

SERIES 621 PRESSURE INDICATOR

Specifications – Installation and Operating Instructions



The Dwyer Series 621 Pressure Indicator is a compact, 1/8 DIN instrument for measuring and controlling compatible air or gas pressure and converting it into a standard 3½ digit display with a 4-20 mA output signal. Positive, negative or differential pressures can be measured with a full span accuracy of $\pm 0.5\%$. Ranges are available from 0-3 in. w.c. (0-0.75 kPa) to 0-100 PSI (0-690 kPa). Versatile circuit design enables use in 2, 3 or 4-wire current loops.

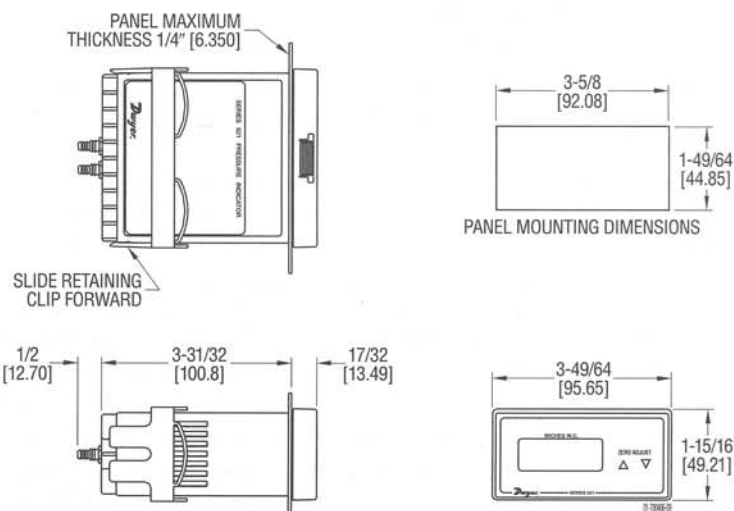


FIG. A

SERIES 621 ENGLISH MODELS & RANGES

MODEL NUMBER	RANGE	MAXIMUM PRESSURE
621-3	0-3 in. w.c.	5 PSI
621-6	0-6 in. w.c.	5 PSI
621-10	0-10 in. w.c.	5 PSI
621-20	0-20 in. w.c.	11 PSI
621-40	0-40 in. w.c.	11 PSI
621-100	0-100 in. w.c.	29 PSI
621-200	0-200 in. w.c.	29 PSI
621-1000	0-1000 in. w.c.	150 PSI
621P-10	0-10 PSI	58 PSI
621P-20	0-20 PSI	58 PSI
621P-30	0-30 PSI	58 PSI
621P-50	0-50 PSI	150 PSI
621P-100	0-100 PSI	150 PSI

SERIES 621 METRIC MODELS & RANGES

MODEL NUMBER	RANGE	MAXIMUM PRESSURE
621-0.75 kPa	0-0.75 kPa	34 kPa
621-1.5 kPa	0-1.50 kPa	34 kPa
621-2.5 kPa	0-2.50 kPa	34 kPa
621-5 kPa	0-5.00 kPa	76 kPa
621-10 kPa	0-10.00 kPa	76 kPa
621-25 kPa	0-25.0 kPa	200 kPa
621-50 kPa	0-69.0 kPa	400 kPa
621-138 kPa	0-138.0 kPa	400 kPa
621-207 kPa	0-207 kPa	400 kPa
621-249 kPa	0-249 kPa	1034 kPa
621-345 kPa	0-345 kPa	1034 kPa
621-690 kPa	0-690 kPa	1034 kPa

SPECIFICATIONS

GENERAL

Pressure Connections:	Barbed for 1/8" (3 mm) I.D. tubing
Media Compatibility:	Air and non-corrosive gases
Electrical Connections:	Terminal block
Housing:	Gray PVC, type I
Weight:	8.5 ounces (241 grams)
Adjustments:	Accessible potentiometers

ELECTRICAL

Power Supply:	10-35 VDC (2, 3 or 4 wire) 16-26 VAC (4 wire)
Output Signal:	4-20 mA DC (limited at 38 mA DC)
Loop Resistance:	0-1300 ohms DC max. 0-1200 ohms AC max.
Current Consumption:	DC, 38 mA max. AC, 76 mA max.

PERFORMANCE AT 70°F (21.1°C)

Zero Output:	4 mA DC
Full Span Output:	16 mA DC
Accuracy:	$\pm .5\%$ of full span output. Includes linearity, hysteresis and repeatability
Span and Zero:	Adjustable to 0.5% of full span
Warm-up Time:	10 minutes

ENVIRONMENTAL

Operating Temperature:	20 to 120°F (-6.7 to 49°C)
Thermal Errors:	$\pm 0.02\%/^{\circ}\text{F}$ typical

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INSTALLATION

1. LOCATION: Select a location where the temperature of the unit will be between 20°F and 120°F. Distance from the receiver is limited only by total loop resistance. See Electrical Connections. The tubing feeding pressure to the instrument can be run practically any length required but long lengths will increase response time slightly. Mount the instrument in a location that will not be subject to excessive temperature, shock or vibration. All models are designed for mounting in an enclosed panel.

Select the mounting position for the instrument on the panel. Prepare the panel by cutting and deburring the required opening. Refer to Figure A.

From the front panel, slide the instrument through the cutout. The housing gasket should be against the housing flange before installing.

From the rear of the panel slide the mounting collar over the housing. Hold the housing with one hand and using the other hand, push the collar evenly against the panel until the springs are compressed. The ratchets will hold the mounting collar and housing in place.

2. POSITION: A horizontal position is recommended (pressure connections pointing horizontally) since that is how all standard models were originally spanned and zeroed at the factory. They can be used at other angles but final spanning and zeroing must be done while transmitter is in that alternative position.

3. PRESSURE CONNECTIONS: Two integral barbed tubing connections are provided for use with 1/8" (3 mm) I.D. vinyl or rubber tubing. Attach tubing from positive pressure source to port marked HI or from negative (vacuum) source to port marked LO. In either case, opposite port must be vented to atmosphere. For differential pressures, the higher source is connected to the HI port and the lower to the LO port.

ELECTRICAL CONNECTIONS

CAUTION: DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. THIS UNIT IS NOT DESIGNED FOR 120 OR 240 VOLT AC LINE OPERATION.

Electrical connections to the Series 621 Pressure Indicator are made to the terminal block located on the back of the unit. The terminal block is marked 17, 18, 19 and 20. Refer to Figure B for location of the terminal block, span and zero adjust potentiometers.

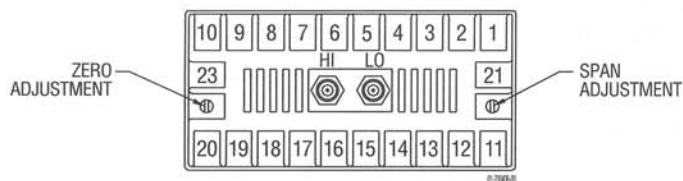


FIG. B

Wire Length – The maximum length of wire connecting the pressure indicator and receiver is a function of wire size and receiver resistance. Wiring should not contribute more than 10% of the receiver resistance to total loop resistance. For extremely long runs (over 1000 feet), choose receivers with higher resistance to minimize size and cost of connecting leads. Where wiring length is under 100 feet, hook-up wire as small as 22 AWG can be used.

2-Wire Operation – An external power supply delivering 10-35 VDC with minimum current capability of 40 mA DC (per indicator) must be used to power the control loop. See Fig. C for connection of the power supply, indicator and receiver. Note the jumper between 17 and 18. The range of the appropriate receiver load resistance (R_L) for the DC power supply voltage available is expressed by the formula and graph in Fig. F. Shielded two-wire cable is recommended for control loop wiring. If grounding is required, use negative side of the control loop after the receiver. Otherwise, in 2-wire operation it is not necessary to observe polarity of control loop connections.

2-WIRE CONNECTION

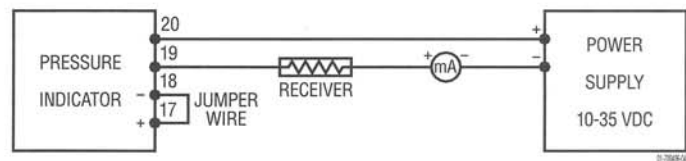


FIG. C

3-Wire Operation – An external power supply delivering 10-35 VDC with minimum current capability of 40 mA DC (per indicator) is required. See Fig. D for connection of power supply, indicator and receiver. The range of the appropriate receiver load resistance (R_L) for the DC power supply available is expressed by the formula and graph in Fig. F. Shielded cable is recommended for control loop wiring. Do not employ a separate ground in 3-wire operation. Unit will not function properly and/or damage could result. Control loop polarity must be observed in the following respect. Although power supply terminals 19 and 20 are not polarized, the receiver must be connected between terminal 18 of indicator and negative side of power supply.

3-WIRE CONNECTION

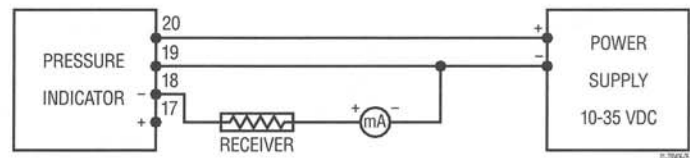


FIG. D

4-Wire Operation – An external power supply delivering 10-35 VDC with a minimum current capability of 40 mA DC (per transmitter) or 16-26 VAC with a minimum current capability of 80 mA AC (per transmitter) is required. See Fig. E for connection of power supply, indicator and receiver. The range of the appropriate load resistance (R_L) for the DC or AC power supply available is expressed by the formulas and graphs in Figs. F and G. Shielded cable is recommended for control loop wiring. Do not employ a separate ground in 4-wire operation. Unit will not function properly and/or damage could result. Control loop polarity must be observed; terminal 18 is negative and 17 is positive. Power supply terminals 19 and 20 are not polarized.

4-WIRE CONNECTION

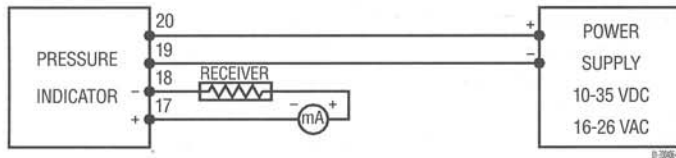


FIG. E

POWER SUPPLY VOLTAGE – VDC (2, 3 or 4-wire)

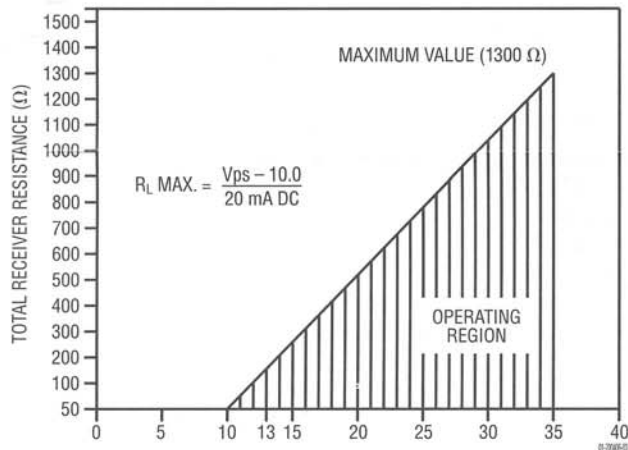


FIG. F

POWER SUPPLY VOLTAGE – VAC (4-wire)

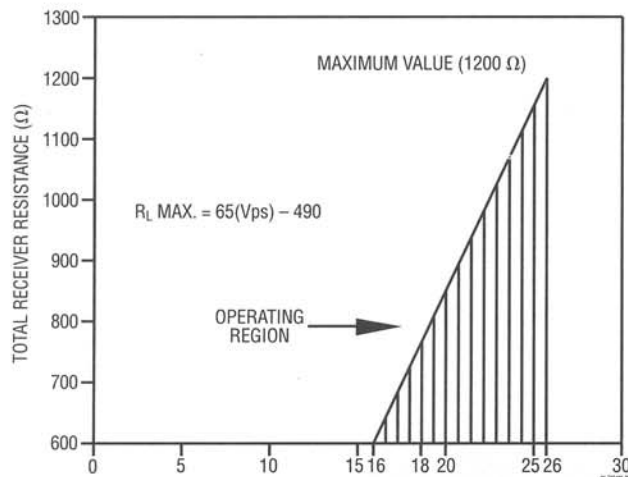


FIG. G

RECALIBRATION PROCEDURE

Transmitter – If the transmitter needs to be recalibrated, use the following procedure.

1. With the transmitter connected to the companion receiver, insert an accurate milliammeter in series with the current loop. Full scale range should be approximately 30 mA.
2. Connect a controllable pressure source to one leg of a tee with the second leg connected to the high pressure port of the pressure indicator and the third leg to an accurate test gage or manometer. The low pressure port must be vented to atmosphere. Calibration must be performed in the same position in which the unit will be mounted.
3. Apply electrical power to the unit and allow it to stabilize for 10 minutes.
4. With no pressure applied, use the Zero Adjust controls on the front of unit to set display to the center of the adjustment range. First, press and hold the ▲ key until it reaches its limit and record the value. Next, do the same with the ▼ key. Add readings and divide by two to establish the average. Example: If maximum ▲ reading is +0.22 and minimum ▼ reading is -0.14, total span is 0.36. Dividing 0.36 by 2 equals 0.18. Subtracting 0.18 from 0.22 equals 0.04. Adjust controls as necessary until display reads exactly 0.04.
5. Next, with no pressure applied to the pressure indicator, adjust the Transmitter Zero Control on the back of the unit so loop current is 4.00 mA. See Fig. B.
6. Apply full range pressure and adjust loop current to 20 mA using the Transmitter Span Control. See Fig. B.
7. Relieve pressure and allow pressure indicator to stabilize for 2 minutes.
8. Zero and Span controls are slightly interactive, so repeat steps 4 through 7 until zero and full range pressure consistently produce loop currents of 4 and 20 mA respectively.
9. Remove the milliammeter from the current loop and proceed with final installation of the pressure indicator and receiver.

Voltage Input – Series 621 Pressure Indicator can be easily adapted for receivers requiring 1-5 or 2-10 VDC input. Insert a 249 ohm, 1/2 watt (1-5 VDC) or 499 ohm (2-10 VDC) resistor in series with the current loop but in parallel with the receiver input. Locate this resistor as close as possible to the input. Because resistor accuracy directly influences output signal accuracy, we recommend use of a precision $\pm 0.1\%$ tolerance resistor to minimize this effect. See Figs. H and J.

3-WIRE CONNECTION (1-5/2-10 VDC OUTPUT)

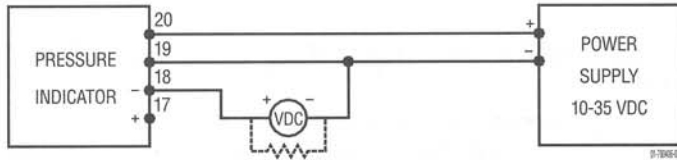


FIG. H

4-WIRE CONNECTION (1-5/2-10 VDC OUTPUT)

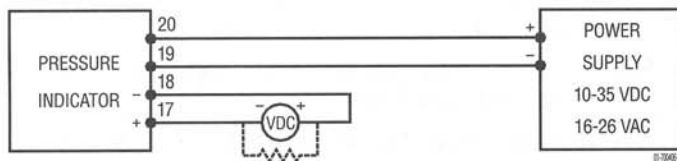


FIG. J

MULTIPLE RECEIVER INSTALLATION

An advantage of the standard 4-20 mA DC output signal provided by the Series 621 Pressure Indicator is that any number of receivers can be connected in series in the current loop. Thus, an A-701 Digital Readout Accessory, an analog panel meter, a chart recorder, process controlling equipment or any combination of these devices, can be operated simultaneously. It is only necessary that each be equipped with a standard 4-20 mA input and that proper polarity of the input connections be observed when inserting the device in the current loop. If any of the receiving devices displays a negative or downscale reading this indicates that the signal input leads are reversed.

MAINTENANCE

Upon final installation of the Series 621 Pressure Indicator and the companion receiver, including the A-701 Digital Readout, no routine maintenance is required. A periodic check of the system calibration is recommended. The Series 621 Pressure Indicator is not field serviceable and should be returned, freight prepaid, to the factory if repair is required. The A-701 Digital Readout should be returned to the manufacturer if service is needed. Refer to the A-701 instruction sheet.



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