

Attachment A

BUDGETARY ESTIMATE

Quote From:

Hydro Specialties Co.

14435 S. Center Point Way
Bluffdale, UT 84065

Phone: 801-562-9130
Fax: 801-562-9140

Quote # 43747866

Date: 10/09/19

Terms: Net 30 days

Freight: F.O.B. Bluffdale, Utah

Taxes: If applicable, are not included

Ref. No:

Quote To:

Clarkston Town AMR Upgrade
c/o: Scott Archibald
Sunrise Engineering

Project:

Scope: upgrade reading equipment for the
Badger Orion CE Reading System

Item	Quantity	Description	Unit Price	Amount
1	1	Beacon Cloud Services Engagement Fee... Includes: Setup and Activation of Portfolio, Software Licensing	2,300.00	2,300.00
2	1	Beacon Mobile Read Annual Subscription License...	900.00	900.00
3	1	Beacon Mobile User Login License (1st Year Included)...	-	-
4	1	Training & Setup of Beacon Mobile System...	1,300.00	1,300.00
5	1	Orion CE Mobile Receiver w/ Antenna & Cables	3,696.00	3,696.00
		** Annual Renewal of Item 2 is \$900.00		-
		** Annual Renewal of Item 3 is \$360.00		-
		** Mobile Hosting Service Units at No Charge for Year 1		-
		** Mobile Hosting Service Units are \$0.06/endpoint/month		-
		<u>Optional:</u>		-
6.		Orion LTE-M Cellular Endpoint... > cell endpoint is compatible with current meters & registers.	129.80	-
		** if cellular is an option, we should have a 1 hour work meeting to discuss options & costs to combine both technologies.		-
		** Cellular Hosting Service Units are \$.89/cell endpoint/month		-
			Sub total	\$ 8,196.00
			Discount	
			Tax	
			Total	\$ 8,196.00

Notes:

- Pricing effective 30 days from quote date
- Computer will be furnished by the city; either a Windows 10 laptop or tablet to be connected to Item 5 (Orion CE receiver).

Authorization:

Name: Jonas Welch

Date: 10/09/19

Signed:



Badger Meter

ORION® Water Endpoints

Cellular LTE-M Endpoint

DESCRIPTION

The ORION® Cellular LTE-M endpoint is an innovative, two-way water endpoint for smart water applications. The endpoint utilizes existing IoT (Internet of Things) cellular infrastructure to efficiently and securely deliver meter reading data to the utility via the reliable cellular network.

The Cellular endpoint is a member of the time-tested ORION family of products from Badger Meter, designed for maximum flexibility. Since 2002, the ORION product family has provided comprehensive Advanced Metering Analytics (AMA) for interval meter reading and data capture using both one-way and two-way communications.

FUNCTIONALITY

Operation: The Cellular LTE-M endpoint communicates with the encoder and captures 15-minute interval read data and meter status information. The endpoint then automatically broadcasts the information, including endpoint status information, via the cellular network to BEACON® AMA. The endpoint is designed to call in four times each workday and features a configurable schedule that enables utility customers to select call-in times that best support their processes.

Activation: All ORION Cellular LTE-M endpoints are shipped in an inactive, non-transmitting state. The Badger Meter IR Communication Device can be used to activate the endpoint and verify the encoder connection. Successful endpoint function can be confirmed through a web app demonstrating that communication has been verified to both the encoder and the network.

Alternatively, the endpoints offer a Smart Activation feature. After installation, the endpoint begins broadcasting data when the encoder senses the first usage of water. No field programming or special tools are required.

Broadcast Mode: The Cellular LTE-M endpoint broadcasts fixed network reading data through the secure cellular network within the service area. Based on the results of cellular coverage analysis, there are primary and secondary carrier options to support full network coverage. The endpoint also transmits a mobile message to facilitate troubleshooting in the field.

Data Storage: The endpoint stores 42 days of 15-minute data.

Output Message: The Cellular LTE-M endpoint broadcasts its unique serial number, meter reading data, and applicable status indicators. As an advanced data security measure, each message is securely transported to the BEACON AMA software only via private network and never over the public internet.



APPLICATION

Configurations: The Cellular LTE-M endpoint is a multi-purpose endpoint that can be deployed in indoor, outdoor and pit (non-metal pit lid) applications. The electronics and battery assembly are fully encapsulated in epoxy for environmental integrity. The endpoint is available with a connector assembly for ease of installation.

Meter Compatibility: When attached to a Badger Meter High Resolution Encoder, the Cellular LTE-M endpoint is compatible with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies, and with E-Series® Ultrasonic, E-Series™ Ultrasonic Plus, and M-Series® Electromagnetic flow meters.

Encoder Compatibility: The Cellular LTE-M endpoint is suitable for use with Badger Meter High Resolution Encoders as well as the following Badger Meter approved three-wire encoder registers that have a manufacture date of 2005 or newer, are programmed into the AMR/AMI three-wire output mode, and have three-wires connected: Honeywell® InVISION encoder and evoQ4 meter (encoder output); Master Meter® Octave® Ultrasonic meter encoder output; Metron-Farnier Hawkeye; Mueller Systems 420 Solid State Register (SSR) LCD; Neptune® ProRead, E-Coder® and ARB-V®; and Sensus® Electronic Register encoder (ECR) and ICE.

SPECIFICATIONS

Dimensions	5.125 in. (130 mm) (H)
	1.75 in. (44 mm) Diameter at top
	2.625 in. (W) x 2.875 in. (D) at base
	67 mm (W) x 73 mm (D) at base
Broadcast Network	Primary LTE-M cellular network, NB-IoT (Narrow Band-Internet of Things) Mobile backup frequency is FCC-regulated 902...928 MHz frequency hopping modulation
Operating Temperature Range	
• Storage, Meter Reading and Mobile Backup	–40...60° C (–40...140° F)
• Cellular Communications	–20...60° C (–4...140° F)
Humidity	0%...100% condensing
Battery	One (1) lithium thionyl chloride D cell (nonreplaceable)

FEATURES

Smart City Ready	Future-proof technology
Communication Type	Two-way
Application Type	Control/Monitor
Endpoint Communication	Configurable call-in schedule, up to four times each workday
Reading Interval Type	15-minute
Encoder Compatibility	Absolute
Fixed Network Reading	✓
Cut-Wire Indication	✓
Encoder Error	✓
Low Battery Indication	✓
Remote Clock Synchronization	✓
Firmware Upgrades	✓

Construction: All ORION LTE-M Cellular endpoints are housed in an engineered polymer enclosure with an ORION RF board, battery and antenna. To ensure long-term performance, the enclosure is fully potted to withstand harsh environments and to protect the electronics in flooded or submerged pit applications.

Wire Connections: ORION Cellular LTE-M endpoints are available with in-line connectors (Twist Tight® or Nicor®) for easy installation and connection to compatible encoders/meters. The endpoints are also available with flying leads for field splice connections. Other wire connection configurations may be available upon request.

License Requirements:	ORION Cellular LTE-M and LTE endpoints comply with Part 15, Part 22, Part 24, and Part 27 of the FCC Rules. No license is required by the utility to operate an ORION meter reading system. This device complies with Industry Canada license exempt RSS standard(s).
Transportation:	WARNING: The operation of transmitters and receivers on airlines is strictly prohibited by the Federal Aviation Administration. As such, the shipping of radios and endpoints via air is prohibited. Please follow all Badger Meter return and/or shipping procedures to prevent exposure to liability.
Warning:	To reduce the possibility of electrical fire and shock hazards, never connect the cable from the endpoint to any electrical supply source. The endpoint cable provides SELV low voltage limited energy power to the load and should only be connected to passive elements of a water meter register.
Caution:	The endpoint batteries are not replaceable. Users should make no attempt to replace the batteries. Changes or modifications to the equipment that are not expressly approved by Badger Meter could void the user's authority to operate the equipment.

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www.badgermeter.com

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Badger Meter

BEACON® Advanced Metering Analytics

Mobile Solution

OVERVIEW

The BEACON® Advanced Metering Analytics (AMA) mobile solution from Badger Meter is built on a century of water metering experience, combining our intuitive BEACON AMA software suite with our proven ORION® communication technologies to prepare you for the future.

SOFTWARE APPLICATIONS

BEACON Advanced Metering Analytics (AMA)

The BEACON AMA software suite brings greater visibility and utility management control. With tools beyond meter reading, BEACON AMA software offers targeted Advanced Metering Analytics in a secure hosted platform. The innovative software puts metering data to work with easy-to-use data tools for the utility to increase efficiency in day-to-day utility operations and address demands for actionable intelligence.

- Customizable dashboards to deliver information in a format matched to utility requirements
- Ability to set unique alert conditions to define and monitor exceptions
- Automatic software upgrades
- Integration with your utility systems: billing, work order, inventory, Customer Relationship Management (CRM) and Geographic Information Systems (GIS)

BEACON AMA Field Application Suite

The BEACON AMA Field Application Suite handles field assignments and data collection with ease and efficiency.

BEACON AMA Field Director

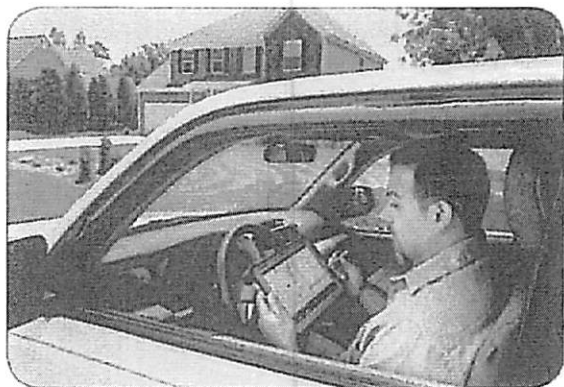
The BEACON AMA Field Director web-based application is designed for utilities to manage meter reader field assignments and monitor the read collection process. Dispatchers can update meter reading assignments and monitor their completion from the office.

ORION Mobile Read

ORION Mobile Read is a browser-based application designed for utility meter route reading. Meter reading field assignments and reading data are automatically synchronized with the cloud-based BEACON AMA software anytime an Internet connection is established, so meter readers do not have to come into the office to receive assignments or deliver reading data.

ORION Endpoint Utility

ORION Endpoint Utility software is a client-based troubleshooting application for programming and quick read of ORION Migratable (ME), Fixed Network (SE) and Classic (CE) endpoints. The software can also be used to extract and view historical interval data from endpoints with data profile functionality using IR or RF technology for ORION SE/ME/CE or SE/ME endpoints respectively.



HARDWARE

The BEACON AMA mobile solution features high-powered ORION meter endpoints and a data collector that is both mobile and rugged to deliver precise daily meter information. The mobile solution is comprised of the following hardware:

ORION Endpoints

Compatible with BEACON AMA, ORION endpoints are integral elements of the mobile solution.

- ORION ME endpoints are two-way water endpoints for mobile applications. ORION ME endpoints are easily upgraded from mobile to fixed network data collection without rolling a truck or reprogramming the endpoint, preparing you for the future.
- ORION CE endpoints are one-way water endpoints designed for mobile meter reading.

Trimble® T10 Tablet

The Trimble T10 Windows®-based tablet is built for highly mobile operations like meter reading. The T10 tablet operates in every environment—from intense heat and sunlight, to pouring rain and freezing temperatures. Together with an ORION mobile transceiver kit or ORION mobile receiver kit, the T10 tablet is compatible with the BEACON AMA mobile solution, including ORION Mobile Read and the ORION Endpoint Utility software. Refer to the T10 hardware specifications on next page or download the Trimble T10 Tablet datasheet (<http://download.trimblewater.com/t10.pdf>) for more information.

ORION Mobile Transceiver, Receiver

The ORION FHSS (frequency hopping spread spectrum) mobile transceiver and mobile receiver are portable devices designed for use with ORION software applications. The transceiver and receiver both feature a plug-and-play design that can be easily maintained and operated. When connected, the ORION mobile transceiver supports RF collection of meter reading data from ORION ME and SE endpoints, while the ORION mobile receiver supports ORION CE endpoints. Also refer to the *ORION ME Mobile Transceiver* and *ORION CE Mobile Receiver Application Data Sheets*, available in the Resource Library at www.badgermeter.com.

SECURITY

BEACON AMA is ISO 27001 certified and SOC 2 examined for security, availability and confidentiality.

TECHNICAL SUPPORT AND TRAINING

Configured for the utility, the safe and secure hosted BEACON AMA software suite provides utilities with regular updates, long-term support and maintenance. Comprehensive training is provided at the time of system deployment. To maintain best practices, a library of online videos and options for web-based training and support are also available. Once deployed, our technical support specialists may be contacted by phone, email and web to provide ongoing, utility-friendly support. Additionally, Badger Meter offers extended customized training to further enhance user expertise.

TECHNICAL REQUIREMENTS

BEACON AMA and Field Director

Developed as hosted software platforms, BEACON AMA and Field Director are cloud-based software applications accessed through a standard web browser. User logins provide secure access. Field assignment data is synchronized with ORION Mobile Read on the mobile collection device through a wireless or wired Internet connection. Internet access is required.

BEACON AMA supported web browsers include the latest and next previous major releases of Google® Chrome, Microsoft® Edge, Mozilla® Firefox®, Microsoft® Internet Explorer® (IE 11 only); and Apple® Safari®.

Field Director requires the latest version of Google Chrome.

ORION Mobile Read

ORION Mobile Read is a browser-based application that requires the latest version of Google Chrome and runs on the Trimble T10 tablet, or on a Utility-supplied tablet/laptop, which meets or exceeds the specifications listed in the table below. An ORION mobile transceiver or mobile receiver kit is required for collection of mobile meter reading data. Secure user logins limit access to field assignments.

Tablet/Laptop Specifications

NOTE: The Trimble T10 tablet offered by Badger Meter meets or exceeds all the Utility-Supplied Tablet/Laptop Requirements listed below.

Operating System	Trimble T10 Tablet Specifications	Utility-Supplied Tablet/Laptop Requirements
Memory	Windows 10 IoT Enterprise 8 GB RAM	Windows 10 Pro (recommended), Windows 7 Pro (minimum*) 8 GB RAM (recommended), 4GB (minimum)
CPU	Intel Core i7	Intel Core i7 (recommended), i5 or i3 (minimum), or equivalent
Storage	512 GB SSD	128 GB, SATA or SSD
Connectivity	Bluetooth® 4.0 LE; Wi-Fi 802.11ac, 2.4 GHz/5GHz dual band; 4G LTE multi-carrier (Utility-supplied data plan required to activate)	Bluetooth® 3.0; Intel WiFi; Gobi or other 3G or LTE wireless (Utility-supplied data plan)
GPS (required for mapping functions)	On-board NMEA com-based GPS capability	On-board NMEA com-based GPS capability; External GPS receiver may be used if it meets system requirements
Display	10.1 in., 10-point capacitive multi-touch; Active pen support; daylight readable; LED backlight, scratch-resistant screen	Touch-capable; daylight readable
Audio	Built-in microphone and speaker; Audio Jack 3.5mm	Built-in microphone and speaker; Audio Jack 3.5mm
Camera	5.0 MP (rear-facing) and webcam	—
Battery	Long lasting lithium-ion battery pack, 11.4V, 5400 mAh, hot swappable	Long lasting lithium-ion battery pack
USB port	One (1) USB port	One (1) USB port**
Ruggedized	MIL-STD-810G certified; IP65-certified	Rugged device recommended
Accessories	Digital pen with tether, Hand strap, Screen protectors (x2), A/C charger***	—

*Limited compatibility and support for Windows 7 Pro operating system. Depending on age of device, upgrade to Windows 10 Pro may be required.

**Use of Utility-supplied USB hub or second USB port is required for simultaneous connection and usage of ORION ME Mobile Transceiver Kit and ORION CE Mobile Receiver Kit.

***A limited number of T10 tablet accessories are available from Badger Meter. Refer to the Trimble T10 Tablet Parts List available at www.badgermeter.com for more information.

ORION Endpoint Utility

ORION Endpoint Utility is a client application that runs natively on a Windows-based device with Windows 7 or higher. An IR communication cable is required for IR programming functions, and an ORION mobile transceiver or mobile receiver kit is required for performing RF quick reads, or two-way RF communications (ORION ME/SE endpoints only).

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NEPTUNE

TECHNOLOGY GROUP INC.

1600 Alabama Highway 229
Tallahassee, AL 36078
www.neptunetg.com

Quote Provided by: **METERWORKS**

No. of Pages: 1

Date: 10/08/19

Prices Valid Until: _____

PRICE QUOTATION

Customer

Company: Clarkston

Address: _____

Attn: Scott Archibald

Phone: (435)213-4448

Email: _____

Project

Job/City: Clarkston

Bid Number: _____

Bid Date: _____

Quantity	Product Description	Unit Price	Total
Neptune Package Deal			
250	R900 Pit Radio Unit (This is to connect to a Badger ADE Register) I usually don't recommend this, if the meter is over 10 years old	\$ 119.68	\$ 29,920.00
Neptune Reading Equipment			
1	MRX 920 Mobile Reader Complete (Normally \$7,000)	\$ 4,000.00	\$ 4,000.00
1	Neptune Bell Clip Receiver	No Charge	
1	Tablet (Android or Apple)	No Charge	
1	Neptune 360 Software <u>Annual Fee</u> (This software is hosted by Neptune)	\$ 2,500.00	\$ 2,500.00
1	Neptune 360 Software Training and Implementation	No Charge	
This system is good for 20 years. Bodies have a lifetime warranty, Electronics on meters have a 20 year warranty (10 years full / 10 years prorated)			
* This is a savings of \$10,000 from what the equipment would cost you without buying the meters.			
TOTAL			\$ 36,420.00

Notes

This is a complete meter reading package. The only item that is required is a transfer file between the billing system and our reading software. This is required for any meter reading system you purchase.

FOB Clarkston

TERMS NET 30

DELIVERY Meters are in stock and Reading equipment is approx 4-6 weeks.

METERWORKS

Name Ken Sheffield

Title Sales Representative

Address 1199 West 850 North

Centerville, UT, 84014

Phone (801) 309-6612

Email ken.sheffield@meterworks.net

WE APPRECIATE THE OPPORTUNITY
TO PROVIDE PRICING ON THE
PRODUCTS LISTED AND LOOK
FORWARD TO SERVING YOU



NEPTUNE

TECHNOLOGY GROUP INC.

1600 Alabama Highway 229

Tallahassee, AL 36078

www.neptunetg.com

Quote Provided by: **METERWORKS**

No. of Pages: 1

Date: 10/08/19

Prices Valid Until: _____

PRICE QUOTATION

Customer

Company: Clarkston

Address: _____

Attn: Scott Archibald

Phone: (435)213-4448

Email: _____

Project

Job/City: Clarkston

Bid Number: _____

Bid Date: _____

Quantity	Product Description	Unit Price	Total
Neptune Package Deal			
250	5/8" x 3/4" T-10 Meters w/ R900i Integrated Radio and 6' Antenna	\$ 262.60	\$ 65,650.00
Neptune Reading Equipment			
1	MRX 920 Mobile Reader Complete (Normally \$7,000)	\$ 4,000.00	\$ 4,000.00
1	Neptune Bell Clip Receiver	No Charge	
1	Tablet (Android or Apple)	No Charge	
1	Neptune 360 Software <u>Annual Fee</u> (This software is hosted by Neptune)	\$ 2,500.00	\$ 2,500.00
1	Neptune 360 Software Training and Implementation	No Charge	
This system is good for 20 years. Bodies have a lifetime warranty, Electronics on meters have a 20 year warranty (10 years full / 10 years prorated)			
* This is a savings of \$10,000 from what the equipment would cost you without buying the meters.			
This is Neptune's Package Deal. It is a complete meter reading system.			
TOTAL			\$ 72,150.00

Notes

This is a complete meter reading package. The only item that is required is a transfer file between the billing system and our reading software. This is required for any meter reading system you purchase.

FOB Clarkston

TERMS NET 30

DELIVERY Meters are in stock and Reading equipment is approx 4-6 weeks.

METERWORKS

Name Ken Sheffield

Title Sales Representative

Address 1199 West 850 North

Centerville, UT. 84014

Phone (801) 309-6612

Email ken.sheffield@meterworks.net

WE APPRECIATE THE OPPORTUNITY
TO PROVIDE PRICING ON THE
PRODUCTS LISTED AND LOOK
FORWARD TO SERVING YOU



A PRODUCT SHEET OF NEPTUNE TECHNOLOGY GROUP

R900® Wall or Pit Meter Interface Unit (MIU)

Build Onto Your Existing Technology Investment

As part of Neptune's R900® System, the R900® meter interface unit (MIU) was designed for flexibility. Like its fellow system components, the R900 MIU works seamlessly with prior generations of equipment. At the same time, it allows your utility to incorporate innovations as you need. A single radio frequency unit that can transmit meter reading data using any reading method – mobile or fixed network – the R900 MIU never has to be reprogrammed. That makes migrating to new technologies simple whenever your utility is ready to implement them. When it's time to add new features or functionality, you can do it at your own pace, confident of continual system support without stranded assets.

Conserve Resources, Simplify Operations

With the pressures your utility faces, Neptune knows you don't have time, personnel, water, or revenue to waste. That's why we designed the R900 MIU and the rest of the system for ease of use. In addition, the R900 MIU's interleaved, high-power, 1 Watt fixed network message reduces infrastructure costs while allowing reading in any mode – without separate reading systems, site visits, or any type of MIU reconfiguration. The R900 MIU provides fixed network transmission capability at all times, while it also transmits readings for walk-by or mobile methods. Making operations even easier, the user-friendly, intuitive R900 System design requires only minimal training, providing you flexibility to adapt to changes in your workforce and reallocate staff to different departments as needed.

Reduce Complaints, Delinquencies, And Write-Offs

Neptune's R900 MIU greatly improves access to meter readings, while delivering detailed consumption profile information as well as alerts for leak or backflow, helping your utility more proactively identify and resolve customers' questions. This accurate, timely data can be used to head off high bill complaints, reduce delinquent payments, and eliminate write-offs.

Because detailed data logging information from the last 96 days is always available, just waiting to be transmitted by the R900 MIU when needed, personnel can take care of a customer's issue then and there, in a single site visit. Not only can the data boost efficiency and customer service, but it will also help your utility make better-informed decisions going forward.



KEY BENEFITS

Facilitates Migration to AMI

- 1 Watt fixed network message reduces infrastructure costs
- Interleaved mobile and fixed network messages facilitate migration without changing the "modes" in the MIU

Reduces Non-Revenue Water

- Provides leak history/diagnostics
- Enables proactive leak notification
- Provides hourly consumption data
- Improves meter reading accuracy
- Eliminates estimated reads

Identifies Potential Theft

- Tamper detection
- Reverse flow detection
- Identifies significant periods of zero consumption

Simplifies Installation Process

- Easy to install/no programming required
- Reduces labor cost

Technical Specifications

Electrical Specifications:

- MIU power: Lithium battery with capacitor

Transmitter Specifications:

- Two-way MIU
- Transmit period (interleaved mobile and fixed network messages):
 - Standard mobile message every 14 seconds at 100 mW
 - Standard fixed network message every 7½ minutes at 1 Watt
- FCC verification: Part 15.247
 - Transmitter channels: 50; frequency-hopping, spread-spectrum
 - Channel frequency: 910 to 920 MHz
- Encoder register reading interval:
 - Every 15 minutes
- Data logging interval:
 - 96 days of hourly data

Environmental Conditions:

- Operating temperature:
 - -22°F to +149°F (-30°C to +65°C)
- Storage temperature:
 - -40°F to +158°F (-40°C to +70°C)
- Operating humidity:
 - 100% condensing

Antennas:

- Wall MIU: standard internal antenna
- Pit MIU: standard through-the-lid antenna
 - 18" Coax
 - 6' Coax
 - 20' Coax

Encoded Register Compatibility:

- Neptune ARB® V, ProRead™, and E-CODER®
- Sensus ECR II, ICE, iPerl, Electronic Register and OMNI
- Hersey/Mueller Translator
- Badger ADE and HR E|LCD
- Elster/AMCO InVision (Sensus protocol version)

Options

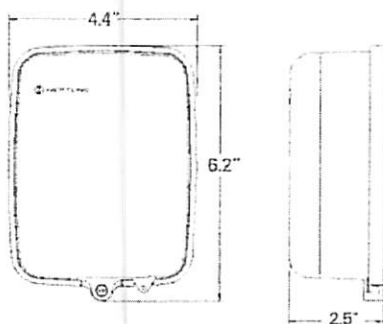
System Compatibility:

- Handhelds with R900® Belt Clip Transceiver - mobile RF
- MRX920™ - mobile RF
- R900® Gateways - fixed network RF

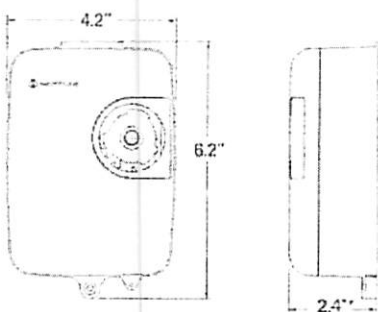
Warranty

20 years (10/10); refer to specific Warranty Statement

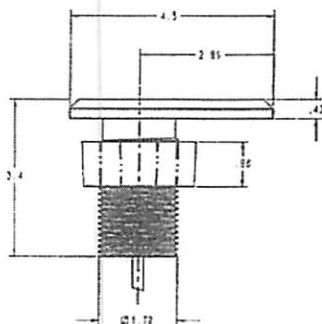
Dimensions



R900 Wall MIU



R900 Pit MIU



R900 Pit Antenna

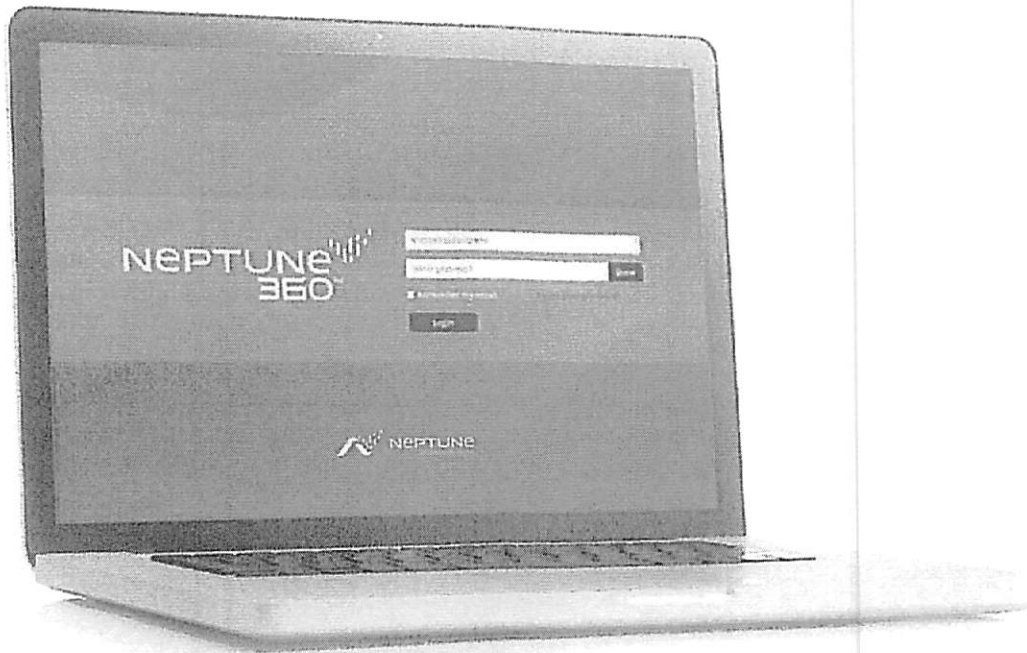


#winyourday
neptunetg.com

Neptune Technology Group
1600 Alabama Highway 229
Tallahassee, AL 32307
800-633-8754 f 334-283-7293

Neptune® 360™ Data Management Platform

A Product of Neptune Technology Group



Turn Information into Action

Data is just data unless you can use it effectively.

To go beyond basic meter reading and billing,

your utility needs tools that provide a deeper

understanding of the data you collect to turn it

into meaningful information for a Smart Water

Network. The Neptune[®] 360[™] data management

platform was designed to provide as much data as

your utility needs, while helping you make sense

of it all — empowering faster, more informed

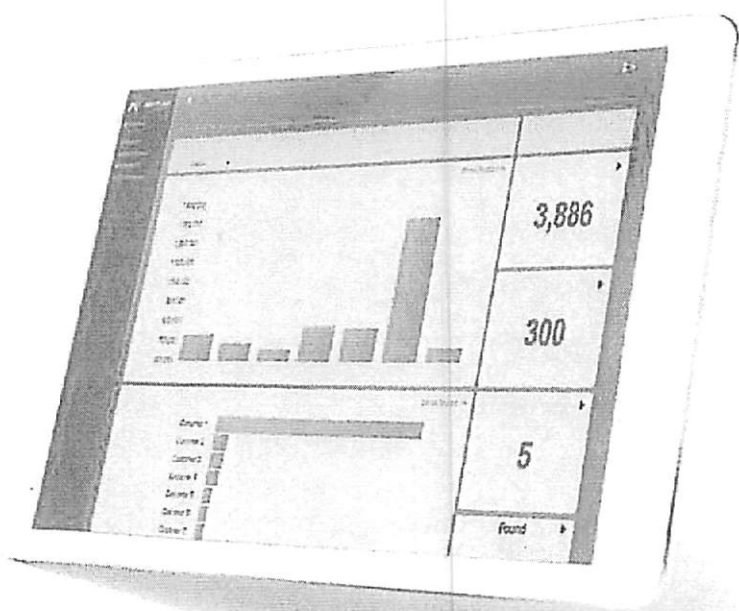
decisions. Analyze data quickly and easily with

software tailored for the needs of water utilities.

Putting Your Data in View

Having the data is one thing, seeing the data and making sense of it is another. Neptune 360 delivers an intuitive, user-friendly design, making the data clear and easy to interpret. Examining your entire AML network using system-wide Key Performance Indicators and geographical views assists with identifying areas of concern and finding ways to maximize operational efficiencies.

Quickly access a dashboard view of your largest water consumers, providing you with information needed to take action. Analysis of individual trends and usage patterns helps resolve customer service calls with confidence. Detailed reporting of consumption activity, potential leaks, and reverse flow will keep you ahead of issues that could impact your utility's revenue.



Lift Your IT Burden with a Cloud-Based Solution

Boost utility efficiency with Neptune 360 delivered as a service. No longer install servers or perform upgrades. All that is needed is an Internet browser. Just log on to access anywhere at any time.



A True Sense of Security

Ease your security concerns and stay focused on the business of water. Continuously-monitored Neptune 360 operates from a world-class data center, providing the highest level of security, redundancy, and disaster recovery services.

Share Information Across the Smart Water Network

Your management, maintenance, customer service, water quality, and other departments all need fast, easy access to information. Share and leverage actionable data captured by Neptune 360, empowering

collaboration and helping predict impacts on your utility. The platform seamlessly integrates meter data, event data, and alerts directly with third party work order systems, customer portals, hydraulic modeling applications, and other systems through Application Programming Interfaces (APIs).



\$

An Application that Grows as You Grow

From mobile meter reading today, to moving to an AMI network tomorrow, the same software platform is utilized. Apply trend analysis in rate structure planning and usage initiatives. The modular-based platform makes it easy to turn on new features as your needs evolve, bringing you critical data to proactively plan for tomorrow.



Trust the Data

Data accuracy and dependability matter. By implementing the highest-level architecture, Neptune ensures data integrity with processes and tools to maintain quality from the meter to the platform as part of routine business operation.

NEPTUNE³⁶⁰

Analyze and share meaningful data with a platform that empowers utilities. Actionable Insights help you achieve your goals and objectives.

METERS MATTER

Stream critical actionable data right into Neptune³⁶⁰.



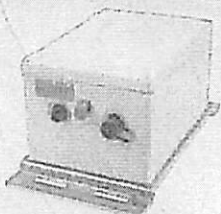
WALK-BY DATA

Sync collected data easily.



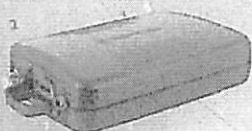
FUTURE PROOF AMI

Connect AMI network data.



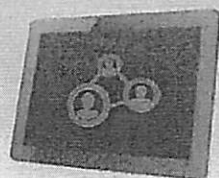
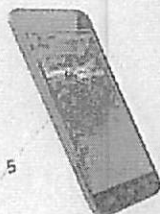
MOBILE

Incorporate mobile data collection.



BRING YOUR OWN DEVICE

Eliminate specialized devices and communicate efficiently.



THIRD PARTY SOFTWARE

Link data with third party applications (such as GIS and ESRI).



CUSTOMER RELATIONSHIPS

Streamline utility data management and provide exceptional customer service.



+ ACT QUICKLY

+ PLAN FOR THE FUTURE

+ MANAGE GROWTH



Neptune® 360™ Benefits

- Neptune-managed system with no installation required
- Cloud-based solution in a world-class data center with the highest level of security and disaster recovery/redundancy
- 24/7 software system monitoring
- Retain data ownership in a system designed exclusively for water utilities
- Integrate and access Data Analytics across departments — helping your utility achieve goals and objectives
- Identify potential leaks, excessive consumption, and reverse flow to proactively resolve issues faster
- Migrate easily from mobile to fixed network
- Aid Non-Revenue Water reduction, conservation, and rate planning
- A single platform across devices that can be accessed anywhere at any time

Specifications

Neptune 360

- Google Chrome and Microsoft Edge web browsers supported
- When using touch screen monitors, Neptune recommends Microsoft Edge web browser for optimal viewing and performance

Neptune 360 Mobile

- Neptune 360 Mobile supports Android, iPhone, and iPad devices running the following operating systems:
- Android: 5.1.X Lollipop, 6.0.X Marshmallow, 7.0.X Nougat, 7.1.X Nougat, 8.1.X Oreo
- iOS: 10.3.1 and higher, 11

Bring Your Own Device to Field Operations

Save money and time with Neptune 360 Mobile — use your utility's existing Android or iOS cell phones or tablet devices to perform meter reading. Pair with an R900™ Belt Clip Transceiver or MRX920™ Mobile Data Collector and expand your field device options when performing re-reads, reading monthly routes or even responding to high water bill complaints.



96

days of hourly
historical
consumption



Neptune 360 Mobile provides direct communication via wireless from the field without the need to bring your mobile device back into the office, yielding data on demand for more efficient customer service. Other application capabilities include RF Test, Off-Cycle Read, and Data Log to capture 96 days of hourly historical consumption — addressing customer issues faster.



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NEPTUNE
TECHNOLOGY GROUP

NGO™ APP



ANALYZE AND PRESENT DATA AT THE SOURCE

Simplify the collection of meter reading data and turn it into actionable information with the NGO™ app, available for your Android™ phone or tablet in the Google Play™ store. This app enables your personnel to make the most of their time while in the field, providing on-the-spot analysis and presentment capabilities. Part of the enhanced R900® System, NGO leverages the detailed, accurate metering data from the E-CODER® absolute encoder register. Analyze that metering data at the source to improve your customer service as well as identify leaks and reverse flow.

AUTOMATE AND OPTIMIZE YOUR FIELD OPERATIONS

Neptune makes it easy for your utility to optimize workforce and operational efficiency. Running on any common Android phone or tablet, NGO enables your field techs to collect detailed data logging information when needed during on-site customer visits. They can immediately generate graphs of a customer's water usage patterns to show exactly when they used more water than usual or when a probable continuous leak began somewhere in their house. The graphs also provide all E-CODER alerts to further aid in troubleshooting usage anomalies. Our NGO app is easy to install and use, and immediately puts AMI functionality literally in the palm of your hand – including 96 days of hourly interval data as well as flags for leaks, tamper, and reverse flow straight from the meter.

PROVIDE PROACTIVE, CONFIDENT CUSTOMER SERVICE

The NGO app helps your utility save time and money, especially when it comes to saving truck rolls by allowing faster response in the field. It puts the power of Neptune's E-CODER technology and advanced analysis into more of your utility personnel's hands.

With simplified access through the app to accurate, timely information, your personnel can take care of a customer's water-related issue or answer a question then and there, in a single site visit. Quickly, easily, and confidently, they can inform customers of high water consumption and identify leaks and other problems much earlier, cutting weeks and possibly months in the discovery and saving customers a great deal of money in the process. All this proactivity can head off high bill complaints, reduce delinquent payments, and eliminate write-offs.

KEY BENEFITS

- Analyze data at the source and improve customer service
 - View data logging graphs and data in the field
 - Share data logging graphs and data with the homeowner to address high bill complaints
 - Test read R900s in the field or before installation to obtain reading and E-CODER flag events
- Increased Efficiency
 - Address high bill complaints and provide customer service while on site
 - Obtain off-cycle reads
 - Easy-to-use and intuitive app

SPECIFICATIONS

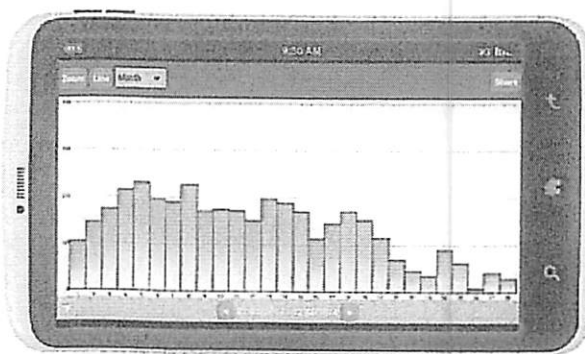
- Required Components
 - Android phone or tablet running Android version 4.1 to 7.1.1*
 - Google Play account
 - R900® Belt Clip Transceiver
- Functions
 - RF Test (free)
 - Allows the user to read either all R900s in range or a specific R900 MIU ID
 - Data logging (in app purchase)
 - Retrieve 96 days of hourly consumption interval data
 - Graph/analyze the data logging interval data
 - Share the graph and/or data with the homeowner via email
 - Off-cycle reads (in app purchase)
 - Obtain a meter read from a specific calendar date within the past 96 days
 - Pressure logging** (in app purchase)
 - Receive current pressure reading
 - Track pressure over time
 - Graph history and identify periods of high/low pressure

*Requires NGO v1.7 or later

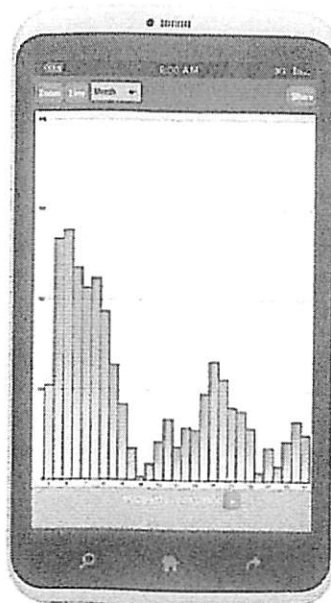
** Requires Vivax-Metrotech Pressure Monitor



From here the user can select one of the three different functions of the app – RF Test, Data Log, or Off Cycle.



From here the user can analyze usage by month, week, and day as well as share the graph via email with the homeowner.



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A PRODUCT SHEET OF NEPTUNE TECHNOLOGY GROUP

MRX920™ Mobile Data Collector and MX900™ Software

Make Reading Success and Efficiency Automatic

Reliable, accurate, and field-proven, Neptune's MRX920™ mobile data collector – along with its MX900™ meter routes and mapping software – has helped water utilities across North America streamline, automate, and increase operational efficiencies. As part of Neptune's R900® System, the MRX920 helps transform data into actionable information that helps identify hidden causes of loss and optimize operational efficiency.

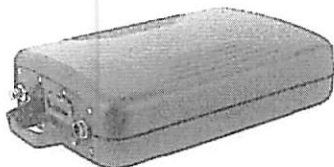
Strapped to the seat of your utility vehicle, the MRX920 reads up to fifty (50) meters simultaneously as your meter reader cruises down the streets. And in conjunction with the routes-integrated/Esri®-powered MX900 mapping, meter reading is automatic, fast, and effortless for your meter readers, accurate with less manpower deployed for your utility.

The MRX920 comes with Bluetooth capability, so your meter readers have the option of wirelessly updating routes and uploading the latest readings to the host system remotely and in near real-time without having to return to the office^{1,2}.

Additionally, Neptune has ported its well-established R900 radio frequency (RF) architecture to the latest release of MRX920 using software-defined radio (SDR) technology. This means all Neptune data collection systems have a common, core code base which translates to faster availability of new features and functionalities for your utility.

Make Migration to Other Technology Simple

The R900 System is designed to easily accommodate and support past generations of meters, encoder registers, and data collectors – while at the same time giving your utility the flexibility to incorporate future innovations as needed. The MRX920 is no exception, providing seamless compatibility with all generations of R900 MIUs. Its industry-leading performance can save days or even weeks for your meter reading routes, and new features within its MX900 software, such as Esri-powered mapping and wireless mobility, make valuable data available in real time as you read your system. Feel free to phase in these new features and equipment at your own pace, secure in the knowledge that Neptune will support your future needs without leaving you with stranded assets.



KEY BENEFITS

Reduced Meter Reading Time

- Reads up to fifty (50) meters simultaneously

Simple Access to Actionable Data

- Esri-powered GIS maps¹ show meter reading and flag status
- Wireless mobility – communicate meter reading data back to N_SIGHT® in real time¹
- User-configurable advanced filtering shows you only the information you need
- Data logging and off-cycle reads without physical access to the meters²

Analyze Data at the Source

- View data logging graphs in the field and share with homeowner to address high bill complaints
- Identify high/low audit status failures
- Receive leak, reverse flow, and days of no flow alerts from E-CODER®-equipped meters

¹ Optional MX900™ Mapping and Mobility module required. Mobile computing device recommended and not included.

² Cellular or Internet connection required.

Save Your Utility – and Your Customers – Time and Money While the R900 System always allows your utility to migrate forward to implement fixed network data collectors, or backward to use RF technology for individual off-cycle readings or data logging, using the MRX920 and MX900 software as a part of your system makes for fast and simple access to information that can provide effective resolutions to customers' water-related issues. With detailed consumption data in hand while working in the field, along with proactive alerts of leaks and backflow conditions, you can enhance customer service. In the process, you can even preempt high bill complaints, reduce delinquent payments, and eliminate write-offs.

Specifications

Physical Specifications

- Dimensions: 8" (width) x 3.15" (height) x 11" (length excluding connections and handle)
- Weight: ~5 lbs

Electrical Specifications

- Power consumption: < 1A
- Power supply: 12V DC via vehicle power source adapter

Date	Reading	Consumption
02/11/2016	314303.0	Consumption 37.7
02/16/2016	314322.0	Consumption 18.6
02/20/2016	314357.1	Consumption 35.1
02/26/2016	314354.3	Consumption 22.2
02/27/2016		
02/28/2016		
02/29/2016		
03/01/2016		
03/02/2016		
03/03/2016		
03/04/2016		
03/05/2016		
03/06/2016		
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03/30/2016		
03/31/2016		



Neptune recommends the following mobile computing hardware specifications for optimal performance:

- 12.1" XGA (800 x 600) minimum
- 89-key keyboard
- Operating System:
 - Windows® 7 Professional 32 & 64
 - Windows® 8 Professional 32 & 64
 - Windows® 8.1 Professional 64
 - Windows® 10 Professional 64
- .Net Framework 4.5 or higher
- Processor: Intel Pentium 1.7 Ghz or faster processor
- Memory: 1 GB minimum
- Communication
 - Internal 802.11 b/g wireless LAN
 - Windows Wireless Connection Manager (if Bluetooth connection to the receiver is desired, Bluetooth v2.1 + EDR required)
- USB 2.0
- GPS receiver (required for the mapping and mobility module)
- Minimum of 2 GB of available hard drive space

Environmental Conditions

- Operating temperature: -4°F to +122°F (-20°C to +50°C)
- Storage temperature: -40°F to +185°F (-40°C to +85°C)
- Operating humidity: 5 to 95% non-condensing relative humidity



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A PRODUCT SHEET OF NEPTUNE TECHNOLOGY GROUP

E-CODER®)R900i™

Protect And Expand Your Technology Investments

Neptune® designed the R900® System to make it easy for your utility – installation, everyday use, and expansion for the future without stranded assets. The E-CODER®)R900i™ combination absolute encoder register/radio frequency meter interface unit (RF MIU) is a perfect example of all of the above. Not only does it work with past generations of meters and meter reading systems, but seamless integration is built into this single-unit endpoint itself, providing two-way communications of advanced metering data. The E-CODER®)R900i's interleaved mobile and high-power fixed network messages allow for simple migration from mobile to fixed network reading without site visits or reprogramming.

Streamline Operations And Manage Resources

In addition to eliminating the need for programming, the E-CODER®)R900i has no external wires, making installation easier, faster, and less costly; plus it reduces potential vandalism or tamper. As with the rest of the R900 System, the design of the unit is intuitive and user-friendly so that minimal training is required for operation. It's designed to help manage time, labor, and other resources. The radio frequency transmission of the E-CODER®)R900i can save your utility significant amounts of time in terms of both meter reading and billing, and provide flexibility to reallocate personnel to different tasks or departments depending on your changing workforce needs.

Do More With Detailed, Actionable Data

The types of data your utility can generate through the E-CODER®)R900i can take you far beyond a simple meter reading for a monthly bill. Hourly consumption profile information over an account's last 96 days, along with alerts for leak or backflow, help to proactively identify and resolve customer issues – heading off high bill complaints, reducing delinquent payments, and eliminating write-offs. Using Neptune® 360™ host software, your utility can leverage detailed data from the E-CODER®)R900i to balance water produced versus water consumed, group accounts for District Metered Area analysis, and track and manage Non-Revenue Water. From increasing efficiencies to pinpointing possible tamper or water theft to aiding customer service, the data supplied by the E-CODER®)R900i can help your utility make better, more confident decisions.



KEY BENEFITS

Facilitates Migration to AMI

- 1 Watt fixed network message reduces infrastructure costs
- Interleaved mobile and fixed network messages facilitate migration without changing the "modes" in the MIU

Reduces Non-Revenue Water

- Provides leak history/diagnostics
- Enables proactive leak notification
- Provides hourly consumption data
- Improves meter reading accuracy
- Eliminates estimated reads

Identifies Potential Theft

- Tamper detection
- Reverse flow detection
- Identifies significant periods of zero consumption

Simplifies Installation Process

- Easy to install/no programming required
- No external wires
- Reduces labor cost
- Reduces potential wire vandalism and damage

Technical Specifications

Electrical Specifications

- MIU power: Lithium battery with capacitor

Transmitter Specifications

- Two-way MIU
- Transmit period (interleaved mobile and fixed network messages):
 - Standard mobile message every 14 seconds at 100 mW
 - Standard fixed network message every 7½ minutes at 1 Watt
- FCC verification: Part 15.247:
 - Transmitter channels: 50; frequency-hopping, spread-spectrum
 - Channel frequency: 910 to 920 MHz

- Encoder register reading interval:
 - Every 15 minutes
- Data logging interval:
 - 96 days of hourly data

Environmental Conditions

- Operating temperature:
 - 22°F to +149°F (-30°C to +65°C)
- Storage temperature:
 - 40°F to +158°F (-40°C to +70°C)
- Operating humidity:
 - Inside set - 0 to 95%, condensing
 - Pit set - 100% submersible

Materials

- Register housing:
 - Inside set: plastic polycarbonate
 - Pit set: roll-sealed copper shell

- Lens:
 - Inside set: plastic
 - Pit set: glass

Antennas

- Standard internal antenna
- Optional through-the-lid antenna:
 - 18" Coax
 - 6' Coax
 - 20' Coax

Options

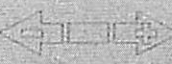
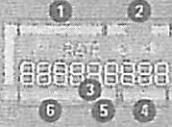
Compatibility

- Available for all sizes and makes of current Neptune meters
- Handhelds with R900* Belt Clip Transceiver - mobile RF
- MRX920™ - mobile RF
- R900* Gateways - fixed network RF

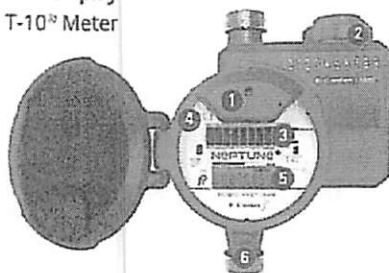
Units of Measure: U.S. Gallons, Cubic Feet, Imperial Gallons, Cubic Metres

Warranty

20 years (10/10); refer to specific Warranty Statement

	FLOW INDICATOR Shows the direction of flow through the meter: ON Water in use. OFF Water not in use. Flashing Water is running slowly. Reverse flow. Forward flow.
	LEAK INDICATOR Displays a possible leak: OFF No leak indicated. Flashing Intermittent leak indicates that water has been used for at least 50 of the 96 15-minute intervals during a 24-hour period. On Continuously Indicates water use for all 96 15-minute intervals during a 24-hour period.
RATE 	RATE OF FLOW Average flow rate is displayed every twelve seconds on LCD display. LCD DISPLAY Nine-digit LCD displays the meter reading in billing units of measure: U.S. gallons, cubic feet, Imperial gallons, or cubic metres. ① E-CODER basic reading/customary 6-digit remote reading ② Customary sweep hand digits ③ E-CoderPLUS reading (8-digit remote reading) ④ Testing units used for diagnostics ⑤ Extended reading units ⑥ Customary billing units

- ① Internal Antenna
- ② Optional Antenna Port
- ③ Solar Panel
- ④ Date of Manufacture
- ⑤ LCD Display
- ⑥ T-10® Meter



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R900® Belt Clip Transceiver

Automate Measurement to Activate Operational Efficiency

As part of the Neptune® R900® System, the R900® Belt Clip Transceiver (R900 BCT) is your utility personnel's partner in mobile meter reading and in-field customer support and is now iOS compatible.

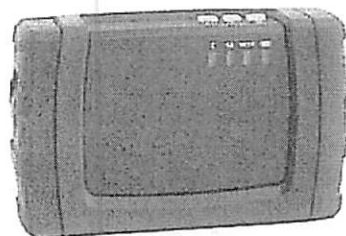
The R900 BCT's two-way communications to the R900® MIU eliminate meter access issues and speed up retrieval of valuable data logging information – up to 96 days of historical hourly consumption data from an individual account. In addition, its exceptional radio frequency (RF) throughput reduces meter reading time, especially in high-density environments. Field personnel can even read R900s while performing maintenance or other tasks when taking advantage of the R900 BCT's unattended operations mode. These automated features ensure you collect accurate data that can be turned into meaningful information – to help improve accuracy, identify hidden causes of loss, and optimize the efficiency of your operations.

Move Ahead with Backward Compatibility and Forward Innovation

The R900 BCT, as with the rest of the Neptune R900 System, works with past generations of equipment while remaining flexible to incorporate innovations as needed. The R900 BCT maintains support to read previous generations of R900 MIUs yet introduces powerful software-defined radio (SDR) technology to support the new advanced two-way features of the R900 System. Now, the R900 BCT is capable of reading electric, bubble-up ERT® devices and processing SCM or SCM+ message files that these ERT devices transmit. This gives utilities the freedom of equipping with just the R900 BCT to read both water and electric meters.

So, go ahead and phase in new features and equipment at your own pace with confidence that Neptune will support your future needs without leaving you with stranded assets.

Present Consumption Data in the Field for Proactive Customer Service
Simplified access to critical information means your utility can provide even more proactive customer service. Pairing the R900 BCT with a handheld device or a mobile device running the Neptune NGO™ app, your personnel can maximize their efficiency in the field, with the flexibility to perform impromptu service calls and address customer service issues on-site without a separate truck roll¹. With the data literally in hand, they can share data logging graph information with homeowners. This on-the-spot, on-site presentment of how much water they used and when, helps head off customer complaints regarding high water bills, reduce delinquencies, and avoid write-offs.



KEY BENEFITS

Increases meter reading efficiency

- Increased RF throughput capabilities which reduce reading time in high-density R900 environments
- Two-way communications to R900 MIU which reduces time required to retrieve data logging information
- Unattended operations mode allows utility personnel to read R900s while performing other non-meter-reading-related job functions

No stranded assets

- Compatible with all generations of R900 MIUs
- Probe compatibility with Advantage and Pocket ProReader
- Connects via Bluetooth to Trimble Nomad or Trimble Ranger for meter reading
- Connects via Bluetooth to Android or iOS mobile devices for in-field customer support
- Software-defined radio technology enables the R900 BCT to be updated for compatibility with future products

KEY BENEFITS CONTINUED

Reads ERT devices

- Compatible with Itron electric ERT technology (bubble-up ERTs only)
- Processes SCM and SCM+ message format

Analyze data at the source with either a smart phone or tablet via NGO app

- Test-read R900s in the field or before installation to obtain reading and E-CODER[®] flag events
- Retrieve 96 days of hourly interval data logging information
- View graph of data logging intervals in the field
- Share data logging graph information with homeowner to address high bill complaints

*Contact Neptune Customer Support for the latest device and operating system compatibilities.

Specifications

Communication: Bluetooth 2.1 or later and USB

Handheld Software Compatibility: N_SIGHT[®] version 4.7 or later

Power Supply

- Rechargeable lithium-ion battery pack – 5000 mAh capacity
- Field-replaceable, recommended replacement every 2 years

Memory: 4GB SD card

Device Compatibility

- Trimble Nomad 900B/900LE/1050B/1050LE, Trimble Ranger 3, and Android/iOS mobile devices¹

Indicators

- Four LEDs identify Bluetooth communication, RF status, mode status, and battery status

Dimensions

- Height: 3.58" (9.1 cm)
- Width: 1.66" (4.22 cm)
- Length: 5.75" (14.6 cm)

Weight: 1.1 lbs. (499g) including rechargeable battery

Temperature Range

- Operating: -4°F to +122°F (-20°C to +50°C)
- Storage: -40°F to +185°F (-40°C to +85°C)

Accessories

- Spare battery
- Spare battery charger
- Belt clip
- SD card
- 12V USB vehicle power cable

Warranty

- One-year comprehensive warranty
- Hardware maintenance contracts available

Receiver Channels: 50

Number of Simultaneous Channels: 8

Approvals

- FCC Class B
- IC

Mode Overview

	Normal	Unattended Operations	USB Mass Storage
Bluetooth Pairing to Devices	Required	N/A	No. Used for firmware updates and transfer of data via USB from SD card to N_SIGHT [®] host PC
Trimble Nomad 900B/900LE/ 1050B/1050LE Compatible	Yes	N/A	*Advantage/Pocket ProReader and data logging not supported in Android NGO app.
iOS App Compatible	Yes	N/A	
Android App Compatible	Yes*	N/A	
R900 Compatible	Yes	Yes	
Advantage / Pocket ProReader Compatible	Yes	No	
Data Logging Compatible	Yes	No	
SD Card Data Storage	Yes	Yes	



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