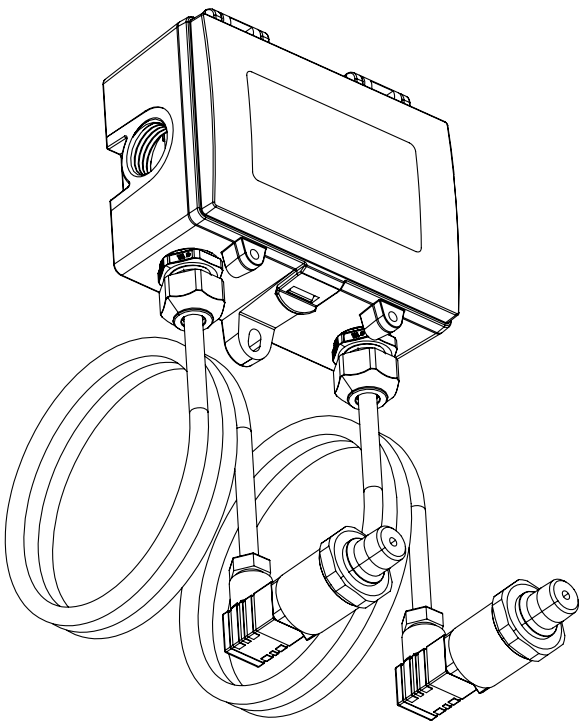
GREYSTONE
ENERGY SYSTEMS INC

Pressure Wet Remote Differential Transmitter

PWRD Series – Installation Instructions



INTRODUCTION

The differential pressure transmitter is designed with dual remote sensors that enable it to accept high pressure in ranges up to 5 PSI to 500 PSI. All models can handle overload pressure 2X the maximum full-scale range and burst pressure is 10X the maximum full-scale range. Features include field-selectable pressure ranges and output signal types, output reversal and slow damping, port swapping, pressure reading display (HIGH, LOW and DIFFERENTIAL) and bidirectional measurements for the most flexible applications. The output signal is factory calibrated.

WARNING :It is recommended to stay below the Proof pressure (2x the highest range). Exceeding the proof pressure will effect the sensor's accuracy.

BEFORE INSTALLATION

Read these instructions carefully before installing and commissioning the pressure transmitter. Failure to follow these instructions may result in product damage. Do not use in an explosive or hazardous environment, with combustible or flammable gases, as a safety or emergency stop device or in any other application where failure of the product could result in personal injury. **Take electrostatic discharge precautions during installation and do not exceed the device ratings.**

MOUNTING

The transmitter mounts on a vertical surface using the two integrated mounting holes. The remote sensor cable connection should be located at the bottom of the enclosure. The two mounting holes will facilitate a #10 size screw (not supplied). See Figure 1.

Ensure there is enough space around the unit to make the electrical connections and that it is within an acceptable distance for the length of remote sensor cables. Avoid locations with severe vibrations or excessive moisture. The enclosure has standard opening for a conduit connector or cable gland type fitting. In this position the High port is on the left and the Low port is on the right as shown on the PCB.

The enclosure has a hinged cover with a latch. Open the cover by pulling slightly on the latch on the bottom side of the enclosure and at the same time pulling on the cover, as illustrated in Figure 2.

A 1/2" NPT threaded connection hole is provided in the left side of the enclosure as shown in Figure 3. Screw the EMT connector or cable gland connector in until tight. See Figure 4. It is recommended that weatherproof conduit or cable gland fittings be used. The F style enclosure includes 1/2" NPT to M16 thread adapter and cable gland fitting.

Two security screws are provided which can be installed to help secure the cover once settings and wiring connections are complete. See Figure 4.

Figure 1

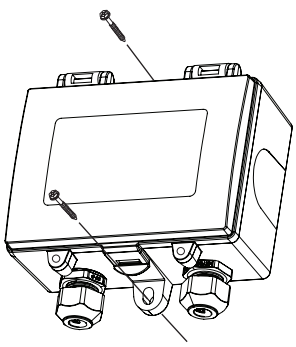


Figure 2

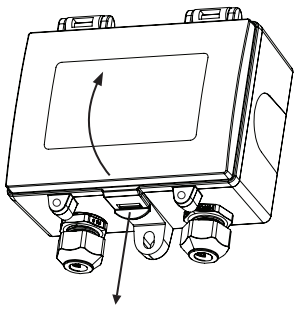


Figure 3

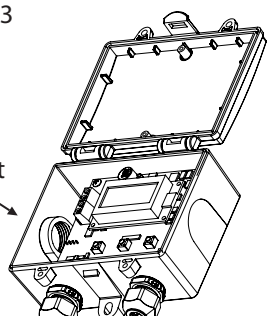


Figure 4

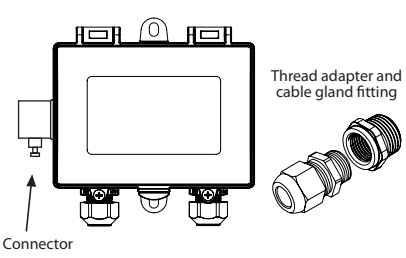
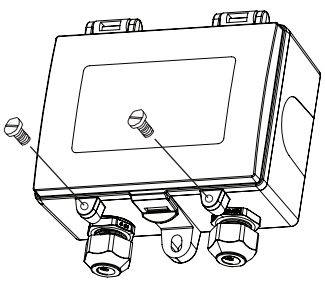


Figure 5



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PLUMBING

The two stainless steel pressure sensors are labeled High and Low. The output signal will indicate a positive value when the pressure applied to the High sensor is greater than the pressure applied to the Low sensor, so ensure the sensors are connected correctly as shown in a typical application in Figure 6. Both sensors incorporate 1/4" NPT male threads for connection to the pipe being monitored. Do not allow material to fall into the pressure ports as contamination could damage the sensors. It is recommended to use Teflon tape to prevent leaks.

IMPORTANT: Before installing the sensor(s) ensure the sensor port, fitting or shutoff valve is free of any fluids in the area the sensor is being installed. Failure to remove excessive fluids may damage the sensor during pressurization.

Remove the High-pressure sensor from the remote cable by unscrewing and pulling apart from the remote cable boot as shown in Figure 7. Wrap 1/4" NPT male sensor threads with Teflon tape. Screw into the sensor port on the pipe being monitored until finger tight. Use an appropriate size wrench to tighten the sensor until snug as shown in Figure 8. Reconnect the remote sensor cable you are aligning the remote sensor cable boot and screwing onto sensor. See Figure 9.

Repeat with the Low-pressure sensor.

Figure 6

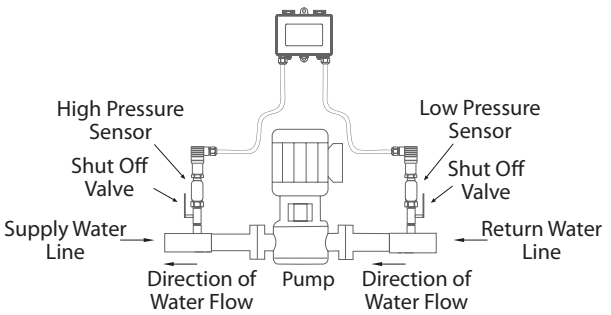


Figure 7

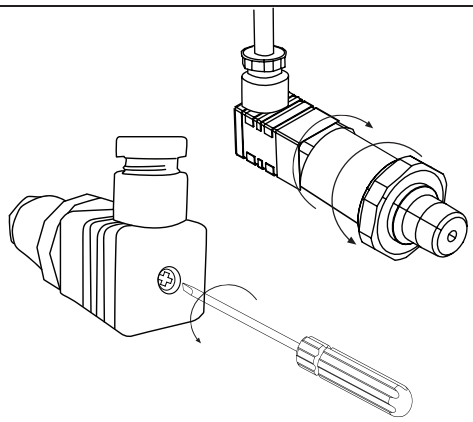


Figure 8

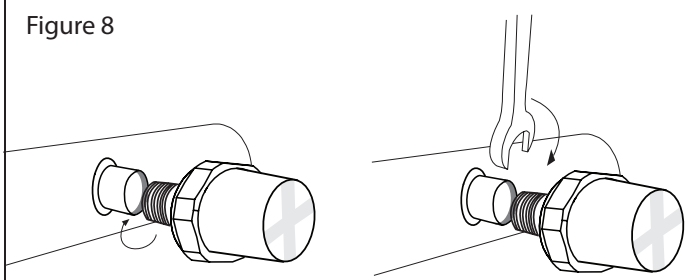
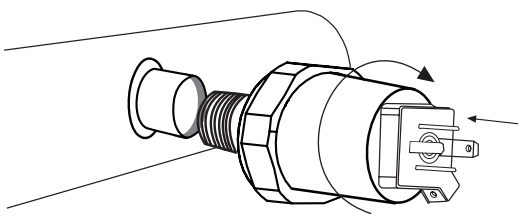


Figure 9



CONFIGURATION

Most configurations are done using User Menu setting with LCD and push buttons on PCB. See the User Menu section for details.

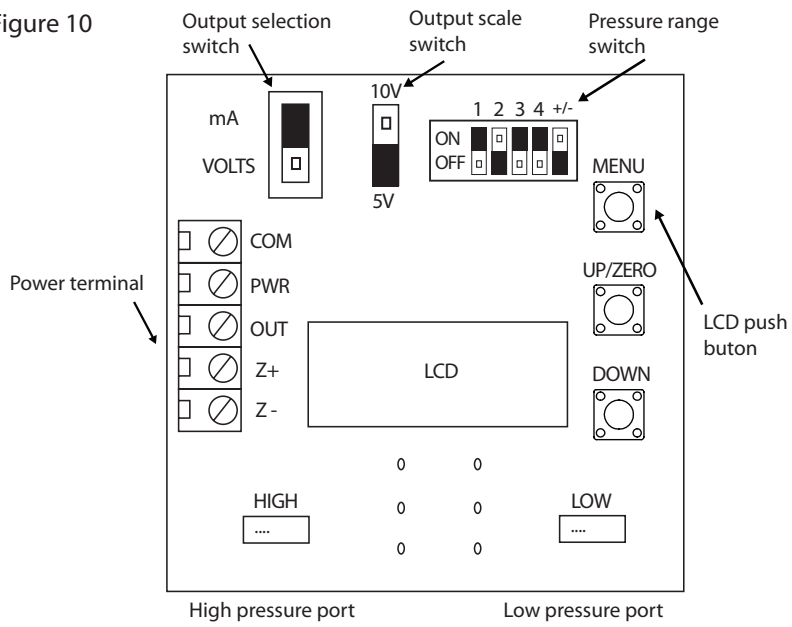
Warning: The transmitter must not have power applied during set up or when making changes to the output signal.

OUTPUT SELECTION

The transmitter features user-selectable output signals of 4-20 mA, 0-5 Vdc and 0-10 Vdc. It is factory configured to operate in the Current (4-20 mA output) mode but can be changed to Voltage mode by sliding the output selection switch from the position marked mA to the position marked VOLT as shown in Figure 10.

In Voltage mode the output scale may be changed to either 0-5 or 0-10 Vdc by using the board switch

Figure 10



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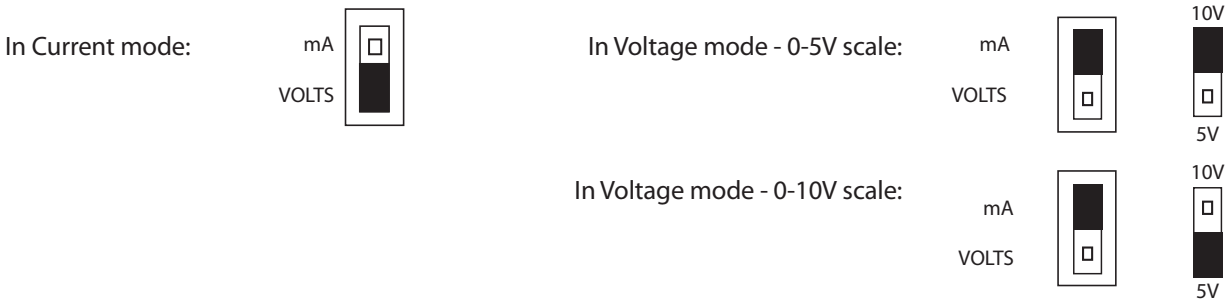
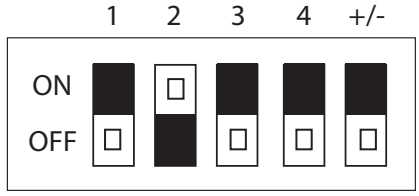
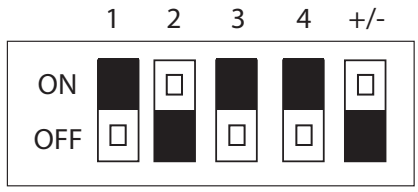


PRESSURE RANGE: The pressure range defaults to the largest range (4) of the device. Use the Pressure range switch to step through the four available ranges specific to the model. Example : PWRDB01 offers 5, 10, 25, 50psi as pressure ranges. If 10 psi is to be selected for maximum range in the application DIP switch is to be set as follow:

DIP switch for Uni-directional (0-10psi) operation..



DIP switch setting for Bi-directional (-10 to +10psi) operation..



The pressure values available options are shown below in Figure 11:

Figure 11	PRESSURE RANGE			
Model	**1**	**2**	**3**	**4**
01	5 PSI	10 PSI	25 PSI	50 PSI
02	10 PSI	20 PSI	50 PSI	100 PSI
03	25 PSI	50 PSI	125 PSI	250 PSI
04	50 PSI	100 PSI	250 PSI	500 PSI
05	0.5 Bar	1.0 Bar	2.5 Bar	5.0 Bar
06	0.7 Bar	1.4 Bar	3.5 Bar	7.0 Bar
07	1 Bar	2 Bar	5 Bar	10 Bar
08	3.5 Bar	7 Bar	17.5 Bar	35 Bar
09	50 kPa	100 kPa	250 kPa	500 kPa
10	70 kPa	140 kPa	350 kPa	700 kPa
11	100 kPa	200 kPa	500 kPa	1000 kPa
12	350 kPa	700 kPa	1750 kPa	3500 kPa
13	40 PSI	80 PSI	200 PSI	400 PSI

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WIRING

- Deactivate the 24 Vac/dc power supply until all connections are made to the device to prevent electrical shock or equipment damage.
- Use 14-22 AWG shielded wiring for all connections and do not locate the device wires in the same conduit with wiring used to supply inductive loads such as motors. Make all connections in accordance with national and local codes.
- Remove terminal block from the board then complete the wiring connection according to the wiring diagram for the applicable power supply and output signal type.
- Connect the plus DC or the AC voltage hot side to the PWR terminal. For voltage output or AC power, the supply Common is connected to the COM terminal. **DO NOT connect power to the OUT terminals as the device will be damaged.** It has half-wave power supply so the supply Common is the same as the signal Common. See Figure 12.
- For Current output or DC power, only one loop for powering the device is required. See figure 13

The analog output is available on the OUT terminal. Check the controller Analog Input to determine the proper connection before applying power. In voltage Mode, if using the Zero function, connect the Remote Zero Switch between the Z+ and COM terminals. In current mode, connect Remote Zero Switch between Z+ and Z- changed to either 0-5 or 0-10 Vdc by using board the switch.

NOTE: Both the low and high pressure sensors must be open to atmosphere to perform auto-zeroing function. A sensor Auto-Zero can be initiated by pressing and holding the internal <ZERO> button for at least 3 seconds. If both pressure ports are close to zero pressure, then the device will calibrate with a new zero point. The Auto-Zero can also be initiated by holding the ZERO terminal low for 3 seconds.

Figure 12

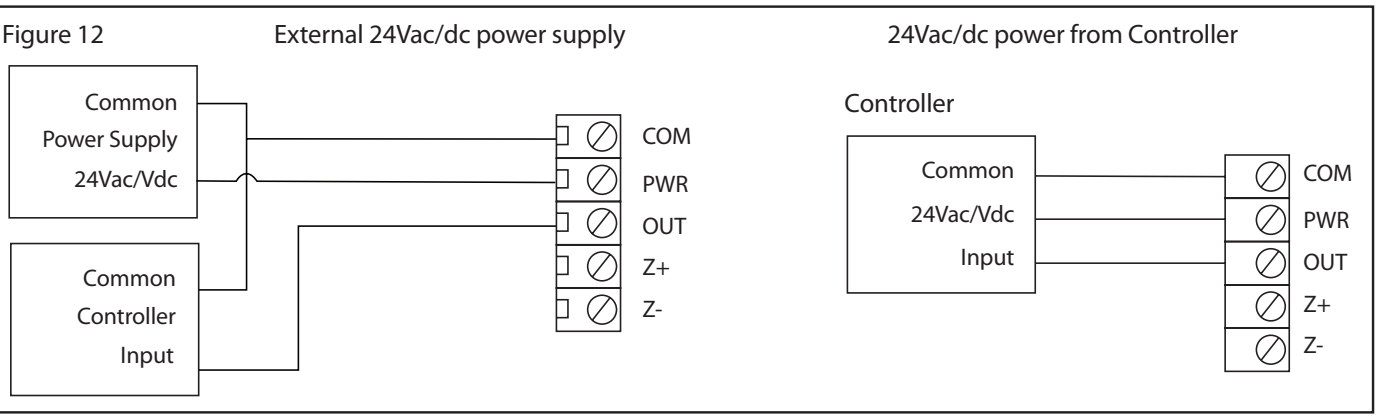
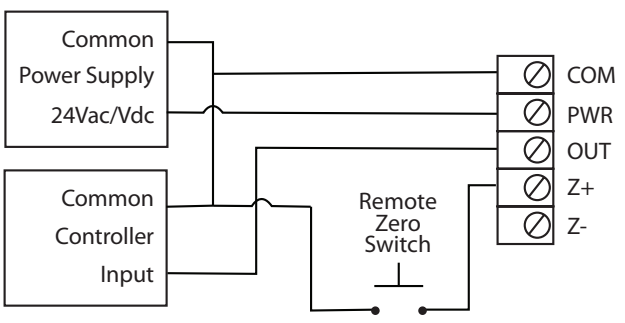
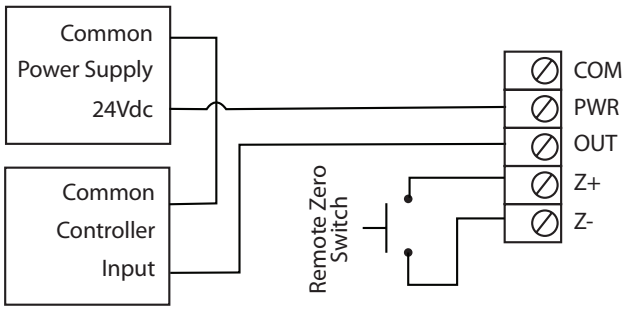


Figure 13

Voltage (0-10V or 0-5V) wiring setup when using a Remote Zero Switch Command. **Switch Common only and do not apply voltage to Z+ terminal.**



Current 4-20mA setup as a 2-wire Loop Powered signal. When using a Remote Zero Switch command **requires Z+ voltage passing thru switch and return signal back to Z- terminal.**



START-UP

Upon applying power to the device, it will enter the start-up mode.
The LCD will display the current software version and pressure range code

1. **SOFTWARE VERSION NUMBER** Example: 1.00
2. **MODEL PRESSURE RANGE** Example: P 1

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USER MENU

The User Menu can be accessed by pressing the <MENU> key at any time after the start-up mode. Note that the <ZERO> key function changes to an <UP> key function when a menu is active.
The system suspends operation when in the menu and holds the last pressure value as the output value. If the User Menu is not active for 5 minutes (no key press), then the menu will exit and the device returns to normal operation.
The User Menu operation and parameters are explained below.
In normal status, press MENU key to enter user menu. "P-0", for example.

- **"P-0"** menu is for showing factory configured max pressure range only. Press MENU key to advance "A 4" user menu.
- **"A 4"** menu is for pressure averaging time. Press UP or DOWN key to get the desired value from 1 to 60 seconds. Press MENU key to save the value and advance "r 4" user menu.
- **"r 0"** menu is for output reversing. Press UP or DOWN key to get the desired value from 0 to 1. 0 is for normal output (i.e. 0-5V,0-10V or 4-20mA), and 1 is for reversing output (i.e. 5-0V, 10-0V or 20-4mA). Press MENU key to save the value and advance "S 0" user menu if the device is DP. Otherwise (i.e. the device is GP), advance "d 0" user menu.
- **"S 0"** menu is for port swapping. Press UP or DOWN key to get the desired value from 0 to 1. 0 is for no swap (i.e. pressure = HI - LO), and 1 is for swap (i.e. pressure =LO-HI). Press MENU key to save the value and advance "d 0" user menu.
- **"d 0"** menu is for LCD display mode. Press UP or DOWN key to get the desired value from 0 to 1. 0 is for displaying differential pressure only, and 1 is for displaying "High/ Low/Differential pressure" in sequence. Press MENU key to save the value and exit to normal operation.

- **IMPORTANT**: The pressure value is displayed on a 3 ½" digit LCD. For pressure value of 2000 kPa and above, pressure value will appears with a display gap. Example: pressure read is 2005 Kpa, value displayed is 200 5 Kpa

200	5

SPECIFICATIONS

Power Supply.....24 Vac/dc ± 10% (non-isolated half-wave rectified)
Consumption.....30 mA max @ 24 Vdc
Output Signal.....4-20 mA, 0-5/0-10 Vdc (switch selectable)
Output Drive.....**Current:** 500 ohms max
.....**Voltage:** 10K ohms min
Protection Circuitry.....Reverse voltage protected, transient protected
LCD.....3 ½ digit LCD display
Accuracy.....± 1% F.S. of selected range (range 1 is ±2% F.S.) @ 22°C (72°F) including hysteresis, non-linearity and repeatability
Stability.....± 0.25% FS typical (1 year)
Pressure Ranges.....4 per model (switch selectable)
Media Compatibility.....17-4 PH, 316 stainless steel
Proof Pressure.....2X highest range per model
Burst Pressure.....10X highest range per model
Maximum Line Pressure.....highest model range
Pressure Cycles.....> 100 million
Surge Damping.....1-60 seconds averaging (menu selectable)
Zero Adjust.....Push-button and remote input
Sensor Operating Range..... - 40 to 105°C (-40 to 221°F)
Operating Environment.....0 to 50°C (32 to 122°F), 10 to 90 %RH non-condensing
Pressure Connection.....1/4" NPT male
Sensor Housing.....IP65
Remote Sensor Cable.....**S**: FT-6 plenum rated
.....**A**: Armored Flexible S/S
.....**C**: Conduit option
Wiring Connection.....14-22 AWG screw terminal block
Enclosure.....Polycarbonate, UL94-V0, IP65 (NEMA 4X)
.....F style includes thread adapter (1/2" NPT to M16) and cable gland fitting
Dimensions.....W 112.5mm x H 116.5mm x D 53.7mm (4.43" x 4.59" x 2.11")
Weight.....650g (22.9 oz) - Including remote cable and sensors
Country of Origin.....Canada

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