# MFTB Interface through HART Wireless Adapter

The HART enabled MFT B-Series Flow transmitter can leverage the wireless capabilities of the HART Protocol by installing it with a WirelessHART adapter. This is a simple, reliable, secure and cost-effective method to add a flow measurement to an existing control system without the need to run more wires.

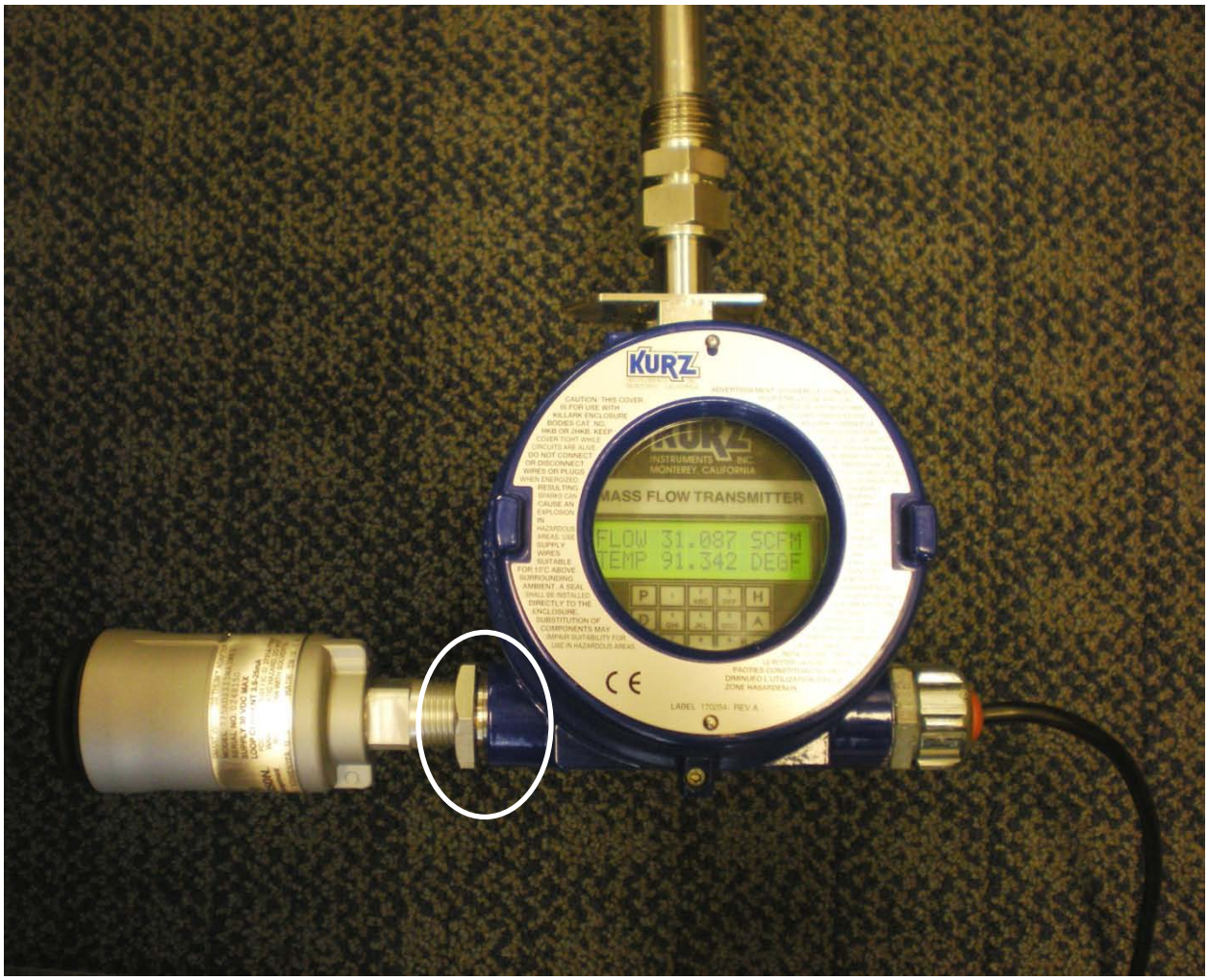
Several manufacturers have developed and released WirelessHART adapters that connect directly to the MFTB flow meter. The following sections describe how to setup the MFT B-Series flow meter with the Emerson Smart Wireless THUM Adapter; other adapters can be installed in a similar fashion. With this setup the THUM adapter extracts the HART data from the flow meter and then wirelessly transmits it to the Smart Wireless Gateway which finally sends the data to a DCS or other HOST automation system.

The figures below show pictures of the Emerson Smart Wireless Gateway and Smart Wireless THUM Adapter.

**Emerson Smart Wireless Gateway**

**Emerson Smart Wireless THUM Adapter**

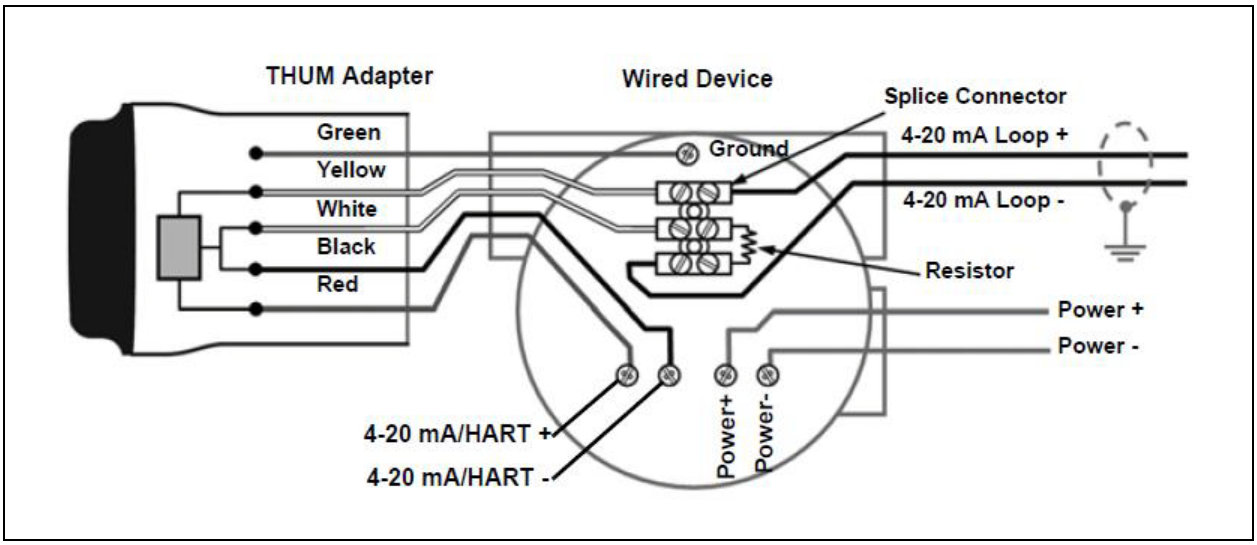
The THUM adapter is attached at one of the conduit ports on the meter enclosure as shown below.




## Wiring

In order for the THUM Adapter to function properly there must be at least 250 Ohms resistance in the loop. The wired connection between the THUM Adapter and the MFTB depends on whether the MFTB is self powered or loop powered. Self powered (or active loop) is when the MFTB is supplying power to the 4-20mA loop. Loop powered (or passive loop) is when the customer supplies the power to the 4-20mA loop. It is important to verify whether your MFTB is self powered or loop powered. The wiring diagrams below are from the Wireless THUM Adapter Reference Manual.

If your MFTB is self powered, the wired connection between the THUM Adapter and the MFTB is similar to the following:

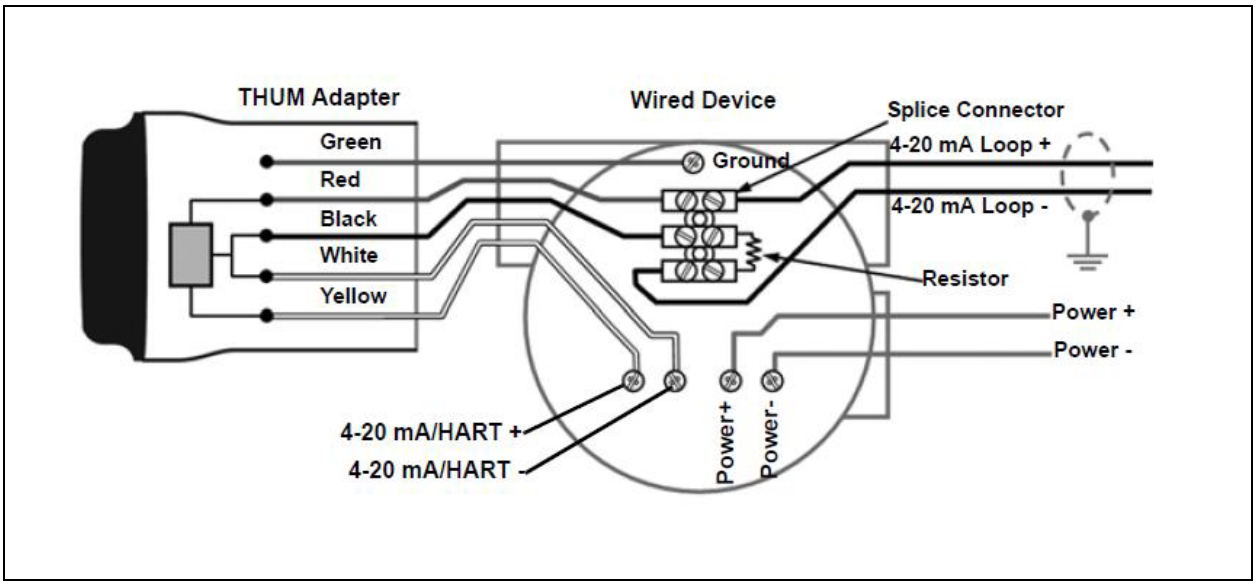



**THUM/MFTB Wiring Diagram – MFTB Self Powered**

| | MFTB SC Board Terminals | THUM Adapter Wires |
|---|---|---|
| 1 | RPS | *MFTB Sensor Wires* |
| 2 | RPL | |
| 3 | RPH | |
| 4 | RTCL | |
| 5 | RTCH | |
| 6 | GND | **Green** |
| 7 | 485+ | *NC* |
| 8 | 485- | |
| 9 | GND | **Black** |
| 10 | +24V | *Jumper* |
| 11 | AO1+ | |
| 12 | AO1- | **Red** |

A jumper is placed across the +24V / AO+ for a self powered MFTB (see MFTB Field Wiring Tutorial for details). The THUM **Yellow** wire connects to the customer's 4-20mA(+) field wiring and the THUM **White** wire connects to the customer's 4-20mA(-) field wiring.

If your MFTB is loop powered, the wired connection between the THUM Adapter and the MFTB is similar to the following:

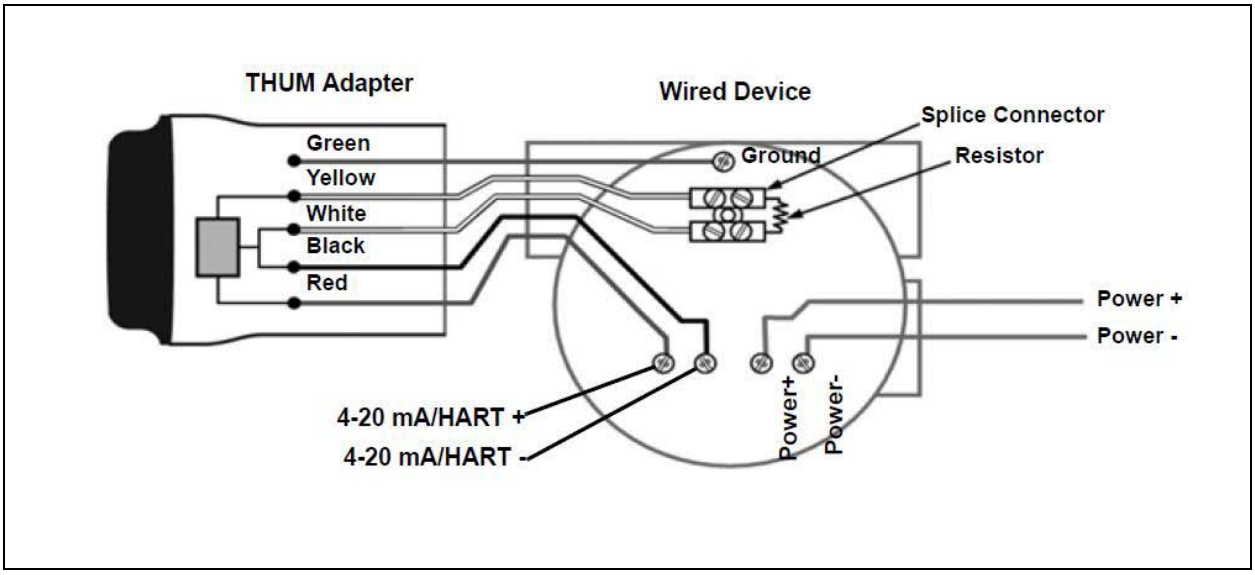



**THUM/MFTB Wiring Diagram – MFTB Loop Powered**

| | MFTB SC Board Terminals | THUM Adapter Wires |
|---|---|---|
| 1 | RPS | *MFTB Sensor Wires* |
| 2 | RPL | |
| 3 | RPH | |
| 4 | RTCL | |
| 5 | RTCH | |
| 6 | GND | **Green** |
| 7 | 485+ | *NC* |
| 8 | 485- | |
| 9 | GND | |
| 10 | +24V | |
| 11 | AO1+ | **Yellow** |
| 12 | AO1- | **White** |

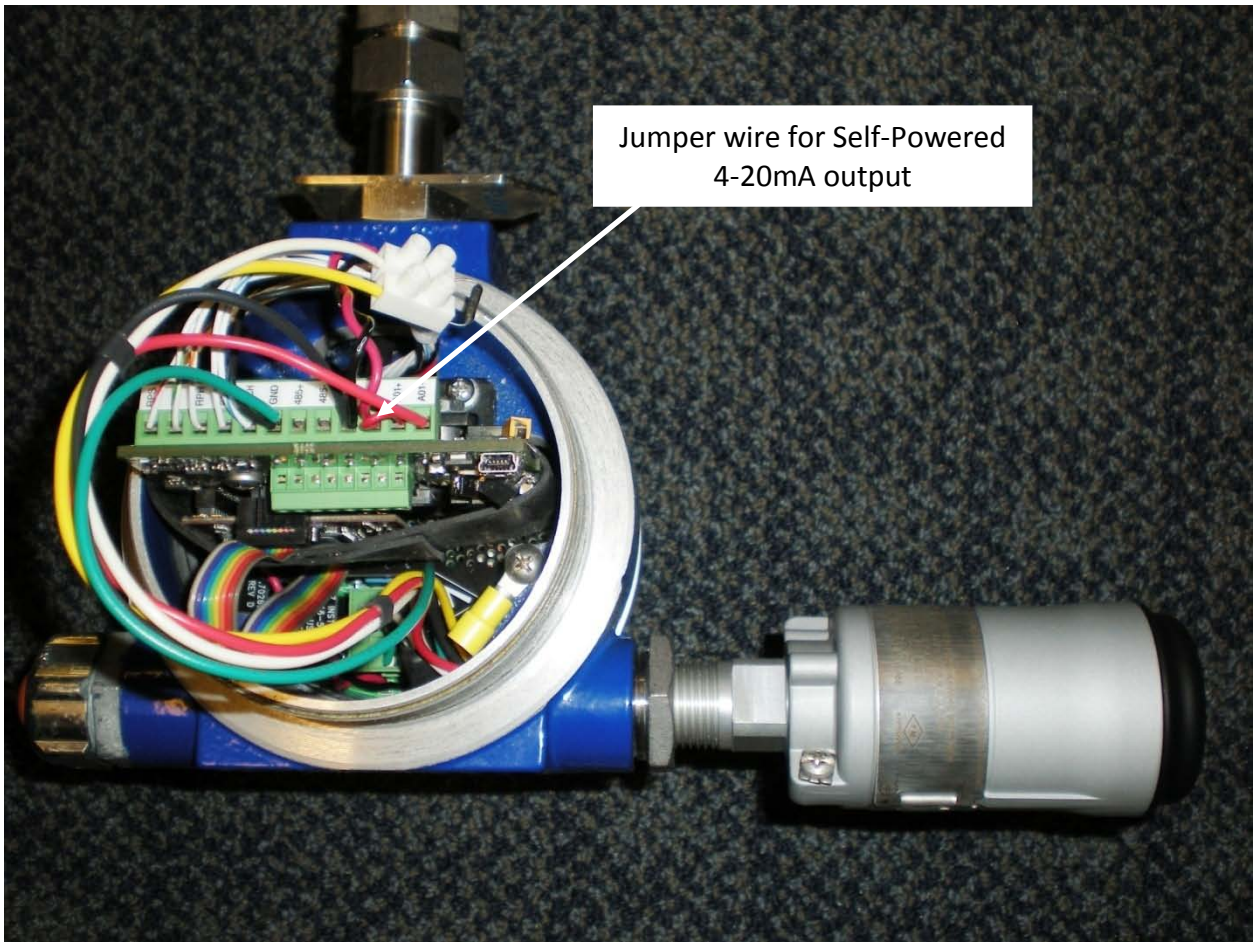
The THUM **Red** wire connects to the customer's 4-20mA(+) field wiring and the THUM **Black** wire connects to the customer's 4-20mA(-) field wiring.

Before mounting/installing the flow meter to your duct/pipe, it is recommended that the THUM/MFTB be configured on a bench top using a Field Communicator. For bench top wiring use the Direct Mount Wiring as shown below:

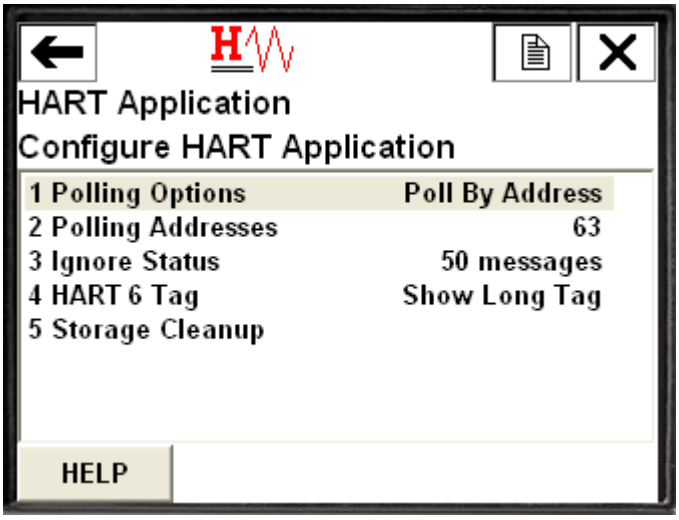



**THUM/MFTB Direct Mount Wiring for Bench Top Connection**

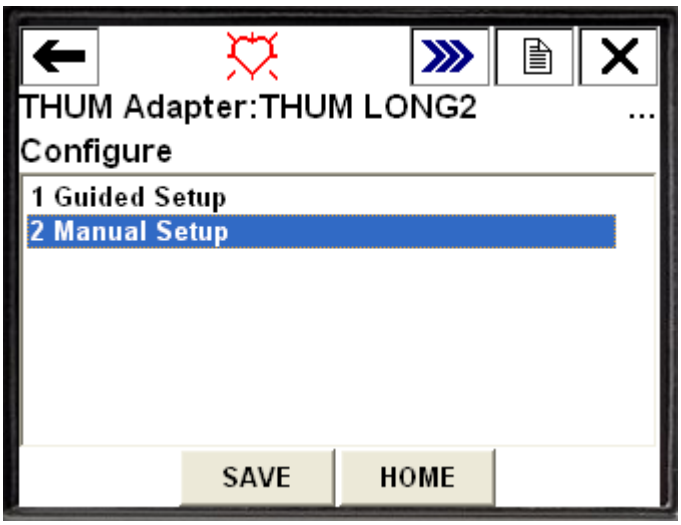
The actual wiring connections at the MFTB terminal block is shown below. Note the jumper between 24V+ and AO+ for the self powered MFTB (reference Kurz Document 360209-AR)

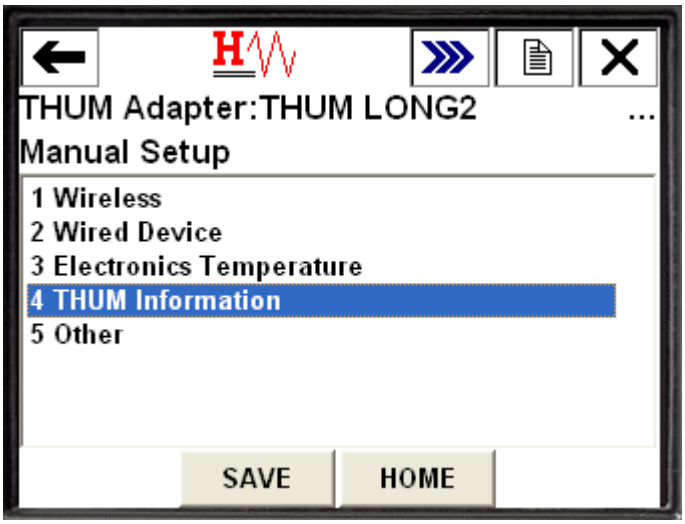

Jumper wire for Self-Powered
4-20mA output

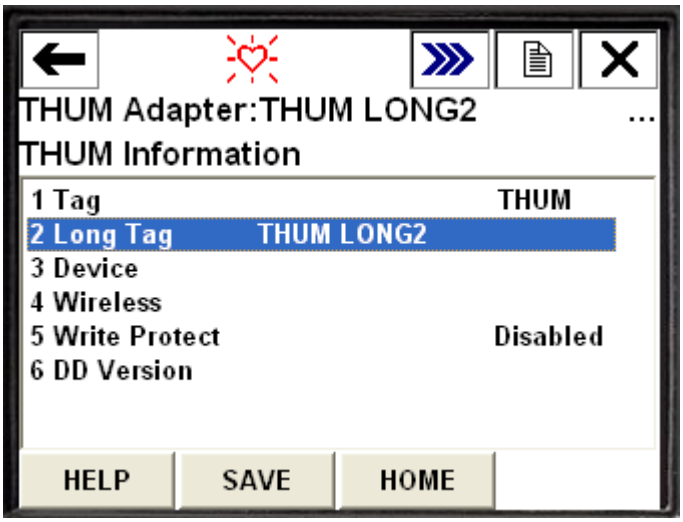
Connect a handheld communicator across the 250 Ohm resistor. In order to communicate with the THUM Adapter, 'Poll By Address' needs to be set on the Field Communicator with the Polling Address set to 63 (the default address for the THUM is 63).



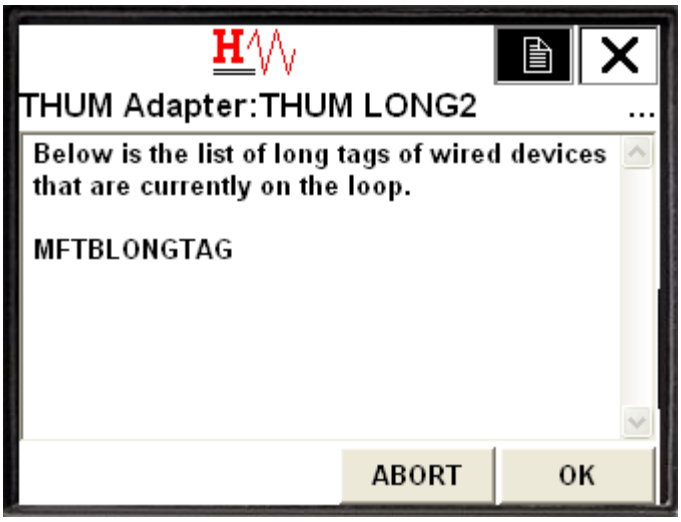

The Long Tag is how the THUM will show up in the Smart Wireless Gateway web interface. By setting this parameter to a unique value it will be easier to determine which THUM Adapter you are communicating with. This value is set in the **THUM Information Menu** by selecting Configure – Manual Setup – THUM Information as follows:





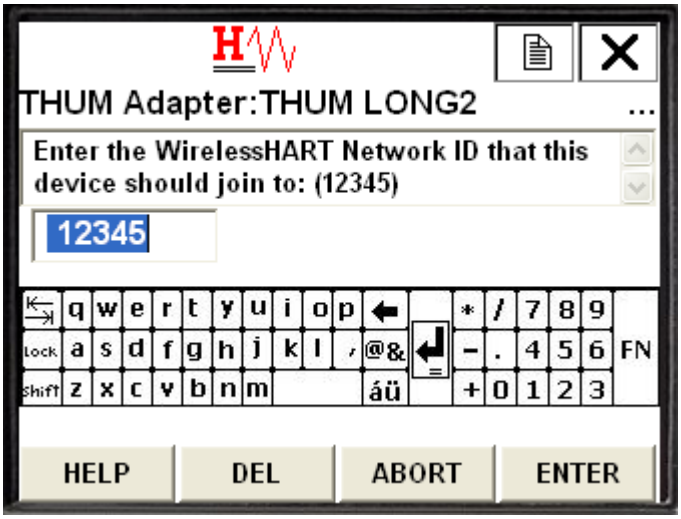

If the THUM is properly wired to the MFTB, the MFTB should show up as the wired device for the THUM on the **Wired Devices Menu**. To invoke this menu, tap on Service Tools – Maintenance – Other – List Wired Devices

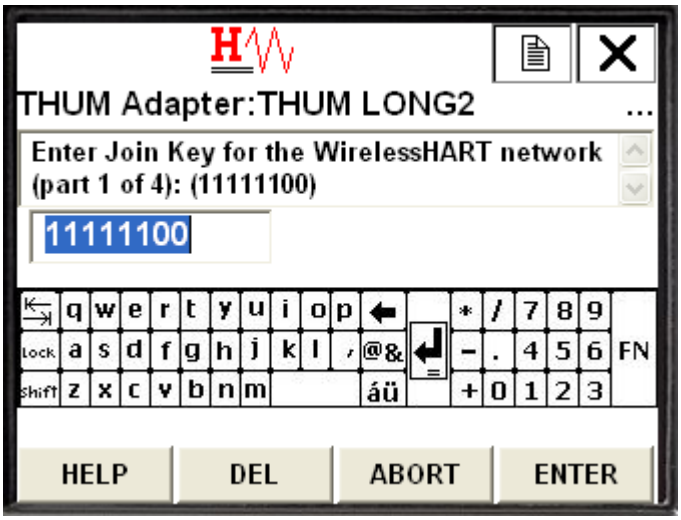


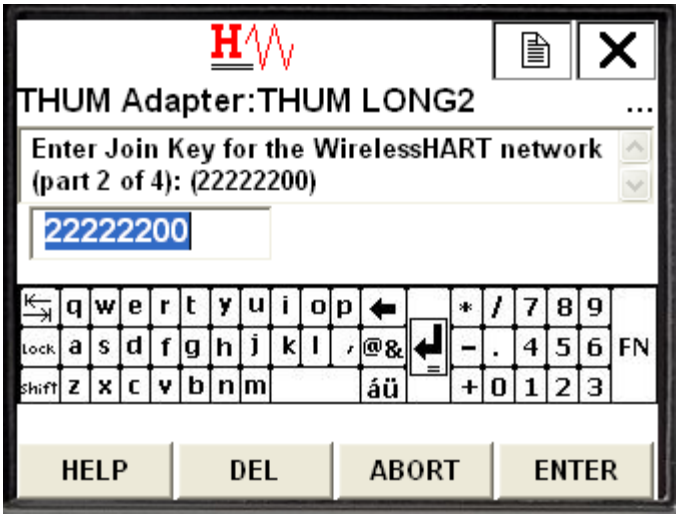

The MFTB will be listed with its HART Long Tag. This is the name that the THUM reports to the Gateway.

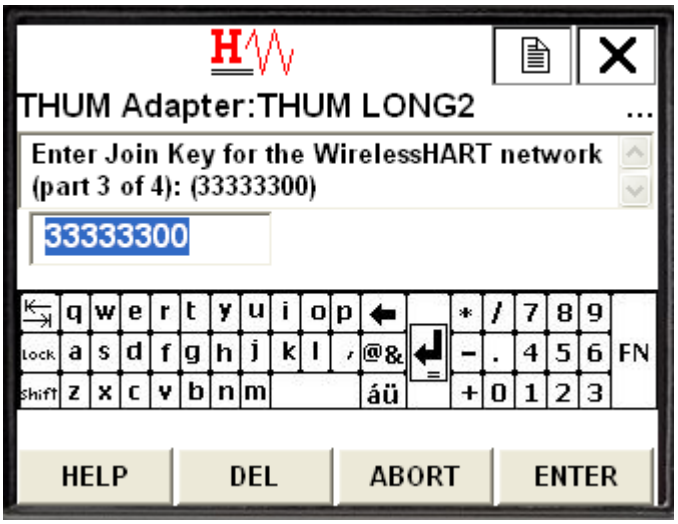
**Join Device**

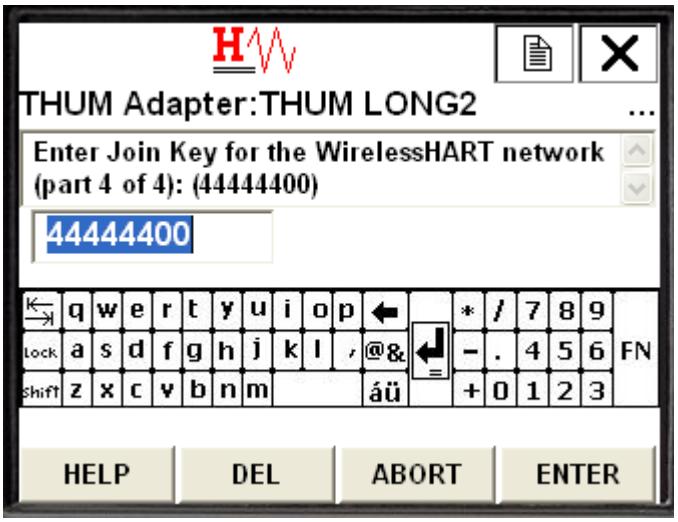
In order to communicate with the Smart Wireless Gateway, and ultimately the HOST System, the THUM must be configured to communicate over the wireless network. This step is the wireless equivalent of connecting wires from the MFTB to the host system. This is done on the **Guided Setup Menu** which is invoked by selecting Configure – Guided Setup – Join Device to Network and entering the Network ID and Join Key that matches the Network ID and Join Key of the Smart Wireless Gateway.

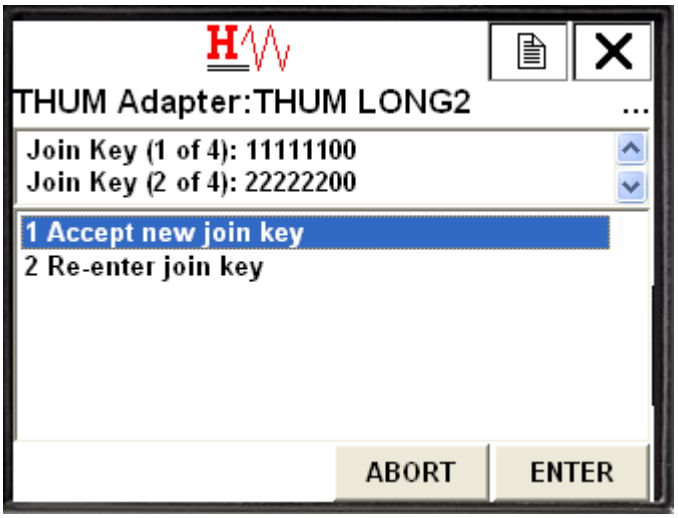



THUM Adapter:THUM LONG2
Enter Join Key for the WirelessHART network (part 1 of 4): (11111100)
11111100
HELP
DEL
ABORT
ENTER


THUM Adapter:THUM LONG2
Enter Join Key for the WirelessHART network (part 2 of 4): (22222200)
22222200
HELP
DEL
ABORT
ENTER


THUM Adapter:THUM LONG2
Enter Join Key for the WirelessHART network (part 3 of 4): (33333300)
33333300
HELP
DEL
ABORT
ENTER


THUM Adapter:THUM LONG2
Enter Join Key for the WirelessHART network (part 4 of 4): (44444400)
44444400
HELP
DEL
ABORT
ENTER




In this example, the Network ID is 12345 and the join key is 11111100, 22222200, 33333300, 44444400. This information will be used to setup the Smart Wireless Gateway in the next section. Power off the MFTB Flow Meter.

# Configuring the Smart Wireless Gateway

For more details on installing an Emerson Smart Wireless Gateway, reference the Emerson Wireless Gateway Reference Manual.

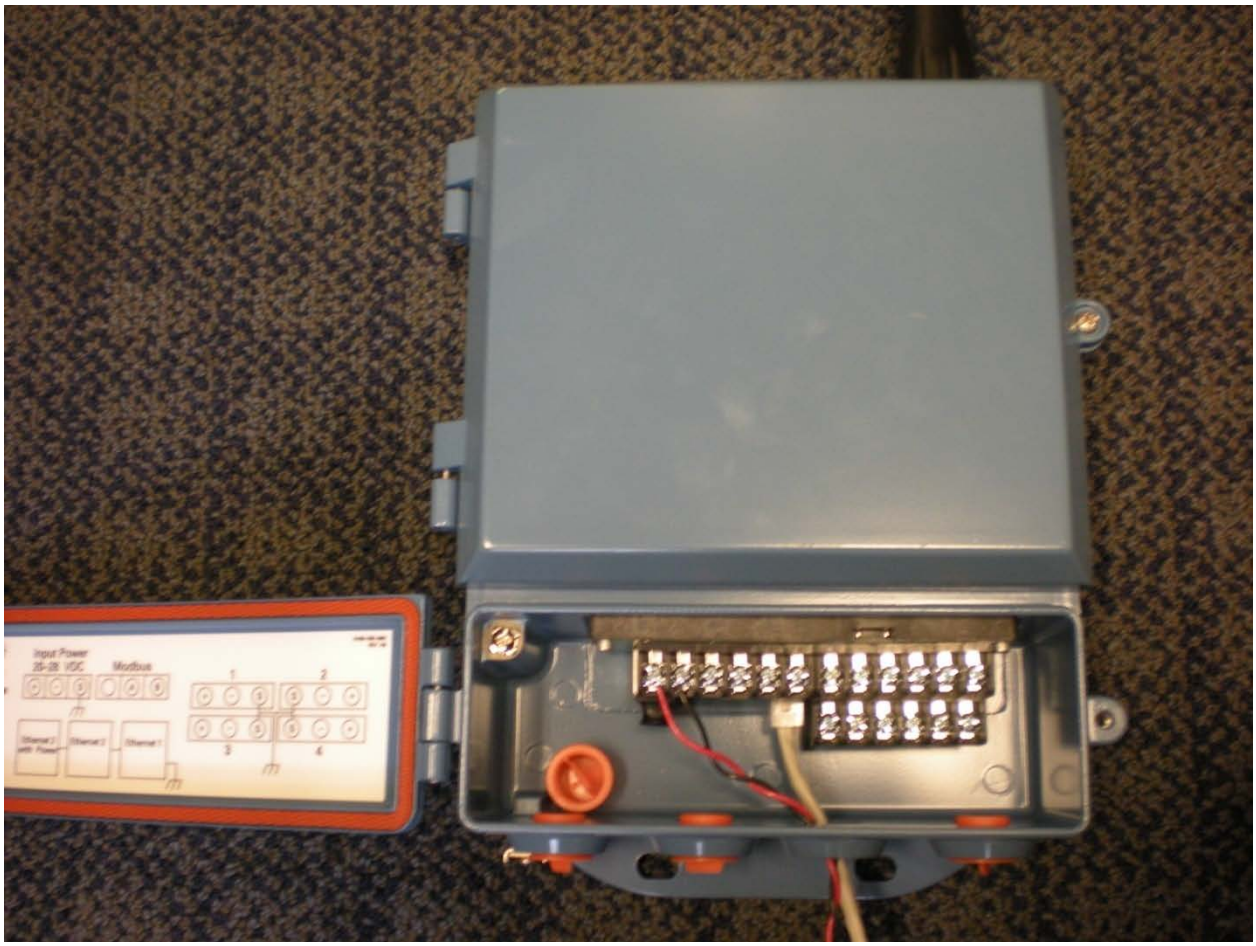
A PC/Laptop will need to be configured to form a private network before communicating to the Gateway. The network settings can be found in the control panel of the PC/Laptop. To configure these settings:

1. Find and open the Control Panel. (It is generally found from the Start Menu)
2. Open Network Connections
3. Select Local Area Connection
4. Right click the mouse and select Properties from the list
5. Select Internet Protocol (TCP/IP), and choose the Properties button
6. From the General tab, select Use the following IP address button
7. Set the IP Address to 192.168.1.12 and press Tab button
8. A Subnet mask of 255.255.255.0 should fill in automatically
9. Click OK to close the Internet Protocol (TCP/IP) window
10. Click Close to close the Local Area Connection window

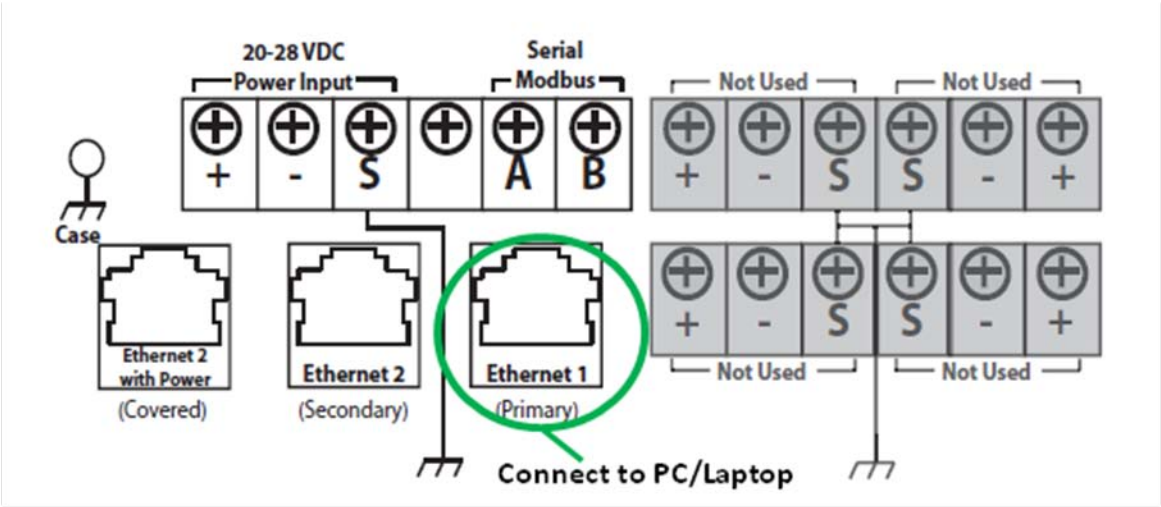
Next, internet proxies will need to be disabled through the PC/Laptop's internet browser application as follows:

1. Open an internet browser (typically Microsoft Internet Explorer).
2. Find the Tools menu and select Internet Options
3. From the Connections tab, click the LAN Settings button
4. Under Proxy Server, the box for use a proxy server for your LAN should be unchecked
5. Click OK to close the Local Area Network (LAN) Settings window
6. Click OK to close the Internet Options window

The PC/Laptop is now set up to communicate with the Gateway to configure the Gateway for placement on a live control network. Connect the PC/Laptop to the Gateway with an Ethernet cable using the Ethernet 1 port on the Gateway.



The figure below shows the standard terminal block diagram.




Standard Terminal Block in the Smart Wireless Gateway

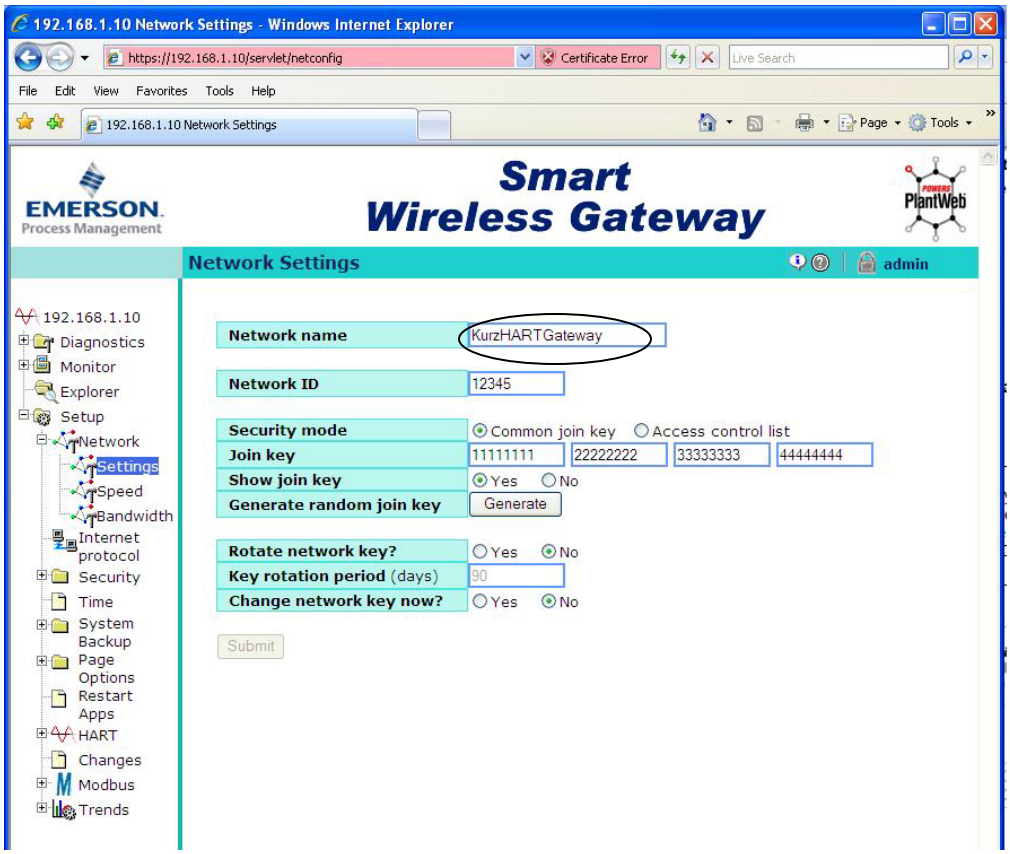
The Gateway should be powered with a 24Vdc power supply with at least 500 mA. Use the following procedure to log in to the Gateway to configure it.

1. Open an internet browser (typically Microsoft Internet Explorer)
2. Enter 192.168.1.10 in the address bar
3. Acknowledge the security to proceed
4. Enter *admin* for User Name
5. Enter *default* for the Password

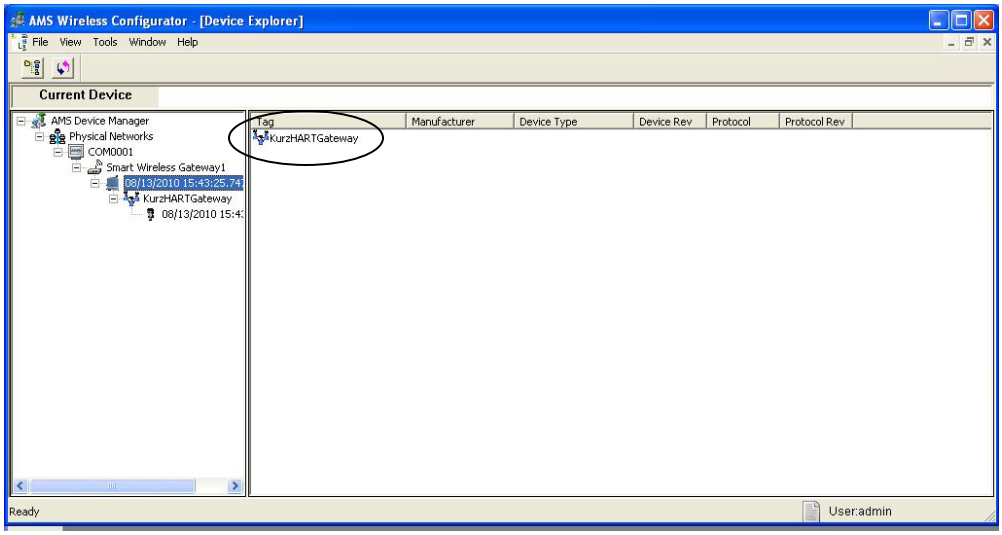
The web browser will be directed to the Gateway's default home page. There is a navigation menu located on the left hand side with four main areas as follows:

- Diagnostics – View status of communications, client server parameters, and more
- Monitor – Screens created by the user to view data from field devices
- Explorer – Basic view of values from field devices
- Setup – Configure the Gateway for operations, security, and host system integration

The Setup menu is where the security keys are configured that allow the wireless HART device (i.e., MFTB) to communicate with the Smart Wireless Gateway and ultimately to the DCS or HOST Information System. This menu is also where the Network Settings for the Gateway is configured. Access Setup > Network > Settings as shown below:

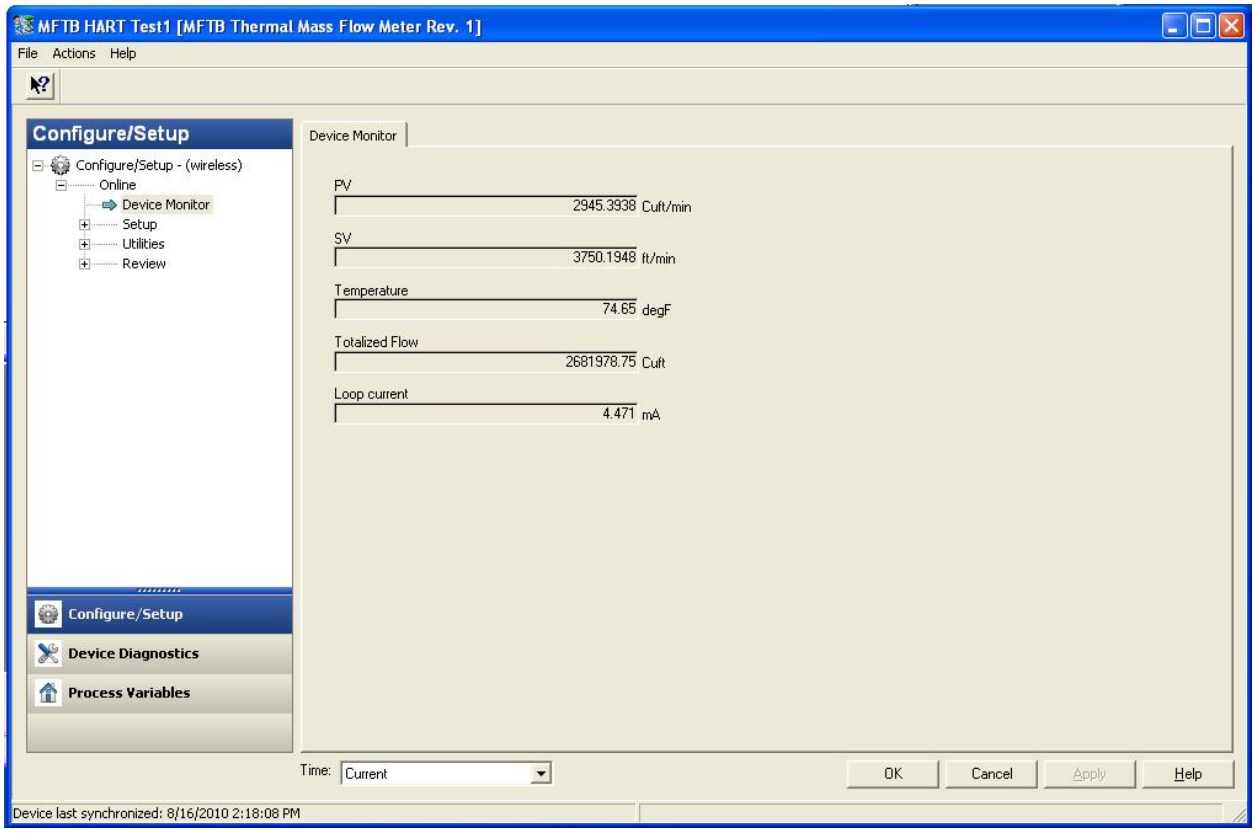



The Network name is the identifying name of the Gateway when it is connected into the HOST system.

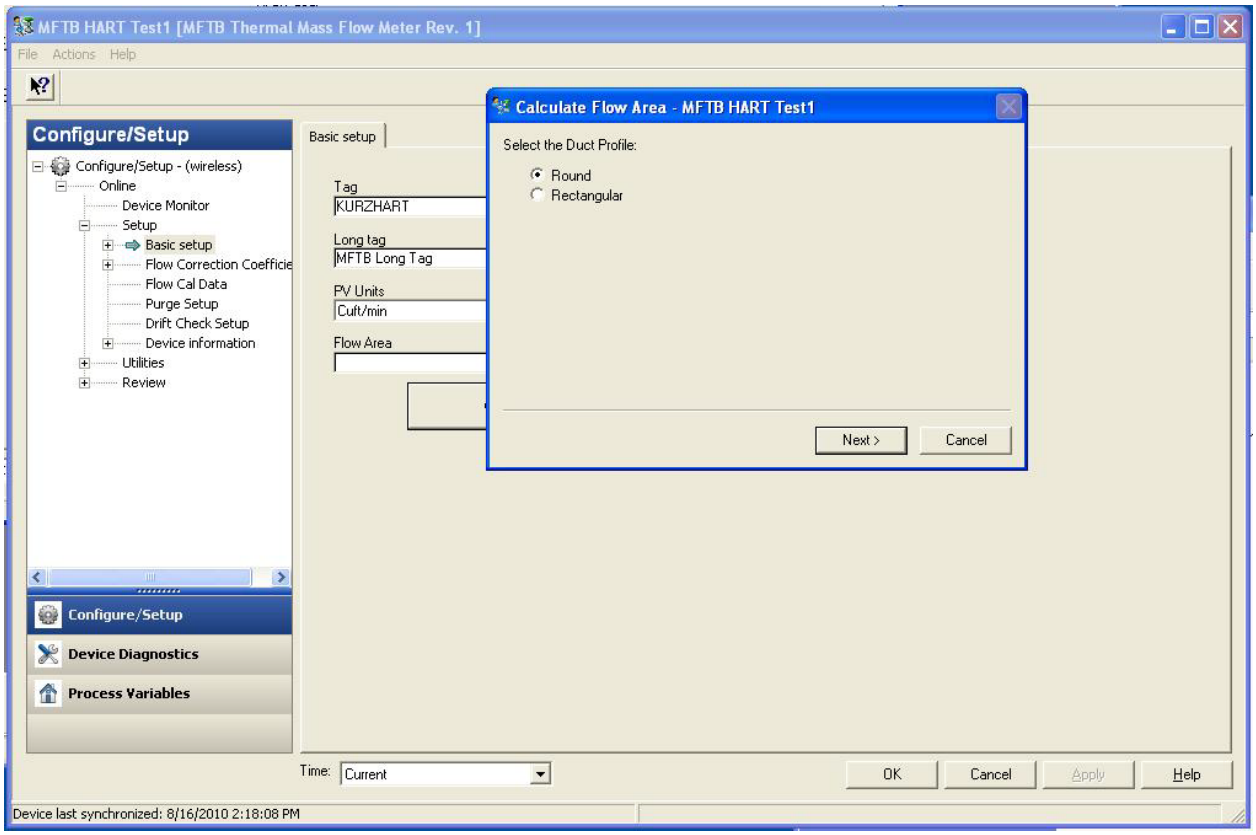


The Network ID and Join Key(s) are used by the wireless HART devices in the network to "join" into the network. Once these settings are defined, the MFTB can connect into the network wirelessly through the THUM adapter.

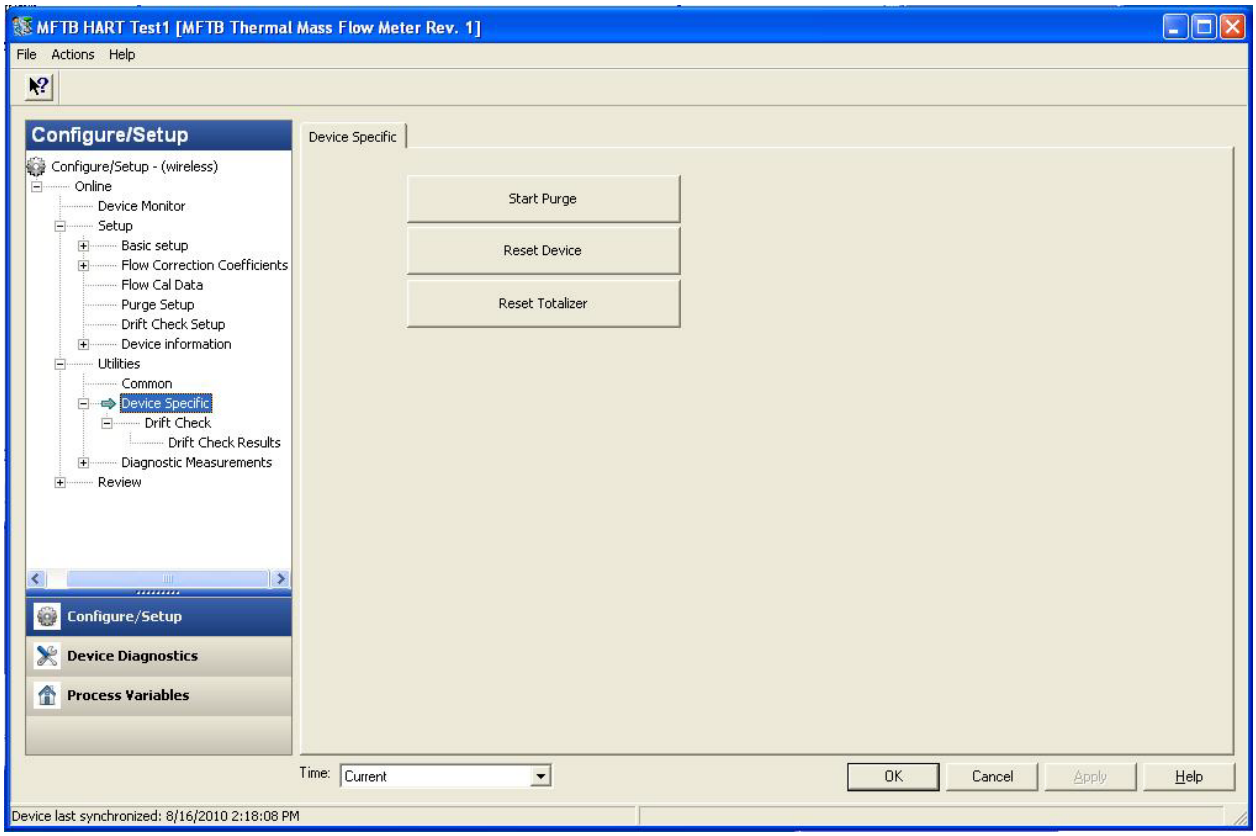
The screen shots below show the Kurz MFTB interface displayed on the Emerson AMS Wireless Configurator application that is installed on a host system. The AMS uses the MFTB DD to access the full capabilities available on the MFTB HART interface.



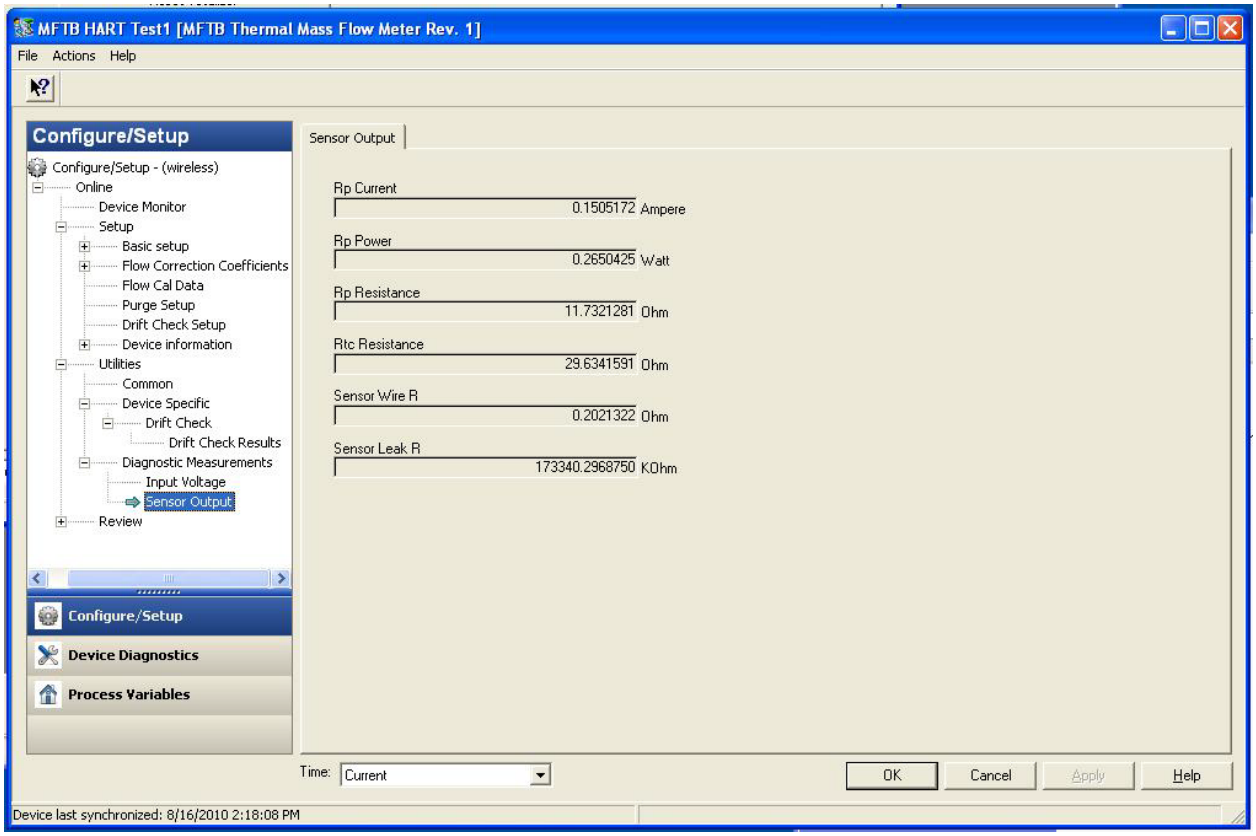

**Live data from the Device Monitor menu**




**Setup Menu with Flow Area Wizard**




Device Specific Utilities provide methods to (1) Start a sensor purge gas cleaning, (2) Power cycle the MFTB, (3) Reset the Totalizer and (4) Start a Drift Check test




**Diagnostic output is available to aid in troubleshooting meter issues**