BULLETIN NO. 240/11
(SUPERSEDES BULLETIN NO. 240/06)

Mid-West® Instrument

"Diaphragm Type" Model 240

"Hazardous Locations"

Indicating / Non-Indicating
Differential Pressure Switch or Transmitter

- A low cost Diaphragm type differential pressure switch for use in measuring or controlling the pressure drop cross filters, strainers, separators, valves and pumps.
- Working Pressure 1,500 PSIG (103 bar)
- Over-range protection to maximum pressure.
- Aluminum or 316 Stainless Steel wetted pressure containing body assembly.
- Wetted Internals – 316 Stainless Steel and Ceramic moving components.
- Weather resistant gauge construction standard.
- Dial Size: 4-1/2" with Shatter resistant acrylic lens.
- Five Year Limited Warranty

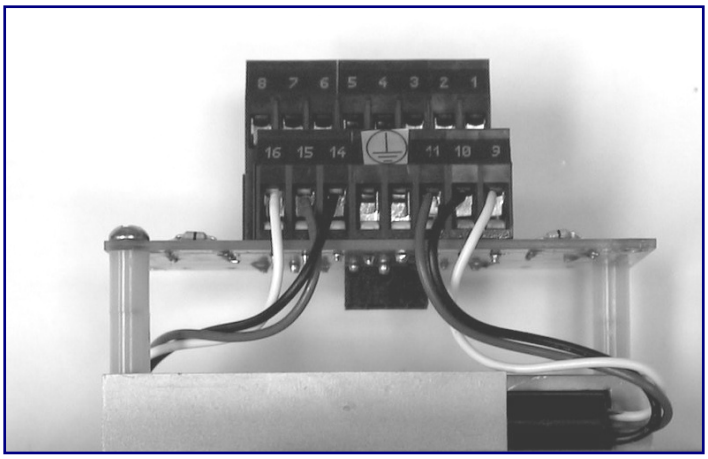
- Field wireable terminal strip interface.
- Up to 10A 120/240 VAC switching with DPDT Relay outputs.
- Hermetically Sealed Switch Outputs up to 3 Amps in SPST configuration and up to 1 Amp in SPDT configuration
- SPST outputs available in Normally Open or Normally Closed configurations
- Up to (2) independent adjustable switch points.
- 4-20 mA Transmitter with 8-28 Vdc loop power
- ½" Conduit interface
- CSA & UL Certified to US and Canadian standards.
- CSA & UL Certified:
  Class I, Division 1 / Groups B, C & D
  Class II, Division 1 / Groups E, F & G
  Class I, Division 2 / Groups A, B, C & D
  Class II, Division 2 / Groups F & G
- Certified for ATEX / IECEx
  Ex d IIB + H_2 Ex tb IIIC, IP65
  Division 2 Units are NEMA 4X

Model	Body Material	Accuracy	Min. ΔP Range	Max. ΔP Range	MWP PSIG (Bar)	Switch Options
240	Aluminum & 316L S.S.	±2%	0-20" H2O (0-50 mbar bar)	0-100 PSID (0-7 bar)	1,500 (103)	1 or 2 switches or 4-20mA Transmitter

“Diaphragm Type”
Differential Pressure Gauge
Switch Options
Model 240

The switching components are housed under a copper free Aluminum cover the combination of the gauge body and the cover make up the flame-proof seal. Electrical interface to the internal field wire terminal strip is via ½” NPT industry standard conduit connection located through the gauge body.

The hazardous environment indicating differential pressure switch is available with one or two hermetically sealed reed switches with optional one or two DPDT relay outputs. Each switch is independently adjustable within a defined percentage of the full scale range of the gauge and is available in SPDT and SPST (normally open or normally closed) for various load power ratings. The switches can be set to activate or deactivate on rising or falling differential pressure. If the optional relay output is specified, an input operating voltage must also be specified.



OUTPUT RATINGS (Resistive Load)

Type	SPST	SPDT	SPDT	DPDT Relay
Electrical Specification Input Option	A	A	A	B,C,D,E,F,G,H
Electrical Specification Output Option	E	H	A	R
*Power	60 W	60 W	3W	N/A
Maximum Current	3 Amps	1.0 Amps	0.25 Amps	10 Amps
Max. Volts VAC/VDC	240	240	125	277 / 30
Setting (Full Scale) **	15% to 100%	25% to 100%	15%-100%	15% to 100%
Hysteresis Full Scale	20% / 9% (Max / Nom)	25% / 18% (Max / Nom)	15% / 6% (Max / Nom)	20% / 10% (Max / Nom)
Repeatability	1% Full Scale	1% Full Scale	1% Full Scale	1% Full Scale

* Product of the switching voltage and current shall not exceed the power rating of device
**For ranges ≥60 PSID, minimum adjustability = 25%

Warning: **The suitability of the application and installation of this differential pressure switch is the responsibility of the end user. The applicable certifications, listings apply to the differential pressure switch only.**

"Diaphragm Type"
Differential Pressure Gauge
Transmitter Option
Model 240

Model 240 Transmitter provides a simple low cost loop powered 8-28 Vdc two wire 4-20 mA transmitter with highly visible local display allowing for monitoring at the unit and in the control room.

The transmitter utilizes the same CSA, UL and ATEX rated sensor and explosion proof housing as on the Model 240 explosion proof switch. Although the transmitter option in not yet listed, the sensors and explosion proof housing are rated Class I, Division 1 Groups B, C & D. Class II, Division 1 Groups E, F & G and Ex d IIB + H2 Ex tD A21 II 2 GD IP65. Each transmitter is individually calibrated to the gauge using an 11 point calibration linearization technique.

TRANSMITTER SPECIFICATIONS

Transmitter Specifications:	**Comments:**			
Differential Pressure Range	0-20" H2O to 0-100 PSID			
Leakage	None, Diaphragm Isolated Hi to Lo			
Pressure (Ratings)				
Max Working	1500 PSIG			
Gauge Accuracy	2%			ASME B40.100 GRADE B
Operating Temperature (Max.)	-20°F -150°F			
ELECTRICAL:				
	Min	**Typ**	**Max**	
Transmitter Accuracy (FSR)			2%	Upper 80% of Full Scale Range
Supply Voltage (3) (Vdc)	8		28	Pin 3 Reverse Polarity Protected
Output Current (ma)				
Zero Floating (2)	4.0 – 20.1 ma	4.0 – 21.0	4.0 – 22.0	Pin 2
Zeroed (1 connected to 2)		8		
Voltage (Pin 2 to 1)	4.8		6.3	
Zero Time (seconds)	2			
Max Loop Resistance (ohms)			1000	
Max Loop Resistance Formula	((Vs – 8) / 20) *1000)			
INTERFACE:				
Electrical:				
Connections:	4 Position Terminal Strip; ½" NPT Conduit 1= Rtn, 2= Zero, 3 = 8-28 Vdc In 4= Chassis			22 Awg – 12Awg Wire
Environmental Rating:	Explosion-proof Enclosure rated Class I, Div I, Groups B, C, D; Class II, Div I, Groups E, F, & G **			
Certifications:	Ex d IIB + H2 Ex tb IIIC, IP65 T 85°C -30°C ≤ Ta ≤ 65°C			

PROOF PRESSURE: 6,000 PSI.

TEMPERATURE LIMITS: -40°F (-40°C) to +185°F (+85°C)– For electrical Input Options A in combination with electrical output options A, E, & H. These limits are based on the entire instrument being saturated to these temperatures. System (process) temperatures may exceed these limitations with proper installation. Contact our customer service representative for details.

-40°F (-40°C) to +160°F (+70°C) – For output option R (Relay Output)

-20°F (-30°C) to +150°F (+65°C) – For output option 4-20 mA Transmitter

STANDARDS: The Model 240 Series differential pressure gauge either conforms to and/or is designed to the requirements of the following standards: ASME B1.20.1, ASME B40.100, CSA-C22.2 No. 14, 25 and 30, UL Std. No. 50, 508, 698, and 1203, NEMA Std. No. 250, SAE J514, EN60079-0, EN60079-1 & EN61241-0, EN61241-1, EN13463-1

Mid-West® Instrument

Standard Dial Ranges: Model 240

Range Type				
IN H_2O	PSID	Kpa	bar	Flow Dials
0-20"	0-5	0-16	0-1.0	0-1.0
0-25"	0-10	0-25	0-1.6	0-1.5
0-30"	0-15	0-40	0-2.5	0-2.0
0-40"	0-20	0-60	0-4.0	0-2.5
0-50"	0-25	0-100	0-6.0	0-5.0
0-60"	0-30	0-160	0-7.0	0-7.5
0-75"	0-50	0-200		0-10
0-100"	0-60	0-250		
0-135"	0-75	0-400		
0-150"	0-100	0-600		
0-200"		0-700		
0-300"				
0-400”				
Available Multipliers for Flow Dials: X10, X100, X1000, and X10,000				
Note: Not all ranges available in all diaphragm materials				

The above mentioned ranges are some of the most popular requested today.
Mid-West Instrument can provide special un-cataloged dial range requirements.
As well as multiple scale dials, multiple color dials and special decals.
Please consult factory for complete information.

Model	Min. ΔP Range	Max. ΔP Range
240	0-20" H2O (0-50 mbar)	0-100 PSID (0-7 bar)

PROOF PRESSURE: 6,000 PSI.

TEMPERATURE LIMITS: **-40°F (-40°C) to +185°F (+85°C)**– For electrical Input Options A in combination with electrical output options A, E, & H. These limits are based on the entire instrument being saturated to these temperatures. System (process) temperatures may exceed these limitations with proper installation. Contact our customer service representative for details.

-40°F (-40°C) to +160°F (+70°C) – For output option R (Relay Output)
-20°F (-30°C) to +150°F (+65°C) – For output option 4-20 mA Transmitter

STANDARDS: The Model 240 Series differential pressure gauge either conforms to and/or is designed to the requirements of the following standards:

ASME B1.20.1
ASME B40.100
CSA-C22.2 No. 14, 25 and 30
UL Std. No. 50, 508, 698, and 1203
NEMA Std. No. 250
SAE J514
EN60079-0, EN60079-1 & EN61241-0
EN61241-1, EN13463-1

Standard Model Specifications: 240-AC-02-O (JAA)

1500 PSIG Working Pressure, Aluminum wetted pressure containing body assembly, Stainless Steel/Ceramic Magnet internals, Buna-N Seals, ¼" FNPT End Connections, 4-1/2" round dial, engineered plastic dial case with Shatter Resistant Acrylic Lens, **(1)** 3W 125 VAC/VDC SPDT reed switch with terminal strip, aluminum explosion proof switch enclosure and ½" FNPT electrical access.

Mid-West Instrument **Complete assembly 3rd Party Certified**

Range 0-20 IN. H_2O to 0-100PSID (0-50 mbar to 0-7.0 bar)

1	1	2	3	4	5	6	6	6	6	7	8
2	4	0									

Basic Model

Range:_____




2	Material
A	Aluminum Wetted Pressure Containing Body, Stainless Steel / Ceramic Magnet Internals
S	316/316L S.S Wetted Pressure Containing Body Assembly Stainless Steel / Ceramic Magnet Internals
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
F	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only **(with select electrical options)**
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
5	Ethylene Propylene
9	Special ***(Un-coded Options)***
5	**Process Connections**
2	1/4" FNPT End Connections ***(Standard)***
7	1/2" FNPT End Connections
9	Special ***(Un-coded Options)***
6	**Additional Options**
O	None
F	Carbon Steel 2" Pipe Mounting Kit
G	Stainless Steel 2" Pipe Mounting Kit
M	Maximum Indicator Follower Pointer **(Not available with Electrical Configurations R & S)**
Q	CRN **(Canadian Registration Number)**
S	Shatter Proof Glass Lens **(Available with 4-1/2" Aluminum Dial Case only)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag with S.S. Screw
Z	Special ***(Un-Coded Options)***

NOTE: Not All Options Available in Combination with other Options

Standard Model Specifications – continued Model 240

"MODEL 240" ELECTRICAL CONFIGURATIONS	
7	**DP Ranges greater than or equal to 60 PSID the Switch adjustability is 25%-100% of Full Scale for all Switch options. (T6 Temperature Class unless specified)**
A	One (1) Control switch in NEMA-4X enclosure **(1) (6) (8)**
B	Two (2) Control switches in NEMA-4X enclosure **(1) (6) (7) (8)**
J	One (1) Control switch in NEMA 7 (Explosion Proof Enclosure) **(2)**
K	Two (2) Control switches in NEMA 7 (Explosion Proof Enclosure) **(2) (7)**
R	One (1) Control switch in Ex d Enclosure (CE marked) ATEX / IECEx **(2) (9)**
S	Two (2) Control switches in Ex d Enclosure (CE marked) ATEX / IECEx **(2) (7) (9)**
T	4-20 mA Transmitter in NEMA7/EExd (Explosion Proof Enclosure) **(9)** **(Temperature Limits -20°F to +150°F) Transmitter not yet CSA or UL certified**
Z	Special ***(Un-coded Options)***
8	**"INPUT OPTIONS" ELECTRICAL SPECIFICATIONS (Select (1) input and (1) output option)**
A	No Input power for reed outputs A, E, F, G & H
B	5/6 VDC
C	12 VDC
D	24 VDC
E	48 VDC **Specify with option "R" below**
F	24 VAC
G	120 VAC
H	240 VAC **(T4-ATEX; T4A-NORTH AMER.) TEMP CLASS**
T	8-28 Vdc Loop Power **(Option T only)**
	"OUTPUT OPTIONS" ELECTRICAL SPECIFICATIONS (Resistive Load) (3)
A	SPDT, 3W, 0.25 Amp., 125 VAC/VDC **(Switch Adjustable 15-100% of full scale ascending) 60 PSID & Above 25-100% of full scale ascending**
E	SPST, 60W, 3.0 Amp., 240 VAC/VDC (Normally Open) **(Switch Adjustable 15-100% of full scale ascending)**
H	SPDT, 60W, 1.0 Amp., 240 VAC/VDC **(Switch Adjustable 25-100% of full scale ascending)**
R	DPDT, Relay, 10A @ 30 VDC, 120/240 VAC **(7) (8)** **(Switch Adjustable 15-100% of full scale ascending) 60 PSID & Above 25-100% of full scale ascending**
T	4-20 mA Transmitter in general purpose enclosure, 3rd Party Certified Division 2 Hazardous Locations with Terminal Strip / 1/2" FNPT Conduit Connection **(±2% accuracy from 20-100% of full scale ascending)**
Z	Special (Contact Factory)

(1) Complete Assy. **3rd Party Certified**. Rated Class I, Div II, Groups A, B, C & D; Class II Div II Groups F&G **(R output excluded)**

(2) Complete Assy. **3rd Party Certified.** Rated Class I, Div I, Groups B, C & D; Class II Div I Groups E, F&G

(3) For output options A through H, the product switching voltage and current shall not exceed power rating.

(6) Enclosure Type 4/4X

(7) For electrical configuration B, K & S, SPDT relay output only

(8) Electrical configuration A & B in combination with Output Option R **is not** rated for Hazardous Locations

(9) Atex / IECEx Rated CE marked Ex d IIB + H_2 , Ex tb IIIC, IP65 (3000 PSIG SWP)

(10) Not Available with Electrical Configurations R & S

MID-WEST INSTRUMENT has been serving a variety of industries (Power, Chemical, Petro-Chemical, HVAC, Water Filtration etc…) for over 50 years. Over 1,000,000 DP Gauges have been produced bearing the Mid-West name or private branded for our OEM customers!

Mid-West understands that in today's demanding environment, flexibility, quick response time and the ability to ship most of our product line in 2 weeks or less is essential to our customers. Standard configurations can be customized and modified to suit our customer's needs for ease of installation or retrofit.

or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you.