Devices to be in compliance with their respective specifications under normal use and service, and to be free from material defects in materials and workmanship for a warranty period of twelve (12) months from the date of shipment. The warranty period for new spare parts and components sold by Sensus is twelve (12) months from the date of shipment. The warranty period for repaired or refurbished parts repaired by Sensus is ninety (90) days from the date of shipment, unless repaired pursuant to a warranty, in which case the repair is warranted for the time remaining of the original warranty period.

7. **RF Field Equipment.** Sensus warrants the Sensus RF Field Equipment to be in compliance with their respective specifications under normal use and service, and to be free from material defects in materials and workmanship for a warranty period of twelve (12) months from the date of shipment.

8. **Server Hardware.** Sensus provides no warranty on the Server Hardware.

9. **Third Party Goods.** Notwithstanding anything to the contrary herein, Sensus does not warrant any goods manufactured or software supplied by third parties. For example, if Customer elects to buy meters from a third party, the Sensus SmartPoint Modules installed in such third party meters shall, subject to Section 11, below, be covered by the warranty above, but any warranty on the meter itself shall be a matter directly between Customer and such third party meter supplier.

10. **Services.** Sensus warrants that its services shall, at the time of performance, materially conform to the contract requirements, and shall be performed in a professional and workmanlike manner, free from material defects in workmanship.

11. **Remedy.**

   a. If any Field Device or RF Field Equipment fails during the applicable warranty period (a "Failed Good"), Sensus' obligation, and Customer's exclusive remedy, is, at Sensus' option, to either (i) repair or replace the Failed Good, provided the Customer (a) returns the product to the location designated by Sensus within the warranty period; and (b) prepays the freight costs both to and from such location; or (ii) deliver replacement components to the Customer, provided the Customer installs, at its cost, such components in or on the Failed Good (as instructed by Sensus). In all cases, Customer shall be responsible for returning the Failed Good to Sensus, including all costs associated with the return of the Failed Good, and Sensus shall be responsible for shipping the repaired or replaced good back to Customer's warehouse. Customer shall, in all cases, be responsible for the In/Out Costs. If Sensus determines that the returned good is not defective, Customer shall pay and/or reimburse Sensus for all expenses incurred by Sensus in the examination of the returned good.

   b. Customer's remedy under the warranty for services shall be, at Sensus' sole cost and expense, to correct or re-perform any defective or non-conforming services to assure compliance with the contract requirements.

   c. THIS SECTION 11 SETS FORTH CUSTOMER'S SOLE REMEDY WITH RESPECT TO A FAILED GOOD OR ANY DEFECTIVE OR NON-CONFORMING SERVICE.

12. **Warranty Exceptions and No Implied Warranties**. This Sensus General Limited Warranty does not include costs for removal or installation of products, or costs for replacement labor or materials, which are the responsibility of the Customer. The warranties in this Sensus General Limited Warranty do not apply to, and Sensus has no liability for, goods that have been: installed improperly or in non-recommended installations; installed to a socket that is not functional, or is not in safe operating condition, or is damaged, or is in need of repair; tampered with; modified or repaired with parts or assemblies not certified in writing by Sensus, including without limitation, communication parts and assemblies; improperly modified or repaired (including as a result of modifications required by Sensus); converted, altered, damaged; read by equipment not approved by Sensus; for water meters, used with substances other than water, used with non-potable water, or used with water that contains dirt, debris, deposits, or other impurities; subjected to misuse, improper storage, improper care, improper maintenance, or improper periodic testing (collectively, "Exceptions."). If Sensus identifies any Exceptions during examination, troubleshooting or performing any type of support on behalf of Customer, then Customer shall pay for and/or reimburse Sensus for all expenses incurred by Sensus in examining, troubleshooting, performing support activities, repairing or replacing any Equipment that satisfies any of the Exceptions defined above. The above warranties do not apply in the event of Force Majeure, as defined in the Terms of Sale.

THE WARRANTIES SET FORTH IN THIS SENSUS GENERAL LIMITED WARRANTY ARE THE ONLY WARRANTIES GIVEN WITH RESPECT TO THE GOODS, SOFTWARE, SOFTWARE LICENSES AND SERVICES SOLD OR OTHERWISE PROVIDED BY SENSUS. SENSUS EXPRESSLY DISCLAIMS ANY AND ALL OTHER REPRESENTATIONS, WARRANTIES, CONDITIONS, EXPRESSED, IMPLIED, STATUTORY OR OTHERWISE, REGARDING ANY MATTER IN CONNECTION WITH THIS SENSUS GENERAL LIMITED WARRANTY OR WITH THE TERMS OF SALE, INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, NON-INFRINGEMENT AND TITLE.

SENSUS ASSUMES NO LIABILITY FOR COSTS OR EXPENSES ASSOCIATED WITH LOST REVENUE OR WITH THE REMOVAL OR INSTALLATION OF EQUIPMENT. THE FOREGOING REMEDIES ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES FOR THE FAILURE OF EQUIPMENT, LICENSED SOFTWARE OR SOFTWARE SERVICES, AND OTHER SERVICES TO CONFORM TO THEIR RESPECTIVE WARRANTIES.

13. **Limitation of Liability**

   a. SENSUS' AGGREGATE LIABILITY IN ANY AND ALL CAUSES OF ACTION ARISING UNDER, OUT OF OR IN RELATION TO THIS AGREEMENT, ITS NEGOTIATION, PERFORMANCE, BREACH OR TERMINATION (COLLECTIVELY "CAUSES OF ACTION") SHALL NOT EXCEED THE TOTAL AMOUNT PAID BY CUSTOMER TO SENSUS UNDER THIS AGREEMENT. THIS IS SO WHETHER THE CAUSES OF ACTION ARE IN TORT, INCLUDING, WITHOUT LIMITATION, NEGLIGENCE OR STRICT LIABILITY, IN CONTRACT, UNDER STATUTE OR OTHERWISE.

   b. AS A SEPARATE AND INDEPENDENT LIMITATION ON LIABILITY, SENSUS' LIABILITY SHALL BE LIMITED TO DIRECT DAMAGES. SENSUS SHALL NOT BE LIABLE FOR: (I) ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES; NOR (II) ANY REVENUE OR PROFITS LOST BY CUSTOMER OR ITS AFFILIATES FROM ANY END USER(S), IRRESPECTIVE OF WHETHER SUCH LOST REVENUE OR PROFITS IS CATEGORIZED AS DIRECT DAMAGES OR OTHERWISE; NOR (III) ANY IN/OUT COSTS; NOR (IV) MANUAL METER READ COSTS AND EXPENSES.

   c. The limitations on liability set forth in this Agreement are fundamental inducements to Sensus entering into this Agreement. They apply unconditionally and in all respects. They are to be interpreted broadly so as to give Sensus the maximum protection permitted under law.

   d. To the maximum extent permitted by law, no Cause of Action may be instituted by Customer against Sensus more than TWELVE (12) MONTHS after the Cause of Action first arose. In the calculation of any damages in any Cause of Action, no damages incurred more than TWELVE (12) MONTHS prior to the filing of the Cause of Action shall be recoverable.

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14. **Definitions**. Any terms used in this General Limited Warranty as defined terms, and which are not defined herein, shall have the meanings given to those terms in the Terms of Sale.

a. "Agreement" means this General Limited Warranty, Customer's purchase order (except any Additional Terms), Sensus' Acknowledgement Form (if any), Sensus' invoice and the Terms of Sale.

b. "DA Devices" means RTMs and RTUs.

c. "Echo Transceiver" (formerly "FlexNet Network Portal" and "FNP") identifies the Sensus standalone, mounted relay device that takes the radio frequency readings from the SmartPoint Modules and relays them by radio frequency to the relevant FlexNet Base Station.

d. "End User" means any end user of electricity/water/gas that pays Customer for the consumption of electricity/water/gas, as applicable.

e. "Equipment" means the Field Devices, RF Field Equipment, Server Hardware, and any other goods sold hereunder.

f. "FlexNet Base Station" (formerly "Tower Gateway Base Station" and "TGB") identifies the Sensus manufactured device consisting of one transceiver, to be located on a tower that receives readings from the SmartPoint Modules (either directly or via an Echo Transceiver) by radio frequency and passes those readings to the RNI by TCP/IP backhaul communication.

g. "Field Devices" means the meters, SmartPoint Modules, DA Devices and HAN Devices.

h. "Force Majeure" shall have the meaning set forth in the Terms of Sale.

i. "HAN Devices" means the PCTs, IHDs and LCMs.

j. "IHDs" means the in-home displays.

k. "In/Out Costs" means any costs and expenses incurred by Customer in transporting goods between its warehouse and its End User's premises and any costs and expenses incurred by Customer in installing, uninstalling and removing goods.

l. "LCMs" means the load control modules.

m. "PCTs" means the programmable controllable thermostats.

n. "Remote Transceiver" (formerly "FlexNet Remote Portal" and "FRP") identifies the Sensus standalone, mounted relay device that takes the radio frequency readings from the SmartPoint Modules and relays them directly to the RNI by TCP/IP backhaul communication.

o. "RNI" identifies the regional network interfaces consisting of hardware and software used to gather, store, and report data collected by the FlexNet Base Stations from the SmartPoint Modules.

p. "RF Field Equipment" means, collectively, FlexNet Base Stations, Echo Transceivers and Remote Transceivers.

q. "RTMs" means the telemetric remote telemetry modules.

r. "RTUs" means telemetric MicroRTU (T866).

s. "Server Hardware" means the RNI hardware and the FlexServer hardware.

t. SmartPoint™ Modules" identifies the Sensus transmission devices installed on devices such as meters, distribution automation equipment, lighting fixtures, and demand/response devices located at Customer's End Users' premises that take the readings of the devices and transmit those readings by radio frequency to the relevant FlexNet Base Station, Remote Transceiver or Echo Transceiver.

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SERVICES BRIEF

Sensus Extended Warranty Program FlexNet™ Infrastructure

Hundreds of utilities across North America have adopted the Sensus FlexNet™ system. This technology empowers electricity, gas, water or combination utilities to conserve resources through a flexible, reliable and open system. The FlexNet communications network quickly becomes a critical part of our customers' day-to-day business, which is why it is important to ensure your network equipment is always online and operating at the highest level.

The FlexNet™ Extended Warranty Program provides utilities peace of mind, knowing that Sensus technical support professionals are ready to diagnose, troubleshoot, or send out replacement parts at no cost. This keeps your utility's critical infrastructure up and running, limiting your network's downtime.

Participation and Coverage

The Extended Warranty Program is available for purchase any time before the initial standard one year warranty expires. The standard one-year warranty begins from the date of shipment, which establishes the anniversary date. New FlexNet system customers receive the standard warranty free of charge until the first anniversary date. Base station extended warranty includes firmware maintenance/upgrades, remote diagnostics of operational issues, and repair or replacement of defective parts or units. Warranty does not include batteries, labor, travel, or standard maintenance. Participation in the Extended Warranty Program is strongly recommended to maintain the highest level of business continuity within your utility.

INCLUDED SERVICES	S50/S100 D50/D100	M400B/M400B2 M400DS/M400D	R100NA
Firmware Updates*	✓	✓	✓
Remote Diagnostics of Operational Issues	✓	✓	✓
Repair or Replace Defective Parts or Units**	✓	✓	✓

Installation is not included.
***Labor (Travel and Expenses) and batteries are not included.*

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Extended Warranty Terms

- Customer may opt to purchase extended warranties at any time during the period that the initial standard warranty is in effect. Extended warranties are not available after the initial standard warranty has expired.
- Extended warranties are an optional service. Products have a standard warranty with the initial purchase. Extended warranties, if purchased, will go into effect following the expiration date of the standard warranty. Standard warranty plus any extended warranties purchased may not exceed five (5) years from date of shipment. Any repairs after five (5) years from date of shipment will be invoiced at current repair rates.
- Base station extended warranty includes firmware maintenance/upgrades, remote diagnostics of operational issues, and repair or replacement of defective parts or units. Warranty does not include batteries, labor, travel, or standard maintenance. Warranty does not cover "acts of God."
- Labor, travel and expense will be quoted per warranty incident as necessary.
- Above equipment comes standard with one year warranty from date of initial purchase.
- Extended Warranty is only available for up to 5 years from date of purchase.
- Please refer to Sensus' G500 for terms and conditions pertaining to standard warranties.

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ATTACHMENT O: SYSTEM TEST FIXTURE USER GUIDE

Version History

Version	Contributor	Comments
0.1	K. Olschner	Initial Version
0.2	K.Olschner	Updated pictures

Introduction

This user guide is intended to outline the basic operating procedure for the water meter test cart. This guide contains setup, operation, and maintenance for normal operation using three water meters. Please use common safety procedures while operating, ensuring leaks are not present and all electrical connections are protected.

Water Cart Components

Water Reservoir: The water reservoir contains an 800 GPH submersible pump. Warning, this pump is NOT designed to be run dry, please ensure that the reservoir is adequately full prior to operation.

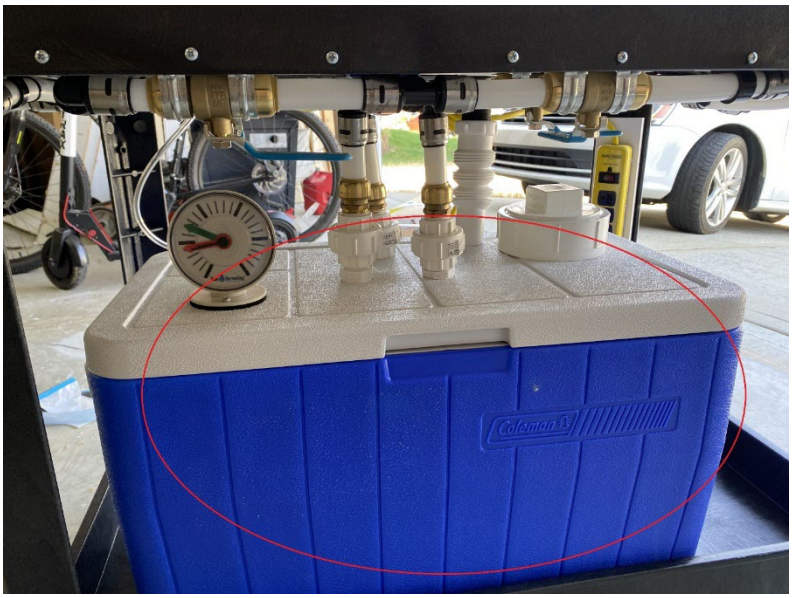


Figure 1 Water Cart Reservoir

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Figure 2 Water Pump

Connections: The pump outlet and draining connections are quick connect incase the pump or reservoir needs to be removed. The following connections are identified in Figure 3:

- Connection 1: Air Bleeder Hose Drainage
- Connection 2: Reverse flow Drainage
- Connection 3: Top Cart Drainage
- Connection 4: Water Pump Outlet
- Connection 5: Forward Flow Drainage

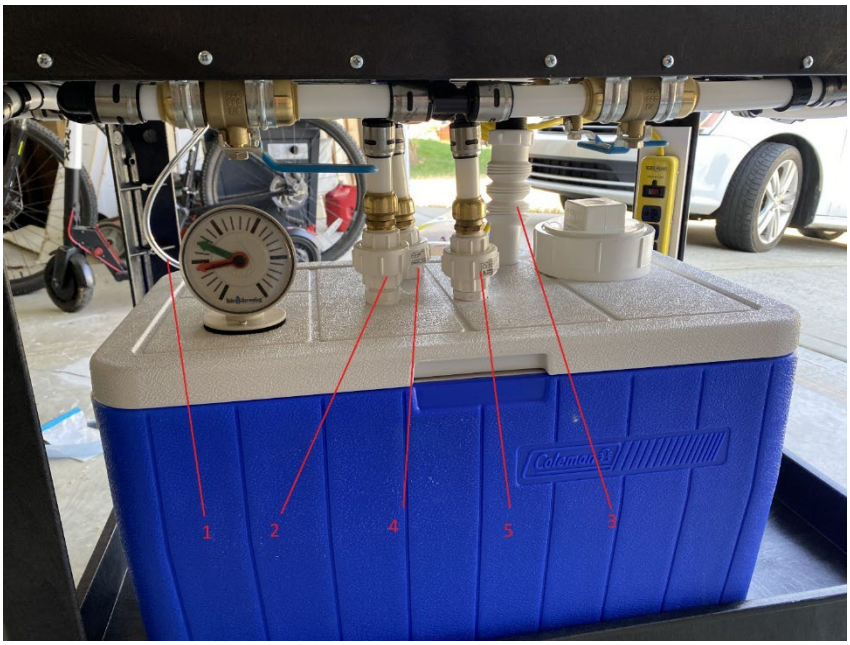


Figure 3 Water Cart Connections

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Fill Cap: The fill cap is labeled in Figure 4 can be used to fill the reservoir using a water hose. Attention should be paid as to not overfill the reservoir.

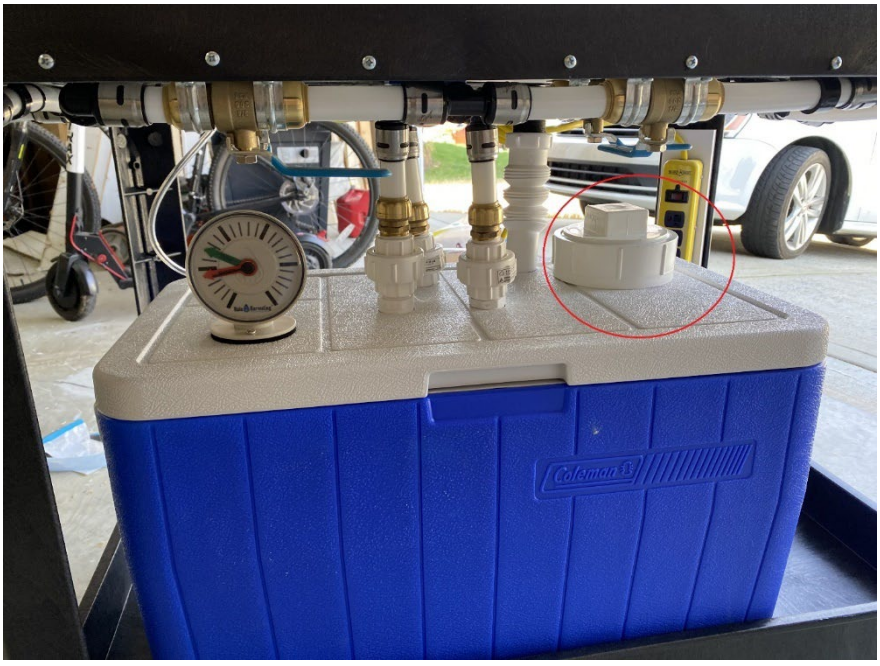
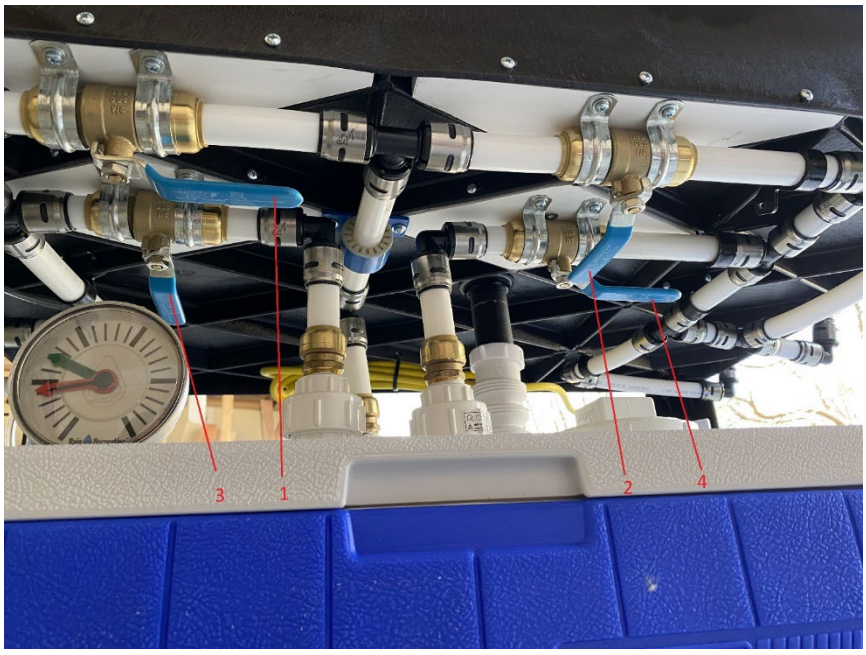


Figure 4 Fill Cap

Directional Valves: The directional valves are located under the cart (detailed in Figure 5), and are used to set the water flow to either forward or reverse flow. *Caution: Pay close attention to the directional valve orientation as to not cause excessive pressure on the system.*



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Air Bleeder Valves: The water cart has been outfitted with bleeder valves to make air expulsion easier during operation (Figure 6).

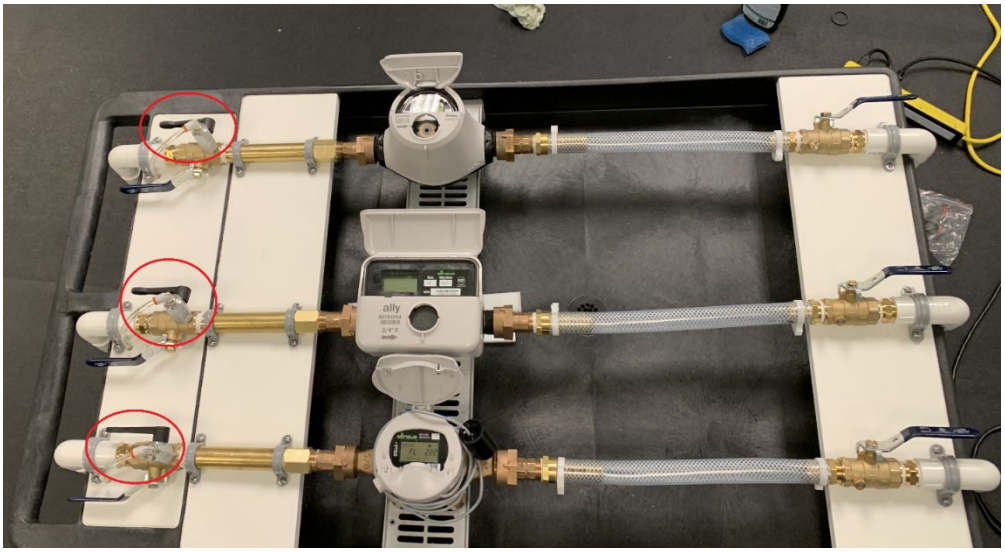


Figure 6 Air Bleeder Valves

Water Flow Valves: The Flow valves located on top (both sides) of the water cart are used to control the flow of water to each meter (Identified in Figure 7).

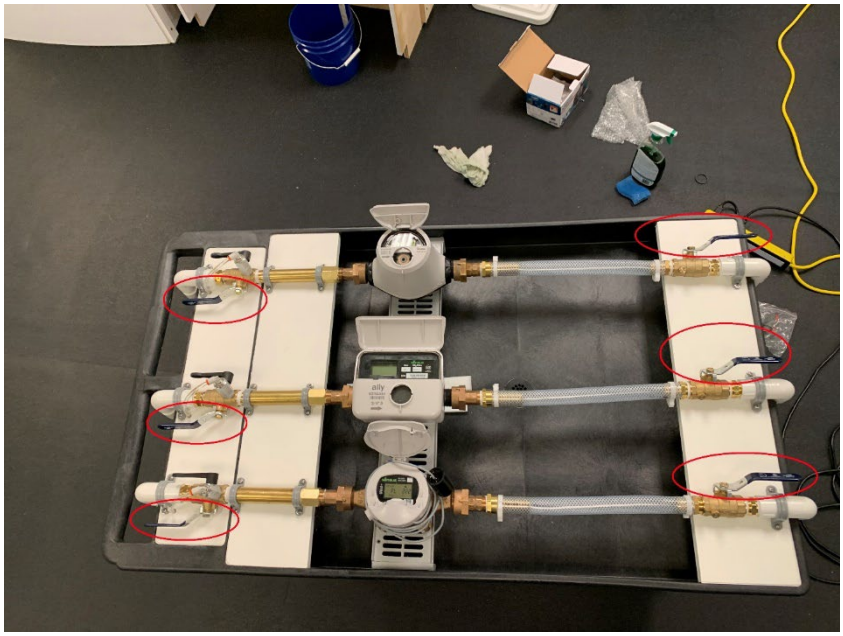


Figure 7 Flow Valves

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Meter Connections: The water cart includes connections for a maximum of three meters to simultaneously be used at once. The connections are for ¾" pipe size on a 7" lay length meter.

Directional Valve Configuration

The following chart outlines the directional valve configuration for forward and reverse flow. Please refer to the **Directional Valves**: section of this document for details on the location, identification, and purpose of each valve.

Forward Flow		Reverse Flow	
Valve Number	Valve Position	Valve Number	Valve Position
1	OPEN	1	CLOSED
2	CLOSED	2	OPEN
3	CLOSED	3	OPEN
4	OPEN	4	CLOSED

Operation

Setup

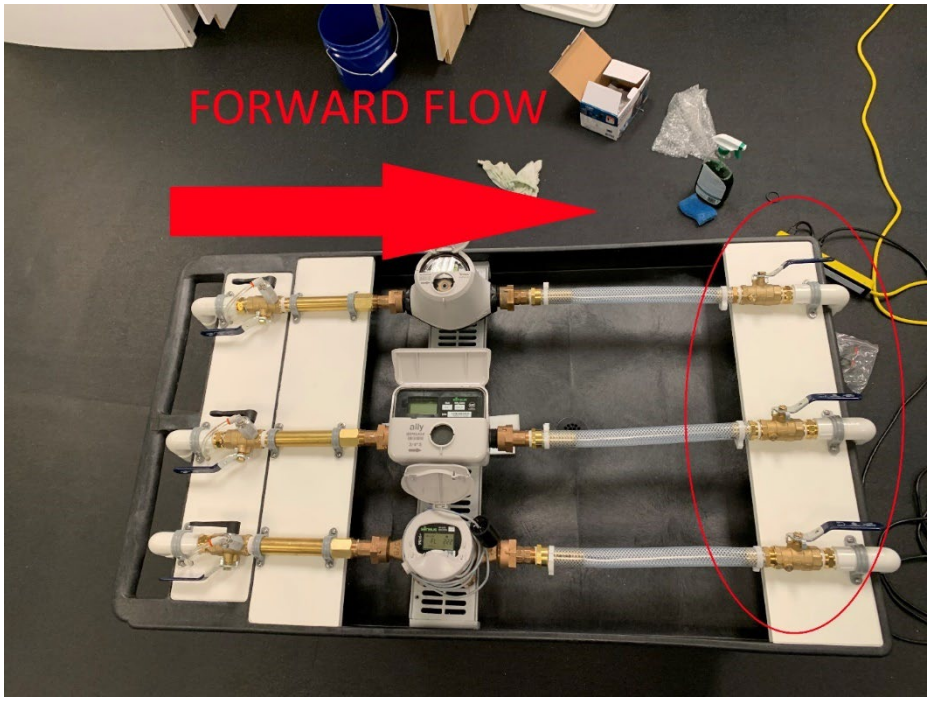
The following procedure should be followed for operation of the water cart in forward or reverse flow configurations. Please refer to the Water Cart Components section of this document for location, identification, and purpose of each component.

- **Step 1)** Ensure the water reservoir drain is closed.
- **Step 2)** Follow the **Directional Valve Configuration** section of this document for forward and reverse flow. Set the valve to the desired configuration.
- **Step 3)** Configure the flow valves on top of the cart to either the on or off position.
  - For water meters connections that are being used, set the corresponding flow valves to the **OPEN** position.
  - For water meter connections not being used, please ensure both valves corresponding to that meter connection are set to the **CLOSED** POSITION.
- **Step 4)** Place the water meters are the silver grate. Please ensure rubber washers are used with each connection *Note: The Ally meter should be placed in the center meter connection.*
- **Step 5)** Set each air bleeder valve to the CLOSED position.
- **Step 6)** Fill the water reservoir with water. Caution, the water level is difficult to determine so be mindful that there is enough water to submerge the pump during operation.
- **Step 7)** Plug the power strip located on the side of the cart into an electrical outlet. *Note: The pump should be plugged into the power strip.*
- **Step 8)** Flip the power switch on the power strip thus turning on the submerged pump.

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- **Step 9)** Once the pump is started, examine the following for leaks, if any leaks are noticed, unplug the electrical connection immediately and address the leak:
  - Water reservoir quick connections
  - PVC piping throughout the undercarriage of the water cart.
  - PVC to brass fittings
  - Flow Valve connections
  - Air bleeder valve connections
  - Water Meter connections
  - Nipple hose connections
- **Step 10)** With the pump running, locate the flow valve that is AFTER the meter in the direction of the flow.
  - Forward Flow: Figure 8 [Flow Valve Identification]: Forward Flow
  - Reverse Flow: Figure 9 [Flow Valve Identification]: Reverse Flow

Figure 8 [Flow Valve Identification]: Forward Flow



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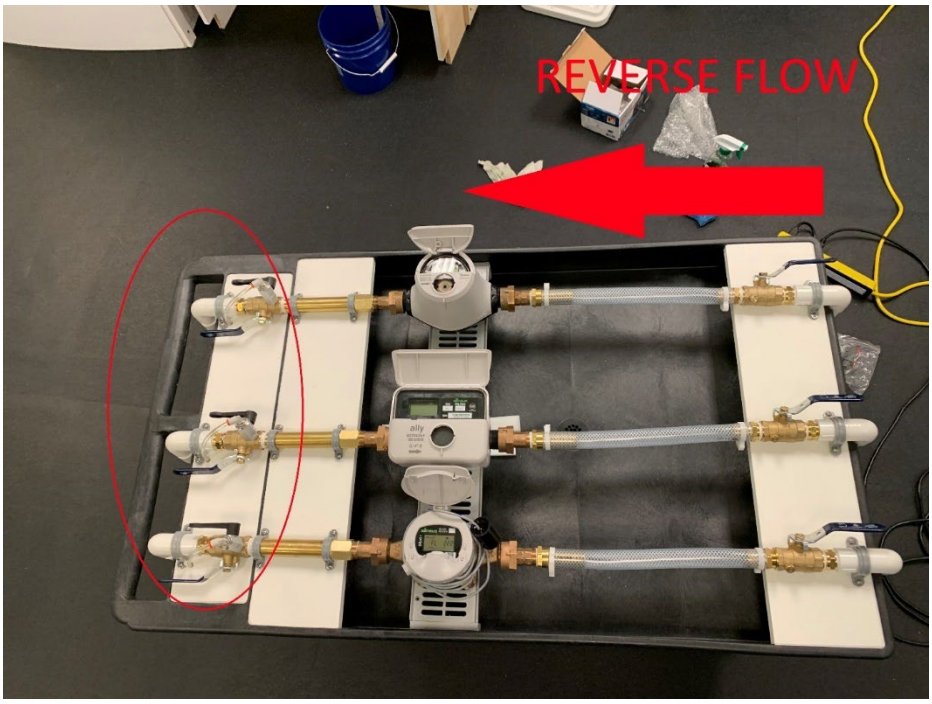


Figure 9 [Flow Valve Identification]: Reverse Flow

- **Step 11)** With the desired flow set, set the air bleeder valves to OPEN for approximately 10 seconds.
- **Step 12)** Set the air bleeder valves to CLOSED.
- **Step 13)** Re-examine the fixture for leaks, refer to Step 9 for components.
- *Note: To prevent unnecessary pressure on the system, never set the directional valves when the pump is on. Repeat this procedure if a change in the direction of the water flow is desired.*

Teardown

The following procedure should be followed for tear down and storage of the water cart. Please refer to the **Water Cart Components** section of this document for location, identification, and purpose of each component.

- **Step 1)** Power off and unplug power strip.
- **Step 2)** Set ALL valves (Air bleeder valves, directional valves, and flow valves) to OPEN.
- **Step 3)** Remove ALL meters from the cart.
- **Step 4)** Wheel the cart to a location where the water can be drained.
- **Step 5)** Attach a water hose to the drain plug located on the water reservoir.
- **Step 6)** Drain the water from the reservoir.
- **Step 7)** For long term storage, it may be necessary to remove the water reservoir completely to completely dry.

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ATTACHMENT P: BERMEX ATTACHMENTS

- AMI Installation Scope
- AMI Field Technician Training Course Outline
- Bermex SOP – Quality Control
- Bermex Door Hanger
- VPie Overview
- Vpie QA

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AMI Deployment Project

Bermex Inc.

PART ONE. GENERAL

Bermex Inc. will provide the following Services for the Project which are categorized and described as follows:

(a). Project Planning Services and Data Deliverables;

(b). Meter Change Services and Deliverables;

(c). Exceptions and Customer Complaints Services and Deliverables;

Bermex Inc. will perform the Services as described in Sections 1 through 3 below, the **"Services Requirements".**

1. PROJECT PLANNING SERVICES AND DATA DELIVERABLES

Bermex Inc. Project management and data Services will include:

A. Project Management and Logistics

(i). **Project Management** - Bermex Inc. will provide all Project management functions necessary to provide detailed Project timelines, manage and schedule field Personnel and routes, manage equipment inventory, and investigate any discrepancies associated with the meter change data.

(ii). **Manage all Scheduling and Routing of Meter Change Services** - Bermex Inc is responsible for the scheduling and routing of all field Services activities and weekly schedules.Bermex Inc will provide a Weekly Installation Schedule to Utility weekly prior to the field Services being performed.

(iii). **Ensure that all Change Services are Performed Off-Cycle** - Bermex Inc will ensure that all meter change field Services are completed 'Off-Cycle' if applicable and that all change-out data is received by Utility personnel prior to the opening of the Cycle Billing Window. Black out periods will be discussed prior to establishing deployment schedule.

B. Data Services

Bermex Inc. will provide all electronic collection devices and software necessary to properly document the meter and/or register change-out Services. At a minimum, each handheld device will include or provide the following functions:

- Barcode Scanners – All bar-coded meters and/or registers, both old and new, will be scanned if applicable, to minimize data collection errors.
- GPS Receivers – Have an integrated GPS receiver that is directly read by the collection software to ensure proper collection of GPS coordinates. GPS collection accuracy shall be 3 meters or less depending on utility specifications.
- Provisions for Collecting GPS Coordinates at Indoor Locations – Have provisions to allow GPS coordinates including X/Y and floor number in the event a multi-story building's meter and or registers are indoors.
- Redundant Data Storage – A redundant data storage method to ensure that the loss of data is minimized should a handheld device fail to operate or is damaged. If installation data is lost, the data will be re-acquired by any means possible within 24 hours of the installation.
- User Tracking – Track each user with a unique sign-on.
- Validation of Meter Readings – Perform advanced validations of collected data to ensure the accuracy of the data on-site.
- Inventory Control – Perform inventory control functions to identify where each new meter

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and/or register is located and to prevent the same meter and/or register from being listed at multiple locations.

- Detailed Electronic Comments Capabilities – Be capable of allowing detailed comments tobe reported with each meter and/or register change-out record.
- Date and Time Stamp Each Change – Each change-out record will be time-stamped with the date and time that the service was started and completed.
- Provision of Data – Have the ability to provide data for all meter or register types.
- Radio Verification – Have the ability to accommodate the technology of choice radio verification device via Bluetooth connectivity.

C. Data Support Services

Bermex Inc will provide the IT staffing necessary to provide the turnkey data processing functions listed below:

- Remote Electronic Method to Transfer Data (Preferred Method) – Meter change-out data will be transferred electronically from the individual handheld devices in the field to the back office as the meter or register change occurs.
- Validation Processes to Ensure Accuracy of Collected Data – Advanced validation processes will be employed to ensure the accuracy of the meter and/or register change-out data.
- Utilize the Secure FTP Site for Data Dissemination to and from Utility - Bermex Incwill utilize a secure FTP location for the transfer of data to and from Utility.
- Ability to Accept and Process Data in any Format – Bermex Inc will accept and process data in the format provided by Utility.
- Provide Meter Change-out Data in Approved Formats the Next Day – All meter and/or register change-out data will be validated and posted, in the required format, by12:00 noon the day after the change-out Service was performed.
- Provide Project Summary Status and Exceptions Reports on a Daily Basis – All data collected in the field will be available via the customer web portal daily for review.
- Provide Inventory Summary Status Reports on a Daily Basis – If applicable Bermex shall provide access via the customer web portal the visibility to see current inventory of each meter type and/or register type.

D. Data Confidentiality

Bermex Inc acknowledges that it will have access to confidential information regarding Utilityand Utility customers in order to perform the Services. Bermex Inc will emphasize this requirement to all Personnel when they start performing the Services and will periodically remind all Personnel.

2. METER CHANGE SERVICES AND DELIVERABLES

Bermex Inc. meter and/or register change and removal Services will be performed by Bermex Inc. field Personnel (collectively referenced here as **"Representatives,"** regardless of the individual's job title and will include:

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A. **Representatives and Vehicles**

(i). **Change All Meter, Register, or Module Types** - Bermex Inc' Representatives will be qualified to perform meter change-out and field-testing Services for all types of meters used by Utility during the term of this Project.

(ii). **Professional Appearance** – Representatives will wear a company shirt and pants. Company shirts will have Bermex Inc' name or logo. All Representatives will be well groomed and present themselves professionally to Utility customers.

(iii). **Identification Badge -** Utility will provide a "Utility ID" badge (with name and photo) for each Representative, which badge will be worn and clearly visible at all times when performing the Services. If a badge is lost, the Representative will immediately notify Bermex Inc and Bermex Inc will contact Utility to have the badge voided. Bermex Inc will be responsible for facilitating the Representative's procurement of a replacement badge. No Representative may perform field Services without the Representative's Utility ID badge (regardless of the reason). Bermex Inc will emphasize to all Representatives the importance of maintaining possession of the badge at all times.

(iv). **PPE in Good Condition** – All Representatives will wear the appropriate Personal Protective Equipment (PPE) necessary to perform safely the meter change-out and repair Services if applicable. All PPE will be in a clean and safe condition. PPE may include the following: Hard Hat, Overshoes or dielectric, Low Voltage Gloves, Eye Protection and Flame-Resistant Shirt and/orJacket. Any PPE will meet applicable O.S.H.A. requirements.

(v). **Company Vehicles Permanently Marked** – All Bermex Inc vehicles will be permanently marked with the Company name and/or logo. All vehicles will be marked with specific lettering or numbering that uniquely identifies each vehicle. Bermex Inc will provide Utility with a list of the vehicles that will be used in performing the Services and provide quarterly updates regarding any changes. All vehicles used to perform these Services will be Bermex Inc owned/leased vehicles.

B. **Services and Tasks at Customer Premises**

(i). **Customer Relations -** Bermex Inc acknowledges that Utility's relations with Utility's customers and with the public are of utmost importance. All Representatives will be courteous in all communications and interaction with Utility's customers and the public encountered during performance of Services for this Project.

(ii). **Customer Notification Procedure** – When a Representative arrives at a customer's premises, and before performing any meter change or other Services, the Representative will notify the customer/occupant and give the customer/occupant time to disconnect electronic equipment, such as computers, turn off water etc, if desired. Representative will also notify customer of need for entry for pilot relighting if applicable. Bermex Inc' Representatives will follow the following **"Customer Notification Procedure"** at each customer's premises:

(a). Immediately upon arrival at the premises, attempt to alert the customer/occupant of Representative's presence by knocking or ringing at the front door;

(b). Wait for approximately one minute;

(c). If no one answers, proceed to perform the Services at the premises;

(d). If someone answers, Representative will:

- Identify himself/herself using the Utility-issued identification;
- Identify the Services to be performed;
- Indicate there will be a temporary interruption of service;
- If customer/occupant does not object to performance of the Services, Representative will:

  (a). Allow the customer/occupant adequate time to shut down equipment;

  (b). Explain that he/she will wait at the door until given approval to proceed;

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(c). Wait for verbal agreement from customer/occupant before proceeding; and

(d). Perform Services at the premises.

(e). Enter premise and relight pilots and follow appropriate compliance checks.

- If customer/occupant denies permission for the Services, Representative will note the exception in the handheld device and proceed to next Work Site.

(f). This Customer Notification Procedure will be followed each and every time a Representative or other member of Bermex Inc Personnel visits a customer premises. All Bermex Inc Representatives and Personnel are to be reminded periodically that they are working on private property and will always treat customers and their property with respect.

(iii). **Meter, Register, Module Inspection, Change, and Removal Procedure** – Once the customer/occupant gives permission for change Services to proceed, or if there is no response to the knock/doorbell per the Customer Notification Procedure, Representative will proceed with the Services as follows:

(a). Confirm the database information (e.g., match between premises address, meter number, and approximate meter reading if applicable). If the data do not match, Representative will knock/ring the doorbell at the front door to notify the customer/occupant (if present) and report this location as an exception per *"Rework Exceptions Handling"* in Section 3 A below;

(b). Please refer to Bermex specific exchange procedures for detailed exchange, removal, and/or upgrade procedures per service type.

(c). **Stand-by for Life/Safety Situation Requiring Immediate Utility Response** – If an unsafe or hazardous condition (e.g., missing meter can lid, broken blocks, broken jaws, heated jaws, exposed conductor, severe corrosion, gas leak, diversion, etc.) is identified during any visual inspection that is considered "**immediately hazardous"** or "**an immediate threat to life or safety,"** Representative will contact Utility promptly. Representative will secure the site, stand by at the premises until Utility has terminated temporarily the service or has taken other action to render the premises safe, and will note the problem in the handheld. Representative will complete the change or repair if notified by UTILITY that it is safe to do so. If the change or repair cannot be completed at that time, Representative will note the exception in the handheld and proceed to the next Work Site.

(d). If an issue is identified during any visual inspection that should be addressed by the customer (or others) but is considered "not immediately hazardous" (e.g., any gas AOC, water leak, broken register, bent or damaged entrance cable mast, tree limb on entrance cable, etc.) and Representative reasonably believes that the meter and/or register change can be completed safely, Representative will note the issue in the handheld and complete the exchange.

(iv). **Meter Change Confirmation** – When the new meter, register, or module is installed, Representative will verify that the meter, register, or module is active, and enter the new meter information into the handheld device.

(v). **Cleanup** – Upon conclusion of Services at each customer's premises, Representative will gather and remove all equipment, materials, and debris resulting from the Services. Representative will pick up and destroy all used seals, excess dirt and debris, etc., found at the premises or used in the installation. All equipment, materials, and debris will be disposed of in accordance with Legal Requirements.

(vi). **Door Hanger Notice for Services performed in Customer's Absence** - If no one answered the door when Representative arrived and Representative was able to complete the exchange, Representative will leave a door hanger (provided by Utility) on the front door notifying the customer that the meter was changed.

(vii). **Door Hanger Notice for Rework/Exceptions** - If Representative cannot change out the meter or device, Representative will leave a door hanger (provided by Utility) requesting customer to contact Bermex Inc for a return visit.

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3. EXCEPTION AND CUSTOMER COMPLAINT SERVICES AND DELIVERABLES

Bermex Inc' exception and customer complaint Services will include:

A. Call Center Operations, Exceptions Rework and Customer Complaints

(i). **Rework Exceptions Handling** - Bermex Inc will provide all Call Center functions necessary to provide re-scheduling of meter change-out exception locations that require appointments for reasons such as Unable to Locate (incorrect address data, obstruction, no meter found, no meter available), Bad Dog, Locked Gate, Customer Unable to Take Unscheduled Outage, Customer/Occupant Withholds Permission, Unsafe Condition, Damage (e.g., requiring work by customer), etc.

(ii). **Call Center Staffing** - Bermex Inc will provide the Call Center staffing necessary to provide adequate customer service to field customer calls during and after business hours.

(iii). **Remote Electronic Method to Schedule** – Bermex Inc will utilize web-based Internet scheduling systems to allow customers an automated method to schedule the re-visit to their premises.

(iv). **Service Timeliness** – Exception Services will be scheduled by Bermex Inc in a timely manner to ensure that they are completed within five business days from the date that the customer contacts the Call Center. Exceptions to the five-business day window will be made for premises that are within a Utility Billing Window, which premises will be serviced within five business days after the Utility Billing Window opens.

(v). **Unable to Locate/Bad Address** – Utility will provide Bermex Inc with detailed location directions and/or valid street addresses for all "Unable to Locate" exceptions. Bermex Inc will complete these in a timely manner to ensure that they are completed within five business days from the date that the updated information is provided to Bermex Inc. Exceptions to the five-business day window will be made for premises that are within a Utility Billing Window, which premises will be serviced within five business days after the Utility Billing Window opens.

(vi). **Customer Complaint Issue Resolution** – Bermex Inc will notify Utility promptly of any communication or coordination issue with a customer. Bermex Inc will investigate any Utility customer complaint arising out of Bermex Inc' Services. Bermex Inc will keep Utility informed regarding these complaints and will provide to designated Utility personnel, in a timely manner, a written report detailing the nature of each complaint and the actions taken to resolve the matter. If the investigation shows that the problem arose from an act of nature or something other than an action or inaction of Bermex Inc, the matter will be reported to Utility for resolution.

B. Field Operations Group

Field Service Activities: Bermex Inc' field operations group will handle field service activities: meter change outs, and exceptions re-work. The field technician Personnel will be structured into service modules. Each service module will consist of a Working AMI Supervisor, an Exception Technician, and up to ten Field Technicians. Bermex Inc will monitor efficiencies and productivity by sub-project. All Bermex Inc field personnel will be assigned a company vehicle. Field Technicians will be equipped with a compact pickup truck with a secure enclosure. All vehicles will be equipped with a real-time GPS tracking system to monitor the vehicles' location and speed.

AMI Supervisor: AMI Supervisor is responsible for ensuring that the Supervisor's team of technicians is equipped to perform safely and efficiently their job tasks within the designated service area. The AMI Supervisor is a working supervisor (after assigning daily tasks and resolving any field service issues, the Supervisor will perform quality audits on meter and/or module/register changes, exceptions and re-visits, to ensure all quality standards are met.

Technician Training: Every effort will be made to service each Utility customer location in a safe and professional manner. Every Bermex Inc technician will be certified by Bermex Inc' Safety,Service, and Field Service training programs. Training outlines are provided upon request.

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AMI Field Technician Course Outline - Version 7.0

Course Overview and Approach

Courseware consists of an Instructor Presentation, Student Workbooks and Handout Exercises with a heavy emphasis on Safety and Quality. Written testing is performed after each Module. Classroom and Hands-on Lab time changing out meters is split 50/50. Attendees must pass a closed book Final Certification Written Exam and Hands-on Practical Exam before transitioning to the field. Classroom/Lab Course length is five (5) days or longer depending on number of attendees. Following formal training, AMI Techs are paired up with a Field Mentor for one to two weeks before receiving management sign-off to work alone. Portions of the course are customized to meet Utility specific requirements.

Course Purpose and Objectives:

- Purpose: To train personnel to become qualified AMI Field Technicians.

At the end of this course attendees will be able to:

- State Bermex Services Mission and Values and describe how to apply them in the field
- Describe safety procedures, explain why they are important and demonstrate proper use of Personal Protective Equipment (PPE)
- List Field Work-Flow Processes and Procedures
- Describe Power Grid components, electronic circuit components, and Calculate power usage
- Identify different kinds of Meters and list Form Types, Classes and Base Voltage requirements for each
- Demonstrate ability to change out meters while following safety procedures and entering required information into the Hand-held Computer
- Pass tests relating to Vehicle Safety
- List Techniques for creating Positive Customer Perceptions
- Demonstrate ability to perform Meter Base Inspections
- Demonstrate ability to do Level One Meter Base Repairs
- Pass Final Written and Practical Certification Examinations before transitioning to the field

Course Outline by Module

- Module One – Safety, Company Introduction and Job Role
- Module Two – Meter Reading
- Module Three – Power Transmission Grid and Electricity Basics
- Module Four – Using the Handheld Computer
- Module Five – Safety
- Module Six – Working with Self Enclosed Meters
  - Hands on Lab Exercise – Removing and Installing Self Enclosed Meters
- Module Seven - Working with Commercial Meters – Demand Meter Readings
  - Hands on Lab Exercise – Removing and Installing Commercial Meters

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- Module Eight – Utility Specific Procedures
- Module Nine – Handling Workflow Exceptions
- Module Ten – Customer Relationships
  - Hands On Practice Changing Out Meters
- Module Eleven – Working Smart in the Field
  - Site Inspections – Working Efficiently - Ensuring Safety
- Module Twelve – Performing Repairs
  - Hands on Lab Exercise
- Module Thirteen – Handling Inventory and Ensuring Quality
  - Hands On Practice Changing Out Meters
- Final Testing and Certification – Written, and Practical Application Test
- In-Field Training Working with Field Mentor
  - One to Two Weeks

Module One - Safety, Company Introduction and Job Role

- Company introduction
- Bermex Services Mission, and Values
- Applying Company Values at Work
- AMI Field Technician Role and Workflow
- Introduction – Styles of Old and New Meters
- Post Module Exercise and Test

Module Two - Meter Reading

- Meter Reading Basics
- Reading Rules and Guidelines
- Meter Reading Practice
- Post Module Exercise – Meter Reading Test

Module Three - Power Transmission Grid and Electricity Basics

- Power and Distribution Grids
- Smart Grid
- Electronic Components
- Basics of Electricity – Voltage, Current, Resistance
- Power Formulas
- Single and Polyphase Service and Wiring
- Calculating Voltage, Current and Power Usage
- Safety Basics – Working with Electricity
- Using the Volt-Ohm Meter
- Post Module Exercise and Test

Module Four – Using the Handheld Computer

- Menus, Screens and Buttons
- Image Manager Screen
- GPS Device connections

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- Initializing
- Capturing Meter GPS Locations
- Syncing and accessing work orders
- Uploading work and photos
- Post Module Exercise and Test

Module Five – Vehicle and Site Safety

- Requirements for using PPE
- Testing Safety Gloves for Leaks
- Rules for Operating Company Vehicles
- Safe Driving Presentation and Testing
- Safety Bulletin Review
- Safety Presentation
- ARC FLASH Definition and Causes
- Post Module Exercise and Test

Module Six - Working with Self Enclosed Meters

- Meter Enclosure Types
- Decoding Meter Nameplates - Form Types, Voltage Rating, Class, Wires, Kh
- Self-Contained Meter Definition
- Safety – Working on Training Meter Boards
- Meter Base Inspection Requirements
- Surge Suppressors, Locking Rings, Meter Rings and Seals
- Process for Changing Out Meters – Hand-held Screen Sequence Demo
- Taking Voltage Measurements - Voltage Tolerances
- Post Module Exercise and Test

Module Seven - Working with Commercial Meters – Demand Meter Readings

- Transformer Rated (CT) Meter Definition
- 5, 6, 7 and 13 Jaw Meter Bases
- 12S, 16S Delta and Wye Meter Forms and Voltage Comparisons
- Demand Meter Readings
- Delta and Wye Transformer Basics
- Self-Enclosed Commercial Meters
- Transformer Rated (CT) Meter Introduction – 3S, 4S,5S, 6S, 9S, 45S
- CT Testing Introduction
- Procedures for Changing Out Commercial self-enclosed and CT Meters
- Socket Adapters, Surge Suppressors, Extenders and Pullers
- Safety Tips when Working with Commercial Meters
- Post Module Exercise and Test

Module Eight - Utility Specific Procedures

- Customer Requirements – Notification and Contact Procedures
- Inventory Stocking Locations and Processes

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- Expected Meter Types
- Seal Colors, AS FOUND Seal Statuses, As LEFT Seal Statuses
- Unable to Service/ Strike Process - Door Hangers
- Utility Specific Service Bulletins
- Repair Procedures
- Reporting
- Post Module Exercise and Test

Module Nine – Handling Workflow Exceptions

- Knowing when to contact your supervisor
- Finding Out What Is Left to do on your Route/Cycle
- Unable to Service Points/Strikes in the Workflow Process
- Unable to Service/Strike Categories
- Selecting Codes and documenting Comments
- Post Module Exercise and Test

Module Ten - Customer Relationships

- Who is the Customer?
- Creating Positive Customer Perceptions
- Customer Notification Procedures
- What to Say and What Not to Say
- Leaving the Work Site in Better Condition than you found it
- Post Module Exercise and Test

Module Eleven – Working Smart in the Field

- Safety – Working at Customer Sites – Being mindful of surroundings
- Driving and Parking on Customer Property
- Performing Site Inspections – Identifying dangerous situations
- Meter Base Inspections and Identifying Theft
- Having Integrity when something goes wrong – Telling the Homeowner- Leaving a Note
- Improving Efficiency - Being Safe, Achieving High Quality and Productivity
- Loading and Unloading Vehicles - Working the Cycle/Route
- Effective Communication between Field Techs and Supervisor
- Reporting Unsafe Conditions and Accidents
- Post Module Exercise and Test

Module Twelve - Performing Repairs

- Importance of Standardizing Terminology
- Meter Socket Nomenclature
- Field Techs and Repair Tech Repair Roles
- Field Repairs
- AMI Project Meter Base Repair Process (if applicable)
- Post Module Exercise and Test

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Module Thirteen - Handling Inventory - Ensuring Quality in the Field

- Proper Handling of Old and New Inventory
- Rotating inventory in Vehicle – Loading and Off Loading
- Packing boxes
- Field Tracking Reports and Systems
- Ensuring Quality of Data – Data entry, Comments and Photos
- Working on Gangs of Meters – Apartments
- Post Module Exercise and Test

Final Written Certification Test

Field Mentor Assignments and Reporting Locations

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Standard Operating Procedure – Quality Control

May 26, 2022

Bermex must utilize a rigorous field Quality Control "QC" program to ensure data integrity and installer capabilities. The quality control program utilizes the current handheld system so each Field Supervisor can audit their teams.

The field requirements are as follows:

Supervisors will inspect one hundred percent (100%) of all work orders completed by new hires for a period of five (5) working days from the date the installer begins field work (the "Training Period"). "New Hire" installation audits should occur within five (5) days of the installation. If an installer's installation errors are found to be in excess of one percent (1%), the installer shall be removed from the field and retrained.

After the training period, a five percent (5%) random sample of each installer's work orders will be audited on a monthly basis.

If, after the training period, an installer's critical installation errors are found to be in excess of one percent (1%) over a period of six weeks, the installer shall be removed from the field and retrained. All work performed by that installer during the two (2) days prior to the six week period shall be audited. If the audit results for those two days show a critical installation error of two percent (2%) or greater, all work performed by the installer in the last 30 days will be reviewed. A site visit audit will be attempted for each. Bermex and the utility will review the audit results and discuss further action as required.

Office procedures are as follows:

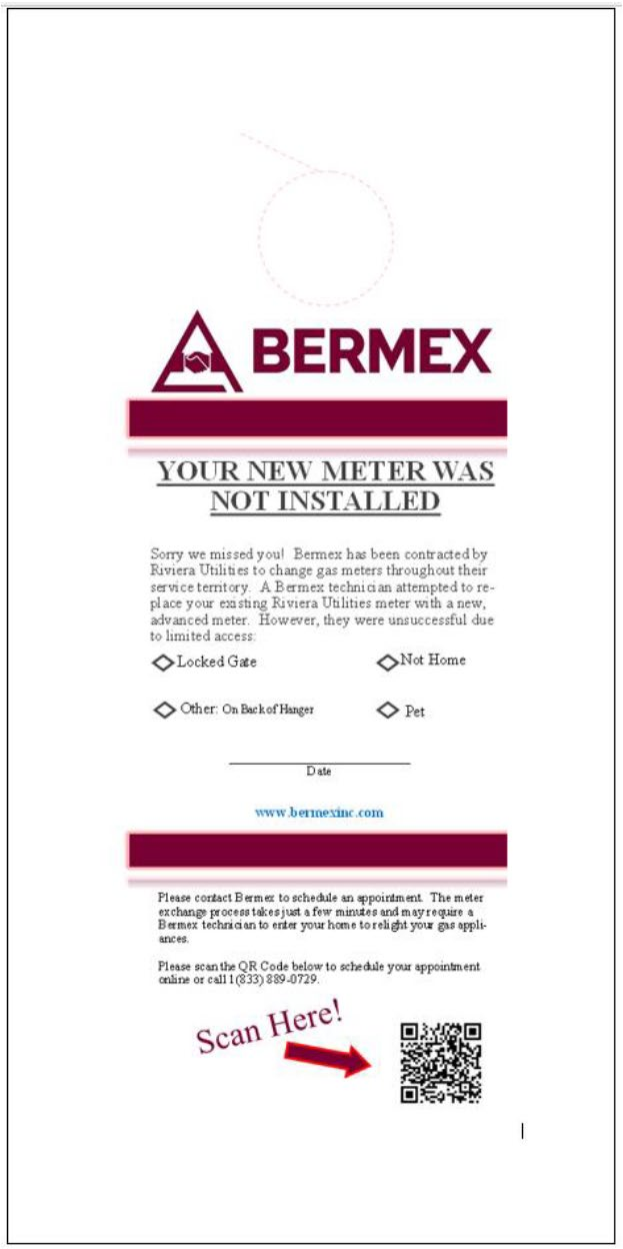
Data Analyst will record and report all errors discovered during data cleansing procedures. If a technician's error rate goes over one percent (1%) then the technician will be removed from the field and retrained on the area where the errors are being made.

Data Analyst will inspect one hundred percent (100%) of all pictures taken by new hires for a period of five (5) working days from the date the installer begins field work (the "Training Period"). The As Found Meter picture will be inspected for clarity, and to make sure the meter read and meter number are visible and readable. "New Hire" picture inspections should occur within five (5) days of the installation. If an installer's installation errors are found to be in excess of one percent (1%), the installer shall be removed from the fieldand retrained.

After the training period, a five percent (5%) random sample of each installer's pictures will be audited on a monthly basis.

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BERMEX DOOR HANGER EXAMPLE



BERMEX

YOUR NEW METER WAS NOT INSTALLED

Sorry we missed you! Bermex has been contracted by Riviera Utilities to change gas meters throughout their service territory. A Bermex technician attempted to replace your existing Riviera Utilities meter with a new, advanced meter. However, they were unsuccessful due to limited access:

◇ Locked Gate ◇ Not Home

◇ Other: On Back of Hanger ◇ Pet

Date

www.bermexinc.com

Please contact Bermex to schedule an appointment. The meter exchange process takes just a few minutes and may require a Bermex technician to enter your home to relight your gas appliances.

Please scan the QR Code below to schedule your appointment online or call 1(833) 889-0729.

Scan Here!

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VPie

Work Order Management Software Designed For Water, Gas, and Electric Utilities

- Mobile Data Collection, Real-Time Dashboards, Key Performance Indicators
- Easy to Create Mobile App with Smart Fields, Take Unlimited Pictures
- Customized Digital Work Orders with Utility Logo
- Asset Management - Track from Warehouse to Installation
- Built in Routing Software to Efficiently Assign Tasks to Field Personnel
- Online Scheduler for Customers to Schedule Appointments
- Powerful Communication Platform - Email, Text, & Voice Blast
- History of all Customer Communications
- Chronological Work Order History
- Easy to Search, Sort, and Filter on All Data Fields Available
- Geo Tagged Data
- Native Mobile App - No Wi-Fi or Cellular Service
- Full Integration to CIS, Billing, other 3rd Party Software



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VPIE QA PROCESS

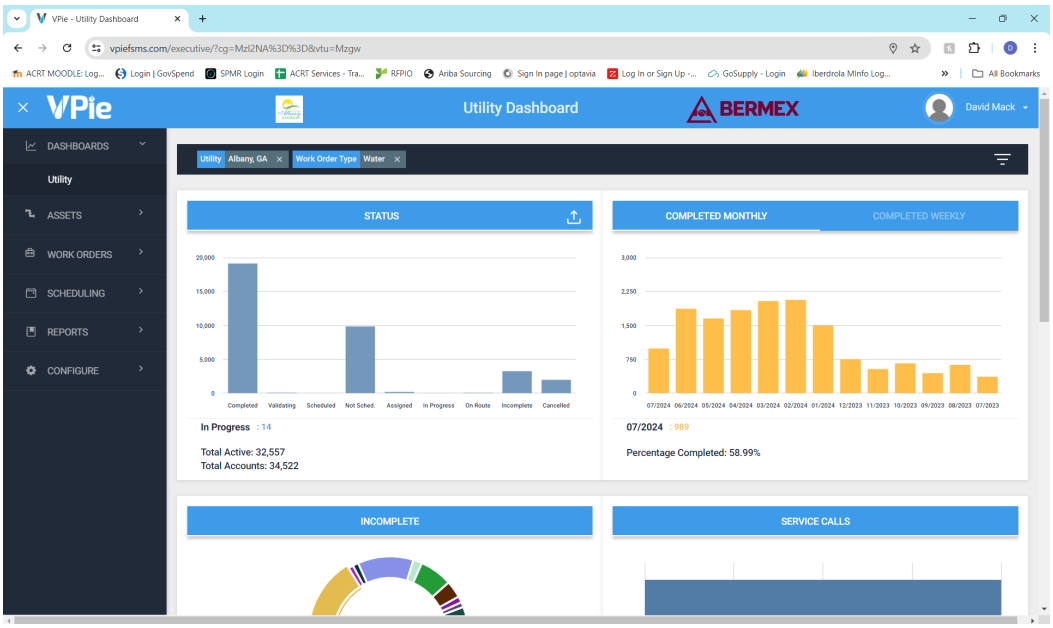
Frequently Asked Questions:

- How does the utility get the data after work is completed.
  - Data is ready to export from VPIE by 1pm the next day after installation. Bermex validators will scrub the data prior to export file being available
  - Data is accessed through the VPIE utility dashboard
  - We can provide access to any utility employee that needs a login
  - VPIE will format the data so that all data files exported will upload directly into utility billing system
  - Data will stay in VPIE for 2 months after project end date and can be extended for an additional $300 monthly fee after the 2 months
- What type of data file needs to be provided to VPIE to set up the work order management system.
  - Data needs to be provided at least two weeks prior to deployment start date
  - Data can be refreshed on a monthly basis if required
- How can I monitor the deployment progress?
  - The VPIE dashboard provides the ability to sort and filter data so you can see the installs daily, weekly, monthly.
  - If you want to review a specific address you can filter by the account number, meter ID, address, etc to pull the specific account.
  - By clicking the photo icon on a specific account you can access the photos of the meter
- Blackout Period
- VPIE has the ability to monitor black out periods based on assigned settings.
  - Keeps employees from working in cycles that are in the reading/billing process
  - Usually set up as 3 days before utility will export their meter reading file and 3 days after utility imports the new meter read file
  - We can also change it on the fly if the utility wants to alerts us of changes
  - Blackout period scheduling will not work unless we have a specific read calendar from the utility and the utility sticks to the read schedule.

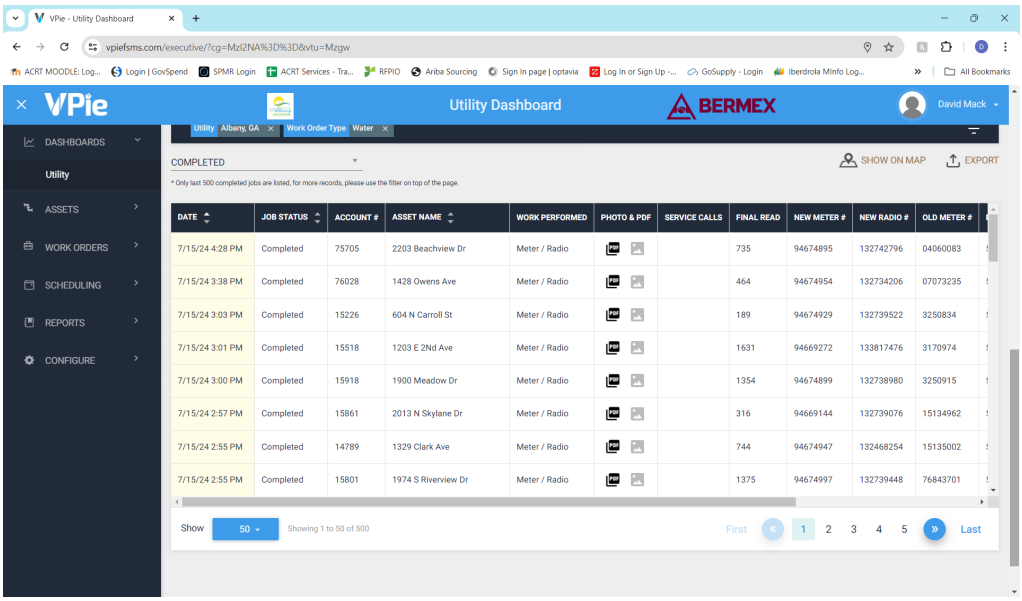
WORK ORDER MANAGEMENT SYSTEM

Provided are several screen shots from our Work Order Management System VPIE. This is the leading WMS for Installation projects in the United States. The online portal can be easily accessed on computers or cell phones. There is no limit to the number of logins that can be provided to the Utility though it is suggested to get this to a minimum and those directly related to the project. Project Summaries and reports are easily downloaded and sent.

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Once an install is completed and validated by our staff a PDF Work Order is created so that if questions do arise, all answers will be found in one document easily searchable on the system.

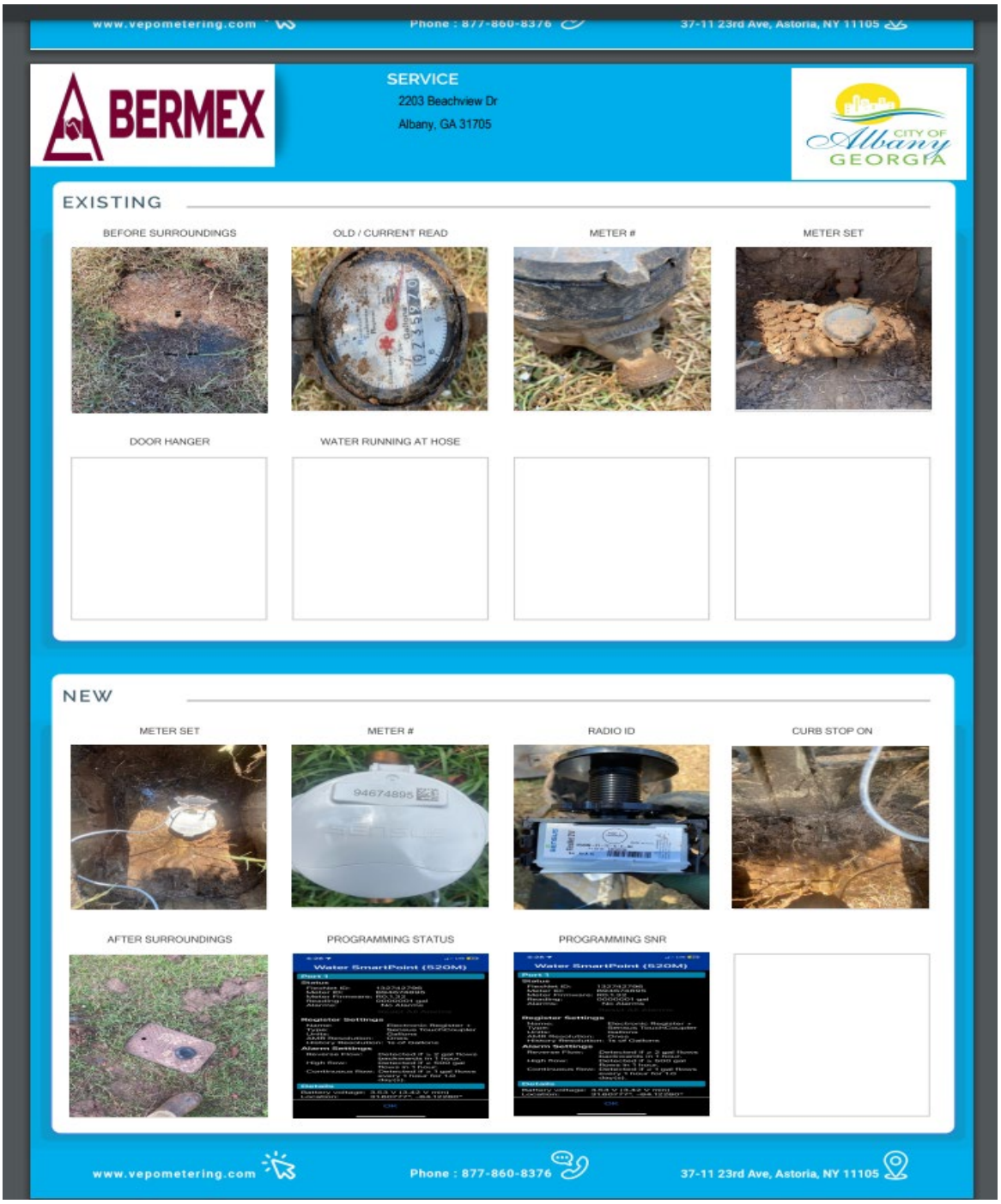


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Work Order Example



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Sensus Roadmap

Sensus Electric Roadmap

Sensus Roadmap Approach

Sensus utilizes a **Now, Next, and Later approach** to roadmap planning for new initiatives.

NOW: Building/Launching. Allocated resources, defined scope, expected timeline for launch, budgets, and sales expectations and are already in market or soon to be launching broadly.

NEXT: Evaluating/Planning/Designing. Currently being vetted by Product Management and Engineering for product/market fit OR are in early stages of design and development, targeted (but not necessarily committed) to be launched in the next 6-18 months.

LATER: Ideation/Innovation. Early ideation and innovation around ways to solve key customer problems and/or ways to enter new markets. In early tech feasibility exploration and/or on deck for initiative kick-off. Too soon to approximate time frames.

Sensus' Stratus IQ Meter Features

The Stratus IQ meter was designed from the outset to provide utilities with the capacity necessary for the 20-year life of their FlexNet system and beyond. The Stratus IQ meter features several significant increases in performance and memory over our preceding generation of residential meters to ensure that your FlexNet system grows with you as your needs grow. The Stratus IQ employs an application processor as well as a Digital Signal Processor (DSP) to ensure future features can be supported via the over-the-air upgrades to its software-defined metrology.

TABLE 1: STRATUS IQ FEATURES PLANNED FOR RELEASE IN MID-2022

Feature	Initial Release	Phase 2 Release*
Load Profile Channels	8	32
Multiple Data Sets with Independent Interval Length	No. 1 LP Data Set Supported	Yes. 4 LP Data Sets Supported
Loss of Neutral (Form 2S) Detection		Yes
Advanced Theft Detection Techniques (including detecting theft when user compromises meter)	Yes. Detection when meter removed from meter socket	Yes. Extended Support for Detection of Bypass Wiring around meter socket
Arc Detection and Auto-Open		Yes
Tilt Detection and Auto-Open		Yes

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Fundamental Metering (60 Hz Energy)		Yes
Four Quadrant Metering	Yes	Yes
Per-Phase Metering		Yes
Total Harmonic Distortion, Total Demand Distortion (THD/TDD)		Yes
Sag & Swell Log		Yes
Outage Log (clicks, blinks, short, sustained		Yes

TABLE 2: STRATUS IQ FEATURES & ROADMAP ITEMS

* These capabilities are planned for the next Stratus IQ update expected to be commercially available soon via an over the air firmware update (no hardware change to the meter required).

Additional Electric Roadmap Initiatives

Sensus is working closely with several third-party companies under non-disclosure agreements to integrate a variety of solutions into our offering. Timing for these solutions is targeted for 2023. These efforts include:

- Distributed Energy Resource management optimization
- Dynamic meter to distribution transformer mapping
- Electric vehicle detection
- Distribution power flow optimization
- Anomaly detection at the meter

DC Metering

Green energy, solar panels, residential battery systems, and electric vehicles are driving demand for a new type of electric meter—one that measures DC Power consumption.

- A new ANSI standard for DC meters is being formulated across utilities, and Xylem is heavily involved in the development.
- Form 2S meter prototypes have been developed and are currently being tested in the field.
- A pending Xylem patent provides a wider dynamic range improved accuracy for our planned product.

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Sensus Water Roadmap

Sensus has a number of exciting water roadmap solutions that are being worked on for our utility customers. Many of these solutions have been conceived through discussions with our existing customers, including those participating in our SPAN customer-run users' group.

These solutions will be supported on existing FlexNet systems, with upgrades to the new software supporting them, or with new hardware being rolled out to accomplish them.

Water Meters

- Enhance existing iPerl meter to include metal flow tube.
- Develop 1-inch ally meter size.
- Continued development for our static meter portfolio through more sizes and meter applications.
- Support for additional sensors and alarms support.
- Additional interface methods for ease of use, troubleshooting, data retrieval, and installation.
- Implement variable measurement intervals for troubleshooting, investigations, and asset life extension.

Sensors

- Add more third-party sensors to increase Sensus' support of additional use cases.

Communications

- Support for more input interfaces (sensor and meter) for additional interoperability and compatibility.
- Additional options for controls, downlinks, and high-data volume applications.

Software

- Integrate additional Xylem applications such as View, Polaris, and BluX.
- Additional smart water applications for hydraulics, sustainability, water quality, and asset management
- Increased third-party interface support for a wide variety of solutions, including SCADA, prepayment, customer portals, and enterprise data.

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Base Station Installation and Commissioning

Base Station Mounting

The M400B2 FlexNet Base Station is packaged in a NEMA-4 cabinet enclosure that facilitates easy mounting outdoors or indoors on a wide variety of structures, poles, or walls. This design makes the M400B2 a flexible network device that can be installed virtually anywhere.

Typically, the M400B2 is mounted at ground level for easy mounting and access by field personnel, with the coaxial cable going up to the antenna, which is mounted at the height delineated in the RF propagation study.

Base Station Installation

FlexNet Base Stations are installed on any vertical asset, including communication towers, water tanks, poles, and buildings. They provide field-proven, overlapping, high-bandwidth communications to all FlexNet-enabled endpoints, including water, gas, and electric meters, as well as to a wide variety of smart network devices using Sensus' FCC-licensed, primary-use, full-duplex RF frequencies.

When the order for the M400B2 is placed, the mounting type is also selected: pole mount or wall mount. This selection determines the mounting kit that will be shipped with the base station.

The base station installation guide provides details and guidelines on how to install M400B2 FlexNet Base Stations.

Base Station Site Requirements

Site requirements for installing FlexNet Base Stations are as follows:

- Located according to the RF propagation study.
- Appropriate mounting space available.
- A proper grounding connection available.
- Access to AC power.
- Each base station location requires a suitable structure to mount the antenna that gives an unobstructed view of the endpoints, per the RF propagation design.
- The FlexNet Base Station has been designed to interface to a wide variety of communications options for its backhaul connection to the FlexNet Head End System.

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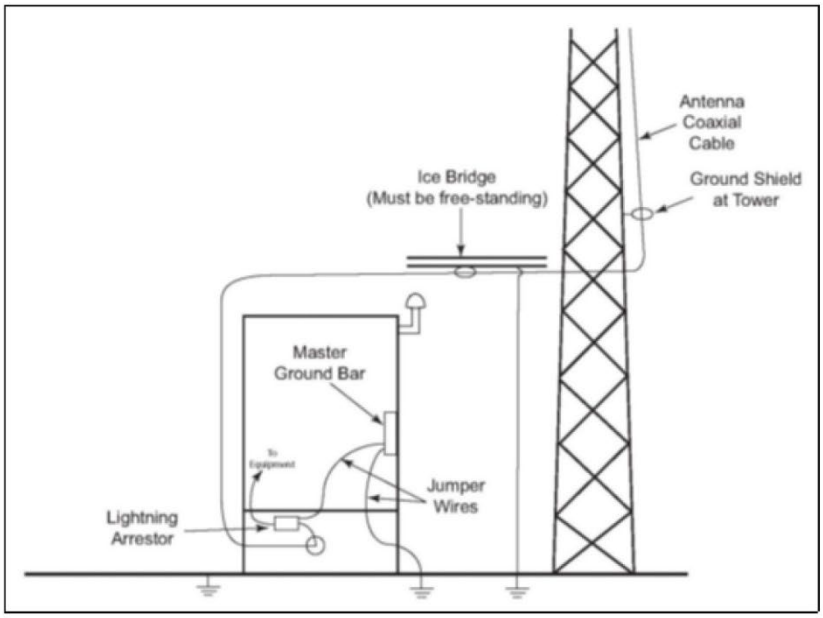


FIGURE 1: FLEXNET BASE STATION COAX AND GROUNDING DETAILS



FIGURE 2: M400B2 FLEXNET BASE STATION (STRUCTURE-MOUNTED BACK VIEW)

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FIGURE 3: M400B2 FLEXNET BASE STATION (STRUCTURE-MOUNTED FRONT VIEW WITH DOOR OPEN)

Base Station Installation Specifications

Base station installation can either be performed by the utility or by Sensus. If Sensus installs the base stations, Sensus provides the Statement of Work (SOW) for each base station site installation, including the details for the site and specifications for installation. Once a site's base station, coax, and antenna have been installed, a Sensus RF expert will certify the installation and ensure that each installation meets performance standards for your FlexNet system. Sensus provides the utility with an as-built certification packet for each base station, which ensures the network is properly configured and optimized for maximum performance.

If the utility chooses to install the base stations, the Statement of Work is the responsibility of the utility.

Site Preparation Activities

Sites can require some preparation work, up to and including permitting, leasing, clearing, electric installation, backhaul installation, pad placement, pole installation, and trenching to run or bury cables. This work will be the responsibility of the utility, with the option for Sensus to provide and install poles, if needed.

Installation Time and Manpower

Sensus typically schedules two days' effort for installation of the equipment at each M400B2 FlexNet Base Station site. Many sites able to be completed in one day.

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Base Station Antennas

FlexNet Base Stations are installed at the base of hardened vertical assets, and the antennas installed at the appropriate height, with coaxial cable connecting them. When the Sensus RF Design Team creates the propagation study for your service territory, they use electric models of different antenna types to design a network that will achieve your desired performance.

Based on the study they conduct; the RF Design Team then makes a recommendation of which models of radio antennas should be purchased. The Sensus Deployment Team works with the base station installer to procure and install the antennas based on the RF Design Team's recommendations, along with appropriate lengths of coax and any required mounting equipment.

Base Station Antenna Q&A

Do we supply radome covers for the antennas?

Radome covers are typically used for dome antennas, while our designs typically use omni and panel antennas.

Pictures of Base Station Installations



FIGURE 4: M400B2 FLEXNET BASE STATION MOUNTED ON LATTICE STRUCTURE

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FIGURE 5: M400B2 FLEXNET BASE STATION MOUNTED OUTSIDE OF SUBSTATION

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FIGURE 6: M400B2 FLEXNET BASE STATION MOUNTED TO STRUCTURE IN SUBSTATION

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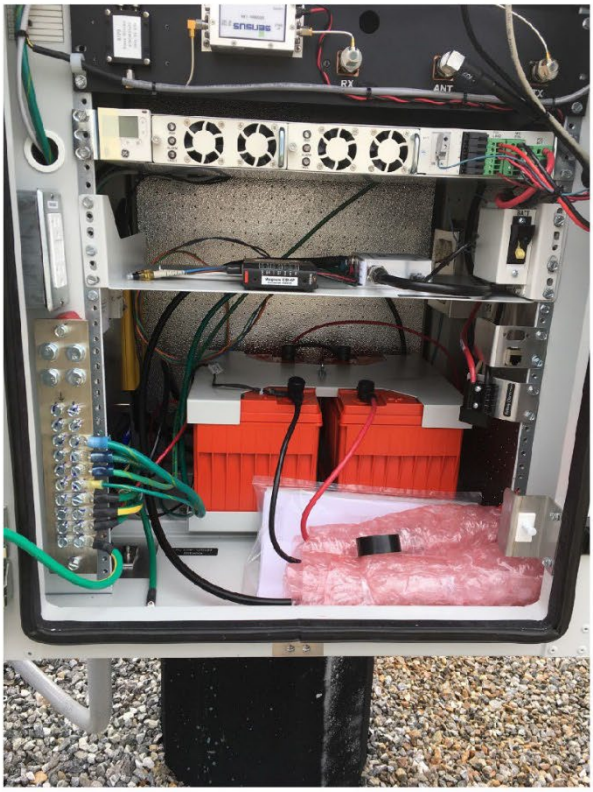


FIGURE 7: M400B2 FLEXNET BASE STATION INTERIOR

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FIGURE 8: M400B2 FLEXNET BASE STATION MOUNTED ON STEEL POLE



FIGURE 9: M400B2 FLEXNET BASE STATION FULL INTERIOR

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FIGURE 10: M400B2 FLEXNET BASE STATION MOUNTED ON STEEL POLE

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FIGURE 11: BASE STATION ANTENNA MOUNTED AT TOP OF STEEL POLE

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FIGURE 12: COAX GOING UP STEEL TRANSMISSION POLE AT M400B2 FLEXNET BASE STATION SITE

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FIGURE 13: ANTENNA MOUNTED AT TOP OF STEEL POLE AT M400B2 FLEXNET BASE STATION SITE

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FIGURE 14: M400B2 FLEXNET BASE STATION INSTALLATION ON STEEL POLE AT SUBSTATION

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FIGURE 15: M400B2 MOUNTED IN BUILDING WITH BUILDING-SIDE MOUNT ANTENNA

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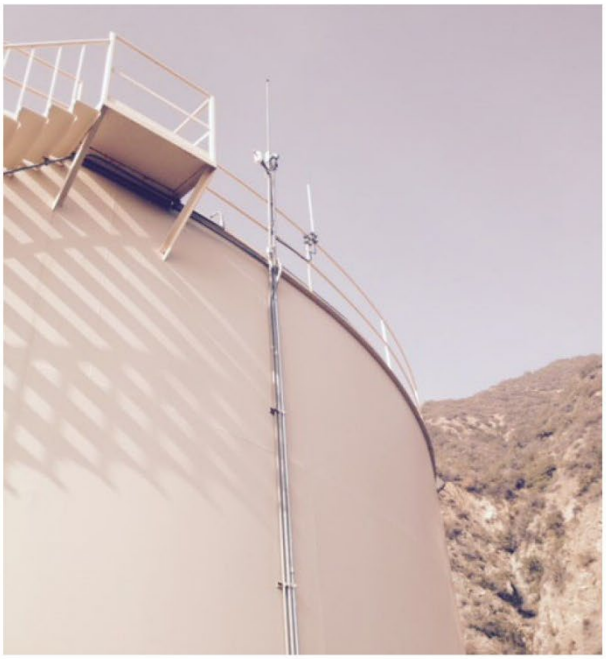


FIGURE 16: BASE STATION ANTENNA MOUNTED ON WATER TANK RAIL



FIGURE 17: BASE STATION ANTENNA MOUNTED ON WATER TANK RAIL

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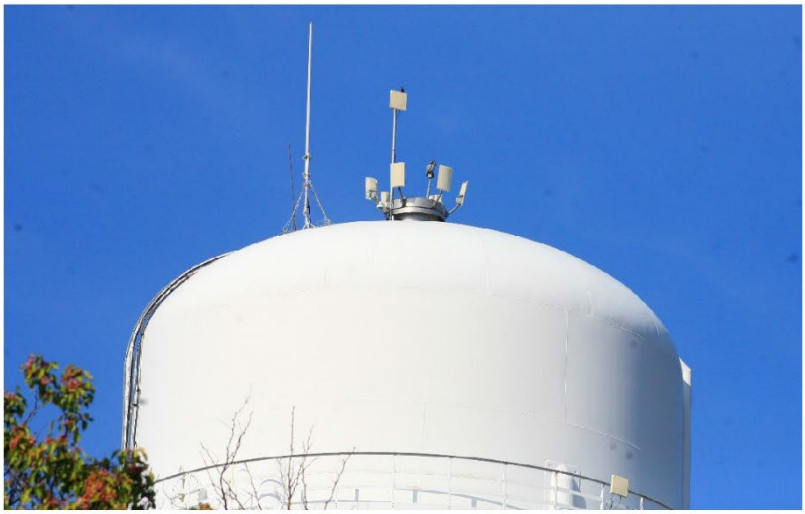


FIGURE 18: BASE STATION ANTENNA MOUNTED ON WATER TANK TOP (LEFT SIDE)



FIGURE 19: BASE STATION ANTENNA MOUNTED ON WIND TURBINE

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FIGURE 20: BASE STATION MOUNTED ON CONCRETE PAD WITH ANTENNA AT TOP OF POLE

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ATTACHMENT S: METER COMPATIBILITY GUIDE

QUICK GUIDE

510M/520M SmartPoint® Module

Water Meter and Ancillaries Compatibility Quick Guide

Sensus

Register Type	Model	Meter Type
ICE & ICE Opto	All meters that accept ICE & ICE Opto 3-wire.	Positive Displacement, Multi-jet, Compound, Turbine, Propeller, Fire Service
OMNI™	T2, C2, F2, R2	Floating Ball Technology
accuMAG™	accuMAG	Mag
iPERL®	iPERL	Mag
Permalog	Permalog+	Acoustic Technology
Sensus® Electronic Register+™ and E-Register	accuSTREAM, SR II	Positive Displacement
ally	ally	ally
Hydroverse	Hydroverse	Mag

Badger

Register Type	Model	Meter Type
ADE	All meters that accept ADE 3-wire and TouchCoupler support, Sensus Approved TR/PL lead, up to 8 wheels.	Disc, Turbine, Compound, Fire Service
HR-E LCD	All meters that accept HR-E LCD 3-wire, up to 8 wheels. Must be at least SmartPoint firmware version R1.2.1f or higher.	Disc, Turbo Series, Compound Series, Combo Series, Fire Service
E-SERIES 8 digits	All models with firmware version 1.36. 3-wire**	Ultrasonic

Neptune

Register Type	Model	Meter Type
Proread 4 wheel	All meters that accept Proread registers. 3-wire support	Positive Displacement, Turbine, Compound, Fire Service
E-coder with TouchCoupler 4 wheel	All meters with firmware version 01.02. Manufactured after 1/2016.	Positive Displacement, Turbine, Compound, Fire Service
Proread 6 wheel	All meters that accept Proread registers. 3-wire support	Positive Displacement, Turbine, Compound, Fire Service
E-coder 6 wheel	All meters that accept E-coder registers. 3-wire support (Proread protocol only)	Positive Displacement, Turbine, Compound, Fire Service
E-coder with TouchCoupler 6 wheel	All meters with firmware version 01.02. Manufactured after 1/2016.	Positive Displacement, Turbine, Compound, Fire Service
E-coder 8 wheel	All meters that accept E-coder registers. 3-wire support*	Positive Displacement, Turbine, Compound, Fire Service
E-coder with TouchCoupler 8 wheel	All meters with firmware version 01.02. Manufactured after 1/2016.	Positive Displacement, Turbine, Compound, Fire Service
ProCoder 8 wheel	All meters with firmware version 63.16. Manufactured after 7/2018. TouchCoupler and 3-wire**	Positive Displacement, Turbine, Compound, Fire Service

*SmartPoint firmware version 1.2 and above only
**SmartPoint firmware version 1.7 and above only

sensus
a xylem brand

WQG-10021-07

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Elster/Amco

Register Type	Model	Meter Type
Scancoder	All meters that accept Scancoder 3-wire support (Sensus protocol only).	Positive Displacement, Turbine, Multi-jet, Bulk combo, Fire service
InVision	All meters that accept InVision 3-wire support (Sensus protocol only).	Positive Displacement, Turbine, Multi-jet, Bulk combo, Fire service

Master Meter

Register Type	Model	Meter Type
AccuLinx V1.19	All meters that accept AccuLinx 3-wire and TouchCoupler, Sensus approved TR/PL lead.	Positive Displacement
Sonata 8 digits	3-wire and TouchCoupler, firmware version 5.01 or greater.**	Ultrasonic
Octave 8 digits	3-wire only.**	Ultrasonic

McCrometer

Register Type	Model	Meter Type
McCrometer flowcom FC100-00M 8 digits	3-wire reading. Firmware 2.4. Manufactured after 4/2015.	Propeller
ML255 battery powered register 8 digits	3-wire reading only. Firmware 5.09 or greater.**	Propeller
ML Series converter, AC powered 8 digits	3-wire reading only. Firmware 3.03 or greater.**	Propeller

Kamstrup

Register Type	Model	Meter Type
flowIQ 2100 4, 6 and 8 wheel	3-wire reading. Version C1.	Ultrasonic
flowIQ 2100 4, 6, and 8 wheel	3-wire and TouchCoupler version H1.**	Ultrasonic

Diehl

Register Type	Model	Meter Type
Hydrus 8 digits	3-wire support only.** Manufactured after 4/2018.	Ultrasonic

Zenner

Register Type	Model	Meter Type
PMN Nitro 01 4 wheel, 6 wheel	3-wire support only. Manufactured after 8/2015.	Multi-jet

Hersey/Mueller Systems

Register Type	Model	Meter Type
Translator	All meters that accept Translator 3-wire and TouchCoupler support, Sensus approved TR/PL lead.	Positive Displacement, Mag

*SmartPoint firmware version 1.2 and above only
**SmartPoint firmware version 1.7 and above only

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