

HYDRO-GUARD™

Operating Instructions

REMOTE PRESSURE MONITORING SYSTEM



Chattanooga, Tennessee 37450

www.muellercompany.com

CAUTION

1. 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.
2. United States Patent and Trademark Office – Patents Pending. The content of this manual is the sole and exclusive property of Mueller Co. Unauthorized distribution or reproduction strictly prohibited.

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REMOTE PRESSURE

MONITORING

SYSTEM

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HYDRO-GUARD™ REMOTE PRESSURE MONITORING SYSTEM

Warranty, Safety, Shipping

LIMITED WARRANTY

The Hydro-Guard® Remote Pressure Monitoring System is warranted for one year from the date of delivery. Mueller® will repair or replace any defective part or component as long as the unit is installed and operated in accordance with the procedures described within this manual. Damage or failure caused by the improper installation, assembly, disassembly, maintenance, or operation of the Remote Pressure Monitoring System is not covered by the terms of this warranty. Warranty Service is available by contacting Mueller® at (844) 263-5395 during Monday through Friday between 8am and 5pm Eastern.

SAFETY & OPERATIONAL PROCEDURES

- Each person involved in the assembly, installation and/or maintenance of the Remote Pressure Monitoring System must read this manual carefully and follow all instructions prior to performing any installation or maintenance procedures involving the unit.
- Be sure the corporation valve or other isolation valve is closed prior to installation or removal of the pressure sensor.
- Always use all necessary safety equipment and follow all recommended procedures when installing, operating and maintaining the Remote Pressure Monitoring System.
- 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 Technical Service can assist in the verifying that the proper saddle and valve box can be supplied.
- When installing the Remote Pressure Monitoring System ensure the known pressure is less than 250 psi. If pressure may exceed 250 psi at identified installation site, contact Mueller Technical Service for proper configuration.
- 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 can be compromised by the location of the **Device**. Location of the **Device** should take into account buildings or geographic features which may block the GPS signal. The GPS antenna must have a direct view of GPS satellites with an unobstructed line of sight. An Installation with an obstructed view could hinder reception quality. It is recommend that when possible

observation angles of 70° from the vertical axis (20° above the horizon) be maintained. When installing the RTU, select a site where the RTU will not become buried by snow; covered by foliage; or obstructed by parked vehicles. If possible, avoid placing the GPS-equipped RTU in close proximity to broadcast antennas or high power transmitters. In the event the **Device** cannot be located automatically, due to interference, the location of the unit may be entered manually so that it displays properly on the map. See instructions on manual map location setup.

NOTE: Composite lids must be utilized in vaults or boxes to ensure cellular communication signals can broadcast without hindrance.

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® 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.

INSTALLATION

HYDRO-GUARD™ REMOTE PRESSURE MONITORING SYSTEM

Installation Procedures and Site Evaluation

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/CDMA or AT&T/GSM) is available at the identified site. Contact Mueller Technical Service for additional support if required.

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 IWT™ 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.

A. Installation with 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 Figures 1 and 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 Figures 1 and 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
4. After the drilling operation is complete and the 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.
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.

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

The screenshot displays the 'Device' management interface. On the left, a table lists device details: Description (Tim S. Test Unit), Mode (Normal), Status (Critical High), Latitude (35.0757516666667), Longitude (-85.1868716666666), Uploads per Day (0), and ICCID (8901 1704 2580 2049 4799). On the right, a map shows the device location with a red pin. Below the map is a 'Pressure Sensor' status chart with five horizontal bars representing pressure levels: Critical High (red), High (orange), Normal (yellow), Low (light yellow), and Critical Low (pink). A callout box on the right provides a detailed view of the device settings:

Mode	Normal
<input type="checkbox"/> 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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Installation Procedures and Site Evaluation

6. 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 composite valve box (MC014 – Rev 02/14) located at the following web address: <http://catalog.muellercompany.com/Catalog/Composite-Valve-Box-Sold-in-US-and-Canada/555>

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.

NOTE: Be sure the sensor tip is exposed to line pressure prior to connecting the sensor cable to the RTU.

7. 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).
8. 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.

9. 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” section on page 9.

B. Installation with 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” section on page 9.

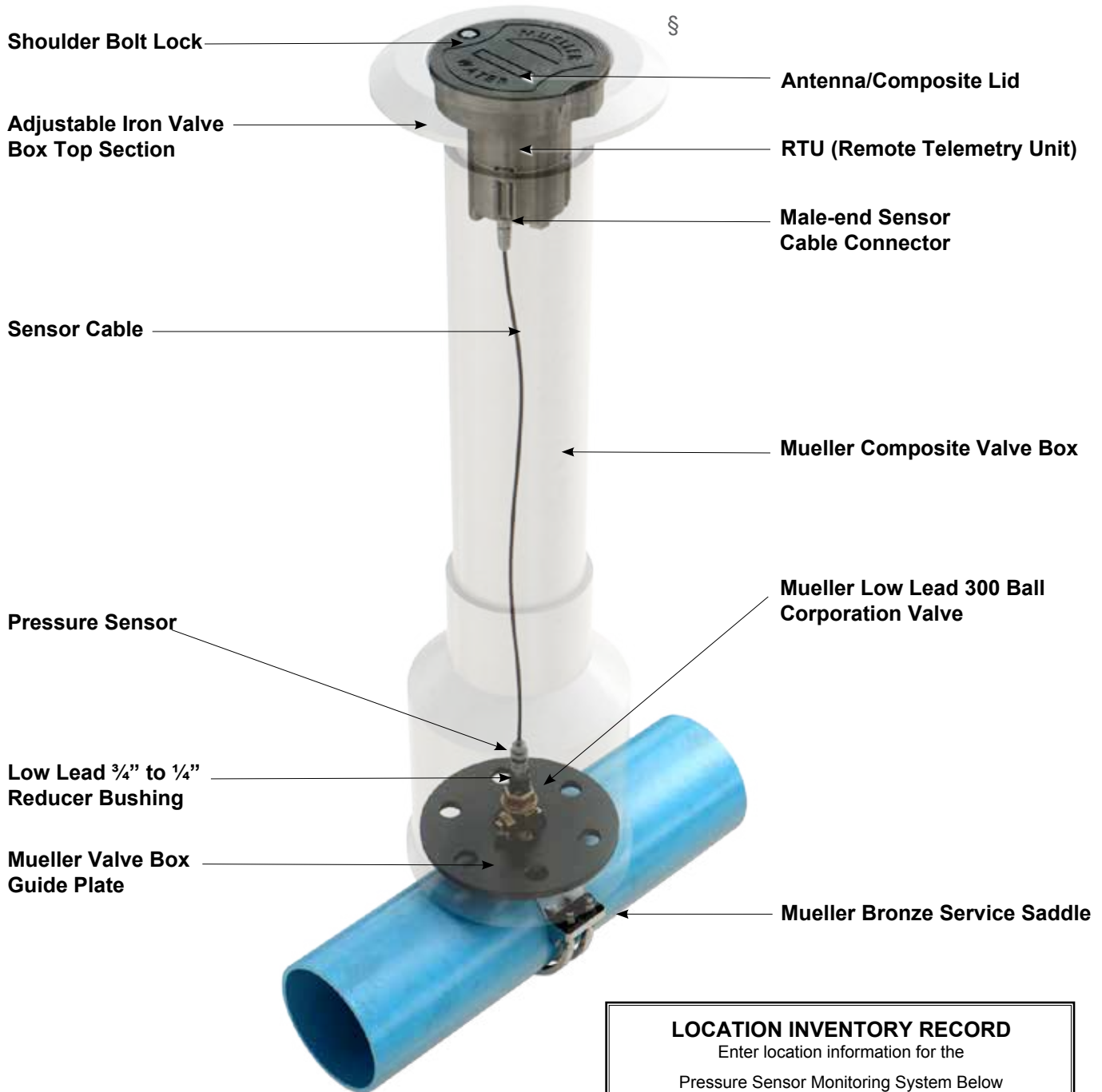
NOTE: For best communication performance RTU must be installed vertically with the flange facing up. See Parts Illustration Figure 2.

NOTE: 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.

HYDRO-GUARD™ REMOTE PRESSURE MONITORING SYSTEM

Parts Illustration

FIGURE 1



LOCATION INVENTORY RECORD

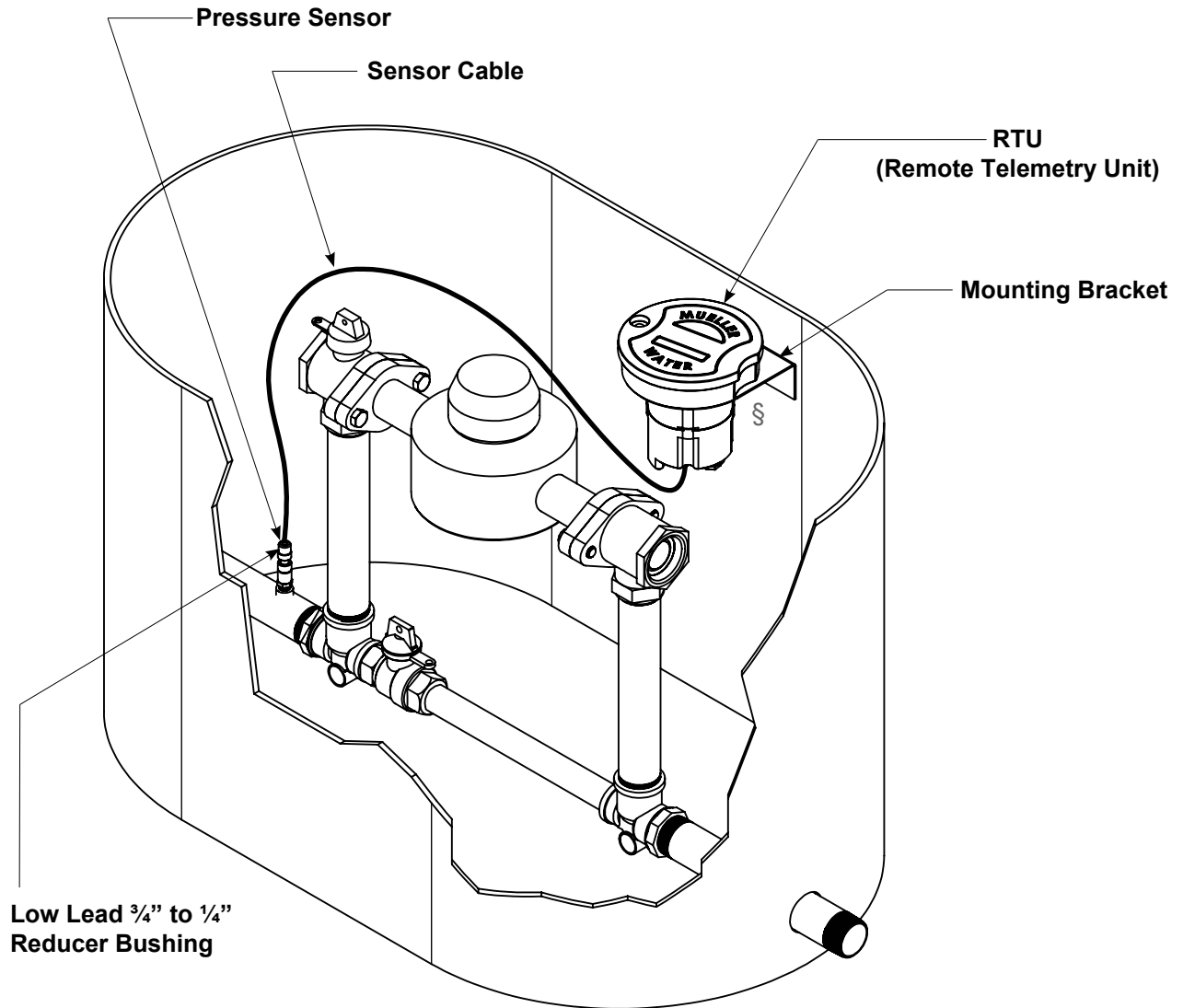
Enter location information for the
Pressure Sensor Monitoring System Below

Model #: PS-1500
 SIM#: _____
 Address: _____
 City/State: _____
 FCC ID #: R17HE910
 Patent: www.mwppat.com

HYDRO-GUARD™ REMOTE PRESSURE MONITORING SYSTEM

Parts Illustration

FIGURE 2



LOCATION INVENTORY RECORD

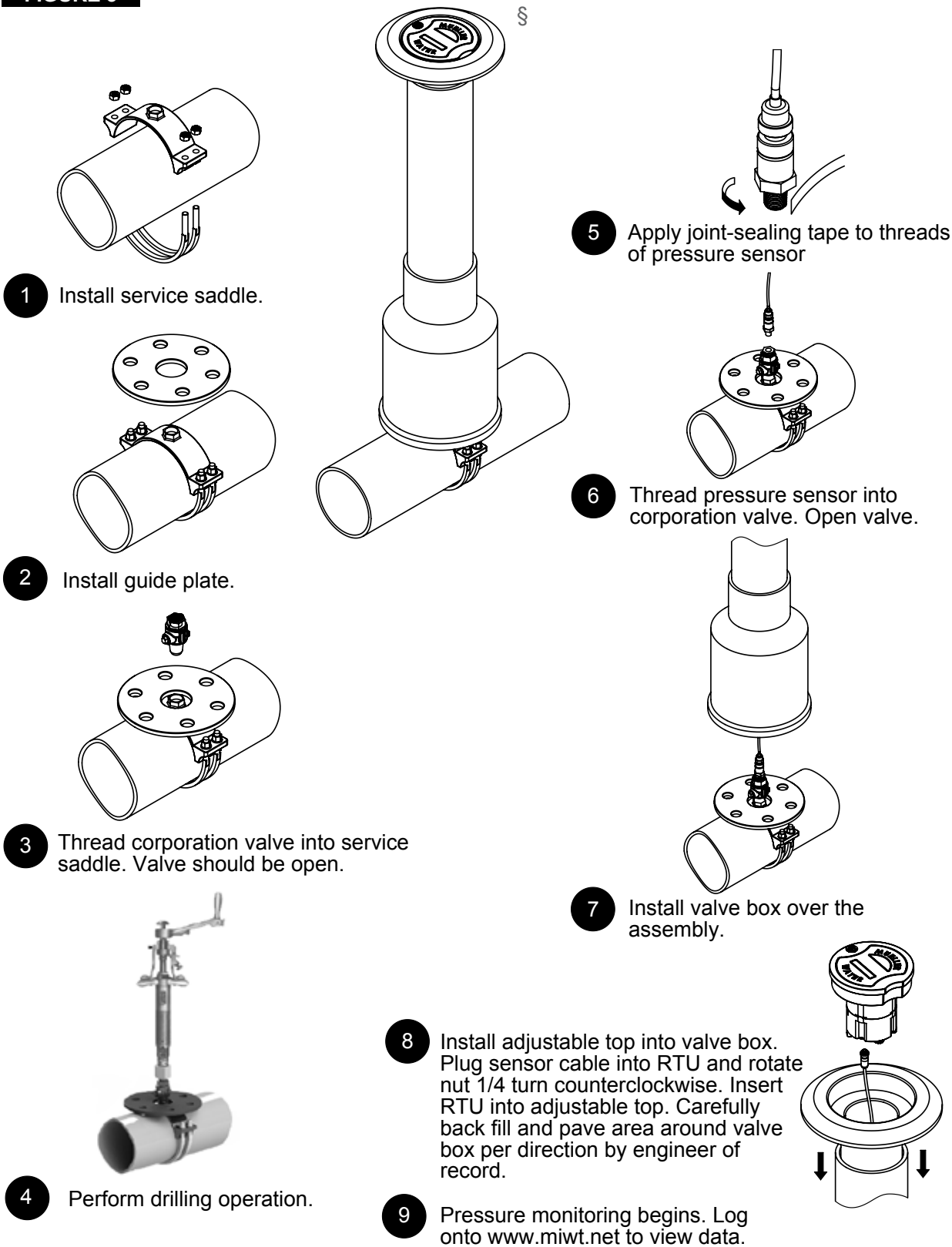
Enter location information for the
Pressure Sensor Monitoring System Below

Model #: PS-1500
SIM#: _____
Address: _____
City/State: _____
FCC ID #: R17HE910
Patent: www.mwppat.com

HYDRO-GUARD™ REMOTE PRESSURE MONITORING SYSTEM

Parts Illustration

FIGURE 3



HYDRO-GUARD™ REMOTE PRESSURE MONITORING SYSTEM

Operating Instructions

GETTING STARTED

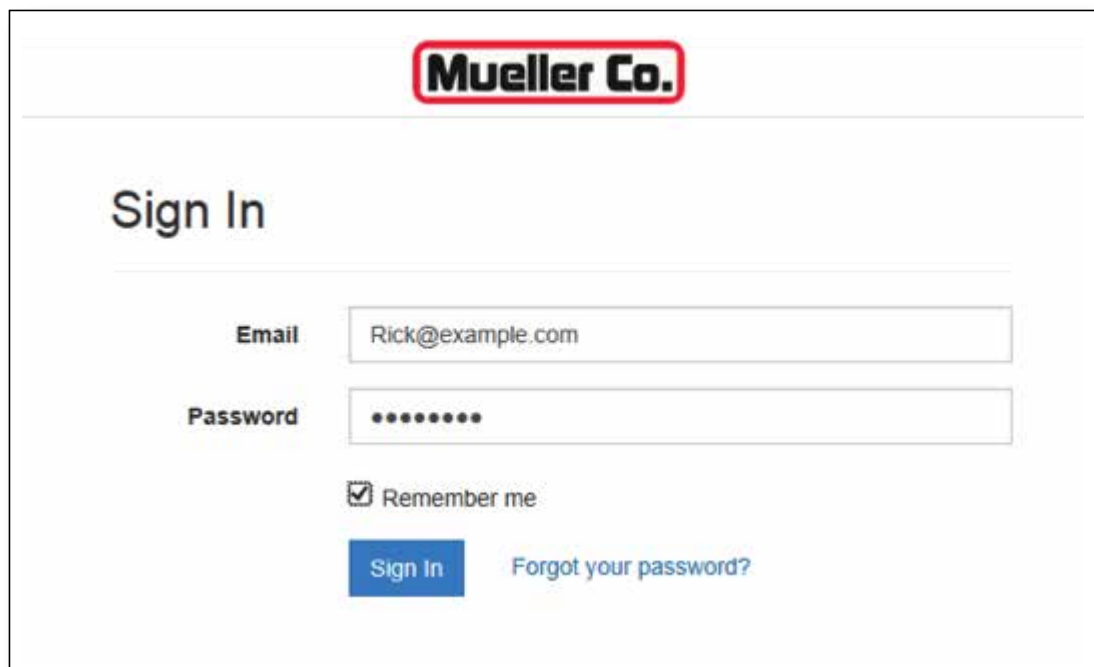
The **Device** will begin logging data once the sensor cable is plugged into the Remote Terminal Unit (RTU); however pressure readings may take up to 24 hours to be transmitted to the website. The **Device** will reveal system pressures with no additional inputs. Up to four (4) customizable values can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

Once installed, the module is ready for operation and system monitoring. During deployment process, a

Mueller® (Intelligent Water Technology) administrator will send an invitation email to the designated customer administrator with System Registration instructions. The customer can forward directions to multiple users for registration with the online utility.

Once registered, users may log into the Mueller® secure web page via the following 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.

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



Mueller Co.

Sign In

Email Rick@example.com

Password

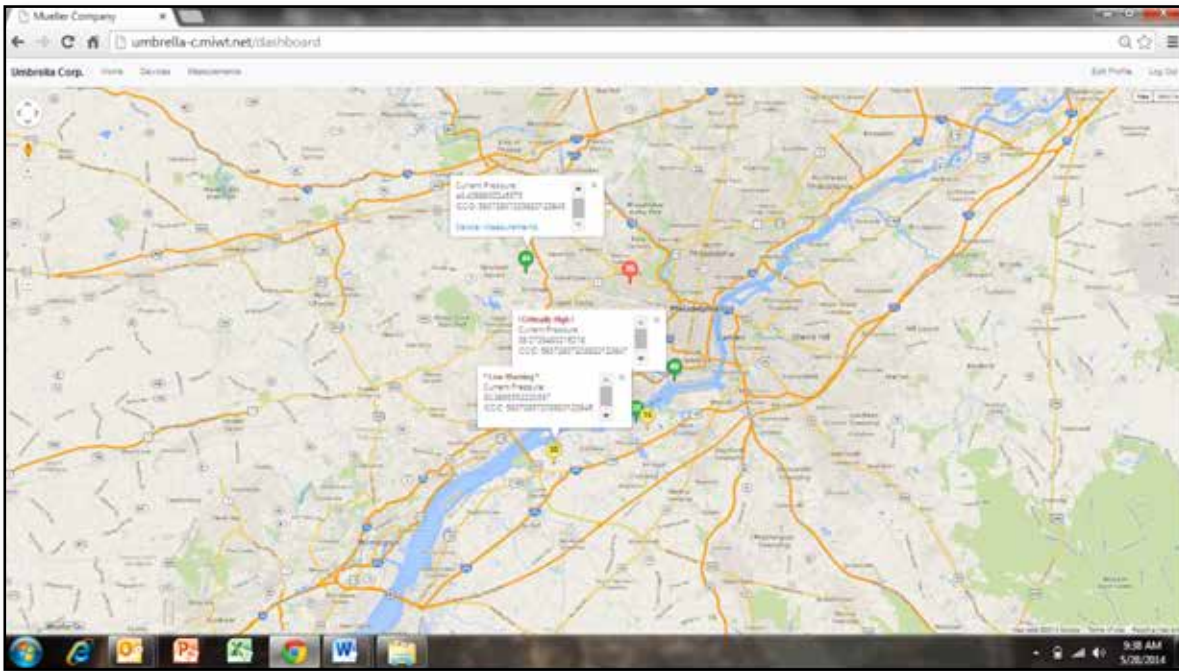
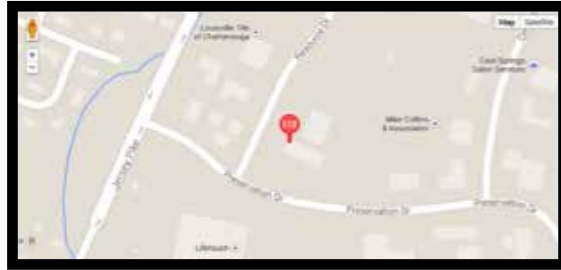
Remember me

[Sign In](#) [Forgot your password?](#)

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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.



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Operating Instructions

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.

The screenshot shows the 'Device' edit page. On the left, there is a 'Device' information table with an 'Edit' button. The table contains the following data:

Field	Value
Description	Tin & Test Unit
Mode	Normal
<input type="checkbox"/> Request maintenance mode	
Status	Critical High
Latitude	35.0757515888867
Longitude	-85.18667166666655
Uploads per Day	0
ICCID	8801 1104 2588 23974788

In the center is a map showing the device location with a red pin labeled 'T19'. The map includes street names like 'Lansville Trl of Chalmers' and 'Mills Cylins & Associates'. On the right, there are 'Info' and 'Settings' buttons.

Below the map is the 'Pressure Sensor' configuration table, which defines alert levels:

Alert Level	Value	Unit
Critical High	130.0	psi
High	80.0	psi
Normal		
Low	40.0	psi
Critical Low	20.0	psi

On the administrator screen shown above, the customer can enter or change alert levels.

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DESCRIPTIONS 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.net 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.
- **Logging Interval:** Device samples pressure at least once per minute and it will store the highest and lowest recorded values per hour.
- **Uploading interval:** Number of hours between data uploads. Recommended value is 24.

Once you've made the desired adjustments, simply select the **"Update Device"** button and you will be directed to the individual screen with map of the Device.

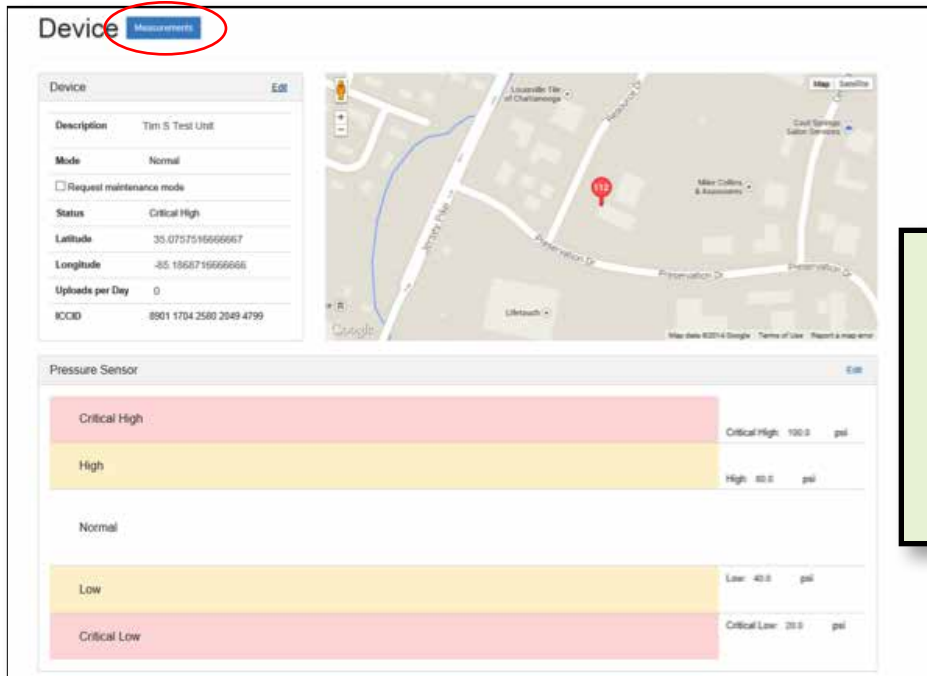
NOTE: Alerting messages occur when readings register above or below Warning and Critical Values defined by the end user. User may define warning levels and critical levels for high and low pressures using the web interface. Alerts are sent when two consecutive readings are above or below the user defined levels.

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

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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 (highlighted in blue and located next to the upper left corner of the control screen) 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.

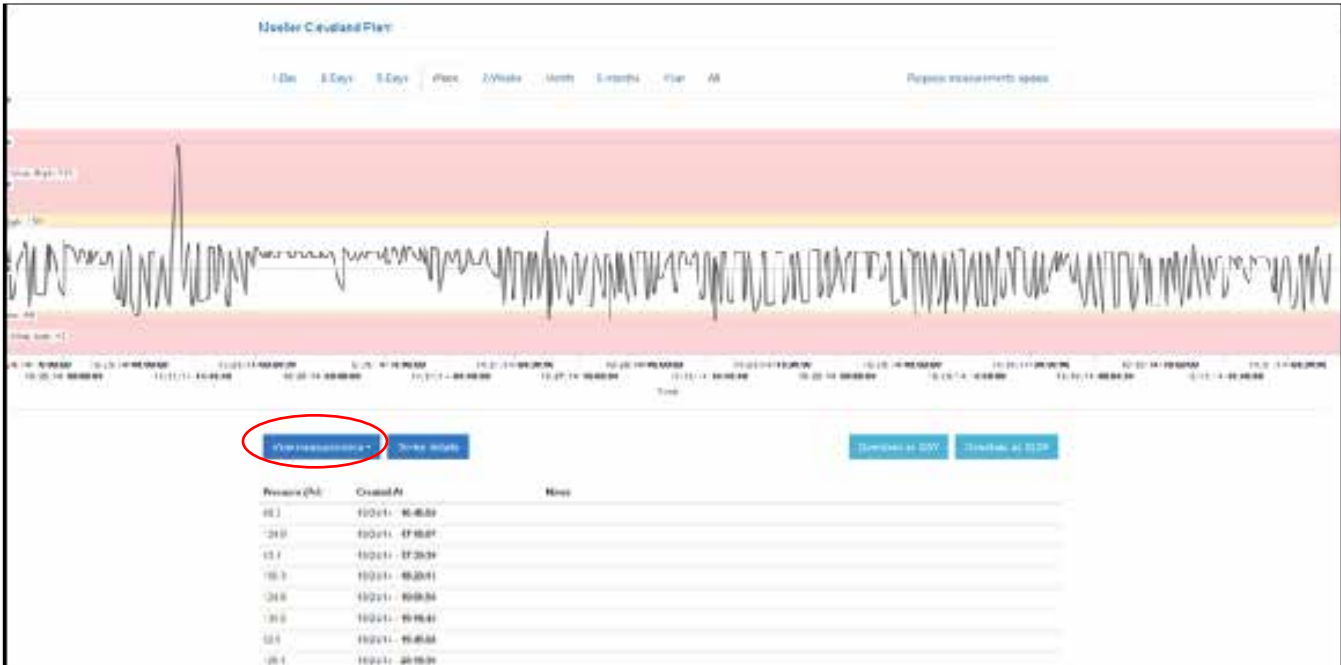


Measurements recorded today; over the past two days; over the past week; or even those recorded over the past two years can be viewed on the **Measurements** page.

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Operating Instructions

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.



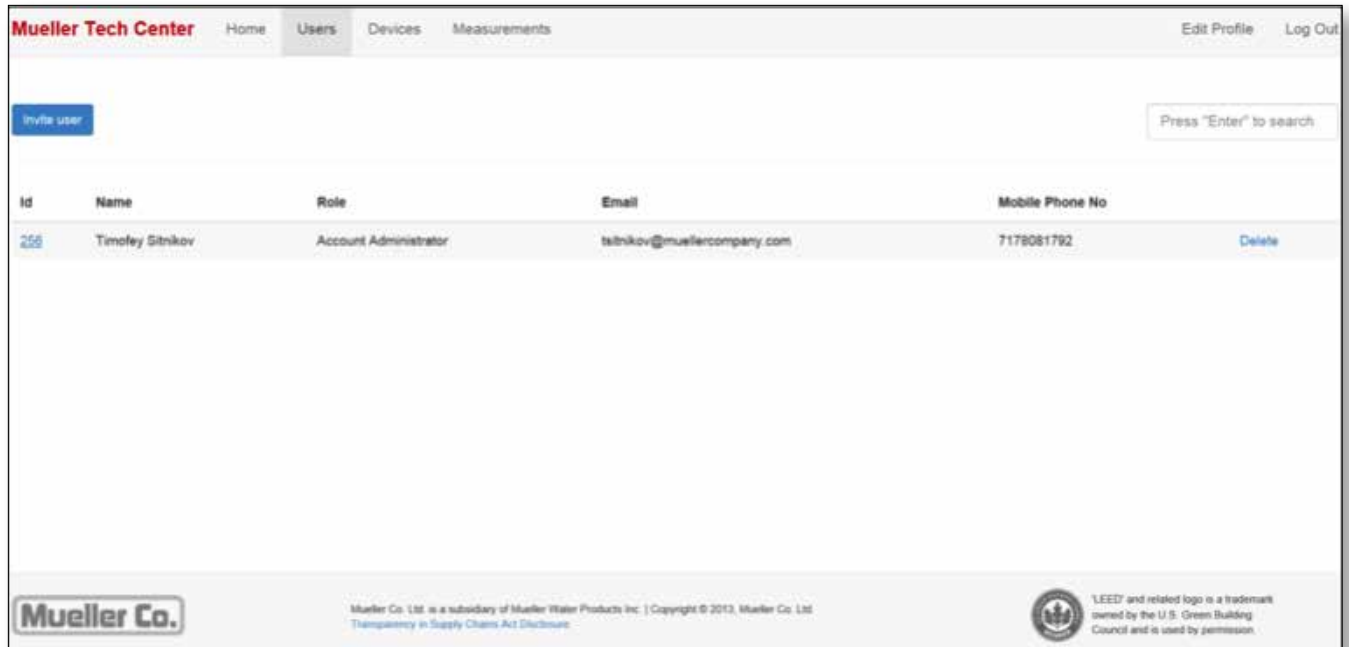
INSTALLING ADDITIONAL PRESSURE MONITORS: New monitoring **Devices** will automatically appear on the customer web interface once installed. It may take up to 24 hours for data and location to appear after installation.

Mueller Tech Center						
Home Users Devices Measurements						
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	

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Operating Instructions

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

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Battery Replacement and Technical Information

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.

Procedure

WARNING: Battery must be replaced by a qualified electrical technician or contact Mueller 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. Cut the battery leads and reconnect new battery pack with crimp-on waterproof connectors with shrink wrap supplied by Mueller.

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.

OTHER OPTIONS

Optional Valve Box Lengths:

- 3', 5', 7', 9'

Service Saddles:

- Bronze Double Strap (up to 200 psi)
- Ductile Iron Double Strap (over 200 psi)
- Bronze OD Controlled for PVC Pipe (up to 200 psi)

Pressure Sensors:

- Up to 250 psi
- Pressures over 250 psi*

TECHNICAL INFORMATION

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

Pressure Range: 0 to 250 psi.

Standard Sensor Pressure (0-250psi) Over Pressure:

In the event that the pressure exceeds 250 psi, per the manufacturers specification, the the overpressure rating of the sensor is 700 psi; however, the sensor may be damaged should pressure exceed 500 psi. The RTU will only identify pressures up to 250 psi.

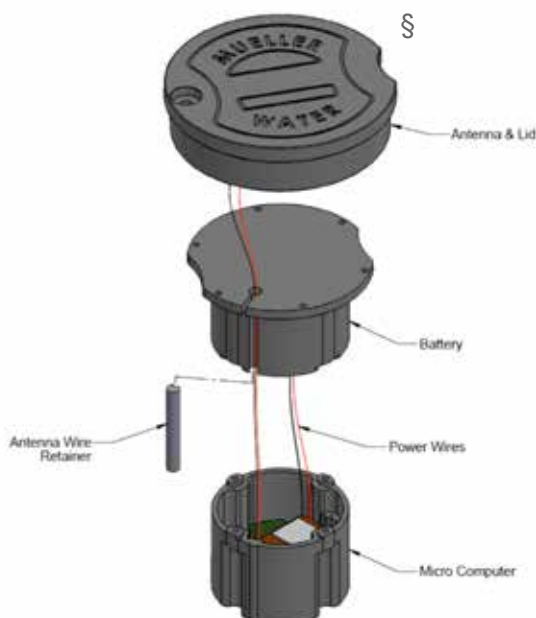
Operating Temperature Range: -30°F to 150°F.

Pipe Diameter Range: ½" or larger.

Default Sampling Range: 1 sample every 15 seconds.

*Indicates Standard Option

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



HYDRO-GUARD™ REMOTE PRESSURE MONITORING SYSTEM

Troubleshooting/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 filtered.

FREQUENTLY ASKED QUESTIONS (FAQ's)

What is my cost of ownership?

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.

Who manages my web account?

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.

Who has access to the website?

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

Where is the data stored?

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.

Who does the data belong to?

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.

Can the data be downloaded?

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

How long is the data stored on the web?

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

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

Not currently.

At what frequency should the sensors be installed?

A minimum of 1 per district metering area, or DMA.

Are the Pressure Monitoring Systems SCADA compatible?

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>

Will the Pressure Monitor notify of power failure?

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.

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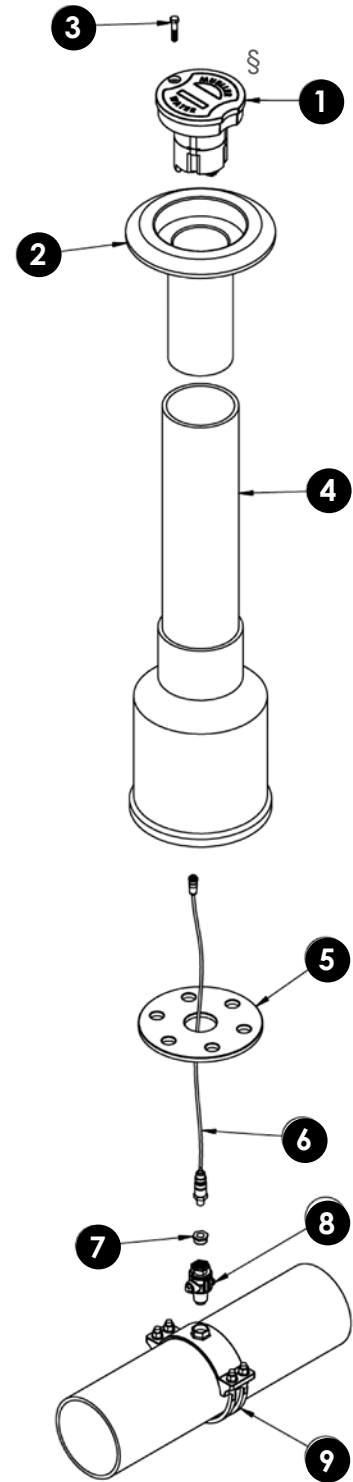
Parts List

PARTS

Item	Quantity	Description
1	1	RTU (Remote Telemetry Unit) with Lithium Batteries
2	1	AJBV-4D Ductile Iron Adjustable Top–12" Length
3	1	³ / ₈ " dia x 1 ³ / ₈ " shoulder x ⁵ / ₁₆ " - ⁵ / ₁₈ " screw – SS
4	1	Mueller Composite Valve Box – 5 ft.*
5	1	Valve Box Guide Plate
6	1	Sensor Cable Sub-Assembly
7	1	Reducer Bushing – ³ / ₄ " NPT to ¹ / ₄ " NPT
8	1	Mueller 300 NO Ball Corp. Valve, ³ / ₄ "
9	1	Bronze Service Saddle – Double Strap**

* 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.



HYDRO-GUARD™ REMOTE PRESSURE MONITORING SYSTEM

Notes



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Canada: 1.705.719.9965
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