DRESSER
NATURAL GAS SOLUTIONS

# Dresser™ Series D Meter

## Models D800 and D1000

## Installation Supplement

# Contents



# 1 Introduction

This manual provides information to install and start using the Dresser D800/D1000 Series D meters. Please read the entire manual and refer to the *Dresser Series D Installation, Operation, and Maintenance Manual* for information about how to properly and safely install, use, and maintain these meters and some of their accessories. The Dresser MeterWare software provides the user interface to the meter's digital indexes with an IrDA (infrared) communication interface.

This manual provides recommendations when no established company procedure or practice is available.

The following additional resources are available:

- The *Dresser™ Series D Meter Installation, Operation, and Maintenance Manual*, which contains detailed information about installing, operating, and maintaining the D800 and D1000 Series D meters
- The *Dresser MeterWare Software Manual*, which contains detailed information about the meter's digital index software

Manuals are available by request or online at www.dresserngs.com.

# 2 Receiving, Handling, and Storage

Follow the steps and recommendations in this section to ensure your meter and its accessories are ready for installation and use.

## 2.1 At Time of Delivery

Perform the following steps when you receive your shipment:

1. Check the packing list to verify all items have been received.
2. Inspect each item for damage and, if necessary:
   - **a.** Record any visible damage or shortages on the delivery record.
   - **b.** File a claim with the carrier.
   - **c.** Immediately notify your Dresser meter supplier.

**Note:**

- Do not accept any shipment that appears damaged without immediately inspecting the contents for damage.
- Check the meter for free rotation soon after arrival. Internal working parts might be damaged without obvious external evidence. To check the meter, blow dry air lightly into the meter inlet to verify the free rotation of the impellers.

## 2.2 Storage

If the product is not tested or installed soon after it is received, store it in a dry location in the original shipping container for protection within the meter's operating temperature range of -40°F to 140°F (-40°C to 60°C).

# 3 Parts Identification

## 3.1 Meter Display

View the meter information on its LCD (liquid-crystal display) screen.

### 3.1.1 Scrolling Through the Screens

To scroll through the different screens, swipe a magnet across the black dot to the right of the LCD screen on the meter's label, as shown in Figure 1 and Figure 2.

**Note:** The screen will not change if the magnet is swiped on another area of the label.

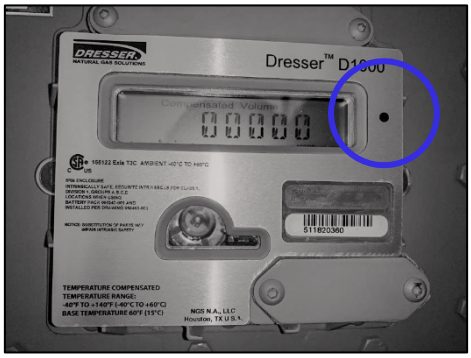



**Figure 1: Label on D1000 meter**


**Figure 2: Swipe magnet across black dot to change the screen**

The magnet can be purchased as part of the Communications Kit or individually by part number, as shown in Table 1. Contact the Factory for pricing.

**Table 1: Magnet Part Numbers**

| Part | Number (P/N) |
|---|---|
| Communications Kit | 060542-000 |
| Individual Magnet | 060541-000 |

### 3.1.2 LCD Screen Displays

The home or default screen displays either Compensated Volume or Non-Compensated Volume, depending on the meter configuration. After approximately thirty (30) seconds of inactivity, the home screen displays.

Swipe the magnet vertically over the black dot on the meter's label until the screen you want to view displays. Depending on the meter configuration, some screens might not display.

After the value's name or parameter displays for three to five (3–5) seconds, the screen displays the parameter's value.

**Note:** Use the Dresser MeterWare software to configure parameters on the screens by selecting or clearing the checkbox for the parameter to be displayed (refer to the *Dresser MeterWare Software Manual*).

## 3.2 RPM Wheel

The black and white, reflective RPM wheel located under the plastic cover just below the index (refer to Figure 3) serves two purposes: It verifies the impeller rotation to indicate that gas is flowing, and it is also used as an optical photo-sensor (scanner) when a proving device is testing the meter for accuracy.

Each revolution of the RPM Wheel indicates 0.007407 cf (0.0002098 $m^3$) of non-compensated gas flow through the meter.


**Figure 3: RPM Wheel location under cover in meter**

# 4 Problems with Installation or Operation

If you encounter any serious problems during installation or initial operation of the meter, immediately notify your Dresser meter supplier.

**Note:** Do not attempt repairs or adjustments. Doing so might void all claims for warranty.

When reporting a suspected problem, complete the following steps:

1. Provide the following information to your Customer Service Representative:
   - Purchase order number and/or sales order number
   - Product model, serial number, and/or bill of material number
   - Description of the problem
   - Application information such as gas type, pressure, temperature, and flow characteristics

2. Pack all returns in the original shipping container or similar, if available, and use shipping material that protects the product from damage during transit.
3. Contact your Dresser meter supplier to obtain an RMA (Return Materials Authorization) number.

The Dresser Product Services Department offers professional services for all Dresser Meters and Instruments products. Authorization for return is required for all products shipped to the Factory for repair, calibration, warranty, exchange, or credit. An RMA number is required to obtain authorization.

# 5 Meter Installation

**WARNING**

**Before installation, check the meter nameplate and verify that the MAOP and rated capacity for flow rate meet the installation requirements.**

**WARNING**

**For installations in confined spaces, allow adequate room to safely handle product and equipment without causing bodily strain. Also verify proper ventilation is in place to maintain a breathable atmosphere.**

**WARNING**

**If equipment is installed/serviced/maintained at elevated heights, ensure proper safe site work practices are in place to prevent fall and drop hazards.**

This section provides detailed information about proper installation of the Series D meters.

## 5.1 Preinstallation Considerations

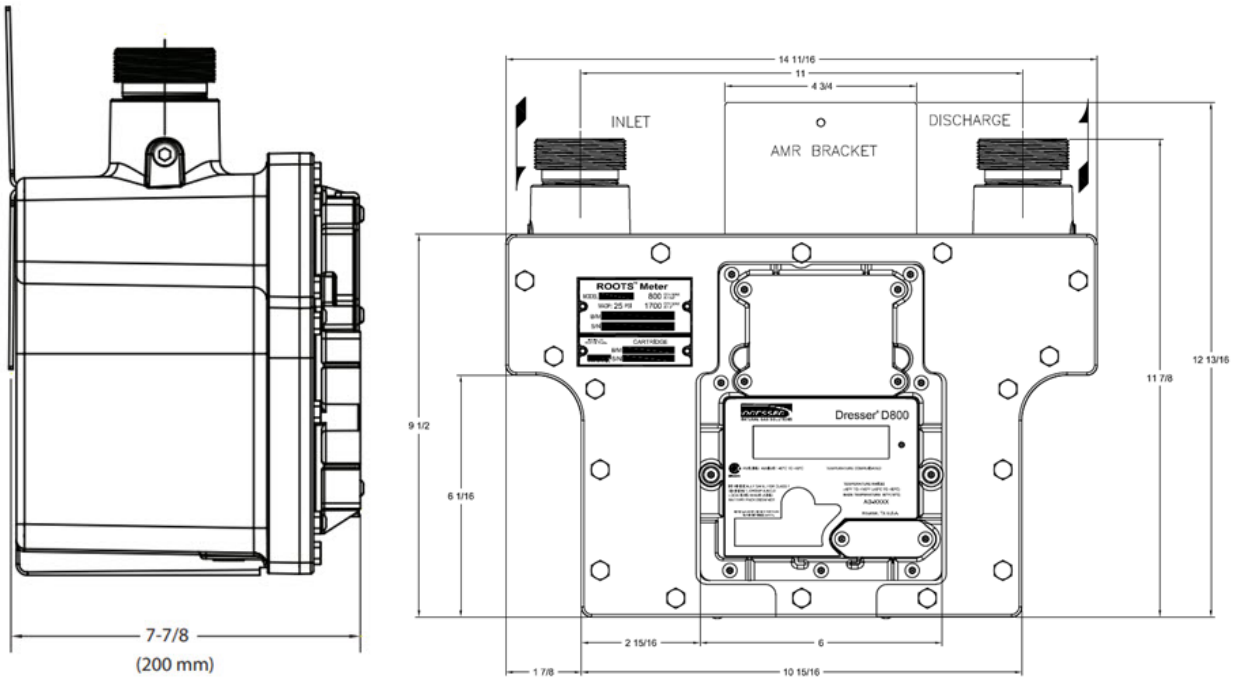
Dresser meters are designed for continuously measuring and indicating accurate measurement of clean, dry natural gas and other non-corrosive gases at constant or varying flow rates. The Dresser Series D meters have excellent rangeability and are capable of accurately measuring small pilot loads. Contact your Dresser meter supplier for a list of approved gases or additional performance details.

### 5.1.1 Installation Size Considerations

Verify that the selected installation location provides sufficient space for the meter (Figure 4). Also allow additional space for an attached AMR device, if applicable.

Leave sufficient space around the meter to allow access to the LCD screen, AMR device, and cable access for testing, as applicable.




**Side View** **Front View**

**Figure 4: Series D Meter Size Specifications**

### 5.1.2 Environmental Considerations

The meter's temperature operating range is from -40°F to 140°F (-40°C to 60°C). Verify that the location where the meter is installed allows the temperature of the meter to remain within this range.

Ensure the meter can remain level within 1/16 inch per foot (5 mm/m) in any direction, side to side, and front to back.

### 5.1.3 Piping Considerations

A 60 mesh screen is recommended in the inlet connection.

**CAUTION**

- **To avoid accumulation of condensate and foreign materials in the metering chamber, do not install the meter lower than the discharge pipe run. Use a screen or strainer upstream of the meter to remove liquids and foreign matter (pipe sealant, tape, weld slag, etc.) from the gas stream. A 60 mesh screen is recommended.**
- **Do not install a lubricated gas valve directly before a meter; excess valve lubricant or other foreign material can stop impeller rotation.**

A meter bypass allows the meter to be tested by using a transfer prover while it is mounted in line.

If over-speed conditions can occur, a restricting flow orifice plate should be installed two to four (2–4) pipe diameters downstream of the meter outlet. Contact Dresser Meters and Instruments for sizing, pricing, and availability. The warranty does not cover over-speed conditions.

### 5.1.4 Safety Considerations

**WARNING**

**To reduce the risk of severe injury or death, follow your company guidelines and industry accepted practices. Other safety considerations are provided below:**

- **This equipment is designed to operate at temperatures between -40°F and 140°F (-40°C to 60°C). Prior to going on-site for installation or maintenance, make sure proper safety equipment is worn before handling the equipment and that you are properly dressed for the worksite environment temperatures.**
- **Beware of sharp surfaces and potential pinch points while performing installation, maintenance, and repair procedures. Use proper personal protective equipment and procedures.**
- **Follow proper safe site work practices to prevent fall and drop hazards if equipment is installed/serviced/maintained at elevated heights.**
- **For installations in confined spaces, allow adequate room to safely handle product and equipment without causing bodily strain. Also, verify proper ventilation is in place to maintain a breathable atmosphere.**

### 5.1.5 Installation Recommendations

Follow your company guidelines and industry accepted practices. In addition:

- Verify protective devices are in place to prevent personal injury and damage to vehicles and equipment in areas of reduced visibility, such as next to parking lots or where the meter can become covered in snow.
- Prevent debris and moisture from entering the meter to avoid possible damage and restriction of gas flow. A strainer or filter upstream of the meter may be used to help remove contaminants such as pipe sealant, tape, and weld slag from the gas stream.

## 5.2 Placing Meter in Line

Perform the following steps to install the meter in line:

**DANGER**

**Venting gas into the atmosphere can create a hazardous environment. Follow your company guidelines for venting gas into the atmosphere.**

1. Before installing the meter, perform the following steps:
   **a.** To prevent damage to the meter, purge the gas line to ensure the upstream piping is clean of scale, dirt, liquids, and other debris. This purge is often done by venting the line to the atmosphere.

**b.** Remove the protective caps from the threaded male inlet and outlet fittings (e.g., ferrule or spud) by turning counter-clockwise. To prevent small slivers of plastic from falling into the meter or damaging the spud threads, do not pull or pry the cover from the ferrules.

**c.** Place a new meter mount swivel washer (gasket) on each swivel nut as shown in Figure 5. Ensure the washer is properly installed or the swivels will not seal properly against the meter ferrules (spuds).

**Figure 5: Proper installation of washer into swivel**

2. Connect the swivel nut on the gas supply side of the line to the meter ferrule (spud) as shown in Figure 6. Ensure gas flow is in the same direction as configured on the meter index. For the volume accumulation method, refer to the Meter Operation section in the *Dresser™ Series D Meter Installation, Operation, and Maintenance Manual*.
3. Hand tighten the nut to the meter ferrule.

**Figure 6: Connect meter ferrule into swivel nut on the gas supply side**

4. Connect meter outlet to the downstream side of the line as shown in Figure 7.
5. Hand tighten the nut to the meter spud.

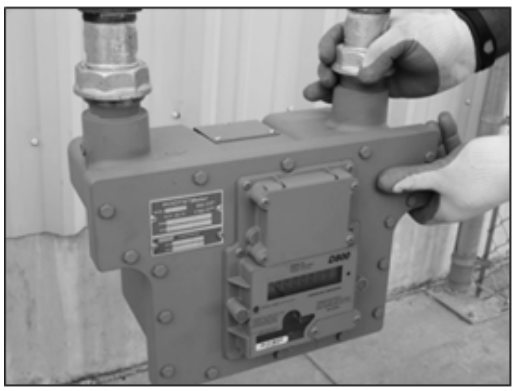


**Figure 7: Connect meter outlet to swivel nut on the downstream side**

6. Verify the meter index is parallel to the ground with both meter ferrules (spuds) pointing upward. Refer to Figure 8.

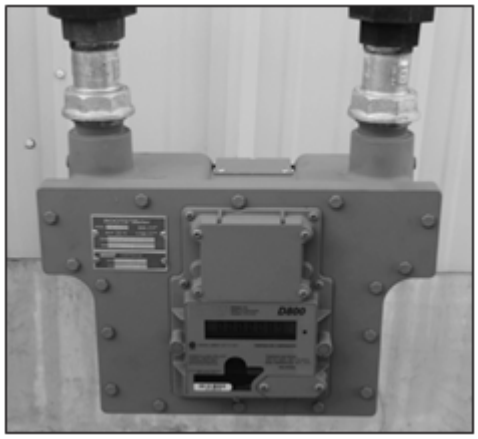


**Figure 8: Meter placed in line**

7. Verify the meter is installed without piping strain to prevent binding.
8. Check the orientation of the meter with a level. The meter must be level within 1/16 inch per foot (5mm/m) in any direction, side to side, and front to back.

9. Use a pipe wrench to tighten the nuts to the meter ferrules as shown in Figure 9.Tighten the nuts until the seal is properly compressed and there are no leaks.

   There is no torque value for swivels. Proper compression depends upon the thickness of the swivel seal (gasket).

**Figure 9: Use a pipe wrench to tighten swivel nuts**

**WARNING**

**Due to the nature of this fastener, no torque value is stated; however, under- or over-tightening the fastener might result in gas leakage because of improper sealing or damage to the meter pressure vessel. Perform a leak test as specified in Section 7.**

10. Before turning on the gas, verify the downstream valve is closed, if applicable. Verify all connections have been tightened to the appropriate torque.
11. Perform a leak test immediately after placing the meter in service. Refer to Section 7. All leak points must be eliminated quickly and before leaving the meter site. Otherwise, remove the meter from service by placing it on by-pass or using another method.

# 6 Meter Startup

After proper installation and leveling of the meter, as described in Section 5, perform the following steps to start up the meter:

1. Slowly open the meter inlet valve just enough to allow gas into the meter.

   This gas flow allows the meter to pressurize. The RPM Wheel may start to rotate during this process.

**CAUTION**

**Do not exceed five (5) psig/second (35 kPa/second) maximum when pressurizing the meter. Rapid pressurization can cause an over-speed condition, which may damage the meter. Resulting damage is not covered by warranty.**

2. Open the bypass and outlet (downstream of meter) gas valves.
3. Partially open the meter inlet gas valve until the meter starts operating at low speed. Throttling of the bypass valve might be necessary to initiate gas flow through the meter.
4. Verify gas is flowing though the meter by watching for movement of the RPM Wheel to indicate impeller rotation, and then proceed depending on the results:
   - If movement is present, go to Step 5.
   - If the RPM Wheel is not turning, verify gas is being delivered to the meter.
   - If gas is flowing to the meter inlet and the RPM Wheel is not moving, go to Step 6.
5. Let the meter operate at low speed for several minutes. Listen closely for unusual scraping or knocking sounds:
   - If unusual sounds are present, go to Step 6.
   - If the meter is operating normally, go to Step 7.
6. If unusual sounds are present or the RPM Wheel is not turning, place the meter in bypass. Slowly depressurize and vent all pressure from the meter set before checking for piping misalignment, piping strain, torsion, or other related problems. After the problem has been resolved, repeat the startup procedure starting from Step 2.

**WARNING**

**Do not adjust or work on the meter before slowly depressurizing and venting all pressure from the meter set in accordance with company procedures or industry guidelines.**

7. When the meter is operating smoothly, slowly open the inlet valve until a full line flow is passing through the meter and the inlet valve is fully open.
8. Slowly close the bypass valve.
9. After the meter is pressurized, follow your company's authorized procedures or common industry practices to leak test the meter and all pipe connections. Soapy water, Snoop®, or gas analyzers are

commonly used for this procedure. The meter also incorporates a leak test feature, as described in Section 7.

# 7 Downstream Leak Tests

A leak test is commonly performed on a meter set after it is installed. The leak test feature on the meter can detect a leak (or gas flow) at any point downstream of the meter cartridge.

**Note:** The meter will not detect leaks that are flowing below the start rate of the meter. Flow above one (1) cfh is measured at +90% accuracy.

**WARNING**

**Adhere to federal, state, company, and local codes and procedures, as applicable.**

To perform a downstream leak test, use one of the following methods:

- RPM Wheel Method
- Electronic Method using the magnetic interface
- Electronic Method using the Dresser MeterWare software interface

## 7.1 RPM Wheel Method

The RPM Wheel is tied directly to the meter impellers and is extremely sensitive to flow.

To detect a leak, look at the RPM Wheel on the meter and ensure it is not rotating. If it is rotating, gas is flowing downstream of the meter.

For more information about the RPM Wheel, refer to Section 3.2.

## 7.2 Electronic Method – Magnetic Interface

If the **LEAKTEST** screen is not available, use the Dresser MeterWare software to enable this test feature on the meter. For information about enabling this feature, refer to the *Dresser MeterWare Software Manual*.

1. Use the magnet to scroll through the LCD screens until **LEAKTEST** displays (Figure 10).


**Figure 10: Leak Test (LEAKTEST) LCD screen**

2. Hold the magnet on the black dot for five (5) seconds until **LKTST.RUN** displays (Figure 11), and then remove the magnet. The leak test process begins.


**Figure 11: Leak Test Run (LKTST.RUN) LCD screen**

The meter uses a preconfigured test sequence to run the leak test based on acceptable flow/volume limits and time duration. Use the Dresser MeterWare software to change these parameters.

The default is a maximum flow rate of 0.5 cfh with a test duration of two (2) minutes.

After the leak test process completes, either a Leak Test Pass Screen (Figure 12) or a Leak Test Fail Screen (Figure 13) displays.

The meter holds this leak test result for 24 hours. To access this test result within this time, view the parameter value for LEAKTEST.

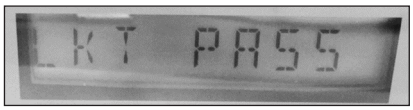



**Figure 12: Leak Test Pass (LKT PASS) LCD screen**

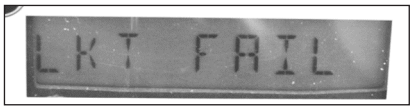



**Figure 13: Leak Test Fail (LKT FAIL) LCD screen**

3. If you want to repeat the leak test, first clear the screen by displaying the leak test result and holding the magnet on the black dot next to the display screen. The screen returns to the Leak Test run screen (**LKTST.RUN**) shown in Figure 11.

## 7.3 Electronic Method – MeterWare Interface

The Leak Test feature is also accessible in the Dresser MeterWare software through the **Advanced** screen, as shown in Figure 14.

This method requires connecting to the meter by using the IR (infrared) communication cable. The IrDA cable refers to the IR dongle connected to the USB extension cable. For more information, refer to the *Dresser™ Series D Meter Installation, Operation, and Maintenance Manual*.

With the Dresser MeterWare software, you can adjust the test parameters and run the leak test (refer to Figure 15).

After the leak test process completes, PASS or FAIL displays on the screen (refer to Figure 16) and on the meter (as described in Section 7.2).

For more information about running a leak test by using the Dresser MeterWare interface, refer to the *Dresser MeterWare Software Manual*.

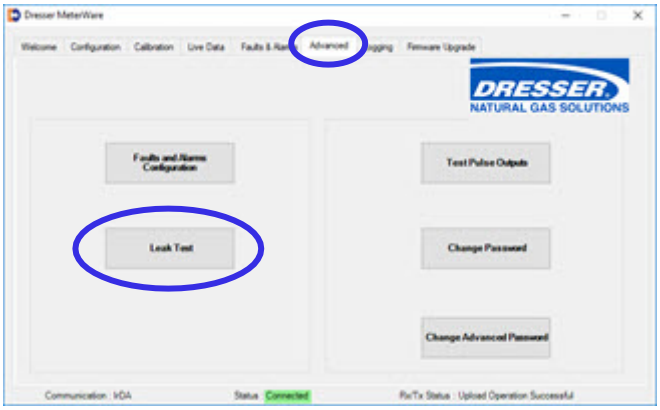



**Figure 14: Advanced screen in Dresser MeterWare**

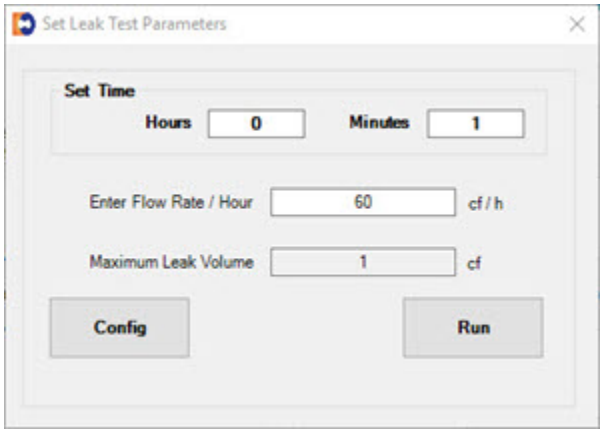



**Figure 15: Leak Test Parameters screen in Dresser MeterWare**

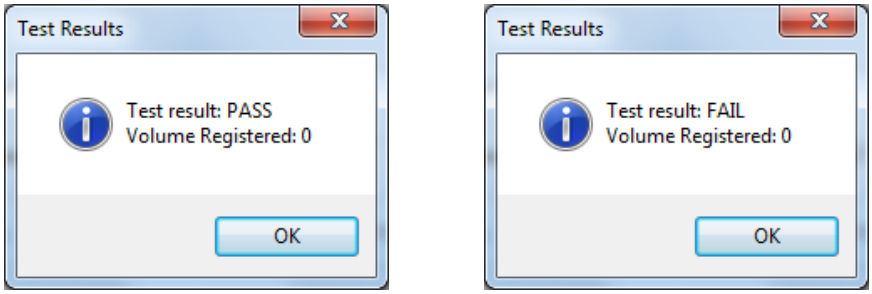



**Figure 16: Leak test pass/fail indications in Dresser MeterWare**

# 8 AMR Installation

Perform the following steps to install an AMR (automatic meter reading) device, if applicable.

If an AMR is not factory installed, the AMR mounting bracket will be attached as shown in Figure 17. Remove the brackets before installation.

**Figure 17: AMR mounting brackets as shipped from the Factory**

- If you have a pulse output cable visible under the AMR bracket (Figure 18), perform the steps in Section 8.1.1.
- If you have a pulse output cable circular connector visible under the AMR bracket (Figure 22), perform the steps in Section 8.1.2.

### 8.1.1 Preparing the AMR Bracket and Cable

1. After you remove the brackets, the pulse output cable is visible as shown in Figure 18.

**Figure 18: Pulse output cable on backside of meter**

2. Loosen the cable gland and pull the cable until at least 7.5–8 inches of cable extend from the cable gland as shown in Figure 19. Retighten the cable gland. Torque to 25–27 inch pounds.

**Figure 19: Loosen cable gland and extend the cable out of the gland**

3. Flip one bracket over as shown in Figure 20, and feed the cable through the holes located at the bend of the mounting brackets. Refasten the brackets to the meter as shown in Figure 21.

**Figure 20: Properly positioned mounting bracket**

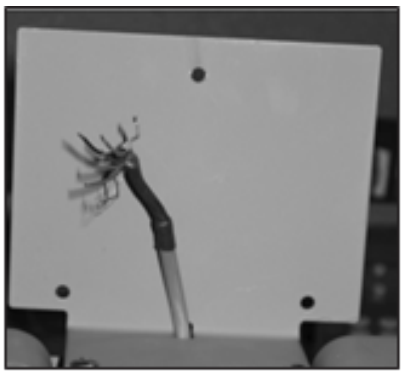


**Figure 21: Pull cable through the center hole**

### 8.1.2 Preparing the AMR Bracket and Connecting the Cable

1. After you remove the brackets, the pulse output cable connector is visible as shown in Figure 22.

**Figure 22: Pulse output cable connection on backside of meter**

2. Plug the pulse output cable into the cable connection as shown in Figure 23.

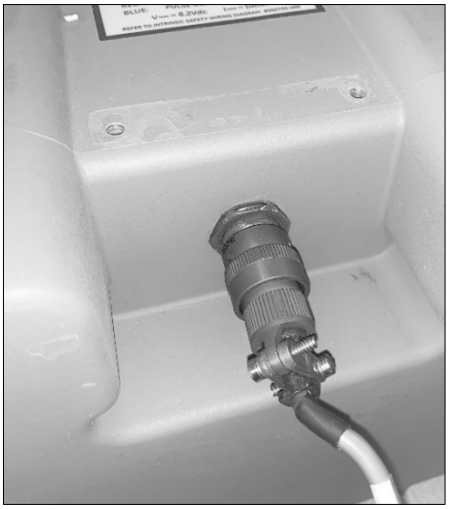


**Figure 23: Pulse output cable plugged into connection**

3. Fasten the mounting bracket to the meter as shown in Figure 24.

**Figure 24: Properly positioned mounting bracket**

### 8.1.3 Installing an Itron ERT Module

To install an Itron ERT® (encoder receiver transmitter) module on the meter, perform the following steps:

1. Splice the meter pulse output wires to the ERT.
   - If using Pulse Output 1, the green meter wire connects to the red AMR wire and the brown meter wire connects to the white AMR wire.
   - If using Pulse Output 2, the black meter wire connects to the red ERT wire and the white meter wire connects to the white ERT wire.

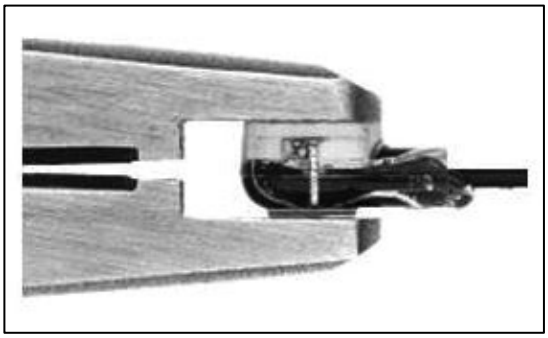


**Figure 25: Use proper crimping pliers on gel cap splice**

**Note:** You do not need to strip the wire as the gel cap splices supplied with the ERT are IDC (insulation displacing connection) type connectors. Use appropriate crimping pliers as shown in Figure 25 to properly clamp the splice.

2. After the ERT is properly wired, install the supplied cable tie approximately 1/8 inch from the end of the shrink tubing as shown in Figure 26.

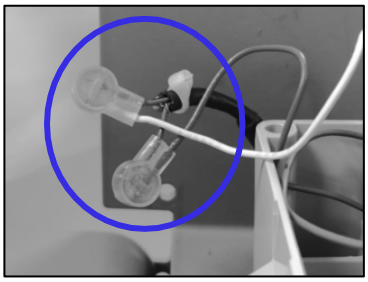


**Figure 26: Pulse Output 2 wired to the ERT**

3. Slide the cable into the slot on the ERT back plate as shown in Figure 27. Ensure the cable tie is toward the inside of the ERT to provide a strain relief for the cable. When mounting the ERT assembly to the meter mounting bracket, route the cable across the back plate as shown in Figure 28 to prevent pinching the cable.

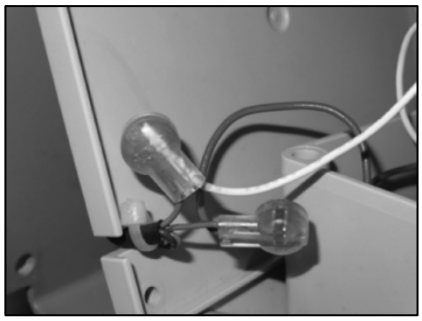


**Figure 27: ERT cable properly routed through the back plate**

**Figure 28: Meter cable routed across the back plate**

4. Carefully dress wires into the housing, and install the backplate on the Endpoint using the supplied T15 Torx screws as shown in Figure 29.

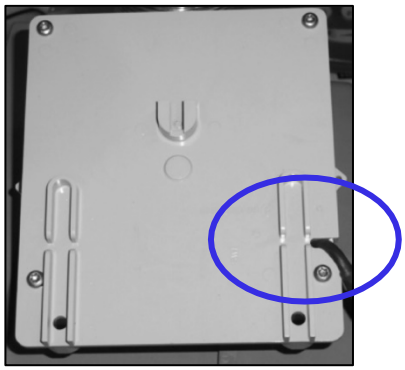


**Figure 29: Attach ERT to backplate with Torx screws**

5. Source locally one (1) #8-32 x 1/2 inch screw, two (2) each #8-32 x 3/4 inch screws, and three (3) #8-32 Kep® nuts (or equivalent).
6. Insert 1/2-inch screw into the top hole in the mounting plate, and thread one of the nuts loosely on the end as shown in Figure 30.

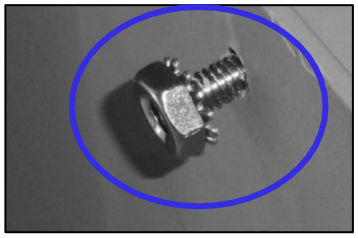


**Figure 30: 1/2 inch screw inserted in the top hole of the mounting plate**

7. Tilt the bottom of the Endpoint away from the mounting plate, and slide the notched mounting slot under the nut as shown in Figure 31. Leave the screw loose for now.

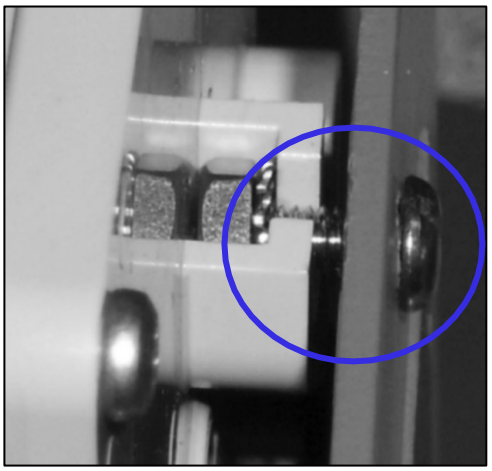


**Figure 31: Mounting plate attached to the nut**

8. Install the bottom set of screws and nuts as shown in Figure 32.
9. After all three sets of screws and nuts are installed, tighten each set.

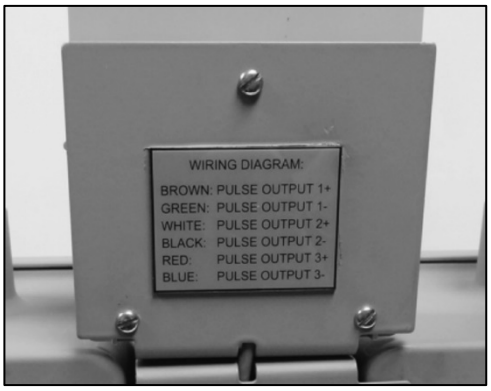



**Figure 32: Lower screws and nuts installed**

10. After all hardware is tightened, install the red tamper seals (supplied) on the Endpoint Module as shown in Figure 33.

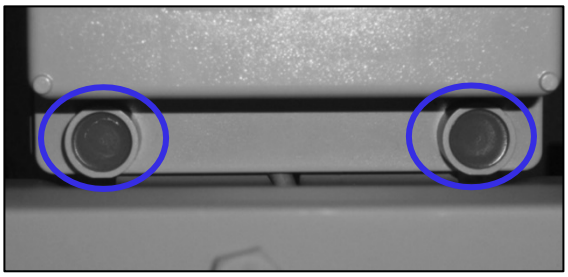


**Figure 33: Attach top AMR mounting bracket screws**

# 9 Pulse Output Connections

This section provides information about connecting the pulse outputs with the meter and configuring them with the Dresser MeterWare software.

Each Dresser Series D meter comes standard with two (2) flow frequency pulse outputs (Pulse Outputs 1 and 2) that represent volumetric information for remote data collection. Pulse Outputs 1 and 2 can be configured for faults and alarm signals. Pulse Output 3 is reserved for fault and alarm signals only.

The pulse output cable is routed through a cable gland located at the back of the meter. The output location is recessed and covered by a protective plate as shown in Figure 34.

**Figure 34: Pulse output cable under the protective plate**

## 9.1 Pulse Output Allocation Settings and Testing

In the Dresser MeterWare software, the Corrector pulse output allocation is configured on the **Volume Configuration** screen (refer to Figure 35).

For more information about the settings on this screen, refer to the *Dresser MeterWare Software Manual*.

**Note:** Some customers have their meter configured by the Factory. Verify your company policy before making any configuration changes.

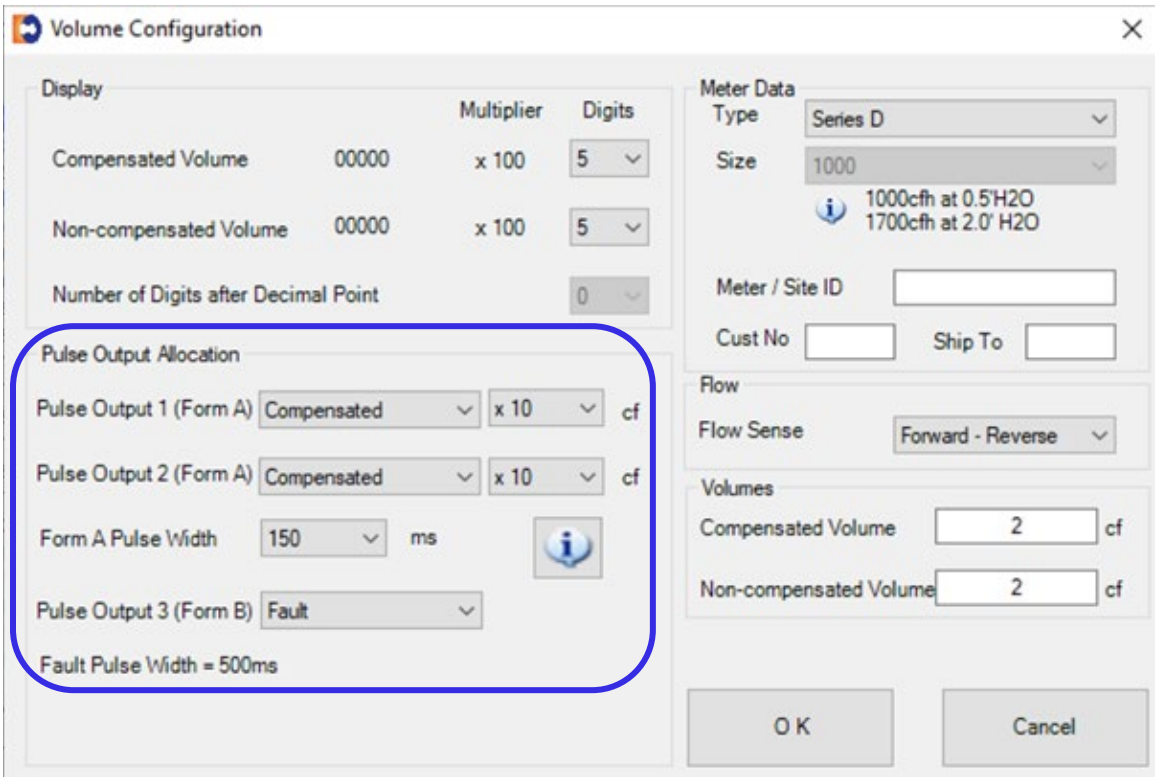



**Figure 35: Pulse Output Allocation fields on the Volume Configuration screen**

To send test pulses to verify the pulse outputs are connected correctly, use the MeterWare software **Test Pulse Outputs** function on the **Advanced** screen (refer to Figure 36). The **Test Pulse Outputs** feature allows you to specify the number of pulses to test pulse outputs 1, 2, and 3. The pulse width of the Compensated and Non-Compensated Volume test pulses is the pulse width specified on the **Volume Configuration** screen.

For more information about configuring and testing pulse outputs, refer to the *Dresser MeterWare Software Manual*.

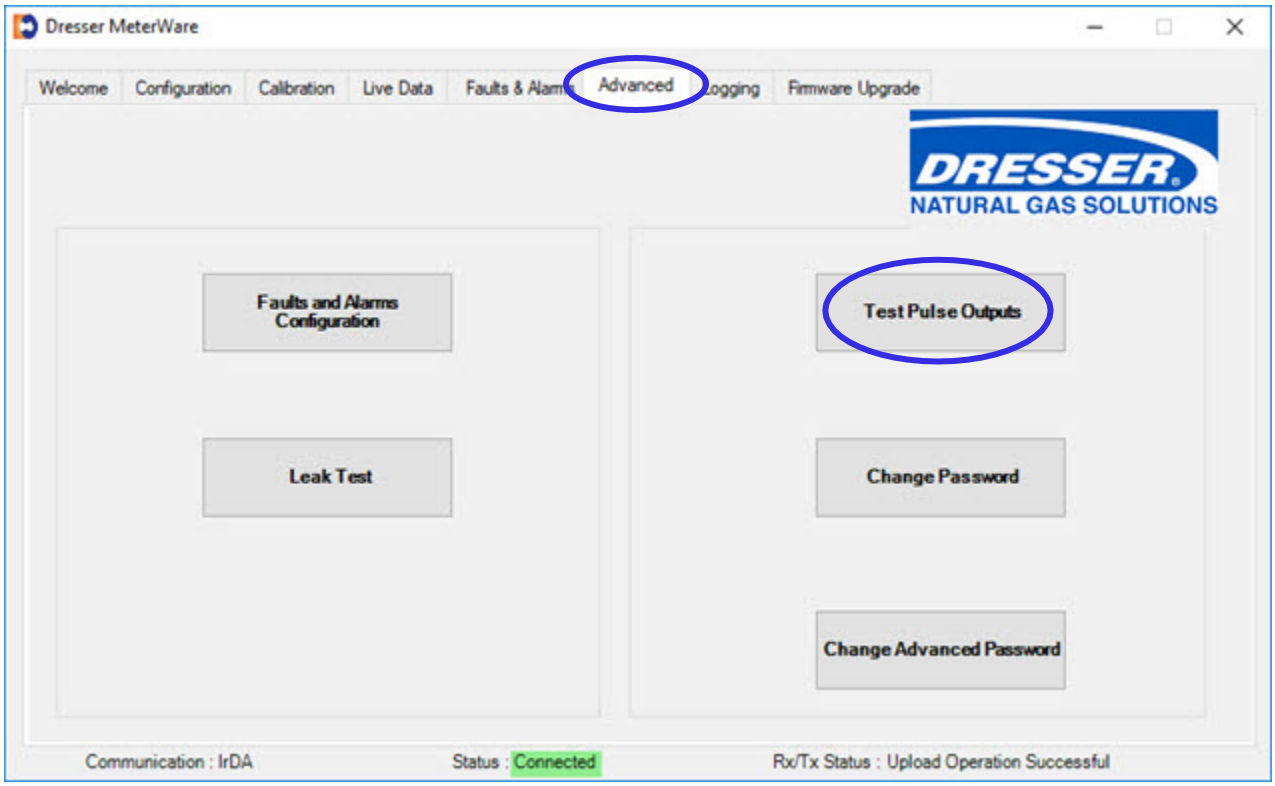



**Figure 36: Test Pulse Outputs on the Advanced screen**

## 9.2 Wiring Instructions for Hazardous Locations

To maintain compliance with CSA certification, use a suitable Intrinsic Safety barrier for a Class 1, Division 1 hazardous area for groups A, B, C, and D.

Do not exceed the following input values for the barrier device:

- Vi = 8.2V
- Ii = 10 ma

The OUTPUT and power handling capability of a barrier should not exceed:

- Vout = 30V
- Iout = 50 ma

For hazardous areas, use a recommended barrier such as Turck Brand IM1-12EX-T Single Channel or IM1-22 EX-R Dual Channel Barrier or an equivalent.

For wiring products in hazardous locations, refer to the *Dresser™ Series D Meter Installation, Operation, and Maintenance Manual*.

# WARNING

**Products certified as intrinsically safe installations shall be:**

- **Installed, put into service, used, and maintained in compliance with national and local regulations and in accordance with the recommendations contained in the relevant standards concerning potentially explosive atmospheres.**
- **Used only in situations that comply with the certification conditions shown in this document and after verifications of their compatibility with the zone of intended use and the permitted maximum ambient temperature.**
- **Installed, put into service, and maintained by properly licensed and trained professionals who have undergone suitable training for instrumentation used in areas with potentially explosive atmospheres.**

A wiring output guide is conveniently located on the cover plate located on the back of the meter as shown in Figure 37. This information is also contained in Table 2.

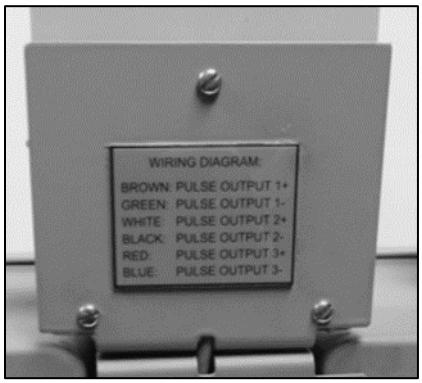



**Figure 37: Cover plate with wiring guide**

**Table 2: Pulse Output Cable Guide**

| Pulse Output | Name | Wire Color | Pulse Type |
|---|---|---|---|
| Pulse Output 1 (+) | PO1 (+) | Brown | Form A |
| Pulse Output 1 (-) | PO1 (-) | Green | |
| Pulse Output 2 (+) | PO2 (+) | White | Form A |
| Pulse Output 2 (-) | PO2 (-) | Black | |
| Pulse Output 3 (+) | PO3 (+) | Red | Form B |
| Pulse Output 3 (-) | PO3 (-) | Blue | |
| Ground | (GROUND) | Bare wire | - |

Meter serial number: _____

Digital index serial number: _____

Meter badge number: _____

**Notes**

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