MEETING AGENDA
for
PLANNING, RESOURCES AND OPERATIONS COMMITTEE

August 25, 2020 @ 3 pm
by Virtual/Online or Teleconference

Please join the meeting from your computer, tablet or smartphone at https://global.gotomeeting.com/join/805781141

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Access Code: **805-781-141**

- **Call to Order**

1. Recognitions and Presentations:
2. Additions-Deletions to the Agenda:
3. Public Comments
   This is the time for any shareholder or member of the public to address the committee members on any topic under the jurisdiction of the Company, which is on or not on the agenda. Please note, pursuant to the Brown Act the Committee is prohibited from taking actions on items not listed on the agenda. For any testimony, speakers are requested to keep their comments to no more than four (4) minutes, including the use of any visual aids, and to do so in a focused and orderly manner. Anyone wishing to speak is requested to voluntarily fill out and submit a speaker's form to the manager prior to speaking.
4. Approval of Committee Meeting Minutes
   A. Regular Committee Minutes of June 23, 2020
5. Planning and Operational Issues:
   A. AMI Smart Meters
      Discussion and Possible Action on AMI 'SMART' Meter Program
6. Planning and Operational Updates:
   A. Project Status Report/Project List
      Report on on-going projects
7. Basin Issues and Updates:
   - San Antonio Canyon Watershed – Verbal report
   - Chino Basin - Verbal report
   - Six Basins - Verbal report
   - Cucamonga Basin – Verbal report
8. Closed Session: None.
9. Committee's Comments and Future Agenda Items:
   This is the time for the Committee to comment and consider future agenda items relative to planning, water resources and operations of the company and its shareholders.

Adjournment:
The next regular PROC Meeting will be held on August 25, 2020 at 3:00 p.m.

NOTE: All agenda report items and back-up materials are available for review and/or acquisition at the Company Office (139 N. Euclid Avenue, Upland, CA.) during regular office hours, Monday through Thursday [8:00 – 11:30 & 12:30 – 4:00] and alternating Fridays [8:00 – 11:30 & 12:30 – 3:00]. The agenda is also available for review and copying at the Upland Public Library located at 450 N. Euclid Avenue.

POSTING STATEMENT: On August 20, 2020 a true and correct copy of this agenda was posted at the entry of the Company Office (139 No. Euclid Avenue), and on the public bulletin board at 450 N. Euclid Avenue (Upland Public Library), and on the Company website.

MINUTES OF THE SAN ANTONIO WATER COMPANY
PLANNING, RESOURCES, and OPERATIONS COMMITTEE
June 23, 2020

An open meeting of the Planning, Resources, and Operations Committee (PROC) of the San Antonio Water Company (SAWCo) was called to order at 3:00 p.m. on the above date at the Company office located at 139 N. Euclid Avenue, Upland, California and virtually. Committee members present were Will Elliott, Gino Filippi, Martha Goss, and Tom Thomas (virtually). Also in attendance were City of Upland Interim Public Works Director Steve Nix, SAWCo's General Manager Brian Lee and Senior Administrative Specialist Kelly Mitchell. Mr. Elliott presided.

1. Recognitions and Presentations – None.

2. Additions-Deletions to the Agenda – None.

3. Public Comments – None.

4. Approval of Committee Meeting Minutes:
   A. Regular Committee Minutes of April 28, 2020 – Mr. Filippi moved and Mr. Thomas seconded to approve the meeting minutes of April 28, 2020 as presented. Motion carried unanimously.

5. Planning and Operational Issues:
   A. None.

Ms. Martha Goss entered the meeting at 3:06 p.m.

6. Planning and Operational Updates -
   A. *Project Status Report/Project List*
   - ***2020 Capital Improvement Projects*** – Design and professional services contract was awarded to Civiltec Engineers for $301,760 which is roughly $40,000 less than the authorized amount. The projects have been divided into three managed projects. Reservoir 9 pipeline, the Frankish Tunnel, and the Cliff Road, Euclid Crescent, Glendale Road, Linda Lane, and Primrose Lane pipeline replacements. The View Point pipeline replacement is on hold.
   - ***Reservoir 9 Pipeline*** – The survey has been completed. A 30% design plan review was held earlier in the week. The plan is to have the project out to bid by end of summer with construction taking place in early fall.
   - ***Frankish Tunnel Modifications*** – The 30% design review has taken place. A solution to the discrepancy in the location of the discharge box and the location of the meter is being discussed.
   - ***Domestic Pipeline Replacements*** – A domestic meter being served by a long lateral that crosses private property and a natural drainage channel needs to be relocated along with replacement of main pipelines.
   - ***Comprehensive System Master Plan and Asset Management Program*** – The consultant is working on the model for the computer simulation. Hydrant testing will be scheduled most likely towards the end of summer.

- **GIS** – Field staff received training on the system using tablets. They are making corrections to the program as they see them in the field. On a quarterly basis over the next year the consultants will work with field staff to gather data and make corrections to the system. This is a multiyear project with field staff and the consultant continuously updating information.
- ***Cucamonga Crosswalls*** – There is not much water left in the crosswalls sans the upper basin. Staff received a noise complaint from a Rancho Cucamonga resident through the San Bernardino County Supervisors office. The issue has been resolved.
- ***Holly Drive Reservoir Phase II –*** Staff is in the final stages working to get ready for permits so the project can go out to bid. A separate inlet/outlet is required of this tank which will be difficult to accomplish and increase costs of roughly $18,000. This project will hopefully be bid in the next few weeks. Staff hopes to start construction towards the end of summer.
- ***AMR/AMI Smart Meters –*** Staff has received quotes from four different manufacturers. One manufacturer utilizes cellular service while the other three utilize proprietary networking system. Utilizing cellular service may reduce costs substantially. Staff has purchased five of the meters that utilize cellular service and will test meters in areas where cellular service is known to be bad to help determine if it is a viable option. The cellular signal needs only to be strong enough to send a text message as that is the method the meters will use to send information. A recommendation should be ready by the August PROC meeting.
- ***Well 19 –*** The design of a new Well 19 site has been budgeted for 2020. Staff will be issuing a Request for Proposals (RFP) with the hopes of having design proposals by the August PROC meeting. Mr. Lee advised of a possible lease agreement for a cell tower on the location.
- ***City of Upland Street Improvements*** – Staff has been receiving plans for street improvements in the city of Upland and has been reviewing and responding as needed.
- ***Caltrans I-10 Corridor Project –*** SAWCo has a number of waterlines that run underneath this project. Caltrans will be extending the casings on those waterlines.
- ***San Bernardino County Flood Control District – Storm and Sewer Work on San Antonio Avenue.*** One of SAWCo's pipelines discharges into the storm sewer to deliver water. SBCFCD needs this space and has volunteered to abandon SAWCo's pipeline at SBCFCD's cost as well as allow SAWCo water to travel through SBCFC's storm sewer at SBCFCD's cost.
- ***Sweet Pea Ranch Expansion –*** The owner of Sweet Pea Ranch has design changes that will expand services at the event location. This site is directly north of one of SAWCo's water supply sources and it is imperative any changes made do not threaten this source. Sweet Pea Ranch has agreed to pave instead of use decomposed granite or dirt and has agreed to bio swells for filtering. All run off will go street side.

7. Basin Issues and Updates
   - ***San Antonio Canyon Watershed –*** Mr. Lee advised the canyon clean-up will not take place the weekend after Independence Day this year. Performing the clean-up

in the fall has been considered however, there is a possibility of the event simply not taking place this year.

- ***Chino Basin*** – Mr. Lee reported there have been several court filings over the past few weeks in the Chino Basin. SAWCo has filed for ability to spread 2,500 acre feet (AF) of water in the basin 2021.

- ***Six Basins*** – Mr. Thomas advised of efforts coordinating MS4 with the various agencies.

- ***Cucamonga Basin*** – Mr. Lee reported the working group is meeting regularly. They are nearing the end of their review and revisions. Once complete, the modifications will be presented to the Board.

8. Closed session: None.

9. Committee's Comments and Future Agenda Items: None.

Adjournment: –The meeting adjourned at 3:33 p.m.

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Assistant Secretary
Brian Lee

Agenda Item No. 5A

Item Title: Discussion and Possible Action on AMI Smart Meters

Purpose:

Discussion and possible action regarding Company's plans to install Advanced Metering Infrastructure (AMI) meters.

Issue:

Should the Company replace existing handheld reading meters with cellular AMI meters?

Manager's Recommendation:

Recommend that the full Board authorize the General Manger to execute a contract with Metron-Farnier to install Spectrum 50DL water meters and associated internet connectivity for a 10-year not-to-exceed $771,000 service contract.

Background:

The Company has been researching AMI meters to increase the availability of water consumption data for Company and Shareholder use. Since the Company only reads meters one a month, leaks on shareholder systems can go unchecked for weeks, leading to a high loss of water and associated high water bill. AMI meters provide daily water reads that show hourly water consumption over a 24-hour period. AMI meters are tied into computers systems that can automatically alert the Company and Shareholders if their system hits certain thresholds; 24-hours of continuous use, extremely high-water use, etc.

There are a variety of AMI systems available. Most AMI systems utilize a proprietary communication network. Others utilized existing cellular networks (effectively cellphones strapped to the water meter).

Over the past year Company staff have been researching four systems; iPerl (our current meters w/o AMI connectivity), ICONIX, Allegro and Metron-Farnier. ICONIX, iPerl and Allegro utilize a proprietary communication network and charge a yearly subscription fee. Metron-Farnier utilizes existing cellular networks and charge an upfront flat fee for a ten-year contract term.

The budgetary cost for each system is:

	10-years	15-years
iPerl:	$ 661,000	$ 799,000
Metron:	$ 771,000	$ 771,000
Allegro:	$ 789,000	$ 893,000
ICONIX:	$960,000	$1,107,000

Generally, meters are warrantied for 10 years. Most meters will last longer. The actual cost of implementation will be somewhere between the 10- and 15-year estimate.

The budgetary numbers support either iPerl or Metron.

iPerl utilizes a plastic body meter that has been problematic for staff under current use; breaking meter bodies and mis-threads on installation. Metron uses a metal body.

Staff prefers utilizing existing cellular networks instead of installing a proprietary communication system. Using existing cellular infrastructure removes the burden of managing new infrastructure.

Because Metron-Farnier utilizes existing cellular infrastructure, the Company was able to purchase five test meters to see how the system operates. Those meters were installed in July. Two of the meters were installed on Director's water services. The other three were installed in known 'low cellular' areas around the service area. Four of the meters have read daily with no service issues. One meter located in the canyon has had read problems. That meter has provided daily reads, but not consistently. Metron-Farnier is working through the issue and is confident it can be resolved. All meters installed within the heights have read consistently.

Four of the five meters identified possible leaks on the customer system.

A high-level review indicates that installing AMI smart meters would add about $1.65 per month to Company meter costs, or an additional $24,000 per year, above what we are currently spending on meter services. That amount translates to about 3 units of water per domestic meter per month.

If the software leak analysis is accurate, water loss through leaks on five shareholders systems accounts for about 750 gallons-per-day. Extrapolating that out to the full meter install base totals 180,000 gallons-per-day water loss through leaks. That's 240 units of water loss per day (7,200 units a month or 16 acre-feet per month).

There are a lot of details that need to be worked out; install schedule, coordinating customer notification of new system, staff training, preparation for increase service calls. These issues would be handled at the staff level prior to roll out.

Based on the above, staff recommends contracting with Metron-Farnier.

<u>Impact on the Budget</u>:

$70,000 budgeted for meter replacement in 2020, under a ten-year replacement schedule. The additional $700,000 of funds would come from capital reserves. Meter replacement budget for the next nine years would be $0.00.

The Company currently has about $5.7M in capital reserves.

Agenda Date: August 25, 2020

Previous Actions:

None

Metron-Farnier
Smart Water Meters & Systems

Company Address	5665 Airport Blvd Boulder, CO 80301 US
Quote Number	00000447
Created Date	5/20/2020
Expiration Date	6/19/2020
Prepared By	Dustin Rivas
Phone	(303) 453-9706
Email	dustinr@metronfarnier.com
Contact Name	Brian Lee
Phone	909.982.4107
Email	blee@sawaterco.com
Bill To Name	San Antonio Water Co
Bill To	139 North Euclid Avenue Upland, CA 91786 United States
Ship To Name	San Antonio Water Co

Quantity	Product	Line Item Description	Sales Price	Total Price
1,200.00	Antenna Local Paddle	Local 4G Paddle Antennas	$0.00	$0.00
1,200.00	Cellular Connectivity 10 Years	Verizon 10 Year Service Plan	$0.00	$0.00
1,200.00	Innov8-VN	VN LTE/Verizon	$0.00	$0.00
1,200.00	Labor	1" Meter Installation	$75.00	$90,000.00
1,200.00	Spectrum 50DL 1" 10.75" LL	S50 1" Top Load Brass Measurer	$525.00	$630,000.00

Programming Description	100 Cubic Feet 10yr Connectivity

Subtotal	$720,000.00
Total Price	$720,000.00
Tax	$48,825.00
Shipping and Handling	$1,500.00
Grand Total	$770,325.00

Spectrum 50DL

The Spectrum Single-Jet Meter is the widest ranged, single measuring element meter available to U.S. utilities. They have been designed to replace limited range displacement meters. The Spectrum meters can accurately measure 8 to 10 times lower flow rates than modern displacement meters of comparable size. The combination of design simplicity, superior grade materials, high quality manufacturing standards and now a top-loading design allows for years of virtually new meter performance with simple maintenance.

Spectrum features include:

- High accuracy down to **1/8 gpm**
- Wide range
- Superior low flow registration
- No maintenance
- Excellent performance in adverse conditions
- Unaffected by sand or small debris in line
- No straight pipe requirements upstream or downstream of meter
- No strainer requirement
- 5-year warranty
- 5-year register warranty
- Compatible with OER absolute encoder and innov8 electronic registers
- Universal AMR compatibility

Physical Specifications

Model – DL
Body – Low lead Bronze: ASTM C875
Impeller – Polypropylene
Register – OER or innov8
Impeller Bearings – Tungsten Carbide
Impeller Shaft – AISI 303 with Tungsten Carbide tip
Dimensions – See Table 2
Weight – 5 lbs. Without Register

Functional Specifications

Fluids measured – Potable cold or reclaimed water
Flow Range – See Table 1
Accuracy – ± 1.5% See Table 1
Pressure Loss – See Table 1
Repeatability – 0.5 % of flowrate
Maximum Operating Pressure – 230 PSI (15.9 bar)
Maximum Operating Temperature –
140° F (60°C)
194° F (90° C) optional
End Connections – See Table 2
Registration – See Figure 1

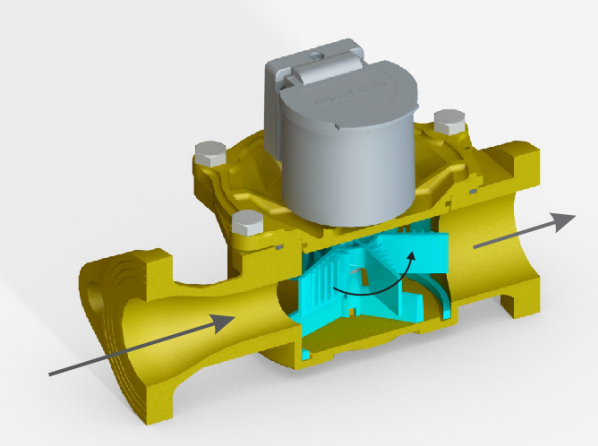
Warranty – 5 Yr. – Materials & Workmanship
5 Yr. – OER Register

Standards

AWWA C712-15
NSF-61/372

Operation

Incoming water rotates a suspended impeller that is magnetically linked to the register. A low friction tungsten carbide bearing supports the impeller at low flow rates while a tungsten carbide thrust bearing provides the support at high flow rates. This patented "dual bearing" design provides unparalleled accuracy and durability at both high and low flows.



Metron D models are top-loading, chamber designs which allow for field maintenance and repairs.

AMR/AMI Interfaces

Metron Spectrum 50 Model-DL water meters utilize the OER or innov8 register and thus can be utilized within virtually any AMR/AMI system. Both the OER and innov8 employ defacto communications standards for 2-wire (touchpad) and 3-wire (radio) interfaces which can be configured for typical utility billing systems. SCADA options such as scaleable pulse and 4-20mA are also available.

Reference the OER and innov8 technical specifications and AMR application notes for more information.

Registers

Metron Spectrum 50 Model DL water meters utilize the OER (optically-encoded register) or innov8 electronic register. Both models are field replaceable with configurable outputs.

The OER utilizes a light transmitter and light-pipe to detect the various positions of the encoder wheels. This non-mechanical sensing technology offers many advantages, including extremely low drag on the measuring element and minimal chance of mechanical wear/failure. The HFO (High Frequency Output) is an attachment device for a high frequency pulse for SCADA and datalogging applications

Reference the OER technical specifications for more information.

The innov8 is a fully electronic register which utilizes a highly sensitive magnetic field sensor to measure the magnet within the measuring element of the Spectrum meter. This sensing method exerts virtually no drag on the measuring element. The innov8 offers high resolution datalogging which detects down to individual magnet rotations.

The innov8 has an 8-digit display, flow-rate display and configurable AMR outputs. The innov8 also offers multiple SCADA outputs and an embedded T2 900 MHz radio for datalogging and AMR.

Reference the innov8 technical specifications for more information.

Tamper-Proof Features
A factory installed tamper detection seal prevents unauthorized access to the meter. Tamper proof chamber bolts can be provided upon request.

The OER register is fixed to the meter body with an ABS plastic snap ring. This snap ring must be removed with a special tool. Unauthorized removal will break the snap ring and indicate tampering. The innov8 register is fixed to the meter body with an ABS plastic housing which utilizes a tamper-proof screw attachment.

Installation
The Spectrum 50DL meter comes in a standard AWWA lay length.

To maintain accuracy, the meter is to be installed horizontally (±10°) in the direction of water flow, with the register face up. In most applications, no straight pipe length, upstream or downstream is necessary. Under normal usage conditions the Spectrum is not affected by sand or suspended particles and does not require a strainer.

Detailed reference sheets for meter installation can be provided by Metron-Farnier upon request.

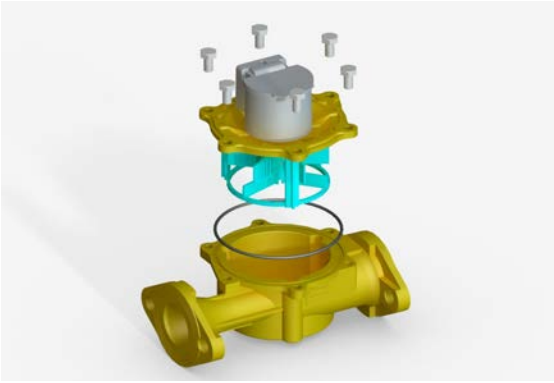
Accuracy Testing
For optimal performance during meter accuracy tests observe the following:

1. Register is level to the horizontal
2. Upstream pipe should be the same diameter or larger than meter connection
3. Upstream valve should be fully opened during test, use downstream valve to regulate flow rates
4. Inspected for leaks between the Spectrum and downstream volumetric tank or reference meter
5. Time low flow test to confirm accuracy of flowrate indicator
6. If innov8 register, initiate test mode for greater read resolution

Refer to AWWA M6 manual for more information on bench and field testing.

Maintenance
The measuring chamber of the Spectrum meter can be removed without requiring the meter being removed from service.

Once the meter is isolated with no water pressure, the four bolts can be removed to allow the chamber to be lifted from the primary meter body.



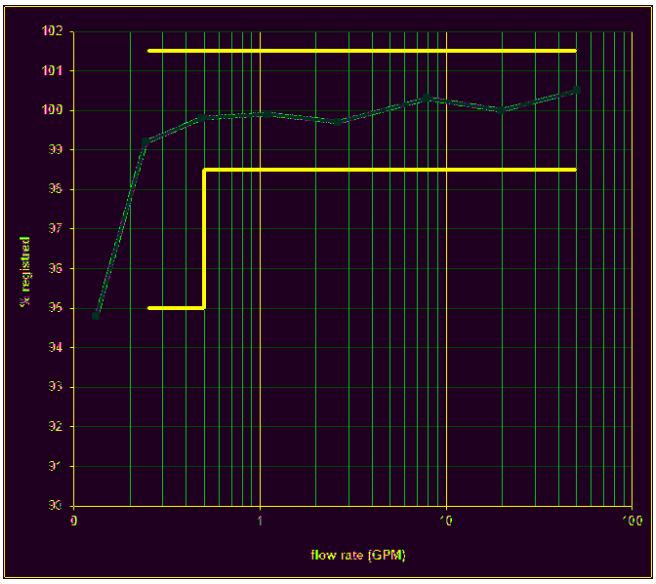
Consult Metron for procedures on cleaning and replacement parts.

Flow Specifications– Table 1

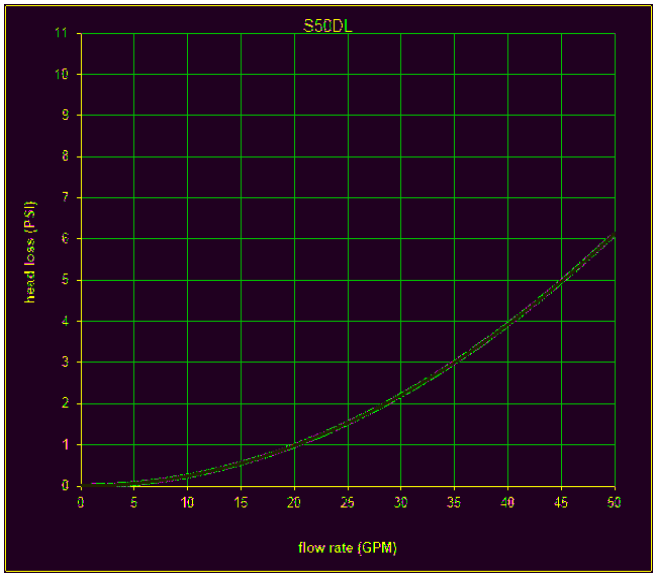
Model - MP5	Size in mm	Min Test Flow (95%-101.5%) gpm m3/hr	Normal Operating Range (98.5%-101.5%) gpm m3/hr		Safe Maximum Operating Capacity [1] gpm m3/hr	Max Cont. Duty [2] gpm m3/hr	Head Loss @ SMOC psi Bar
A6WA C712	1" 25	0.75 0.17	3.0 0.70	50 11.4	50 11.4	25.0 5.7	15 1.03
Spectrum 50DL	1" 25	0.125 0.028	0.50 0.114	70 15.9	50 11.4	35 7.9	8.0 0.55

1 Safe Maximum Operating Capacity (SMOC): As defined by A6WA, this is the flow sustained for 10% (or 2-hr) per 24 hrs
2 Max Continuous Flow: This is defined as the flow rate which can be maintained 12 hrs/day for 7 days/week

Accuracy Curve

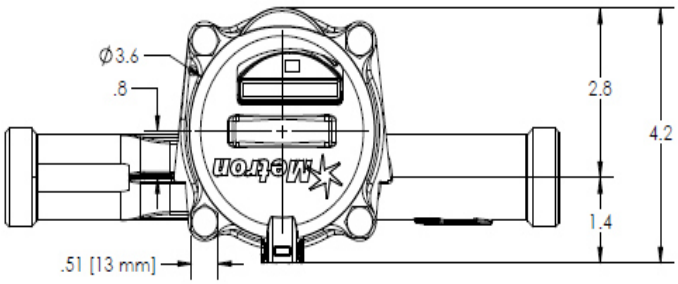


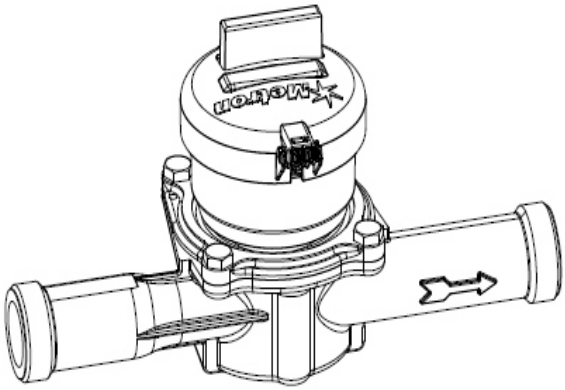
Pressure Loss Curve

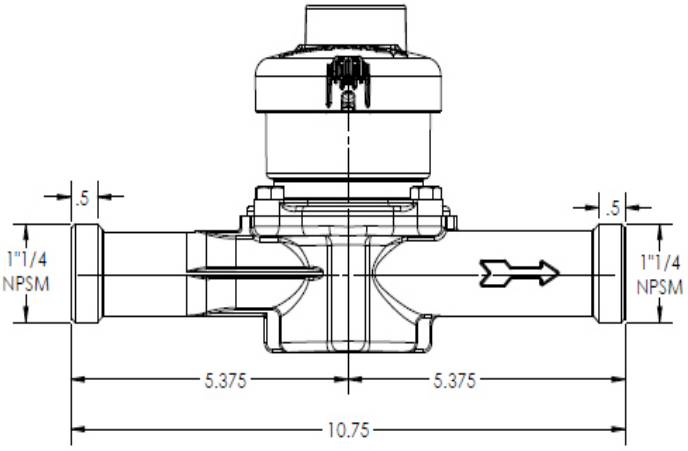


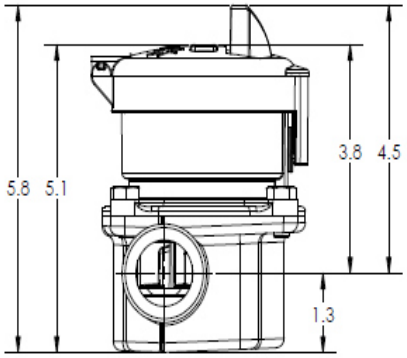
Meter Dimensions – Table 2

Spectrum 50DL - 1”



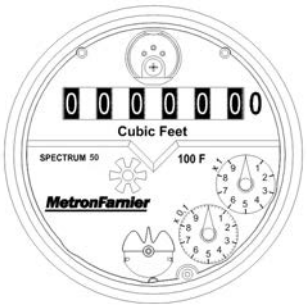




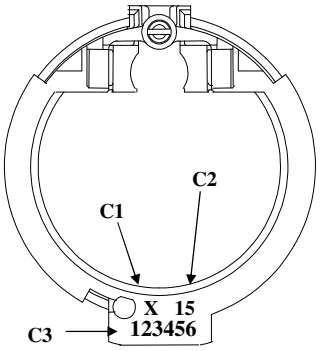


Register Information – Figure 1

OER - Ft3



Resolution: 0.02 Ft^3
Registration: 0.1 Ft^3
Capacity: 10M Ft^3



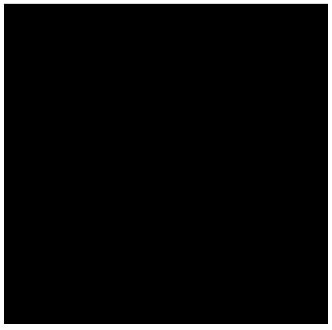
C1: Units (G, F, M)
C2: Model Identifier
9 – Spectrum 50DL
C3: Register ID

OER - USG

Resolution: 0.2 G
Registration: 1 G
Capacity: 10M G

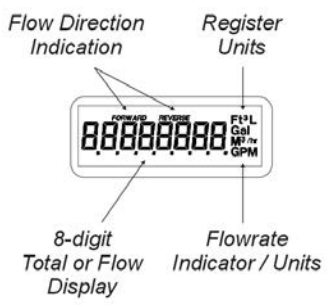
Consult the OER Datasheet for additional information.

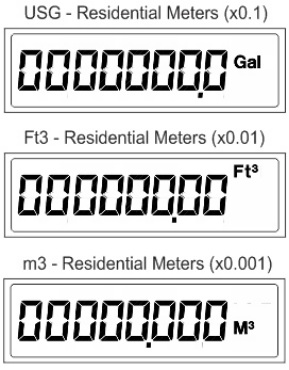
OER - m3



Resolution: 0.001 m3
Registration: 1 m3
Capacity: 1M m3

Innov8 Register



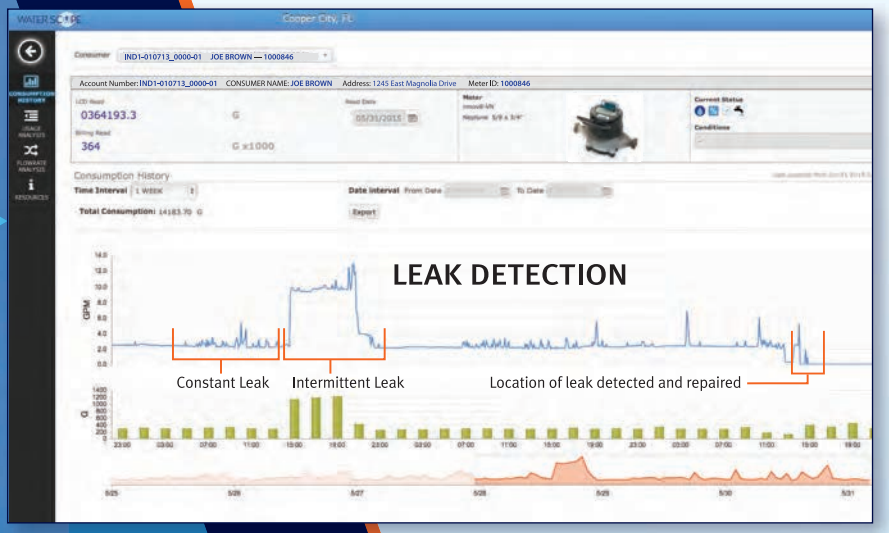


Consult the innov8 Datasheet for additional information.

TRANSPARENT TECHNOLOGIES
Advance Metering Analytics

VN Virtual Network

Transparent Technologies has teamed with the country's largest wireless network provider to offer the Virtual Network system for water utilities. The VN System communicates over the existing Verizon Wireless network which means no new infrastructure, no installations or maintenance hassles, and superior performance. The "virtual network" allows for immediate deployment of endpoints and utilization of high-resolution interval data.



The VN system requires **no new infrastructure** and provide 5-min data resolution.

Universal Endpoints can be deployed on virtually any existing meter.

Machine-To-Machine

Hydrant/Construction Meter Application

Introducing the **Voyager 3" Hydrant Meter** with VN cellular-based registers. Existing hydrant meters may be retrofitted with the VN register depending on manufacturer. The meters will report in every day with readings and consumption history, even when you are not sure of where they are. Talk to your local Metron-Farnier/ Transparent Technologies representative to discuss your 3" new hydrant meter applications or to verify if a VN register is compatible with your existing hydrant meters.

Voyager™
HYDRANT METER

Irrigation/Watering-Event Monitoring System

Waterscope provides the most granular data for monitoring watering events of ***any*** AMI system.
Continuous 5-minute sampling of consumption will monitor and alert for the following events EVERY day:

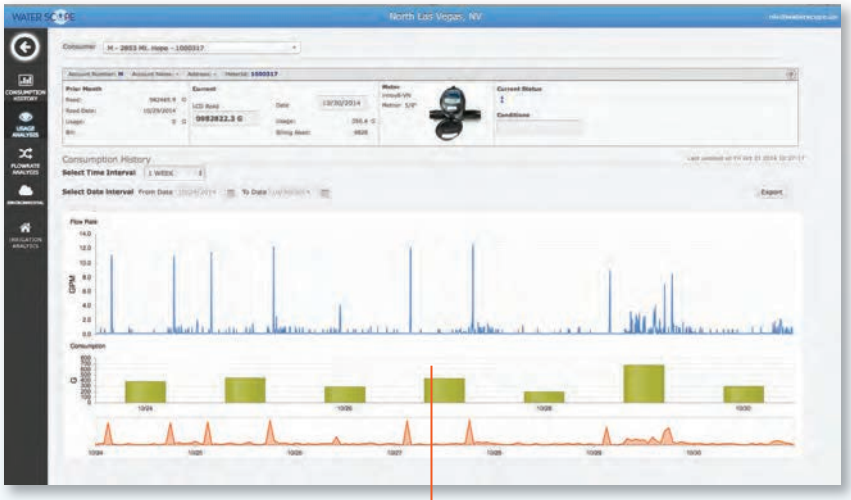
- Set the system for voluntary or mandatory restrictions
- Tracks the number of times the property waters per day and week
- Tracks the time of day the watering event occurs
- Utilizes the billing system interface to track odd and even address adherence to watering restrictions
- No longer will there be a need for time consuming and expensive "water cops"
- All consumption history will be accessible via the Utility portal for enforcement and Consumer portal so that property owners can verify adherence or be alerted when watering events violate current restrictions.

Utility and Consumer Access – Meter Analytics Website

WATER SCOPE

Powered by:

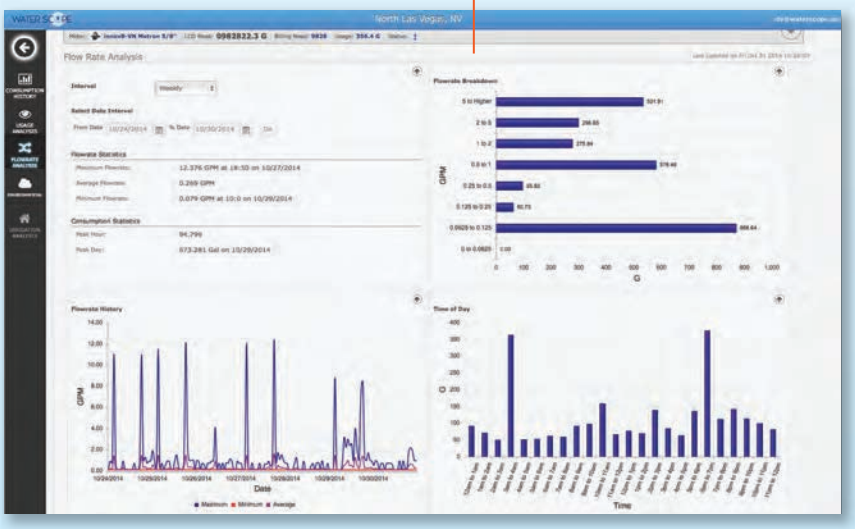
verizon wireless



Interactive Rate of Flow

Identification of the Type of Water Consumption

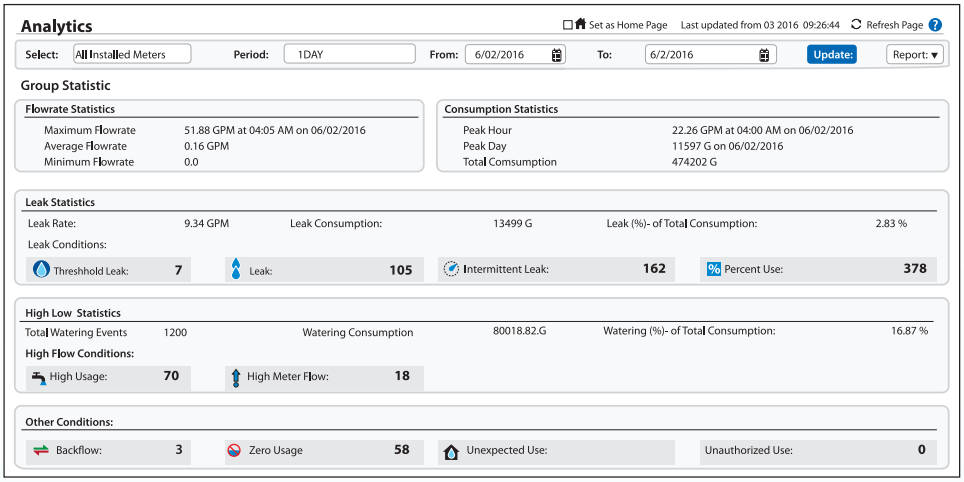
Meter Sizing, Time of Use and Flow Rate Percentages



Virtual Network (VN) Features and Benefits

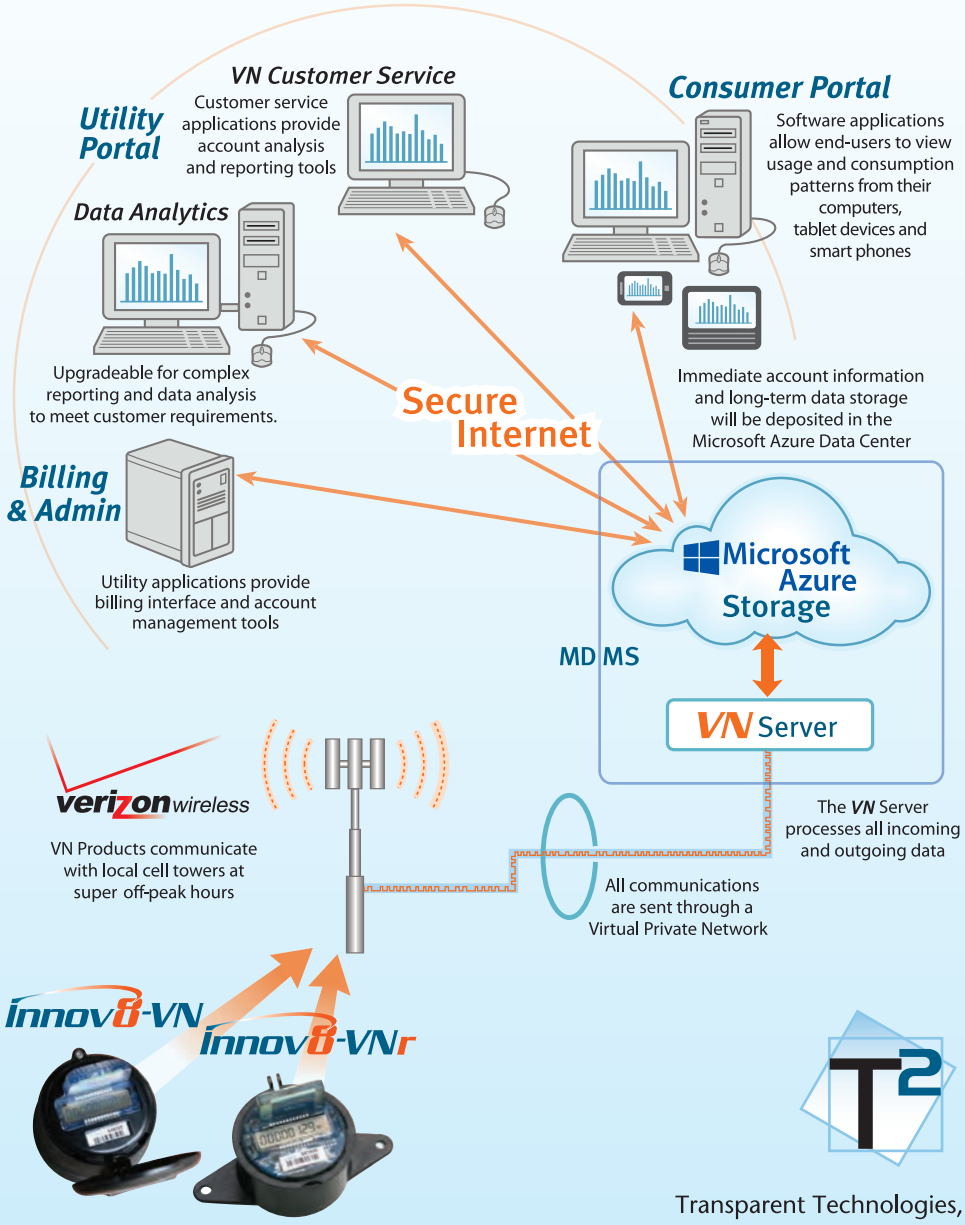
- **Completely Scalable Deployment:** Install 1 or entire system today ~ Read them tomorrow ~ No Infrastructure installation, ownership or maintenance ~ Free unlimited access to Water Scope website for daily reading, high-level analytics, billing and usage profiles ~ Strategic deployment accounts include:
  - **– Commercial / Industrial / Large Users**
  - **– Hard Access Customers**
  - **– Military Bases**
  - **– Chronic Complainers**
  - **– Fill in holes in existing AMI Systems**
  - **– Hydrant / Construction Meters**
- **Retrofits to most modern mechanical meter bodies ~** No need to change meter
- Increase existing PD/Piston meter accuracy to beyond new meter specifications.
- **Connects directly to the Verizon Network:**
  No Propagation Studies, ***No*** Hardware, ***No*** Software, ***No*** Servers, ***No*** Support Costs, ***No*** Network Headaches
- Industry leading 5-minute continuous sampling and Sub 1/10th GPM resolution
- Highly-evolved Utility and End-User access via T2's Water Scope secure portal
- Secure cloud storage through the Microsoft Azure platform

System-Wide Daily Analytics



- System Overview for Daily, Weekly, Monthly & Utility-Selectable Dates (customizable groups)
- Max/Min/Average flow rates with timestamp for the selected time interval
- Summary of System Leaks – rate of flow, number of leaks, number of threshold leaks and number of leaky toilets
- High-Flow Condition Synopsis
- Irrigation/Watering Event Conservation Adherence
- Number of Backflow, Zero Use, Unexpected and Unauthorized-Use Events

How the system works is simple and concise.



Innov8-VN registers or ***innov8-VNr*** stand-alone units measure water and monitor consumption patterns

Innov8-VN

Electronic register for new meter or retrofit applications

Compatibility list

- *Sensus SR-II*
- *Sensus Precision*
- *Metron*
- *Badger*
- *Neptune*
- *Elster-AMCO*

Check with your local T2 Rep for pending models

Innov8-VNr

Stand-alone modem for connection to registers

Compatibility list

- *Metron*
- *Sensus Encoder*
- *Hersey*
- *Elster-AMCO*
- *Ultrasonic*
- *Badger Pulse & Encoder*
- *Neptune Encoders*
- *Switch Closures*
- *Active Pulse*
- *Master Meter*
- *Magmeter*

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Innov8-VN Register

Technical Reference

The innov8-VN is an electronic water meter register with an embedded cellular modem. This document provides details on the configuration, operation and installation of the device.

Innov8-VN with integral antenna

Innov8-VN with external antenna

Models

All innov8-VN registers are fully configurable and adaptable to many common water meters. The only model variations are for hardware configuration:

- Innov8-VN Register with integral antenna
- Innov8-VN Register with external antenna – 4-ft, 6-ft or 12-ft lengths
- Innov8-VN Register with 3-wire AMR Output
- Innov8-VN Register with Switch Closure Output

Installation

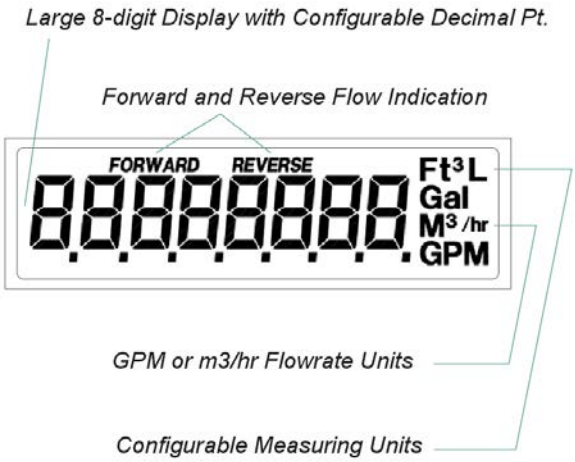
For installation, the innov8-VN will attach to the water meter with an outer housing and in some cases adapter rings. The user will need to specify the type of water meter to ensure the proper hardware is included.

- Metron Spectrum and Enduro water meters
- Sensus™ PMM water meters
- Sensus™ SRII water meters
- Neptune™ water meters
- Badger™ water meters
- Elster™ /Zenner™ water meters

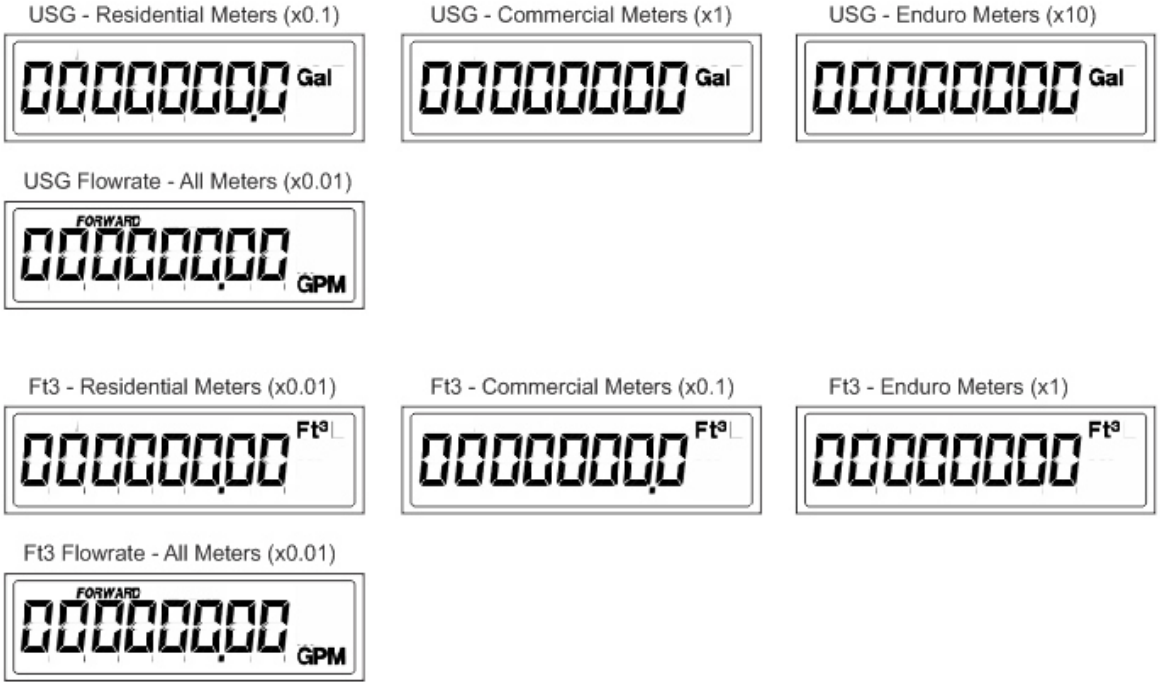
Contact Metron for attachments for other meters.

LCD Configuration

The format of the innov8-VN's LCD display is shown below.



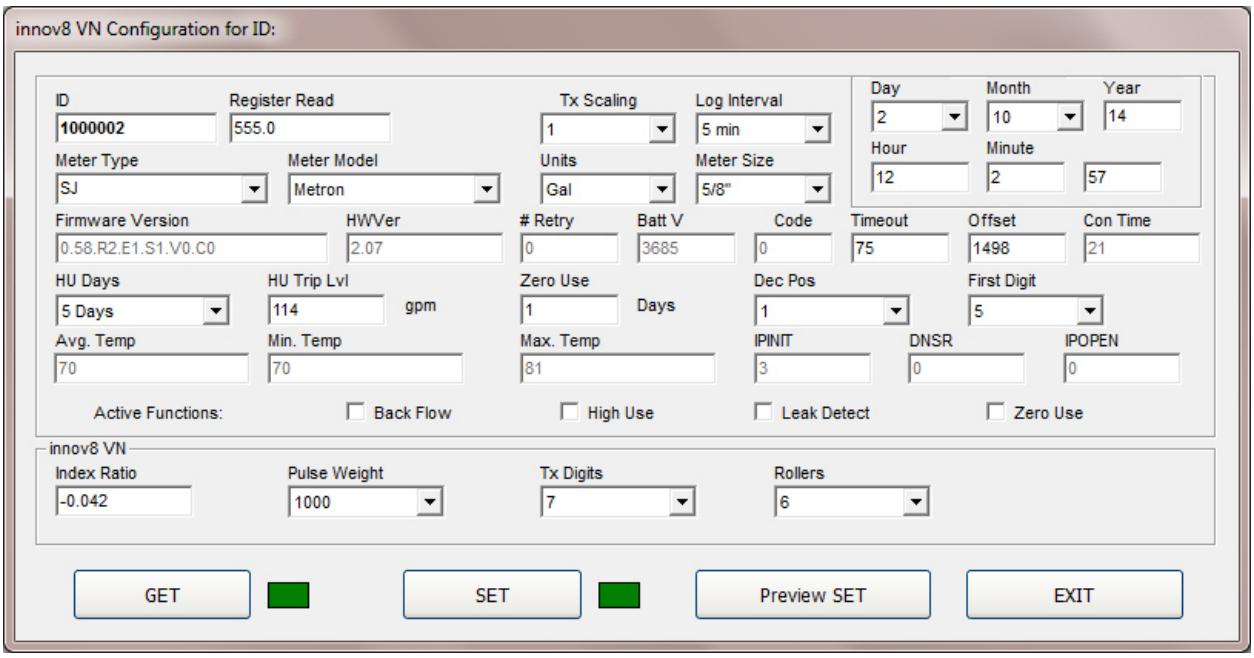
The following diagram shows the default display configuration for residential, commercial and industrial meters.



Configuration Parameters

Configuration of the innov8-VN will typically be performed using the Tablet App Communicator software. This software will run on any Windows™ XP, 7 or 8 laptop or tablet. This software will require an IR-bridge device from T2 which provides the infrared communication to the innov8-VN.

The configuration screen for the innov8-VN register will only show the applicable parameters for this register:



On the Configuration screen, editable parameters are shown in black while read-only parameters are greyed-out.

Meter Configuration

The meter type, model and size are important ***reference*** fields for the innov8-VN register. These parameters allow the remote verification of the register's configuration.

- Meter Type: SJ (single-jet), MJ (multi-jet), Disc (Displacement), Turb (turbine), Comp (Compound), Other
- Meter Model: Metron, Badger, Sensus, Neptune, Elster, Mueller, MasterMeter, Other
- Meter Size: 5/8", 5/8x3/4", 3/4", 1", 1.5", 2", 3", 4", 6", 8", 10", 12"
- Units: Gallons or Ft3

The index ratio is the factor which calibrates the innov8-VN to the meter. It is critical to have this factor configured correctly for the innov8-VN to track consumption accurately.

- Index Ratio: Set to match meter model/type/size. Contact Metron for more information
- Tx Scaling: Output units that will be transmitted

LCD Configuration

The LCD configuration is also critical for data accuracy. The incorrect First Digit Position or Decimal Position can cause scaling problems on data resulting in inaccurate billing reads. The innov8-VN register maintains a large reading index number internally and these parameters provide the "window" for display and transmission purposes.

- First Digit Position: 3, 4, 5, 6, 7
- Decimal Position: 0, 1, 2, 3

These parameters should match the defaults for units and meter size. Metron can provide reference sheets for different configurations (i.e. very high resolution) upon request.

Outputs

The innov8-VN can optionally have cabled outputs. One is a 3-wire AMR output and another is a switch closure output. Contact Metron for more information on outputs.

- 3-Wire AMR: Rollers (4, 5, 6, 7, 8)
  - Rollers equates to the number of register dials from left (most significant)
- Switch Closure: Pulse weight (0.01 to 1000)
  - Pulse weight will be limited based on units and LCD configuration

Data Functions

The innov8-VN register has four water consumption data functions: Leak detection, High Usage detection, Zero Usage detection and Backflow detection. Each of these functions can be active or de-active.

- Leak Detect (no configuration parameters)
  - A leak flag is set if consumption is seen in every 5-minute log interval throughout the day. The flag is reset if a period of zero-usage is detected.
- High Usage (Trip level and # of days)
  - A high usage function looks for a certain flowrate which occurs over a number of times per week. If the trip level is exceeded more than the set number of days, the high usage flag is set. If the condition is not seen the next week, the flag is reset.
- Zero Usage (# of days)
  - The zero usage function looks for no consumption for a set number of days. If no consumption is measured over the set number of days, the zero usage flag is set. If any consumption is measured, the flag is reset.
- Backflow (no configuration parameters)
  - The backflow function looks for any 5-minute log interval which has a negative value. If this condition exists, a flag is set. If the condition is removed for a period of 30 days, the flag is reset.

Communications

Communication parameters for the cellular modem are not typically exposed to customers. If any communication parameters need to be adjusted, Metron personnel will provide instructions to the user.

Diagnostics

There are multiple diagnostic fields shown on the configuration screen. These parameters will only be used by a customer during potential technical support calls.

- Date/Time: The unit's internal time
- HW Version: The unit's hardware version
- FW Version: The unit's firmware version
- Batt V: The unit's battery voltage
- # Retry: An unused field set aside for potential future use
- Code: Function code
- Timeout: Internal timeout variable
- Offset: Broadcast Offset
- Con Time: Last connection time
- IP Factors: These are internal timing parameters
- Avg Temp: Previous day's average temperature
- Min Temp: Previous day's minimum temperature
- Max Temp: Previous day's maximum temperature