



Differential Liquid/Gas Pressure Transmitter

Catalog Number(s) 1414-CPZ10FWFAA,
1414-IPZ10FWFAA



Explosion Hazard

WARNING

Do not use in an explosive or hazardous environment, with combustible or flammable gasses, as a safety or emergency stop device or in any other application where failure of the product could result in personal injury. Use electrostatic discharge precautions during installation and do not exceed the device ratings.

About the Differential Liquid/Gas Pressure Transmitter

There are four different pressure ranges.

Range	1	2	3	4
Maximum Pressure	100 PSI	50 PSI	20 PSI	10 PSI

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at <http://www.literature.rockwellautomation.com>) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.





In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

WARNING 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard and recognize the consequences.
SHOCK HAZARD 	Labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.
BURN HAZARD 	Labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be dangerous temperatures.

Install the Differential Liquid/Gas Pressure Transmitter

The transmitter mounts on a vertical surface with the pressure ports and cable entrance on the bottom using the two screw holes on the base of the unit. Ensure there is enough space around the unit to make the pressure and electrical connections. Avoid locations with severe vibrations or excessive moisture. The enclosure has a standard ½" conduit opening and may be installed with either a conduit coupler or a 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 printed circuit board.

Wire and Connect the Differential Liquid/Gas Pressure Transmitter

Use twisted-pair 18 to 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. Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local electrical codes.

This device is a 3-wire sourcing type transmitter. Connect the positive dc voltage or the hot side of the ac voltage to the terminal marked PWR. The power supply common is connected to the terminal marked COM. The device is reverse voltage protected and will not operate if connected backwards. The analog output signal is available on the OUT terminal. This signal is jumper selectable for either voltage or 4 to 20 mA output (factory default). In voltage mode, either 0 to 5 or 0 to 10V dc can also be selected. These options are indicated on the circuit board.

The remote zero feature may be used by wiring a dry-contact (relay only) digital output to the ZERO terminals. Do not apply voltage to the ZERO terminals.

Plumbing

The two pressure ports are labeled High and Low. The output signal indicates a positive value when the pressure is higher on the High port than the Low port so ensure these ports are connected correctly. Use an appropriately rated pressure tubing and arrange it to minimize stress on the connections.

Do not allow material to fall into the pressure ports as contamination could damage the sensors.

Configure the Differential Liquid/Gas Pressure Transmitter

As shown on the printed circuit board diagram, push-on jumpers and switches are used to select the output signal type, the input pressure range and several features. The device is factory configured to operate in the 4-20 mA output mode but can be changed to voltage mode by moving the two jumpers from the positions marked

Current to the positions marked Voltage. Always note the current jumper position first and then move them to the new position. If the jumpers are rotated 90 degrees and installed incorrectly the product will not work and damage may occur. In voltage mode the output scale may be changed to either 0-5 or 0-10 Vdc by moving the single jumper to the 5V or 10V position. The Range and Options switches can be changed while the unit is operating. However, the output jumpers can only be changed while the power is removed.

The jumper marked Light is not used. The input pressure range (as shown on the product label) is set by moving the 4- position slide switch marked RANGE.

Bidirectional operation, port swap, slow damping and analog reverse functions are available by switching the appropriate DIP switch position to ON.

- Bidirectional

This switch changes the range from 0 to full scale differential pressure to minus full scale to plus full scale differential pressure. The analog output will read $\frac{1}{2}$ when the differential pressure is zero. The example below shows the results when Range 1 (0 to 100 psi) and bidirectional mode (-100 to 100 psi) are selected.

HIGH port	LOW port	Differential Pressure	4-20 mA	0-5 V
100 PSI	50 PSI	50 PSI	16 mA	3.75 V
50 PSI	100 PSI	-50 PSI	8 mA	1.25 V
50 PSI	50 PSI	0 PSI	12 mA	2.5 V
100 PSI	0 PSI	100 PSI	20 mA	5 V

- Port Swap

This switch reverses the polarity of the pressure ports. It makes the HIGH port 'low' and the LOW port 'high'. This is useful to correct plumbing errors.

- Slow Damping

This switch provides an 8-second averaging for surge dampening (normally it is 4-seconds).

- Output Reverse

This switch reverses the output signal polarity. In reverse mode the analog output is maximum when the pressure differential is zero and decreases as pressure increases.

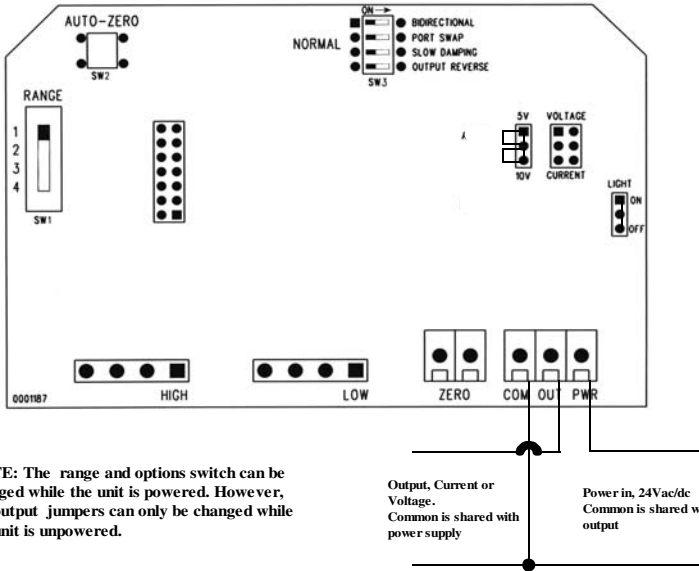
Operation

For normal operation such as 0-100 PSI, the pressure applied to the High port must be higher than the pressure applied to the Low port. If the pressure connection is reversed then the transmitter will always output 4 mA or 0 V. If the Low port is left open to ambient pressure, then the High port is used to measure a positive pressure and 0 PSI = 4 mA and 100 PSI = 20 mA. For bidirectional operation such as +/-100 PSI, the pressure applied to the High port should be higher than the pressure applied to the Low port for a positive output response. Negative pressure is indicated if the High pressure is less than the Low pressure. In this case -100 PSI = 4 mA and +100 PSI = 20 mA. Since the transmitter is linear 0 PSI = 12 mA.

Calibration

With both ports open to the ambient pressure (or with both ports equalized at 0 pressure), press and hold the auto-zero button or provide contact closure on the ZERO terminals for at least 3 seconds. Release the button or terminals and the device will calculate and store the new zero point. To protect the unit from accidental zeroing this feature is enabled only when the detected pressure on both ports is less than 5% of the full range. It is not recommended that the span calibration be performed in the field unless a high quality calibrator is available.

Optional switch settings. Default is Normal (switch set to off).

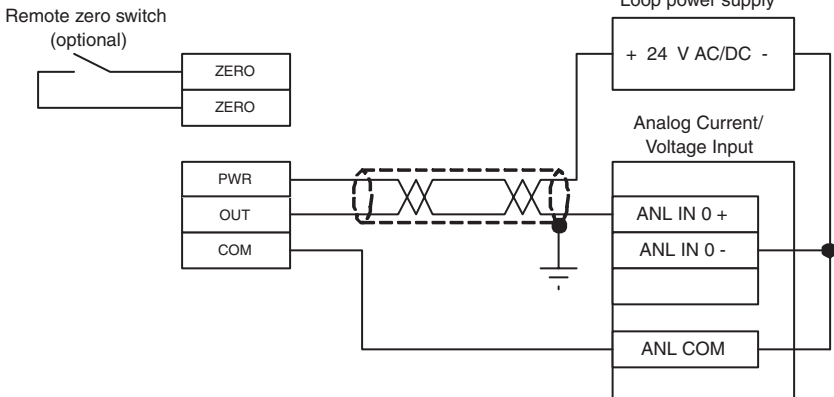


NOTE: The range and options switch can be changed while the unit is powered. However, the output jumpers can only be changed while the unit is unpowered.

Output, Current or Voltage - Common is shared with power supply

Power in, 24Vac/dc - Common is shared with output

DO NOT CONNECT POWER TO THE 'OUT' TERMINAL AS THE UNIT WILL BE DAMAGED!



Specifications

Differential Pressure Transmitter Specifications

Specification	Value
Media compatibility	17-4 PH stainless steel
Input power	15 ... 30 Vdc / 24 Vac nominal
Supply current @ 24 Vdc	35 mA
Output signal	4 ... 20 mA, 0 ... 5 or 0 ... 10 Vdc
Proof pressure Max.	2x F.S. range
Burst pressure Max.	5x F.S. range
Accuracy	+/- 1 %F.S. (range 4 is +/- 2 %)
Surge damping	4 sec averaging (8 sec for slow)
Long term stability	+/- 0.25% typical (1 year)
Auto-zero adjust	pushbutton and remote input
Sensor operating range	-40 ... 105 °C (-40 ... 220 °F)
Operating environment	0 ... 50 °C, 10 ... 90 %RH n.c.
Fittings	1/8" NPT female
Enclosure	5" x 5" x 2.25" PVC NEMA 4

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For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://support.rockwellautomation.com>.

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

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