# SERIES W Liquid Differential Pressure Transmitters

## DESCRIPTION

The Series W pressure transmitters are designed to measure low differential pressures of liquids or gases. A wide selection of standard pressure ranges and electrical ratings is available.

These transmitters feature: no moving parts to wear out, proven long term stability of piezoresistive devices, only 316 stainless steel in contact with the fluid, and all welded construction.

Series W transmitters are an excellent choice for many HVAC, process and automation monitoring requirements. Typical applications include measurement of differential pressure across flow elements, heat exchangers, pumps, filters, liquid level monitoring and other demanding differential pressure measurement and control applications.

The transmitters are housed in a compact heavy duty gasketted cast aluminum enclosure designed to IP 65 of IEC 529 standards and NEMA 4. The die cast aluminum enclosure incorporates a recessed neoprene gasket to prevent ingress of moisture or dust. Wall mounting holes are enclosed in the cast aluminum box and concealed by the cover. The wall mounting holes and the cover attaching screws are outside the gasketted area. Access to the electrical terminals are made through knockouts on the front of the box. A choice of one or two knockouts and three hole sizes is available to accommodate usage of 1/2" conduit or metric sizes PG11 and PG13.

Pluggable terminal block connectors are provided with wire protection and captive terminal screws.

The Series W includes four models: Model W10, Model W20, Model W30 and Model W40.

These four models incorporate a variety of power and signal options (see table).

The span or zero adjustment is performed with a 20-turn potentiometer for fine resolution. A 50% adjustment in output is possible.

The Series W transmitters have been tested by an accredited laboratory and comply with the European requirements of Council Directive 89/336/EEC for emission measurements per EN50081-1 and immunity tests per EN50082-1.

	3-Wire		2-Wire
W10	DC Voltage In	W30	DC Voltage In
	DC Voltage Out		4 - 20 mA Out
	4-Wire		4-Wire
W20	24, 120, or 240 Vac In	W40	24, 120, 240 Vac In
	DC Voltage Out		4 - 20 mA Out

## **OPERATION**

The pressure transmitter consists of two high accuracy piezoresistive sensors with stainless steel isolation diaphragms. Both sensors measure static pressure and the difference between these two measurements is computed electronically. The use of high accuracy and stable sensors makes this measurement possible. Since each sensor measures the full static pressure, there is no possibility of overpressurizing the transmitter if one sensor is disconnected from the line. No complex and expensive balancing valves are needed.



## **SPECIFICATIONS**

#### Performance

Accuracy: ±1/2% of differential pressure range (includes non-linearity and hysteresis) or ±1% for 6 psid (50 kPA) range

Effect of static pressure on differential pressure measurement: less than  $\pm 0.25\%$  for static pressure change from 0 to 100% or  $\pm 0.5\%$  for 6 psid (50kPa) range

Calibration: (Traceable to N.I.S.T.)

#### **Environmental**

Process wetted surfaces are 316 stainless steel Operating temperature range: 0°C to 50°C (32°F to 122°F) Storage temperature: -30°C to 70°C (-20°F to 160°F) Effect of temperature:

on zero: ±0.05%/°C or ±0.1%/°C for 6 psid (50 kPa) range on span:±0.03%/°C or ±0.06%/°C for 6 psid (50 kPa) range Operating humidity range: 10% to 90% R.H. non-condensing Shock Resistance: 10G (11ms) Vibration resistance: 5G 3 to 50 Hz

#### **Electrical Connectors**

Polarized Euro plug/connectors Connections: Pluggable terminal block for wire 14 to 26 AWG Mating connector is supplied

Connection to enclosure ground is provided Connector rating: 10 Amps/300 volts Material: Glass-filled polyester

#### **Physical**

Dimensions: 3.56"x4.54"x2.18" (90x115x55 mm) Enclosure material: Aluminum Alloy #A380 Cover screws: M4 Stainless Steel non-magnetic Finish: Black epoxy paint Knockout: Choice of 1 or 2 holes Hole sizes are offered in a choice of 1/2" conduit or metric sizes

of PG11 or PG13 Cable glands not included

Pressure port connections: 1/8-28 female NPT Weight: 1.2 lb (540g)

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## **MODEL W10**

#### **DC Power Input/Voltage Output**



## **SPECIFICATIONS**

#### Electrical

Supply Voltage: 11 to 32 Vdc (14.5 to 32 Vdc for 10 Volts output) Protected against reversal of polarity Supply Current: 10mA Output:

0 to 5 Volts, linear 0 to 10 Volts, linear Sink or source 3.5mA Protected against short circuit



Terminal 1 is enclosure ground. Terminal 2 is positive signal voltage. Terminal 3 is positive supply voltage. Terminal 4 is common to both the DC power supply and the output signal.

## **ORDERING INFORMATION**

Order Number (See Table below and Reference Table B on page 26) W10 - PPP - V - KQ - KS

EXAMPLE: W10 - 31E - 5 - 1 - R

PPP = Pressure Range	V = Voltage Output	<mark>KQ</mark> = Knockout Quantity	KS = Knockout Size
See Reference Table B	5 = 0 to 5 Volts	1 = 1 Hole	R = 1/2" conduit
	X = 0 to 10 Volts	2 = 2 Holes	S = PG 11
			T = PG 13

#### **MODEL W20**

#### AC Power Input/Voltage Output

#### **SPECIFICATIONS**

#### Electrical

Nominal Input Voltage	Power Consumption	Operating Voltage Range		
24 Vac, 50/60HZ	1.5W	20 to 30 Vac		
120 Vac, 50/60Hz	1.5W	100 to 140 Vac		
240 Vac, 50/60Hz	1.5W	200 to 260 Vac		

Output voltage is 0 to 5 Volts or 0 to 10 Volts, and can sink or source 3.5 mA. Protected against short circuit

Transformer isolation between power supply and output is 2500 Vrms



Terminals 1 and 2 are DC voltage output. Terminal 3 is ground. Terminals 4 and 5 are AC power input.

### **ORDERING INFORMATION**

Order Number (See Table below and Reference Table B on page 26) W20 - PPP - SV - V - KQ - KS

EXAMPLE: W20 - 34P - C - X - 2 - S

PPP = Pressure RangeSV = Supply Voltage		V = Voltage Output	KQ = Knockout Quantity	KS = Knockout Size	
See Reference	C = 24 Vac	5 = 0 to 5 Volts	1 = 1 Hole	R = 1/2" conduit	
Table B	D = 120 Vac	X = 0 to 10 Volts	2 = 2 Holes	S = PG 11	
	E = 240 Vac			T = PG 13	

## **MODEL W30**

Two Wire / 4-20mA Output

## **SPECIFICATIONS**

## Electrical

Supply Voltage: 11 to 32 Vdc (See diagram below for maximum loop resistance) Protected against reversal of polarity Output limited to approx 3.85mA at low end of span and approx. 25mA at upper end of span





## **ORDERING INFORMATION**

Order Number (See Table below and Reference Table B on page 26) W30 - PPP - KQ - KS

EXAMPLE: W30 - 35M - 1 - T

PPP = Pressure Range	KQ = Knockout Quantity	KS = Knockout Size
See Reference Table B	1 = 1 Hole 2 = 2 Holes	R = 1/2"Conduit S = PG 11 T = PG 13

#### **MODEL W40**

## AC Power Input / 4-20mA Output SPECIFICATIONS

#### Electrical

Nominal Input Voltage	Power Consumption	Operating Voltage Range
24 Vac, 50/60Hz	1.5W	20 to 30 Vac
120 Vac, 50/60Hz	1.5W	100 to 140 Vac
240 Vac, 50/60Hz	1.5W	200 to 260 Vac

Transformer isolation between power supply and output is 2500 Vrms Receiver resistance can be from 0 to 600 Ohms Output limited to approx. 27mA at the upper end of span



Terminals 1 and 2 are 4-20 mA current output. Terminal 3 is the enclosure ground. Terminals 4 and 5 are AC power input.

## **ORDERING INFORMATION**

Order Number (See Table below and Reference Table B on page 26) W40 - PPP - SV - KQ - KS

EXAMPLE: W40 - 33E - D - 2 - R

PPP = Pressure Range	<mark>SV</mark> =	<mark>KQ</mark> = Knockout	KS = Knockout	
	Voltage Output	Quantity	Size	
See Reference Table B	C = 24 Vac D = 120 Vac E = 240 Vac	1 = 1 Hole 2 = 2 Holes	R = 1/2" Conduit S = PG 11 T = PG 13	

## TABLE A—STANDARD PRESSURE RANGES

	ENGLISH		METRIC UNITS					
Pressure	Pressure Range	Max. Safe Momentary	Pressure	Pressure Range	Max. Safe Momentary	Pressure	Pressure Range	Max. Safe Momentary
Code	English	Overpressure	Code	Pascals	Overpressure	Code	Pascals	Overpressure
01E	0-0.100 in. H <sub>2</sub> 0		01P	0-25.0 Pa		01M	0-2.50 mm H <sub>2</sub> 0	
02E	0-0.200 in. H <sub>2</sub> 0	5 in. H <sub>2</sub> 0	02P	0-50.0 Pa	1.25 kPa	02M	0-5.00 mm H <sub>2</sub> 0	125 mm
03E	0-0.300 in. H <sub>2</sub> 0		03P	0-75.0 Pa		03M	0-7.50 mm H <sub>2</sub> 0	
04E	0-0.500 in. H <sub>2</sub> 0		04P	0-100.0 Pa		04M	0-10.00 mm H <sub>2</sub> 0	
05E	0-1.00 in. H <sub>2</sub> 0		05P	0-250 Pa		05M	0-25.0 mm H <sub>2</sub> 0	
06E	0-2.00 in. H <sub>2</sub> 0	20 in. H <sub>2</sub> 0	06P	0-500 Pa	5 kPa	06M	0-50.0 mm H <sub>2</sub> 0	500 mm
07E	0-3.00 in. H <sub>2</sub> 0		07P	0-750 Pa		07M	0-75.0 mm H <sub>2</sub> 0	
08E	0-5.00 in. H <sub>2</sub> 0		08P	0-1.00 kPa		08M	0-100 mm H <sub>2</sub> 0	
09E	0-10.0 in. H <sub>2</sub> 0	5 psid	09P	0-2.50 kPa	35 kPa	09M	0-250 mm H <sub>2</sub> 0	3.5 m
11E	0-20.0 in. H <sub>2</sub> 0		11P	0-5.00 kPa		11M	0-500 mm H <sub>2</sub> 0	
12E	0-30.0 in. H <sub>2</sub> 0		12P	0-7.50 kPa		12M	0-750 mm H <sub>2</sub> 0	
13E	0-50.0 in. H <sub>2</sub> 0		13P	0-10.0 kPa		13M	0-1.00 m H <sub>2</sub> 0	
14E	0-100 in. H <sub>2</sub> 0	15 psid	14P	0-25.0 kPa	100 kPa	14M	0-2.5 m H <sub>2</sub> 0	10 m
15E	0-1.00 psid		15P	0-50.0 kPa		15M	0-5.0 m H <sub>2</sub> 0	
16E	0-2.00 psid		-	-		-	-	
17E	0-3.00 psid		-	-		-	-	
18E	0-5.00 psid		-	-		-	-	
19E	0-15.0 psid	30 psid	16P	0-100 kPa	200 kPa	16M	0-10.0 m H <sub>2</sub> 0	20 m
20E	0-30.0 psid	60 psid	17P	0-200 kPa	400 kPa	17M	0-20.0 m H <sub>2</sub> 0	40 m

# TABLE B—STANDARD PRESSURE RANGES FOR W SERIES

	ENGLISH UNIT	S	METRIC UNITS					
Pressure Code	Differential Pressure Range, psid	Operating Static Pressure, psi	Pressure Code	Differential Pressure Range, kPA	Operating Static Pressure, psi	Pressure Code	Differential Pressure Range, k mm H <sub>2</sub> 0	Operating Static Pressure k mm H <sub>2</sub> 0
31E	0-6 psid		31P	0-50 kPa		31M	0-5.0 k mm H <sub>2</sub> 0	
32E	0-10 psid	0-100 nsi*	32P	0-75 kPa	0 - 700 kPa*	32M	0-7.5 k mm H <sub>2</sub> 0	0-70 k mm H <sub>2</sub> 0
33E	0-15 psid	0 100 poi	33P	0-100 kPa		33M	0-10 k mm H <sub>2</sub> 0	
34E	0-30 psid		34P	0-200 kPa		34M	0-20 k mm H <sub>2</sub> 0	
35E	0-60 psid		35P	0-500 kPa	0.000015.i	35M	0-50 k mm H <sub>2</sub> 0	0.200 k mm H 0
36E	0-100 psid	0 - 300 psi*	36P	0-750 kPa	0 - 2000 kPa*	36M	0-75 k mm H <sub>2</sub> 0	0-200 K 11111 1120
37E	0-150 psid		37P	0-1000 kPa		37M	0-100 k mm H <sub>2</sub> 0	
38E	0-200 psid		38P	0-1500 kPa		38M	0-150 k mm H <sub>2</sub> 0	

\* Maximum safe momentary overpressure at any port is 2X the maximum operating static pressure

## TABLE C—STANDARD PRESSURE RANGES FOR MANOMETER

	ENG	LISH					METRIC	C UNITS			
Pressure	Pressure	Displayed	Max. Safe	Pressure	Pressure Range	Displayed	Max. Safe Momentary	Pressure	Pressure Range	Displayed	Max. Safe Momentarv
Code	Range	Units	Overpass	Code	Pascals	Units	Overpass	Code	mm of $H_2O$	Units	Overpass
01E	0-0.100 in. H <sub>2</sub> 0	.100		01P	0-25.0 Pa	25.0		01M	0-2.50 mm	2.50	
02E	0-0.200 in. H <sub>2</sub> 0	.200	$5 \text{ in H}_20$	02P	0-50.0 Pa	50.0	1.25 kPa	02M	0-5.00 mm	5.00	125 mm
03E	0-0.300 in. H <sub>2</sub> 0	.300		03P	0-75.0 Pa	75.0		03M	0-7.50 mm	7.50	
04E	0-0.500 in. H <sub>2</sub> 0	.500		04P	0-100 Pa	100.0		04M	0-10.0 mm	10.0	
05E	0-1.00 in. H <sub>2</sub> 0	1.000		05P	0-250 Pa	250		05M	0-25.0 mm	25.0	
06E	0-2.00 in. H <sub>2</sub> 0	1.999	2H <sub>2</sub> 0	06P	0-500 Pa	500	5 kPa	06M	0-50.0 mm	50.0	500 mm
07E	0-3.00 in. H <sub>2</sub> 0	3.00		07P	0-750 Pa	750		07M	0-75.0 mm	75.0	
08E	0-5.00 in. H <sub>2</sub> 0	5.00		08P	0-1.00 kPa	1.000		08M	0-100 mm	100.0	
09E	0-10.0 in. H <sub>2</sub> 0	10.00		09P	0-2.50 kPa	2.50		09M	0-250 mm	250	
11E	0-20.0 in. H <sub>2</sub> 0	19.99	5 psid	11P	0-5.00 kPa	5.00	35 kPa	11M	0-500 mm	500	3.5 m
12E	0-30.0 in. H <sub>2</sub> 0	30.0		12P	0-7.50 kPa	7.50		12M	0-750 mm	750	
13E	0-50.0 in. H <sub>2</sub> 0	50.0		13P	0-10.0 kPa	10.00		13M	0-1.00 m	1.000	
14E	0-100 in. H <sub>2</sub> 0	100.0		14P	0-25.0 kPa	25.0		14M	0-2.50 m	2.50	
15E	0-1.00 psid	1.000	5 psid	15P	0-50.0 kPa	50.0	100 kPa	15M	0-5.00 m	5.00	10 m
16E	0-2.00 psid	1.999		16P	0-100 kPa	100.0		16M	0-10.0 m	10.00	
17E	0-3.00 psid	3.00		17P	0-200 kPa	199.9		17M	0-20.0 m	19.99	
18E	0-5.00 psid	5.00									