
CONDENSED WATER CATALOG



NEPTUNE
TECHNOLOGY GROUP

ARB[®] | UTILITY
MANAGEMENT
SYSTEMS[™]

TODAY'S WATER UTILITIES ARE FACED WITH EVER-INCREASING PRESSURES

— on their water supply, their efficiency, their workforce, their infrastructure, and their bottom line. But every problem has a solution. Neptune knows, because **our people have answers.**

Where do we get those answers? For one, from experience. We have a long history of water industry firsts under our belt with constant innovation. Our answers also come from listening. Neptune utility customers know that they can approach us with a challenge and that we will take the time to look at that challenge from all angles and recommend the best solution from our portfolio of products and systems. Whatever solution your utility seeks from Neptune, the answer will be specifically designed to meet your utility's needs.

MANAGE YOUR DATA

TODAY'S UTILITIES HAVE ACCESS TO MYRIADS OF DATA.

But it's crucial to make all that data work for you, and not the other way around. Neptune's Automatic Meter Reading (walk-by and drive-by) and Advanced Metering Infrastructure (fixed network) systems empower your utility to not just simplify data collection, but also to analyze data at the source and turn it into actionable information for every department.

The E-Coder® absolute encoder register is an essential part of a smart water network, analyzing detailed usage data at the meter in 15-minute increments to flag leaks, backflow, and days of no flow. The R900® System provides detailed consumption usage data along with the E-Coder flags. N_SIGHT™ software can graph individual account consumption history, making these consumption anomalies visible to your utility personnel and your consumers. Neptune's advanced analytics help reduce cost of operations, manage water conservation initiatives, reduce system losses and Non-Revenue Water, and resolve customer questions and issues more proactively.

ADOPT TECHNOLOGY AT YOUR OWN PACE

How can your water utility protect present investments in technology while building onto those investments as you need, *at your own pace*? Neptune has the people who have the answers, providing practical solutions that address your utility's individual business needs.

Neptune has long been committed to helping our utility customers adopt the most advanced technologies without stranding assets. The

R900 System provides more opportunities than ever to maintain backward compatibility while enabling forward innovation.

With additional features and expanded functionality, it's never been easier for your utility to pick and choose components within a common system. Mix and match AMR (walk-by or drive-by) with AMI technologies. Neptune's N_SIGHT software suite allows each component to work together as a complete system. Which of the system's enhanced features your utility chooses to deploy, as well as when, are purely business decisions as your needs change.



OPTIMIZE YOUR UTILITY OPERATIONS

When you work with Neptune's AMR and AMI systems, you'll automate and redesign processes to improve system monitoring, boost asset performance, and help your workforce be more efficient in their jobs, saving your utility time and money. Our intuitive system design reduces training time, and our automated features ensure that the data you collect is accurate. As a result, your utility can realize increased billing process efficiency and reduced billing errors.

That's just the beginning. Neptune's systems provide the foundation that you can build on, going far beyond basic meter reading and billing to maximize efficiency throughout your utility. For instance, the technology

providers that comprise Neptune's Connected Utility Partnership Program™ make it simple to communicate analyzed data across departments and leverage the knowledge of your personnel. By sharing timely, critical data, you can reduce operational expenditures across the utility, reduce bad debt costs, and improve long-term planning to better manage future capital costs.

Optimize your water utility efficiency. Satisfy customers who've come to expect more transparency and accountability. Conserve water resources. And increase your utility's financial viability. All by turning data into meaningful information – Neptune's answers for effective utility management.



Neptune's Connected Utility Partnership Program™

INFORMATION INTO ACTION

At Neptune, we know that data is just data unless you can act on it. To become a smart water utility, you need to go beyond basic meter reading and billing. Your utility needs tools that provide a deeper understanding of the data you collect. Our software is designed to remove barriers to information and translate it into action across your utility, helping to simplify operations, improve productivity, and provide more proactive customer service.

N_SIGHT™ software suite is comprised of three modules designed to work together to address your meter reading, data storage, and analytics needs. N_SIGHT™ host is the basis for mobile AMR; N_SIGHT™ PLUS host is used for fixed network AMI; and N_SIGHT™ IQ is a meter data warehouse, consumer portal, and analytics application that can be used with N_SIGHT and/or N_SIGHT PLUS.



N_SIGHT™ HOST MODULE

By streamlining data collection, simplifying operations, and enabling more proactive response time, Neptune's intuitive N_SIGHT host module allows your utility to do more with less, providing the flexibility to reallocate staff to different functions or adapt to changes in your workforce over time. The software works in walk-by or mobile reading modes, while turning the data into meaningful information that helps create a smart water network across your utility.

- Support walk-by and mobile AMR modes simultaneously
- Graph 96 days of hourly historical data log consumption
- Generate standard and customizable reports
- Unattended operation
- Easy to install and use
- Leverage E-Coder®PLUS data for more proactive customer service
- Leverage flexibility to reallocate staff or adapt to workforce changes
- Data encryption, secure login process, and active directory integration



N_SIGHT™ PLUS HOST MODULE

With Neptune's N_SIGHT PLUS host module, it's easy to collect accurate data, analyze it, share it across departments in your utility, and act upon it. The easily customizable software leverages data for advanced analytics, determining what action(s) needs to be taken and pushing this information to the appropriate area of your utility. Perform time-synchronized reads that help track and manage Non-Revenue Water. Analyze customer usage profile data to resolve disputes as well as support water conservation initiatives. And act on immediate priority alarms to more proactively address leaks and backflow events.

- Supports fixed network AMI
- Group accounts to create virtual districts
- Review KPIs on a dashboard screen for the entire system
- View graphical/tabular representations of consumption data
- Perform diagnostics for individual meters or groups of meters
- Set and receive priority alarm notifications for leaks or backflow events
- Identify high consumption early to preempt bill complaints and eliminate write-offs
- Generate advanced reports including high/low, backflow, and even custom reports
- Utilize Esri®-powered, map-based GIS solutions
- Balance water produced against water consumed
- Perform virtual disconnects with and without usage
- Share data with other utility systems using connected utility APIs
- Advanced reporting and analysis engine powered by SAP
- Data encryption, secure login process, and active directory integration

N_SIGHT™ IQ INTELLIGENT DATA AND ANALYTICS – STORE, ANALYZE, AND INFORM

N_SIGHT IQ helps your utility turn AMI, CIS, and other data into actionable information. Providing a fully-hosted, cloud-based solution, the application reduces your infrastructure costs as well as your need for IT resources. To make management and exploration of the data more efficient, including account-history-based forecasting, N_SIGHT IQ provides up to ten years of online real-time data storage and data analysis capabilities. The software avoids the expense of servers, reduces the need for IT support, and offers virtually unlimited power and scaling capabilities. As Software-as-a-Service (SaaS), it's automatically and instantaneously updated. There's no need for costly upgrades and retraining of personnel. Store, Analyze, Inform.



- Communicate critical information directly to your utility customer
- Identify historic trends for better budgeting and planning
- Retain up to 10 years of detailed historical consumption data
- Group similar accounts down to the neighborhood level to compare consumption
- Utilize advanced data analysis and reporting and share it across your utility
- Enable consumers to better monitor and manage their water consumption using optional web portal
- Weather data is synchronized against interval usage
- Cut down your call load as well as costly truck rolls to investigate anomalies
- Avoid infrastructure costs by using cloud-based platform
- Data encryption, secure login process, and active directory integration

SMART METERS



E-CODER® SOLID STATE ABSOLUTE ENCODER

A true absolute encoder, the E-Coder® is the foundation of a smart water meter. In addition to all the features of a basic encoder register, when the E-Coder is connected to an R900® RF MIU, it provides value-added PLUS features – leak, tamper, and reverse flow detection. Utility software applications can use E-CoderPLUS information in billing, customer service, and operational reports. Providing 8-digit readings (absolute 9-digit meter readings on its display) and resolution down to 1/10th of a gallon, the E-Coder's accuracy and reliability form a solid foundation on which to build and expand an AMR or AMI system. The E-Coder is available in two different configurations for specific applications – inside set and pit set.

- Battery-independent metrology
- True leak detection (15-minute interval calculations w/leak-state indication over the previous 35 days)
- Proactive leak notification on customer bills
- No-flow and reverse-flow flag indicators by account
- Large, easy-to-read LCD display
- Rate-of-flow on display
- Tamper detection and meter diagnostics
- Proactive response to potential fraud scenarios
- Proactive meter maintenance
- Reduced water loss and maximum revenue generation
- Compatibility with probe receptacles, R900 RF MIU, handheld, mobile, and fixed network systems



MACH 10® ULTRASONIC METER

The MACH 10® is Neptune's newest water meter, offering solid state metrology with a rugged, lead free bronze maincase. The high-resolution measurement of the MACH 10 allows you to accurately capture extremely low flow rates. The MACH 10 features no moving parts, so there is no opportunity for accuracy loss over the life of the meter. Maintaining this level of performance over the life of the meter provides maximum revenue generation from your metering program.

- High-Resolution Measurement
 - Extended low-flow range and accuracy
 - Extended upper-flow range capability
 - No special test mode required for bench testing
 - Sustained accuracy over meter life
- NSF/ANSI 61 Certified Bronze Maincase
 - Regulatory compliance
 - No stranded assets – durable bronze maincase and threads
- Supports Water Conservation
 - Extended low-flow range identifies the smallest leaks
 - 15-minute interval flow monitoring for advanced leak detection
 - Enables proactive leak notification on customer bills
- Increased Operational Efficiencies
 - Work order reduction for high water bill inquiries
 - Maintenance-free design – no moving parts, plus fully-potted electronics and battery
 - 20-year battery life
- Tamper Management
 - Identification and prioritization of potential tamper cases



E-CODER®)R900i™ INTEGRATED ABSOLUTE ENCODER/RF MIU

Neptune's E-Coder®)R900i™ combination absolute encoder register/radio frequency meter interface unit (RF MIU) provides two-way communications of advanced smart metering. The E-Coder)R900i's interleaved mobile and high-power fixed network messages allow for simple migration from walk-by to mobile to fixed network reading without site visits or reprogramming. 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.

- Interleaved mobile and fixed network messages facilitate migration without changing "modes" of the MIU for simultaneous mobile and fixed reading capabilities
- 1-watt fixed network message reduces AMI infrastructure costs
- Easy-to-install wireless package
- Two-way RF transmission
- 96 days of hourly data logging capability
- No programming required
- Battery-independent metrology
- Large, easy-to-read LCD display
- Rate-of-flow on display



R900® RADIO FREQUENCY METER INTERFACE UNIT (RF MIU)

A single radio frequency unit, Neptune's R900® MIU features an interleaved, high-power, 1-watt fixed network message that reduces infrastructure costs while allowing reading in any mode – walk-by, mobile, or fixed network – without separate reading systems, site visits, or any type of MIU reprogramming or reconfiguration. Available in both wall and pit mount configurations, the R900 MIU greatly improves access to meter readings, and delivers detailed consumption information as well as alerts for leak or backflow, helping your utility more proactively identify and resolve customers' questions.

- Interleaved mobile and fixed network messages facilitate migration without changing "modes" of the MIU for simultaneous mobile and fixed reading capabilities
- 1-watt fixed network message reduces AMI infrastructure costs
- Easy to install/no programming required
- Two-way RF transmission
- 96 days of hourly data logging capability



R900® Belt Clip Transceiver

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R900® BELT CLIP TRANSCEIVER

With two-way communications to the R900 MIU, the R900® Belt Clip Transceiver (R900 BCT) eliminates meter access issues and speeds up retrieval of valuable data logging information. In addition, its exceptional radio frequency (RF) throughput reduces meter reading time, especially in high-density environments. Pairing the R900 BCT with a handheld (Trimble Nomad or Ranger) or an Android device running Neptune's NGO™ app, your personnel can perform impromptu service calls in the field and address customer service issues onsite without a separate truck roll. Apple iOS compatibility coming soon.

- Compatible with all generations of R900 MIUs
- Software-defined radio (SDR) technology enables compatibility with future products
- Retrieve 96 days of hourly interval data logging information
- Receive leak, reverse flow, and days of no flow alerts from E-Coder-equipped meters
- Unattended operations mode allows meter reading while performing maintenance or other tasks
- Read and process electric CRT/SCM+ bubble up messages

NGO™ APP FOR ANDROID PHONES AND TABLETS

- Analyze data at the source with Android phone or tablet via NGO app
- View graph of data logging intervals in the field
- Share data logging graph information with homeowner to address high bill complaints



Trimble Ranger

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TRIMBLE RANGER 3XE/ TRIMBLE NOMAD HANDHELD COLLECTOR

Maintaining support to read R900 MIUs through its internal HR2650i receiver, the Trimble Ranger 3XE lets you choose manual keyed entry, probed, and walk-by RF data collection methods at any time. The Ranger can be paired via Bluetooth with the R900 BCT for RF-activated data logging of 96 days of hourly consumption data. With the Trimble Ranger 3XE and R900 BCT, your meter readers can quickly and remotely capture interval data as well as flags for leaks, tamper, and reverse flow from E-Coder-equipped meters. They can also generate graphs of a customer's water consumption for onsite presentation with NGO.

The Trimble Nomad has been designed to be more ergonomic than typical handhelds used by meter readers, at less than half the weight, plus its high-capacity battery ensures in-field performance throughout a full work day. Compared with other handhelds' six-to-seven hours of power, the Nomad provides at least 10 hours in cold weather conditions and up to 15 hours under normal outdoor conditions.



Trimble Nomad

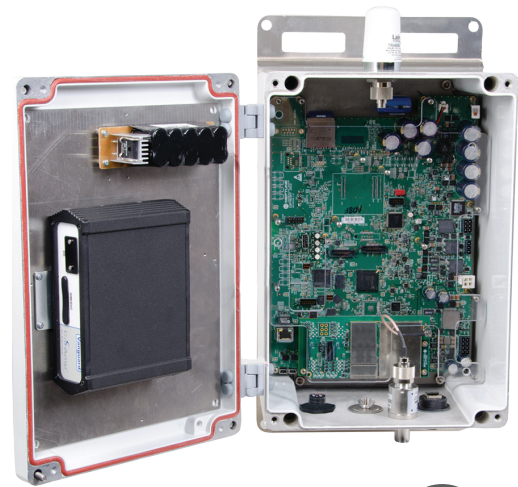


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MRX920™ MOBILE DATA COLLECTOR

Reliable, accurate, and field-proven, Neptune's MRX920™ mobile data collector can read eight meters simultaneously and process 70 unique readings every second. It makes automatic meter reading (AMR) simple, helping to take "feet off the street" to save days or even weeks in the field while helping improve meter reader safety. The MRX920 provides seamless compatibility with all generations of R900 MIUs, while 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.

- Esri-powered GIS maps show meter reading and flag status
- Wireless mobility option – communicate meter reading data back to N_SIGHT in real time while in the field
- View data logging graphs in the field, 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



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R900® GATEWAY FIXED DATA COLLECTOR

The R900® Gateway collects metering data as well as daily leak, reverse flow, and days of no flow alerts from all R900 E-Coder-equipped meters. Its software-defined radio (SDR) technology can process eight meter readings simultaneously and gather 360 readings per second – optimizing your fixed network with high throughput reading performance. The R900 Gateway easily integrates with walk-by and mobile methods of reading your existing R900 endpoints, so that you can choose the technology you need, where you need it – without special programming or reprogramming of MIUs. The R900 Gateway supports the R900 System's 1-watt fixed network message from endpoints, reducing infrastructure costs.

- Migrate at your own pace – read your system by any combination of walk-by, mobile, and fixed network
- Supports 1-watt fixed network message from R900® endpoints, reducing infrastructure costs
- No need to reprogram endpoints to migrate to fixed network reading
- Daily leak, reverse flow, and days of no flow alerts from E-Coder-equipped meters
- Maintains compatibility with existing R900s deployed

SYSTEM ARCHITECTURE



1. THIRD-PARTY ACOUSTIC LEAK LOGGERS
 2. CELLO CELLULAR DATA LOGGER FROM NEPTUNE SISTER COMPANY TECHNOLOG

MOBILE VS. FIXED BENEFITS ANALYSIS

FUNCTIONALITY	R900 FIXED NETWORK AMI	R900 MOBILE AMR
READING RESOLUTION OF 1/10TH GALLON		
CUSTOM LEAK DETECTION		
TAMPER DETECTION		
REVERSE FLOW		
USAGE PROFILE ANALYSIS		
HIGH WATER BILL		
LEAKS ON DISTRIBUTION LINE		
ACOUSTIC SENSOR		
GIS METER LOCATION MAPPING		
OFF-CYCLE READS		
NON-REVENUE WATER		
STOPPED METER		
DISTRICT METERED AREAS		
PRIORITY ALARMS		
VIRTUAL DISCONNECT		
TWO-WAY COMMUNICATIONS		
TIME-SYNCHRONIZED METER READS		

NEPTUNE SMART WATER SYSTEM TECHNOLOGY FEATURES AND BENEFITS

N_SIGHT™ IQ INTELLIGENT DATA AND ANALYTICS SYSTEM¹

- + Advanced data analysis and reporting
- + Long-term data retention
- + Utility and utility customer web presentation
- + Utility customer self-management

N_SIGHT™ HOST SOFTWARE

- + Light footprint application
- + Intuitive graphical interfaces
- + Powerful consumption data analysis
- + Support for all reading methods



R900® WALK-BY AMR 1,000-2,000 READS PER DAY

- + Absolute encoder reading resolution of 1/10th of a gallon²
- + No estimated reads
- + Leak, tamper, reverse flow detection
- + Quarterly, bi-monthly, or monthly billing

R900® MOBILE AMR

2,000-30,000 READS PER DAY

- + Monthly billing
- + Data logging at meter – rolling 96 days of hourly data (E-Coder)R900i)
- + GIS meter location mapping

Note: Each step in the N_SIGHT™ System chart contains and builds upon the benefits of the previous step.

1) N_SIGHT IQ is available for N_SIGHT and N_SIGHT PLUS Host Software.

2) 1/10th gallon resolution available with E-Coder. Lower resolution available with ProRead or third-party absolute encoders.

N_SIGHT™ PLUS HOST SOFTWARE

- + **Web-based "dashboard" interface** + **Customizable reporting engine**
 - + **Customer service and operations screens**
- + **Non-Revenue Water analysis** + **GIS mapping** + **Virtual disconnects**
 - + **District Metered Area monitoring**



R900® FIXED NETWORK AMI

MULTIPLE READS PER METER PER DAY

- + **900 MHz unlicensed frequency**
- + **Hourly reading/alarm capability**
- + **Hourly leak, tamper, and reverse flow detection**
- + **Seamless migration from mobile AMR**



METERS



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T-10® METERS 5/8"-2"

Neptune T-10® water meters are time-proven for accuracy and dependability even at low flow rates and provide a wide effective flow range for maximum revenue.

- Meets or exceeds the latest AWWA C700 Standard
- Lead free bronze maincase – NSF/ANSI 61 and NSF/ANSI 372 certified, SDWA compliant
- Lifetime guarantee on meter body
- Positive displacement nutating disc measuring chamber
- Effective flow range
- Proprietary polymer measuring chamber materials maximize long-term accuracy
- Floating chamber design is unaffected by meter position or in-line piping stresses



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HIGH PERFORMANCE (HP) TURBINE METERS 1½"-10"

Neptune High Performance (HP) Turbine water meters provide accuracy at flows from 4 gpm to 8,000 gpm – some of the widest flow ranges of any turbine meters on the market.

- Meet or exceed performance/accuracy requirements of AWWA C701 for Class II turbines
- Maximum continuous flow rates may be exceeded by as much as 25% for intermittent periods
- NSF/ANSI 61 and NSF/ANSI 372 certified, SDWA compliant
- Unitized Measuring Element (UME) allows quick, easy, in-line interchangeability
- Calibration vane allows field calibration of UME to lengthen service life and ensure accurate registration

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TRU/FLO® COMPOUND METERS 2"- 6"X 8"

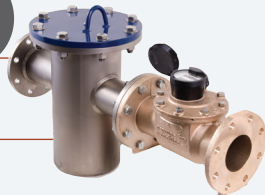


Combining the low-flow sensitivity of a T-10 disc-type meter with the high-flow capacity of a turbine-type meter, the TRU/FLO® is specially designed for extremely wide flow rate applications such as apartment buildings, hotels and hospitals.

- Patented hydraulic valve transfers flow smoothly between disc and turbine sections, minimizing loss of accuracy in crossover range
- Meet or exceed performance/accuracy requirements of AWWA C702 for Class II compounds
- NSF/ANSI 61 and NSF/ANSI 372 certified, SDWA compliant
- Maximum continuous flow rates may be exceeded by as much as 25% for intermittent periods
- Unitized measuring element (UME) makes maintenance easier and faster with less downtime
- Calibration vane allows field calibration of UME to lengthen service life and ensure accurate registration

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HP FIRE SERVICE TURBINE STAINLESS STEEL (S) METERS



Designed to measure both domestic and fire service usage where flow rates are moderate or high, the HP Fire Service Turbine offers some of the widest flow ranges of any fire service turbine meter on the market.

- NSF/ANSI 61 and NSF/ANSI 372 certified, SDWA compliant
- Meet or exceed AWWA C703
- Underwriters Laboratory (UL) Listed and Factory Mutual (FM) Approved for fire service use
- Maximum continuous flow rates may be exceeded by as much as 25% for intermittent periods
- Combines all features of the HP Turbine with 300 series stainless steel Fire Service Strainer

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HP PROTECTUS® III STAINLESS STEEL (S) FIRE SERVICE METERS



The HP PROTECTUS® III Stainless Steel (S) fire service meter has become the industry standard for applications where fire service and drinking water supplies are fed by a single line.

- Registers leaks or unauthorized use of water from fire service lines
- Combines low-flow sensitivity of disc meters with high-flow capacity of turbine meters for an extremely wide flow range
- NSF/ANSI 61 and NSF/ANSI 372 certified, SDWA compliant
- Meet or exceed AWWA C703
- Underwriters Laboratory (UL) Listed and Factory Mutual (FM) approved for fire service use
- Combines all features of HP PROTECTUS III with 300 series stainless steel body

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KROHNE WATERFLUX 3070 ELECTROMAGNETIC FLOWMETER

Neptune has partnered with KROHNE to offer the WaterFlux 3070 Electromagnetic Flowmeter with 8-digit E-Coder protocol.

- No moving parts means sustained meter accuracy
- No straight pipe requirements for meters 12" and less
- Field-replaceable battery for extended life
- NSF 61 approved
- Sizes 2" - 24"



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DOUBLE CHECK T-10® METER ½"

The Double Check T-10® meter combines the metering accuracy of the T-10 meter with the water quality protection of a double check valve, reducing installation time and cost, supporting cross-connection control, and addressing homeland security initiatives.

- 365-day, 15-minute interval reverse flow monitoring with E-Coder)R900*i* registers
- Lead free maincase
- ASSE Certified
- Adaptable to Neptune ProRead, E-Coder, E-Coder)R900*i*, TRICON®/S, TRICON/E®3, and Neptune meter reading systems without removing the meter from service





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TRICON® METERING SYSTEMS

- TRICON®/S is designed for applications requiring a switch closure output proportional to the consumption (several switch configurations are available)
- TRICON/E®3, with a digital pulse and 4–20mA analog output signal, provides information on total consumption and flow rate for close monitoring of water usage
- The bayonet-type mount allows either TRICON system to be easily retrofitted to any current Neptune meter without interruption of service



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SMARTROL™ METERING SYSTEM

SmartTrol™ is a versatile microprocessor-based controller for use with TRICON/E3 electronic registers. The main function of the unit is to display rate and totalization values.

- Allows two metered flows to be measured
- Separately scales flows for both rate and total, then combines into one overall rate and one total
- Can be used with TRU/FLO and HP PROTECTUS III meters having two separate measuring elements to monitor flow

SUPPORT

Whenever you need support, you'll have access to Neptune's factory-trained service and support teams at any time. Our support staff resolves 95 percent or more of incidents on the same call and 95 percent or more the same day they receive them, minimizing your downtime. ☺



NEPTUNE
TECHNOLOGY GROUP

TAKE CONTROL

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SYSTEMS™

N_SIGHT™

N_SIGHT™ PLUS

N_SIGHT™ IQ

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