



CITY COUNCIL AGENDA ITEM

REQUESTED COUNCIL MEETING DATE 12/05/06

SUBJECT: Sensus Metering System Base Radio with Flex Net

DEPARTMENT: Finance

RECOMMENDED MOTION:

Waiver of bid procedures enabling the City to acquire the Flex Net Metering System (radio water meter reading) from Sensus Metering Systems Inc.

SUMMARY:

Previously Staff brought forward for discussion at the 11/14/06 Council Meeting a proposal from Sensus Metering Systems for their Flex Net System, which is an upgrade for drive-by to fixed base radio water meter reading. That proposal is as outlined at that 11/14/06 meeting (see attached). Staff recommends that the Council waive bid procedures and authorize staff to proceed with this acquisition from Sensus. Funding was identified at that time.

ATTACHMENTS: Ordinance Resolution Budget Resolution

Other Support Documents/Contracts Available for Review in Manager's Office

DEPARTMENT HEAD

John A. Shelley, Finance Director

Date 11/22/06

FINANCE DEPARTMENT

Stella Intener
Approved as to Budget Requirements

Date 11/22/06

CITY ATTORNEY

Stella Intener
Approved as to Form and Legality

Date

CITY MANAGER

Approved Agenda Item For:

12/5/06

COUNCIL ACTION:

Indefinitely

Approved as Recommended

Disapproved

Tabled

Continued to Date Certain

Approved with Modification:



The City of Port Orange FINANCE DEPARTMENT

Memorandum

To: Kenneth W. Parker, City Manager

From: John A. Shelley, Finance Director

Subject: Monetary Benefit Derived from Fixed Net Radio Water Meter Reading

Date: November 20, 2006

At the City Council meeting held on November 14, 2006 the Fixed Net Radio Water Meter Reading Devices were discussed. In this discussion the City Council was interested in the monetary benefit of a fixed tower based radio water meter reading alternative. As you know this type meter reading is a fundamentally different radio read format. The City currently has about one third of its water meters read by radio device; however, it is recommended that as we go forward and also replace existing radio units that we use the new fixed net system. As was previously stated this fixed net system allows for a two way communication with specific water meters giving a variety of use benefits that will reduce the number of trips to and from individual residences.

There will be no immediate cash savings although this investment of less than \$100,000 will prevent and delay the hiring of new personnel in the future. Also, it will allow the expansion of our current utility system with a negligible impact on personnel needs. New personnel are currently not going to be required for at least another two years; however, the number of new meters related turn ons and turn offs and trouble shooting problem meters will probably require us to expand our current meter reading staff.

An entry level meter reader including fringe benefits and other personnel costs amount to \$31,800 per year. This along with the lease cost of a truck, and costs including uniforms and fuel, amount to an additional \$9,000. Total costs of approximately \$40,800. In addition the lease/finance fund would incur costs of \$18,000 for purchase of the new vehicle. Changing our direction to a fixed net meter reading system will prevent and delay the need for additional personnel. It is intended that existing personnel will still be needed in order to migrate from the old system and maintain and repair the new system. Again, our primary goal with this proposed meter reading system is to enhance customer service, enhance water conservation, and at the same time reduce long term costs.

Should you have any additional questions pertaining to this matter, please contact me.

Cc: Stella Gurnee, Comptroller
Bobbi Palmer, Purchasing Coordinator
Betty Barnhart, Customer Service Manager
Nancy Zuber, Meter Foreman



CITY COUNCIL AGENDA ITEM

REQUESTED COUNCIL MEETING DATE 11/14/06

SUBJECT: Proposal from Sensus Metering Systems.

DEPARTMENT: Finance Department

RECOMMENDED MOTION:

Acceptance of the attached proposal from Sensus Metering Systems and proceed with installation of the FlexNet System for net price not to exceed \$95,814.

SUMMARY:

During the past several months, City Staff has been in discussion with Sensus Metering Systems pertaining to the evolution of the City's water meter reading technology. During the past two decades the City has been converting to newer technology pertaining to water meter reading devices. Recently the City of Apopka has completed a test on the FlexNet water meter reading equipment. In summary, this equipment allows the City to mount radio signal receiving equipment on cell towers and receive water metering reading data on demand. This technology will allow the City to read water consumption at a specific address from City Hall. In the long run meter reading will evolve into a read by exception, trouble shooting problem meters, and system monitoring and maintenance.

Sensus has provided a proposal to maintain current pricing on this equipment; however, we will need to install two (2) Tower Gateway Basestations (TGB) and a regional network interface. This equipment along with installation and training after being offset by various credits would amount to a net acquisition price of \$95,814. It should also be noted that Sensus will help us with the transition of existing equipment by allowing a \$40 credit for each radio transmitter less than five years old, and help with the sale of the newer 520R Drive-by Transmitters, to nearby communities. The concept behind the sale is to recoup as much of our investment as possible and with the Sensus warranties in place the equipment is very marketable.

Staff believes that this is an acceptable proposal and will allow an effective evolution to new technology. Please note, we have acquired Sensus equipment as a sole source purchase primarily because of standardization and efficiencies gained. We continue to make this recommendation. Funding in 401-0500-536-64-00,

ATTACHMENTS: Ordinance Resolution Budget Resolution

Other Support Documents/Contracts Available for Review in Manager's Office

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|---------------------------|------------------------|------------------------------------|------|----------|
| DEPARTMENT HEAD | <i>John A. Shelley</i> | John A. Shelley, Finance Director | Date | 11/3/06 |
| FINANCE DEPARTMENT | <i>[Signature]</i> | Approved as to Budget Requirements | Date | L |
| CITY ATTORNEY | <i>[Signature]</i> | Approved as to Form and Legality | Date | |
| CITY MANAGER | <i>[Signature]</i> | Approved Agenda Item For: | | 11/14/06 |

COUNCIL ACTION: Approved as Recommended Disapproved Tabled Indefinitely
 Continued to Date Certain Approved with Modification:

October 11, 2006

Mr. John A Shelley,
Finance Director,
City of Port Orange
1000 City Center Circle
Port Orange, FL 32129

Dear John,

The purpose of this letter is to provide pricing for the City of Port Orange to upgrade from drive-by to fixed base radio with Flex Net. Port Orange has always used new technologies like TouchRead, drive-by RadioRead and now Flex Net to improve efficiency and service to its residents. As a long term business partner Sensus Metering Systems is committed to help you move forward and would offer the following:

- 1) All pricing for 520X Flex Net transmitters would be the same as the present 520R drive-by transmitters.
- 2) Any 520R drive-by transmitter that fails under warranty would be replaced with a 520X Flex Net transmitter under the existing terms of our nationally published warranty.
- 3) A credit of \$40.00 each would be offered for any working 505B or 505C drive-by transmitter that is two (2) to five (5) years old that the city would like to trade-in to Sensus.
- 4) Sensus would help Port Orange sell any 520R transmitters to neighboring utilities that are utilizing the drive-by technology and honor all warranties.

Page two.

5) There presently is a open credit of \$49,186.06 that Port Orange can use towards the purchase of any of the listed equipment.

6) The pricing for the:

Tower Gateway Base (TGB) Station is \$65,000.00 which includes installation up to three hundred (300') feet.

Regional Network Interface (RNI) is \$35,000.00 which includes software, two (2) days of training, FCC License and one (1) year of the maintenance agreement.

With the purchase of the TGB and RNI Sensus would rebate the City of Port Orange a credit of \$10,000.00 for the RNI and a credit of \$5,000.00 each per TGB. This would bring the net prices to the same as the City of Apopka.

Please let me know if you any questions or need any other information.

Sincerely,

Robert S. Lutz
District Manager



FlexNet System

SPECIFICATIONS

FlexNet

System Overview

The Sensus FlexNet System is a wide area Advanced Metering Infrastructure (AMI) system that provides the ability to read water, gas and electric meters with a common AMI platform. The FlexNet system is designed around the central concepts of Simplicity, Flexibility, and Reliability. The system supports one-way radio frequency (RF) transmission for water and gas meters, and offers two-way RF functionality for electric meters, including on-demand readings, remote disconnects/reconnects, and load shedding.

The system transmits using a patented (7-level FSK) RF modulation developed specifically for AMR/AMI applications. The system transmits on a primary use (unshared) licensed band in the 890-960 MHz spectrum. Due to licensed band operation, the FlexNet system can transmit at the highest power levels available with any AMR/AMI system (up to 2 Watts) and with a variety of transmission modes ("normal" mode, "buddy" mode, and "boost" mode). Use of licensed band also ensures that performance will not degrade over time due to interference from other systems and devices. The low noise floor of the licensed band and higher transmission power of the endpoints combine to provide the Flexnet system the highest range of any system on the market. The high power, various transmission modes, primary-use licensed band operation, and long range allow for the smallest infrastructure footprint in the industry. In addition, the water and gas meter endpoints provide four (4) transmissions per day with a twenty (20) year battery warranty. Hourly readings can be included in the four (4) daily transmissions. The endpoints can store hourly readings, and each transmission contains between 8-168 prior readings. This allows the system database to backfill any readings from transmissions that may be missed.

The Sensus FlexNet system is a "single-tier" system, meaning that readings are transmitted directly from the meter endpoint to one or more Tower Gateway Basestations (TGBs) which are usually miles apart from each other. No complex series of collectors are required to "store and forward" reading data due to the excellent network performance capabilities. Upon reaching the TGBs, the readings are sent immediately to the back-end software (RNI and MDM) via any available Ethernet connection (wired, wireless, Wi-Fi, fiber, frame relay, analog modem). Typical range from the endpoints to the TGB varies due to many factors (building density, topography and foliage), but reliable communications can be established between meter endpoint via one of the variety of transmit modes (established at installation time). The FlexNet system supports long range reliable transmission which can be achieved with minimal infrastructure. This in turn results in low overall maintenance costs. The utilization of primary-use licensed spectrum ensures that the system performance (value) will be protected for the long term from interference, which can severely degrade performance in license free ISM band or secondary use spectrum fixed base systems.

The back-end FlexNet software allows very easy interface to most Customer Information and Billing software packages. The Meter Data Manager (MDM) is accessed via an internet browser, which means that the FlexNet system does not require any special client software to be installed on user PCs. The Meter Data Manager (MDM) software can easily be configured to work with various billing system file formats without any reprogramming, offering compatibility with virtually every utility billing software package on the market. The web architecture allows multiple users to access the system locally or remotely, and provides the ability for Sensus to provide remote support if desired by the utility.

AMR/AMI Transmitters

The water and gas transmitters shall be capable of collecting readings from the meter on an hourly basis. The transmitter shall pass the reading data to the Tower Gateway Basestation (TGB) at least four (4) times per day. Each transmission shall contain the past 8-168 readings in order to provide redundancy. If a transmission is missed, the system is capable of recovering the missed reading information from the endpoint on the next transmission. After being transmitted from the meter endpoint, transmissions must be immediately received at the back-end software for review. No "storing and forwarding" of readings on collectors shall be acceptable. Low power endpoints originally designed for walk-by/drive-by applications shall not be acceptable due to low power and range capabilities, and undesirable quantity of required "collectors".

Electric meter endpoint operation shall allow true two-way RF operation, providing "on demand" reading and remote connect and disconnect capability.

The water transmitter shall be enclosed in a two-piece molded plastic housing capable of being installed through the meter or vault lid. The plastic housing shall incorporate a tamper resistant, waterproof connection technology. The electronics of the transmitter shall be hermetically sealed in a High Density Polyethylene (HDPE) enclosure that is waterproof and provides an operating temperature range of -30°F to 165°F (-34°C to 74°C). The pit set transmitter may be completely submerged in water for the life of the product without any internal damage or malfunction. The two-piece enclosure must contain the unit components including, HDPE enclosure, battery, and wire connections. The unit shall be available with TouchCoupler technology (or equivalent) that eliminates the need for wire connectors.

The water transmitter shall be a one-way device that transmits at a power level of up to two (2) Watts in primary-use licensed band in the 900 MHz spectrum. The transmitter shall also be required to transmit at least eight (8) reading digits from the encoded register in a resolution of at least 0.1 gallon or 0.01 cubic feet for meters up to 1 inch. Water transmitter must also have the ability to provide leak detection capability. Water transmitter must also provide the ability for field replaceable batteries.

The meter endpoints shall be FCC Part 90, 101, and 24 approved for licensed band operation, and communicate with the TGB using an RF modulation designed specifically for AMR/AMI applications. Furthermore, the modulation shall use CRC-32 error detection and Viterbi forward error correction scheme capable of recovering up to one bit error out of every three bits. The receiver will have a sensitivity of -109 dBm or better for mPass mode operation in order to provide adequate range for minimal infrastructure.

Tower Gateway Basestation (TGB)

The Tower Gateway Basestation(s) (TGB) shall receive and process the readings from the meter transmitters, and convey the data immediately to the Regional Network Interface (RNI) for storage in the database where it can be viewed by utility personnel. The TGBs shall provide for redundant, overlapping coverage of meter endpoints. No "collectors" using "store and forward" technology as the primary method of operation shall be acceptable. Each Tower Gateway Basestation or pole top collection device shall provide a live, two-way Ethernet connection with the back-end computer system (RNI). The TGB must be supplied with an eight (8) hour battery back-up in the event of primary power loss. In the event of a power loss greater than eight (8) hours, the Flex-

SPECIFICATIONS

FlexNet System

Net system shall be able to recover missed readings by backfilling prior readings sent with each transmission from the endpoint.

The TGB shall have the ability to maintain at least one primary and one secondary data link to the back-end system (RNI). Both primary and secondary data links shall provide for two-way Ethernet (TCP/IP) communications. Both the primary and secondary data links can be any form of Ethernet chosen by the utility (wired, wireless, Wi-Fi, fiber, frame relay, leased line, POTS, etc.). System must be capable of operating at a data rate of 33.6 BAUD or greater between the TGB and RNI. The TGB shall have the ability to store up to 30 days of meter reading data from all meter endpoints in its service area in the event of extended failure of the data links to the utility office. If communication links cannot be re-established within 30 days, the system shall allow a laptop computer to be connected to the TGB to recover reading data.

The system shall be "single-tier", meaning that the endpoint shall transmit directly to a Tower Gateway Basestation (TGB) with a live, two-way Ethernet link to the back-end system in the utility office. Repeaters or "Buddy Boxes" may be used, but must provide for instant forwarding of the reading data to a Tower Gateway Basestation (TGB). No "storing and forwarding" of data shall be allowed on tower or pole-top collectors as primary mode of operation.

Regional Network Interface (RNI)

The RNI is the network backbone of the system. It receives and stores the reading data from the TGBs, and presents it to the user via the Meter Data Manager (MDM) software. The RNI also monitors system health of the TGB(s). The two servers consist of the Network Controller (NC) and the Utility Information Platform (UIP). The Network Controller (NC) maintains communications with the TGB(s) and routes the data to the Utility Information Platform (UIP). If the Network Controller loses communications with the TGB(s), the TGB(s) will automatically store up to thirty (30) days of metering data. The TGB automatically downloads the stored meter reading data to the Network Controller (NC) once communications are re-established.

The Utility Information Platform (UIP) collects the raw meter data from the Network Controller (NC). The UIP un-compresses the meter data and stores the most current data. The UIP also uses the redundant information contained in each transmission to fill in any missed meter readings from prior transmissions. The FlexNet system can store up to 13 months of meter reading data in conjunction with the Meter Data Manager (MDM) software.

The operating platform used in the Regional Network Interface (RNI) shall consist of multiple servers, a Network Controller (NC) and a Utility Information Platform (UIP). The Network Controller (NC) shall use the Mandriva (Linux) operating system, and the Utility Information Platform (UIP) shall use the Windows 2003 Server operating system. Both servers shall use a RAID 1 hard drive array for redundancy. The UIP shall maintain at least sixty (60) days of data on the dual redundant hard drives. The Regional Network Interface (RNI) servers, in conjunction with the Meter Data Manager (MDM) software, shall maintain a 13 month deep history of meter reading data. This data shall be available for review at any time via the Meter Data Manager (MDM).

Meter Data Manager (MDM)

The Meter Data Manager (MDM) shall act as a middleware between Customer Information Systems (CIS) and the Sensus FlexNet Regional Network Interface (RNI).

The MDM shall have the ability to accept data from the CIS system and export data back to the CIS system using various outputs in a simple flat text. These formats are user configurable and managed within the MDM software without custom programming in either the MDM or the CIS system.

The MDM shall provide management reports for the data collected by the FlexNet system. The MDM system and management reports shall have the ability to identify all of the following (among others): all meters read, all unread meters, High/Low meter usage, possible leak conditions, hourly, weekly, monthly, bi-annual and yearly consumption with selectable date ranges. The MDM shall provide graphing.

Performance Warranties

In evaluating bid proposals, warranty coverage will be considered. The vendor shall be required to state its warranty and/or guarantee policy with respect to each item of proposed equipment. The procedure for submitting warranty claims must also be approved.

As a minimum, the electronics shall be warranted for twenty (20) years from the date of shipment for defects in materials and workmanship. Battery warranty shall be twenty (20) years from date of factory shipment. For additional information on warranties refer to Sensus publication G-500.

System Maintenance and Support

In addition to warranty periods, vendors are required to supply information on required or optional maintenance programs beyond the warranty period for both hardware and software. Features of those programs shall also be included with any additional charges such as hourly rate for on-site and/or remote support. The locations of and procedures for obtaining such support shall be stated.



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Sensus FlexNet

Tower Gateway Base Station

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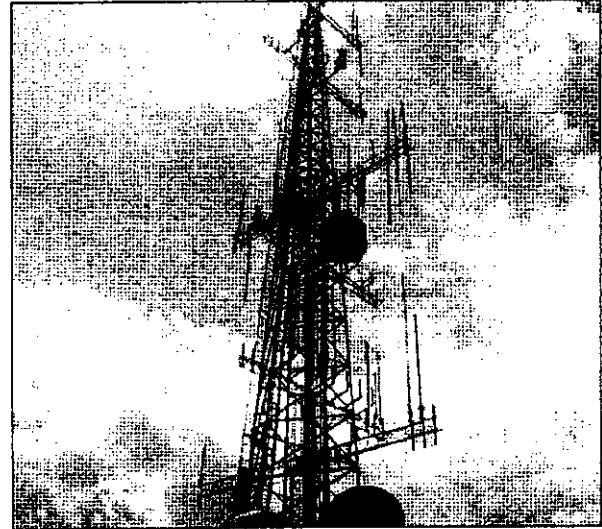
Description

Application: The Tower Gateway Base station (TGB) is a one-way application and receives transmission from the endpoints in predetermined intervals. TGB's are strategically located within an area to insure coverage requirements are achieved. The units can be housed on typical communications towers and/or on a utility's property should they meet the criteria for installation. Once the data is received at the TGB, the information is then forwarded to the Regional Network Interface (RNI) typically located at the utility.

Operation: The TGB was designed to insure data integrity and reliability. The TGB microprocessors employ multiple levels of access control to ensure that the only authorized users access the system. Access, authentication and authorization is controlled by a username and password restricted requirements. Users attempting to access the TGB will be required to submit a username and password using the Secure Shell Login (SSL). The secured login capability at the TGB site allows the end user to access redundant stored data should the communications link to the Regional Network Interface (RNI) breakdown and the customer requires data. In addition, when data is received at the TGB, the data is wrapped with a timestamp associated with the receive time, Time of Intercept (TOI) and then forwarded. Each packet is uniquely identified with a customer mask combined with the TGB identification. Data stored on the TGB remains encrypted and the encryption keys are never stored on the same equipment as the data.

The features incorporated in the TGB provide the industries most reliable data collection system. Incorporated in the design, the system provides assurance that data will not be lost and can also be held for extended periods of time. One of the primary features of the TGB is its ability to store thirty (30) days worth of data. This feature provides the ability for the end user to access the tower should an extended outage occur. The TGB also incorporates other alternative communication methods in the chance that the primary communication link is disabled. In addition, the TGB provides an eight (8) hour battery backup in case the primary source of power is interrupted. In the case of multiple TGB sites in the coverage area, neighboring TGBs can accept and process data if required.

TGBs are strategically placed throughout the service territory to maximize coverage and minimize infrastructure requirements. Through the process known as propagation modeling, the locations of TGBs are determined. By incorporating numerous factors such as power output, tower heights, and terrain propagation modeling can predict infrastructure requirements and present a clear picture prior to deployment of the coverage provided by the TGB. This process maximizes coverage with the least amount of infrastructure compared to other systems operating at lower power output levels.



Specifications

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|--|--|
| DIMENSIONS | 22" W x 25-1/2" D x 48" H |
| WEIGHT | 240 lbs |
| RF DATA RATE | 8 Kbps Normal Mode |
| FREQUENCY RANGE | Input 901 - 902 MHz |
| MODULATION | Seven Level FSK |
| NETWORK CONTROL CENTER COMMUNICATIONS | TCP/IP |
| SENSITIVITY | -121 dBm Normal Mode |
| COMPLIANCE | FCC CFR 47: Parts 15, 24, 90, 101 Compliant Licensed Operation Industry Canada (IC) RSS-119, RSS-134 |
| POWER SUPPLY | 120 V grounded line at 10' Maximum |
| TRANSCIVER OPERATING TEMPERATURE | -40° C to +85° C -40° F to +185° F |
| ANTENNA REQUIREMENTS | External Omni Directional |



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SELECTED SENSUS DISTRIBUTOR



Water Meter Transmitter

Model 520X – Pit Set Unit

FlexNet

Description

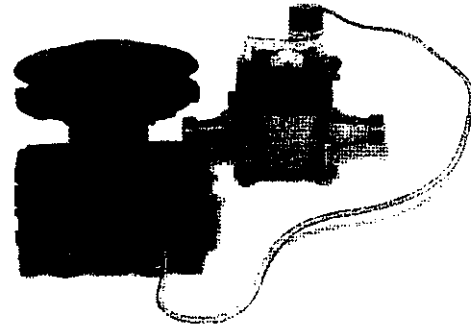
Application: Sensus FlexNet transmitter model 520X is a pit set radio signal device which permits off site meter reading via radio signal in a pit set or vault environment. The model 520 is designed to maximize performance in an RF environment. In order to achieve maximum performance, the model 520 must be installed through the pit lid. The FlexNet transmitter interfaces with any compatible absolute encoder-equipped utility meter and operates in conjunction with a Sensus FlexNet system. The Sensus FlexNet System eliminates a number of meter reading problems such as lockouts, curbside reading estimates, estimated bills and errors associated with manual meter reading methods.

The FlexNet transmitter is available in one and two port models. This feature provides enhanced cost effective AMR where multiple meter installations exist.

TouchCoupler Design: TouchCoupler utilizes the patented Sensus inductive coupling meter reading system (TouchRead) to communicate with its encoder. This allows for easy upgrade from Sensus TouchRead to FlexNet applications. Since the TouchRead system only requires two wires to communicate, the TouchCoupler unit enables customers who have only two wire connections to their meters the ability to utilize the same wire instead of installing a three wire connection. The TouchCoupler design provides a fast, efficient and reliable connection – the best available in the marketplace today. The TouchCoupler design minimizes installation time, which results in a cost effective solution.

Operation: The FlexNet transmitter receives input from the meter register and remotely sends the data to the Tower Gateway Base (TGB) at predetermined intervals. TGB's are strategically placed in the utility service area to ensure maximized reception. The readings are instantaneously transmitted to the Regional Network Interface (RNI). Data is not stored, so information is immediate from time of transmission. The FlexNet system provides unmatched reliability by using expansive tower receiver coverage of metering end points, data/message redundancy and fail over back up provision's and operation on FCC licensed exclusive-use (unshared) spectrum. The standard transmitter is programmed to transmit four times a day.

Powerful Transmission: The most significant advantage of the module is its powerful two watt transmitter. The strong signal minimizes the number of TGB's and lowers your deployment costs. By providing long range transmission capability in conjunction with minimal infrastructure requirements, the overall life cycle costs are minimized.



Specifications

| | |
|---------------------------------|--|
| SERVICE | Pit set installation interfacing utility meter to Sensus FlexNet System. Unit fits in 1-3/4" diameter hole in pit lid. Can attach to meter pit lid thickness of 1-3/4" |
| PHYSICAL CHARACTERISTICS | 4.43" W x 5.09" H x 4.6" D |
| WEIGHT | 1 lb (0.4536 Kg.) |
| 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 in conjunction with a hybrid layer capacitor (HLC) |
| APPROVALS US: | FCC CFR 47: Part 90, Part 24D, Part 101C, Part 15 Licensed operation |
| CANADA: | Industry Canada (IC) RSS-134, RSS-119, RSS-210 |
| OPERATING TEMPERATURE | - 30° F to +165° F - 34° C to + 74° C |
| OPTIONS | Dual or single port availability; TouchCoupler only, wired only, TouchCoupler and wired combination options available, (TouchCoupler connection available only with Sensus meters) |
| INSTALLATION ENVIRONMENT | 100% condensing, water submersible |
| COMPATIBILITY | TouchCoupler and Wired Version: Sensus ECR11 and ICE water registers Wired Version Only: Neptune ARB VI (ProRead) |
| WARRANTY | 20 years – Based on four transmissions per day Refer to Sensus G-500 for warranty. |



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