Dresser™ Model 10C25 Series K Meter

Installation, Operation, and Maintenance Manual

Contents

1 Introduction

This manual provides information for installing, testing, operating, and maintaining the Dresser 10C25 Series K Digital Index non-compensated meter (10C25 DI) and the 10C25 Temperature Compensated Digital Index meter (10C25 DI-T). Please read the entire manual for information about how to properly and safely install, use, and maintain the meter and some of its accessories.

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

The following additional resources are available:

- The *Dresser MeterWare Software Manual*, which contains detailed information about the meter's digital index software
- An Installation Supplement guide, which ships with the meter

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

2 Overview

The Dresser 10C25 Series K (DI/DI-T) meter continues the Dresser legacy of superior long-term rotary meter performance in a compact oil-free design.

The 10C25 meter body offers:

- A maximum flow rate of 1,000 acfh.
- An MAOP (maximum allowable operating pressure) of 25 psig.
- A functional and aesthetic design for situations in which a larger meter may draw unwanted attention.
- Bi-directional flow capability that allows for more compact meter set designs.
- Direct replacement for the Dresser Series Z 5C15 and 8C15 ROOTS meters.

The 10C25 digital indexes offer:

- Innovative interconnection for AMR (automatic meter reading) devices pulse outputs including ease of mounting and IP-68 watertight connections.
- A fast, two (2)-minute proving capability on Dresser Model 5 Transfer Provers and on common sonic nozzle bench provers.
- Two (2) programmable pulse output signals.
- Dedicated alarm output.
- 150 days of hourly logs stored in non-volatile memory.
- Programmable fixed-factor pressure correction.

The Dresser MeterWare software provides the user interface to the 10C25 digital indexes with an IrDA (infrared) communication interface and is compatible with multiple Dresser metering products.

2.1 Operating Principle

The Dresser meter is designed to measure the volume of gases and gas mixtures with a high degree of accuracy. The industry accepted rotary type positive displacement operating principle supports permanent, non-adjustable accuracy by using precision machined two-lobe impellers encased within a rigid measuring chamber. Measurement accuracy is not affected by changes in gas specific gravity, pressure, or fluctuating flow.

Figure 1: Two (2) contra-rotating impellers of two-lobe or 'figure 8' contour

As shown in Figure 1, two (2) contra-rotating impellers of two-lobe or 'figure 8' design are encased within a rigid measuring chamber that has inlet and outlet connections on opposite sides. Precision machined timing gears keep the impellers in the correct relative position. Optimal operating clearances between the impellers, cylinder, and headplates provide a continuous, non-contacting seal.

This design effectively isolates the gas at the meter inlet from the gas at the outlet. This enables a very small pressure drop across the impellers to cause them to rotate.

2.2 Performance Characteristics

The 10C25 rotary meter has the following performance characteristics:

- Manufactured in accordance with the American National Standard specification ANSI/ASC-B109.3 for rotary type gas displacement meters
- Not affected by low or varying line pressures
- Suitable for use at pressures ranging from a few inches of w. c. (water column) to the MAOP of 25 psig
- Mounts in the gas line like the Dresser™ Series Z 5C15 and 8C15 meters

2.3 Features

The 10C25 has the following features:

- Both horizontal (side) and vertical (top) mounting capability
- Oil-less with permanently lubricated bearings
- RPM (revolutions per minute) Flow Indicator to indicate flow
- Differential testing capability
- Fast prove feature available
- Compatible with common AMR/AMI devices that require pulse input
- Compensated and non-compensated versions available
- IP66 to IP68 rating (depending on pulse output configuration)
- Multiple connection types, including Sprague #3/#4, 30 LT, 45 LT, and 1-1/2 inch FNPT

For additional specifications, refer to Section 17.

3 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.

3.1 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.

3.2 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).

4 Parts Identification

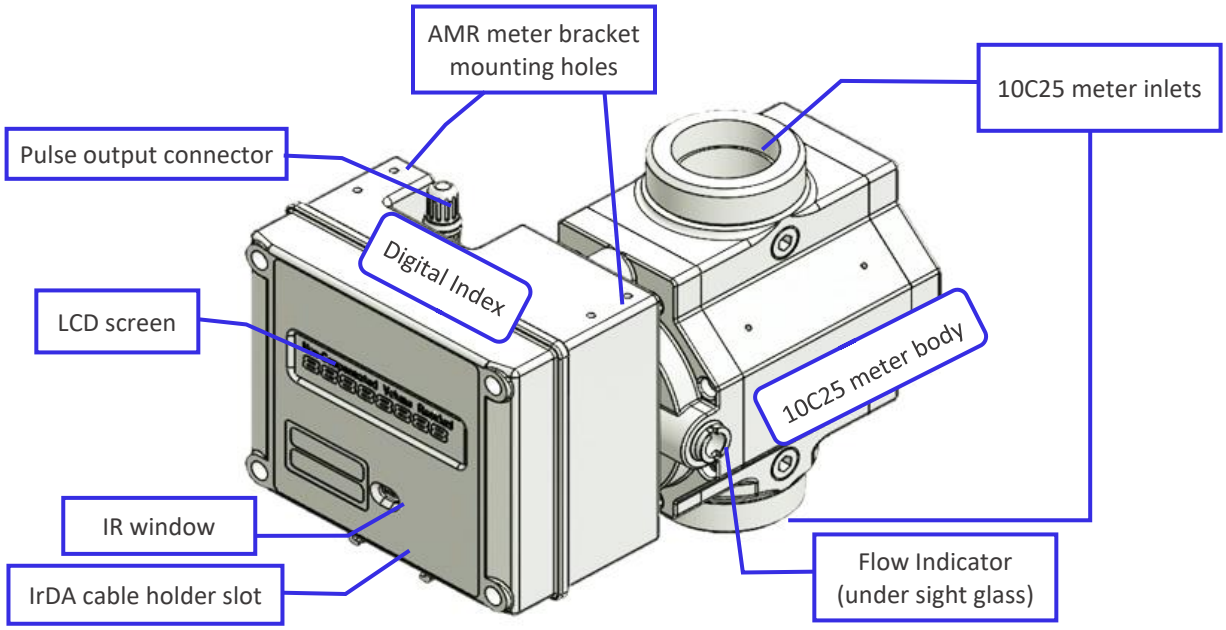


Figure 2: Parts identification

4.1 Meter Display

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

4.1.1 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 3.

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

Figure 3: Magnet used to change screens

The magnet can be purchased as part of the Communications Kit (refer to Figure 85) 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

4.1.2 LCD Screen Displays

The home or default screen displays either Compensated Volume or Non-Compensated Volume, depending on the meter version and customer 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. The screens always display in the order shown in Table 2. 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*).

Table 2: Scrolling Sequence of LCD Screens

Displayed on Screen	Represents	Function
COMPENSATED VOLUME	Compensated Volume	Displays non-compensated volume that has been corrected to standard conditions
NON-COMPENSATED VOLUME	Non-Compensated Volume	Displays actual non-compensated volume
LINETEMP	Line Temperature	Displays live line temperature
FIXED P	Fixed Line Pressure	Displays the line pressure as entered by the user
FLOWRATE	Flow Rate	Displays uncorrected flow rate (average of latest thirty (30) seconds of captured data)
MTR INFO	Meter Info	Displays meter size and type
LEAKTEST	Leak Test	Performs a functional test to determine low flow leakage downstream of the meter
PROVE CV	Compensated Prove Mode	Allows for compensated volume accuracy testing
PROVE UV	Non-Compensated Prove Mode	Allows for non-compensated volume accuracy testing
BATTVOLT	Battery Voltage	Displays battery voltage
REM LIFE	Remaining Battery Life	Calculates remaining battery life and displays it in months
FIRM REV	Firmware Revision	Displays the current firmware revision
LCD TEST	LCD Test	Tests all display segments

Displayed on Screen	Represents	Function
BATT.CHNG	Change Battery	Saves data to memory and resets remaining battery life to 240 months
COMPFCTR	Compensation Factor	Displays the factor applied to non-compensated volume to calculate compensated volume
COMPENSATED RESIDUAL	Compensated Residual	Displays extended compensated volume data beyond the value displayed on the compensated volume screen
NON-COMPENSATED RESIDUAL	Non-Compensated Residual	Displays extended non-compensated volume data beyond the value displayed on the non-compensated volume screen
BASE T	Base Temperature	Displays base temperature as entered by the user
BASE P	Base Pressure	Displays base pressure as entered by the user
PRESS FA	Fixed Pressure Factor	Displays the fixed pressure factor
NCVOLFLT	Non-Compensated volume under fault	Displays non-compensated volume that has accumulated since a fault occurred

4.1.3 Data Display Screen and Icons

Data displays in digital format, as shown in Figure 4.

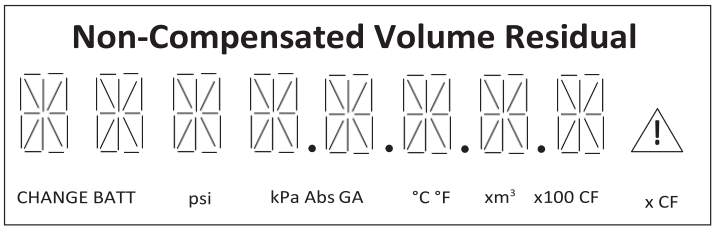


Figure 4: Data display screen

Icons display depending on the function or parameter and how the meter is configured in the Dresser MeterWare software. For icon descriptions, refer to Table 3.

For information about these data settings, refer to Section 11.

Table 3: Data Display Icons

Icon	Description
CHANGE BATT	Change Battery
psi	Pounds per Square Inch
kPa	Kilopascal
Abs	Absolute
GA	Gauge
°C	Temperature in Celsius
°F	Temperature in Fahrenheit
xm^3	Cubic Meters
x100 CF	100 Cubic Feet
x CF	Cubic Feet

Icon	Description
⚠	Alarm/Fault has occurred; refer to Section 11.5

4.2 Flow Indicator

The white, reflective Flow Indicator located on the top of the meter (refer to Figure 5) 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 Flow Indicator indicates 0.007407 cf (0.0002098 m^3) of non-compensated gas flow through the meter.

Note: Keep the Flow Indicator covered by the rubber cap to help protect the viewing port and keep it clean.

Figure 5: Flow Indicator location under cover in meter

5 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.

6 Meter Installation

WARNING

Before installation, check the meter nameplate and verify that the MAOP (Maximum Allowable Operating Pressure) and rated capacity for flow rate meet the installation requirements.

This section provides detailed information about proper installation of the 10C25 meter.

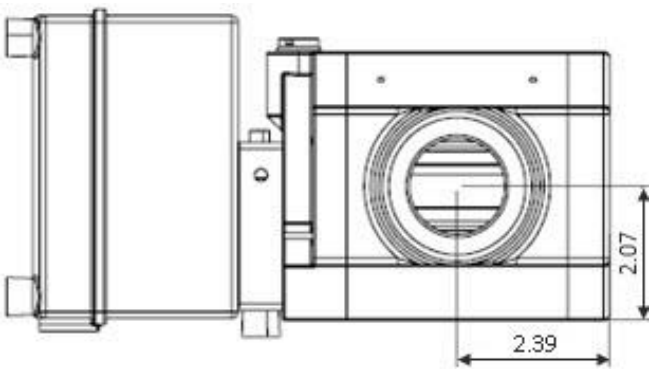
6.1 Preinstallation Considerations

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 10C25 meter has excellent rangeability and is capable of accurately measuring small pilot loads. Contact your Dresser meter supplier for a list of approved gases or additional performance details.

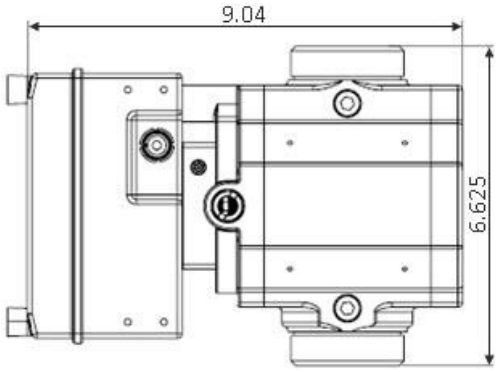
6.1.1 Installation Size Considerations

Verify that the selected installation location provides sufficient space for the meter (Figure 6 and Figure 7). Also allow additional space for an attached AMR device, if applicable.

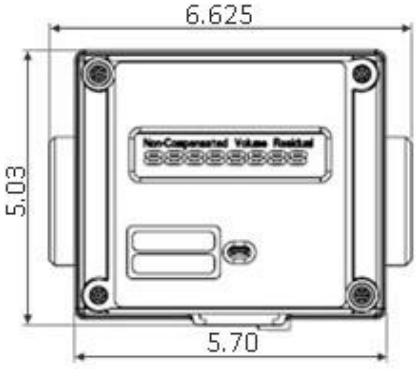
Leave sufficient space around the meter to allow access to the LCD screen, AMR device, and cable access for testing, as applicable.



Side Inlet Orientation–Side View

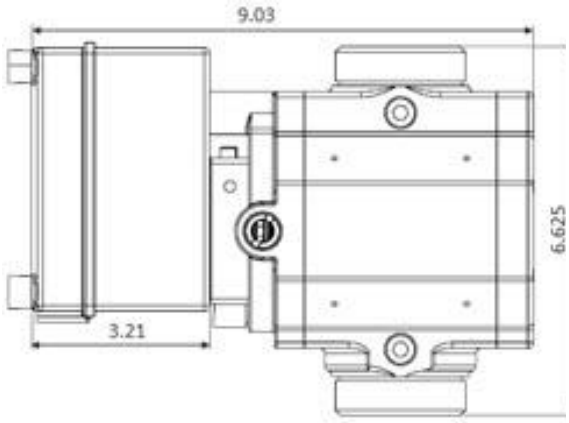


Side Inlet Orientation–Top View

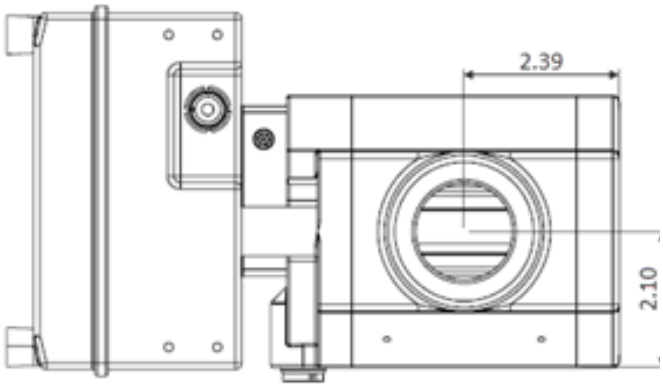


Side Inlet Orientation–Front View

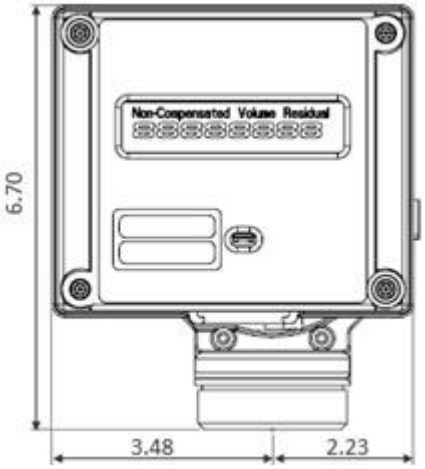
Figure 6: 10C25 Meter Size Specifications–Side Inlet Orientation (horizontal)



Top Inlet Orientation–Side View



Top Inlet Orientation–Top View



Top Inlet Orientation–Front View

Figure 7: 10C25 Meter Size Specifications–Top Inlet Orientation (vertical)

6.1.2 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.

6.1.3 Piping Configurations

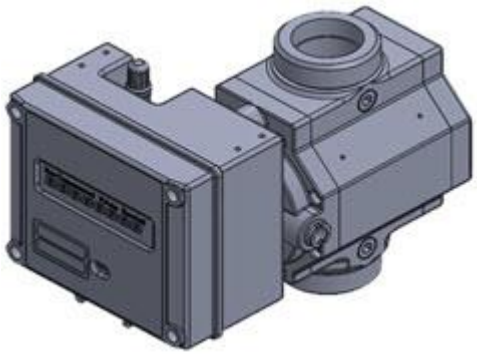


Figure 8: Top inlet (vertical)

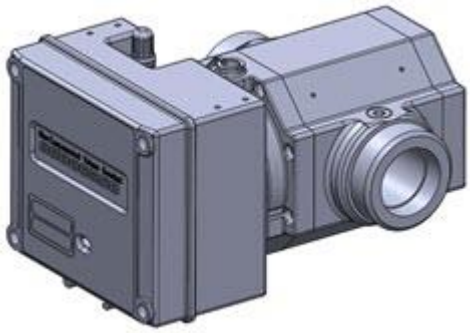


Figure 9: Side inlet (horizontal)

The line mounted Dresser 10C25 meter can be installed in either a top inlet (vertical), a side inlet (horizontal), or a bottom inlet (vertical) configuration.

A top inlet in a vertical pipe line with gas flow downward is the preferred or recommended installation. The top inlet mounting allows gravity to pass dirt, pipe scale, or other debris through the meter.

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 Measurement for sizing, pricing, and availability. The warranty does not cover over-speed conditions.

6.1.4 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.**

6.1.5 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.

6.2 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. If needed, change the orientation of the digital index for the configuration (vertical or horizontal) in which the meter will be installed. For more information, refer to Section 12.4.

c. Verify the impellers turn freely and no objects or contaminants are in the measuring chamber. To check the meter, blow dry air lightly into the meter inlet to verify the free rotation of the impellers.

Depending on the meter's condition, the meter might need to be flushed with an approved solvent. Verify the measuring chamber is clean and dry and the impellers turn freely before installing.

For information about cleaning the meter, refer to Section 12.3.

2. Connect the meter inlet to the gas supply side of the line. Verify the gas will flow in the same direction as the arrow on the meter body nameplate (for example, the arrow is pointing *downward* for the top inlet or in both directions for bi-directional flow).

Figure 10: Gas flow direction

3. Install the meter without piping strain to prevent binding.

4. 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, front to back.

7 Meter Startup

After proper installation and leveling of the meter, as described in Section 6, 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 Flow Indicator 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 Flow Indicator to indicate impeller rotation, and then proceed depending on the results:

- If movement is present, go to Step 5.
- If the Flow Indicator is not turning, verify gas is being delivered to the meter.
- If gas is flowing to the meter inlet and the Flow Indicator 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 Flow Indicator 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 8.

8 Downstream Leak Tests

A leak test is commonly performed on a meter set after it is installed. The leak test feature on the 10C25 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:

- Flow Indicator Method
- Electronic Method using the magnetic interface
- Electronic Method using the Dresser MeterWare software interface

8.1 Flow Indicator Method

The Flow Indicator is tied directly to the meter impellers and is extremely sensitive to flow.

To detect a leak, look at the white Flow Indicator 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 Flow Indicator, refer to Section 4.2.

8.2 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 11: Leak Test (LEAKTEST) LCD screen

2. Hold the magnet on the black dot for five (5) seconds until **LKTST.RUN** displays (Figure 12), and then remove the magnet. The leak test process begins.

Figure 12: 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 13) or a Leak Test Fail Screen (Figure 14) 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 13: Leak Test Pass (LKT PASS) LCD screen

Figure 14: 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 12.

8.3 Electronic Method – MeterWare Interface

The Leak Test feature is also accessible in the Dresser MeterWare software through the **Advanced** screen, as shown in Figure 15.

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 Appendix A.

With the Dresser MeterWare software, you can adjust the test parameters and run the leak test (refer to Figure 16).

After the leak test process completes, PASS or FAIL displays on the screen (refer to Figure 17) and on the meter (as described in Section 8.2).

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

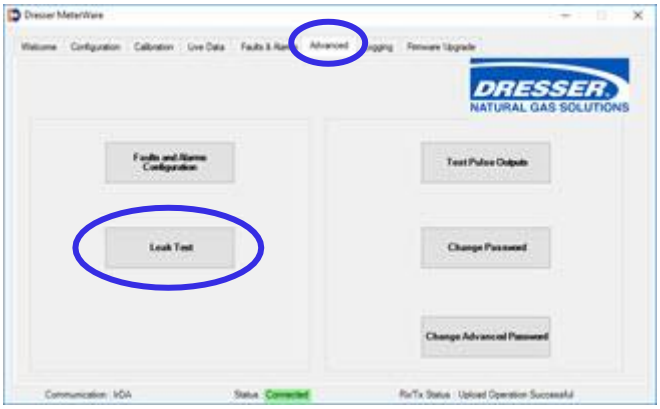


Figure 15: Advanced screen in Dresser MeterWare

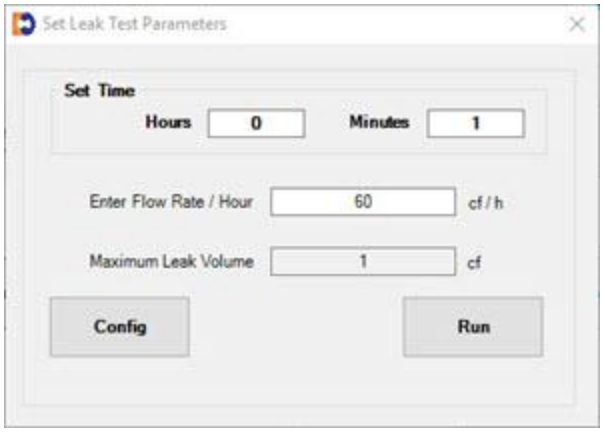


Figure 16: Leak Test Parameters screen in Dresser MeterWare

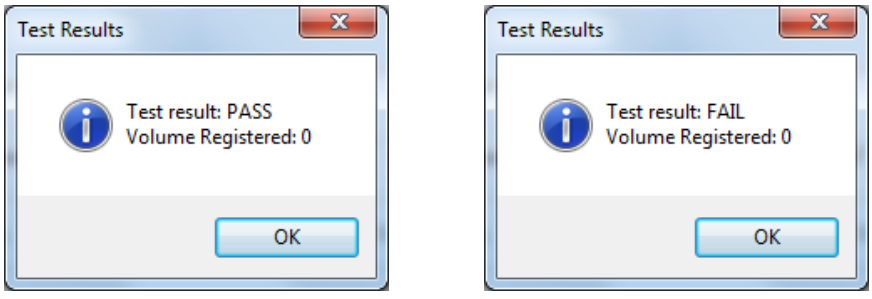


Figure 17: Leak test pass/fail indications in Dresser MeterWare

9 AMR Installation

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

9.1.1 Preparing the AMR Cable

1. To allow for installation options, the provided AMR cable usually needs to be trimmed to the correct length.

   Determine the length of the cable needed. As shown in Figure 23, at least one (1) loop of extra cable (slack) is needed.

   If the AMR will be wall mounted, verify the cable is long enough to run from the AMR device location to the meter without tension.

2. Connect the wires from the AMR cable to the pulse output connector cable. Gel caps are commonly used to connect the wires.

   Follow the wiring instructions based on your desired pulse output configuration (refer to Section 10).

   Contact your AMR provider to verify you have the correct wiring configuration.

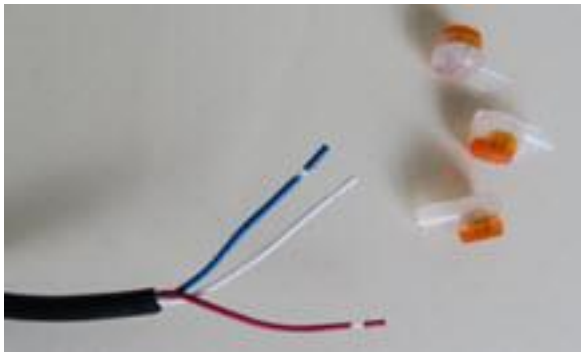


Figure 18: Example of gel caps

9.1.2 Mounting an AMR Device to the Meter

Tip: Remove the digital index from the meter for easier installation (refer to Section 12.4).

If the AMR device is to be mounted on the meter, perform the following steps:

1. Align the base AMR mounting bracket over the holes on the top of the digital index.
2. Insert the screws into position and turn them until they touch the cover.
3. Tighten the screws to a maximum torque of 18 inch pounds.

Figure 19: Align and attach the base AMR mounting bracket to the digital index

4. Push the AMR cable into the pulse output connector until it locks into place.

Figure 20: Push the AMR cable into the pulse output connector

Note:

- Trim the AMR cable to the correct length prior to connecting it (refer to Section 9.1.1).
- If needed, remove the cover over the pulse output connector.

5. Align the mounting holes on the AMR device with the holes on the top AMR mounting bracket.

Note: The design of the top AMR mounting bracket may differ from the one shown in Figure 21.

Figure 21: Align AMR device with holes on top AMR mounting bracket

6. From the front of the AMR device, insert the screws into position, and tighten the screws. Refer to the AMR provider installation information for torque requirements.

Figure 22: Attach the AMR to the top AMR mounting bracket

7. Carefully tuck the AMR cable inside the opening of the base AMR mounting bracket.

Figure 23: Tuck wires into base of AMR mounting bracket

CAUTION

To prevent damage to the wires and gel caps, do not overpack the wires. They are stiff. You could break the wires or the gel caps.

8. Tilt and slide the top AMR mounting bracket over the tabs of the base AMR mounting bracket.

Figure 24: Slide on the top AMR mounting bracket

9. Verify there are no gaps or wires between the top and base AMR mounting brackets.

Figure 25: Check for gap between the top and base AMR mounting brackets

10. Insert the screws into position to attach the top AMR mounting bracket to the back of the digital index, and tighten the screws to a maximum torque of 18 inch pounds.

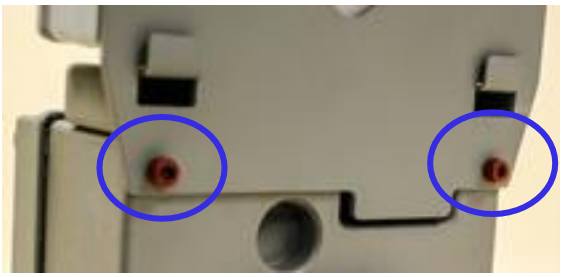


Figure 26: Attach top AMR mounting bracket screws

11. Install the digital index onto the meter if it was removed prior to AMR mounting (refer to Section 12.4.3).
12. Install tamper evident devices, as applicable.

Figure 27: Attach digital index to meter

9.1.3 Using a Remote-Mounted AMR

If the AMR device is to be mounted remotely (not attached to the meter), perform the following steps:

1. Push the AMR cable into the pulse output connector until it locks into place.

Figure 28: Push the AMR cable into the pulse output connector

2. Align the remote AMR mounting bracket over the holes on the top of the digital index.

   This bracket helps prevent removal of the AMR cable.
3. Insert the screws into position and turn them until they touch the cover.
4. Tighten the screws to a maximum torque of 18 inch pounds.
5. Install tamper evident devices, as applicable.

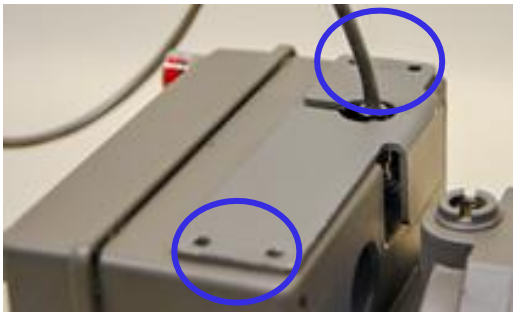


Figure 29: Align and attach the remote AMR mounting bracket to the digital index

The AMR device can now be installed in a location a distance from the meter. Verify the cable is long enough to run from the AMR device location to the meter without tension.

10 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 10C25 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 plugs into the pulse output connector on the digital index (refer to Section 9).

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 (refer to Appendix A).

10.1 Pulse Output Allocation Settings and Testing

In the Dresser MeterWare software, pulse output allocation is configured on the **Volume Configuration** screen (refer to Figure 30).

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.

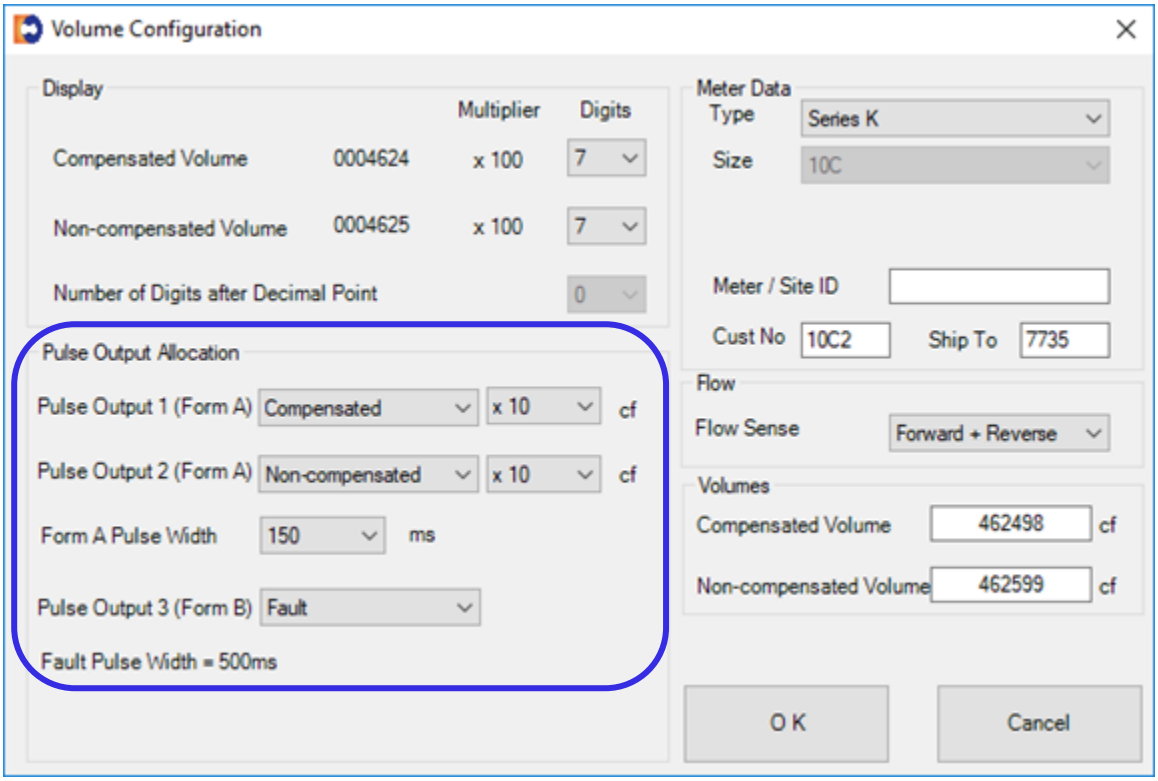


Figure 30: Pulse Output Allocation fields on the Volume Configuration screen

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 31). 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*.

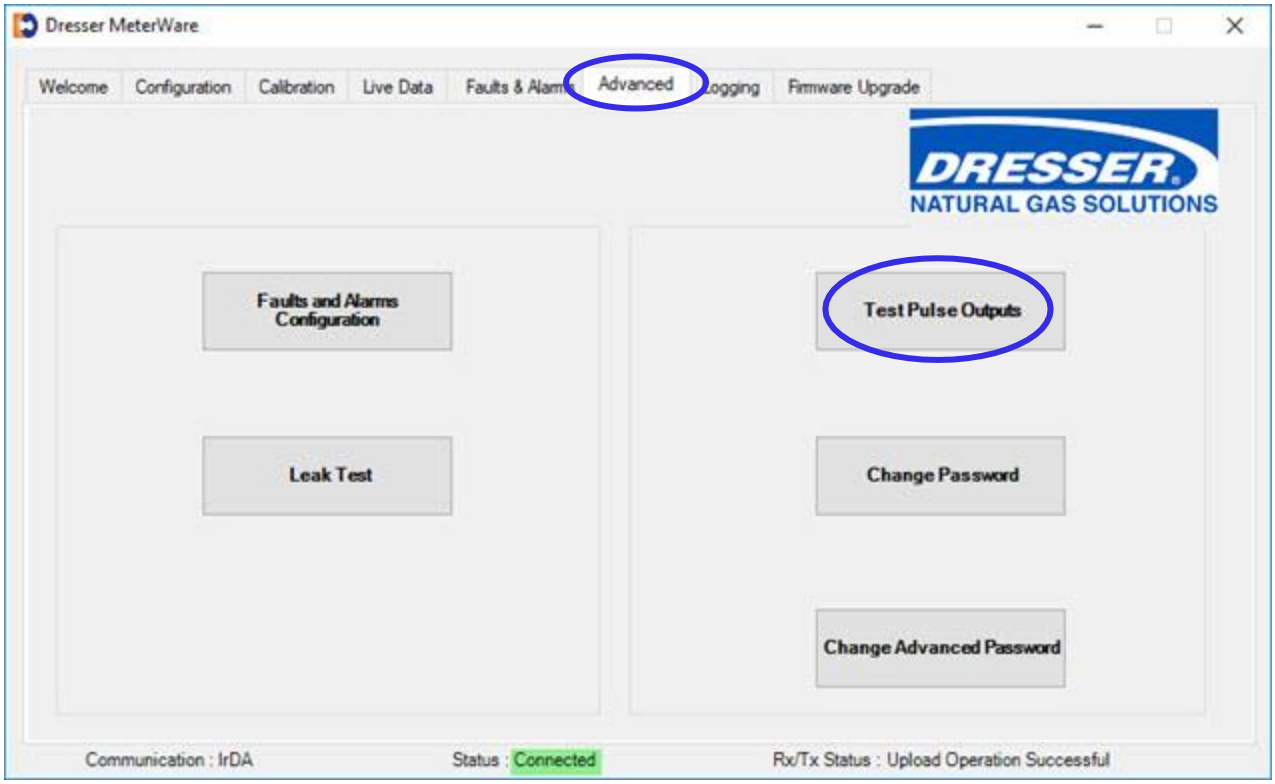


Figure 31: Test Pulse Outputs on the Advanced screen

10.2 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 Figure 32.

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.**

Table 4: 10C25 AMR Pulse Output Locations

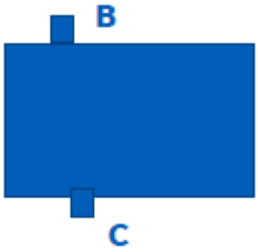
Top Only	Top and Bottom	Bottom Only
		

Table 5: Pulse Output Cable Guide

Telemetry Output (refer to Table 4)				Pulse Output	Name	Wire Color	Pulse Type
A	B	C	D				
✓	✓	-	✓	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	-

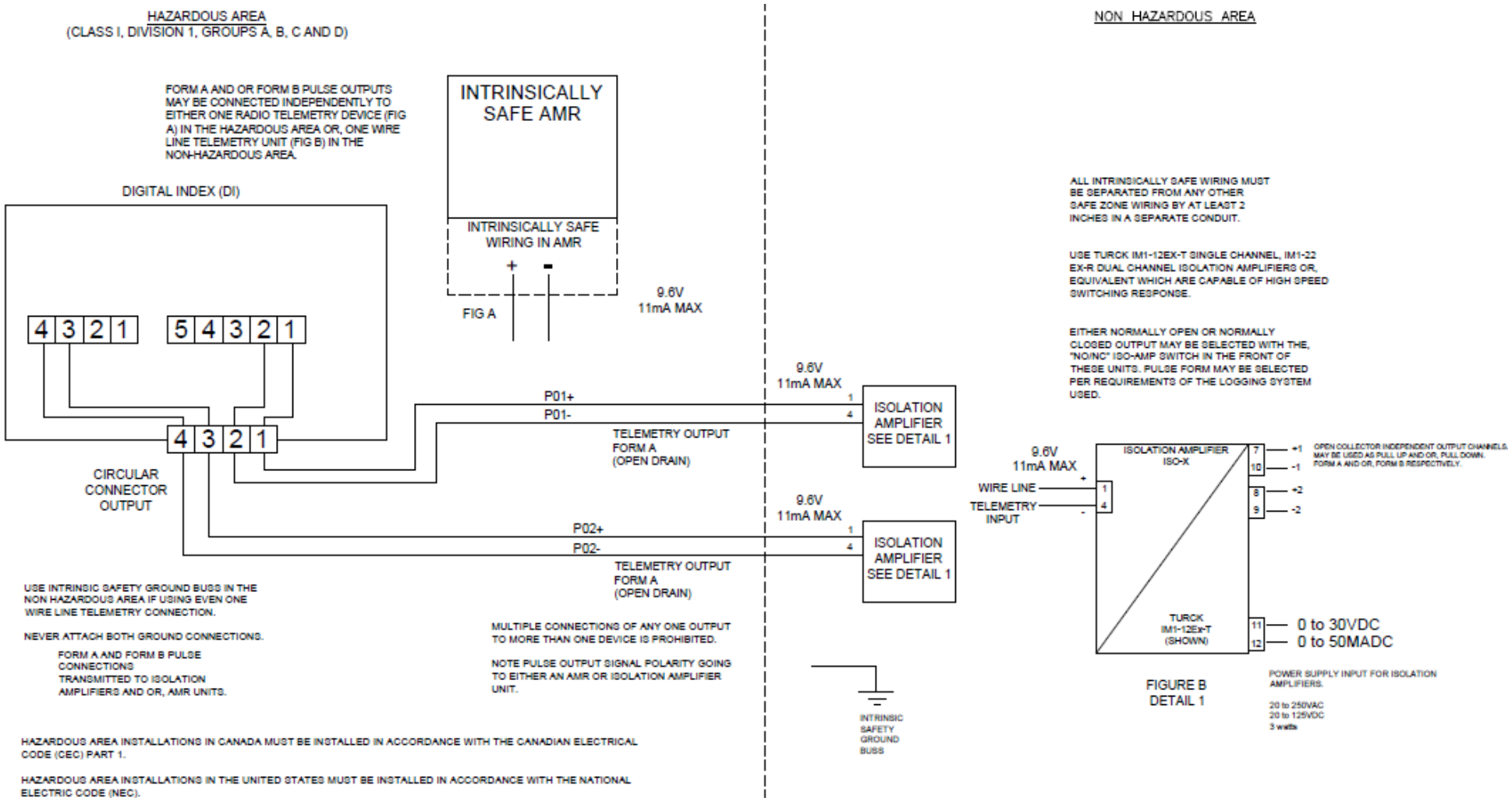


Figure 32: Wiring diagram for hazardous locations (top configuration type A)

11 Meter Operation

This section provides information about using and configuring the meter.

11.1 MeterWare Software Information

The Dresser MeterWare software can be installed on your computer to configure the meter, download its logged data, and update the meter's firmware. An infrared cable using the IrDA protocol enables the MeterWare software to communicate with the meter (refer to Appendix A).

After the MeterWare software connects to the meter, a Live Data screen displays current operating conditions. The Volume Configuration screen provides the ability to adjust volume information, such as odometer readings and pulse output configurations. Faults and alarms are configurable, and the meter's LCD screens are selectable.

For more information about the installation and operation of the MeterWare software, refer to the *Dresser MeterWare Software Manual*.

11.2 Volume Measurement

11.2.1 Imperial or Metric Measurement Options

Use the Dresser MeterWare software to configure the following parameters of the LCD screen:

- Volumetric Units
- Temperature (Fahrenheit or Celsius)
- Fixed Pressure Factor (psi or kPa)

11.2.2 Volume Detection

Volume from the 10C25 meter is detected with a volume input board. This volume input board uses the same Wiegand sensor technology used in other Dresser instruments.

There are five (5) volume accumulation methods, which are based on the capability to read either the forward or the reverse flow directions, as shown in Table 6.

Table 6: Volume Accumulation Methods

Volume Accumulation	Measured Flow Source		
	Forward	Reverse	Calculated Flow
Forward minus (-) Reverse	✓	✓	Volume in Reverse flow is subtracted from the volume calculated in Forward flow.
Reverse minus (-) Forward	✓	✓	Volume in Forward flow is subtracted from the volume calculated in Reverse flow.
Reverse	X	✓	Volume in Reverse flow only is calculated. All flow in the Forward direction is ignored.
Forward	✓	X	Volume in Forward flow only is calculated. All flow in the Reverse direction is ignored.

Volume Accumulation	Measured Flow Source		
	Forward	Reverse	Calculated Flow
Forward plus (+) Reverse	✓	✓	Volume in Reverse and Forward flow are calculated. Calculated volume is the total of all flow in both directions.

Note: The Factory default method for volume accumulation is Forward plus (+) Reverse to allow for mounting in either flow direction and to prevent 'rollback' of the volume count.

For information about changing the accumulation method, refer to the *Dresser MeterWare Software Manual*.

11.2.3 Volume Sample Frequency

Volume is sampled every thirty (30) seconds.

11.2.4 Volume Update Frequency

All parameters on the LCD are updated every thirty (30) seconds.

11.2.5 Pulse Output Frequency

Volume pulses are provided in real-time.

Form A outputs are configurable by:

- Volume per pulse
- Pulse width
- Imperial or metric

The Form B fault/alarm pulse output is not configurable and provides a 500 ms pulse every thirty (30) seconds when a fault or alarm is present.

11.3 Temperature Measurement

The ambient temperature is measured by using a Class A, PT1000 precision RTD and is sampled every thirty (30) seconds.

In normal operation, the accumulated temperature Corrected Volume total is

- Updated every thirty (30) seconds
- Displayed in scf (standard cubic feet) or nm^3 (normal cubic meters)
- Measured within the range of -40°F to +140°F (-40°C to +60°C)

The total ambient temperature effect is less than 0.1°F (0.05°C) over the entire temperature range. Additionally, temperature measurement accuracy is graduated over the measurement range, as shown in Table 7.

Table 7: Temperature Reading Accuracy

Temperature Reading Accuracy
-40°F to 140°F: +/- 0.9°F (-40°C to 60°C: +/- 0.5°C)

You can configure the units of measure (°F or °C) and the reference base temperature by using the Dresser MeterWare software.

For ease of calibration, you can use the Dresser MeterWare software to perform a single point temperature field calibration.

For more information, refer to the *Dresser MeterWare Software Manual*.

11.4 Flow Rate Measurement

Access the flow rate by scrolling to the Flow Rate screen (**FLOWRATE**) on the meter's LCD screen, as described in Section 4.1. The flow rate indication is not instantaneous, but it is based on the average flow rate of the last thirty (30) seconds of the saved uncorrected volume data.

Because the meter updates and stores the data collected every thirty (30) seconds, there is a slight delay in the timing of the displayed results ranging from 1 to 29 seconds until the results are updated again.

11.5 Faults and Alarms

11.5.1 Fault Types

A fault indicates a problem with the meter electronics hardware or the firmware.

Table 8: Fault Types

Fault Type	LCD Screen Display	Occurs When
Temperature Fault	T FLT	The temperature probe is faulty or disconnected from the meter electronics.
Volume Fault	VOL FLT	The volume input pulses are out of sequence.
Volume Sensor Fault	VOL SNSR FLT	An open wire on the volume input board or mag pickup is present.
Internal Operation Fault	INT FLT	A memory access fault is present.
Power Fault	PWR FLT	A power problem occurred or battery wiring is disconnected.
Low Battery Fault*	LOW BATT	The battery voltage drops below 2.7 V.

* Refer to Section 11.5.5.

11.5.2 Alarm Types

An alarm indicates when a battery has low voltage or when line temperature or flow rate has moved above or below the desired limits. The limits are user configurable by using the Dresser MeterWare software.

Table 9: Alarm Types

Alarm Type	LCD Screen Display	Occurs When
High Temperature Alarm Limit	HIGHT. AL.	The temperature rises above the user-defined limit.
Low Temperature Alarm Limit	LOWT. AL.	The temperature drops below the user-defined limit.
High Flow Rate Alarm Limit	HIGHFL. AL.	The flow rate rises above the user-defined limit. **Note:** Default high flow alarm allows for a 20% overspeed.
Low Battery Alarm*	LBATT AL.	The battery voltage drops below 3.0 V (not user configurable).

* Refer to Section 11.5.5.

11.5.3 LCD Screen Notices

When a fault or alarm is active, the LCD screen displays a caution symbol (Figure 33).

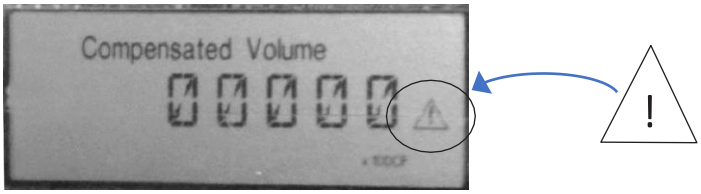


Figure 33: Fault/alarm on LCD screen

To view the fault or alarm type that has occurred, use the magnet to scroll through the LCD screens until a fault or alarm screen displays (refer to Table 8 and Table 9).

To clear a fault or alarm on the meter LCD screen after the problem has been resolved, perform the following steps:

Note: The **LCD TEST** screen must be selected to display to perform this procedure.

1. Use the magnet to scroll to the **LCD TEST** screen.
2. Wait for twenty (20) seconds until the **FLT. AL** screen displays.
3. Hold the magnet on the black dot for at least six to ten (6–10) seconds to clear the fault or alarm. The screen displays **CL.RD** to indicate that all occurred faults and alarms have been cleared from the unit.

Note: This process does not clear a current fault or alarm if the issue that triggered it has not been resolved. It also does not update the values in the Live Data screen in the Dresser MeterWare software.

For a battery-related fault or alarm, refer to Section 11.5.5.

11.5.4 MeterWare Notices

In the Dresser MeterWare software, faults and alarms display on the Live Data screen.

When a fault or alarm is present, the value displays highlighted in red (refer to Figure 34).

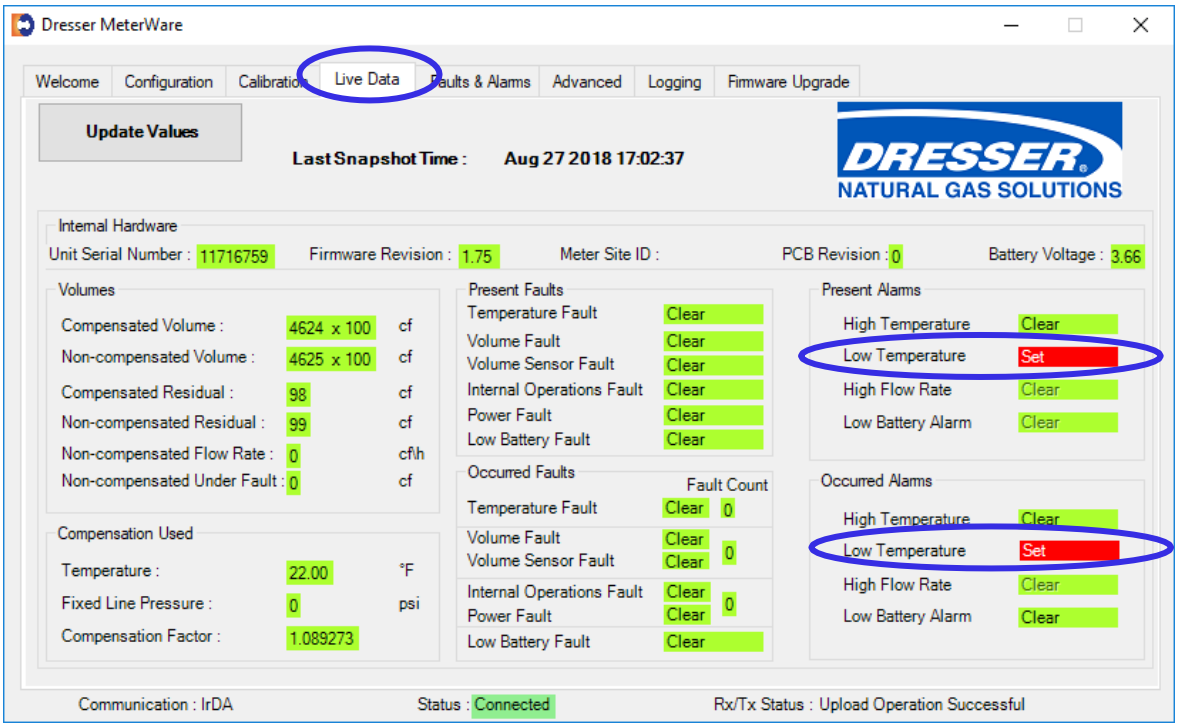


Figure 34: Live Data screen displaying alarms

To clear an existing fault or alarm with MeterWare, connect the meter to the Dresser MeterWare software and clear the items in the **Faults & Alarms** screen (refer to Figure 35).

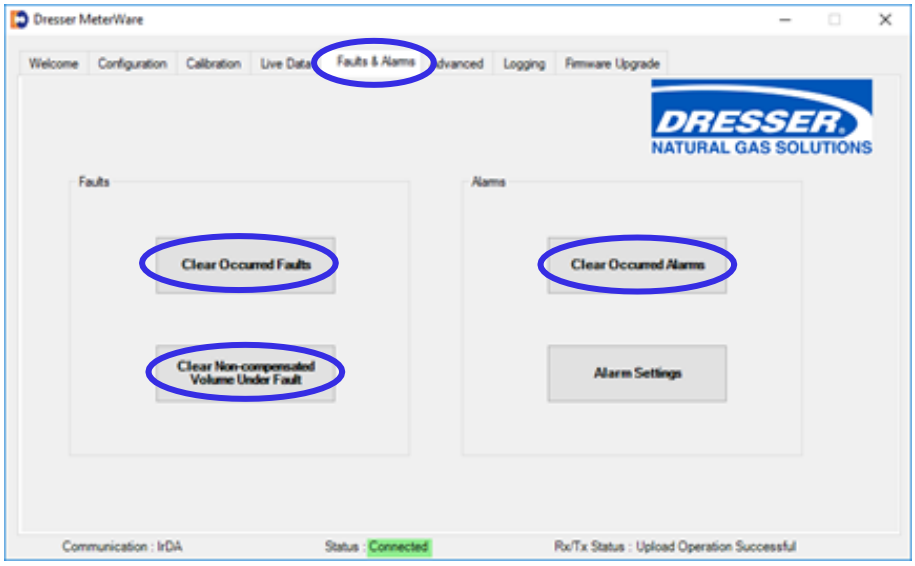


Figure 35: Faults & Alarms screen in Dresser MeterWare

11.5.5 Battery Faults and Alarms

To clear a battery fault or alarm, check battery voltage and replace the battery if necessary.

For information about accessing and replacing the battery, refer to Section 12.6.2.

11.5.6 Fault and Alarm Pulse Outputs

The meter can provide a pulse output when a fault or alarm is present. This feature is configurable in the **Volume Configuration** screen of the Dresser MeterWare software. To display the **Volume Configuration** screen, select the **Configuration** screen in the MeterWare software, and then click **Volume** (refer to the *Dresser MeterWare Software Manual*).

Pulse Output 1 and Pulse Output 2 provide a Form A (Normally Open) pulse when 'Fault' is selected for the output. Form A fault/alarm pulses can be configured to either send a single latched pulse or a continuous pulse string when they occur (refer to the *Dresser MeterWare Software Manual*). A pulse output is provided every thirty (30) seconds when a fault or alarm is present. The pulse width is selectable as 50, 150, or 250 ms.

Unlike the other two (2) pulse outputs, Pulse Output 3 is a dedicated Form B (Normally Closed) switch and is configured for a 500 ms pulse. There are only two settings for the pulse output:

When a fault of any kind is present:

- The pulse outputs for Compensated and Non-Compensated Volume do not pulse out.
- Any pulse output configured to be a fault pulse functions as an alarm/fault pulse output.

If an alarm is present, all pulse outputs continue to perform as configured.

If the 10C25 meter is configured to use the Fixed Temperature Under Fault function and a Temperature Fault occurs, the Compensated and Non-Compensated Volumes:

- Continue to increment and be displayed on the LCD screen.
- Are logged in the Logged Data Reports.

If the 10C25 meter is not configured to use the Fixed Temperature Under Fault function and a Temperature Fault occurs:

- Non-Compensated Volume only continues to be logged in the Non-Compensated Volume Under Fault register.
- **NCVOLFLT** displays on the LCD screen (if the Non-Compensated Volume Under Fault parameter is enabled at time of unit configuration).

11.6 Logging Features

The meter records information for the Data Logs and Audit Logs to store information about the activity and settings for the meter. These logs are stored in non-volatile memory and are maintained during a power failure. These logs can be downloaded for reference.

11.6.1 Data Logs

The meter records Data Logs hourly and maintains 150 days of hourly logs stored on a FIFO (first in/first out) basis. The Data Logging feature is not configurable.

The Data Log is saved as a CSV (comma-separated values) file for easy import into spreadsheets, such as Microsoft Excel. Select the number of days of hourly logs to download by using the **Logging** screen in the Dresser MeterWare software.

For more information, refer to the *Dresser MeterWare Software Manual*.

11.6.2 Logged Parameters

The meter has non-volatile memory. If the meter's battery fails, the meter retains all logs recorded within the last hour of operation. These logs are available and ready for use as soon as power is restored. The configuration is also stored in the non-volatile memory and is not lost if the main battery fails.

Data Logs are continually stored in the memory on an hourly basis. Data log parameters include:

- Log Number
- Log Date & Time
- Compensated Volume (ft^3 or m^3)
- Non-compensated Volume (ft^3 or m^3)
- Compensation Factor
- Non-compensated Volume Under Fault (ft^3 or m^3)
- End Temperature
- Battery Voltage
- Present Fault – Temperature
- Present Fault – Volume
- Present Fault – Internal Operation
- Present Fault – Low Battery Fault
- Present Fault – Volume Sensor Fault
- Present Fault – Power Fault
- Occurred Fault – Temperature
- Occurred Fault – Volume
- Occurred Fault – Internal Operation
- Occurred Fault – Low Battery Fault
- Occurred Fault – Volume Sensor Fault
- Occurred Fault – Power Fault
- Present Alarm – High Temperature
- Present Alarm – Low Temperature
- Present Alarm – High Flow
- Present Alarm – Low Battery
- Occurred Alarm – High Temperature
- Occurred Alarm – Low Temperature
- Occurred Alarm – High Flow
- Occurred Alarm – Low Battery

11.6.3 Audit Log

The Audit Log includes a tracking facility that details parameter changes that affect billing. The log maintains the parameter change and its original information. Each entry is date and time stamped. The Audit Log cannot be deleted.

The Audit Log is saved as a CSV (comma-separated values) file for easy import into spreadsheets, such as Microsoft Excel. Download the Audit Log by using the **Logging** screen in the Dresser MeterWare software.

For more information, refer to the *Dresser MeterWare Software Manual*.

Changes recorded in the Audit Log include:

- Parameters that have changed
- Date and time the change occurred
- Old value
- New value

Parameters captured in the Audit Log include:

- Meter Type
- Meter Size
- Revolution/Unit volume
- Flow Sense
- Temperature Units
- Base Temperature
- Temperature Mode
- Fixed Temperature
- Pressure Units
- Base Pressure
- Atmospheric Pressure
- Pressure Factor
- Fixed Pressure
- Pressure Mode
- Compensated Multiplier
- Non-compensated Multiplier
- Pulse Output 1
- Pulse Output 2
- Pulse Output 3
- Pulse Output 1 Selected
- Pulse Output 2 Selected
- Pulse Output 3 Selected
- Telemetry Form A Pulse Width
- Compensated Volume
- Non-compensated Volume
- Non-compensated Volume Under Fault
- Pressure Calculation Type
- User Temperature Calibration Offset
- High Temperature Alarm Limit
- Low Temperature Alarm Limit
- Volume Display Decimal Places
- Corrected and Uncorrected Number of Digits

12 Meter Maintenance

Perform the following steps as needed to help keep your meter functioning properly.

12.1 Meter Lubrication

No lubrication is required. This meter incorporates permanently lubricated bearings and gears.

12.2 Meter Leveling

Because the meter is supported entirely by the gas pipeline, movement of the piping due to accident, settling of the ground, or other causes can impede meter operation and accuracy.

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

12.3 Meter and Digital Index Cleaning

Clean the exterior of the meter and the digital index housing with isopropyl alcohol.

If there is any evidence of dirt or dust in the meter body, perform the following steps:

1. Windmill the impellers (at a speed less than maximum capacity) by injecting controlled compressed air from a nozzle into the meter inlet.
2. While the impellers are turning, flush approximately five (5) ounces (150 ml) of an approved safe solvent through the meter.
3. Use compressed air to completely dry the meter.

12.4 Digital Index Replacement

Perform the steps in this section when replacing the digital index and when removing or installing the digital index to change the orientation (vertical or horizontal) of the meter. Also perform these steps as part of the process for removing or replacing the temperature probe, accessing the AMR cable, and other maintenance tasks where the digital index needs to be removed to provide access.

12.4.1 Recommended Tools

The following tools are recommended for replacing the digital index:

- Adjustable torque wrench/driver
- 5/32 inch Allen wrench

12.4.2 Digital Index Removal

Perform the following steps to remove the digital index from the meter:

1. Remove tamper evident devices, as needed.
2. Remove screws that attach the digital index to the meter.

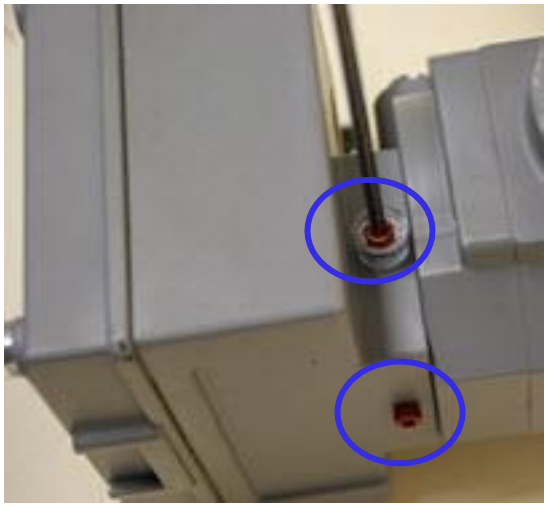


Figure 36: Remove the screws that attach the digital index to the meter

3. Gently pull the digital index forward to remove it from the meter.

Figure 37: Remove the digital index

4. If needed, remove and unplug the temperature probe from the connector on the digital index.

Note: Unplugging the temperature probe generates a temperature fault (T FLT).

For information about clearing faults, refer to Section 11.5.

12.4.3 Digital Index Installation

Perform the following steps to install the digital index onto the meter:

1. If needed, insert the temperature probe (refer to Section 12.5).

2. Insert the digital index onto the meter in the desired orientation according to the meter inlet.

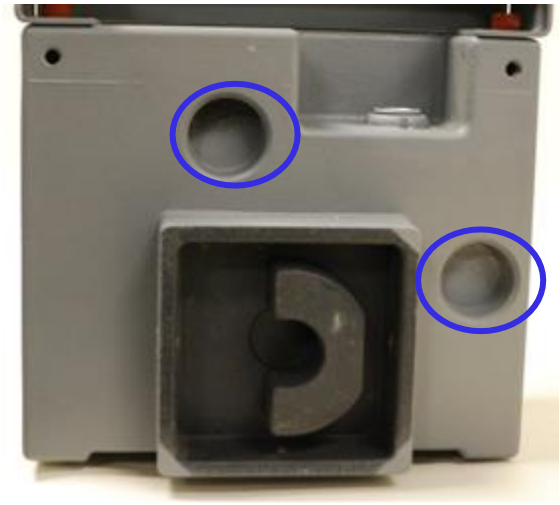


Figure 38: Back of digital index to show inlet connections

Figure 39: Top inlet orientation

Figure 40: Side inlet orientation

3. Insert screws that attach the digital index to the meter. Tighten the screws to a maximum torque of 20 inch pounds.

> **Tip:** To ensure a uniform fit, alternate tightening the screws around the meter connection.

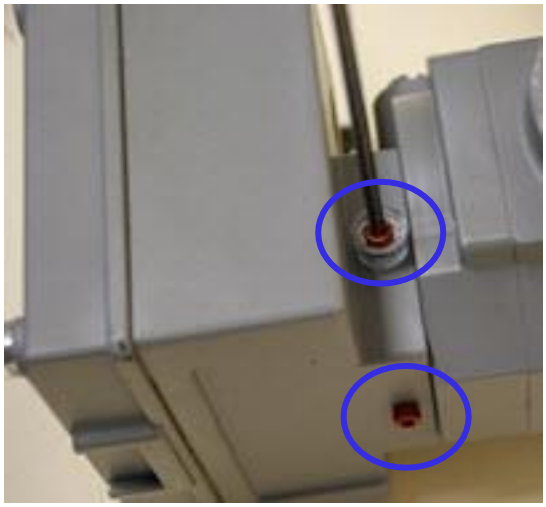


Figure 41: Replace the screws that attach the index to the meter

4. Install tamper evident devices, as applicable.

12.5 Temperature Probe Insertion or Replacement

Temperature probes are used on temperature compensated digital indexes. The digital index has two connectors: one for the top inlet and one for the side inlet. The temperature probe is plugged into the connector on the back of the digital index that corresponds to the meter inlet that is being used. When a temperature probe is installed, the unused connector should be covered to protect it from dirt and damage.

Perform the following steps to install or replace a temperature probe:

1. Remove the digital index as described in Section 12.4.2.
2. Remove the cover over the connector, and plug the temperature probe into the connector on the digital index that corresponds to the meter inlet that is being used.
3. Insert the temperature probe into the appropriate meter inlet.
4. Install the protective cover over the unused temperature probe connector.

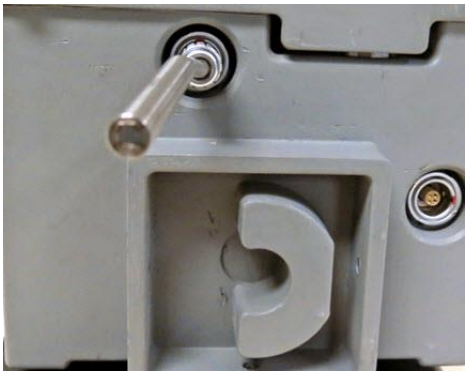


Figure 42: Temperature probe installation on digital index

5. Replace the digital index as described in Section 12.4.3.
6. Clear the temperature fault (T FLT) by using the LCD screen or the Dresser MeterWare software (refer to Section 11.5).
7. If needed, perform the single point calibration process for the temperature probe with the MeterWare software (refer to the *Dresser MeterWare Software Manual*).

   This procedure requires a stable and accurate temperature reference device for comparison. Allow enough time for the temperature to stabilize between the new temperature probe and the reference temperature device.

   For the best results, submerge the new temperature probe and the reference temperature device in a temperature-controlled liquid bath.

12.6 Battery Maintenance

The digital index is powered by a sealed battery pack with two (2) Lithium Thionyl Chloride batteries with an average life span of twenty (20) years.

The actual battery life depends on the conditions under which it is used. It is calculated by assuming continuous flow at 50% of the meter's maximum capacity.

Battery life expectancy is 20+ years in cooler climates and 15+ years in warmer climates.

Note: Check remaining months of battery life by accessing the **REM LIFE** LCD screen.

12.6.1 Low Battery Indication

The meter monitors the state of the battery pack and generates a low battery alarm or fault before the batteries are discharged. The period of time between the Low Battery Alarm and the Low Battery Fault is approximately ninety (90) days.

Table 10: Low Battery Indicators

Battery Pack Voltage	Notice Generated	LCD Screen Display
Below 3 volts	Alarm	LBATT AL
Below 2.7 volts	Fault	LOW BATT

12.6.2 Battery Replacement

Perform the following steps to replace the sealed lithium battery pack in the digital index. Replace the gasket to maintain the seal.

Table 11: Battery Replacement Parts Table

Part Description	Part Number
5/32 inch Allen wrench	-
Adjustable torque wrench/driver	-
Lithium battery pack	060416-000
Gasket	060309-000
Magnet (or part of the Communications Kit)	060541-000

WARNING

All local codes shall be maintained during installation.

Batteries 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.**
- **Installed by qualified and competent professionals who have undergone suitable training for instrumentation used in areas with potentially explosive atmospheres.**

Note: The digital index does not need to be removed from the meter to replace the battery pack.

1. To reduce the amount of time the meter does not have battery power and help retain stored settings, have the replacement sealed lithium battery pack easily accessible before removing the current battery pack. Also have the replacement gasket ready to install.

2. Use a magnet to scroll the meter's LCD screen to **BATT.CHNG**. Hold the magnet on the dot for approximately five (5) seconds.

   The meter saves the compensated volume, the non-compensated volume, and the non-compensated volume under fault in its non-volatile memory while the battery is changed.

Figure 43: Select BATT.CHNG LCD screen

   When the information has been saved, **CHNG. RDY** displays on the LCD screen.

   The meter is now ready for the battery to be replaced.

Figure 44: The battery is ready to be replaced

3. Use a 5/32 inch Allen wrench to remove the four (4) screws that are holding the digital index cover in place.

Figure 45: Remove four (4) screws on index cover

4. Gently pull the digital index cover to remove it.

Note: Wires attach from the digital index cover to the housing.

Figure 46: Remove the index cover

5. Tilt the battery pack from the top, and pull the battery pack outwards to remove the battery.

Figure 47: Pull the battery pack outwards

6. Locate the connector on the cable attached to the battery.
7. Gently pull the connector to disconnect the old battery from the main circuit board.
8. Reconnect the connector on the cable from Step 6 to the cable on the new battery pack.

Figure 48: Disconnect/reconnect the wiring connector

9. With the cable facing out, gently push the new battery pack into position.

CAUTION

To prevent crimping and wire damage, verify the battery cable is in the channel (refer to Figure 50).

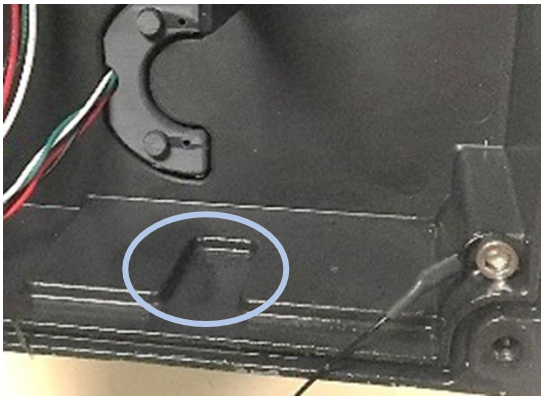


Figure 49: Battery pack cable channel

Figure 50: Insert battery pack with cable in channel

10. Lift the gasket and remove it around the digital index cover by holding the gasket by the short side and moving it over the cover.

    The gasket can be maneuvered around the digital index cover without disconnecting the wires.

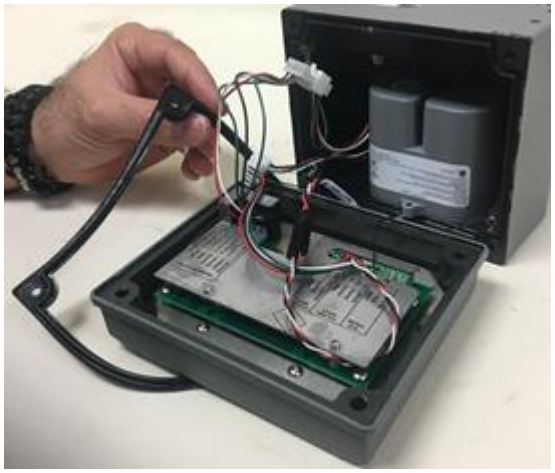


Figure 51: Remove the gasket

11. Place and align a new gasket onto the digital index housing. The gasket should lie flat.

CAUTION

To ensure a proper fit and seal, verify the gasket is installed with the raised face side of the gasket fitting into the groove around the edge of the base (refer to Figure 54).

Figure 52: Closeup of gasket raised face side

Figure 53: Replace the gasket

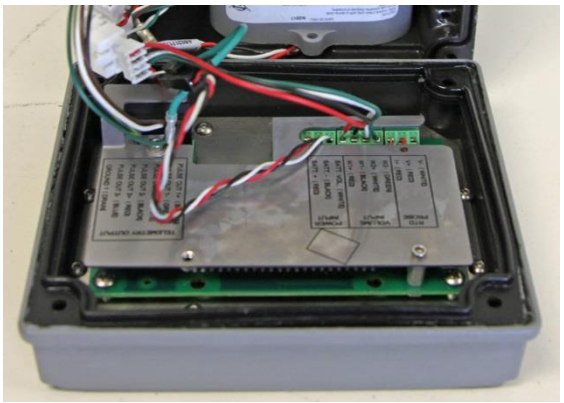


Figure 54: Align the gasket in the index housing with the raised face side up

12. Carefully tuck the wires inside the digital index housing.
13. Carefully replace the digital index cover.

CAUTION

To prevent damage to the wires and the seal, be careful not to pinch any of the wires in between the cover.

Figure 55: Tuck in all wires and replace the digital index cover (viewed from the top)

14. After replacing the battery, **BATT. OK** displays on the LCD screen if the battery and its wiring connection are installed correctly.

    The life of the battery is set to 240 months (20 years). This can be verified by scrolling to the **REM LIFE** LCD screen and viewing its value; it should display **240MONTH**.

Figure 56: The battery is installed correctly

15. Insert the four (4) screws into position, and turn them until they touch the cover.
16. Tighten the screws in a cross-pattern to a maximum torque of 20 inch pounds.
17. Install tamper evident devices as applicable.

Figure 57: Insert and tighten cover screws

12.7 Removing the Meter from Service

WARNING

If for any reason the meter must be removed from service after pressurizing the meter, strictly adhere to safety precautions in accordance with established company and/or regulatory guidelines and procedures.

Before working on the meter, slowly depressurize and vent all pressure from the meter. Release pressure at a rate less than five (5) psig/second (35 kPa/second).

13 Testing Procedure

Test accuracy of the 10C25 meter by using industry accepted methods: prover testing (including sonic nozzle, bell, and transfer provers), optical scanner testing, and differential rate testing.

- Prover Testing

  A prover cable is available for testing the meter using the same IrDA (infrared) interface that is used for communicating with the meter. The prover cable allows for rapidly testing compensated and non-compensated accuracy on the Dresser Model 5 prover and the Honeywell SNAP® Proving Systems (contact the Factory for compatibility with other systems).

- Optical Scanner Testing

  A white Flow Indicator allows for testing the non-compensated accuracy by using an optical scanner.

- Differential Rate Testing

  The differential rate test is unique to rotary meters and is an accurate and convenient method of determining the meter's condition by comparing the meter's performance to previous or original performance records. Differential testing is accepted by many state regulatory agencies as a means of periodically substantiating that the original accuracy of a meter has not changed. The 10C25 meter provides upstream and downstream ports for differential testing as well as the capability of displaying the gas flow rate on the LCD screen.

13.1 Prover Test Mode Configuration

This section details how to configure the meter for prover test mode. If you are able to scroll to an LCD screen stating **PROV C.V** (for compensated testing) or **PROV NC.V** (for non-compensated testing), the meter is already configured for prover testing. For more information about performing these tasks in the Dresser MeterWare software, refer to the *Dresser MeterWare Software Manual*.

If the meter is already configured for testing, skip the steps in this section.

Perform the following steps to configure the meter for prover test mode in the Dresser MeterWare software:

1. Connect the IrDA cable from the computer to the meter, and then connect the meter with MeterWare (refer to Appendix A).

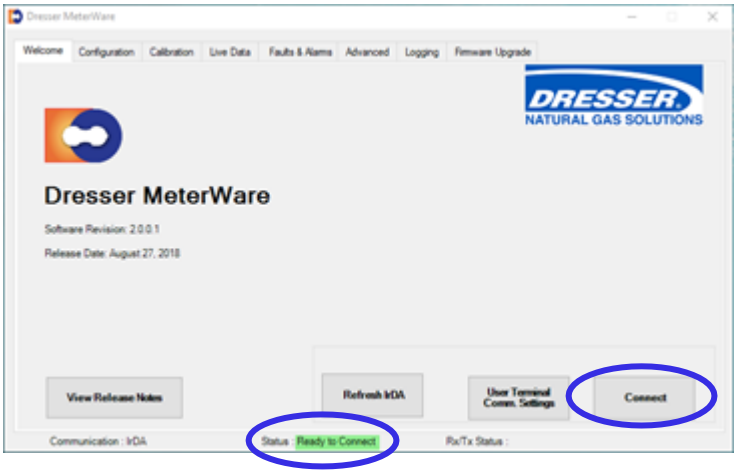


Figure 58: Connect with the meter

2. On the **Configuration** screen, click **Customize LCD** to open the **LCD Settings** screen.

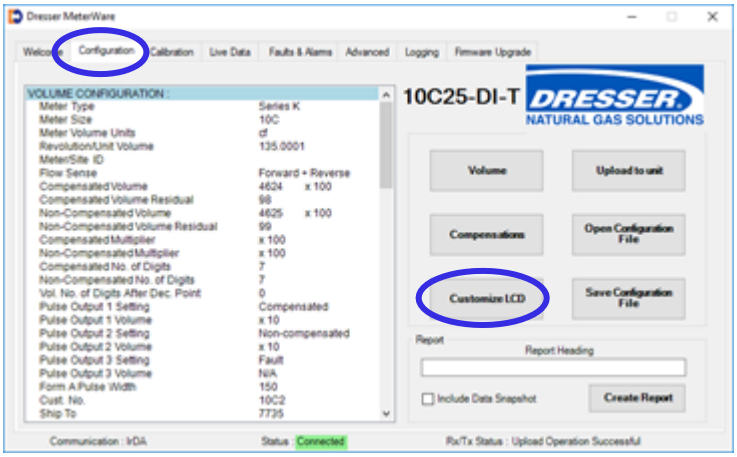


Figure 59: Click Customize LCD in Dresser MeterWare

3. On the **LCD Settings** screen, select **Compensated Prove Mode, Non-Compensated Prove Mode**, or both.
4. Click **OK** to return to the **Configuration** screen.

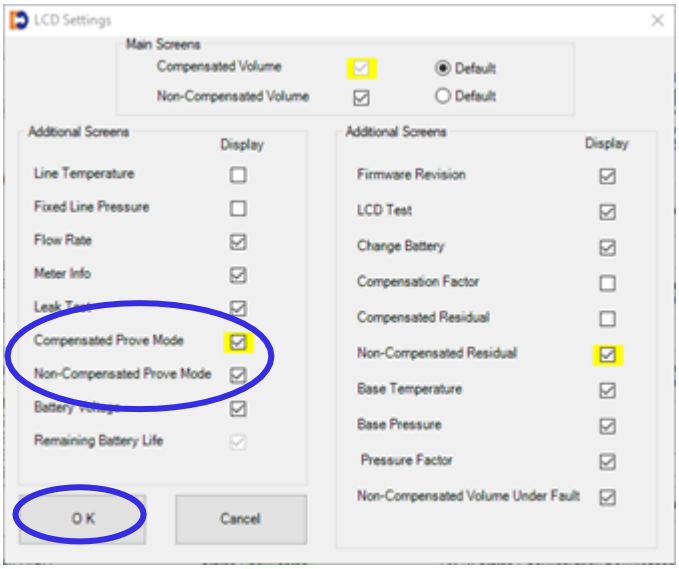


Figure 60: Select the appropriate prove mode in Dresser MeterWare

Note: Settings highlighted in yellow have not yet been uploaded to the meter.

5. On the **Configuration** screen, click **Upload to unit** to upload the setting changes to the meter and clear the highlighting.

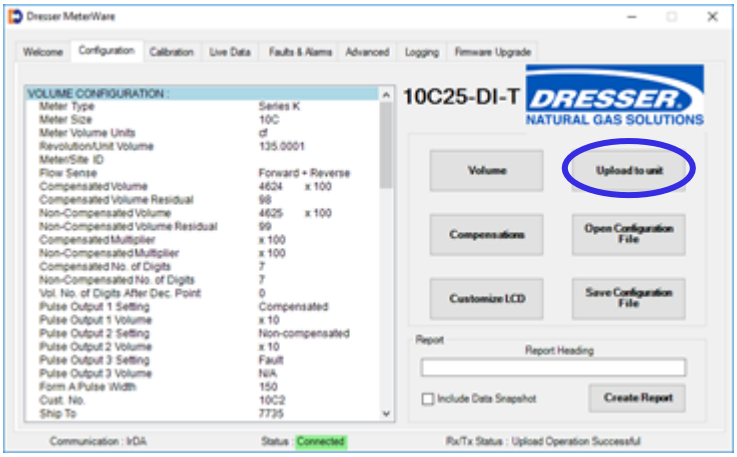


Figure 61: Click Upload to unit.

6. Select the appropriate prove mode on the LCD screen on the meter (refer to Section 13.1.1 or Section 13.1.2).

13.1.1 Compensated Prove Mode Setting

Perform the following steps on the meter's LCD screen:

1. Swipe the magnet across the black dot on the meter until the screen displays **PROV C.V**, and then stop swiping.

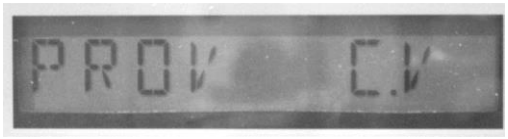


Figure 62: PROV C.V LCD screen

2. After five (5) seconds, the display changes to **PROVE I.C.V**.

Figure 63: PROVE I.C.V LCD screen

3. Hold the magnet on the black dot for approximately five (5) seconds until the display changes to **PRVE_CO.R**.

   The meter is now ready to be proved by using the compensated volume output.

Figure 64: PRVE_CO.R LCD screen

4. To exit Prove Mode, hold the magnet on the black dot for five (5) seconds.

Note: The unit will automatically exit prove testing mode in thirty (30) minutes.

13.1.2 Non-Compensated Prove Mode Setting

Perform the following steps on the meter's LCD screen:

1. Swipe the magnet across the black dot on the meter until the screen displays **PROV NC.V**, and then stop swiping.

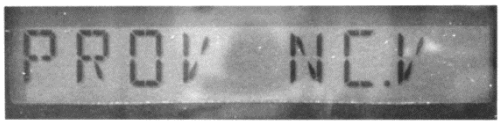


Figure 65: PROV NC.V LCD screen

2. After five (5) seconds, the display changes to **PROVE I.U.V**.

Figure 66: PROVE I.U.V LCD screen

3. Hold the magnet on the black dot for about five (5) seconds until the display changes to **PRVE_NC.V**.

   The meter is now ready to be proved by using the non-compensated volume output.

Figure 67: PRVE_NC.V LCD screen

4. To exit Prove Mode, hold the magnet on the black dot for five (5) seconds.

Note: The unit will automatically exit prove testing mode in thirty (30) minutes.

13.2 Proving with the Honeywell SNAP Prover

Note: If using a Dresser-supplied test fixture, verify the SNAP leak test feature has been disabled.

13.2.1 Configuring SNAP Prover with Legacy Software Platforms

1. Log into the prover system as a supervisor that has permission to create a meter test file in the prover.
2. With supervisor login, click **PROVE METER**, click **SELECT METER TYPE**, and then click **OTHER** for the manufacturer.
3. Click any one of the meters listed on the **OTHER** manufacturer category, click **CHANGE SPECS**, and then click **ADD METER**.

   This action clears all of the areas or changes them to zero (0).
4. Fill in every box with data. Click the **ENTER** button after each input to save the data in each box.

Table 12 shows an example of the type of data listed in each field.

Table 12: Example Honeywell SNAP Prover Data Fields with Legacy Platforms

Field	Example Data
Meter Name	10C25
Proof Open	100
Proof Check	100
Proof Other	100
Rate Open	1000
Rate Check	100
Rate Other	500
Revs Open	4
Revs Check	2
Revs Other	3
Exercise Revs	2
Jog Rate	100
Revs/Unit Volume	1
Max Diff Set Point	0.5
Tolerances Pos	1
Tolerances NEG	-1
Slope	1 1
Repair	2
Meter Size	10C

5. After updating every field with the correct data, click **SAVE SPECS**.
6. Verify the caption **SPECS SAVED** displays in the blue caption box. If this caption does not display, the meter file was not saved. Retry Step 5 until the meter test file saves.
7. When you exit the test setup screen, verify the meter test file is listed in the **OTHER** manufacturer category.
8. You can now install the meter on the test bench (refer to Section 13.2.3).
9. Exit to the test screen, and continue the normal process for running a test. For more information about running a test, refer to Section 13.3.

Note: For SNAP Provers, the 10C25 meter must be tested by using a Large Meter Kit for flows greater than 500 cfh.

13.2.2 Configuring SNAP Prover with MMX Software Platforms

1. Log into the prover system as a supervisor that has permission to create a meter test file in the prover.
2. With supervisor login, click **SPECIAL FUNCTIONS**, and then click the **EDIT CONFIG FILES** button. Click the **EDIT METER FILE** button.

3. Verify you are in the **Other** category in the **Mfr Type** area on the upper part of the screen. Click **ADD METER**.
4. Fill in every box with data. The MMX prover leaves information in each box, so change the areas that require updates. Click the **ENTER** button after each input to save the data in each box.

   Table 13 shows an example of the type of data listed in each field.

Table 13: Example SNAP Prover Data Fields with MMX Platforms

Field	Example Data
Meter Name	10C25
Proof Open	1000
Proof Check	100
Proof Other	500
Rate Open	800
Rate Check	80
Rate Other	400
Revs Open	4
Revs Check	2
Revs Other	3
Exercise Revs	2
Jog Rate	100
Revs/Unit Volume	1
Max Diff Set Point	0.5
Tolerances Pos	1
Tolerances NEG	-1
Slope	1 1
Repair	2
Meter Size	10C

5. After updating every field with the correct data, click **SAVE SPECS**.
6. Verify the caption **SPECS SAVED** displays in the blue caption box. If this caption does not display, the meter file was not saved. Retry step 5 until the meter test file saves.
7. When you exit the test setup screen, verify the meter test file is listed in the **OTHER** manufacturer category.
8. You can now install the meter on the test bench (refer to Section 13.2.3).
9. Exit to the test screen, and continue the normal process for running a test (refer to Section 13.3).

Note: For SNAP Provers, the 10C25 meter must be tested by using a Large Meter Kit for flows greater than 500 cfh.

13.2.3 Installation of Meter on Bench

1. Install the meter on the prover table, and adjust the meter arms to fit the appropriate height and width of the meter.

   On the SNAP prover, extensions are required for the meter connections because of the shorter height of the meter.

   Use the connections according to the ones installed on the meter. For example, if the meter uses 45LT connections, use the 45LT swivels on the prover.

2. Install the IrDA test cable from the prover to the meter. Slide the black box into the adapter for the IrDA slot on the bottom of the digital index.

3. After the cable is connected to the meter, connect the other end to the optical outlet port (J4) on the prover. This port is a keyed 9-pin connector that can only be installed in one orientation.

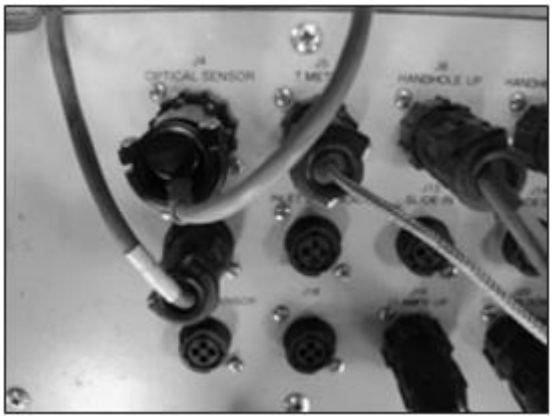


Figure 68: Optical sensor port (J4) with connector

Figure 69: J4 port without connector

Note: If you set up the 10C25 meter text and exited, the **METER** area in the center of the screen displays the test is for the 10C25. If you tested another meter before testing the 10C25, click **SELECT METER TYPE**, click the **OTHER** button, click **10C25**, and then click **EXIT**. The **METER** area should display **10C25**.

13.3 Testing Modes

The following sections explain the testing modes for the meter. The meter can test both the compensated and non-compensated accuracy with the IrDA prover cable.

13.3.1 Testing Compensated Accuracy

To test the compensated accuracy of the meter, perform the following steps:

1. Select the following settings:
   - TC
   - % PROOF, % ERROR or % ACCY (depending on company standards)
   - INTEST or OUTTEST (depending on how the company tests)
   - ENGLISH
   - Either 2-RATE or 3-RATE
   - OPTIC
   - INDEX 1
2. Fill in the required screens on the left side of the prover display screen to enable the **PRESS CLAMP BUTTONS** button.
3. Click **PRESS CLAMP BUTTONS** to start the test. Press both clamp buttons at the same time to lower the arms to the meter.
4. Place the meter into the Compensated Prove mode (refer to Section 13.1.1).

   After the meter is in prove mode, the red light changes from flashing to solid.

   The meter test is ready to start.
5. After the meter tests complete, press **ACCEPT** to save the meter test results.

13.3.2 Testing Non-Compensated Accuracy

To test the non-compensated accuracy of the meter, perform the following steps:

1. Select the following settings:
   - REG
   - % PROOF, % ERROR or % ACCY (depending on company standards)
   - INTEST or OUTTEST (depending on how the company tests)
   - ENGLISH
   - Either 2-RATE or 3-RATE
   - OPTIC
   - INDEX 1
2. Fill in the required screens on the left side of the prover display screen to enable the **PRESS CLAMP BUTTONS** button.

3. Click **PRESS CLAMP BUTTONS** to start the test. Press both clamp buttons at the same time to lower the arms to the meter.
4. Place the meter into the Non-Compensated Prove mode (refer to Section 13.1.2).

   After the meter is in prove mode, the red light changes from flashing to solid.

   The meter test is ready to start.
5. After the meter tests complete, press **ACCEPT** to save the meter test results.

13.4 Proving with Dresser Model 5 Transfer Prover

To use the Dresser Model 5 Transfer Prover, connect the IrDA cable to establish a connection with the meter, and then configure the Model 5 Prover software.

Table 14: Prover Parts Table

Part Description	Part Number
Prover Cable	060673-000
Prover Interface Holder	060658-000
Magnet (or part of Communications Kit)	060541-000

13.4.1 Establish IrDA Prover Cable Connection

1. Insert the IR prover cable holder in the open slot under the meter label.

   The cable holder aligns the cable with the meter's IR window and helps hold it in place.
2. Insert the IR prover cable in the cable holder.

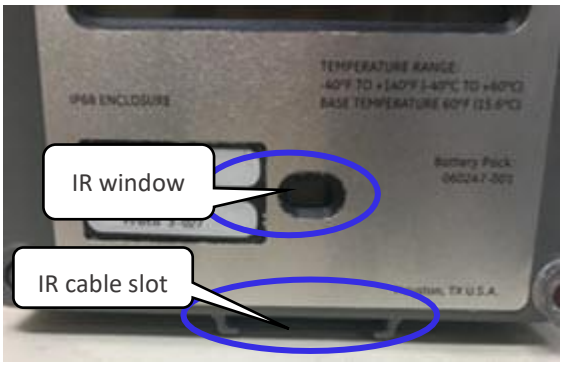


Figure 70: Location for holder installation

Figure 71: IR prover holder in slot

3. Attach the cable connector of the IrDA to the ID Pulser connection port on the Prover field meter junction box.

Figure 72: IrDA connected to the meter and Model 5 Prover

4. Turn on the power switch of the Model 5 Prover, and wait for the light on the IrDA to turn on and start flashing.
5. When the meter is in Prove Mode, the flashing light changes to a solid light.

Figure 73: Light indicating connection established

13.4.2 Configure Model 5 Prover Software

Set the Model 5 Prover software configuration settings as shown in Figure 74 (1).

Set the TC Options box for Diaphragm TC for all meter sizes as shown in Figure 74 (2).

For more information about the values for the prover configuration, refer to Table 16.

The recommended pulses for the test and test volume are shown in Table 15 according to meter capacity. Using the provided values allows for a test lasting a minimum of the Factory recommended thirty (30) seconds. If your Model 5 Prover is not equipped with a 2M master meter, you will not be able to test below 100 cfh. In this case, the minimum flow rate for testing a meter rated at 1000 cfh is 100 cfh. Use a minimum of two (2) pulses with a minimum test volume of two (2) cubic feet.

Click the **Start** button to run the prover test as shown in Figure 74 (4).

Adding Test Points

To add test points, fill in the following fields as needed:

- Enter the appropriate flow rate in the next available Flow Rate column.
- Enter the appropriate test volume. Suggested values are provided in Table 15.
- The Drive Rate/PPT value always matches the volume.
- The remaining boxes in the row automatically populate based on the current prover default settings.
- Fill in additional rows to add other test points. Always start with the highest flow rate and progress downward to the lowest flow rate.

Note: When entering values, always move to the next box by either pressing **Enter** or by using the cursor. Pressing the **Tab** key causes errors in the test configuration.

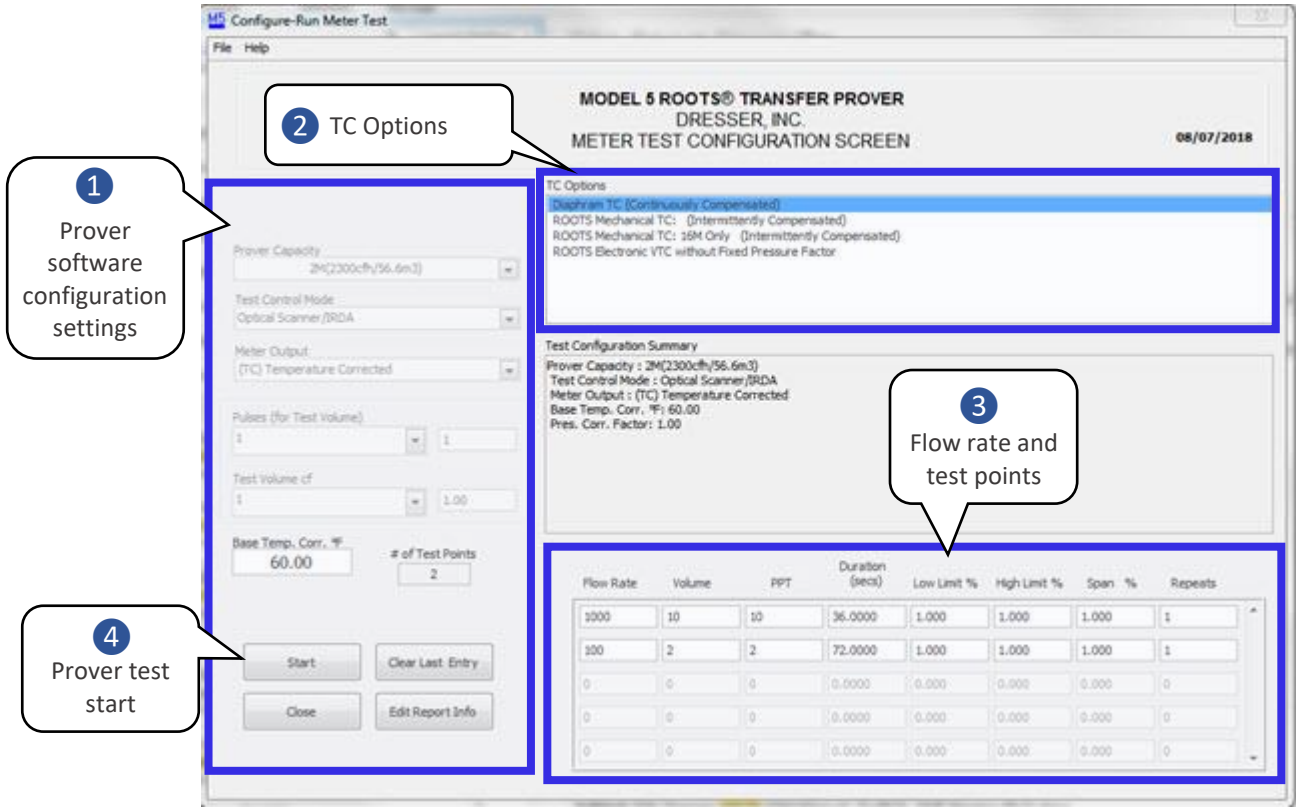


Figure 74: Prover configuration screen

The following tables provide information about filling in the data fields.

Table 15: Recommended Prover Configuration Settings

Meter Differential	Flow Rate (% of Maximum Flow Rate)			
	100%		10%	
	Min. # of Pulses	Min. Test Volume	Min. # of Pulses	Min. Test Volume
1/2 inch w. c. (0–1000 cfh)	10	10	2	2

Table 16: Prover Test Configuration Screen Settings

Data Field	Setting	Notes
Prover software configuration settings (1)		
Power Capacity	Select **10 M (10,000 cfh/283.2 m3/h)**.	For flow rates above 100 cfh
	Select **2M (2,300 cfh/65.1 m3/h)** master meter.	For flow rates under 35 cfh and 100 cfh, if the prover is equipped with this option This setting allows for testing a meter rated at 1/2 inch w.c. at 10% capacity (100 cfh).

Data Field	Setting	Notes
Test Control Mode	Select **Optical Scanner**.	
Meter Output	Select **Temperature Correction**.	
Pulses/Test (PPT)	Select **Other**. In the small box to the right, select pulses per test based on Table 15.	
Test Volume cf	Select **Other**. In the small box on the right, enter the same number as the value input in the Pulses/Test (PPT) field.	This data needs to be the same because one (1) pulse = 1 cf.
TC Options (❷)		
TC Options	DIAPHRAGM TC (CONTINUOUSLY COMPENSATED)	
Flow rate and test points (❸)		
Flow Rate	Enter the desired flow rate for the first test.	

Note: Volume, Drive Rate/PPT, and other fields automatically populate based on the information provided in the Prover software configuration settings group (1).

14 Differential Testing

Only a change in the internal resistance of a meter can affect its accuracy. Any increase in the resistance to flow increases the pressure drop between the inlet and the outlet of the meter, which increases the differential pressure drop. This is why the meter differential pressure drop appears as a prime indicator of meter condition.

Although accuracy is not directly determined by a differential test, testing has shown that an increase of up to 50% in the differential pressure at the higher flow rates (25% and above) can be tolerated without affecting meter accuracy by more than 1%. Supportive technical data is available upon request.

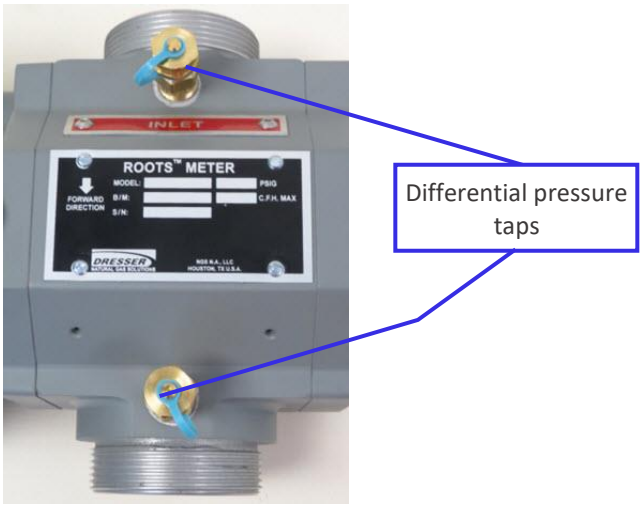


Figure 75: Differential pressure taps located on the inlet and outlet connectors

14.1 Establishing Baseline Curves

Developing an original differential baseline curve is recommended when the meter is first installed. Because any change in flow rate, line pressure, or specific gravity causes a change in the differential, at least three (3) test points are required at gas flow rates from 25% to 100% of meter capacity. As shown in Figure 76, the resulting points will be non-linear, so a minimum of three (3) points is necessary to establish a curve. Plot the points on a graph, and then connect the points to form a curve. This method provides an accurate baseline for comparison to later tests.

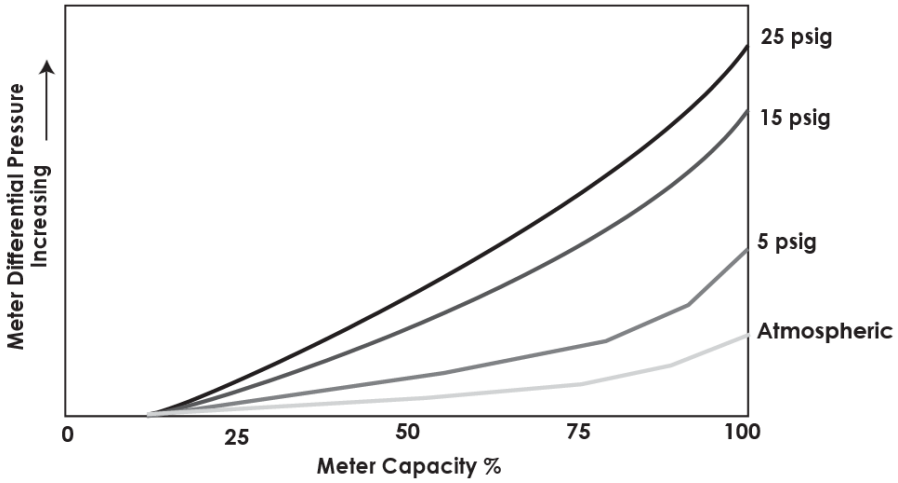


Figure 76: Differential curves change as pressure increases

To help with record keeping, a data chart like the one shown in Table 17 and provided in Appendix B allows the technician to compare new test data to older data. A test under actual operating conditions provides the most reliable data for future checks of a meter's operating condition. This is particularly important when the line pressure is higher than 15 psig (200 kPa Absolute). Because meter differential pressure increases with line pressure, multiple curves may be necessary for meters under varying line pressure conditions.

Table 17: Sample Data Chart for Detailed Meter History of Differential Rate Tests

Differential – Rate Test Data – Sample Sheet									
Meter Model:		Mfg. Serial No.:		Utility Serial No.:					
Location:		Date Installed:		Register Reading:					
Line Pressure	Gas Temp	Specific Gravity	Volume Measured	Run Time	Rate (ft^3)	Differential Pressure		Date	Tester
						w.c.	% Change		
Initial Tests – New Meter									

Periodic Check Tests									

14.2 Pressure Differential Test Procedure

14.2.1 Pressure Differential Test Equipment

Perform differential testing by using the following test equipment specifications:

- Use differential pressure test equipment with an indicating scale range of at least 20 inches of w.c.
- Use a testing device with bypass valving that is pressure rated for the maximum metering line pressure for the test.
- Connect pressure lines to the 1/4 inch meter inlet and outlet pressure taps located on the meter body, as shown in Figure 75.
- (Optional) Permanently install differential test plugs in the pressure taps to facilitate testing.
- (Recommended) Use a pressure gauge to verify pressure readings.

14.2.2 Differential Test Process

The meter is able to display the flow rate when it is operating at a fairly steady rate of flow (refer to Section 11.4.)

WARNING

When the meter is pressurized, follow applicable safety rules and use appropriate personal protective equipment.

1. Install the pressure differential test equipment into the meter inlet and outlet differential taps (refer to Figure 75). Follow the manufacturer's instructions for proper installation and operating procedures. On the upstream side of the meter, install a pressure gauge or other pressure standard if it is not already a part of the test equipment.
2. If possible, use the meter set valve(s) to adjust the flow rate in the lower capacity range or no less than 25% of the meter's rated capacity. Let the flow rate stabilize.

3. Use a magnet to scroll the meter's LCD screen to **FLOW RATE**. After approximately five (5) seconds, the screen will display the calculated flow rate. Convert the calculated flow rate to a percentage of meter rated capacity by using the following formula:

$$\%\ Meter\ Capacity\ = \frac{FLOW\ RATE\ \times 100}{(Base\ Rating)}$$

Note: The base rating is determined by using the meter rating of 1000 acfh.

4. Record the pressure differential, line pressure, and gas specific gravity. Repeat the test to obtain an accurate average reading.

Note: At the time of meter startup in a new installation, repeat Steps 2–4 at a minimum of three (3) different flow rates, each between 25% and 100% of meter capacity. An original baseline curve should be drawn using data at a constant pressure for all three (3) tests.

5. Remove the differential test equipment.
6. Perform one of the following steps:
   - If this test is for the baseline curve, plot and save the curve for future reference.
   - If this is a subsequent test and the pressure differential compares against the baseline curve within acceptable limits, return the meter to full service.
   - If the pressure differential is not within acceptable limits or has increased by 50% above the values on the baseline curve, remove the meter for inspection and, if needed, for service.

14.2.3 Periodic Differential Testing

After developing a baseline curve, check the meter condition and performance periodically by running a similar differential rate test at a single selected point.

If the differential pressure increases by more than 50% above the original value, inspect the meter for causes for resistance. The usual causes are binding impellers, worn bearings, or contaminants (such as dirt or valve grease) in the metering chamber.

14.2.4 Repair Information

For Factory repairs and/or inspection, please call your Customer Service Representative or your Dresser meter supplier to request an RMA (Return Material Authorization). For more information, refer to Section 5.

15 Upgrading Digital Index Firmware

Firmware is special software stored in the memory of the unit. Upgrade the meter's current firmware revision by using the Dresser MeterWare software and the IrDA cable assembly included in the Communications Kit.

For more information about Dresser MeterWare, refer to the *Dresser MeterWare Software Manual*.

CAUTION

To prevent interruption, the IrDA cable assembly must be held firmly in place while upgrading firmware revision levels. If the upgrade process is interrupted, the firmware in the meter will be corrupted, and the meter must be returned to the Factory for reprogramming.

Perform the following steps to upgrade the meter's firmware:

1. Connect the IrDA cable from the computer to the meter, and then connect the meter with MeterWare (refer to Appendix A).

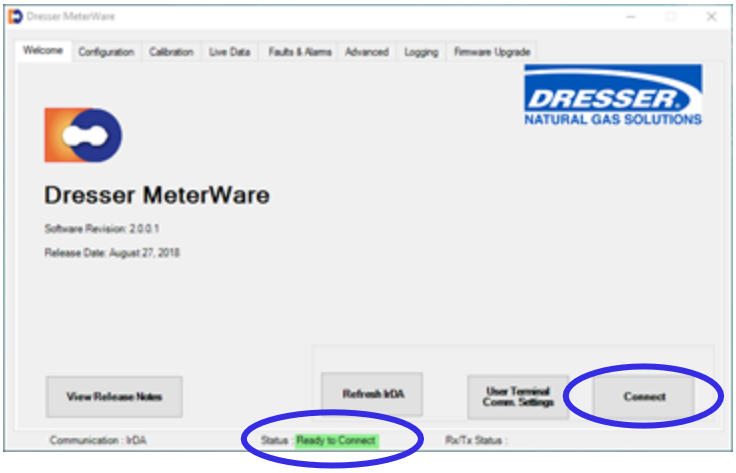


Figure 77: Connect with the meter

2. On the **Firmware Upgrade** screen, click **Select File**.

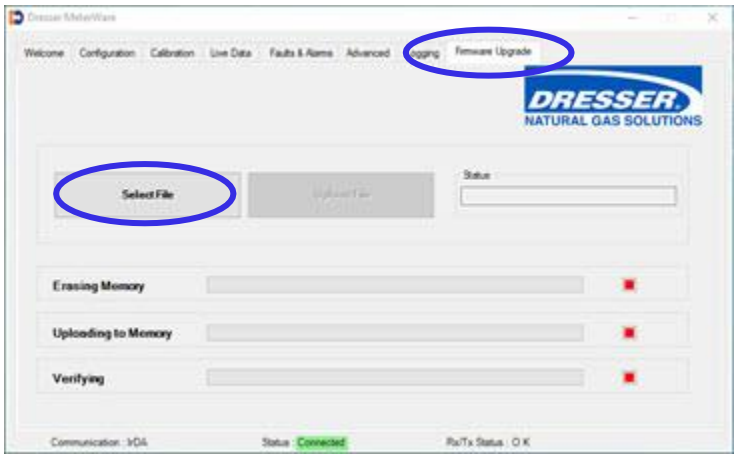


Figure 78: Select File on the Firmware Upgrade screen

3. On the **Open** screen, select the appropriate .hex firmware upgrade file to upload to the meter.
4. When the file name displays in the **File name** field, click **Open**.

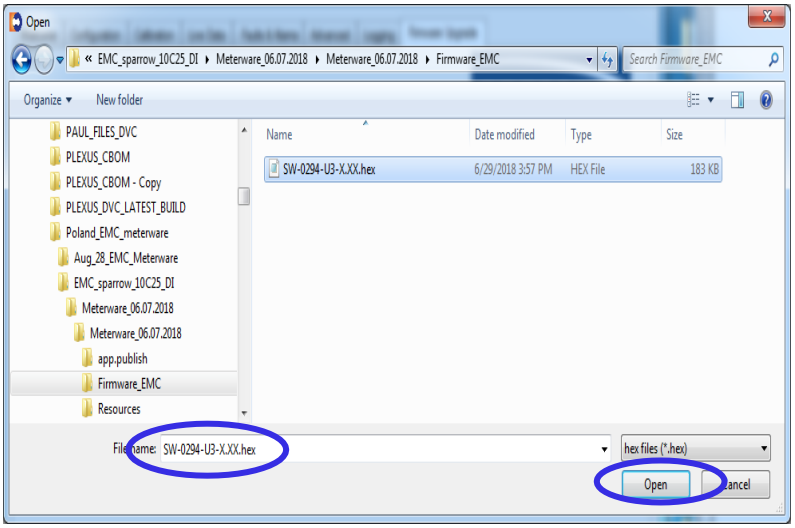


Figure 79: Select the .hex firmware file to upload

5. On the **Enter Password** screen, enter the advanced password. The default password is the number zero (0).
6. Click **OK** to begin the firmware upgrade process.

   Clicking **Cancel** ends the process.

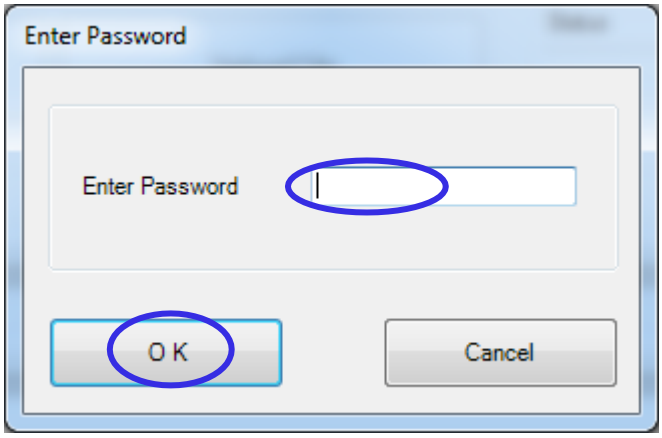


Figure 80: Enter advanced password

On the **Firmware Upgrade** screen, the **Status** box displays **In Progress** to indicate the upgrade process status.

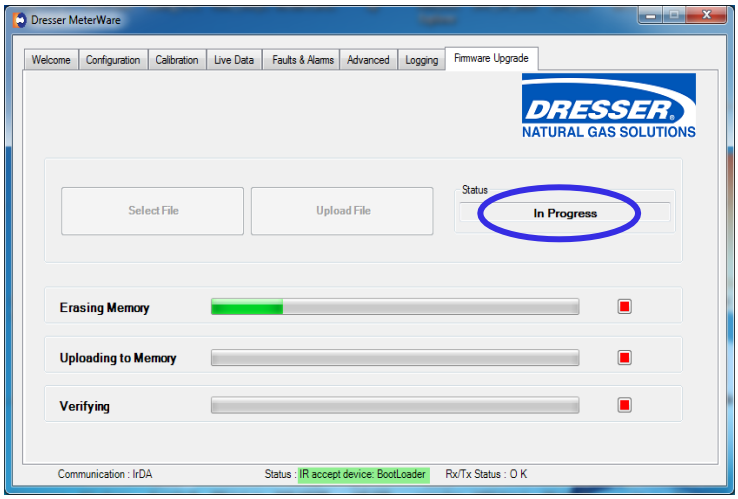


Figure 81: In Progress status indicator

The software searches for the BootLoader on the meter, which is necessary to upgrade the firmware.

When the BootLoader is detected, the **Status** text at the bottom of the screen changes from **Searching** to **Device in range** highlighted in yellow.

When the BootLoader is located, the **Status** text is highlighted in green.

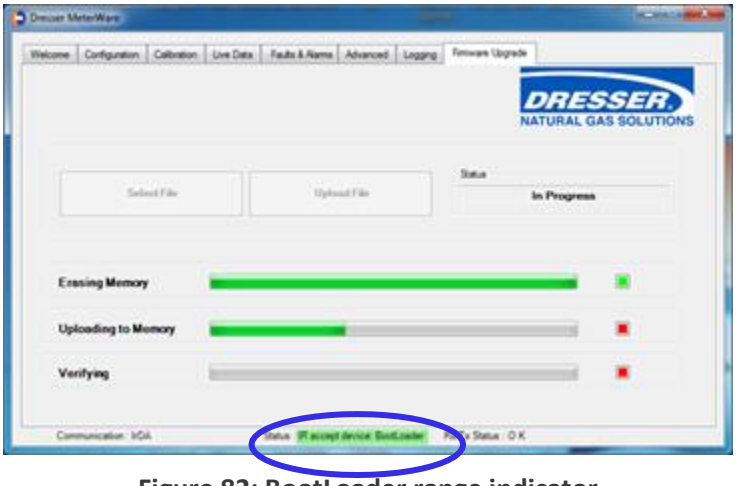


Figure 82: BootLoader range indicator

When the firmware upgrade process begins, three (3) status bars display. These status bars indicate the progress of each of the three (3) steps in the process as they are completed:

- **Erasing Memory** erases the current firmware in the meter.
- **Uploading to Memory** uploads the new firmware into memory.
- **Verifying** confirms the new firmware has been properly uploaded.

As each step completes, the square to the right of that step changes from red to green.

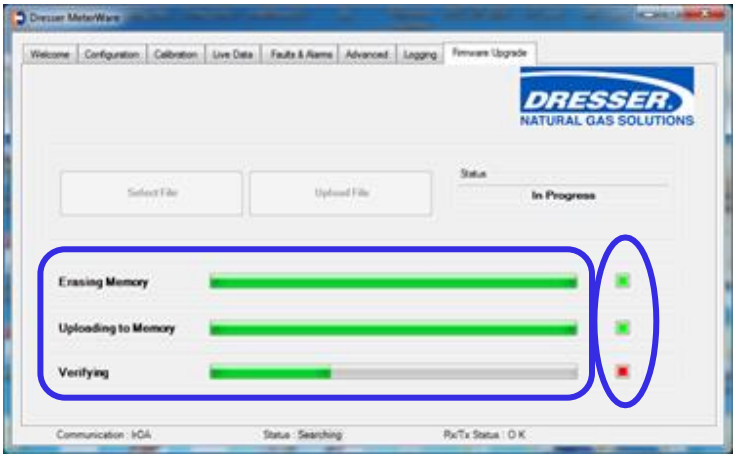


Figure 83: Firmware upgrade process progression

When the firmware upgrade is complete, all three (3) squares are green and the **Status** box displays **Firmware updated successfully**.

7. Optional but recommended: Disconnect and reconnect from the meter by clicking **Disconnect** and then **Connect** on the **Welcome** screen.

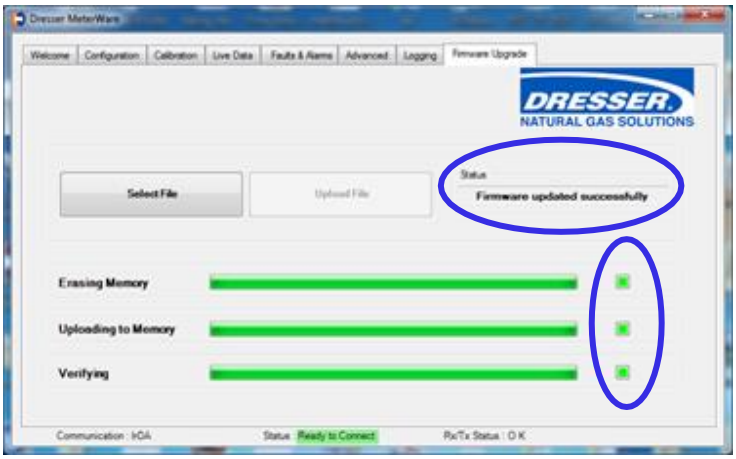


Figure 84: Firmware upgrade complete

16 Troubleshooting

Problem	Item	Possible Cause	Suggested Action
No flow registered	1	Obstruction in piping or meter	Check piping and valves to ensure there is an open flow path.
	2	Obstruction in screen or strainer	Clean screen or strainer.
	3	Digital index flow value not updating	No gas flow. Open valve or remove obstruction; refer to Item 1.
Low volume registration	4	Meter oversized for load	Use proper meter size.
	5	Leak at meter bypass	Check bypass and valves.
	6	Meter internal friction	Refer to the “High differential” problem possible causes and actions.
High differential	7	Build-up of deposits	Clean meter; refer to Section 12.3.
	8	Worn bearings or sleeves	Replace or return to the Dresser Product Service Department.
	9	Impellers rubbing headplates; meter out of time	• Rotate impellers manually to check for binding or rubbing. • Remove obstructions; refer to Item 1. • Time meter. • Check the meter level.
Vibration or noise	10	Misalignment of piping or strain	• Remove piping strain. • Level meter.
	11	Impellers rubbing casing	Refer to Items 7 and 8.
	12	Contaminants in measuring chamber	Clean meter; refer to Section 12.3.

17 Specifications

Table 18: Meter Specifications

Criteria	Specification
Model number	10C25 Meter
Physical	
Overall Dimensions	Side Inlet Orientation: 9.04” (L) x 6.625” (W) x 5.03” (H) Top Inlet Orientation: 9.04” (L) x 5.71” (W) x 6.70” (H)
Carton Dimensions	11-1/16 x 9-1/8 x 13-1/8
Net Weight/Shipping Weight	9.5 lb/11 lb
Connections	30 LT/45 LT/#3, #4 Sprague,1-1/2”FNPT
Maximum Allowable Operating Pressure (MAOP)	25 psig
Operating Temperature Range	-40°F to 140°F (-40°C to 60°C)
Gas Application	Clean, non-corrosive dry gas
Display	
Display Type	LCD with 10 mm digits
Capacity Registration	5, 6, 7, or 8 digits
Screens	20 (user selectable)
Screen Scrolling	Magnetic switch
Temperature Measurement System (Electronic Index)	
Type	Extremely Stable Class A, PT 1000 RTD
Range	-40°F to 140°F (-40°C to 60°C)
Total Ambient Temperature Effect	Less than 0.1°F (0.05°C) over entire temperature range
Pressure Compensation	Programmable Fixed Factor
Computational Accuracy	
Computation	+/- 0.25% of compensated volume reading
Data Logging	
Data Logged	150 days of hourly logs
Logged Data	• Time Stamp • Compensated Volume • Non-Compensated Volume • Line Temperature • Battery Voltage • Faults • Alarms
Audit Trail	• Parameter • Time Stamp • Old Value • New Value
Data Exportable	Microsoft Excel

Criteria	Specification
Power	
Battery Pack	Lithium Thionyl Chloride Pack with protective circuitry
Voltage Range	3.0 to 3.7 V DC
Nominal Battery Life	20 years
Battery Access	Field replaceable
Battery Life Remaining Indicated	In months
Information Retention	Flash memory for permanent information retention without power
Testing Proof Verification	
Compatibility	• Most sonic nozzles provers that use IrDA • Pulse output • Black and White flag
Model 5 Compatibility	• IrDA interface • Prover interface box • Black and White flag • Two (2) minute proving time
Flow Detection	White Flow Indicator
Uncorrected Prover Testing	White flow indicator on most provers
Communication	
Optical Reading Port Requirements	• Optical probe • Dresser MeterWare software (data downloads, programming, firmware upgrades)
Pulse Type	Two (2) user-selectable Form A Outputs
Output Representation	• Compensated • Non-compensated • Fault • Disabled
Pulse Rate	User scalable: x 1, x 10, x 100, or x 1000 cu. ft
Pulse Duration	User scalable: 50, 150, or 250 ms
AMR Type	Any Form A pulse collector
Dedicated Fault Output	Form B (500 ms pulse duration)
Isolated Outputs?	Yes
Maximum Input Voltage	8.2V
Flow Selection	
Flow Direction	Forward, Reverse, Forward-Reverse, Reverse-Forward, Forward+Reverse
Alarms	
Alarm Notifications	• High/low temperature • High flow • Low battery

Criteria	Specification
Fault	
Fault Conditions	• Temperature • Volume • Low battery • Internal operation
Regulatory Standards	
Regulatory Standards	• ANSI, B109.3, LMB-EG-09E • OIML, MID, EN1359 • EN 60529 for IP66 to IP68 • EN 61000-6.1, 2, 3, 4 • UN 38.3 • 060247-001 certificate of compliance
Safety Approvals	• CSA C22.2 No. 213 Class 1 Div 1 Group A, B, C, D • T3C
Dust/Moisture Ingress Protection	IP66 to IP68 dependent upon connector configurations

Table 19: Temperature Reading Accuracy

Temperature Reading Accuracy
--40°F to 140°F: +/- 0.9°F (-40°C to 60°C: +/- 0.5°C)

18 Meter Capacity

Capacity of the 10C25 meter is not affected by specific gravity.

Table 20: Meter Capacity

Operating Pressure			Base Rating (cfh) Corrected Capacity (scfh)	Base Rating (m^3/h) Corrected Capacity (nm^3/h)
psig	kPa	bar	1000	28,3
0.25	1.7	0.02	1000	28,3
1	6.9	0.07	1045	29,6
3	20.7	0.21	1181	33,4
5	34.5	0.34	1317	37,3
10	68.9	0.69	1656	46,9
15	103.4	1.03	1996	56,5
20	137.9	1.38	2335	66,1
25	172.4	1.72	2675	75,7

19 Warranty

Contact the Factory for the latest revision of Terms and Conditions for Sale of Products and Services. For more information, refer to Section 5.

Appendix A Connecting with MeterWare

Perform the following steps to connect the meter to a computer to communicate with the MeterWare software.

A.1 Required Equipment

The following equipment is needed to perform the steps in this section. Contact Customer Service to request these parts or assistance:

- Dresser MeterWare software installed
- Dresser™ Communications Kit, which includes the parts listed in Table 21

Table 21: Communications Kit Contents

Item	Part	Purpose
1	USB extension cable	Connects the IR dongle USB connector to the computer's USB port
2	Magnet	Initializes and scrolls through LCD screens on the unit
3	IR dongle (with USB connection)	Communicates with the IR window on the unit
4	IrDA cable holders	Aligns the IrDA device with the unit's IR window and holds it in place

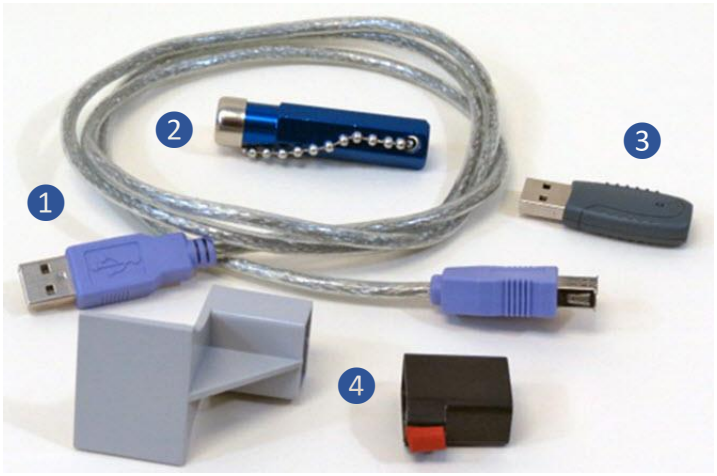


Figure 85: Communications Kit

Note: The package or appearance of the items may differ from the ones shown in Figure 85.

For more information, refer to the *Dresser MeterWare Software Manual*.

A.2 Attaching the IrDA Cable

Perform the following steps to connect the IrDA data cable to enable communication with the meter:

Note: In this manual, the IrDA cable refers to the IR dongle attached to the USB extension cable.

1. Plug the USB extension cable connector into the computer's USB port.
2. Plug the wide end of the USB extension cable onto the IR dongle.
3. Insert the correct IrDA cable holder into the cable holder slot on the meter.
4. Insert the IR dongle into the IrDA cable holder to align it with the IR window on the meter (refer to the following figures).

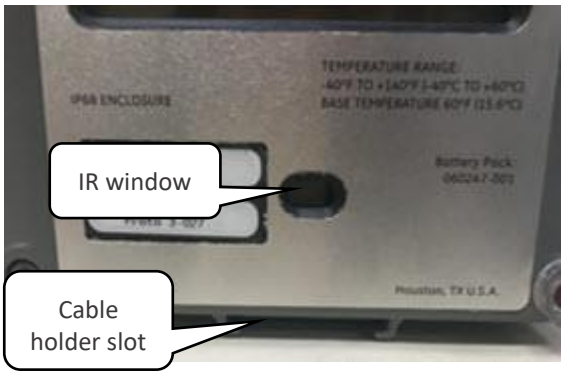


Figure 86: Location for holder installation

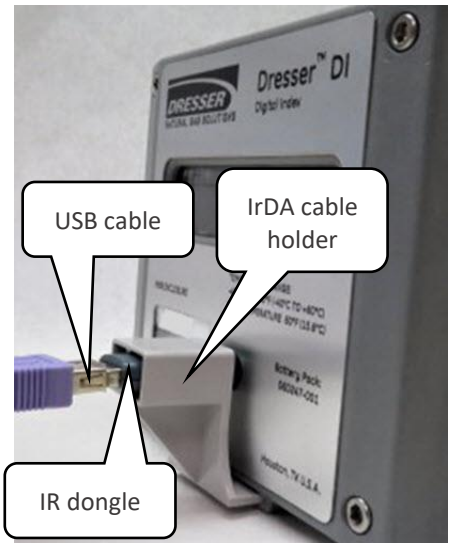


Figure 87: Proper installation of the IrDA cable

A.3 Establish Connection with MeterWare

Perform the following steps to be able to transmit information between the Dresser MeterWare software and the meter:

1. Connect the IrDA cable from the computer to the meter (refer to Section A.2).
2. Start the Dresser MeterWare software by double-clicking the Dresser MeterWare icon.

Figure 88: Click the Dresser MeterWare icon

3. On the **Welcome** screen, note the revision number and release date of the MeterWare software.

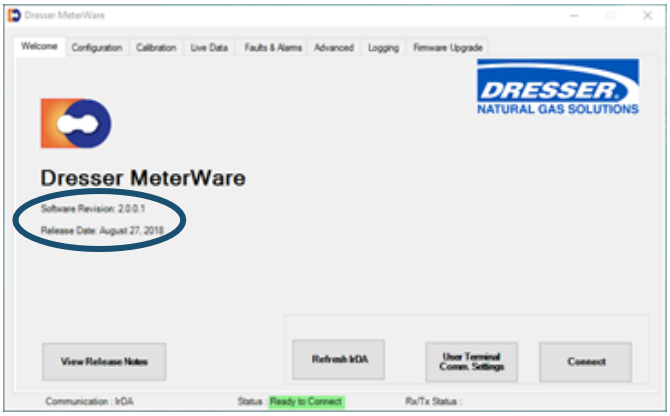


Figure 89: Welcome screen – verify software revision

4. If needed, wake up the meter by swiping the magnet vertically across the black dot by the LCD screen (refer to Figure 3).

5. Observe the **Status** area at the bottom of the screen as the MeterWare software finds the meter.

   The text changes from **Searching** to **In Range** in yellow, and then changes to **Ready to Connect** in green when it is successful.

   If it cannot connect, verify that the IrDA cable is properly connected and positioned.

6. Click **Connect**.

   A green progress bar displays during the process.

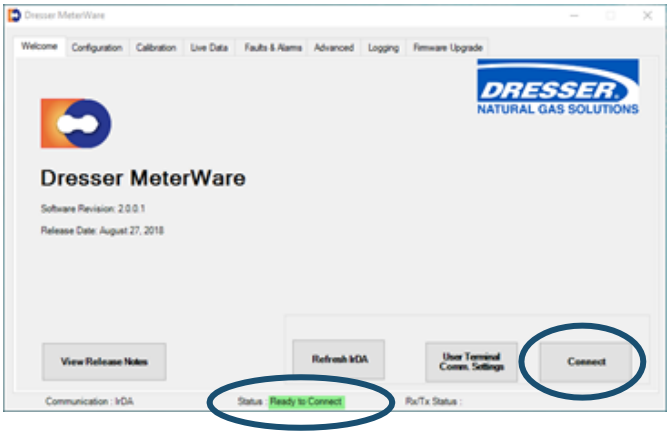


Figure 90: Welcome screen – ready to connect

If connection to the meter is successful, a picture of the connected meter displays, and the **Status** area at the bottom of the screen displays **Connected**. The **Connect** button changes to **Disconnect**.

Figure 91: Connection is successful

Appendix B Differential Rate Test Data Chart

The following page shows a data chart that can be used for keeping a detailed history of a meter's differential rate tests.

Differential – Rate Test Data

Meter Model:		**Mfg. Serial No.:**		**Utility Serial No.:**	
Location:		**Date Installed:**		**Register Reading:**	

Line Pressure	Gas Temp	Specific Gravity	Volume Measured	Run Time	Rate (ft^3)	Differential Pressure		Date	Tester
						w.c.	% Change		
Initial Tests – New Meter									
Periodic Check Tests									

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10C25 Meter IOM Manual NGS.MI.0001a 10.22