HYDRO-GUARD®

Remote Pressure Monitoring System

2.1.1

⚠ **WARNING:**

Failure to read and follow the instructions contained within this manual could result in serious personal injury, and/or damage to the Remote Pressure Monitoring System.

1. Each person involved in the assembly, installation and/or maintenance of the Hydro-Guard Remote Pressure Monitoring System must read this manual carefully and follow all instructions prior to performing any installation or maintenance procedures involving the Unit.

2. Be sure the corporation valve or other isolation valve is closed prior to installation or removal of the pressure sensor.

3. Always use all necessary safety equipment and follow all recommended procedures when installing, operating and maintaining the Hydro-Guard Remote Pressure Monitoring System.

⚠ **CAUTION:**

When installing the Remote Pressure Monitoring System, ensure the known pressure is less than 250psi. If pressure may exceed 250psi at identified installation site, contact Mueller Co. for proper configuration.

Mueller Co.

Reliable Connections

Customer Service Center
Decatur, Illinois
800.423.1323
www.muellercompany.com/hydro-guard
moreinfo@muellercompany.com

GENERAL

Each Remote Pressure Monitoring System, consists of an RTU and Sensor, (here-by known as **Device**). Prior to the installation of the **Device**, strategic installation points should be identified. Confirmation of a cellular signal (Verizon or AT&T) is available at the identified site. Contact Mueller Co. for additional support if required.

When installing the Remote Pressure Monitoring System with a valve box into the distribution network, identify the OD and type of pipe as well as the depth requirement prior to ordering. Mueller Co. can assist in verifying that the proper saddle and valve box can be supplied. The Remote Pressure Monitoring System lid-mounted antenna shall be installed no more than six (6) inches below-grade to ensure the cellular communication signal is not impeded.

GPS Location Considerations

Each **Device** contains a cellular modem and GPS locator. Some obstacles can interfere with the signals required for each of these to operate properly. Confirmation of cellular signal can be obtained with a standard cell phone. If GPS is unavailable, the location of the **Device** can be entered manually into the software. Address or GPS coordinates should be noted upon installation. To obtain GPS coordinates (longitude and latitude coordinates), it is recommended that you utilize a GPS location APP or website. Enter the nearest physical street address to the site where the **Device** will be located into a GPS coordinate APP or website to obtain the GPS coordinates. Upon obtaining the information, enter the longitude and latitude coordinates into the **Device** Management website. Log into account and open the **Device** which is to be mapped. Select "Edit" and enter longitude and latitude coordinates in the appropriate fields.

Shipping

The Remote Pressure Monitoring System is powered by a series of lithium batteries. Specific and approved shipping procedures must be observed. The Remote Pressure Monitoring System may be shipped with or without a valve box and ancillary items depending on the customer's desired installation. In the event of the unit being returned for service, contact Mueller Co. Customer Service for approved shipping and handling information.

NOTE: The RTU can only be shipped via ground transportation and must be properly labeled to identify presence of lithium batteries. Contact Mueller Co. at 877.864.8500 before shipping.
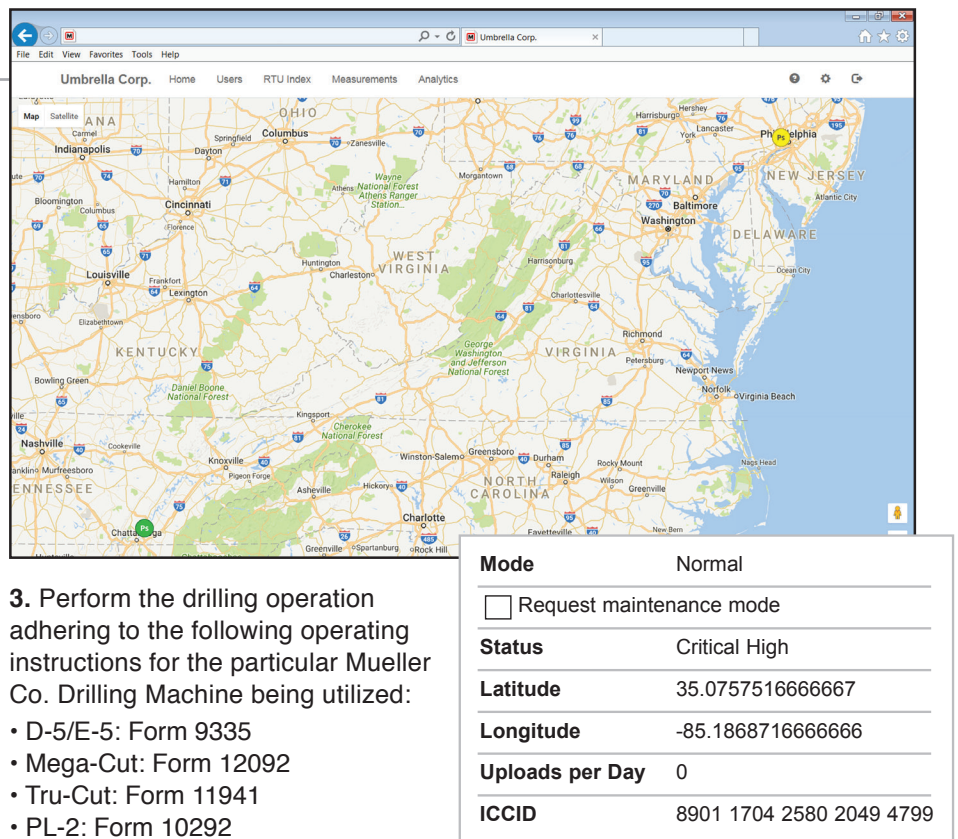
INSTALLATION

Installation in a Valve Box

1. Remove the Remote Pressure Monitor from its packaging and inspect for possible damage during shipping.

2. Once service saddle installation is complete, install guide plate (P/N: 147506P) over the service saddle and apply suitable sealant or joint tape to the inlet side of the corporation valve before installing into the saddle. Thread the corporation valve into the service saddle as shown (see page 3). The guide plate will center the valve box bell end over the service saddle and corporation valve.

NOTE: Before drilling, ensure guide plate is in between the service saddle and corporation valve (see page 3).

3. Perform the drilling operation adhering to the following operating instructions for the particular Mueller Co. Drilling Machine being utilized:

• D-5/E-5: Form 9335
• Mega-Cut: Form 12092
• Tru-Cut: Form 11941
• PL-2: Form 10292

Mode	Normal
☐ Request maintenance mode	
Status	Critical High
Latitude	35.0757516666667
Longitude	-85.1868716666666
Uploads per Day	0
ICCID	8901 1704 2580 2049 4799

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4. After the drilling operation is complete and corporation valve is closed, apply a suitable sealant or joint sealing tape on the inlet side of the ¾" threads on the supplied bushing. Securely attach the ¾" end of the bushing to the outlet of the corporation valve.

NOTE: Avoid use of excessive sealant. Avoid contact with sensor transducer tip.

5. Securely attach the pressure sensor to the ¼" end of the bushing. Utilize a suitable sealant or joint sealing tape on the inlet threads of the pressure sensor to ensure a proper seal.

NOTE: Avoid use of excessive sealant. Avoid contact with sensor transducer tip.

6. Prior to installation of pressure sensor dry the interior of the corporation stop threaded connection.

7. Once the sensor has been attached, turn the corporation valve to the "open" position. Run sensor cable through composite valve box when installing pressure sensor. Refer to the installation instructions for the Mueller® composite valve box (Form MC014).

NOTE: When paving and compacting asphalt, use a Mueller iron lid (P/N: AJBV-4CWATER) to prevent damage to the RTU. Once asphalt work is completed, replace iron lid with the RTU. Be sure the sensor tip is exposed to line pressure prior to connecting the sensor cable to the RTU.
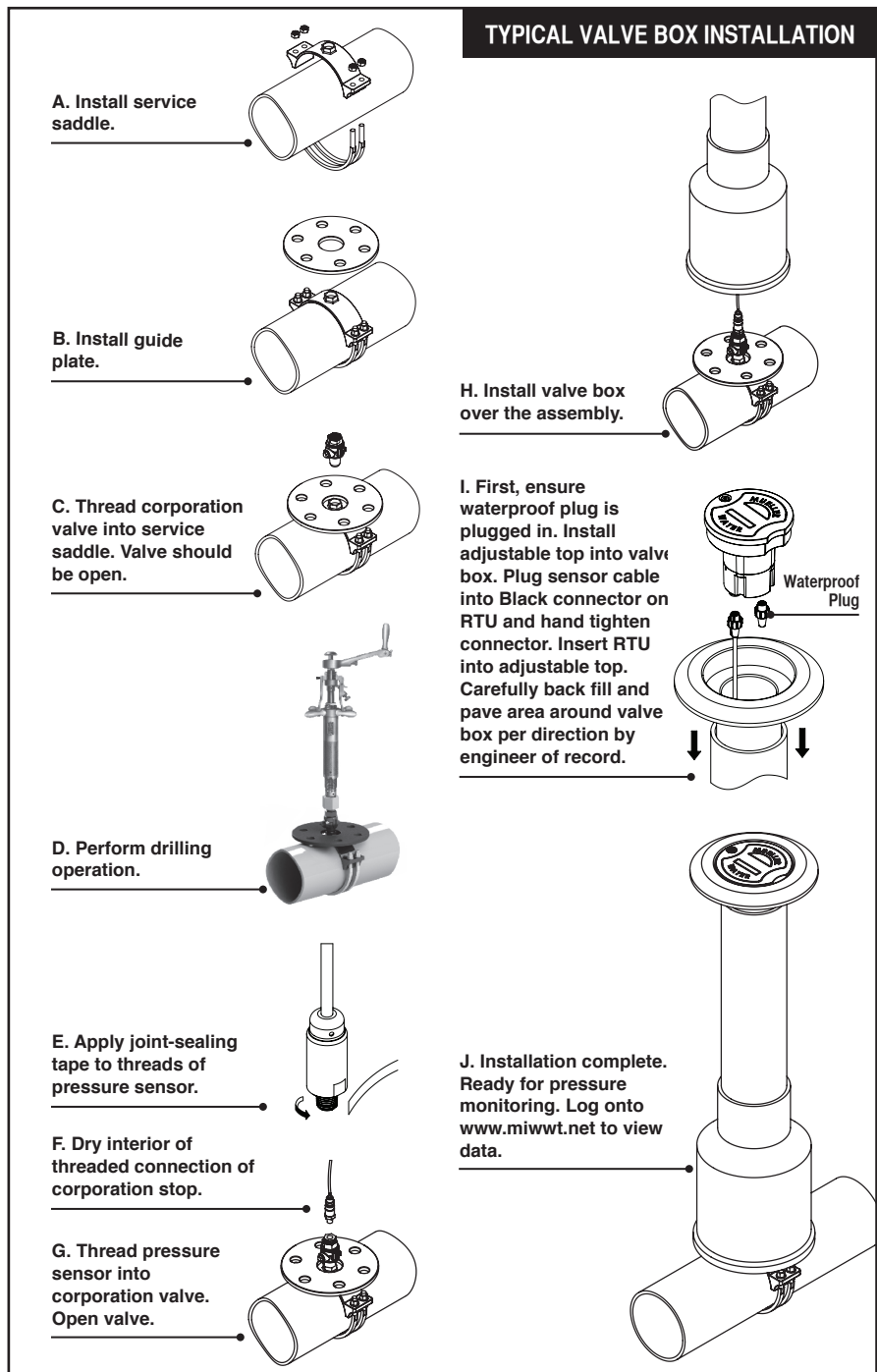
8. Once the corporation stop has been opened and pressurized, plug the male end of the multi-pin connector of the sensor cable into the mated connector of the RTU (located on bottom of RTU).

9. Once the RTU and cable are connected, insert the RTU into the ductile iron top section.

NOTE: Be certain that the lid of the RTU is mounted flush with the surface of the ductile iron valve box top section.

10. The pressure monitor will begin operating once the sensor cable is plugged into the RTU and the pressure sensor is exposed to line pressure. The first reading may take up to 24 hours to be transmitted to the website. The **Device** will reveal system pressures with no additional inputs. In order to customize pressure level notifications, the following four (4) values may be set on the measurements screen: *Warning High, Warning Low, Critical High, and Critical Low.* Entering the above mentioned inputs into the system is described in the "Getting Started" on page 4.

TYPICAL VALVE BOX INSTALLATION

A. Install service saddle.

B. Install guide plate.

C. Thread corporation valve into service saddle. Valve should be open.

D. Perform drilling operation.

E. Apply joint-sealing tape to threads of pressure sensor.

F. Dry interior of threaded connection of corporation stop.

G. Thread pressure sensor into corporation valve. Open valve.

H. Install valve box over the assembly.

I. First, ensure waterproof plug is plugged in. Install adjustable top into valve box. Plug sensor cable into Black connector on RTU and hand tighten connector. Insert RTU into adjustable top. Carefully back fill and pave area around valve box per direction by engineer of record.

Waterproof Plug

J. Installation complete. Ready for pressure monitoring. Log onto www.miwwt.net to view data.

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Installation in a Meter Box, Vault, or other Structure

1. Remove the **Device** from its packaging and inspect for possible damage during shipping.

2. Apply sealant or joint tape to pressure sensor and thread into available ¼" NPT port.

NOTE: Avoid use of excessive sealant. Avoid contact with sensor transducer tip.

3. Install supplied mounting bracket onto setter or to side wall of meter vault no more than 6 inches below grade to ensure the cellular communication signal is capable of transmitting and receiving data.
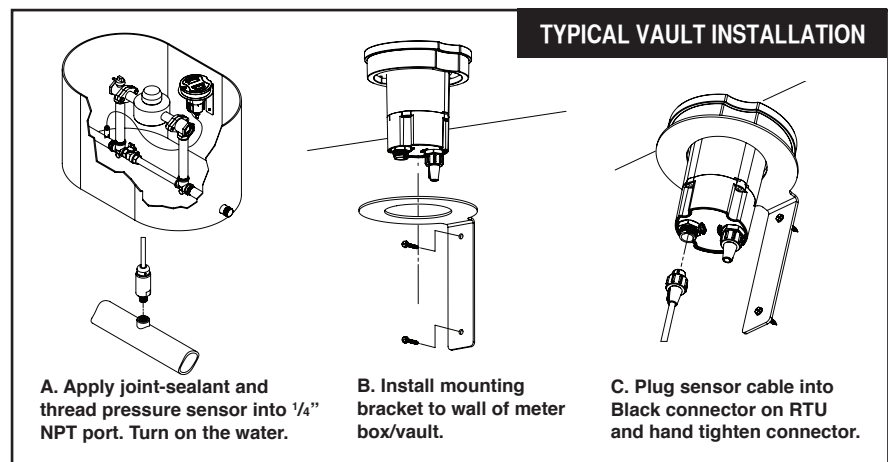
4. Be sure sensor tip is exposed to line pressure prior to connecting the sensor cable to the RTU. Connect the sensor cable to the RTU connection port located on the bottom side of the RTU. The pressure monitor will begin operating once the sensor cable is plugged

into the RTU and the pressure sensor is exposed to line pressure. The first reading may take up to 24 hours to be transmitted to the website. The **Device** will reveal system pressures with no additional inputs. In order to customize pressure level notifications, the following four (4) values may be set on the measurements screen: *Warning High, Warning Low, Critical High, and Critical Low.* Entering the above mentioned inputs into the

system is described in the "Getting Started" below.

NOTES: For best communication performance RTU must be installed vertically with the flange facing up.

Composite lids must be utilized in vaults or boxes to ensure cellular communication, unless a suitably sized hole is cut into a cast iron lid that will allow the composite lid to be mounted in the vault cover.

TYPICAL VAULT INSTALLATION

A. Apply joint-sealant and thread pressure sensor into ¼" NPT port. Turn on the water.

B. Install mounting bracket to wall of meter box/vault.

C. Plug sensor cable into Black connector on RTU and hand tighten connector.

OPERATION AND SYSTEM MONITORING

Getting Started

The **Device** will begin logging data once the sensor cable is plugged into the Remote Terminal Unit (RTU); however pressure readings may take up to 24 hours to be transmitted to the website. The **Device** will reveal system pressures with no additional inputs. Up to four (4) customizable values can be entered into the web based control panel (Warning High, Warning Low, Critical High, and Critical Low).

Upon entering the client's order, a Mueller Customer Service Specialist will send an administrative email to

the client administrator (end user) identified on the order form. The email will contain a web link that will direct the client administrator to the **Device** registration web page. The Registration web page will allow the client administrator to enter a password; select how the system shall send event notifications (i.e., SMS-text messaging, email – both, or none); and time zone settings.

NOTE: The Hydro-Guard Monitoring System registration email invitation will be sent from NOREPLY@MIWT.NET. In the event the customer does not receive

an invitation email, please check spam folders for the receipt. Some servers will block the message as spam until unblocked by the client. Suggestion: To ensure the email is received please email Mueller Co. at NOREPLY@MIWT.NET upon the placement of your order.

Once registered, users may log into the Mueller secure web page via the address: miwt.net. Once logged into the system, registered users can customize their management profile by selecting the "Edit Profile" tab on the top navigation bar.

REGISTRATION PAGE: This page will allow the client administrator to enter a password; select how the system shall send event notifications (i.e., SMS-text messaging, email – both, or none); and time zone settings. Once registered, users may log into the Mueller secure web page via the address: miwt.net.
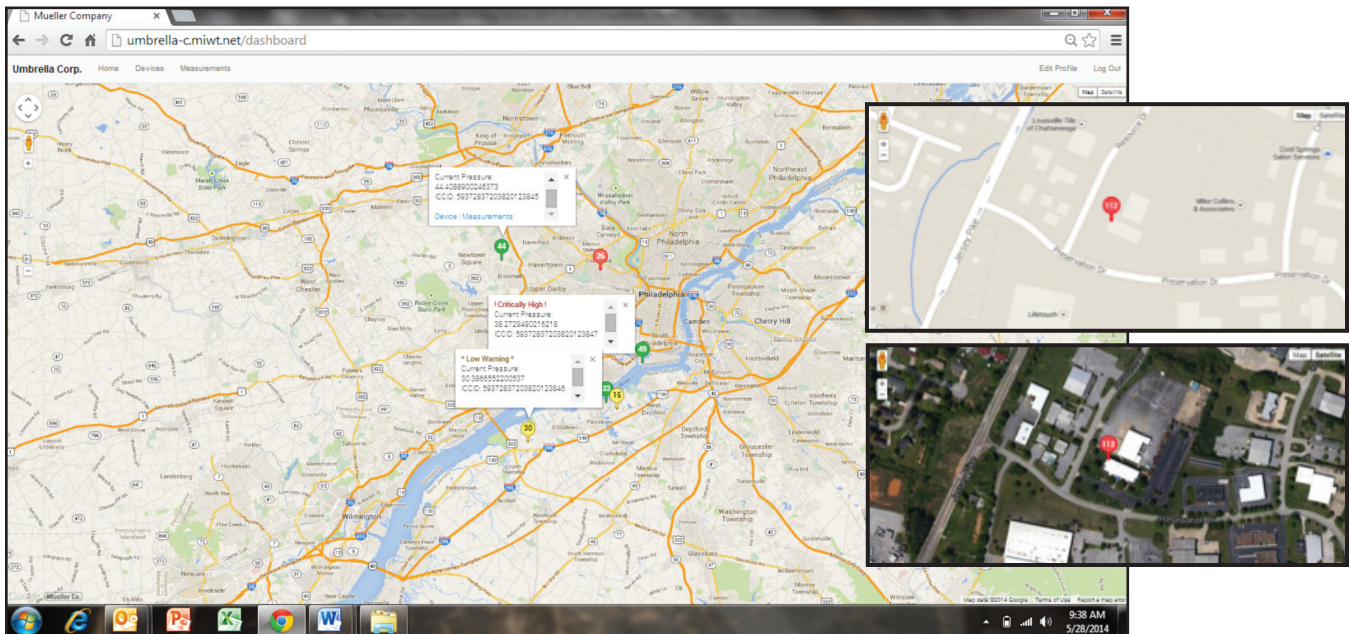

SIGN IN PAGE: Once registered, users may access current and historical pressure readings and view trending graphs by logging onto the system via the Sign In screen.

HOME PAGE: Once signed into the **"Device's"** home page an installation location map will appear. All pressure monitored locations within a client's distribution network will be viewable on the customer's secure website and interactive online map. To view measurements or to edit settings for a specific monitored location click the associated icon on the map.
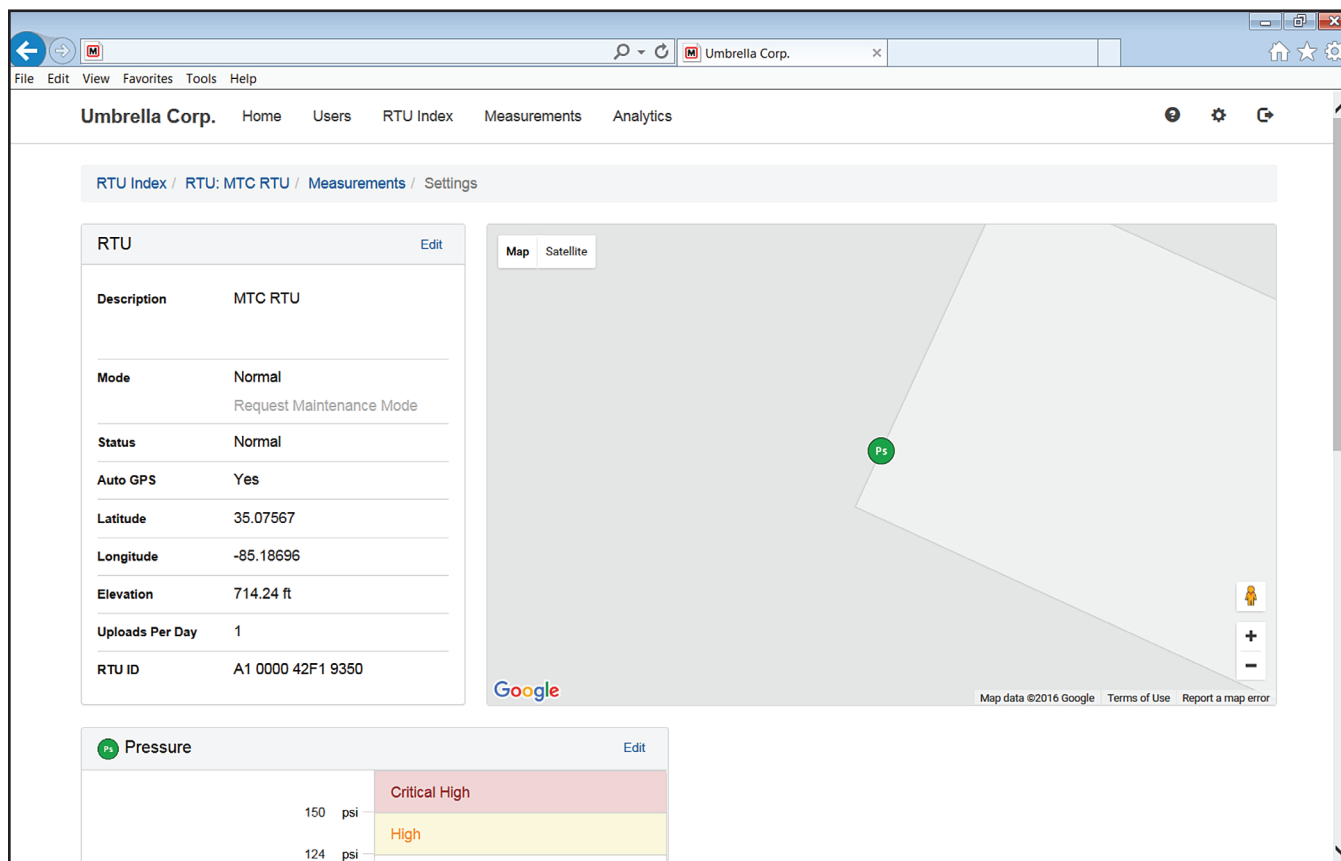
EDIT PAGE: From the **"Edit Device"** menu the viewer can select any existing **Device** to be edited. Selecting the **"Edit"** tab will advance the viewer to the edit screen where the viewer can view or customize the **"Device's"** management and sampling parameters. On the administrator screen (above), the customer can enter or change alert levels.

• **Data Upload/CONNECT function:** The Hydro-Guard® Pressure Monitoring System has been pre-programmed for one data upload per day (default). This setting can be modified to upload data weekly, daily, or up to 24 times per day. To modify the number of data uploads open the **Device** SETTINGS web page and locate the calendar application at the lower section of the management screen. Using the blue PLUS button, open the drop down navigation. Select CONNECT to select the date(s) and time(s) to initiate a data upload.

• **MAINTENANCE function:** The Hydro-Guard® Pressure Monitoring System allows for the scheduling of an immediate response log report, referenced as the MAINTENANCE mode. This mode can be scheduled or operated on an "as needed" basis.

• **TRANSIENT MONITORING function:** The Hydro-Guard® Pressure Monitoring System has the ability to monitor for transient pressures (up to 256 readings per second). This function must be scheduled. To schedule a transient monitoring session open the **Device** SETTINGS web page and locate the calendar application at the lower section of the management screen. Using the blue PLUS button, open the drop down navigation. Select PRESSURE-TRANSIENT CAPTURE. The select the date(s) and time(s) to schedule the **Device** to measure and log transient activity.

⚠ **WARNING: Operating in the PRESSURE-TRANSIENT CAPTURE mode for more than thirty (30) days during the life of the Device can reduce the Device's overall battery life.**

DESCRIPTION OF THE SETUP

• **Phone Number:** The phone number associated with the individual RTU is located on the bottom of the unit.

• **Description:** Customers notes for the particular site.

• **Latitude and Longitude:** GPS location of the unit is automatically determined when the **Device** is installed. In the event the GPS signal is obstructed and unable to locate the **Device**, the installer can manually enter the location on the MIWT website by selecting **Device** in the navigation bar and locating the proper **Device**. Click on the **Device** to be manually located and select "Edit" in the system management screen to enter the longitude and latitude of where the **Device** has been deployed. To determine the longitude and latitude of the **Device**, locate the nearest street address to the installation location. Using online resources, locate the longitude and latitude coordinates for the street address used.

• **High Warning and Low Warning:** Pressure level at which the customer is notified via SMS and/or Email.

• **Critical High and Critical Low:** Pressure at which the customer is notified via SMS and/or Email.

• **Elevation:** For operators interested in viewing head pressure measurements, the **Device** will pull the elevation for the installation point from the GPS mapping system and enter it into this management field. In the event the GPS is not able to populate this management field the field will be zero. A manual entry can be made in this field if the management field does not populate automatically.

• **Uploads Per Day:** Number of hours between data uploads. Recommended value is 2 (Default setting is 1). Once all desired management changes have been made complete the update by clicking on the SAVE button.

NOTES: Alerting messages occur when readings register above or below Warning and Critical Values

defined by the end user. User may define warning levels and critical levels for high and low pressures using the web interface. Alerts are sent when two consecutive readings are above or below the user defined levels.

Up to a 5-year battery life can be expected when recommended settings are utilized. Some settings outside of the recommended settings may reduce expected battery life.

To access a specific **Device** in a distribution network in order to update or change settings of that **Device**, navigate to the **Device** by either clicking on the **Device** from the HOME/MAP SETTINGS or use the top navigation bar to navigate to the RTU INDEX. Both paths will allow access to the settings specific to a **Device** installed in the field. From here the operator can update the specific **Device's** description; longitude and latitude; number of uploads per day; warning set points; and scheduling for monitoring and reporting of activity.
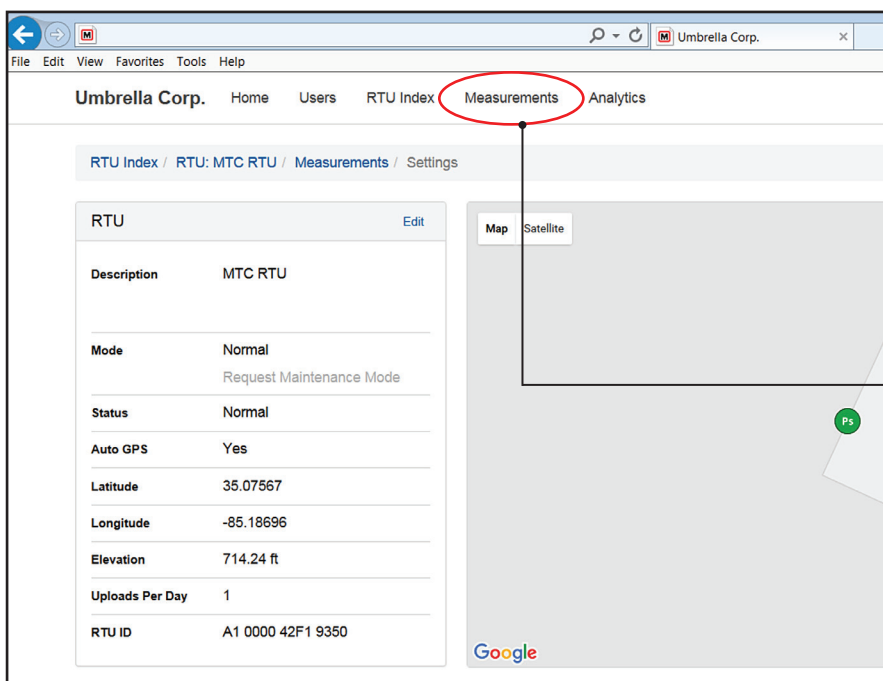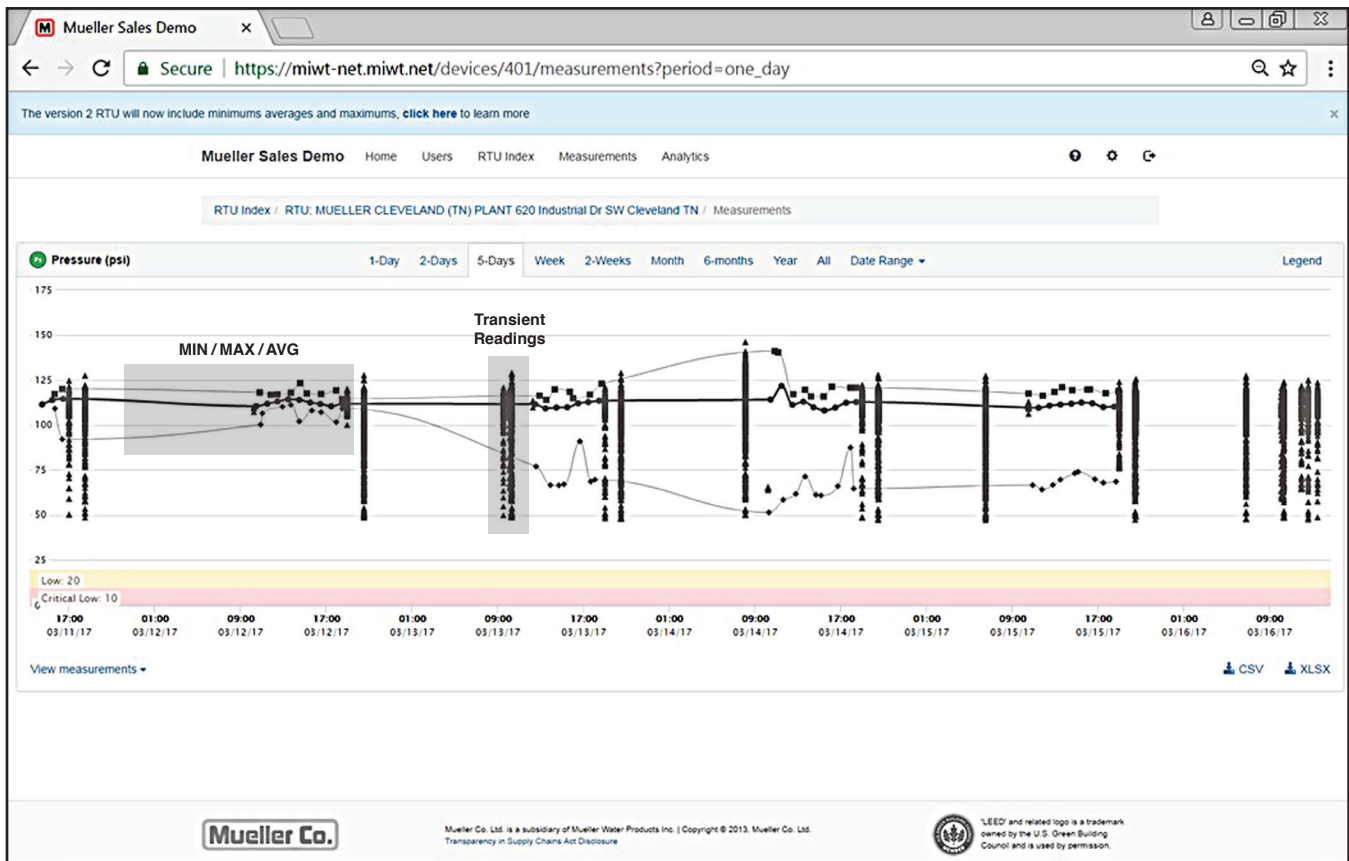

DEVICE PAGE: The **"Device"** home page contains specific information including location, alarm settings, and logging intervals. Authorized administrators or technicians can modify the **Device** settings from within the **Device** page.

The **"Measurements"** tab opens the data log screen which allows the user to browse data over various time frames for individual units.

MEASUREMENTS PAGE: From the Measurements page, the viewer can select a time frame to be viewed for the all units or select units. For example, by selecting **"Month"** all the data collected by an identified unit in the past month is shown on an operational curve of Pressure (psi) over that period of time. Measurements recorded today; over the past two days; over the past week; or even those recorded over the past two years can be viewed on the Measurements page. Data trend mapping includes minimum, maximum and averages for every hour, as well as transient state reports.
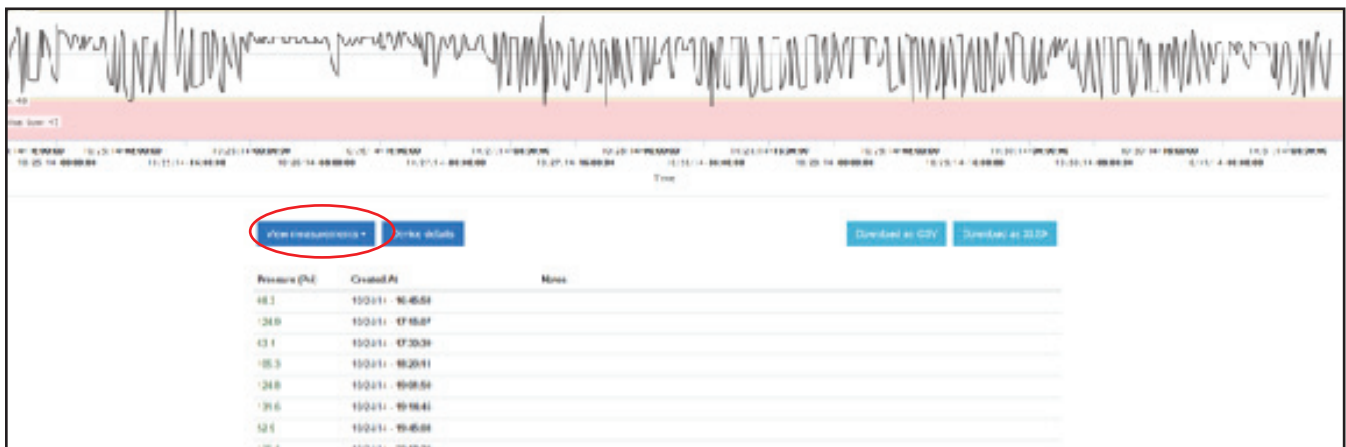
DATA LOG AND INFORMATION DOWNLOADS: Pressure measurements can be reviewed in log form. From the **Measurements** page select the View **Measurements** tab (see highlighted area). A running log of measurements can be viewed; notes related to the log entry can be added; and all information can be downloaded as a CSV or XLS file for system management recordkeeping.

SOFTWARE APPLICATION UPGRADE

AUTOMATED DATA TRANSFER AND LOGGING: The released Hydro-Guard App 1.0.0 software for the Hydro-Guard Pressure Monitoring System allows operators of the second generation product to schedule data transfers from each RTU to a designated storage folder located on their computer or network. To begin, start Launch of software application and log into the utility's MIWT.NET account. Follow these steps:

1. Located the settings icon (✳) and select;

2. Click on the **Hydroguard App 1.0.0** link to download the application file to a dedicated computer(s);

3. Once the application is loaded on the dedicated computer(s) click on the file to unpack the zipped file;

4. Extract the software application's management files by clicking on the **Hydroguard App 1.0.0.exe** application;

5. Click on the **EXTRACT ALL** button to open file location preference screen.

This link will allow for the preferred folder location to be selected—where the Hydro-Guard Pressure Monitoring spreadsheets will be saved;

6. Select the preferred location for where data should be stored;

7. Open folder to view saved data log spreadsheets.
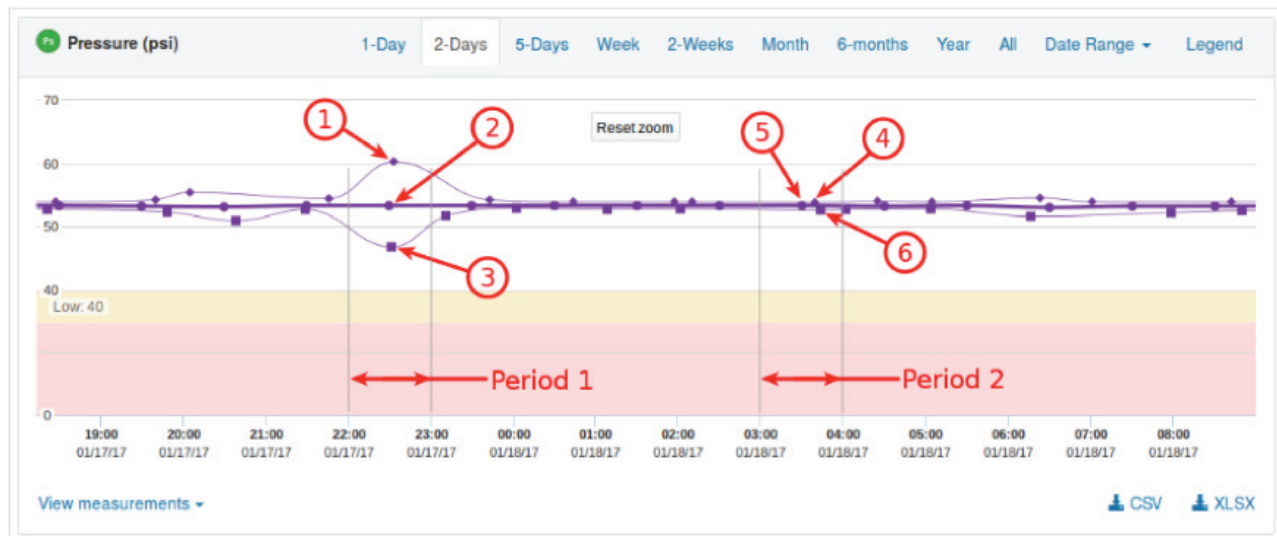
The data is presented for each period, for example on the image above, see **Period 1**. Each period starts at the top of the hour and lasts for one hour and has three data points:

- ① this is the period **maximum**, it is always the highest point in a period.

- ② this is the period **average**, it is always between the minimum and the maximum and it is represented by thick line.

- ③ this is the period **minimum**, it is always the lowest point in a period.

The average point will always be in the middle of a period, the minimum and the maximum will be placed at the time of when it was captured.

NOTE: 1 & 4 = Maximum; 2 & 5 = Average; 3 & 6 = Minimum.

ENHANCED TREND MAPPING: View MINIMUM, MAXIMUM and AVERAGE pressure readings for every hour on an enhanced graphical trend map at miwt.net.

Mueller Tech Center	Home	Users	**Devices**	Measurements			
Description		**Pressure**	**Warning Low**	**Critical Low**	**Warning High**	**Critical High**	
Test_Device: 3; Sensor Serial: 1419200209		**56.1**	1.0	2.0	175.0	180.0	
PowerAnalyzer Device		**4.5**	1.0	2.0	262.0	270.0	
Test_Device: 2; Sensor Serial: 1419200174		**56.8**	1.0	2.0	175.0	180.0	
Test_Device: 4; Sensor Serial: 1419200230		**56.2**	1.0	2.0	175.0	180.0	
Tim S Test Unit		**112.7**	20.0	40.0	80.0	100.0	
Device #3		**No data**	20.0	25.0	180.0	200.0	
Test_Device: 5		**260.2**	20.0	25.0	180.0	200.0	
GPS Development Unit		**260.1**	20.0	25.0	180.0	200.0	
8901 1704 2580 2049 4732		**57.9**	20.0	25.0	180.0	200.0	
8901 1704 2580 2049 4716		**57.3**	20.0	25.0	180.0	200.0	
8901 1704 2580 2049 4724		**57.2**	20.0	25.0	180.0	200.0	
8901 1704 2580 2049 4708		**56.9**	20.0	25.0	270.0	280.0	
Verizon A1 0000 42F1 6926		**261.7**	10.0	40.0	80.0	110.0	

INSTALLING ADDITIONAL PRESSURE MONITORS: New monitoring **Devices** will automatically appear on the customer web interface once installed. It may take up to 24 hours for data and location to appear after installation.

Mueller Tech Center	Home	Users	Devices	Measurements		Edit Profile	Log Out
Invite user						Press "Enter" to search	
Id	**Name**	**Role**	**Email**		**Mobile Phone No**		
054	Timothy Blair	Account Administrator	tjblair@muellercompany.com		2711024610		Delete

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ADDING USER ACCESS: Users may be added by the Administrator at any time using the "**Invite Users**" button under the "**Users**" Screen shown in the image below.

ROLE	USER	TECHNICIAN	ADMINISTRATOR
View Pressure Data	X	X	X
View RTU Settings	X	X	X
View and Edit Personal Data	X	X	X
Annotate Pressure Data		X	X
Change RTU Settings		X	X
Change User Privileges			X
Add/Remove Users			X
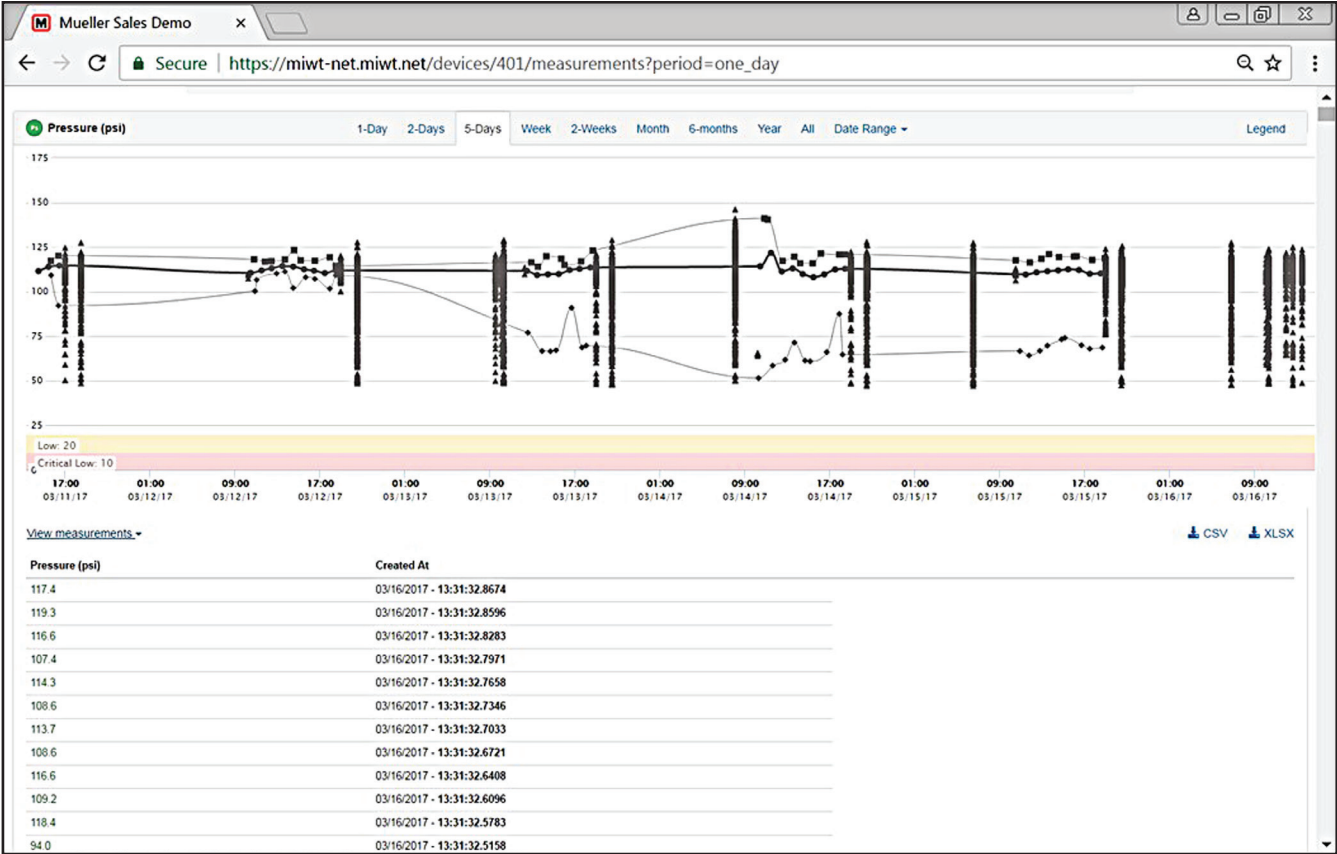
ANALYTICS: The Hydro-Guard® Monitoring System features an analytic function that allows an operator to compare measurements against one another for enhanced distribution system management.

BATTERY REPLACEMENT

Batteries are field replaceable and can be ordered through Mueller Company. DO NOT disassemble the RTU until the replacement batteries have arrived with replacement instructions included. Contact Mueller Customer Service for safe handling and return instructions for used batteries.

⚠️ **WARNING: Battery must be replaced by a qualified electrical technician. Contact Mueller Co. for additional support.**

1. Remove ten (10) screws to separate the battery compartment from the antenna and micro computer.

2. Carefully slide out the antenna wire retainer from the battery compartment so that the antenna wires are free.

3. Disconnect battery lead connectors and reconnect new battery pack using the mated connectors on the replacement battery. Ensure wires are securely connected before moving to step 4.

NOTE: Be sure to connect similar color wires.

4. Reinsert the antenna wire retainer.

5. Reattach the ten (10) screws.

NOTE: Unit includes Lithium batteries which should be returned to Mueller Co. for proper disposal. Return instructions will be provided with replacement parts. Contact Mueller Customer Service for assistance.

Other Options
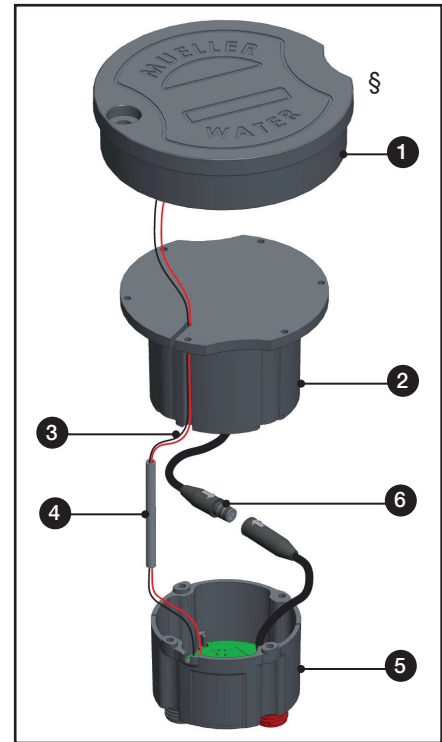*Optional Valve Box Lengths:*
• 3', 5', 7', 9'

Service Saddles:
• Bronze Double Strap (up to 200psig)
• Ductile Iron Double Strap (over 200psig)
• Bronze OD Controlled for PVCPipe (up to 200psig)

Pressure Sensors:
• Up to 250psig
• Pressures over 250psig*

*Indicates Standard Option

ID NUMBER	DESCRIPTION
1	Antenna and Lid
2	Battery
3	Power Wires
4	Antenna Wire Retainer
5	Micro Computer
6	Connectors

TECHNICAL INFORMATION

Battery Life: Five (5) Year minimum when recommended settings are utilized.

Pressure Range: 0 to 250psig.

Standard Sensor Pressure (0 to 250psig) Over Pressure: In the event that the pressure exceeds 250psig, per the manufacturers specification, the the overpressure rating of the sensor is 700psig; however, the sensor may be damaged should pressure exceed 500psig. The RTU will only identify pressures up to 250psig.

Operating Temperature Range: –30°F to 150°F.

Pipe Diameter Range: ½" or larger.

Default Sampling Range: 1 sample every 15 seconds.

Transient Pressure Monitoring: Scheduling of transient monitoring is available with this product. Transient pressures will be measured at a rate of 256 samples per second for a scheduled period of time as defined by the operator. Mapping of transient-state data points will be less than 256 data points. Data mapping is dependent upon volatility of transient activity.

Resolution: 12-bit

Accuracy: +/– 2psi (250psi sensor)
             +/– 5psi (500psi sensor)

NOTE: Some settings outside of the recommended settings may reduce expected battery life.

HYDRO-GUARD® Remote Pressure Monitoring System

TROUBLESHOOTING AND FREQUENTLY ASKED QUESTIONS

Troubleshooting Guide

Customer/User does not receive acknowledgement email when new users are set up.

Customer email system must be able to receive email from noreply@miwt.com. Contact your IT department to make sure this email address is not blocked.

Frequently Asked Questions (FAQ's)

Q. *What is my cost of ownership?*

A. The initial purchase price of the unit includes the first year of cellular service and a 5 year battery. Additional years of cellular service and a 5 year replacement battery may be purchased from Mueller Company. Additional costs may include installation of the unit by others.

Q. *Who manages my web account?*

A. The customer's administrator who is to be identified at the time of the initial purchase. Customer can add or remove administrators as desired. Contact Mueller Customer Service if the administrator changes.

Q. *Who has access to the website?*

A. Customer administrator may grant access to an unlimited number of authorized users within their organization. Roles that can be assigned are: User, Administrator, and Technician. These roles have different accessibility to data.

Administrator: Administrative and Editing Rights
Technician: Viewing and Editing Rights
User: Viewing Rights

Q. *Where is the data stored?*

A. Customer specific data will be uploaded to a secure cloud based system that is only accessible by the clients authorized personnel and the Mueller system administrator.

Q. *Who does the data belong to?*

A. All data captured by the **Device** is the sole property of the client. Mueller does not review or analyze data unless specifically requested to do so for technical service purposes only.

Q. *Can the data be downloaded?*

A. Yes, data can be downloaded into Microsoft™ Excel® or other spreadsheet management software.

Q. *How long is the data stored on the web?*

A. Data is stored in the cloud-based storage for a period of two years. Data older than two (2) years is automatically purged from the customer's database.

Q. *Will the pressure monitoring system work with Mueller Systems Monitoring Software?*

A. Not currently.

Q. *At what frequency should the sensors be installed?*

A. A minimum of two (2) per district metering area (DMA) or pressure zone.

**Q.** *Are the Pressure Monitoring Systems SCADA compatible?*

A. When connecting any SCADA system to an outside source it is advisable for the system integrator to comply with the data security guidelines found in NIST Special Publication 800-82 "Guide to Industrial Control Systems (ICS) Security. For additional information refer to http://csrc.nist.gov publications/nistpubs/800-82/SP800 82-final.pdf

Q. *Will the Pressure Monitor notify of power failure?*

A. Data storage is unaffected by power failures; however, if cellular service is interrupted or the Pressure Monitoring System malfunctions, data transfer will discontinue and service may be required. Notification of a system power failure will be indicated by the **Device's** failure to report data.
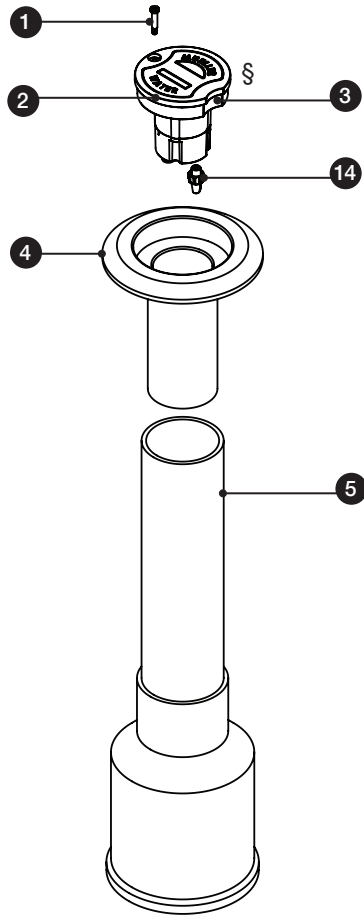
REPLACEMENT PARTS

ID	DESCRIPTION
1	$^{3}/_{8}$" Ø x $1^{3}/_{8}$" shoulder x $^{5}/_{16}$" - $^{5}/_{18}$" screw – SS
2	Antenna/Composite Lid
3	RTU (Remote Telemetry Unit) w/Lithium Batteries
4	AJBV-4D Ductile Iron Adjustable Top – 12" L
5	Mueller Composite Valve Box – 5 ft.*
6	Male-end Sensor Cable Connector
7	Mueller Valve Box Guide Plate
8	Sensor Cable Sub-Assembly
9	Pressure Sensor
10	¾" NPT to ¼" NPT Reducer Bushing
11	Mueller 300 Ball Corp. Valve, ¾"
12	Bronze Service Saddle – Double Strap**
13	Mounting Bracket
14	Waterproof Plug

* Valve Box also available in 3', 7', and 9' lengths.
**Bronze Slip Hinge Saddles Available for IPS & C900 PVC. If the pressure may exceed 200psi, a ductile iron saddle should be used.
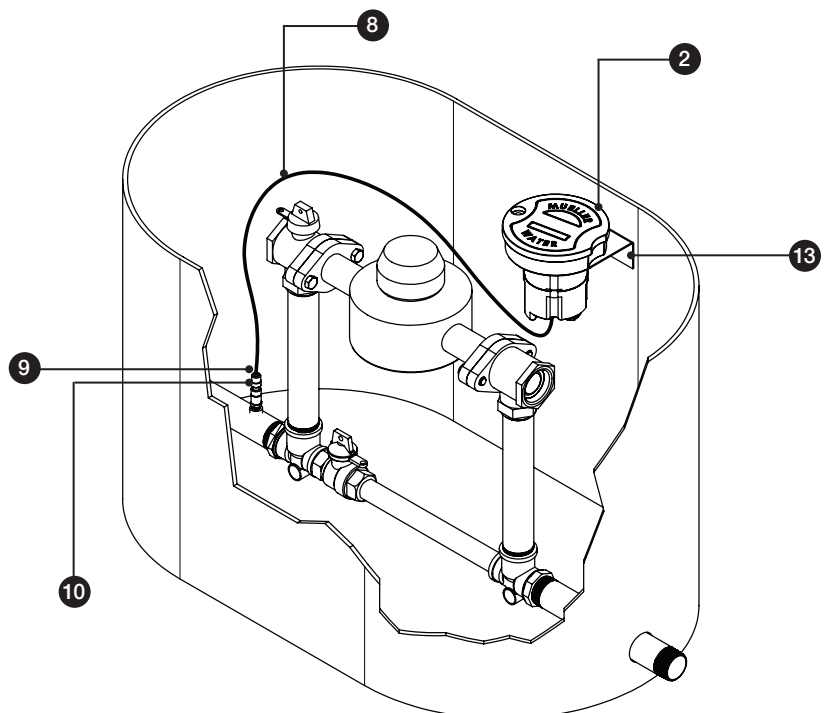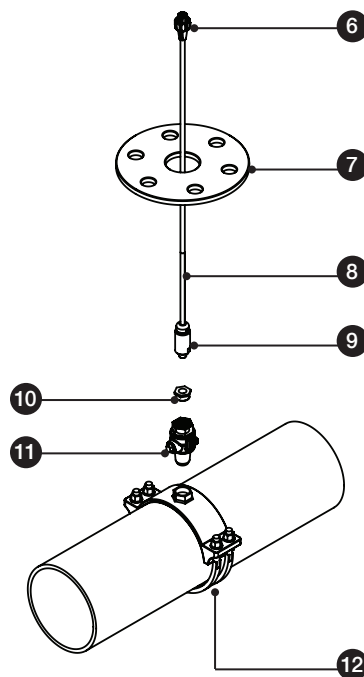
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