

Swagelok® Remote Monitoring System Installation, Operation, and Maintenance Manual



This manual contains important information for the safe and effective operation of the Swagelok® remote monitoring system. Users must read and understand its contents before operating the system.

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Introduction

This document covers the installation, operation, and maintenance of the Swagelok® remote monitoring system. Comprised of three components, this system enables the remote measuring of pressure, temperature, and flow within a fluid system. Wireless transmitters, installed as part of the system, communicate fluid system data to a centrally located, hardwired gateway. The Swagelok® digital control panel software on the gateway allows users to monitor incoming data, create custom views, and more.

Safe Product Use

Follow any enclosed instructions and refer to the product application guide for detailed product information. When using a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user. Improper selection or misuse of the product may result in serious personal injury or property damage.

Safety Summary

For the **gateway safety summary** please see the Advantech® UNO-430-E1H Intel® Atom® Waterproof Data Gateway with IP66 Rating and Explosion Protection for reference to any safety precautions or safety instructions.

Please read before use.

https://advdownload.advantech.com/productfile/Downloadfile5/1-27ZTJ8F/UNO-430%20EXP_EN_User_Manual_Ed.1.pdf

Signal Words and Alert Symbols

WARNING	Statements that indicate a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Statements that indicate a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Statements that indicate a hazardous situation which, if not avoided, could result in damage to the equipment or other property.



Safety alert symbol indicating a potential personal injury hazard.

Warnings



WARNING: Read the entire safety information section and user's manual before using this product. Failure to do so can result in serious injury.



WARNING: The transmitter and gateway are intended to be used as specified within this document. To avoid personal injury and/or damage to equipment, do not attempt to alter or tamper with the transmitter.



WARNING: To avoid personal injury and/or damage to equipment, do not attempt to remove a transmitter from a system while it is under pressure.



WARNING: There is a risk of explosion if the battery is replaced with an incorrect battery type. To avoid personal injury and/or damage to equipment, always use the correct battery type.

NOTICE: This product contains aluminum. Care must be taken to avoid equipment damage due to impact or friction.

NOTICE: Pressure sensors will be visible through the Swagelok fitting port in the rear-ported configuration. Do not insert any tools or sharp objects into the bore as damage to the sensing diaphragm, which would impact transmitter performance, can result.

Grounding



CAUTION: The transmitter enclosure is a grounded device. To tie to earth ground, ensure a stable ground connection is made to the connected system. To avoid potential injury or damage to equipment, exercise caution in hazardous locations so there are not multiple grounds in a single area.

Battery Safety Information

Manufacturer: Tadiran® Batteries

Ordering Number: MS-PTF-BKIT



WARNING: The batteries contain lithium metal thionyl chloride (Li/SOCl₂) cells. To avoid risk of injury and/or accidental release of hazardous chemicals to the environment, the batteries should not be opened, disassembled, or incinerated.



WARNING: To avoid personal injury, never attempt to disassemble or otherwise modify batteries.

Safe Handling

Do Not:

- Short circuit the terminals
- Expose to temperatures above the temperature rating of the battery
- Force over-discharge (voltage below 0.0V)
- Incinerate
- Crush or puncture
- Immerse in liquids

In the event of battery rupture and/or leakage, wear personal protective equipment (PPE) and contain the spill. Ventilate the area. Then cover the spill with sodium carbonate (Na₂CO₃) or a 1:1 mixture of soda ash and slaked lime. Protect the battery/spill from water, rain, and snow. Place the damaged battery in an approved container (after cooling if necessary) and dispose according to local regulations.

Disposal Considerations

1. Dispose in accordance with the applicable local, state, and/or country regulations.
2. Disposal should be performed by licensed professional disposal firms that are knowledgeable in federal, state, and/or local requirements of hazardous waste treatment and hazardous waste transportation.
3. Never incinerate as a means of disposal.
4. Battery recycling should be done by an authorized facility.

Overview

System

The Swagelok® remote monitoring system combines wireless sensors and secure networking equipment, giving you remote access to real-time system data points such as pressure, temperature, and flow. Unlike analog devices, digital sensors in the remote monitoring systems have the advantage of providing a user with the ability to trend system data over time. With this critical information at your fingertips, you can quickly diagnose system issues and make data-driven decisions.

The remote monitoring system consists of two hardware components and user interface software. Swagelok® PTF transmitters are battery powered sensors that can be easily installed in fluid systems to transmit key system information. This data is sent wirelessly to the Swagelok® gateway. The gateway collects information from all your sensors, combining it into a database that can be accessed by your facility's distributed control system (DCS) or sent to a data historian. Transmitter data is also available locally on the Swagelok gateway through our graphical user interface (Swagelok® digital control panel)—a dashboard where you can view current sensor information. The Swagelok digital control panel allows you to manage multiple settings for the gateway and transmitter.

Swagelok® PTF Transmitter

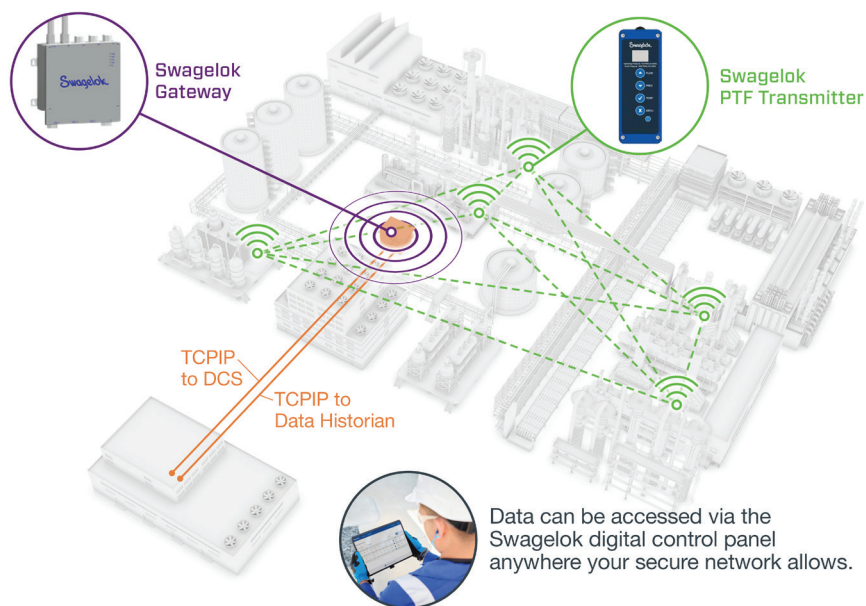
The Swagelok PTF transmitter is an edge sensor that takes pressure, temperature, and flow readings from your fluid system and wirelessly transmits that information to the Swagelok gateway. In designing the transmitter, Swagelok applied its deep knowledge of industrial fluid system applications for a simple setup process and reliable wireless performance. The transmitter handles all calculations within the unit, so no scaling of the signal is required. This simplifies the process and enables increased accuracy of results.

Swagelok® Gateway

The gateway gathers the data from your fluid system's wireless PTF transmitters. It was designed with both ease of use and security in mind. Your system data is compiled in a database, which can be viewed through the Swagelok digital control panel. The historical data that is compiled in that database can be routed for use by your facility's DCS and data historian using RestAPI or Modbus® TCP/IP protocols.

Swagelok® Digital Control Panel

The digital control panel allows you to view your system data and customize its presentation to meet your needs. It is accessible from any web browser within your facility's secure local network, so there is no software to install and no additional license to purchase.



Transmitter Ratings and Specifications

Characteristic	Rating
General	
Operating Pressure	0 to 145 psig (0 to 10 bar)
Proof Pressure	1900 psig (130 bar)
Burst Pressure	3500 psig (241 bar)
Pressure Accuracy	Max $\pm 0.15\%$ FS Total Error Band (incl pressure and temperature variation): $\pm 0.7\%$
Operating Temperature	-4 to 158°F (-20 to 70°C)
Flow Accuracy (Accuracy claims are at calibration point)	Full Scale: $\pm 7\%$ Accuracy Class: G = 7%, qG = 50%, per VDI/VDE 3513 Sheet 2: 2008 ^①
Max Viscosity (For Liquid Service)	Up to 50 cP
Expected Delta Pressure Between Sensors at Max Flow ^②	~ 5 psi
Long-Term Stability	Max $\pm 0.2\%$ Full Scale (per year of service) Limited to max ± 3 mbar
Turn-Down Ratio	10:1
Environment	
Vibration	IEC-60068-2-6, 10 to 500Hz, 5g
Ingress Protection	IP65, Type 4X
North American Class-Division	Class I Division 1 Groups A, B, C, and D T4
North American Zone (USA)	Class I Zone 0 Aex ia IIC T4 Ga
North American Zone (Canada)	Class I Zone 0 Ex ia IIC T4 Ga X
ATEX (Europe)	II 1 G Ex ia IIC T4 Ga
IECEX (International)	Ex ia IIC T4 Ga
Wireless Compliance	FCC
Communication and Transmission	
Expected Battery Life	Up to 2 years ^③
Communication Protocol	SmartMesh (default network ID: 1229) with symmetric key encryption
Min Data Transmission Interval	5 seconds
Max Wireless Range	350 ft (unobstructed line-of-sight)
Max Number of Transmitters Per Gateway	40

Standard liter definition: Standard conditions (std liters/min std liters/h nitrogen flow ranges) are defined as 14.7 psia (1.01 bar) at 60°F (15°C)

^① In accordance with VDI/VDE 3513 Sheet 2: 2008, accuracy class is effectively equivalent to permissible error above $q_G = 50\%$.

where:

G = Constant permissible error in percent of measured value above q_G

q_G = Flow limit value in percent of full scale

Above q_G , the permissible error is constant. Below q_G , the permissible error increases toward lower flow rates inversely proportional.

In sizing a restrictor, $q_G = 50\%$ allows for the greatest accuracy above 50% of the full scale. For assistance with PTF restrictor selection, contact your authorized Swagelok sales and service representative. Fluid media, temperature, pressure, viscosity, and density also must be considered in selecting a transmitter.

^② Delta pressure determined under factory calibration conditions as listed below. If product is used under different conditions, delta pressure may be different at max flow.

^③ Two-year battery life was calculated under the following conditions: 20C ambient temperature, 30 second data transmission interval, screen on only during initial setup. Variables such as ambient temperature, screen usage, and transmission rate will directly impact the battery life of the device.



WARNING: Enclosure contains aluminum. Care must be taken to avoid hazard due to impact or friction.

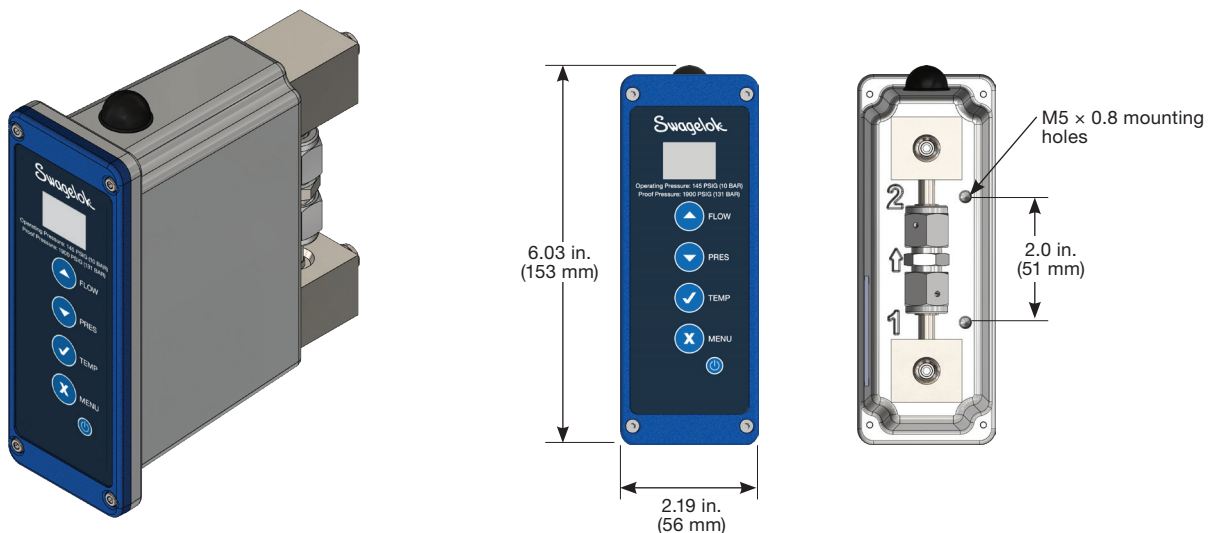


WARNING: Potential electrostatic discharge. Use damp cloth to clean product.

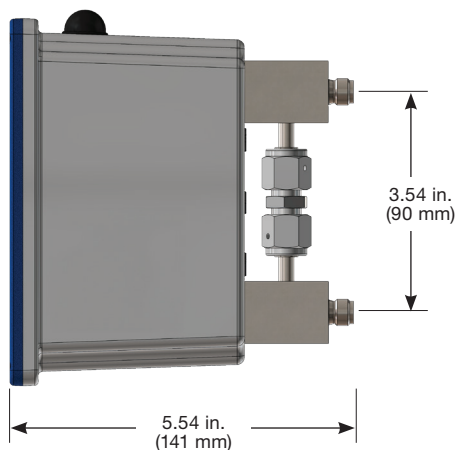


WARNING: To avoid risk of injury, do not install a transmitter in a location that exceeds any of the ratings.

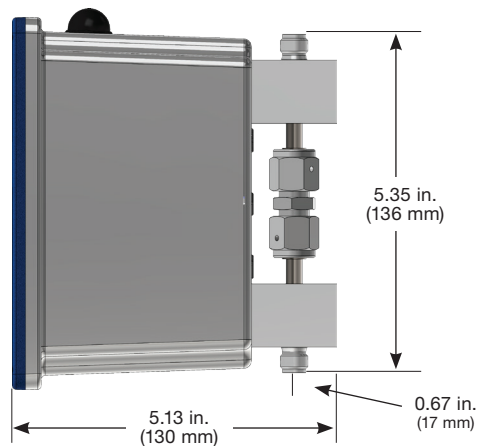
Dimensions



1/4 in. Rear Configuration



1/4 in. Vertical Configuration



Calibration and Testing

Every Swagelok wireless transmitter is factory calibrated to its flow range and accuracy specification using nitrogen. Calibration takes place at full scale flow, with 30 psig (2.0 bar) inlet and ambient temperature of 70°F (20°C).

Gateway Ratings and Specifications

Characteristic	Rating
General	
Dimensions (W x D x H)	7.87 x 7.87 x 2.67 in. (200 x 200 x 68 mm)
Form Factor	Square
Enclosure	Aluminum housing
Mount Options	Wall mount
Weight (Net)	3.7 kg (8.16 lb)
Power Requirement	10 to 36 VDC
Power Consumption	21W (typical)/27W (max.)
Environment	
North American Class-Division	Class I Division 2 Groups A, B, C, and D T4
Wireless Compliance	FCC
System Hardware	
BIOS	AMI UEFI (64 Mbit)
Watchdog Timer	Programmable timer with 255 intervals (1 to 255 sec)
Hardware Security	TPM 2.0
Processor	Intel® Atom® E3950 quad core, 1.6GHz (up to 2GHz)
Memory	8GB of DDR3L, 1600MHz
Graphics Engine	Intel HD Graphics 505
Ethernet	Intel i210-IT GbE, IIEEE802.1AS, 802.3az
LED Indicators	Power, Storage, LTE, Wi-Fi, Programmable LED
Storage	1 x M.2 2242 B-key (SATA signal)
Internal Maintenance Interface	1 x USB 3.0, 1 x USB 2.0, 1 x DP
I/O Interface	
Serial Ports ^①	2 x RS-422/485, 50 to 115.2 kbps
LAN ^①	2 x RJ45, 10/100/1000 Mbps IEEE 802.3u, 1000 BASE-T Fast Ethernet
Power Connector ^①	1 x 3-pin terminal block
Cable Gland	4 x 1/2 in. NPT conduit explosive atmosphere cable gland (cable size OD 0.26 to 0.55 in. (6.55 to 14 mm))
Environment	
Operating Temperature	-40 to 70°C (-40 to 158°F) at 5% to 85% RH with 0.7 m/s airflow
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	10% to 95% RH at 40°C (104°F), non-condensing
Shock Protection	Operating, IEC 60068-2-27, 50G, half sine, 11ms
Vibration Protection	Operating, IEC 60068-2-64, 2Grms, random, 5 ~ 500Hz, 1hr/axis
Ingress Protection	IP66

① Four I/O cables can be connected simultaneously via the cable gland

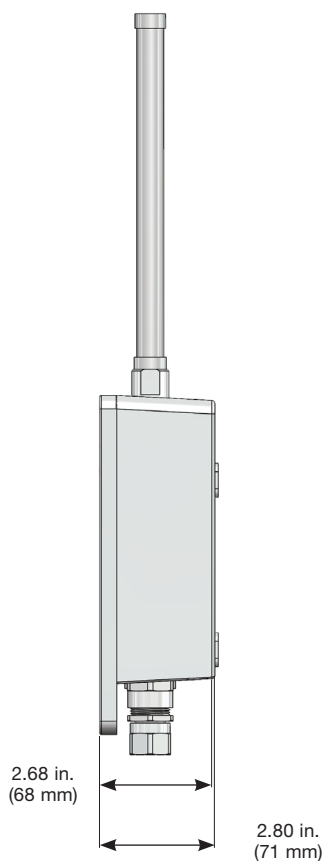
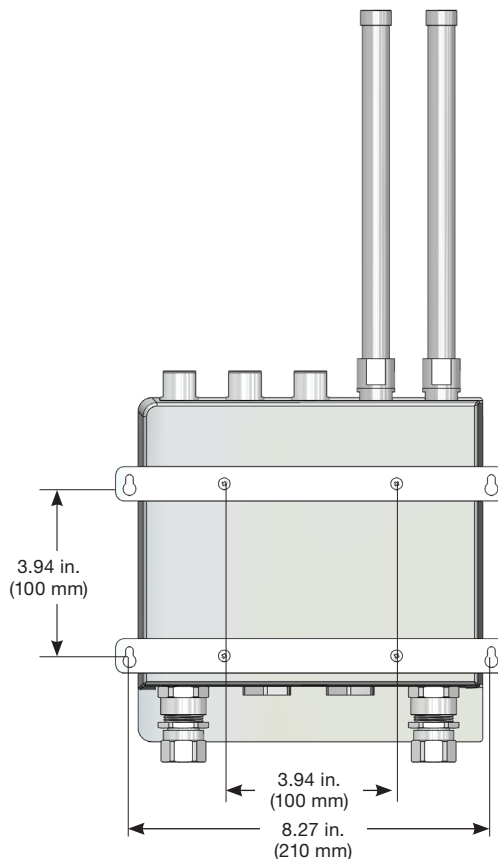
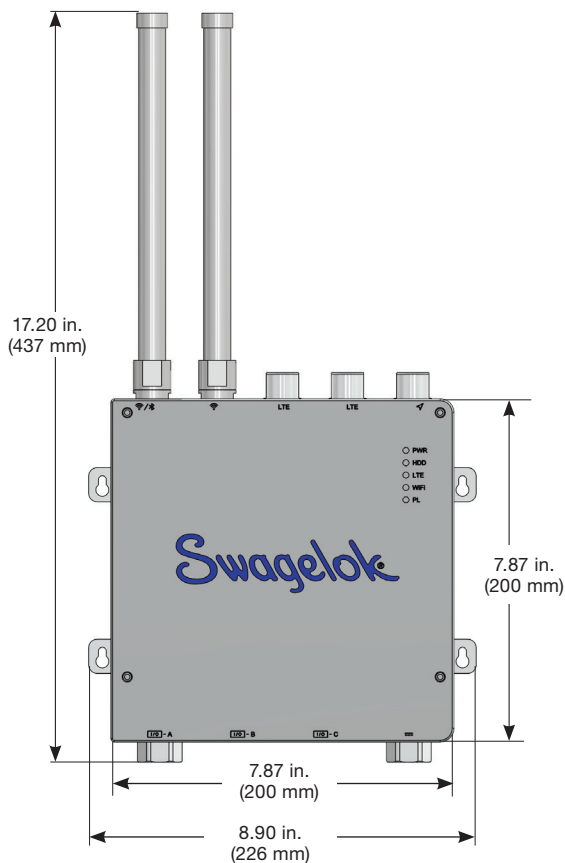


WARNING: To avoid risk of injury, do not install a gateway in a location that exceeds any of the ratings.



CAUTION: To prevent shock, do not remove cover. There are no user-serviceable parts inside. Refer any servicing to qualified personnel

Gateway Dimensions



Gateway Components: Gateway, antenna (two included, assembly required); required but not included: power supply, power cables, and Ethernet cable(s)

Power Requirements: Power supply, power requirement 10~36 VDC (30-watt minimum rating)

Power Cables: Appropriate cables and/or conduit should be selected for CD12 applications; the input terminal block (CN25) should be installed to 12-22AWG wires with 8 mm conductor insulation stripped; the field wiring cable should be rated less than 90 degrees

Ethernet Cable(s): Appropriate cables and/or conduit should be selected for CD12 applications

Initial Setup

The following section outlines the setup of the individual components (gateway, digital control panel, and transmitters).

Gateway Components

---: Before installing a gateway, please review the Additional Information and Best Practices on page 51 to aid in choosing a location for the gateway that will provide the best communication with the transmitters.



CAUTION: To avoid risk of injury, do not place the gateway in a location that exceeds any of the ratings found on page 8.

Gateway Installation

Power, Antennas, and Ethernet

NOTE: Proper installation is required for the transmitter and gateway to communicate. For best results, no obstructions should be located between the transmitter and the gateway. Environmental conditions and weather may affect transmission quality.

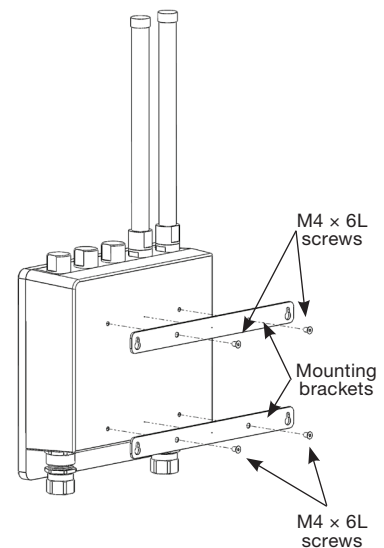
NOTE: The overvoltage protection, shielding, and bonding are in accordance with the applicable IEC standards.

NOTE: It is recommended to do as much preparation of the gateway as possible before the installation into its final location. See the steps below for additional configuration and setup. Once prepared and setup, the gateway can be mounted using the four screw holes on the back.

Mounting the Gateway

The gateway should be installed with the antennas in an upright orientation. See the Additional Information and Best Practices on page 51 for best practices on signal and location recommendations.

1. From the accessory bag, obtain the four M4 × 6L **screws** and two **mounting brackets**.
2. On the back panel of the gateway, align the **mounting brackets** to the predrilled holes and affix the mounting kit. Torque the **screws** to finger-tight.
3. You can then mount the gateway in an appropriate location, making sure that the antennas are in an upright orientation.



Power Requirements

Power Supply

- The gateway requires a separate power supply that meets the following:
 - Power requirement: 10 ~ 36 VDC
 - A 30-watt minimum rating

Power Cables

- Appropriate cables and/or conduit should be selected for C1D2 applications
- The input terminal block (CN25) should be installed to 12-22AWG wires with 8 mm conductor insulation stripped
- The field wiring cable should be rated $\geq 90^{\circ}\text{C}$

Ethernet Cable(s)

- Appropriate cables and/or conduit should be selected for C1D2 applications

Optional Power Supply: [Traco Power TEX 120 Series](#)

- If using Traco Power® TEX 120-112 for Class 1 Div 2 location, unit needs to be installed in IP54 or greater enclosure



WARNING: The power supply listed above meets all the required power specs. To avoid risk of personal injury, it must be installed in an enclosure with an IP54 or higher rating, in a Class 1 Division 2 location.

Connecting Power Supply



WARNING: To avoid risk of personal injury, ensure the power supply is not powered when wiring the gateway.



WARNING: To avoid risk of personal injury, physical connections should not be made to the gateway while a hazardous environment is present.

NOTE: The wires are specific to the power supply and will vary with the power supply selected.

NOTE: For gateway location installation, see the Additional Information and Best Practices on page 51. This area outlines guidance for obtaining the best connectivity to the transmitters.

1. Unscrew all four screws from the corners of the gateway.
NOTE: The screws are captive.



2. Open the gateway's cover.



3. Feed the power cable through the port on the bottom right corner of the gateway.



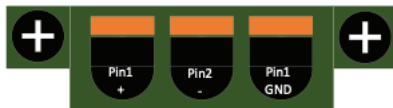
4. Wires should be stripped back 8 mm and then inserted into the terminal block by pressing down the orange retaining clip.

Connector (CN25):

Pin1 = +

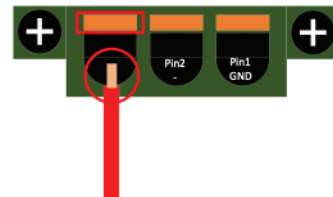
Pin2 = -

Pin3 = GND



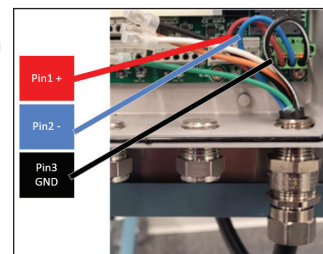
5. **WARNING:** To avoid risk of personal injury, do not use colors as a reference. The colors shown are for example purposes only. Colors shown are specific to the example power supply and your unit may vary. Utilize the specific power supply documentation to determine which wire goes into the ports.

Terminate each of the wires as follows: Press in the orange tab to insert or release each wire one at a time

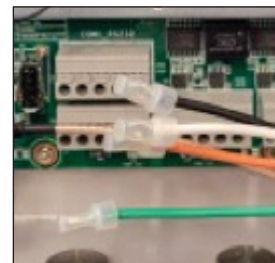


6. The final connections should look as shown in the image on the right.

NOTE: The colors of the wire may not match what is shown in the picture.



7. Connect caps on to the ends of any wires that are not used within the gateway..

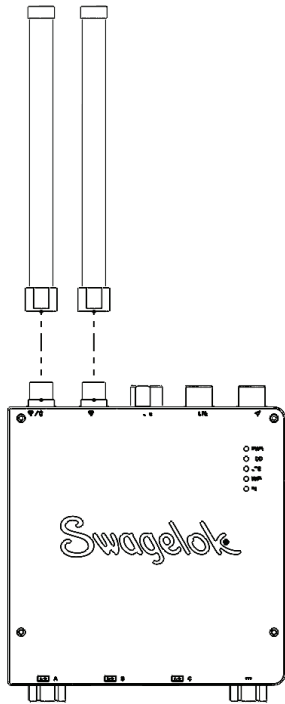


Installing Antennas

1. Remove antennas and antenna adapters contained in the accessories bag.



2. Thread antenna adapters into the ports. Thread antennas onto adapters. Tighten antennas using 17 in.-lb (1 N·m) of torque.

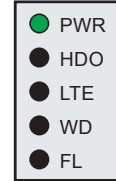


Configuring the Gateway

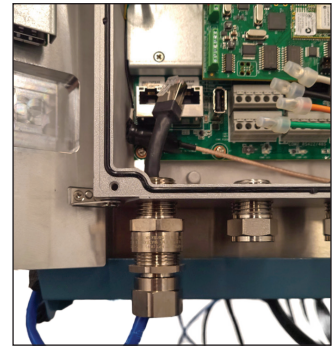
There are two Ethernet ports on the gateway. The left port is the primary Ethernet port (con_eth0) and the right port is the secondary Ethernet port (aux_eth1).

The following instructions apply to the secondary (right) Ethernet port.

1. Turn the gateway power on.



2. Take the Ethernet cable and feed it through the port access hole in the bottom left of the gateway as shown. **NOTE:** Ensure the Ethernet cable used is a shielded Ethernet cable. Ethernet cables with premade strain relief will need the strain relief removed for installation through the port.



3. Plug the cable into the secondary port on the right.



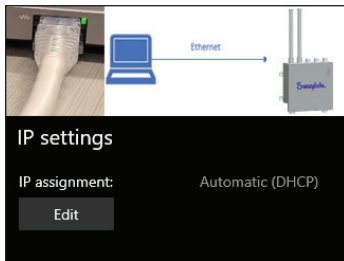
Connecting to the Secondary Ethernet Port



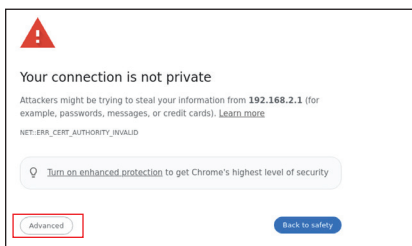
WARNING: To avoid system malfunction and potential personal injury, it is recommended that the primary port is left at its default settings. While this port can be reconfigured, it is intended for local use only.

The instructions that follow refer to configuration of the right, or secondary, Ethernet port. For issues with connecting, see the troubleshooting section for assistance.

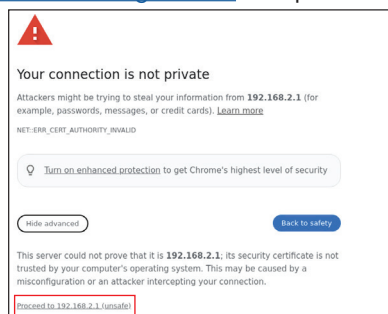
1. With one end of the Ethernet cable plugged into the gateway, plug the other end into a laptop or other personal computer.
2. Manually configure the computer's IP address to connect to the gateway. Please work with your IT team to manually configure the IP address or refer to your computer's operating system instructions. Set the computer to IP address 192.168.2.1



3. On the computer, navigate to either: <https://admin.swagelok.net> or <https://192.168.2.1>
4. On the window that opens, select **Advanced**. You will receive a self-assigned certificate (generated from Swagelok) that will need to be accepted.



5. Next select "Continue to <https://192.168.2.1> or <https://admin.swagelok.net>" to open the dashboard.



6. The following page should then open.

7. Log into the main dashboard by entering the following information:
Username: admin
Password: default



Initial Dashboard Access

The gateway is shipped with the IP address, Network ID, and other information set to default settings. To avoid network conflicts, each gateway will require its own unique configuration settings.

To begin the configuration process, first access the dashboard at <https://admin.swagelok.net> or <https://192.168.2.1>.

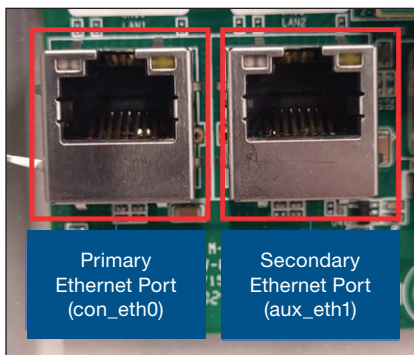
1. On the dashboard page, in the top horizontal navigation bar, use the drop-down menu on **Administration**, and select **Gateway Settings**. It is recommended to select a Network ID at this time. This will be used for future connections with transmitters.

NOTE: The system comes with a default Network ID. You may wish to change the Network ID before connecting the transmitters to the gateway. See Network ID on page 43.
2. Navigate to the **Network Settings** page by clicking the **Administration** drop-down menu. The following page showing the Swagelok default settings will open.

3. While the dashboard page allows for the configuration of both Ethernet ports on the gateway, this user manual will only cover the right, or secondary, port.

Port 0 is the Ethernet port on the left, also referred to as the primary Ethernet port (Ethernet Primary, or con_eth0).

Port 1 is the Ethernet port on the right, also referred to as the secondary Ethernet port (secondary, or aux_eth1). This can be used for local machine-to-machine communication or to connect to a second network. Both ports 0 and 1 utilize the IPv4 protocol.



Configuring the Secondary Ethernet Port

To connect to your corporate intranet (or industrial automation network), update the following fields that appear on the dashboard display.

1. **Fully Qualified Hostname**
This field requires a fully qualified hostname and domain name, passed in as a single string that is used as a reference for the IP address. This will change the name of the URL entered (the URL replaces the IP address entered).
2. **Gateway**
This is the entry point into the subnet that holds the gateway.
3. **IP Address**
The IP address changes the address of communication. The new IP address is what is then used to reach the gateway through the browser. Make sure to record and keep track of this address.
4. **Net Mask**
This informs the network how the IP address is to be interpreted.
5. **Domain Name Servers (DNS)**
The DNS translates domain names into IP addresses so that communications can take place.

Save and Continue

After completing the information fields shown above, select **Save Settings** before continuing.

Modified URL

The URL, or address, is now modified according to the hostname + domain name (new IP address) selected. To access the gateway dashboard now, enter the new url/address on the computer. Use the complete url (e.g. <https://YourHostname.example.com>).

Finish

Replace the gateway cover and tighten the four corner screws using 7 to 8 in.-lb. of torque.




Initial Setup of the Transmitter

The following instructions cover the process of connecting transmitters to the gateway as well as installation of transmitters into a fluid system.

Streamlining Transmitter Connectivity

For an efficient process in connecting multiple transmitters to the gateway, Swagelok highly recommends a systematic approach. Load transmitters in batches of 10 or less and follow the steps outlined below:

1. Connect 10 transmitters to the gateway, see instructions for Connecting Transmitter to the Gateway below.
2. Power off by holding the power button  or take the 10 connected transmitters offline, as detailed in Transmitter Details and Settings on page 31.
3. Repeat steps 1 and 2, adding transmitters in batches of 10 or less, until the maximum of 40 transmitters is reached for the gateway.
4. Once all transmitters are connected, power on the previously connected transmitters in batches of 10 or less to complete the setup.

This method ensures a smooth and organized integration of transmitters, optimizing the performance of the system.

Connecting Transmitter to the Gateway

For connecting the transmitter to a gateway, the transmitter must be in range of the gateway for communication to take place.

1. Power on the transmitter by holding down the **Power** button on the transmitter's keypad for approximately 10 seconds, or until it powers up.
2. The transmitter screen will power on, showing a Swagelok logo as it boots up.



3. Find the unique network ID created for the gateway. (See NET ID on page 43 if you have not yet created the unique ID for the gateway.) All transmitters connected to the gateway will use the same unique ID in order to communicate with the gateway.

4. To change the network ID (NET ID) on the transmitter to the new unique ID, navigate to the transmitter menu by pressing the **Menu** button once.



5. Navigate to the NET ID menu item by using the **Up/Down arrow** buttons on the transmitter.



Up button



Down button



Confirm button

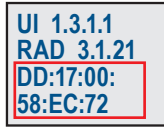
6. Once the NET ID screen is showing, change the current value using the **Up** button to increase the value and use the **Down** button to decrease the value. The arrow underneath the digit on the LCD screen represents the current number being edited.
7. Confirm the digit selected by pressing the **Confirm** button. (**NOTE:** The entire NET ID will require pressing the Confirm button 4 times in total—one for each digit in the NET ID.)
8. After confirming the selected NET ID value, the screen will display:
NET ID CHANGED RESETTING SYSTEM
9. The transmitter will restart and the screen will go blank. Once the power off/on cycle is complete, any keypress on the keypad will illuminate the LCD screen signifying the transmitter power cycle is complete.
10. The transmitter should now show the symbol shown here in the upper right corner of the LCD to indicate that a network with a matching NET ID is in proximity.



To view more details about the transmitter, press the **Menu** button to bring up the **Main Menu** screen.

11. **Find the Unique MAC Address of the Transmitter**

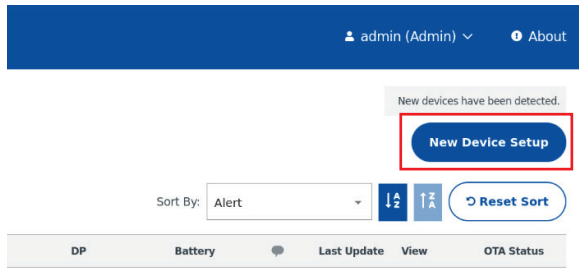
From the **Main Menu** of the transmitter, navigate to the **ABOUT** text on the screen. Select the **Confirm** button. The screen shown here will appear. The bottom two rows of text represent the unique MAC address of the transmitter.



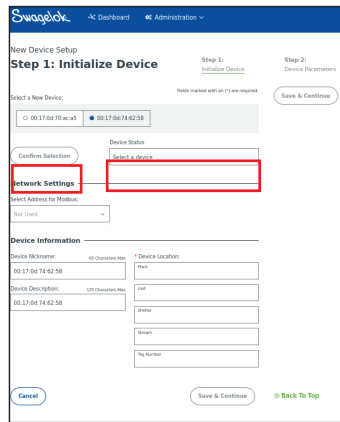
NOTE: This MAC address will be needed in Step 13.

12. Now turn to the gateway. Navigate back to the main dashboard to continue connecting the transmitter.

NOTE: It may take several minutes for the transmitter to appear on the dashboard. Once the transmitter establishes communication, an alert will appear above the **New Device Setup** button that says *new devices have been detected*. Select the **New Device Setup** button.



13. The **Device Setup** page will appear. Under the options shown, select the **MAC address** you found in Step 11.

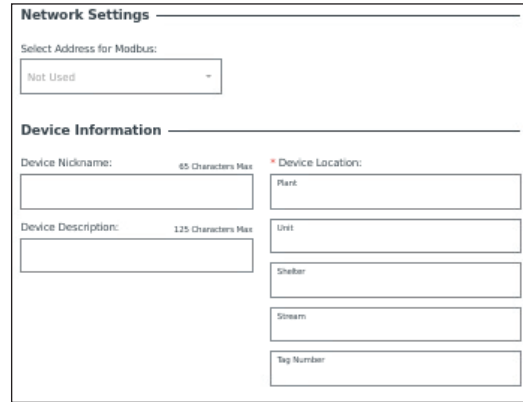


14. Once the **Device Status** shows, select the **Confirm Selection** button. This will start the initial communication linkup with the transmitter.

15. After a few minutes, the **Device Status** will reflect **Complete – PASSED**. You can now fill out the remaining items on this page. (**NOTE:** If this step fails, the **Device Status** will show **Device Initiation.....FAILED**. Should this occur, select the same transmitter, **Confirm Selection** again, and re-run the initial communication linkup. If the connection continues to fail, see Troubleshooting on page 59.)

16. Fill in each of the fields for the Device Information section. (All fields are required except for Modbus. The Modbus drop-down will contain a list of available addresses. If desired, choose the Modbus address from the drop-down list. See Modbus Service on page 38 for more information.)

WARNING: Do not navigate away from the **Device Setup** screen during the entry of these fields. Doing so will prevent the transmitter from properly connecting to the system. If this occurs, remove the transmitter and start over.



17. Once all the fields are complete, select **Save and Continue**.

18. The Device Parameters page appears next. This page displays the current values saved to the transmitter, including the calibration value. This calibration value should match the number etched on the restrictor.

NOTE: If you replace the restrictor, update the calibration value field to match the value etched on the restrictor.

NOTE: If using a non-standard size restrictor, select the “Custom” checkbox and enter the calibration value into the calibration field. For assistance with non-standard calibration values, contact your authorized Swagelok sales and service representatives.

NOTE: If a “Blind” restrictor is installed, check the “Blind” checkbox. The calibration value will automatically be set to 0, and calculated flow values will be 0. For assistance with your specific application using blind restrictors, contact your authorized Swagelok sales and service representatives.

The screenshot shows the 'Step 2: Device Parameters' configuration page. It includes a 'Restrictor ID' field, a 'Calibration Value' field with a warning icon and text 'Calibration value not set or not in range of possible values', and a 'Units of Measure' section with dropdowns for 'Flow' (set to GPM), 'Pressure' (set to PSI), and 'Temperature' (set to Fahrenheit). A 'Save & Continue' button is located at the bottom right.

NOTICE: If the calibration information is not correctly entered, the transmitter may not read correct flow values.

19. Select the **Save and Continue** button to move to the next step.
20. The **Step 3: Device Confirmation** page appears next. Review the fields and make any edits using the edit button. This is also where you select the data transmission interval.

Fields marked with an (*) are required.

Data Transmission Interval:

Speed: 5	Interval: Seconds ▼
-------------	------------------------

21. Select **Save and Continue**. This completes the configuration process. Upon completion, you will be returned to the main dashboard.
22. The transmitter will appear on the main dashboard. It is now connected to the gateway and prepared to transmit data.

RECOMMENDATION: After connecting each transmitter to the gateway, go to the **Device Gauge Limits** and **Device Thresholds** sections and set the appropriate values in order to obtain accurate warnings.

Install Transmitter Into Fluid System



CAUTION: Check the connections on the restrictor kit before connecting to a fluid system. To avoid risk of transmitter damage or bodily injury, ensure there is zero pressure in the system to which the transmitter is being connected. Unexpected pressure when swapping out a pressure gauge for the transmitter can cause transmitter damage or bodily injury.



WARNING: To avoid risk of injury, do not attempt to connect a transmitter to a system that exceeds any of the ratings. Follow the specified ratings of the transmitter to determine if a transmitter can be added into a fluid system.

NOTICE: Pressure sensors will be visible through the Swagelok fitting port in the rear-ported configuration. Do not insert any tools or sharp objects into the bore as damage to the sensing diaphragm, which would impact transmitter performance, can result.

It is **recommended** to connect each transmitter to the gateway and test the wireless connection before physically installing it into the system.

If the current restrictor kit needs to be exchanged out for a different size, see the instructions Transmitter Restrictor Kit on page 53 for details.

NOTE: The transmitter enclosure is a grounded device. To tie to earth ground, ensure a stable ground connection is made to the connected system.

NOTE: The over-voltage protection, shielding, and bonding are in accordance with the applicable IEC standards.

Notice: A filter with an element nominal pore size less than the orifice diameter should be used upstream to avoid the blockage of the restrictor kit.

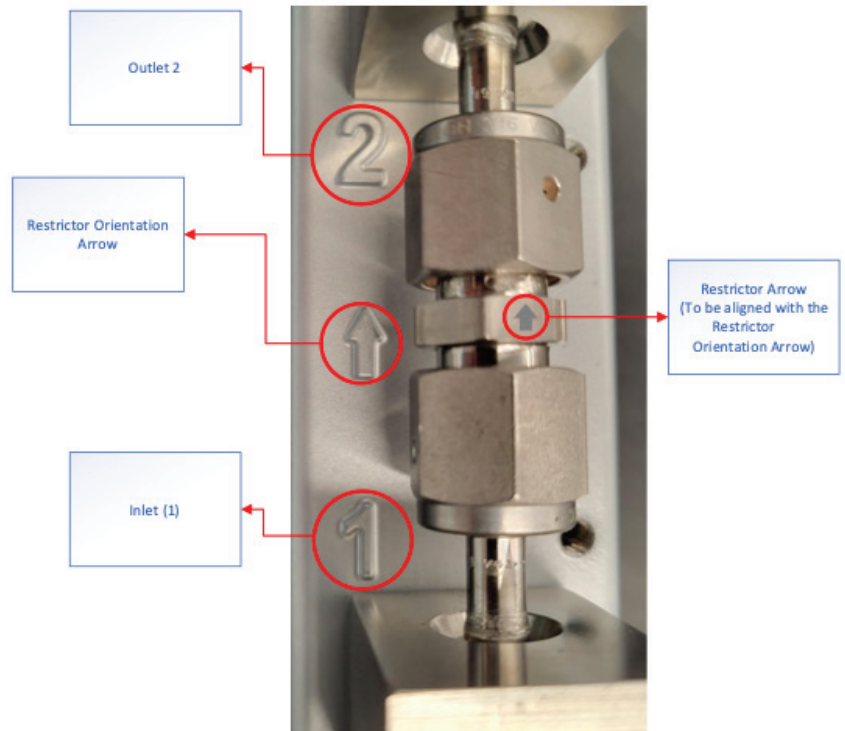
Installation Instructions

When mounted in the standard configuration of bottom to top, the transmitter measures flow with the bottom port as the inlet (1), and the top port as the outlet (2). Each restrictor is calibrated in the flow direction indicated by the marked flow arrow.

The transmitter will work if the restrictor is placed in either direction, however, the accuracy levels may be compromised if it is placed in the reverse direction.

For accurate readings, make sure the restrictor orientation arrow on the transmitter body and the restrictor arrow on the restrictor point the same direction for proper flow. Connect the transmitter to your system by following the end connection instructions for the connection type.

⚠ WARNING: To avoid risk of injury, ensure the system is depressurized before replacing any current transmitters within the system.



RECOMMENDATION: Before installation into the fluid system, use the **Menu** button on the transmitter and navigate to **Tare Device** screen to set the sensors to the atmosphere of the location where the transmitter is being installed. The taring should be done in the location where the transmitter will be installed, but before it is connected to pressure. See View Device Details on page 31 for instructions on taring the transmitter.

Installation Steps

There are two different configurations (vertical and rear ported) for installing the transmitter into a system. Both the vertical and the rear ported configurations utilize standard 1/4 in. (6 mm) Swagelok connections.

Vertically Ported



Rear Ported



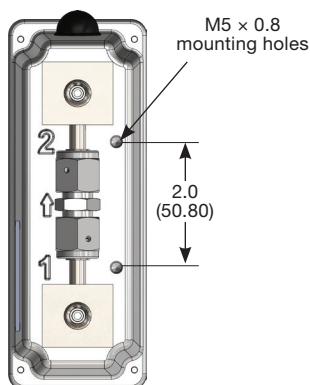
1. Connect transmitter to system. To connect to the Swagelok standard end, use the Swagelok *Tube Fitting Instructions*, [MS-12-01](#).

NOTE: Use backup wrench on sensor bodies to avoid transmitting fitting torque to restrictor.



WARNING: To avoid risk of injury, make sure to check the physical system installation at all connection points before pressurizing the system.

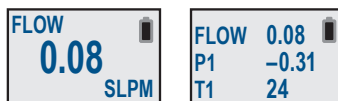
2. Transmitters are manufactured with two M5 x 0.8 mounting holes to enable proper support.



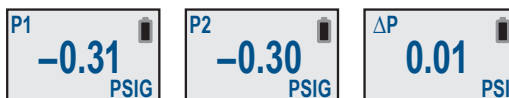
Transmitter User Interface and Functionality

Select the **Power** button to power on the transmitter. Hold down the **Power** button for 10 seconds or until the transmitter screen turns on.

Select the **Up** (FLOW) button to show the flow reading. Pressing the **Up** (FLOW) button again will display a summary of sensor data.

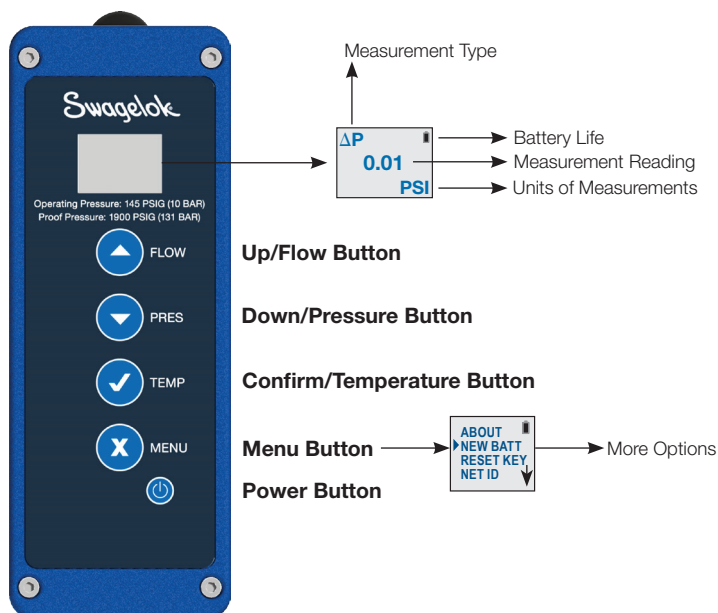


Select the **Down** (PRES) button to show the pressure readings. From here, select the **Confirm** button to navigate between P1, P2, and Delta Pressure.



Select the **Confirm** (TEMP) button to show the temperature readings. Pressing the **Confirm** (✓) button again will navigate between T1 and T2.

You can press the **Cancel** (MENU) button at any time to return to the main screen.



Menu Options

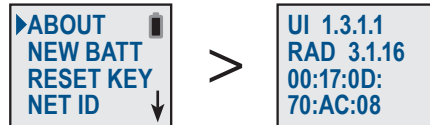
Press the **Menu** button to access the menu options.

About

Use the **Up/Down** buttons to find the **About** section. Press the **Confirm** button to select.

The **About** screen displays the information about the transmitter (UI version, RAD version, and the MAC address).

- The first line is the version of **user interface code** installed on the transmitter
- The second line is the version of **radio code** that is installed on the transmitter
- The third and fourth lines are the **MAC address** for the transmitter



The user interface code and radio code are useful for technical troubleshooting. The MAC address is useful for configuring the transmitter for the first time, as the MAC address is what will be displayed on the gateway before the transmitter is added. To ensure installation of the right transmitter, a user should correlate the MAC address in the transmitter **About** menu with that displayed on the gateway's **Add New Device** screen.

New Battery

This function allows you to reset the battery life indicator when a new battery is installed.

NOTE: When installing a new battery, failure to perform a reset of the battery life indicator may result in the need for a premature battery replacement in the future.

Please see Maintenance and Repairs, Battery Replacement Steps on page 57 for detailed instructions on NEW BATT functionality.



Reset Key

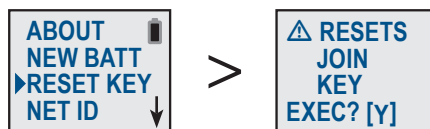
This function allows you to reset the network key that was used when connecting a transmitter to the gateway.

Select the **Menu** button and then use the **Down** button to navigate through the menu options to **RESET KEY**.

Press the **Confirm** button to select.

Press the **Up** button to toggle between **Y** (Yes) and **N** (No).

Select **Y** and press the **Confirm** button to reset the key.



IMPORTANT: Resetting the join key on the transmitter will delete the previously stored unique join key that is required for a complete gateway connection. Therefore, if a transmitter is already connected to the gateway, this will terminate that transmitter's connection to the gateway and the transmitter will show as **Lost**. Using the **RESET KEY** option on the transmitter does not change the gateway settings – the transmitter must be removed from the gateway as well. See Remove a Transmitter from Gateway on page 32 of this document for instructions. The only time the user should ever reset the join key from the transmitter is if the transmitter becomes lost and seems irrecoverable on the gateway itself.

Network ID

Select the **Menu** button and then use the **Down** button to navigate through the menu options to **NET ID**.

Press the **Confirm** button to select.



Once on the NET ID screen, press the **Up** button or **Down** button to change the first digit of the ID. When you reach the correct number, press the Confirm button to select that number and move to the next digit. Repeat this selection process with each digit until the NET ID is correct. Once the final digit is confirmed, the screen will display a confirmation of the change.



The transmitter will then return to the flow screen. Once the transmitter connects with the gateway, the double-arrow icon will appear on the transmitter's screen. To continue adding a transmitter see Connecting Transmitter to the Gateway on page 15.



IMPORTANT: Changing the NET ID on the transmitter will delete the previously stored unique join key that is required for a **complete** gateway connection. Changing the NET ID of a transmitter currently joined to a gateway will terminate the connection and the transmitter will appear as lost. Simply changing the NET ID back to the original NET ID is not sufficient for a complete rejoin. If the NET ID is changed from the transmitter LCD screen as shown in the steps of this section, the transmitter **must** be removed from the gateway before it can **completely** rejoin the previous gateway. See Remove a Transmitter from Gateway on page 32.

Tare

The tare function is used to adjust for local atmospheric pressure to improve the accuracy of readings.

Navigate on the menu, scrolling to the second screen, and select **Tare** by pressing the **Confirm** button.

On the tare screen, press the **Up** button or **Down** button to toggle the response on the tare screen from **Y** (Yes) to **N** (No). Select **Y**, and press the **Confirm** button to complete the change. This will **Tare** the transmitter by resetting its pressures to a reading of 0.

NOTE: The Tare function can also be used from the menu on the display of the transmitter.

NOTICE: Taring in a different ambient environment, or when the transmitter is connected to system pressure, could potentially introduce an unintentional offset and inaccurate pressure/flow readings. If this error is introduced, disconnect the system from pressure and click the **Tare** button again to correct the problem.

A rectangular screen with a light gray background and a thin black border. The text is blue and reads: "SETS", "P1+P2 TO", "0 PSIG", and "TARE? [Y]". There is a small blue triangle icon to the left of the word "SETS".

Sleep Set

The length of time that the transmitter screen stays lit can be adjusted in the **Sleep Set** area. On the **Sleep Set** screen, you can scroll through a list of default time periods that the screen will stay on after a button is pressed.

NOTE: Leaving the screen on for prolonged periods of time can reduce the battery life of the transmitter.

Navigate on the menu, scrolling to the second screen, and select **Sleep Set** by pressing the **Confirm** button.

Press the **Up** button or the **Down** button to scroll through the time period selections.

Press the **Confirm** button to keep your selection.

A rectangular screen with a light gray background and a thin black border. The text is blue and reads: "SLEEP SET" and "[1MIN]".

Moving Transmitters Between Gateways

To move transmitters between gateways, use the steps in the Remove a Transmitter from Gateway on page 32, ensuring the transmitter is powered on while removing it from the gateway. Then follow the steps in Connecting Transmitter to the Gateway on page 15. When changing the NET ID on the transmitter, change it to match the network ID setting on the gateway that the transmitter will join.

Swagelok Digital Control Panel Features and Definitions

All users with a login can access the dashboard configuration. There are several additional settings on the gateway that can be accessed by administrative and technician users.

Main Dashboard Statuses

Each transmitter can have one of three statuses, indicated by a colored circle in the status column on the dashboard.

Status

- **Online:** ● Transmitter is operating normally, sending and receiving data.
- **Offline:** ● Transmitter is offline, and not sending or receiving data. This would be caused by manually unchecking the Online box for that transmitter (on its **Device Details** page).
- **Lost:** ● Connection to the transmitter has been lost, either because it has moved out of range, the battery died, or some other fault. It is no longer sending or receiving data and must be reconnected to the gateway by solving the fault that caused it to go into this state.

Notifications

Notifications ribbons appear at the top of the digital control panel/dashboard page as illustrated in the following image.



Common Notifications and Remedies

Notification	Meaning	Remedy
SmartMesh Manager Disconnected	This notification can occur immediately after adding a transmitter or when changing the NET ID of a transmitter on the gateway. Only necessary to address when transmitters disconnect, and the notification keeps popping up.	Either restart the gateway or use the SmartMesh Restart in the Administrative > Gateway Settings .
Device Name – Transmitter Tamper Notification	The transmitter's enclosure has been opened.	Check that the transmitter is in its physical location and ensure the lid of the transmitter is properly closed. If lid is closed, see troubleshooting section.

Navigating the Dashboard

The following is an overview of the pages available in the dashboard and how to navigate between them.

 A screenshot of the Swagelok login page. It features the Swagelok logo at the top. Below the logo are two input fields: one for 'Username' and one for 'Password', both with red asterisks indicating they are required. At the bottom of the form are two buttons: a 'Cancel' button and a 'Login' button. Below the buttons is a link that says 'Accept PTF API Certificate'.

Login Page

A login is required to access the features within the digital control panel. The level of access to various pages is determined by the role of the person logged in (i.e., administrative, technician, or user).

- The **Administrative** role will be able to access all the pages within the digital control panel.
- The **User** role does not have access to **Administrative** options.
- The **Technician** role will have access to certain operational features under the **Administrative** options.

NOTE: Only a user who is logged in as administrative (Administrative/User Management) can add new users to the system.

Main Dashboard Overview

The screenshot shows the Swagelok Wireless Platform Dashboard. At the top, there is a navigation bar with the Swagelok logo, a 'Dashboard' button (1), an 'Administration' drop-down menu (2), a user profile 'admin (Admin)' (3), and an 'About' link (4). Below the navigation bar, a notification states 'New devices have been detected' with a 'New Device Setup' button (8). The main content area features a 'Grid Layout' drop-down menu (5) with 'All Columns' selected and a 'Create Layout' button (6). To the right, a 'Sort By' drop-down menu (7) is set to 'Alert', with 'Reset Sort' and sort direction icons. The main data table has columns for Status, Device Name, Description, Flow, P1, P2, T1, DP, Battery, Last Update, View, and OTA Status. A row for device 'VE-41' (9) is highlighted, showing a green status, description 'FE17', flow '0.18 SLPM', pressures '-0.16 PSIG' and '-0.15 PSIG', temperature '23 Celsius', and pressure '0.01 PSI'. The battery is at 99%. A blue 'Notes' button (10) and a 'View Details' button (11) are visible for this device. The footer contains the Swagelok logo and copyright information: '(C) 2023 Swagelok Company. All rights reserved.'

1. The **Dashboard** button can be used to navigate back to the **Main Dashboard** from other pages.
2. The **Administration** drop-down menu has the following options: user management, network settings, gateway settings, sensor network, and dashboard configuration. Most of these require an administrative or a technician login role.
3. The **User Profile** shows the current user that is logged in (administrative login is shown). The current user information can be edited from this drop-down menu. This drop-down menu also has the logout option.
4. The **About** link opens a page that displays information on the current software and firmware versions.
5. The **Grid Layout** drop-down menu includes any user created layouts available for selection. Each layout can change what information is shown for the transmitters on the dashboard.
6. Selecting **Create Layout** opens a page that allows for the creation of custom layout views. Custom layouts allow you to change the data fields shown on the main dashboard.
7. The **Sort By** drop-down menu allows for different alphabetic sorting based on an **Alert** or **Name**. It also allows you to **Reset** the sort.
8. **New Device Setup** is where transmitters are added to the gateway. This option only appears once the gateway identifies a transmitter that is set to the same NET ID and is available to join.
9. Selecting a **Device Name** opens a quick view of the transmitter's information (such as name, description, and location information).
10. Selecting the **Notes** button opens the notes section for the selected transmitter. This allows for the adding of additional notes or viewing/editing or deleting old notes.
11. The **View Details** button allows for the viewing of transmitter details, managing the transmitter (removing it, setting up notifications, and networking options), and transmitter configurations (changing the parameters, calibration value, porting, and restrictor kit selection).

Editing User Profile

To edit the current profile credentials, select the **User Profile** drop-down, then select the specific user from the list. Enter or change any of the desired profile information. Then select the **Save User Profile** button.

User Profile

EDIT USER "admin"

* Full Name

* Username * Role

Change Password

Administration

The access for **Administrative** functions is limited to **administrator** (all pages) and **Technician** (some pages) roles.

The options available to an administrative account include user management, network settings, gateway settings, sensor network, and dashboard configuration.

The screenshot shows the top navigation bar of the Swagelok dashboard. The user profile dropdown menu is open, showing the user name "admin (Admin)" and an "About" link. Below the navigation bar, the "Wireless Platform Dashboard" is visible, including a "Grid Layout" selector set to "All Columns" and a "Sort By" dropdown set to "Alert". A table header is partially visible with columns: Status, Device Name, Description, Flow, P1, P2, T1, DP, Battery, Last Update, View, and OTA Status.

The screenshot shows the top navigation bar of the Swagelok dashboard. The "Administration" menu is highlighted with a red box. Below the navigation bar, a horizontal menu lists the following options: User Management, Network Settings, Gateway Settings, Sensor Network, and Dashboard Configuration.

Administrative, Technician, and User Roles

Login to the main dashboard.

From the top of the page, select **username** and then select **User Profile**.

NOTE: The user and technician roles can only change the password of their current profile. The administrative role can edit all features of every profile role.

The following selections can be edited.

- Full Name
- Username
- Role
- Password

When done, select **Save User Profile**.

NOTE: A user with the role of administrator should not be changed to a lesser role unless another user already has administrative privileges.

Tamper Notifications

Transmitter Tamper Notification

When the cover of a transmitter is opened, a tamper switch on the transmitter is triggered.

When the transmitter's tamper switch is triggered, the gateway dashboard will show a notification with the transmitter's name. These notifications alert to the opening of the transmitter cover. Such notifications can be expected during battery replacement. Any unexpected tamper switch notifications should be investigated.

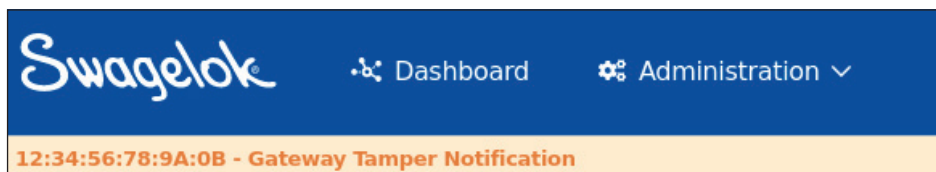
NOTE that if a transmitter cover is opened when the transmitter is powered off, it will log that a tamper switch alert was triggered when it reconnects to the gateway. This will be logged in the gateway database and can be queried with Modbus or REST API.

These notifications can be cleared. Select **Dismiss** to clear the notification. If the **Dismiss** option is not available, investigate to ensure that the transmitter cover is closed.



Gateway Tamper Notifications

The gateway tamper switch is triggered if the gateway's lid is opened. The notification will appear on the dashboard. The tamper switch cannot be cleared until the cover of the gateway is closed. Once the gateway is closed, the **Dismiss** button should become available to clear the tamper switch notification.



User Management—Administrative Access Only

The **User Management** tab allows the administrator to manage the profiles that have access to the dashboard as well as their roles. This tab also allows new user profiles to be added.

Adding a User

New users can be created with appropriate access levels for their role. View configurations can be customized for different users.

To create a new user, login in with an **Administrative** account. From the main dashboard, navigate to the **User Management** tab. Next, select **User Management**.

To add a user, enter the following information: Full Name, Username, Role, and Password.

Select one of the **roles** from the drop-down (**User/Admin/Tech**) to grant the desired permissions.


To finish, select the **Save User Profile** button. This profile can now be used on the login screen to access the digital control panel.

The screenshot shows a web form titled "User Management" with a sub-header "ADD OR EDIT USERS". It contains the following fields and controls:

- A text input field for "Full Name" with a red asterisk indicating it is required.
- A text input field for "Username" containing the value "user1" with a red asterisk.
- A dropdown menu for "Role" with the text "Please Choose" and a red asterisk.
- A password input field with masked characters (dots) and a red asterisk.
- A "Verify Password" text input field with a red asterisk.
- A "Cancel" button on the bottom left.
- A "Save User Profile" button on the bottom right.

Editing a User Profile—Administrator Access Only

Login as **Administrator** and navigate to the **User Management** tab. From the **User Profile** drop-down menu, select the user name you wish to edit.

Select the edit icon next the profile name to be edited. 

The title in the edit window should change to **Edit User "Username."**

Change the desired fields. When done, select **Save User Profile**.

The screenshot shows a web form titled "EDIT USER 'user1'". It contains the following fields and controls:

- A text input field for "Full Name" containing the value "User 1" with a red asterisk.
- A text input field for "Username" containing the value "user1" with a red asterisk.
- A dropdown menu for "Role" containing the value "Technician" with a red asterisk.
- A checkbox labeled "Change Password" with an unchecked box.

Delete a User—Administrative Access Only

NOTE: Once a user is deleted, that **username** cannot be readded. If you need to readd the user, a new unique **username** must be selected.

Login as **Administrative** and navigate to the **User Management** tab > **User Profile**.

The user profiles are shown on the right side of the page. Select the username for the desired profile to be deleted.

Select the trash can icon next the profile name to be deleted.

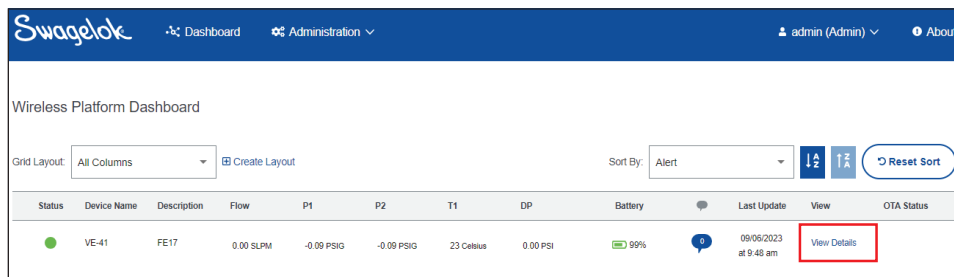
A notification window with the user's information will appear. When done, select **Delete User**.

Transmitter Details and Settings

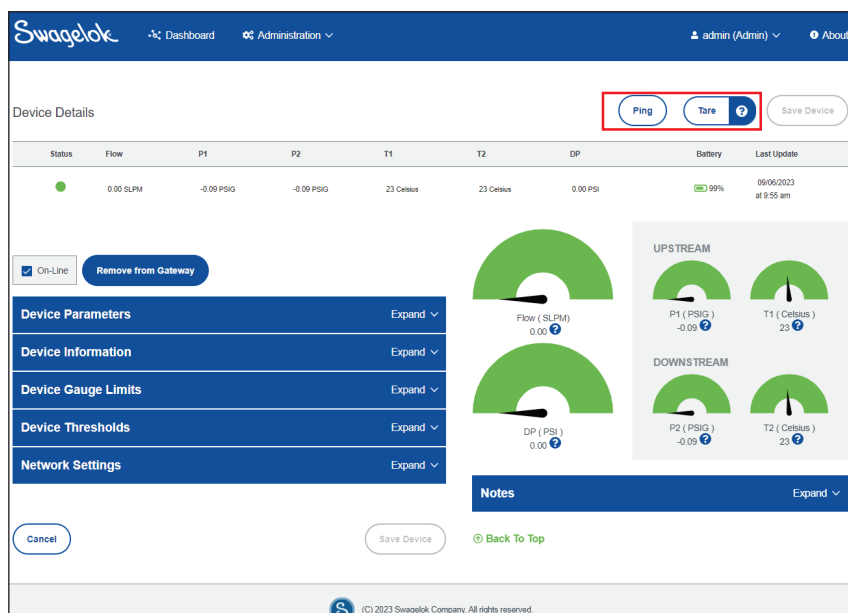
View Device Details

On the main dashboard of the digital control panel, navigate to the **View Device Details** page to see information about a specific transmitter.

Select the link **View Details** on the appropriate transmitter.



The transmitter details page will open. (It may take several moments to load.)



Tare

The tare function adjusts for local atmospheric pressure to improve accuracy. To perform this adjustment for your transmitters, disconnect them from any pressure source and click the **Tare** button on the **Device Details** page. The pressure readings will change automatically, with reset very close to 0.00.

NOTICE: Taring in a different ambient environment, or when the transmitter is connected to system pressure, could potentially introduce an unintentional offset and inaccurate pressure/flow readings. If this error is introduced, disconnect the system from pressure and click the **Tare** button again to correct the problem.

NOTE: The **Tare** function can also be used from the menu on the display of the transmitter on page 24.

Ping

The ping function can be used to check if a transmitter is still connected. Clicking the **Ping** button at the top of the **Device Details** page will return either a **Ping Success** or **Ping Failed** depending on whether the transmitter is still connected to the gateway.

Take a Transmitter Offline

Near the top of the transmitter **Device Details** page, there is a checkbox that says **Online**. If this box is checked, the transmitter will operate in an online state and will send data normally. This state is represented by a **green circle** under the status column of the transmitter.

Uncheck the **Online** box to put the transmitter into an **offline** state and select **Yes** on the notification window acknowledging that the transmitter will not send and store any data, or receive configuration updates, while it is offline. The circle in the status line will turn grey, and the data fields from the transmitter will be blank. The transmitter will no longer send data packets while offline.

NOTE: When a transmitter is offline, it is still connected to the gateway, but it will not send any further data to the database or the dashboard until it is set back to online. To bring a transmitter back online, check the **Online** box on the **Device Details** page again, and the transmitter will come back up online.

Remove a Transmitter from Gateway

To remove a transmitter from the gateway, click the **Remove from Gateway** button at the top of the **Device Details** page. Once you click this, a notification window will appear to warn you that you will lose all data on the gateway associated with this transmitter and it will be removed from the gateway. This process will also send a set of commands to the transmitter to clear out the join key (communication link) and tell the transmitter to power down.

NOTE: The transmitter can be readded at any time after the **Remove** process has successfully completed because the NET ID will remain the same. Simply power on the transmitter and follow the transmitter join process again to reconnect to the gateway. Note that the transmitter will be a new entry in the database and will not be associated with the data it previously collected.

Removing the transmitter may take several minutes. The user will be returned to the dashboard page and the transmitter will no longer be found on that display once the process is complete. A **SmartMesh® Manager is disconnected** notification will appear during the removal process. This is normal and can be dismissed. Click **OK** to exit the window.

SmartMesh Manager is disconnected

IMPORTANT: While it is possible to remove a transmitter that is in the **Lost** state, there is another notification that will warn the user that they will have to manually reset the NET ID on the lost transmitter itself to complete the removal. If this step is not executed, and the transmitter attempts to rejoin the gateway, it will fail to join as the credentials on the gateway were removed. Refer to Transmitter User Interface and Functionality on page 21 for a description on how to change a transmitter's NET ID.

NOTE: After a transmitter is removed, all connected and powered transmitters will appear as **Lost** and will subsequently re-join automatically. This may take several minutes depending on the number of transmitters connected to the gateway.

The screenshot shows the Swagelok Remote Monitoring System interface. At the top, there is a navigation bar with 'Dashboard' and 'Administration' menus, and a user profile for 'admin (Admin)'. The main content area is titled 'Device Details' and features a table with columns for Status, Flow, P1, P2, T1, T2, DP, Battery, and Last Update. The 'Status' column shows a green circle, indicating the transmitter is online. Below the table, there is a 'Remove from Gateway' button highlighted with a red box. To the right of the table, there are several gauge charts for Flow (SLPM), P1 (PSIG), T1 (Celsius), DP (PSI), P2 (PSIG), and T2 (Celsius). At the bottom, there is a 'Notes' section with an 'Expand' button. The footer of the page contains the Swagelok logo and the text '(C) 2023 Swagelok Company. All rights reserved.'

Switching a Transmitter to a New Gateway

To join a previously used transmitter to a new gateway, it's important to completely remove the Transmitter first. Follow the steps in Remove a Transmitter from Gateway on page 32.

If the transmitter is removed in the **Lost** state, reset the **Join Key** and change the NET ID to match the network ID of the new gateway.

IMPORTANT: Transmitters cannot switch back and forth between different gateways by simply changing the NET ID in the transmitter menu.

Once removed properly, join the transmitter to the new gateway by following the steps in Initial Setup of the Transmitter on page 15.

Device Parameters

The **Device Parameters** that were set initially within the setup of the transmitter can be changed. To change the **Device Parameters**, go to the dashboard and navigate to the **View Details** page using the link by the transmitter.

Select the drop-down **Expand** arrow to expand the section.



The fields on this page can now be updated.

NOTE: Any changes to this section will directly affect the values returned onto the dashboard. Once changes are complete, click the **Save Device button** at the bottom of the page.

Device Details

Status	Flow	P1	P2	T1	T2	DP	Battery	Last Update
●	76.00 GPH	83.50 BARa	129.80 BARa	7 Fahrenheit	95 Fahrenheit	52.50 BAR	91%	06/04/2024 at 10:52 am

Device Parameters (Expanded)

Media State: Gas Liquid
 Liquid Type: Water
 Specific Gravity:

* Flow Restrictor: Rear Ported Vertically Ported

* End Connection Orientation: Rear Ported Vertically Ported

* Calibration Value: Custom Blind

Units of Measure:
 * Flow: GPH
 * Pressure: BARa
 Temperature: Celsius Fahrenheit

Device Information (Expand)
 Device Gauge Limits (Expand)
 Device Set-points (Expand)
 Network Settings (Expand)

Buttons: Cancel, Save Device, Back To Top

Device Information

Information about each transmitter can be viewed by accessing **Device Information**. Use the drop-down labeled **Device Information** found on the **View Details** page for the transmitter.

Select the **Expand** arrow to expand the section.



NOTE: Any changes to this section will directly affect the values returned onto the dashboard. Once changes are complete, click the **Save Device** button at the bottom of the page.

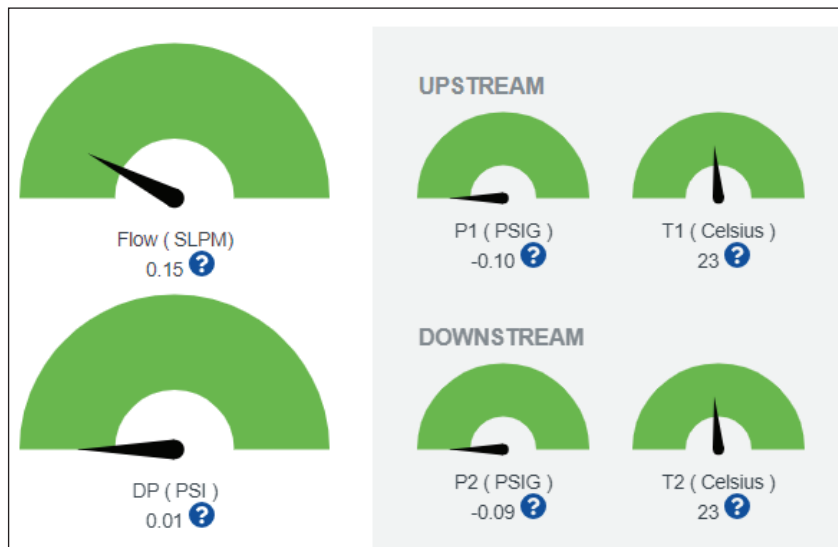
Device Information		Collapse ^
Device ID:	Network ID:	Data Transmission Interval:
00:17:0d:58:fe:17	1251	Speed: 30 Interval: Seconds ▾
Device Nickname: 65 Characters Max	* Device Location:	
VE-41	Plant OFC	
Device Description: 125 Characters Max	Unit OFC	
FE17	Shelter 302x	
	Stream none	
	Tag Number 023717	

Data and Charts

The data shown on the dashboard is also available near the top of the **Device Details** page.

All tamper switch notifications (see Tamper Notifications on page 28) are visible at the top of the each **Device Details** page, no matter which transmitter is selected, as well as on the dashboard.

There are also graphical/visual gauges for a quick overview of the metrics. (Hovering over the ? on each gauge will show its minimum and maximum values.)



Device Gauge Limits

To change the minimum and maximum values of the gauges, expand the **Device Gauge Limits area** and fill in the appropriate upper and lower limits for a gauge.

Device Gauge Limits		Expand ▾
Temperature Gauge Limits		
Minimum Limit: -20	Maximum Limit: 70	
Pressure Gauge Limits		
Minimum Limit: 0	Maximum Limit: 145	
Flow Gauge Limits		
Minimum Limit: 0	Maximum Limit: 1	

Device Threshold Alerts

A series of lower limit/upper limit for notification and critical thresholds is available for each of the data sets received by a transmitter. To update a critical or notification threshold on any of the data readings of a transmitter, navigate to the **Device Details** page of that transmitter and expand the **Device Thresholds** section.



Setting a threshold value will result in a notice being displayed on the dashboard and the transmitter details screen if the transmitted value goes above or below the threshold limits set. Notification alerts will show as a yellow highlight while critical threshold alerts will show as a red highlight. The status of these alarms is stored in the database on the gateway and can be queried through Modbus or REST API protocols.

Within the **Device Threshold** section, notifications can be set for each of the following: flow notifications, delta pressure notifications, upstream notifications, and downstream notifications.

Flow Notifications

Flow

	Notice Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>	Critical Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>
--	---	---

Delta Pressure Notifications

Delta Pressure

	Notice Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>	Critical Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>
--	---	---

Upstream Notifications

Pressure

	Notice Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>	Critical Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>
--	---	---

Temperature

	Notice Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>	Critical Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>
--	---	---

Downstream Notifications

Pressure

	Notice Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>	Critical Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>
--	---	---

Temperature

	Notice Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>	Critical Thresholds: Lower Limit: <input style="width: 80px;" type="text"/> Upper Limit: <input style="width: 80px;" type="text"/>
--	---	---

When finished, scroll to the bottom of the page and click **Save Device**. Any notifications will then be shown on the dashboard as follows:

Notification Threshold Alert

Status	Device Name	Description	Flow	P1	P2	T1	T2	DP	Battery	📢	Last Update	View
●	Mote_eb_001	Mote 0xEB	159.50 SLPH	88.50 PSIG	103.90 PSIG	15 Fahrenheit	97 Fahrenheit	62.40 PSIG	🔋 20%	📢	06/15/2022 at 2:12 pm	View Details

Critical Threshold Alert

Status	Device Name	Description	Flow	P1	P2	T1	T2	DP	Battery	📢	Last Update	View
●	Mote_eb_001	Mote 0xEB	158.50 SLPH	87.50 PSIG	102.90 PSIG	5 Fahrenheit	108 Fahrenheit	61.40 PSIG	🔋 30%	📢	06/15/2022 at 2:11 pm	View Details

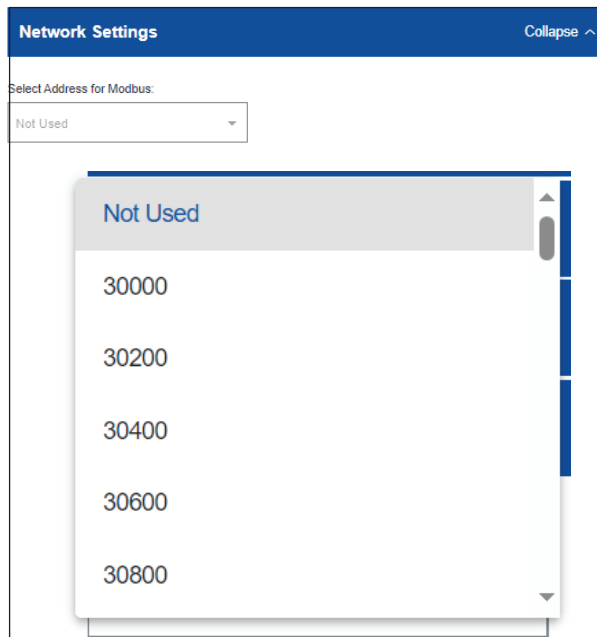
Network Settings

The network settings area allows for changing the Modbus address.

Select the following drop-down to expand the section:



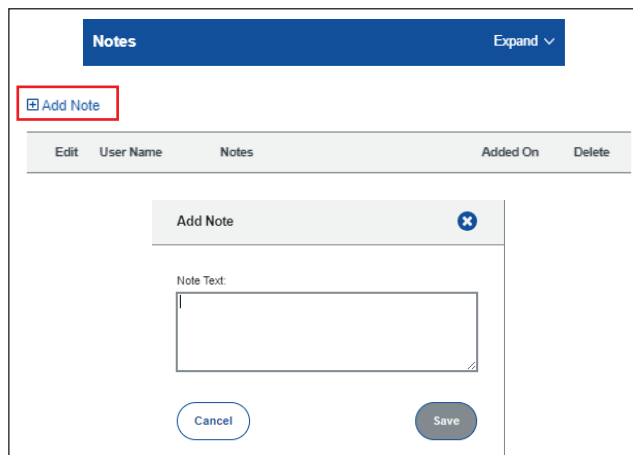
Use the **Select Address for Modbus** drop-down. (Addresses used by other transmitters will not appear in the drop-down.)
Select the appropriate address by clicking on it.



Once completed, select **Save Device**.

Notes

Notes can be added to a transmitter using the **View Details** page of a specified transmitter. First, expand the notes section. In this area notes can be added, edited, and deleted. Once the note is completed, select the **Save** button.



Data Acquisition

Data will be stored on the gateway for 90 days. Modbus and REST APIs can be used to retrieve your data from the gateway.

Modbus

This section will cover enabling Modbus, assigning Modbus addresses and finding a transmitter's Modbus address. Additional Modbus configuration and implementation details can be found in the PTF Modbus Specification Sheet.

Enabling Modbus

Navigate to the dashboard and login. Select the Administration drop-down, then select Network Settings. Select the interface you want to enable Modbus on: Ethernet Primary or Ethernet Secondary. Expand the Advance Port Management tab.

NOTE: Enabling the Modbus Port only activates it for the selected interface. This process must be repeated for the other interface if utilizing both interfaces for Modbus.

Network Settings

Ethernet Primary
Ethernet Secondary

Ethernet Interface: con_eth0

Configures the con_eth0 interface to enable remote access to the gateway.

* Fully Qualified Host Name:

IP Address: Gateway:

Primary DNS: Net Mask:

Secondary DNS:

Advance Port Management Collapse ^

- Enable Firewall ?
- Enable Modbus Port ?
- Enable SSH ?
- Enable SCP SFTP ?
- Enable USB/TCP ?
- Enable Remote Desk ?
- Enable WebAdmin - No VNC ?

Assigning Modbus Addresses to a Transmitter

A Modbus address can be assigned to a transmitter during configuration of the transmitter. It can also be added as shown in Network Settings on page 37.

Finding a Transmitter's Modbus Address

To find the Modbus address of a connected transmitter, login to the gateway dashboard. Find the specific transmitter and select the **Display Details** button. Expand **Network Settings** to see or change the Modbus address of the transmitter.

The screenshot shows the Swagelok gateway dashboard. At the top, there is a navigation bar with 'Dashboard' and 'Administration' menus, and a user profile for 'admin (Admin)'. Below this is the 'Device Details' section for a specific transmitter. The device is currently 'On-Line' and has a battery level of 99%. The main display area contains several gauges for various parameters: Flow (SLPM), P1 (PSIG), T1 (Celsius), DP (PSI), P2 (PSIG), and T2 (Celsius). A sidebar on the left lists expandable sections: Device Parameters, Device Information, Device Gauge Limits, Device Thresholds, and Network Settings. The 'Network Settings' section is highlighted with a red box. At the bottom, there are buttons for 'Cancel', 'Save Device', and 'Back To Top'.

Status	Flow	P1	P2	T1	T2	DP	Battery	Last Update
●	0.00 SLPM	-0.09 PSIG	-0.09 PSIG	23 Celsius	23 Celsius	0.00 PSI	99%	09/06/2023 at 9:55 am

Modbus Recommended Settings

The PTF system operates through a Modbus TCP/IP connection. For optimal performance, we recommend the following:

- Disable the Modbus polling service when assigning Modbus addresses to transmitters
- Set the scan rate within the range of 20,000 to 40,000 milliseconds
- Adjust the response timeout to fall between 10,000 and 15,000 milliseconds
- Implement a delay of 200 milliseconds between polls
- Set the connection timeout to 5000 milliseconds
- Format returned Modbus data as: 32-bit Float -> Little-endian byte swap

Results may vary. These recommendations were gathered based on Modbus Poll, a tool for simulating and troubleshooting the Modbus protocol.

REST API

Swagelok uses web services for our RPC (Remote Procedure Call) interactions, formatted in JSON, using HTTP, making it a RestAPI. In Swagelok's implementation, the RestAPI supports two different protocols: Modbus for use with legacy systems and a custom channel specifically designed for Swagelok's web services. RestAPI operates on the gateway itself and responds to external web service calls from a different device. See below examples for RestAPI data requests.

REST API Request Examples

- Version – Returns the version of software

Parameters: N/A

Example Curl Request: `Curl -x GET http://ws.r1.swagelok.net/version -H "accept: */*"`

Response:

```
{"version": "Ivanhoe3_6 or later"}
```

- Return Data from Specified Device – Returns all data from a specific device

Parameters:

Name or ID of Transmitter: Test Transmitter

Row limit: integer

Example Curl Request:

`Curl -X GET http://ws.r1.swagelok.net/getDataByDevice?name=Test%20Transmitter&rowLimit=1 -H "accept: */*"`

Response:

```
[{"device_id": 20832, "device_name": "Test Transmitter", "updated": "2024-03-05 01:50:56.251101-05", "device_model_channels_name": "/x200a", "Item 0": 6, "Item 1": 0.305655062198639, "Item 2": -0.0309834778308868, "Item 3": -0.0354096591472626, "Item 4": 0.00442618131637573, "Item 5": 67.1450042724609, "Item 6": 66.4025039672852, "Item 7": 0}
```

- Return All Data for a Specified Channel – Returns all the data for a specified channel

NOTE: See channels table at the end of this section for more details on various channels.

Parameters:

Channel: /x200a, /x2003, /x2004, /x2008, /x1001

Sort: ASC or DSC

Row limit: integer

Example Curl Request:

`Curl -X GET http://ws.r1.swagelok.net/channel?chn=%2F%20x200a&order_by=ASC&rowLimit=5 -H "accept: */*"`

Response:

```
[{"device_id": 20832, "device_name": "Test Transmitter", "updated": "2024-03-04 15:53:01.918342-05", "device_model_channels_name": "/x200a", "Item 0": 6, "Item 1": 0.428946495956152, "Item 2": -0.00442621111869812, "Item 3": -0.0132786333560944, "Item 4": 0.00885242223739524, "Item 5": 76.0710688964844, "Item 6": 76.5556335449219, "Item 7": 02024-03-04 15:53:01.918342-05:00}, {"device_id": 20832, "device_name": "Test Transmitter", "updated": "2024-03-04 15:53:31.389529-05", "device_model_channels_name": "/x200a", "Item 0": 6, "Item 1": 0.525296986103058, "Item 2": -0.00442621111869812, "Item 3": -0.0177048444747925, "Item 4": 0.0132786333560944, "Item 5": 75.9650039672852, "Item 6": 76.3362426757812, "Item 7": 02024-03-04 15:53:31.389529-05:00}, {"device_id": 20832, "device_name": "Test Transmitter", "updated": "2024-03-04 15:54:01.788669-05", "device_model_channels_name": "/x200a", "Item 0": 6, "Item 1": 0.393422957658768, "Item 2": -0.00442621111869812, "Item 3": -0.00885242223739624, "Item 4": 0.00442621111869812, "Item 5": 75.8918762207031, "Item 6": 76.0549926757812, "Item 7": 02024-03-04 15:54:01.788669-05:00}, {"device_id": 20832, "device_name": "Test Transmitter", "updated": "2024-03-04 15:54:30.332087-05", "device_model_channels_name": "/x200a", "Item 0": 6, "Item 1": -0.303453236810314, "Item 2": -0.00885242223739624, "Item 3": -0.00442621111869812, "Item 4": 0.00442621111869812, "Item 5": 75.7850036621094, "Item 6": 75.8356246948242, "Item 7": 02024-03-04 15:54:30.332087-05:00}, {"device_id": 20832, "device_name": "Test Transmitter", "updated": "2024-03-04 15:54:59.803164-05", "device_model_channels_name": "/x200a", "Item 0": 6, "Item 1": 0.523448514087677, "Item 2": -0.00442621111869812, "Item 3": -0.0177048444747925, "Item 4": 0.0132786333560944, "Item 5": 75.0725082397461, "Item 6": 75.7118835440219, "Item 7": 02024-03-04 15:54:59.803164-05:00}
```


- Modbus address used by device – Returns the mapped address

Parameters:

Name of transmitter: Test Transmitter

Example Curl Request:

Curl -X GET http://ws.r1.swagelok.net/get_modbus_address?name=Test%20Transmitter -H "accept: */*"

Response:

```
{"deviceName":"Test Transmitter","address":30000}
```



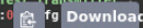
- Modbus data Request – Get modbus data request with given address

Parameters: Modbus Address: 30000

Example Curl Request: Curl -X GET http://ws.r1.swagelok.net/getByModbusAddress?address=30000 -H "accept: */*"

Response:

```
[{"device id":20832, "device name":"Test Transmitter", "updated":"2024-03-20 14:51:39.178365-04", "device channel name":"xStatus1", "Flow":17.9959716796875, "P1":0.10622908724411, "P2":0.118655218362808, "DP":0.00442621111869812, "T1":66.6725082397461, "T2":65.991882342188, "Battery %":100, "Reserved":0}, {"device id":20832, "device name":"Test Transmitter", "updated":"2024-03-20 14:51:39.178365-04", "device channel name":"xStatus2", "Transmitter Status":1, "Err Reg":145, "Min/Max bits":1360, "Reserved":0, "Reserved":0, "Reserved":0, "Reserved":0}, {"device id":20832, "device name":"Test Transmitter", "updated":"2024-03-20 14:51:39.178365-04", "device channel name":"xUnits", "Flow Units (1-5)":3, "P1 Pressure Units (1-6)":1, "P2 Pressure Units (1-6)":1, "DP Pressure Units (1-6)":1, "T1 Temperature Units (0-1)":1, "T2 Temperature Units (0-1)":1, "Media State (0-1)":0, "Reserved":0}, {"device id":20832, "device name":"Test Transmitter", "updated":"2024-03-20 14:51:39.178365-04", "device channel name":"xThresholdStatus1 (Coil)", "Flow Critical Minimum Triggered":0, "Flow Notice Minimum Triggered":0, "Flow Notice Maximum Triggered":0, "Flow Critical Maximum Triggered":0, "DP Critical Minimum Triggered":0, "DP Notice Minimum Triggered":0, "DP Notice Maximum Triggered":0, "DP Critical Maximum Triggered":0}, {"device id":20832, "device name":"Test Transmitter", "updated":"2024-03-20 14:51:39.178365-04", "device channel name":"xThresholdStatus2 (Coil)", "P1 Critical Minimum Triggered":0, "P1 Notice Minimum Triggered":0, "P1 Notice Maximum Triggered":0, "P1 Critical Maximum Triggered":0, "T1 Critical Minimum Triggered":0, "T1 Notice Minimum Triggered":0, "T1 Notice Maximum Triggered":0, "T1 Critical Maximum Triggered":0}, {"device id":20832, "device name":"Test Transmitter", "updated":"2024-03-20 14:51:39.178365-04", "device channel name":"xThresholdStatus3 (Coil)", "P2 Critical Minimum Triggered":0, "P2 Notice Minimum Triggered":0, "P2 Notice Maximum Triggered":0, "P2 Critical Maximum Triggered":0, "T2 Critical Minimum Triggered":0, "T2 Notice Minimum Triggered":0, "T2 Notice Maximum Triggered":0, "T2 Critical Maximum Triggered":0}, {"device id":20832, "device name":"Test Transmitter", "updated":"2024-03-20 14:51:39.178365-04", "device channel name":"xMinMaxMfgStatus1 (Coil)", "Mfg Status Flow Min":1, "Mfg Status Flow Max":0, "Mfg Status P1 Min":1, "Mfg Status P1 Max":0, "Mfg Status P2 Min":1, "Mfg Status P2 Max":0, "Mfg Status DP Min":1, "Mfg Status DP Max":0}, {"device id":20832, "device name":"Test Transmitter", "updated":"2024-03-20 14:51:39.178365-04", "device channel name":"xMinMaxMfgStatus2 (Coil)", "Mfg Status T1 Min":0, "Mfg Status T1 Max":0, "Mfg Status T2 Min":0, "Mfg Status T2 Max":0, "Reserved":0, "Reserved":0, "Reserved":0, "Reserved":0}]
```



Channels

Channel	Data Description	Data Format/Details
/x200a	Flow	Item 1
	P1	Item 2
	P2	Item 3
	ΔP	Item 4
	T1	Item 5
	T2	Item 6
/x2003	T1- Units	Item 5 Where: 0 = Celsius 1 = Fahrenheit
	T2- Units	
	Battery % (0-100%)	Item 6
	Flow Units	Item 7 If 'Media State' = 0 (Gas): 1 = splm 2 = sccm 3 = slph 4 = scfm 5 = gph If 'Media State' =1 (Liquid): 1 = lpm 2 = gpm 3 = ccm 4 = gph 5 = lph
/x2004	Pressure Units	Item 3 If 'Media State' = 0 (Gas): 1 = psig 2 = psia 3 = barg 4 = bara 5 = mbarg 6 = mbara
/x2008	Media State	Item 1 Where: 0 = Gas 1 = Liquid
/x1001	Transmitter Tamper Switch	Item 0 Note: Convert Item 0 to binary (Tamper Switch Bit): Where: 0 = not triggered 1 = triggered Bit 1: Tamper Detect <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;"> b7 b6 b5 b4 b3 b2 b1 b0 x x x x x x y x </div>

Gateway Settings—Administrative and Technician Access

The **Gateway Settings** give you the ability to update the Network ID, the software, and restart gateway services. Login as **Administrator** to access the **Gateway Settings**.

Network ID—Administrative and Technician Access

No transmitters should be connected when the NET ID is changed. If any transmitters are still connected, they will show up as “Lost.” Remove them before changing the NET ID.

To change the **Network ID**, use the drop-down menu under **Network ID** and select the desired ID. Select **Save**.

NOTE: Occasionally a notification that the **Network ID failed to update** appears. Wait for several seconds to a minute. If there is no **Update Successful** notification, select **Save** again and the **Update Successful** notification window should appear.

Once the **Network ID** is changed, the transmitters will need to be set to this new **NET ID** and then can be added to the gateway with this address. See Transmitter User Interface and Functionality > NET ID on page 23.

Time Zone Changes—Administrative and Technician Access

To change the time zone information, select **System Time Zone** drop-down menu and select the appropriate time zone.

Gateway Restart Services - Administrative and Technician access

Several services can be restarted using the gateway dashboard.

- **Restart Services:** This restarts all background processes and automated tasks without rebooting the gateway. Connection to transmitters will be interrupted for a short period of time.
- **Restart Gateway:** This will restart the gateway. Connection to transmitters will be interrupted for a short period of time.
- **Restart SmartMesh Manager:** This will reboot the SmartMesh communication module. Connection to transmitters will be interrupted for a short period of time.



Dashboard Configuration - Administrative and Technician access

From the main dashboard, navigate to **Administrative > Dashboard Configuration**.

The image shows a configuration form titled "ADD OR EDIT DASHBOARD LAYOUT". The form has a header with "10 Layouts Max" and a description: "Configures the Flow, pressure and temperature display on your dashboard." Below this is a text input field for "Layout Name" with a "40 characters max" limit. Underneath is a section for "Layout Options" containing a grid of checkboxes for "Description", "Flow", "P1", "P2", "T1", "T2", and "DP". At the bottom of the form are two buttons: "Cancel" and "Save Layout". To the right of the form is a table with columns for "Edit", "Layout Name", "Description", "Flow", "P1", "P2", "T1", "T2", "DP", and "Delete".

Create a Layout (New Dashboard View)

Select **Create Layout**, enter a name for the layout, then select the details to be shown within this layout.

NOTE: There is a system maximum of 10 custom layouts.

When finished, select **Save Layout**.

The new layout can be edited by selecting the **Edit** checkbox. It can also be deleted by clicking the trash can icon.

Edit	Layout Name	Description	Flow	P1	P2	T1	T2	DP	Delete
<input checked="" type="checkbox"/>	GUITestLayout	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Selecting Layouts from the Main Dashboard

Return to the main dashboard by selecting the **Dashboard** button. From there, select the grid layout drop-down. Then select the desired layout. That layout will now appear on the dashboard.

Ethernet Interface and Advanced Port Management

Navigate to the **Administration Tab > Network Settings**.

NOTE: Leave **Fully Qualified Hostname** as default unless using DNS.

The screenshot shows the 'Network Settings' page for the 'Ethernet Primary' interface. The interface is titled 'Ethernet Interface: con_eth0'. A blue button labeled 'Advance Port Management' with an 'Expand' dropdown is located in the top right corner. Below the title, there is a description: 'Configures the con_eth0 interface to enable remote access to the gateway.' A field for 'Fully Qualified Host Name' contains 'ptf.swagelok.com'. Below this are fields for 'IP Address' (10.220.0.50), 'Gateway' (10.220.0.3), 'Primary DNS' (10.220.0.254), 'Net Mask' (255.255.255.0), and 'Secondary DNS' (10.222.2.61). At the bottom, there are 'Cancel' and 'Save Settings' buttons.

The Ethernet port interface on the gateway facilitates network connectivity, enabling communication with transmitters and services. For recommended operation, certain configuration parameters need to be set. Your IT team can assist in configuring the following settings:

1. Fully Qualified Hostname:

The fully qualified hostname uniquely identifies your gateway on the network. It typically consists of the hostname followed by the domain name (e.g., “gateway.swagelok.com”). If you don’t intend to use webservices, leave the default hostname as is. Host domain name is not required for Modbus TCP.

2. IP Address:

The IP address is a unique numerical label assigned to each device on a network. It enables devices to communicate with each other. Your IT team will assign an appropriate IP address to your device. Currently supporting IPv4 with plans to support IPv6 in the future. Currently supporting static IP addressing with plans to support DHCP addressing in the future.

3. Gateway:

The gateway serves as an entry and exit point for a specific network LAN traffic between different networks or subnets. It directs data packets to their intended destinations. Your IT team will specify the gateway address.

4. Primary DNS (Domain Name System):

The primary DNS server is responsible for translating domain names into IP addresses, facilitating network communication. Your IT team will provide the IP address of the primary DNS server.

5. Secondary DNS:

The secondary DNS server serves as a backup to the primary DNS server. In case the primary DNS server becomes unavailable, the secondary DNS server ensures continuity of network services. Your IT team will provide the IP address of the secondary DNS server.

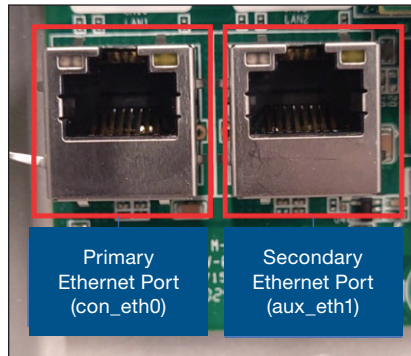
6. Net Mask or Net Bits:

The net mask or net bits determines the size of the network and divides the IP address into network and host portions. It specifies which part of the IP address represents the network and which part represents the host. Net masks are how networks route. Your IT team will configure the net mask according to your network requirements. (Currently Net Mask ipv4 moving to net bits for Net Bits.)

Your IT team will ensure that these configuration parameters are correctly set to establish reliable network connectivity for your device. Select **Save Settings** button to confirm changes.

For assistance with Ethernet port interface configuration, please contact your IT support team.

NOTE: The Ethernet primary interface and Ethernet secondary interface can both be configured. Below is a picture of the physical ports.



Network Settings

Advance Port Management

In this section, the various port toggle switches available on the gateway device are introduced, each serving a specific purpose to enhance functionality and control. These toggle switches enable the user to customize and configure the gateway's connectivity options to suit specific needs. Whether managing remote access, file transfer, or troubleshooting tasks, understanding and utilizing these toggle switches effectively can optimize the gateway's performance and security.

Advance port management can be accessed via the **Administration>Network Settings** tab.

NOTE: Only the administrative role will be able to edit the advance port management section.

Network Settings

Ethernet Primary | Ethernet Secondary

Ethernet Interface: con_eth0

Configures the con_eth0 interface to enable remote access to the gateway.

* Fully Qualified Host Name:
ptf.swagelok.com

IP Address: 10.220.0.50 | Gateway: 10.220.0.3

Primary DNS: 10.220.0.254 | Net Mask: 255.255.255.0

Secondary DNS: 10.222.2.61

Cancel | Save Settings

Advance Port Management Collapse ^

- Enable Firewall ?
- Enable Modbus Port ?
- Enable SSH ?
- Enable SCP SFTP ?
- Enable USB/TCP ?
- Enable Remote Desk ?
- Enable WebAdmin - No VNC ?

The following subsections provide detailed explanations of each toggle switch, including its function, configuration requirements, and potential applications. Additionally, guidance on best practices and considerations for each toggle switch is offered to ensure seamless integration into the user's workflow.

Enable Firewall: By default, the firewall toggle is enabled. This secures the system and turns off all ports except port 80 (http – redirect to port 443), port 443 (https), port 53 (DNS) on both interfaces eth0 and eth1. Toggle should stay ON unless performing maintenance, troubleshooting or setup.

Enable Modbus Port: To activate the Modbus port functionality, toggle the switch to the ON position. This allows for the addition of Modbus addresses. Please note that Modbus (port 502) must be operated within a secure LAN environment; otherwise, keep the switch in the off position. It's important to emphasize that Modbus communication is not inherently secure. By default, Modbus communication is not encrypted. Currently, Swagelok does not offer support for secure Modbus communication. If it's not feasible to establish a secure network for Modbus usage, we recommend utilizing the REST API instead. For a secure method of communicating with the gateway, please refer to the REST API section of this document.

Enable SSH: Activates Secure Shell (SSH) functionality (port 22). SSH access is strictly one-way communication for administrative purposes. Users permitted to administer commands through a terminal session, however, are restricted from transferring files off the gateway. This one-way communication ensures that users can log in and perform administrative tasks such as utilizing HTOP, configuring files, allocating resources, and conducting other command line administration. Remote invocation is not supported. SSH access is particularly useful in troubleshooting scenarios.

Enable SCP SFTP: Toggle switch on to enable Secure Copy Protocol (SCP) and SSH File Transfer Protocol (SFTP) for bidirectional communication. It includes the same functionality as SSH; however, it also allows users to both upload and download files, including log files, from the gateway. Additionally, users can perform remote invocation. SCP and SFTP are particularly useful for troubleshooting scenarios and facilitating expansion by enabling the seamless transfer of files between the gateway and remote systems.

Enable USB/TCP: A feature for future load capacity.

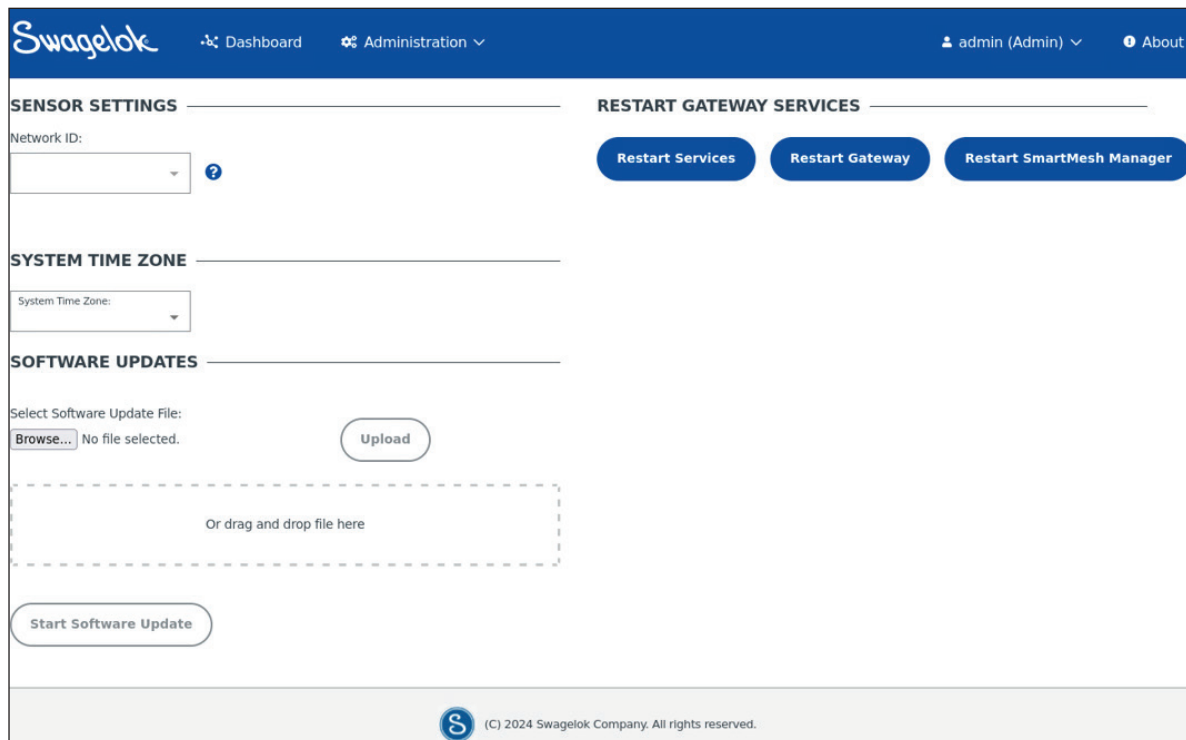
Enable Remote Desk: Facilitates remote desktop access for troubleshooting purposes with clients, distributors, and field service personnel.

Enable WebAdmin: No VNC: This feature is exclusively intended for internal use by Swagelok. It enables on-site administration and troubleshooting for engineering and field service purposes. It's designed for future development and requires a private network for operation.

Updates

Gateway Update

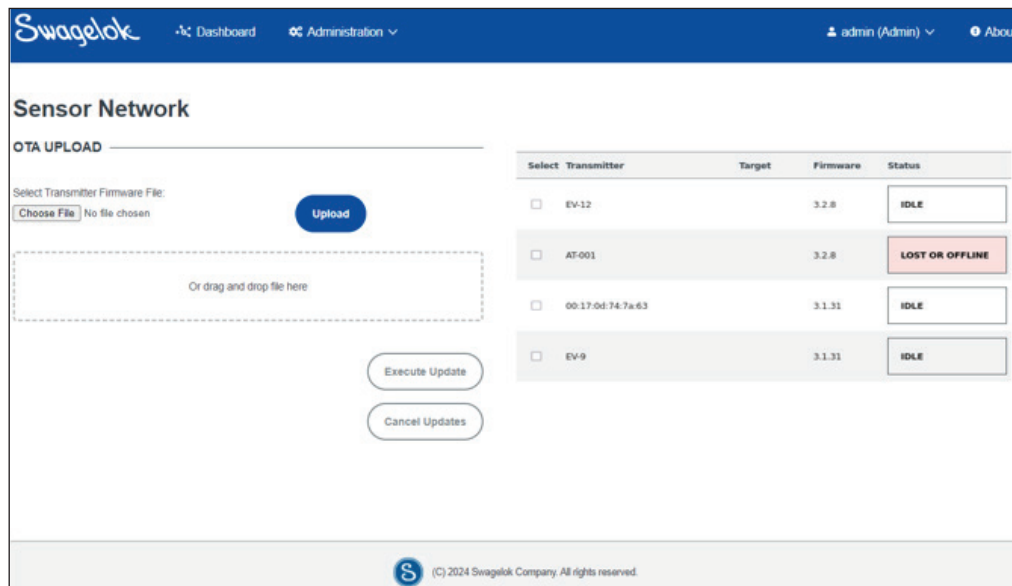
1. Download the latest version from <https://admin.swagelok.net>. Save the file to a location that is easily accessible.
NOTE: Do not update the file name.
2. From the main dashboard, navigate to **Administration > Gateway Settings**.
3. In the **Software Updates** section, select **Choose File/Browse** to browse the file explorer.
NOTE: The **Choose File** button will appear as **Browse** if the user is accessing the digital control panel directly from the gateway.
4. Navigate to the file that was downloaded in step one, and select the file for the update. (e.g.: targ.gz to be added).
5. Select **Upload**.
6. Select the **Start Software Update** button.



Sensor Network Over the Air (OTA) Updates

The Sensor Network section is used for over the air (OTAs) updates to the transmitters. The OTA section of the digital control panel is used to wirelessly deploy updated firmware to the transmitters enabling contact-free updates.

From the main **Dashboard**, navigate to **Administrative > Sensor Network** section.



The above image shows a list of paired transmitters. This list displays:

- Name of transmitter joined to the gateway
- Target firmware (the version of OTA file to be applied)
- Firmware (the current version of the firmware on the transmitter)
- Current status of the transmitter (IDLE, LOST or OFFLINE)
- Selection box for the transmitter

Transmitters can only be selected for an OTA update if:

- The transmitter is in the IDLE state (not LOST or OFFLINE)
- An updated file in .OTAP2 format has been uploaded **and** the transmitter has a different version of firmware than the uploaded .OTAP2 file

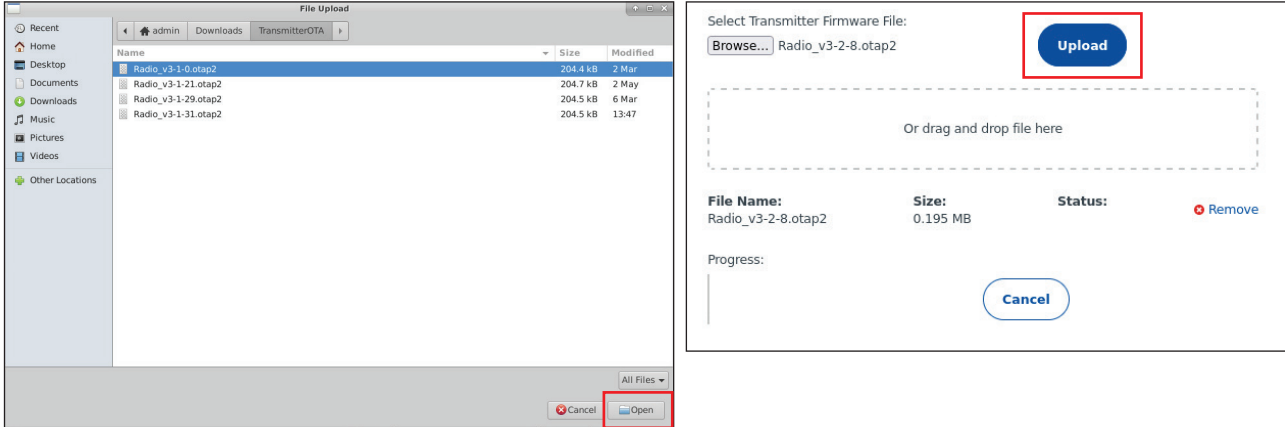
Sensor Network Over the Air (OTA) Updates

Download the latest version from <https://admin.swagelok.net>. The target firmware file will be in the .OTAP2 file format.

- In the **OTA Upload** section of the **Sensor Network** page (left side of page), select **Choose File/Browse** button and browse for the .OTAP2 file.

NOTE: The **Choose File** button will appear as **Browse** if the user is accessing the digital control panel directly from the gateway.

Once the appropriate file is selected, continue by selecting the **Upload** button. The progress bar will indicate when upload is complete.



NOTE: If connected to the gateway via a web browser on an external PC/laptop, a file browser window will launch. Navigate to the location on the external PC/Laptop where the .OTAP2 file was saved or downloaded and follow above steps.

- Wait for the firmware version numbers to appear under firmware in the list of transmitters. This may take several minutes.
- Select the checkbox(es) for the desired transmitters to be updated. Select the **Execute Update** button and the communication process will begin.

Select	Transmitter	Target	Firmware	Status
<input type="checkbox"/>	EV-12		3.2.8	IDLE
<input type="checkbox"/>	AT-001		3.2.8	LOST OR OFFLINE
<input checked="" type="checkbox"/>	00:17:0d:74:7a:63		3.1.31	IDLE
<input checked="" type="checkbox"/>	EV-9		3.1.31	IDLE

Selection of transmitters with outdated firmware.

Select	Transmitter	Target	Firmware	Status
<input type="checkbox"/>	EV-12		3.2.8	IDLE
<input type="checkbox"/>	AT-001		3.2.8	LOST OR OFFLINE
<input type="checkbox"/>	00:17:0d:74:7a:63	3.2.8	3.1.31	5.32%
<input type="checkbox"/>	EV-9	3.2.8	3.1.31	5.32%

The updating process begins, and progress is tracked in the Status column.

NOTE: Navigating away from this screen is permitted, though **do not** close the browser, disconnect the SmartMesh manager, or power off the gateway as this may unintentionally terminate the OTA update session.

- The OTA can be cancelled while in progress by selecting the transmitters via the checkbox(es) and pressing the **Cancel Updates** button.

NOTE: Cancelling an OTA will not delete or corrupt the firmware on the targeted transmitters. They will continue operating as before, and the OTA can be restarted at any time.

- If the OTA is allowed to complete, the status box showing **Complete** will display. COMPLETE
- After the OTA is complete, the transmitters will power cycle themselves off and on as the updates are applied. The gateway digital control panel will run through a series background restarts (transparent to the user) as well.

Additional Information and Best Practices

SmartMesh

SmartMesh is the communication protocol that allows transmitters to communicate with other transmitters to pass data to the gateway if a direct connection cannot be made.

Setup Recommendations

It is recommended to test the connection of the transmitter to the gateway, with the transmitter in its operation location, **before** actually installing it in the fluid system. For best practice, try to avoid any obstructions that are known to block signals such as metal structures and thick walls.

Location and Environment Recommendations

A signal is strongest when there is a direct line of sight to a receiver. Thus, if feasible, a gateway should be located with a direct line of sight to the transmitters. This will provide the greatest range.

An elevated antenna and gateway setup is more likely to clear ground level obstructions, allowing for a direct signal.

Environmental conditions like humidity or rain may impact the signal strength and connectivity of the system.

Signal Dead Zones

A signal dead zone refers to an area where wireless communication signals are weak or absent. This can occur due to factors such as too much distance from the signal source, physical obstructions, or interference from other electronic devices resulting in limited or no connectivity in that area.

The images on the following page illustrate how transmitters can be used to mesh transmitters in dead zones so that communication with the gateway is maintained. Meshing is a way to connect a transmitter that is out of range by utilizing another transmitter to extend connectivity.

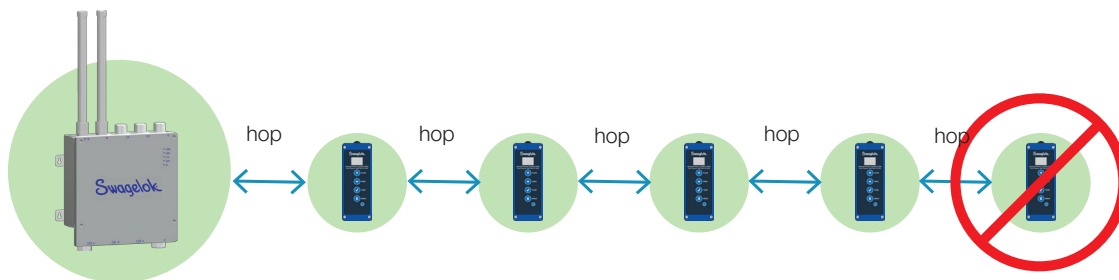
NOTE: Do not hop more than 4 transmitters together as this will cause extreme latency in data communication.

Latency and Configuration

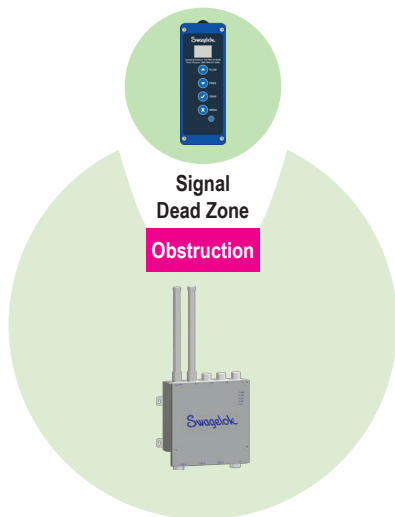
For best practice, the fastest and simplest configuration is when all transmitters connect directly to the gateway. This provides the least latency for the data to be received by the gateway.

Meshing transmitters will extend range connectivity but increase data latency.

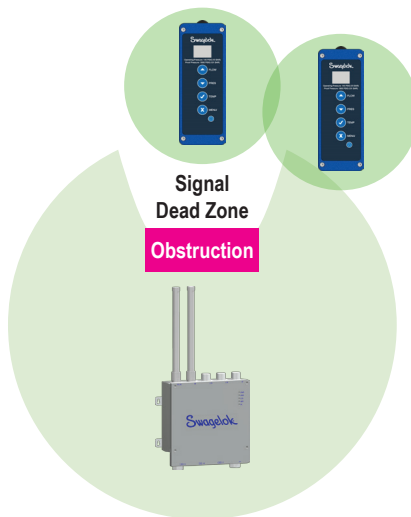
NOTE: Do not hop more than 4 transmitters together as this will cause extreme latency in data communication.



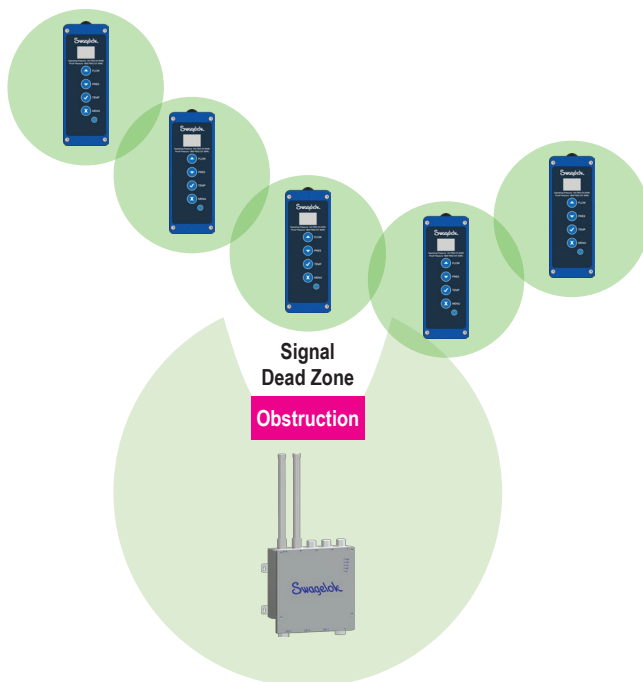
Signal Dead Zones – Illustrated



Transmitter cannot connect due to signal dead zone caused by obstruction



Transmitter in the signal dead zone meshed to another transmitter to continue network connectivity



Meshing multiple transmitters to extend network connectivity

Maintenance and Repairs

Transmitter Fittings Removal from System



WARNING: To avoid risk of injury, ensure system is depressurized before doing any maintenance on the transmitter. Either check the pressure using the digital control panel or by pressing the pressure button on the transmitter to confirm the pressure is showing MIN.



CAUTION: To avoid risk of injury, do not attempt to power on the transmitter when the lid of the transmitter is open.

NOTE: Remove the transmitter from the system and transfer to a workbench for maintenance. For information on removing a transmitter from a system, see Removing Transmitter from System on page 54.

Transmitter Restrictor Kit



WARNING: To avoid risk of injury, ensure system is depressurized before doing any maintenance on the transmitter. Either check the pressure using the digital control panel or by pressing the pressure button on the transmitter to confirm the pressure is showing MIN.

NOTE: Remove the transmitter from the system and transfer to a workbench for maintenance. For information on removing a transmitter from a system, see Removing Transmitter from System on page 54.

Swagelok transmitters can measure the following flow ranges with a 10:1 turn down ratio. The full-scale flow is determined by the installed restrictor orifice diameter.

Restrictor Size	Orifice Diameter, in. (mm)	Flow Measurement Ratings			
		Nitrogen, slpm	Nitrogen, scfm	Water, ccm	Water, gpm
0045	-0.0045 (-0.11)	0.02 to 0.2	0.0007 to 0.007	–	–
0096	-0.0096 (-0.24)	0.1 to 1.0	0.003 to 0.03	–	–
0211	-0.0211 (-0.54)	0.5 to 5.0	0.02 to 0.2	37.9 to 379	0.01 to 0.1
0421	-0.0421 (-1.07)	2.0 to 20	0.07 to 0.7	151.4 to 1514	0.04 to 0.4
0803	-0.0803 (-2.04)	8.0 to 80	0.3 to 3.0	643.5 to 6435	0.17 to 1.7
1061	-0.1061 (-2.69)	14 to 140	0.5 to 5.0	1135.6 to 11356	0.3 to 3

Each restrictor is laser marked with flow direction, calibration value, and orifice diameter as shown below.

Flow Direction



Calibration Value



Orifice Diameter



When mounted in the standard configuration of bottom to top, the transmitter measures flow with the bottom port as the inlet (1), and the top port as the outlet (2). Each restrictor is calibrated in the flow direction indicated by the marked flow arrow. The transmitter will work if the restrictor is placed in either direction; however, flow accuracy can be affected when placed in the reverse direction. Match up the flow arrows on the transmitter and restrictor for proper flow direction.

Removing Transmitter from Fluid System



WARNING: To avoid risk of injury, ensure the lines are depressurized before uninstalling a transmitter or making any changes to the system.



CAUTION: To avoid damage to the sensor, do not attempt to touch the sensor with any type of probing instrument.



CAUTION: To avoid damage to the transmitter, only open the lid of the transmitter in a safe location.



WARNING: See Safety on page 3 for information on safety ratings and the protective techniques used for intrinsic safety.

Removal Steps

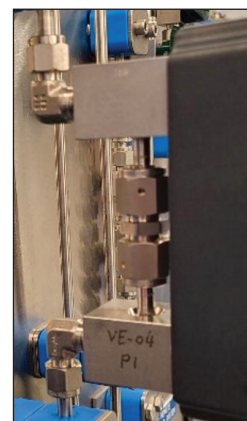
1. Ensure that the system is depressurized before removing a transmitter from the system.



2. Power down the transmitter before disconnecting the physical transmitter.
NOTE: For removing a transmitter from the gateway, see Remove Transmitter from Gateway on page 32.



3. To disconnect the transmitter, use the *Swagelok Tube Fitting Instructions*, [MS-12-01](#), to disassemble the connections.



Installing a Restrictor

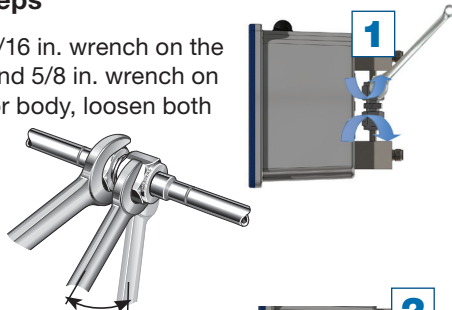
For installation or changing of a restrictor kit, follow the instructions below for installation.

Tools Required:

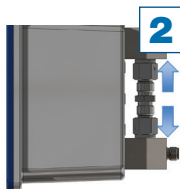
- 5/8 in. wrench
- 11/16 in. wrench

Installation Steps

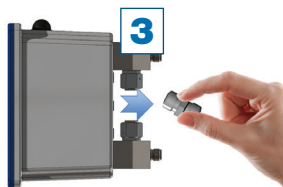
1. Using an 11/16 in. wrench on the VCO® nut and 5/8 in. wrench on the restrictor body, loosen both VCO nuts.



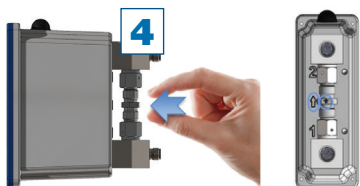
2. Slide the VCO nuts away from each other and toward the bodies.



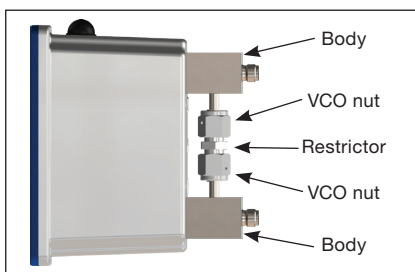
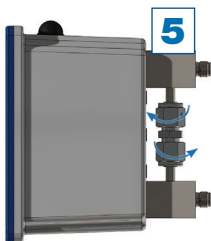
3. Remove old restrictor. Store or discard after removal.



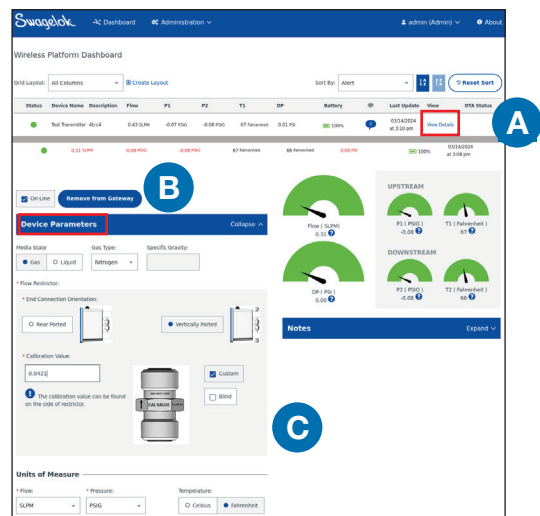
4. Place new restrictor in the gap between the bodies, confirming that the restrictor flow arrow is in same direction as flow arrow on transmitter. If the restrictor gap is too tight for the new restrictor to fit, gently pull bodies outward to expand the gap.



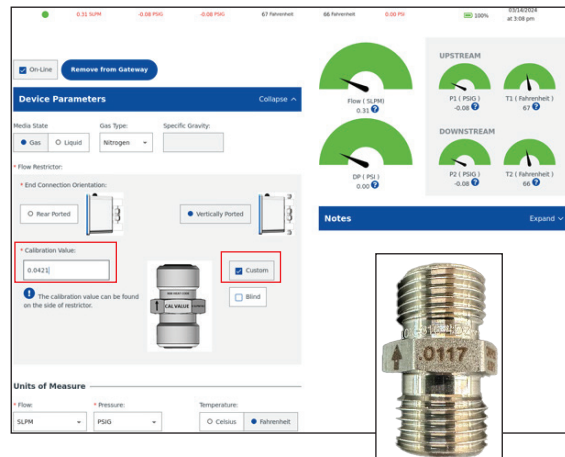
5. Tighten both VCO nuts to finger-tight and then torque them to wrench-tight using an 11/16 in. wrench on the nut and a 5/8 in. wrench on the body.



6. After changing the physical flow restrictor, navigate to **Main Dashboard** on the gateway. Go to the transmitter's **View Details** page (A). Select the **Device Parameters** drop-down (B). The **Device Parameters** will display (C).



7. The calibration value of the restrictor is marked on the side of the restrictor. Ensure the **Custom** checkbox is checked and enter that value into the field under **Device Parameters**. A notification box will appear confirming the user wants to change the factory calibration. Select **Yes**. Then, select **Save Device** at the bottom of the page after completing these steps to upload the new configuration values into the transmitter. **NOTE:** Changes made to this page upload new data to the transmitter. Do not interrupt the **Save Device** function by navigating anywhere else on the page. The page will automatically reroute back to the main dashboard when complete.



Battery Replacement

The transmitter's battery is located inside the housing and is a nonrechargeable D-Cell lithium battery. For removal of a transmitter from the system, see Removing Transmitter from System on page 54.



WARNING: To avoid risk of injury, do not connect or disconnect the battery in a hazardous location.



WARNING: To avoid risk of injury and/or explosion, always use the correct battery type.



CAUTION: To avoid risk of injury, do not attempt to power on the transmitter when the lid of the transmitter is open.

NOTICE: Removing the transmitter from the system and transferring it to a workbench for maintenance are considered a best practice.

Maintenance Kits

Ordering number: MS-PTF-BKIT

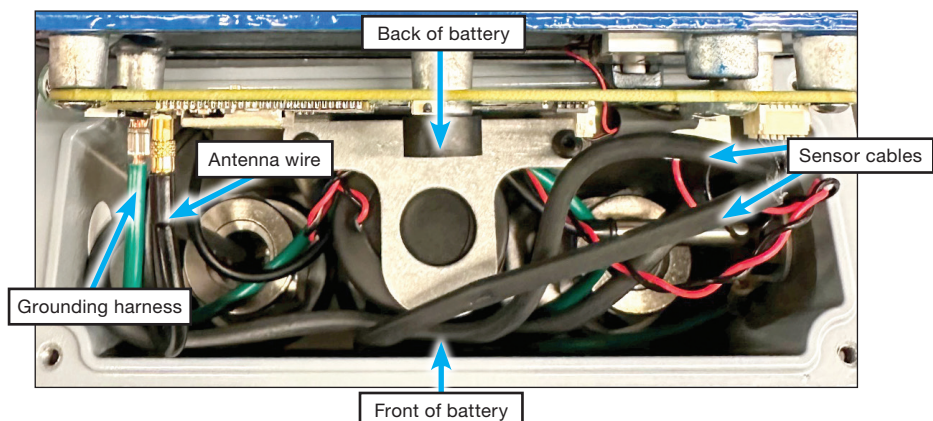
- Battery
- Gasket
- Lid screws (×4)
- Foam insert
- Battery retention screws (×2)

Tools Required

- 3/32 in. hex key – for lid screws
- 5/64 in. hex key – for battery retention screws

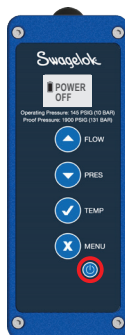
Wiring Pinch Points

1. Sensor cables should be routed and tucked in front of the battery.
2. Excess ground and antenna wire should be tucked on the back side of the battery.
3. Excess battery wire should be tucked on the back side of the battery.

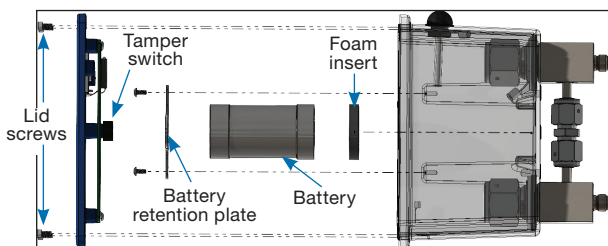


Battery Replacement Steps

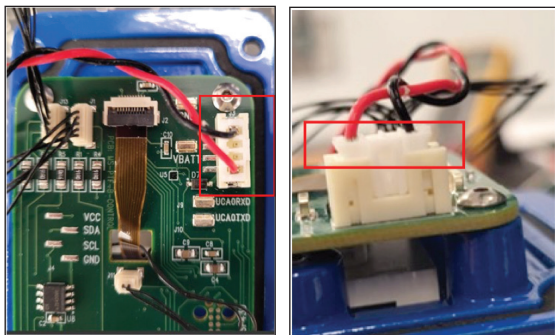
1. If the transmitter is powered on, power off the transmitter by holding down the power button for 5 to 10 seconds until the screen says **POWER OFF**.



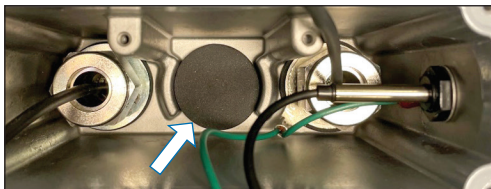
2. Remove the four lid screws holding the transmitter lid to the transmitter rear enclosure.
3. Gently pull the lid away from the rear enclosure keeping in mind that wires are attached to the lid.
4. Remove the battery retention screws and plate.



5. With the lid removed, disconnect the battery connector from the circuit board on the lid of the enclosure and remove the battery from the housing. To remove the connector from the board, pull on the plastic top of the connector as opposed to the wires.

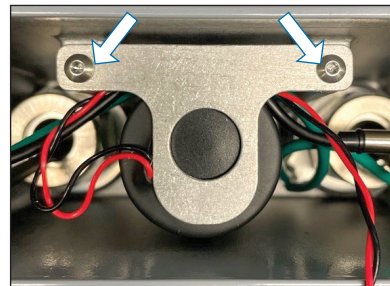


6. **OPTIONAL:** A new foam insert and enclosure lid gasket are provided. If replacement of these items is desired, do the following:
 - Remove old foam battery insert and enclosure lid gasket using a pick or screwdriver.
 - Push new foam battery insert into rear enclosure until it is bottomed.
 - Push new enclosure lid gasket into the lid until it is bottomed, taking care to not twist it.

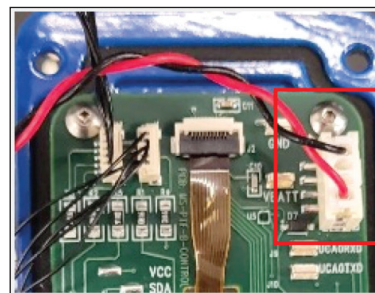


7. Place the new battery against the foam insert in rear enclosure and install the battery retention plate, being careful not to pinch the battery wire with the retention plate. For installation of the battery retention plate screws, tighten each of the screws to approximately 5 in.-lb (0.34 N-m).

NOTE: New screws are included with the kit to replace any screws that are lost.

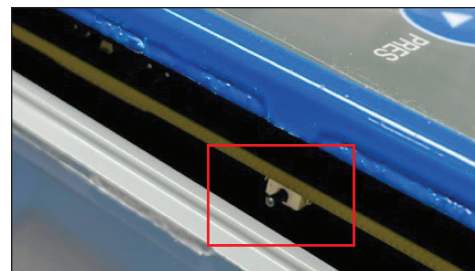


8. Reattach the **battery connector** to the transmitter board.
9. Orient the lid properly for reattaching.



- The top of the lid (screen and Swagelok logo) should be closest to the antenna.
- Make sure contact of the tamper switch with the rear enclosure occurs first to avoid possible damage to the switch.

When reinstalling the lid of the transmitter, notice that the **tamper switch** is located on the side of the printed circuit board. Remove one side at a time.



CAUTION: Care must be exercised when closing the lid. The **tamper switch** that is located on the side of the circuit board must be tucked into the housing **first** when closing the lid. Failure to do so may result in breaking the **tamper switch**.

10. Once lid is flush on the rear enclosure, tighten each of the screws to approximately 15 in.·lb (0.34 N·m) in an alternating pattern.
11. Reinstall the transmitter in the system. Turn the unit on and the system will recognize the transmitter. See *Installing Transmitter into Physical System* on page 18.
NOTE: The gateway will display a notification that the tamper switch has been triggered once it is back online.
12. If a new battery has been installed, reset the battery indicator using the following instructions.
NOTE: Refer to the *Battery Safety Information* on page 4, for information on old battery disposal.

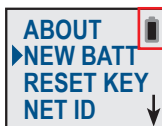
Press the **Menu** button, navigate to the **NEW BATT** option, and press the **Confirm** button.

Use the **Up** button to toggle between **Y** (Yes) and **N** (No). Select **Y** and press the **Confirm** button. This will reset the battery life indicator on the transmitter, and it will return to full.



NOTE: The battery life is calculated based on current draw during operation of the system. Resetting the battery indicator without replacing the battery will cause the transmitter to indicate a full battery regardless of actual battery life remaining. When installing a new battery, failure to perform the reset of the battery life indicator may result in a premature battery replacement in the future.

The symbol on the top right of the screen shows the **battery level** on the transmitter.






Troubleshooting



WARNING: To avoid risk of injury, ensure system is depressurized before doing any maintenance on the transmitter.

This section covers basic troubleshooting. If issues persist, contact your authorized Swagelok sales and service center.

Situation	Possible Cause	Recommended Action
Transmitter not sending data to the gateway	Transmitter is Lost (●) – too far	Move transmitters and gateway physically closer together and eliminate any electrical noise interference. Wait a few minutes for the transmitter to reestablish connection.
	Transmitter is Lost (●) – NET ID is 0000	If the transmitter was online and connected but now appears as lost, check the transmitter's NET ID as described in Transmitter User Interface Functionality > NET ID. If the transmitter's NET ID shows 0000, power cycle the transmitter by pressing the power button  until screen indicates Power Off. Wait 15 seconds and power back on the transmitter by holding the power button  until Swagelok logo appears. Recheck the NET ID as done before and confirm if NET ID has changed back to the original NET ID it was set at. The chevrons and dot  should appear once reconnected to the gateway. Visit the dashboard and check to see if transmitter is now back online and connected.
	Transmitter is Lost (●) – other causes	If the above doesn't work, delete the transmitter from gateway. (See Removing Transmitter from the Gateway on page 32.) On the transmitter, select the reset key (as described in Transmitter User Interface and Functionality > Reset Key on page 23). Then add the transmitter to the gateway again following the steps in Connecting Transmitter to the Gateway on page 15.
	Multiple Transmitters are Lost (●) – Network Drop	If the network goes down and multiple transmitters appear lost on the dashboard, check the transmitters for their connection status. If the transmitters appear to have connection, indicated by the chevron and dot symbol on the transmitter LCD screen, log on to the dashboard, navigate to Administration>Gateway Settings , and select the Restart Services button. Allow time for services to restart and recheck the dashboard. Transmitters will begin to appear back online indicated by their green status symbol.
	Transmitter is Offline (●)	Ensure the online checkbox is checked on the transmitter's Device Details page, as described in View Device Details on page 31.
Transmitter will not join gateway	Transmitter too distant	Move the transmitter and gateway physically closer together. Eliminate any electrical noise interference.
	SmartMesh Manager fault	Select SmartMesh Restart on the digital control panel.

Troubleshooting



WARNING: To avoid risk of injury, ensure system is depressurized before doing any maintenance on the transmitter.

This section covers basic troubleshooting. If issues persist, contact your authorized Swagelok sales and service center.

Situation	Possible Cause	Recommended Action
Transmitter configuration values will not update	Transmitter is Offline (●)	Ensure the online checkbox is checked on the transmitter's Device Details page, as described in View Device Details on page 31.
	Transmitter is Lost (●) – too far	Move the transmitter and gateway physically closer together. Alternatively, place another transmitter on the same network between the lost transmitter and the gateway. Eliminate any electrical noise interference. Wait a few minutes for transmitter to reestablish connection.
	Transmitter is Lost (●) – other causes	If the above doesn't work, delete the transmitter from the gateway. (See Removing Transmitter from the Gateway on page 32.) On the transmitter, select the reset key (as described in Transmitter User Interface and Functionality> Reset Key on page 23). Then add the transmitter to the gateway again following the steps in Connecting Transmitter to the Gateway on page 15.
Flow measurements seem significantly different than expected upon initial setup	Incorrect calibration value inputted	Through the gateway, go to Device Details and confirm or correct the calibration value as shown on the restrictor. See View Device Details on page 31.

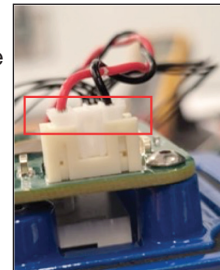
Troubleshooting



WARNING: To avoid risk of injury, ensure system is depressurized before doing any maintenance on the transmitter.

This section covers basic troubleshooting. If issues persist, contact your authorized Swagelok sales and service center.

Situation	Possible Cause	Recommended Action
Flow measurements seem significantly different than expected upon initial setup: P2 pressure reading is higher than P1 , but FLOW reading looks normal	Incorrect selection of gas vs. liquid	Through the digital control panel, go to Device Details and confirm or correct the fluid type.
	Incorrect system media is selected (From the down-down menu, or a custom specific gravity was entered by a user)	Through the digital control panel, go to Device Details and confirm or correct the system media.
	Incorrect calibration number entered	Through the digital control panel, go to Device Details and confirm or correct the calibration value is set to match the number marked on the restrictor.
	Product is installed in reverse flow (the opposite direction of the flow arrow marked on transmitter)	No action needed. The restrictor works in both directions, but a small error could be introduced in flow measurements when running opposite the restrictor's calibrated direction (opposite the marked flow arrow). If reverse flow is undesired (i.e., you want P1 to be higher than P2), flip the restrictor so that the flow is going in the same direction as marked on the transmitter.
DP (delta P) value is very high, and FLOW is very low	Restrictor is plugged	Remove transmitter from the system and examine the restrictor orifice. Clean any debris using forced air and reinstall. If the system contamination is persistent, consider upstream filtration.
DP (delta P) value is very low, and FLOW is very low	Incorrect restrictor selected	See the <i>Swagelok Remote Monitoring System</i> application guide, MS-02-490 .
Transmitter errors on when confirming–crypto challenge failure, for example; the transmitter then shows up on the dashboard with the MAC address as the name of the transmitter	Transmitter partially joined	During the Save Device function when adding a transmitter, sometimes a transmitter will partially join the gateway. This results in data not appearing, even though the transmitter shows connected. To verify that the transmitter is a partial join, select View Details on the main dashboard. To fix a partial join, remove the transmitter (see Remove a Transmitter from Gateway on page 32) and then re-add the transmitter (see Connecting Transmitter to the Gateway, on page 15).
Transmitter is not powering up	Battery connections	Check that the battery leads are fully engaged in the connector. Pulling on the wires instead of the plastic connector when unplugging the battery can damage this connection. In this case, installation of a new battery will be required.




Troubleshooting



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This section covers basic troubleshooting. If issues persist, contact your authorized Swagelok sales and service center.

Situation	Possible Cause	Recommended Action
The gateway's Network ID is set up on the digital control panel, but a transmitter is not connecting to the updated Network ID	Configuration error	A transmitter may connect to a previously set NET ID . If this happens, set the NET ID to a different address on the gateway. Save the new configuration, then after receiving the notification that the NET ID has been updated (may take some time), change to the desired NET ID on the transmitter.
Transmitter not showing up on the gateway but the double-arrow connection icon shows on the transmitter 	Duplicate networks – multiple Gateways (on the same NET ID) within range of transmitter	If a transmitter is set to a NET ID that is within range of two gateways with the same NET ID , the transmitter will only be seen by the first gateway it connects to. It will not show up on the second gateway unless the transmitter is powered down and moved closer to that gateway. (Only one gateway at a time can communicate with a transmitter.) Each gateway should be set to its own Network ID to avoid this issue.
Networking issues	Ethernet connection	Try changing Ethernet cables. Unplug and the plug the Ethernet cable in again. Ensure Ethernet port lights are flashing when cable is plugged in. If not, contact your authorized Swagelok sales and service center.
	Network setup	For networking issues on the gateway, ensure the LAN setup is correct, see Network Settings section. Temporarily disable the firewall on the gateway to rule it out as a potential cause, see Network Settings > Advance Port Management . From the client computer, ping the IP address of the gateway to check connectivity. Then, from the gateway, ping the client computer to ensure two-way communication. After completing these tests, re-enable the firewall on the gateway to maintain security. If issues persist, further investigation into network configurations and firewall rules may be necessary.
Flow accuracy discrepancy	Restrictor kit orientation	The restrictor kit has an orientation on it, shown by the arrow, to ensure that the restrictor kit is orientated correctly. Ensure that the calibration value on the restrictor kit matches the value on the digital control panel. Go to the Main Dashboard and click on the View Device Details of the transmitter in question.
	Transmitter is operating under different accuracy parameters than specified	See the Swagelok <i>Remote Monitoring System Application Guide</i> , MS-02-490 .
Transmitter connecting and disconnecting	SmartMesh connectivity issues	Power off and power back on the transmitter.
	Antenna disconnected	Contact your authorized Swagelok sales and service center.
	Gateway connectivity issues	Navigate to the Administration Tab > Gateway Settings and select the Restart Gateway button. Gateway will power cycle. Allow time for transmitters to reconnect.

Troubleshooting



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This section covers basic troubleshooting. If issues persist, contact your authorized Swagelok sales and service center.

Situation	Possible Cause	Recommended Action
Missing hostname/IP address		Connect using the secondary port as described in the Connecting to the Secondary Ethernet Port on page 13. Ensure network cables are connected properly. From Administration Tab > Network Settings , the Fully Qualified Hostname field needs to be filled out with a name. Leave as default name if not using a DNS. See your IT team to ensure LAN setup is correct. See Network Settings on page 37.
General communication issues	For any communication issues relating to signal communication between transmitter and gateway	See Additional Information and Best Practices on page 51 as it relates to signal propagation and setup. Also, general wireless communication guides typically help in advising on the setup of wireless communications.
	Antenna disconnected	Contact your authorized Swagelok sales and service center.
Temperature and/or pressure error on digital control panel and transmitter display	Sensor wire disconnected	Contact your authorized Swagelok sales and service center.
Transmitter screen not powering/displaying	Transmitter screen is broken or disconnected	Contact your authorized Swagelok sales and service center.
	Transmitter keypad is disconnected or broken	Contact your authorized Swagelok sales and service center.
	Battery could be dead or disconnected	See Battery Replacement on page 56.
Transmitter keypad not functioning	Transmitter keypad is disconnected or broken	Contact your authorized Swagelok sales and service center.
	Transmitter screen is broken or disconnected	Contact your authorized Swagelok sales and service center.
	Battery could be dead or disconnected	See Battery Replacement on page 56.
Transmitter Tamper Switch notification reappearing on digital control panel	Transmitter lid has been opened and switch is disengaged	Check physical location of transmitter and ensure lid is properly secured. Dismiss notifications and check to see if they reappear.
	Transmitter lid was opened multiple times offline	Dashboard will display every instance of the tamper switch disengaging (including when the transmitter is offline), which may result in multiple notifications. Dismiss notifications and check to see if they reappear.
	Tamper switch is broken off or faulty	Contact your authorized Swagelok sales and service center.
Gateway Tamper Switch notification reappearing on digital control panel	Gateway lid has been opened and switch is disengaged	Check physical location of gateway and ensure lid is properly secured. Dismiss notifications and check to see if they reappear.
	Tamper switch is broken off or faulty	Contact you authorized Swagelok sales and service center.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

Safe Product Selection

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

WARNING

Do not mix/interchange Swagelok products or components not governed by industrial design standards, including Swagelok tube fitting end connections, with those of other manufacturers.

Each product catalog and user manual is up to date at the time of printing; subsequent revisions to individual product catalogs and user manuals will be posted to www.swagelok.com and will supersede the printed version.

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MS-13-347, Rev-, October 2024