Mid-West® Instrument

DIFFERENTIAL PRESSURE GAUGES SWITCHES & TRANSMITTERS

FILTER MONITORING • TANK LEVEL • HAZARDOUS LOCATION • FLOW MEASUREMENT • LIQUID LEVEL

LIQUID LEVEL • FLOW MEASUREMENT • FILTER MONITORING • TANK LEVEL • HAZARDOUS LOCATION

2010 PRODUCT CATALOG

STANDARD POLICIES and CONDITIONS OF SALE

Acceptance- Quotations are firm for 30 days unless otherwise specifically noted. All orders are subject to acceptance by Mid-West Instrument at our plant.

Shipping dates- The scheduled shipping date is established from the date we have all information necessary to properly process the subject order. Mid-West assumes no responsibility for any delays in shipment, for any reason.

Dimensional Data and Specifications- Information shown in Mid-West literature is general only and the right is reserved to change dimensions or specifications, etc., at any time.

Mid-West's standard methods of shipments unless otherwise specified are:
United Parcel Service
United Parcel "Hundred Weight" Service
Commercial Carrier

(NOTE: No freight bills are available on shipments by United Parcel Service. Saturday deliveries require customer contact name and phone number.)

Shipping Charges and F.O.B. Point - All shipments are F.O.B. our plant, Sterling Heights, Michigan. If shipping charges are to be prepaid and added to the invoice, Mid-West reserves the right to estimate these charges. Title to invoiced items transfers upon delivery to the carrier.

Minimum Invoice Order - $75.00 Net / **Minimum Credit Card Oder** - $25.00 Net

Cancellations and Returns - None may be made by a purchaser without prior authorization by Mid-West, and all return shipments must be prepaid.
Collect shipments will be refused.

Terms - Net 30 Days after invoice date. A service charge of 1 1/2% per month will be applied to all accounts over 30 days past due. This is a rate of 18% per year.

6500 Dobry Dr. • Sterling Heights, MI USA • Tel: 586-254-6500 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com
Toll Free: 800-648-5778

Mid-West® Instrument

Product Definitions

Making the right decision for your Differential Pressure application


"Piston" Type Gauge

Piston type: ± 2% or ± 5% Full Scale Accuracy. They are primarily designed for liquid applications. They exhibit a slight amount of bypass as the fluid crosses from the high to the low pressure port. Because gas molecules are smaller, the crossover is often deemed too great for the application. The Differential Pressure is sensed by the movement of a precisely ground floating piston/magnet in a precision bore against a calibrated spring. Any variation in pressure on either side of the piston/magnet will cause the magnet to move proportionally to the change in differential pressure. A rotary pointer magnet located close to the internal magnet, but outside the pressure housing, follows the movement of the piston magnet and indicates differential pressure on the dial. Piston type DP gauges exhibit a slight amount of bypass as the fluid crosses from the high to the low pressure port. Due to precision sizing of piston and body bore, leakage across the piston will not exceed 15 SCFH air at 100 PSID at ambient conditions.

Piston-Type Differential Pressure Gauges are available with one or two hermetically sealed reed switches or 4-20mA transmitter depending on model. The switches are adjustable within a defined percentage of the full scale range of the gauge and are available in SPDT and SPST, normally open or normally closed configurations for various load/power ratings. The switches can be set to activate or deactivate on rising or falling pressure. Switches are "CE" marked per the EU low voltage directive. Models 120, 121, & 123 can be configured for use in hazardous locations. All hazardous location switches are both CSA and UL listed. The CSA & UL listings are for the entire assembly and not just the enclosure.

"Diaphragm" Type Gauge

Diaphragm type: ± 2% or ± 5% Full Scale Accuracy. The high and low-pressure ports are completely isolated from each other. There is no bypass and therefore they are ideally suited for use on dissimilar fluids, air, gases, or liquids with a high concentration of solids, etc. They also come in a variety of sizes allowing for very sensitive measurements. The Differential Pressure is sensed by the movement of an elastomer diaphragm against a precision calibrated range spring. The change in position of the diaphragm in response to the change in Differential Pressure moves an internal magnet. This magnet, in turn, causes a rotary magnet external to the gauge body to rotate. This rotary magnet has a pointer attached which indicates the differential pressure on the dial.

Diaphragm-Type Differential Pressure Gauges are available with one or two hermetically sealed reed switches or 4-20mA transmitter depending on model. The switches are adjustable within a defined percentage of the full scale range of the gauge and are available in SPDT and SPST, normally open or normally closed configurations for various load/power ratings. The switches can be set to activate or deactivate on rising or falling pressure. Switches are "CE" marked per the EU low voltage directive. Mid-West Diaphragm-type Differential Pressure Gauges can be configured for use in hazardous locations. All Hazardous Location Switches are both CSA and UL listed. The CSA & UL listings are for the entire assembly and not just the enclosure.

“Bellows” Type Gauge

Bellows type**:** - ± 1/2% or ± 1% Full Scale Accuracy. System pressure is applied to the internal volume of a bellows and mechanical linkage assembly. As pressure changes, the bellows and linkage assembly move to cause an electrical signal to be produced or to cause a gauge pointer to move. The major components of the Model’s 105/106/115 and 116 are a two-piece body, bellows sensing element and over-pressure assembly, a torque tube assembly, a range spring and the gauge front assembly.

The body halves provide the pressure containment function. They also clamp the sensing element and over-pressure assembly between the halves, isolating the high side and low side pressures of the system. The high side body half also provides a mount for the torque tube assembly and the gauge front assembly.

The sensing element is exposed to the differential pressure and deflects in response to the differential pressure. This assembly incorporates a bidirectional relief valve which provides over-pressure protection in both directions. When over-pressured from the high side, the valve is opened by a mechanical stop as the sensing element deflects to its maximum travel. When over-pressured from the low side, the spring-loaded valve opens when the differential pressure exceeds its maximum rating.

The opening of the valve in either direction equalizes the pressure and protects the unit. A range spring is provided to adjust the spring rate of the system to suit the various differential pressure ranges of the instrument. **NOTE:** The use of diaphragm seals is not recommended for model105/106 series gauge. Attempts to install such seals on these gauges will void the warranty.

“Bourdon Tube” Type Gauge

Bourdon Tube type - ± 1/2% or ± 1% Full Scale Accuracy. System pressure is applied to the inside of a slightly flattened arc- shaped tube. As pressure increases, the tube tends to restore to its original round cross-section. This change in cross-section causes the tube to straighten. Since the tube is permanently fastened at one end, the tip of the tube traces a curve that is the result of the change in angular position with respect to the center.

Mid-West Model 109 is powered by a test quality Bourdon Tube Assembly. The assembly is encapsulated in a high pressure chamber that is fitted with a pressure connection to the inside of the Bourdon Tube and a second connection to the pressure chamber. The Model 109 indicates the difference between the pressure applied inside the Bourdon Tube and the pressure inside the chamber.

The pressure chamber for the assembly is small, close fitting and rugged. The volume displacement of the Bourdon Tube through the pressure range is near to zero (0.02 c.c.). The speed of response of the indicator to changes in differential pressure is instantaneous, even on low volume pressure systems. The low volume displacement is an important advantage for differential pressure leak detection, and when isolation diaphragms are required.

The Bourdon Tube Assembly is protected against over-range in either direction to the rated working pressure by a bi-directional relief valve. The output shaft of the gauge assembly is magnetically coupled through the solid wall of the pressure chamber to a sensitive jeweled pointer shaft in the dial housing outside the chamber. The magnetic coupling transmits the exact motion of the assembly to the pointer to give an accurate dial reading of the differential pressure. **NOTE:** The use of diaphragm seals is not recommended for Model 109 series gauge. Attempts to install such seals on these gauges will void the warranty.

6500 Dobry Dr., Sterling Heights, MI 48314 • Tel: 800-648-5778 • Tel: 586-254-6500 • Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email Contact: sales@midwestinstrument.com

Mid-West® Instrument

INTENTIONALLY BLANK

Mid-West® Instrument

"Piston Type"

Differential Pressure Gauges
Switches & Transmitters

Models 120, 122, 123 & 124

A low cost differential pressure gauge for use in measuring the pressure drop across filters, strainers, separators, valves, pumps, chillers, etc., and for local flow indication and control.

Model 120
0-50 PSID
2-1/2" Dial

- Simple, rugged, compact design.
- Working pressure up to 10,000 PSIG (690 bar)
- Over-range protection to maximum pressure.
- Housing materials: Aluminum or 316L Stainless Steel with 316 stainless steel internals.
- Weather-resistant construction standard.
- Shatter resistant lens.
- Temperature Limits: -40°F(-40°C) to +200°F(+93°C)
- Variety of Dial type and Sizes **(3-1/2", 4-1/2")** **(Uni-directional or Bi-directional)**
- Available DP Ranges: Inches H2O, PSID, bar, and Kpa
- ¼" FNPT & ½" FNPT Process Connections
- Multiple mounting options available

"A World Leader in Differential Pressure, Gauges, Switches & Transmitters

Model 122
with 3 color dial

Model 123
0-400 PSID

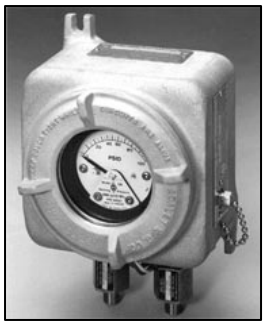
Model 120
0-50 PSID
4-/12" Dial

An optional maximum indication follower pointer provides automatic indication of maximum differential occurring during a time period or system cycle.
Reversed pressure ports are optionally available to facilitate installation and readability depending on which side of a filter, etc., the instrument must be installed.

Model	Body Material	Accuracy	Min. ΔP Range	Max. ΔP Range	MWP PSIG (Bar)	Switch Options
120	Aluminum & 316L S.S.	±2%	0-5 PSID (0-0.35 bar)	0-110 PSID (0-7 bar)	6,000 (400)	1 & 2 switch Hermetically Sealed
122	Aluminum	±5%	0-5 PSID (0-0.35 bar)	0-110 PSID (0-7 bar)	5,000 (340)	1 & 2 switch Hermetically Sealed
123	Aluminum & 316L S.S.	±2%	0-150 PSID (0-10 bar)	0-400 PSID (0-27 bar)	5,000 (340)	1 & 2 switch Hermetically Sealed
124	316L Stainless Steel	±2%	0-5 PSID (0-0.35 bar) 0-150 PSID (0-10.0 bar)	0-110 (0-7.0 bar) 0-400 (0-27.0 bar)	10,000 (690)	1 & 2 switch Hermetically Sealed Or 4-20 mA Transmitter

Proof Pressure: Two times rated working pressure at ambient temperature
Standards: Model 120 -124 Series gauges either conform to and/or are designed to the requirements of the following standards: ASME B1.20.1
ASME B40.100
CSA-C22.2 No. 14.25 and 30
EN-61010-1
NACE MR0175
NEMA Std. No. 250
SAE J514
UL Std. No. 50,508 and 1203

“Piston Type”
Differential Pressure Gauge
Switch & Transmitter Options
Models 120, 122, 123 & 124



The Model 120-124 Series DP gauges are available with one or two hermetically sealed reed switches or 4-20mA transmitter depending on model. (See chart below)

The switches are adjustable (see table for adjustment range) within a defined percentage of the full scale range of the gauge and are available in SPDT and SPST, normally open or normally closed configurations for various load power ratings. The switches can be set to activate or deactivate on rising or falling pressure.

The standard reed switch is enclosed in a weather-resistant plastic housing. Adjustment of the switch setting is made with an external screw adjustment.

The switch functionality will be different for gauges with bi-directional operation for positive and negative delta pressure. For example a SPDT switch with positive .P applied to the gauge, the red wire will be N.O. and the black will be N.C.. For negative .P the functionality will be reversed.

Location for a single SPDT (grommet or conduit) switch will be on the bottom of the gauge body for a normal port and on the top for a reverse port. Locations for a single SPST (grommet or conduit) N.O. or SPST N.C. switch will be on the bottom and top respectively for a normal port gauge. The locations will be reversed for a reverse port gauge.
A non-indicating (no dial) differential pressure switch is also available.

Hazardous Location switches are 3rd Party Certified Class I Div 2 or Class I Div 1 dependant on type of switch. Listings are for the entire design and not just the enclosure. Standard and weatherproof units are CE marked for conformance with the Low Voltage Directive to harmonized standard EN 61010-1.

Transmitters feature Microprocessor based, external zero interface, 8-28 Vdc loop powered, 2 wire interface. Standard output of 4-20mA with a max loop resistance of 1000 Ohms.

Model	•120, ^122,+123, +124	•120,+122, •123,	•120, ^122,+123, +124	•120, •123,•124	•120, •123,•124	124
Type	SPDT	SPDT	SPST NO	SPST NC	SPST NO/NC	4-20mA
Power	3 W	60 W	60 W	60 W	60 W	4-20 mA Loop Power
Max Current	0.25 Amps	1.0 Amps	3.0 Amps	3.0 Amps	3.0 Amps	8-28 VDC Loop Powered 2-Wire interface
Max Voltage VAC/VDC	125	240	240	240	240	1000 Ohm max Loop resistance at 28 vdc
Setting Full Scale	•10-90%	•25-100%	•25-95%	•25-95%	•25-95%	20-100%
	^10-100%	+25-100%	+25-95%			
	+15-90%		^25-100%			
Hysterisis (Max / Norm)	10% / 5% (FS)	20% / 13% (FS)	15% / 8% (FS)	15% / 8% (FS)	15% / 8% (FS)	N/A
Repeatability	1% F.S.	1% F.S.	1% F.S.	1% F.S.	1% F.S.	1% F.S
Leads 22 Awg	(3) 24"	(3) 24"	(2) 24"	(2) 24"	(2) 24"	N/A

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

"Piston Type" Model 121

Differential Pressure Switch & Transmitter

A low cost differential pressure indicating switch or transmitter for use in measuring the pressure drop across filters, strainers, separators, valves, pumps, chillers etc., and for local flow indication and control.

- ½ NPT conduit connection with heavy duty Switch or Transmitter cover and terminal strip
- Choice of 1 or 2 magnetically actuated hermetically sealed reed switches to provide high and low limit alarm or control or 4-20mA transmitter.
- -40°F to + 200°F (Switch Options); -20° F TO + 150° F (Transmitter Option)
- Housing materials: Aluminum or 316L Stainless Steel with 316 stainless steel internals.
- Weather-resistant construction standard.
- Working pressure up to 6,000 PSIG (400 bar)
- Over-range protection to maximum pressure.
- Shatter resistant lens.
- 2 ½", 3 ½" and 4 ½" dial assemblies.
- Available DP Ranges: Inches H2O, PSID, bar, and Kpa
- Gauge accuracy ± 2% full scale (ascending)*.
- Transmitter accuracy ± 2% full scale (from 20% to 100% of scale, ascending)

Transmitter now CSA Listed for Division 2 Hazardous Location Service

2 ½" Dial – Front View
¼" FNPT end connections

Model 121 Switch
¼" FNPT back connections

4-1/2" Dia. Transmitter
¼" FNPT back connections

Model	Body Material	Gauge Accuracy	Min. ΔP Range	Max. ΔP Range	MWP PSIG (Bar)	Switch Options
121	Aluminum & 316L S.S.	±2%	0-5 PSID (0-0.35 bar)	0-110 PSID (0-7 bar)	6,000 (400)	1 or 2 switches or 4-20mA Transmitter

Model 121 Indicating Switch(es) or 4-20mA Transmitter SPECIFICATIONS

TRANSMITTER

Features:
Microprocessor based, external zero interface:
8-28 Vdc loop powered, 2 wire interface

Electrical:

Accuracy	±2% (from 20% to 100% of scale, ascending)
Supply Voltage	8-28 Vdc
Output	4-20mA
Max Loop Resistance	1000 Ohms

Interface:
4 position terminal strip for 16-22 Awg wire
Pin 1 – return, Pin 2 = zero, Pin 3 = 8-28 Vdc, Pin 4-chassis
1/2" NPT conduit connection

Environmental: Weatherproof

Rating: (NEMA 4X, IP65)

SWITCHES

Features:
1 or 2 hermetically sealed reed switches

Electrical:
0-3W, 25 Amp
125 VAC (Adjustable 15-95% F.S.)
60W, 3.0 Amp
240 VAC (Adjustable 20-95% F.S.)

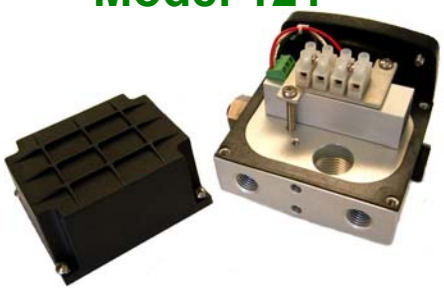
Interface:
7 position terminal strip for 16-22 Awg wire
1/2" NPT conduit connection

Environmental: Weatherproof

Rating: (NEMA 4X, IP65)

“Piston Type”
Differential Pressure
Switch & Transmitter Options
Model 121

Open back view
Model 121 reed switch
with terminal strip



Model 121 Transmitter show
with NEMA 4X plastic cover

Open view Model 121 Transmitter
4-20 mA terminal strip
w/ ¼” FNPT end connections

Piston-Type Differential Pressure Gauges are available with one or two hermetically sealed reed switches. The switches are adjustable within a defined percentage of the full scale range of the gauge and are available in SPDT and SPST, normally open or normally closed configurations for various load/power ratings. The switches can be set to activate or deactivate on rising or falling pressure. Switches are "CE" marked per the EU low voltage directive. Models 121 can be configured for use in Hazardous Locations.

Piston Type DP Gauge: ± 2% Full Scale Accuracy. They are primarily designed for liquid applications. They exhibit a slight amount of bypass as the fluid crosses from the high to the low pressure port. Because gas molecules are smaller, the crossover is often deemed too great for the application. Due to precision sizing of piston and body bore, leakage across the piston will not exceed 15 SCFH air at 100 PSID at ambient conditions.

	Electrical Configurations (CE marked, except E, F, J & K)
A	One (1) Reed switch in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2” FNPT Conduit Connection)**
B	Two (2) Reed switches in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2” FNPT Conduit Connection)**
E	One (1) Switch in general purpose enclosure, Division 2 Hazardous Locations **(1) (2)**
F	Two (2) Switches in general purpose enclosure, Division 2 Hazardous Locations **(1) (2)**
T	4-20 mA Transmitter in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2” FNPT Conduit Connection)**
W	4-20 mA Transmitter in NEMA 4X/IP65 Plastic enclosure. Division 2 Hazardous Locations with terminal strip **(1/2” FNPT Conduit Connection) (1) (2)**
Z	Special ***(Un-coded Options)***
	(1) Complete assembly 3rd Party Certified Class I, Div.2, Groups A, B, C, & D; Class II, Div.2, Groups F and G.
	(2) 5000 PSIG SWP for Stainless Steel: 3000 PSIG SWP for Aluminum
	Electrical Specifications (For Resistive Loads)
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 15-95%)
E	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Open) (Switch adjustable range of 20-95%)
F	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Closed) (Switch adjustable range of 20-95%)
G	SPST 60W, 3.0 Amp, 240 VAC/VDC (1) Normally Open, (1) Normally Closed (Switch adjustable range of 20-95%)
T	4-20 mA Transmitter (8-28 VDC Loop Power) (±2% accuracy from 20% to 100% of scale. Ascending)
Z	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Proof Pressure: Two times rated working pressure or 10,000 PSI whichever is lower at ambient temperature

Temperature Limits: -40°F to + 200°F **(Switch Options);** -20° F TO + 150° F **(Transmitter Option)-** 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.

Standards: Gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1
ASME B40.100
CSA-C22.2 No. 14.25 and 30
EN-61010-1
NACE MR0175
NEMA Std. No. 250
SAE J514
UL Std. No. 50,508 and 1203

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

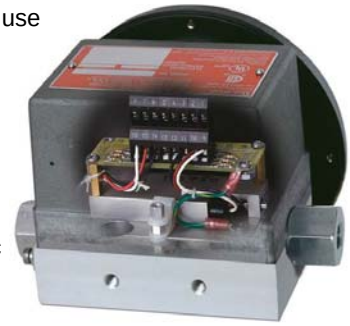
Mid-West® Instrument

"Piston Type" Model 220

"Hazardous Locations"

Indicating / Non-Indicating
Differential Pressure Switch or Transmitter

- Low cost piston type differential pressure switch for use in measuring or controlling the pressure drop cross filters, strainers, separators, valves and pumps.
- Simple rugged compact design
- Working Pressure 4,000 PSIG (275 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.
- Shatter resistant lens.



Switches: 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.

- 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
- 3rd Party Certified to US and Canadian standards.
- 3rd Party 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:
  Ex d IIB + H2 Ex tD A21 Ex II 2 GD IP65
  Division 2 Units are NEMA 4X

NOTE: Due to precision sizing of the piston and the body, bore leakage across the piston will not exceed 15 SCFH air at 100 PSID at ambient conditions. **This gauge should not be used in Hazardous Environments with low process port open to atmosphere.**

Model	Body Material	Accuracy	Min. ΔP Range	Max. ΔP Range	MWP PSIG (Bar)	Switch Options
220	Aluminum & 316L S.S.	±2%	0-5 PSID (0-0.35 bar)	0-100 PSID (0-7 bar)	**4,000 (275)	1 or 2 switches or 4-20mA Transmitter

**3,000 PSIG ATEX Certified

PROOF PRESSURE: 16,000 PSI.

TEMPERATURE LIMITS: -40°C <Ta <70°C – For output option R (Relay Output) -40°C <Ta <85°C – For electrical Input Options A in combination with electrical output options A, E, F, G & 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.

STANDARDS: All Model 220 Series differential pressure gauges either conform to and/or are designed to the requirements of the following standards: ASME B1.20.1 ASME B40.100 NEMA Std. No. 250 CSA-C22.2 No. 14, 25 and 30 SAE J514, UL Std. No. 50, 508, 698, and 1203

"Piston Type"

Differential Pressure Switch or Transmitter

Model 220

7	"MODEL 220" ELECTRICAL CONFIGURATIONS (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) **(2) (9)**
S	Two (2) Control switches in Ex d Enclosure (CE marked) **(2) (7) (9)**
T	4-20 mA Transmitter in NEMA7/EExd (Explosion Proof Enclosure)***(Temperature Limits -20°F to +150°F)** **Transmitter not yet CSA or UL certified**
Z	Special **(10)**
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
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 15-90% of full scale ascending)**
E	SPST, 60W, 3.0 Amp., 240 VAC/VDC (Normally Open) **(Switch Adjustable 15-90% of full scale ascending)**
F	SPST, 60W, 3.0 Amp., 240 VAC/VDC (Normally Closed) **(Switch Adjustable 15-90% of full scale ascending)**
G	SPST, 60W, 3.0 Amp., 240 VAC/VDC One (1) Normally Open, One (1) Normally Closed ***(B, K, & S Electrical Configurations only)*** **(Switch Adjustable 15-90% of full scale ascending)**
H	SPDT, 60W, 1.0 Amp., 240 VAC/VDC **(Switch Adjustable 25-90% of full scale ascending)**
R	DPDT, Relay, 10A @ 30 VDC, 120/240 VAC **(Switch Adjustable 15-90% of full scale ascending) (8)**
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 Rated CE marked Ex d IIB + H2 , Ex tD A21 Ex II 2GD IP65

(10) Not Available with Electrical Configurations R & S

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Standard Dial Ranges: Models 120, 122, 123, and 124

Range Type			
PSID	Kpa	Bar	Dual Scale
0-5 PSID	0-100 Kpa	0-1.0 Bar	0-5 PSID & 0-0.35 Kg/Cm2
0-10 PSID	0-160 Kpa	0-1.6 Bar	0-5 PSID & 0-35 KPA
0-15 PSID	0-250 kpa	0-2.0 Bar	0-10 PSID & 0-0.7 BAR
0-20 PSID	0-400 Kpa	0-2.5 Bar	0-10 PSID & 0-0.7 KG/CM2
0-25 PSID	0-600 Kpa	0-4.0 Bar	0-10 PSID & 0-70 KPA
0-30 PSID	0-700 Kpa	0-6.0 Bar	0-100 PSID & 0-7 BAR
0-50 PSID		0-7.0 Bar	0-100 PSID & 0-7 KG/CM2
0-60 PSID			0-100 PSID & 0-700 KPA
0-75 PSID			0-15 PSID & 0-1 BAR
0-100 PSID			0-15 PSID & 0-1 KG/CM2
0-110 PSID			0-15 PSID & 0-100 KPA
**0-150 PSID			0-20 PSID & 0-1.4 BAR
**0-200 PSID			0-20 PSID & 0-140 KPA
**0-250 PSID			0-25 PSID & 0-1.75 BAR
**0-300 PSID			0-25 PSID & 0-1.75 KG/CM2
			0-25 PSID & 0-175 KPA
			0-30 PSID & 0-2 BAR
			0-30 PSID & 0-2 KG/CM2
			0-30 PSID & 0-200 KPA
			0-50 PSID & 0-3.5 BAR
			0-50 PSID & 0-3.5 KG/CM2
			0-50 PSID & 0-350 KPA
			0-75 PSID & 0-500 KPA

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
120	0-5 PSID (0-0.35 bar)	0-110 PSID (0-7 bar)
122	0-5 PSID (0-0.35 bar)	0-100 PSID (0-7 bar)
**123	0-150 PSID (0-10 bar)	0-400 PSID (0-27 bar)
**124	0-5 PSID (0-0.35 bar) 0-150 PSID (0-10.0 bar)	0-110 PSID (0-7.0 bar) 0-400 PSID (0-27.0 bar)

Proof Pressure: Two times rated working pressure at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Model 120 -124 Series gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1
ASME B40.100
CSA-C22.2 No. 14.25 and 30
EN-61010-1
NACE MR0175
NEMA Std. No. 250
SAE J514
UL Std. No. 50,508 and 1203

Mid-West® Instrument

Standard Dial Ranges: Model 121

Range Type		
PSID	Kpa	Bar
0-5 PSID	0-100 Kpa	0-1.0 Bar
0-10 PSID	0-160 Kpa	0-1.6 Bar
0-15 PSID	0-250 kpa	0-2.0 Bar
0-20 PSID	0-400 Kpa	0-2.5 Bar
0-25 PSID	0-600 Kpa	0-4.0 Bar
0-30 PSID	0-700 Kpa	0-6.0 Bar
0-50 PSID		0-7.0 Bar
0-60 PSID		
0-75 PSID		
0-100 PSID		
0-110 PSID		

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
121	0-5 PSID (0-0.35 bar)	0-110 PSID (0-7 bar)

Proof Pressure: Two times rated working pressure at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Model 121 gauge either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1
ASME B40.1
CSA-C22.2 No. 14.25 and 30
EN-61010-1
NACE MR0175
NEMA Std. No. 250
SAE J514
UL Std. No. 50,508 and 1203

Standard Model Specifications: 120-AA-00-OO

6000 PSIG Working Pressure, Aluminum Body & End Plugs, Stainless Steel Piston,
Ceramic Magnet, Buna-N Seals, ¼" FNPT Back Connections,
2-1/2" round dial, Engineered Plastic Case with Shatter Resistant Acrylic Lens,
Accuracy ±2% Full Scale (Ascending)

Mid-West Instrument
1-800-648-5778

Range 0-5 PSID to 0-110PSID (0.35 to 7.0 bar)

1	2	3	4	5	6	7	8
1	2	0					

Basic Model

Range:_____




2	Material
A	Aluminum Body / Stainless Steel Piston
S	316 S.S Body / Stainless Steel Piston
M	Monel Body / Monel Piston
N	Aluminum Bronze Body / Aluminum Bronze Piston
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
A	2-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
E	3-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
G	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
2	Neoprene
4	Teflon®-A Registered Trademark of Dupont
5	Ethylene Propylene
6	Perfluorelastomers
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/4" FNPT Back Connections ***(Standard)***
2	1/4" FNPT End Connections
3	1/4" FNPT Bottom Connections
4	1/2" FNPT End Connections
6	7/16"-20 Straight Thread "O" Ring Port **(Back Connection)**
7	1/2" FNPT Stainless Steel Adapters / Back or Bottom Connections
9	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Standard Model Specifications – continued Model 120

6	Additional Options
O	None
A	Reversed High / Low Process Connections. **(Not available with Electrical options J & K)**
C	Mounting Holes in Gauge Body for Field Mounting Electrical Configurations Options A & B
D	Mounting Holes in Gauge Body for Field Mounting Electrical Configurations Options L & M
F	Carbon Steel 2" Pipe Mounting Kit **(not available with C, D, E or F electrical switch options)**
G	Stainless Steel 2" Pipe Mounting Kit **(not available with C, D, E or F electrical switch options)**
L	Liquid Fill **(2-1/2" & 4-1/2" Dials Only)** Not Available with Maximum Follower Pointer
M	Maximum Indicator Follower Pointer
N	NACE
Q	CRN **(Canadian Registration Number)**
S	Shatter Proof Glass Lens **(Available only with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag and S.S. Screw **(Contact Factory on Switch Options) Not on Gauge Body for Hazardous Locations**
W	Wall Mount Kit **(Not Available with Back Connections) (not available with E or F switch options)**
Z	Special ***(Un-coded Options)***
	NOTE: Not All Options Available in Combination with other Options
7	**Electrical Configurations (CE marked, except E, F, J & K)**
A	One (1) Switch in standard enclosure with grommet Wire Seal
B	Two (2) Switch in standard enclosures with grommet Wire Seal
C	One (1) Switch in standard enclosure with 1/4" FNPT electrical connection NEMA 4X
D	Two (2) Switch in standard enclosures with 1/4" FNPT electrical connection NEMA 4X
E	One (1) Switch in general purpose enclosure, Division 2 Hazardous Locations **(1) (3)**
F	Two (2) Switches in general purpose enclosure, Division 2 Hazardous Locations **(1) (3)**
G	One (1) Switch & gauge in NEMA 4X plastic enclosure **(Not available with end connections)**
H	Two (2) Switches & gauge in NEMA 4X plastic enclosure **(Not available with end connections)**
J	One (1) Switch in explosion proof enclosure with glass window cover, Division 1 Hazardous Locations **(2) (3)**
K	Two (2) Switches in explosion proof enclosure with glass window cover, Division 1 Hazardous Locations **(2) (3)**
L	One (1) Switch in standard enclosure with plug-in connector (DIN 43650/IP65-PG11)
M	Two (2) Switch in standard enclosures with plug-in connector (DIN 43650/IP65-PG11)
Z	Special ***(Un-coded Options)***
	(1) Complete assembly 3rd Party Certified Class I, Div.2, Groups A, B, C, & D; Class II, Div.2, Groups F and G.
	(2) Complete assembly 3rd Party Certified Class I, Div.1, Groups C & D; Class II, Div. 1, Groups E, F, & G.
	(3) 5000 PSIG SWP for Stainless Steel: 3000 PSIG SWP for Aluminum
8	**Electrical Specifications (For Resistive Loads)**
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 10-90%)
E	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Open) (Switch adjustable range of 25-95%)
F	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Closed) (Switch adjustable range of 25-95%)
G	SPST 60W, 3.0 Amp, 240 VAC/VDC (1) Normally Open, (1) Normally Closed (Switch adjustable range of 25-95%)
H	SPDT 60W, 1.0 Amp, 240 VAC/VDC (Switch adjustable range of 25-100%)
Z	Special ***(Un-coded Options)***

MID-WEST INSTRUMENT has been serving a variety of industries (Power, Chemical, Petro-Chemical, HVAC, Water Filtration etc…) for over 50 years. Over 700,000 piston type units 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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you…

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Standard Model Specifications: 121-AA-00-O(TT)

6000 PSIG Working Pressure, Aluminum Body, Adjusting Screws & End Plugs, Stainless Steel Piston, Ceramic Magnet, Buna-N Seals, ¼" FNPT Back Connections, 2-1/2" round dial, Engineered Plastic Case with Shatter Resistant Acrylic Lens, 4-20mA, 8-28 VDC Loop powered Transmitter in NEMA 4X/IP65 Plastic enclosure with terminal strip, & ½" FNPT Conduit Connection, Accuracy ±2% Full Scale (Ascending)

Mid-West Instrument
1-800-648-5778

Range 0-5 PSID to 0-100PSID (0-.35 bar to 0-7.0 bar)

1			2	3	4	5	6				7	8
1	2	1										

Basic Model

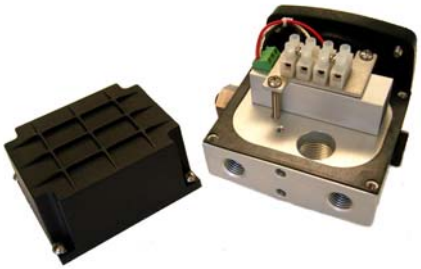
Range:_____




2	Material
A	Aluminum Body / Stainless Steel Piston
S	316 S.S Body / Stainless Steel Piston
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
A	2-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
E	3-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
G	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
2	Neoprene
4	Teflon®-A Registered Trademark of Dupont
5	Ethylene Propylene
6	Perfluorelastomers
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/4" FNPT Back Connections ***(Standard)***
2	1/4" FNPT End Connections
3	1/4" FNPT Bottom Connections
4	1/2" FNPT End Connections
6	7/16"-20 Straight Thread "O" Ring Port **(Back Connection)**
7	1/2" FNPT Stainless Steel Adapters / Back Connection
8	1/2" FNPT Stainless Steel Adapters / Bottom Connection
9	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Standard Model Specifications – continued Model 121



6	Additional Options
O	None
F	Carbon Steel 2" Pipe Mounting Kit
G	Stainless Steel 2" Pipe Mounting Kit
L	Liquid Fill **(2-1/2" & 4-1/2" Dials Only)** Not Available with Maximum Follower Pointer
M	Maximum Indicator Follower Pointer
N	NACE
Q	CRN **(Candian Registration Number)**
S	Shatter Proof Glass Lens **(Available only with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
W	Wall Mount Kit **(Not Available with Back Connections)**
Z	Special ***(Un-coded Options)***
	NOTE: Not All Options Available in Combination with other Options
7	**Electrical Configurations (CE marked, except E, F, J & K)**
A	One (1) Reed switch in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2" FNPT Conduit Connection)**
B	Two (2) Reed switches in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2" FNPT Conduit Connection)**
E	One (1) Switch in general purpose enclosure, Division 2 Hazardous Locations **(1) (2)**
F	Two (2) Switches in general purpose enclosure, Division 2 Hazardous Locations **(1) (2)**
T	4-20 mA Transmitter in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2" FNPT Conduit Connection)**
W	4-20 mA Transmitter in NEMA 4X/IP65 Plastic enclosure. Division 2 Hazardous Locations with terminal strip **(1/2" FNPT Conduit Connection) (1) (2)**
Z	Special ***(Un-coded Options)***
	(1) Complete assembly 3rd Party Certified Class I, Div.2, Groups A, B, C, & D; Class II, Div.2, Groups F and G.
	(2) 5000 PSIG SWP for Stainless Steel: 3000 PSIG SWP for Aluminum
8	**Electrical Specifications (For Resistive Loads)**
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 15-95%)
E	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Open) (Switch adjustable range of 20-95%)
F	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Closed) (Switch adjustable range of 20-95%)
G	SPST 60W, 3.0 Amp, 240 VAC/VDC (1) Normally Open, (1) Normally Closed (Switch adjustable range of 20-95%)
T	4-20 mA Transmitter (8-28 VDC Loop Power) (±2% accuracy from 20% to 100% of scale. Ascending)
Z	Special ***(Un-coded Options)***

MID-WEST INSTRUMENT has been serving a variety of industries (Power, Chemical, Petro-Chemical, HVAC, Water Filtration etc…) for over 50 years. Over 700,000 piston type units 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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you…

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Standard Model Specification: 122-AA-00-OO

5000 PSIG Working Pressure, Aluminum Body, Stainless Steel Piston, Ceramic Magnet,
Buna-N Seals, ¼" FNPT End Connections, 2-1/2" round dial,
Engineered Plastic Case with Shatter Resistant Acrylic Lens,
Accuracy ±5% Full Scale (Ascending)

Mid-West Instrument
1-800-648-5778

Range: 0-5 PSID to 0-110 PSID (0-.35 bar to 0-7.0 bar)

1	2	3	4	5	6	7	8
1	2	2					

Basic Model

Range:_____

2	Material
A	Aluminum Body / Stainless Steel Piston
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
A	2-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
E	3-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
G	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
2	Neoprene
4	Teflon®-A Registered Trademark of Dupont
5	Ethylene Propylene
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/4" FNPT End Connections ***(Standard)***
9	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Standard Model Specifications – continued Model 122

6	Additional Options (Choose up to four)
O	None
A	Reversed High / Low Process Connections.
L	Liquid Fill **(2-1/2" & 4-1/2" Dials Only)** Not Available with Maximum Follower Pointer
M	Maximum Indicator Follower Pointer
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag and S.S. Screw
W	Wall Mount Kit
Z	Special ***(Un-coded Options)***
NOTE	***Not All Options Available in Combination with other Options***
7	**Electrical Configurations (All options CE marked)**
M	One (1) Reed Switch **(Clamp-On)**
N	Two (2) Reed Switches **(Clamp-On)**
Z	Special ***(Un-Coded Options)***
NOTE	***M & N OPTIONS HAVE 22 AWG LEADS – 24" LENGTHS***
8	**Electrical Specifications (For Resistive Loads)**
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 10-100%)
E	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Open) (Switch adjustable range of 25-100%)
H	SPDT 60W, 1.0 Amp, 240 VAC/VDC (Switch adjustable range of 25-100%)
Z	Special ***(Un-Coded Options)***

MID-WEST INSTRUMENT has been serving a variety of industries (Power, Chemical, Petro-Chemical, HVAC, Water Filtration etc…) for over 50 years. Over 700,000 piston type units 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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you…

MADE IN USA

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-265-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Standard Model Specification: 123-AA-02-OO

5000 PSIG Working Pressure, Aluminum Body & End Plugs, Stainless Steel Piston, Ceramic Magnet, Buna-N Seals, ¼" FNPT End Connections, 2-1/2" round dial, Engineered Plastic Case with Shatter Resistant Acrylic Lens, Accuracy ±2% Full Scale (Ascending)

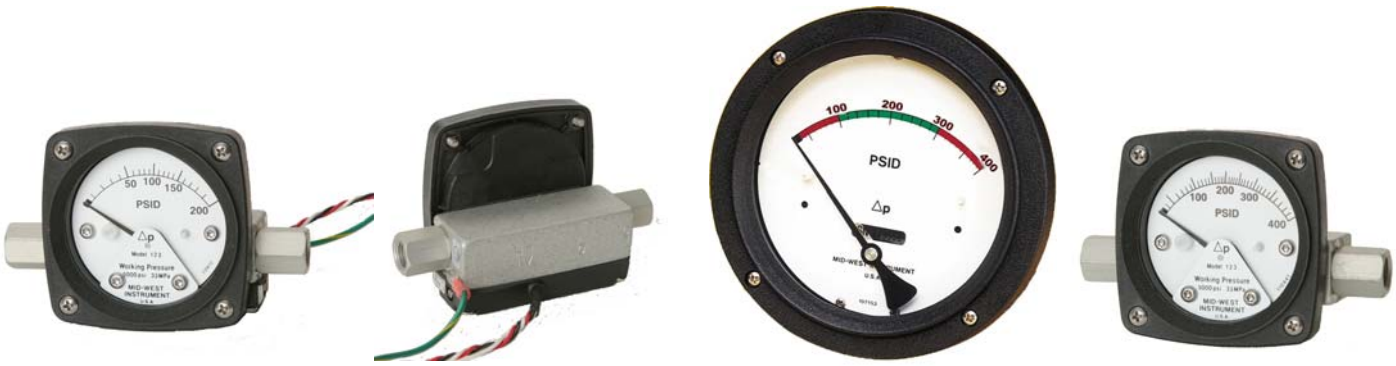
Mid-West Instrument
1-800-648-5778

Range: 0-150 PSID to 0-400 PSID (0-10.3 bar to 0-27.5 bar)

1	2	3												
1	2	3												

Basic Model

Range:_____



2	Material
A	Aluminum Body / Stainless Steel Piston
S	316 S.S Body / Stainless Steel Piston
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
A	2-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
G	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
2	Neoprene
5	Ethylene Propylene
9	Special ***(Un-coded Options)***
5	**Process Connections**
2	1/4" FNPT End Connections ***(Standard)***
4	1/2" FNPT End Connections
9	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Standard Model Specifications – continued Model 123

6	Additional Options
O	None
A	Reversed High / Low Process Connections.
C	Mounting Holes in Gauge Body for Field Mounting Electrical Configurations Options A & B
D	Mounting Holes in Gauge Body for Field Mounting Electrical Configurations Options L & M
F	Carbon Steel 2" Pipe Mounting Kit **(not available with C, D, E or F electrical switch options)**
G	Stainless Steel 2" Pipe Mounting Kit **(not available with C, D, E or F electrical switch options)**
L	Liquid Fill **(2-1/2" & 4-1/2" Dials Only)** Not Available with Maximum Follower Pointer
M	Maximum Indicator Follower Pointer
N	NACE
S	Shatter Proof Glass Lens **(Available onl;y with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag and S.S. Screw
W	Wall Mount Kit **(not available with E or F switch options)**
Z	Special ***(Un-coded Options)***
	NOTE: Not All Options Available in Combination with other Options
7	**Electrical Configurations (CE marked, except E, F, J & K)**
A	One (1) Switch in standard enclosure with grommet Wire Seal
B	Two (2) Switch in standard enclosures with grommet Wire Seal
C	One (1) Switch in standard enclosure with 1/4" FNPT electrical connection NEMA 4X
D	Two (2) Switch in standard enclosures with 1/4" FNPT electrical connection NEMA 4X
E	One (1) Switch in general purpose enclosure, Division 2 Hazardous Locations **(1)**
F	Two (2) Switches in general purpose enclosure, Division 2 Hazardous Locations **(1)**
L	One (1) Switch in standard enclosure with plug-in connector (DIN 43650/IP65-PG11)
M	Two (2) Switch in standard enclosures with plug-in connector (DIN 43650/IP65-PG11)
Z	Special ***(Un-coded Options)***
	(1) 3000 PSIG SWP for Aluminum
8	**Electrical Specifications (For Resistive Loads)**
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 15-90%)
E	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Open) (Switch adjustable range of 25-95%)
F	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Closed) (Switch adjustable range of 25-95%)
G	SPST 60W, 3.0 Amp, 240 VAC/VDC (1) Normally Open, (1) Normally Closed (Switch adjustable range of 25-95%)
H	SPDT 60W, 1.0 Amp, 240 VAC/VDC (Switch adjustable range of 25-95%)
Z	Special ***(Un-coded Options)***

MID-WEST INSTRUMENT has been serving a variety of industries (Power, Chemical, Petro-Chemical, HVAC, Water Filtration etc…) for over 50 years. Over 700,000 piston type units 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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you…

Standard Model Specification: 124-SA-00-OO

10000 PSIG Working Pressure, 316L Stainless Steel Body, Stainless Steel Piston,
Ceramic Magnet, Buna-N Seals, ¼" FNPT Back Connections, 2-1/2" round dial,
Engineered Plastic Case with Shatter Resistant Acrylic Lens,
Accuracy ±2% Full Scale (Ascending)

Mid-West Instrument
1-800-648-5778

Range: 0-5 PSID to 0-110 PSID (0-.35 bar to 0-7.0 bar)
Range: 0-150 PSID to 0-400 PSID (0-10.3 bar to 0-27.5 bar) ***(End connections only)***

1			2	3	4	5	6				7	8
1	2	4										

Basic Model

Range:_____



2	Material
S	316 S.S Body / Stainless Steel Piston
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
A	2-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Dial Case
E	3-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
G	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only
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**
0	1/4" FNPT Back Connections ***(Standard)***
2	1/4" FNPT End Connections
4	1/2" FNPT End Connections
7	1/2" FNPT Stainless Steel Adapters **(Back Connections Only)**
9	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Standard Model Specifications – continued Model 124

6	Additional Options
O	None
A	Reversed High / Low Process Connections.
F	Carbon Steel 2" Pipe Mounting Kit
G	Stainless Steel 2" Pipe Mounting Kit
L	Liquid Fill **(2-1/2" & 4-1/2" Dials Only)** Not Available with Maximum Follower Pointer
M	Maximum Indicator Follower Pointer
N	NACE
S	Shatter Proof Glass Lens **(Available only with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
W	Wall Mount Kit **(not available with E & F switch options)**
Z	Special ***(Un-coded Options)***
	NOTE: Not All Options Available in Combination with other Options
7	**Electrical Configurations (CE marked, except E, F)**
O	NONE
C	One (1) Reed switch in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2" FNPT Conduit Connection)**
D	Two (2) Reed switches in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2" FNPT Conduit Connection)**
T	4-20 mA Transmitter in NEMA 4X/IP65 Plastic enclosure with terminal strip **(1/2" FNPT Conduit Connection)**
Z	Special ***(Un-coded Options)***
8	**Electrical Specifications (For Resistive Loads)**
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 15-90%)
E	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Open) (Switch adjustable range of 25-95%)
F	SPST 60W, 3.0 Amp, 240 VAC/VDC (Normally Closed) (Switch adjustable range of 25-95%)
G	SPST 60W, 3.0 Amp, 240 VAC/VDC (1) Normally Open, (1) Normally Closed (Switch adjustable range of 25-95%)
T	4-20 mA Transmitter (8-28 VDC Loop Power) (±2% accuracy from 20% to 100% of scale. Ascending)
Z	Special ***(Un-coded Options)***

MID-WEST INSTRUMENT has been serving a variety of industries (Power, Chemical, Petro-Chemical, HVAC, Water Filtration etc…) for over 50 years. Over 700,000 piston type units 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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you…

MADE IN USA

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Standard Dial Ranges: Model 220

Range Type			
PSID	Kpa	Bar	Dual Scale
0-5	0-100 Kpa	0-1.0 Bar	0-10 PSID & 0-0.7 BAR
0-10	0-160 Kpa	0-1.6 Bar	0-10 PSID & 0-0.7 KG/CM2
0-15	0-250 kpa	0-2.5 Bar	0-10 PSID & 0-70 KPA
0-20	0-400 Kpa	0-4.0 Bar	0-100 PSID & 0-7 BAR
0-25	0-600 Kpa	0-6.0 Bar	0-100 PSID & 0-7 KG/CM2
0-30	0-700 Kpa	0-7.0 Bar	0-100 PSID & 0-700 KPA
0-50			0-15 PSID & 0-1 BAR
0-60			0-15 PSID & 0-1 KG/CM2
0-75			0-15 PSID & 0-100 KPA
0-100			0-20 PSID & 0-1.4 BAR
			0-20 PSID & 0-140 KPA
			0-25 PSID & 0-1.75 BAR
			0-25 PSID & 0-1.75 KG/CM2
			0-25 PSID & 0-172 KPA
			0-30 PSID & 0-2 BAR
			0-30 PSID & 0-2 KG/CM2
			0-30 PSID & 0-200 KPA
			0-50 PSID & 0-3.5 BAR
			0-50 PSID & 0-3.5 KG/CM2
			0-50 PSID & 0-350 KPA
			0-75 PSID & 0-500 KPA

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
220	0-5 PSID (0-0.35 bar)	0-100 PSID (0-7 bar)

Proof Pressure: Two times rated working pressure at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Model 120 -124 Series gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1
ASME B40.100
CSA-C22.2 No. 14.25 and 30
EN-61010-1
NEMA Std. No. 250
SAE J514
UL Std. No. 50,508 and 1203

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

INTENTIONALLY BLANK

Standard Model Specifications: 220-AC-02-O (JAA)

4000 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 **3rd Party Certified**

1-800-648-5778 **Range 0-5 PSID to 0-100PSID (0-.35 bar to 0-7.0 bar)**

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

Basic Model

Range:_____




2	Material
A	Aluminum Wetted Pressure Containing Body / Stainless Steel Piston
S	316/316L S.S Wetted Pressure Containing Body Assembly Wetted Internals: Stainless Steel Piston & Ceramic moving components
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
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
2	Neoprene
5	Ethylene Propylene
6	Perfluorelastomers
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 only with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag with S.S. Screws
W	Wall Mount Kit **(Not Available with Back Connections)**
Y	S.S. End Fittings with Aluminum Body **(Material Option "A")**
Z	Special ***(Un-Coded Options)***

NOTE: Not All Options Available in Combination with other Options

Standard Model Specifications – continued Model 220

	"MODEL 220" ELECTRICAL CONFIGURATIONS
7	**(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) **(2) (9)**
S	Two (2) Control switches in Ex d Enclosure (CE marked) **(2) (7) (9)**
T	4-20 mA Transmitter in NEMA7/EExd (Explosion Proof Enclosure)***(Temperature Limits -20°F to +150°F)** **Transmitter not yet CSA or UL certified**
Z	Special **(10)**
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
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 15-90% of full scale ascending)**
E	SPST, 60W, 3.0 Amp., 240 VAC/VDC (Normally Open) **(Switch Adjustable 15-90% of full scale ascending)**
F	SPST, 60W, 3.0 Amp., 240 VAC/VDC (Normally Closed) **(Switch Adjustable 15-90% of full scale ascending)**
G	SPST, 60W, 3.0 Amp., 240 VAC/VDC One (1) Normally Open, One (1) Normally Closed ***(B, K, & S Electrical Configurations only)*** **(Switch Adjustable 15-90% of full scale ascending)**
H	SPDT, 60W, 1.0 Amp., 240 VAC/VDC **(Switch Adjustable 25-90% of full scale ascending)**
R	DPDT, Relay, 10A @ 30 VDC, 120/240 VAC **(Switch Adjustable 15-90% of full scale ascending) (8)**
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 Rated CE marked Ex d IIB + H2 , Ex tD A21 Ⓔ II 2GD IP65

(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 700,000 piston type units 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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you…

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

"Diaphragm Type"
Differential Pressure Gauge & Switch
Model 130

Shown here with Range 0-5″ H2O

Model 130 is a rugged general purpose differential pressure gauge with a 4-1/2" round dial.

Common Applications: Tank Level Monitoring Horizontal or Vertical Flow, Liquid Level, Indication/Balancing, Filter Monitoring for Gases, Water Treatment Applications and Vacuum Application

"A World Leader in Differential Pressure Gauges & Switches

The low range capability of the **Model 130** is ideally suited for flow, liquid level and vacuum applications. Magnetic coupling between the sensing element and the indicating pointer provides for complete isolation of the process fluid within the pressure capsule. The few internal metal parts are 316L Stainless Steel.

Shown with Engineered Plastic Body

Model 130:

- Housing materials: Glass-Reinforced Engineered Plastic, Aluminum, 316L Stainless Steel and Brass
- Accuracy: 0-5" thru 0-9.9" H2O ±5% Full Scale Ascending 0-10" thru0-400" H2O ±2% Full Scale Ascending
- Weather-resistant construction standard.
- Use on virtually all reasonably clean liquids or gases.
- Over-range protection to full rated working pressure.
- Diaphragm design allows use of dissimilar fluids on high and low side of gauge.
- Can be used with vacuum or pressure applications
- Shatter resistant lens.
- 4-1/2" plastic dial assemblies standard.
- Variety of Uni-directional Dial types
- ¼" FNPT & ½" FNPT Process Connections
- DP Ranges available in: Inches H2O, PSID, mbar, and Kpa
- Available with Square Root dials for flow measurement

Shown with S.S. Cast Body

Model	Accuracy	Min. ΔP Range	Max. ΔP Range	Max. Working Pressure PSIG (bar)	Optional Switches
130	±2% or 5%	0-5" H_20 (0-12.4 mbar)	0-400" H_20 (0-1 bar)	*300 (20) **500 (34)	1 & 2 switches Hermetically Sealed

*Glass-Reinforced Engineered Plastic **Aluminum, Brass and Stainless Steel

Switches available on Aluminum, Brass & 316 S.S. bodies only.

“Diaphragm Type”
Differential Pressure Gauge
Switch Options
Model 130

Model 130 in Explosion Proof (left)
and NEMA 4X (right) enclosures

Shown w/Aluminum Body &
(1) Reed Switch in Condulet enclosure

Model 130 is available in Aluminum, Brass and 316SS bodies only with one or two hermetically sealed reed switches for low and/or high limit alarm. These CSA listed switches are Single Pole Double Throw (SPDT) with adjustable set points. Switches can be set to activate/deactivate on rising or falling pressure. Switches are enclosed in a weather resistant housing. Switch setting is readily made with a screw adjustment.

CSA listed control switching is available in non-corrosive molded plastic enclosures.
These are oil tight, dust tight and watertight per NEMA Type 4X standards.

CSA listed control switching is available in an explosion-proof enclosure which complies with NEC Class I, Groups C and D; Class II Groups E, F, and G; NEMA 7 and 9 standards. These are machined cast-aluminum enclosures with 1/2" FNPT conduit connection and 24" wire leads.

Shown w/Aluminum Body &
(1) Reed Switch with
Condulet enclosure and
Plug-In Connector
(Din 46350-PG 11)

Model	130
Type	SPDT
Power	3 W
Max Current	0.25 Amps
Max Voltage VAC/VDC	125 VAC/VDC
Setting Full Scale	10-90%
Hysterisis (Max / Norm)	10% / 5% (FS)
Repeatability	1% F.S.
Connections	(3) 24" Leads 22 AWG

Shown in NEMA 4X
Plastic enclosures

Factory preset switch at no extra charge (Specify Setting)
Specify increasing or decreasing range to be set.

Proof Pressure: Two times rated working pressure or 10,000 PSI whichever is lower at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1	NACE MR0175
ASME B40.100	NEMA Std. No. 250
CSA-C22.2 No. 14.25 and 30	SAE J514
EN-61010-1	UL Std. No. 50.508 and 1203

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

"Diaphragm Type"

Differential Pressure Gauges for
Ammonia Service Application

When it comes to tough application solutions Mid-West Instrument provides the answer!!

Model 130
Range 0-5" H2O

The Use of Differential Pressure gauges for Ammonia service in PowerGen emission control is a critical application. The use of special materials along with over 7 years of ammonia service experience has enabled our customers to have confidence that we provide a quality gauge that works not only at start up but for years to come in this harsh environment. Mid-West Instrument has optimized the internal wetted parts as well as the external parts to hold up to the rigors of this environment. We have optimized the design to improve removal of condensate from the system. Silicone and Ethylene Propylene elastomers are highly recommended in Ammonia service especially at elevated temperatures.

Model 130 Polysulfone or Stainless Steel is ideally suited for Ammonia service applications. Magnetic coupling between the sensing element and the indicating pointer provides for complete isolation of the process fluid within the pressure capsule. The Model 130 also has Over-range protection to full rated working pressure.

Model	Accuracy	Min. ΔP Range	Max. ΔP Range	Safe Working Pressure PSIG (Bar)	Optional Switches
130	±2% or *5%	0-5" H20 (0-12.4 mbar)	0-400" H20 (0-1 bar)	*300 (20) **500 (34)	1 or 2
* ±5% Range 0-5" to 0-9.9" H2O			* PolySulfone Engineered Plastic **Stainless Steel		
(Optional Switches available on Stainless Steel body only.)					

Body Materials	Glass Reinforced Ploysulfone Engineered Plastic or 316 Stainless steel
Seal & Diaphragm (under 20" H2O)	Silicone Diaphragm & Ethylene Propylene Seals
Seal & Diaphragm (over 20" H2O)	Ethylene Propylene Diaphragm & Seals
Wetted Parts	Body material & 316L Stainless Steel internal metal parts
Process Connections	1/4" FNPT S.S. Adapters (Polysulfone Body)
Process Connections	1/2" FNPT S.S. Adapters (316 Stainless Steel Body)
Mounting	Panel Mount (Std.) Pipe Mount Optional
Lens	Shatter Resistant Acrylic
Gauge Front	4-1/2" Engineered Plastic (Ammonia Service Tested)
Temperature Limits	-40°F to +200°F

Contact Mid-West at 1-800-648-5778 for assistance with your Ammonia Service application.

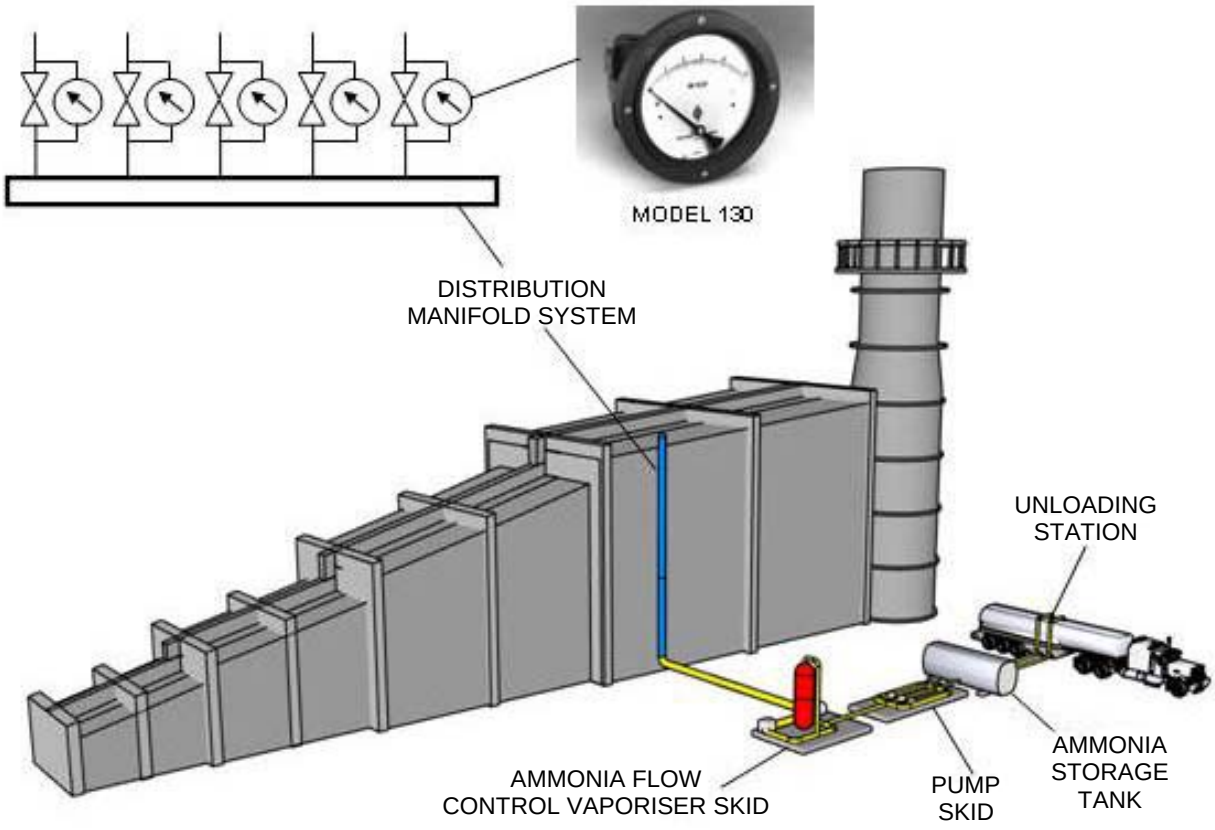
SCR Post-Combustion NOx Control
Model 130-PC or 130-SC

Nitrogen oxides (NOx) are a combustion by-product of fossil fuels burned to produce energy. NOX emissions are regulated under the Clean Air Act.

A Selective Catalytic Reduction System (SCR) is a post combustion technology used to reduce NOx emissions. Ammonia (NH3) is injected into the flue gas. This mixture flows through a catalyst bed where the NH3 and the NOx react to form nitrogen and water vapor.

Aqueous or anhydrous ammonia is pumped from a tank and sprayed into a vaporizer where it is heated and mixed with air. The ammonia-air mixture flows through a distribution manifold system into an injection grid. The injection grid distributes the mixture into the flue gas stream.

The amount of ammonia is adjusted to produce the desired degree of reaction with the NO**x.**Mid-West Instrument model 130-PC or 130-SC are used to balance the flow of the ammonia-air mixture throughout distribution manifold system. The model 130-PC or 130-SC are also used to monitor an ammonia filter prior to injection into the vaporizer.



6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

"Diaphragm Type"
Differential Pressure Gauges
Switches & Transmitters
Models 140 & 142

Models **140/142 Series** of Diaphragm type DP Gauges provide outstanding capabilities not previously available in a modestly priced differential pressure gauge/switch.

Ideally suited for use on dissimilar fluids and wet gas or fluids with a high concentration of solids, etc.

Common Applications: Filter/Strainer Monitoring, Compressed Air, Hydraulic, Refrigerant, Pump Performance Testing, Heat Exchanger Pressure Drop Monitoring, Water Treatment Applications, Tank Level Monitoring Horizontal or Vertical, Flow Monitoring & Balancing

Model 140 with 4-1/2" Dial and maximum follower pointer

Features:

- Total separation of high and low pressures by a Convoluted Elastomer Diaphragm.
- Over range protection to full rated working pressure.
- Body Materials: Aluminum, Brass or 316L stainless steel Hasteloy available upon request.
- Internal metal parts 316 stainless steel.
- ¼" FNPT & ½" FNPT Process Connections
- Sensor magnetically coupled to the indicating pointer and optional switches.
- Weather-resistant construction standard.
- Shatter resistant lens.
- Variety of Uni-Directional Dial types and sizes
- DP Ranges available in: Inches H2O, PSID, bar, and Kpa
- Available with Square Root dials for flow measurement

"A World Leader in Differential Pressure Gauges, Switches & Transmitters

Model 142 with 2-1/2" Dial

Model 140 with 2-1/2" Dial

Model	Accuracy	Min. ΔP Range	Max. ΔP Range	Max. Line Pressure PSIG (bar)	Optional Switches
142	±2%	0-20" H_20 (0-50 mbar)	0-25 PSID (0-1.7 bar)	3000 (200)**	1 or 2 Switches or 4-20 mA Transmitter
140	±2%	0-25 PSID (0-1.7 bar)	0-100 PSID (0-7 bar)	3000 (200)**	1 or 2 Switches or 4-20 mA Transmitter

**** Brass Body Working Pressure rated @ 1500 PSIG (103 bar)**

“Diaphragm Type”
Differential Pressure Gauge
Switch & Transmitter Options
Models: 140 & 142

Model 140 shown with “AA” switch option
(1) Reed switch located inside NEMA 4x enclosure with 7 position terminal strip. An opening at rear of enclosure accepts ½” flexible weather-proof or conduit connector (supplied by customer).

Model 140 shown with “EA” switch option.
(1) Reed switch in general purpose enclosure Division 2 Hazardous locations with 7 position terminal strip. An opening at rear of enclosure accepts ½” flexible weather-proof or conduit connector (supplied by customer).

Model 140 & 142 “Delta Meters” are available with either one or two hermetically sealed reed switches for either high alarm, low alarm, or both and a 4-20mA transmitter depending on model. The switches are Single Pole Double Throw (SPDT) or Single Pole Single Throw (SPST) with adjustable set points. Switches can be set to activate/deactivate on rising or falling pressure.

Model 140& 142 standard switch enclosure is non-corrosive molded plastic that is oil tight, dust tight, and water tight per NEMA 4X. External access to the switch adjustment is provided. 3rd party certified Explosion Proof enclosures with SPDT or SPST switches rated Class I, Groups C & D, Class II, Groups E, F, & G are available. Switch leads are 24", 18 Awg, and are color coded where applicable.

Model 142 shown with “BA” switch option
(2) Reed switches located inside NEMA 4x enclosure with 7 position terminal strip. An opening at rear of enclosure accepts ½” flexible weather-proof or conduit connector (supplied by customer).

Model Type	140, 142 SPDT	140 SPST NO	142 SPST NO	140, 142 Transmitter 4-20mA
Power	3 W	25 W	25 W	4-20 mA Loop Power
Max Current	0.25 Amps	0.5 Amps	0.5 Amps	8-28 VDC Loop Powered 2-Wire interface
Max Voltage VAC/VDC	125 VAC/VDC	230 VAC/VDC	230 VAC/VDC	1000 Ohm max Loop resistance at 28 vdc
Setting Full Scale	**“140”** 15-90% **“142”** 15-95%	15-90%	15-95%	20-100%
Hysterisis (Max / Norm)	10% / 5% (FS)	15% / 8% (FS)	15% / 8% (FS)	N/A
Repeatability	1% F.S.	1% F.S.	1% F.S.	1% F.S
Connections	(3) 24" Leads 22 AWG	(2) 24" Leads 22 AWG	(2) 24" Leads 22 AWG	Terminal Strip

Proof Pressure: Two times rated working pressure or 10,000 PSI whichever is lower at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1	NACE MR0175
ASME B40.100	NEMA Std. No. 250
CSA-C22.2 No. 14.25 and 30	SAE J514
EN-61010-1	UL Std. No. 50,508 and 1203

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

"Diaphragm Type"

Differential Pressure Switches & Transmitter

Model 140/142

The Model 140/142 Transmitter o ffers a highly visible local display along with the independent 4-20mA output. This allows for precise monitoring at the unit or at the control panel. This economical priced unit works well in tank level applications and in fluids with high solids content.

Model 142 Transmitter
0-20" H2O

Transmitter CSA Listed for Division 2 Hazardous Location Service

Transmitter
Top View

Model 141 Switch
0-50 PSID

- Choice of 4-20ma Transmitter or 1 to 2 magnetically actuated hermetically sealed reed switches to provide high and low limit alarm or control.
- Aluminum, 316L Stainless Steel or Brass Gauge Body
- Wetted 316 SS and Ceramic moving parts
- Wide variety of elastomers available
- Weather-resistant construction standard.
- SWP of 3,000 PSIG (207 bar) for ALM. & S.S.Body
- SWP of 1,500 PSIG (103 bar) for Brass Body
- Over-range protection to maximum pressure.
- Shatter resistant lens.
- 2 ½" & 4 ½" dial assemblies or No-dial indication available
- Available DP Ranges: Inches H2O, PSID, bar, and Kpa
- Gauge accuracy ± 2% full scale (ascending)
- Transmitter accuracy ± 2% full scale (from 20% to 100% of scale, ascending)
- Transmitter operating temperature: -20°F to +150°F (-20°C to +65°C)

Model	Gauge Accuracy	Min. ΔP Range	Min. ΔP Range	Max Line Pressure PSIG (bar)	Optional Switches
142	±2%	0-20" H20 (0-50 mbar)	0-25 PSID (0-1.7 bar)	3000 (200)**	1 or 2 Switches or 4-20 mA Transmitter
140	±2%	0-25 PSID (0-1.7 bar)	0-100 PSID (0-7 bar)	3000 (200)**	1 or 2 Switches or 4-20 mA Transmitter

Model 140/142 Indicating Switch(es) or 4-20mA Transmitter SPECIFICATIONS

TRANSMITTER

Features:
Microprocessor based, external zero interface:
8-28 Vdc loop powered, 2 wire interface

Electrical:

Accuracy	±2% (from 20% to 100% of scale, ascending)
Supply Voltage	8-28 Vdc
Output	4-20mA
Max Loop Resistance	1000 Ohms

Interface:
4 position terminal strip for 16-22 Awg wire
Pin 1 – return, Pin 2 = zero, Pin 3 = 8-28 Vdc, Pin 4-chassis
½" NPT access

Environmental: Weatherproof

Rating: (NEMA 4X, IP65)

SWITCHES

Features:
1 or 2 hermetically sealed reed switches

Electrical: Switch rating & adjustability
3W 0.25 Amp 125 VAC/VDC
(10-90% F.S. 140) (15-95% F.S. 142)
25W, 0.5 Amp 230 VAC/VDC NO
(10-90% F.S. 140) (15-95% F.S. 142)

Interface:
7 position terminal strip for 16-22 Awg wire
½" NPT access

Environmental: Weatherproof

Rating: (NEMA 4X, IP65)

“Diaphragm Type”

Differential Pressure Gauge
Switch & Transmitter Options
Models: 140 & 142

Model 140 shown with “AA” switch option

(1) Reed switch located inside NEMA 4x enclosure with 7 position terminal strip. An opening at rear of enclosure accepts ½” flexible weather-proof or conduit connector (supplied by customer).

Model 142 shown with “BA” switch option

(2) Reed switches located inside NEMA 4x enclosure with 7 position terminal strip. An opening at rear of enclosure accepts ½” flexible weather-proof or conduit connector (supplied by customer).

Model 140 & 142 “Delta Meters” are available with either one or two hermetically sealed reed switches for either high alarm, low alarm, or both and a 4-20mA transmitter depending on model. The switches are Single Pole Double Throw (SPDT) or Single Pole Single Throw (SPST) with adjustable set points. Switches can be set to activate/deactivate on rising or falling pressure.

Model 140& 142 standard switch enclosure is non-corrosive molded plastic that is oil tight, dust tight, and water tight per NEMA 4X. External access to the switch adjustment is provided. CSA Listed Explosion Proof enclosures with SPDT or SPST switches rated Class I, Groups C & D, Class I I, Groups E, F, & G are available. Switch leads are 24", 18 Awg, and are color coded where applicable.

	"Model 140" Electrical Configurations (CE marked, except C, D, T & W)
A	One (1) Reed Switch in NEMA 4X/IP66 Enclosure
B	Two (2) Reed Switches in NEMA 4X/IP66 Enclosure
C	One (1) Switch in Explosion Proof Enclosure. Division 1 Hazardous Locations **(2)**
D	One (2) Switches in Explosion Proof Enclosure. Division 1 Hazardous Locations **(2)**
E	One (1) Reed Switch in NEMA 4X/IP66 Aluminum Enclosure, Division 2 Hazardous Locations **(3)**
F	Two (2) Reed Switches in NEMA 4X/IP66 Aluminum Enclosure, Division 2 Hazardous Locations **(3)**
T	4-20 mA Transmitter in NEMA-4X/IP66 aluminum enclosure
W	4-20 mA Transmitter in general purpose enclosure, Division 2 Hazardous Locations **(3)**
Z	Special ***(Un-coded Options)***
	(2) Complete assembly 3rd Party Certified Class I, Div.1, Groups C & D; Class II, Div. 1, Groups E, F, & G.
	(3) Complete assembly 3rd Party Certified Class I, Div.2, Groups A, B, C, & D; Class II, Div.2, Groups F and G.

	"Model 142" Electrical Configurations (CE marked, except T & W)
A	One (1) Reed Switch in NEMA 4X/IP66 Enclosure
B	Two (2) Reed Switches in NEMA 4X/IP66 Enclosure
E	One (1) Reed Switch in NEMA 4X/IP66 Aluminum Enclosure, Division 2 Hazardous Locations **(3)**
F	Two (2) Reed Switches in NEMA 4X/IP66 Aluminum Enclosure, Division 2 Hazardous Locations **(3)**
T	4-20 mA Transmitter in NEMA-4X/IP66 aluminum enclosure
W	4-20 mA Transmitter in general purpose enclosure, Division 2 Hazardous Locations **(3)**
Z	Special ***(Un-coded Options)***
	(2) Complete assembly 3rd Party Certified Class I, Div.1, Groups C & D; Class II, Div. 1, Groups E, F, & G.
	(3) Complete assembly 3rd Party Certified Class I, Div.2, Groups A, B, C, & D; Class II, Div.2, Groups F and G.

	Electrical Specifications (For Resistive Loads)
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 15-90%)
B	SPST, 25W, 0.5 Amp., 230 VAC/VDC (Normally Open) (Switch adjustable range of 15-90%)
T	4-20 mA Transmitter (8-28 VDC Loop Power) (± 2% Accuracy from 20-100% of scale, Ascending)
Z	Special ***(Un-coded Options)***

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

"Diaphragm Type" Model 240

"Hazardous Locations"

Indicating / Non-Indicating
Differential Pressure Switch or Transmitter

- Low cost piston type differential pressure switch for use in measuring or controlling the pressure drop cross filters, strainers, separators, valves and pumps.
- Simple rugged compact design
- Working Pressure 4,000 PSIG (275 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.
- Shatter resistant lens.

Switches: 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 fie 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 independent 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.

- 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
- 3rd Party Certified to US and Canadian standards.
- 3rd Party 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:
  Ex d IIB + H_2 Ex tD A21 Ex II 2 GD IP65
  Division 2 Units are NEMA 4X

Differential pressure is sensed by a flexible elastomer diaphragm and a calibrated range spring. The diaphragm prohibits the possibility of fluid leaking into the gage case, while assuring total isolation of the process fluid within the pressure capsule. The diaphragm assures total separation between the high and low pressure signals.

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)	0-100 PSID (0-7 bar)	1,500 (100)	1 or 2 switches or 4-20mA Transmitter

PROOF PRESSURE: 6,000 PSI.

TEMPERATURE LIMITS: -40°C <Ta <70°C – For output option R (Relay Output)
-40°C <Ta <85°C – For electrical Input Options A in combination with electrical output options A, E, F, G & 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.

STANDARDS: All Model 240 Series differential pressure gauges either conform to and/or are designed to the requirements of the following standards: ASME B1.20.1, ASME B40.100 NEMA Std. No. 250 CSA-C22.2 No. 14, 25 and 30 SAE J514, UL Std. No. 50, 508, 698, and 1203

"Diaphragm Type"

Differential Pressure Switch or Transmitter

Model 240

7	"MODEL 240" ELECTRICAL CONFIGURATIONS 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) **(2) (9)**
S	Two (2) Control switches in Ex d Enclosure (CE marked) **(2) (7) (9)**
T	4-20 mA Transmitter in NEMA7/EExd (Explosion Proof Enclosure)***(Temperature Limits -20°F to +150°F)** **Transmitter not yet CSA or UL certified**
Z	Special (Uncoded 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
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 15-90% of full scale ascending)**
E	SPST, 60W, 3.0 Amp., 240 VAC/VDC (Normally Open) **(Switch Adjustable 15-90% of full scale ascending)**
H	SPDT, 60W, 1.0 Amp., 240 VAC/VDC **(Switch Adjustable 25-90% of full scale ascending)**
R	DPDT, Relay, 10A @ 30 VDC, 120/240 VAC **(Switch Adjustable 15-90% of full scale ascending) (8)**
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 Rated CE marked Ex d IIB + H2 , Ex tD A21 Ex II 2GD IP65

(10) Not Available with Electrical Configurations R & S

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Standard Dial Ranges: Model 130

Range Type				
IN H_2O	PSID	Kpa	mbar	Flow Scales
0-5”	0-5	0-1.6	0-16	0-1.0
0-10”	0-10	0-2.5	0-25	0-1.25
0-15”	0-15	0-4.0	0-40	0-1.5
0-20"		0-6.0	0-60	0-1.75
0-25"		0-10	0-100	0-2.0
0-30"		0-16	0-160	0-2.5
0-40"		0-25	0-250	0-3.0
0-50"		0-40	0-400	0-3.5
0-60"		0-60	0-600	0-4.0
0-75"		0-100	0-1000	0-4.5
0-100"				0-5.0
0-135"				0-5.5
0-150"				0-6.0
0-200"				0-6.5
0-300"				0-7.0
0-400"				0-7.5
				0-8.0
				0-8.5
				0-9.0
				0-9.5
				0-10
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
130	0-5" H2O (0-12.4 mbar)	0-400" H2O (0-1 bar)

Proof Pressure: Two times rated working pressure at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Model 130-142 Series gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1
ASME B40.100
CSA-C22.2 No. 14.25 and 30
EN-61010-1
NACE MR0175
NEMA Std. No. 250
SAE J514
UL Std. No. 50,508 and 1203

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Standard Dial Ranges: Model's 140 & 142

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	0-10
0-75"	0-50	0-250		
0-100"	0-60	0-400		
0-135"	0-75	0-600		
0-150"	0-100	0-700		
0-200"				
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
140	0-25 PSID (0-1.7 bar)	0-100 PSID (0-7 bar)
142	0-20" H2O (0-50 mbar)	0-25 PSID (0-1.7 bar)

Proof Pressure: Two times rated working pressure at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Model 130-142 Series gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1
ASME B40.100
CSA-C22.2 No. 14.25 and 30
EN-61010-1
NACE MR0175
NEMA Std. No. 250
SAE J514
UL Std. No. 50,508 and 1203

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Standard Model Specifications: 130-PC-00-OO

Glass-Reinforced Engineered Plastic Body, 316 Stainless Steel Internal Metal Parts
Ceramic Magnet, Buna-N Diaphragm and Seals, ¼" Steel Compression Tube Fittings,
4-1/2" round dial, Engineered Plastic Case with Shatter Resistant Acrylic Lens,
(Aluminum, Brass & Stainless Steel Bodies-Dual ¼" FNPT Top & Bottom)
Accuracy ±5% Full Scale (Ascending) 0-5" H_2O to 0-9.9" H_2O or equivalent
Accuracy ±2% Full Scale (Ascending) 0-10" H_2O to 0-400" H_2O or equivalent

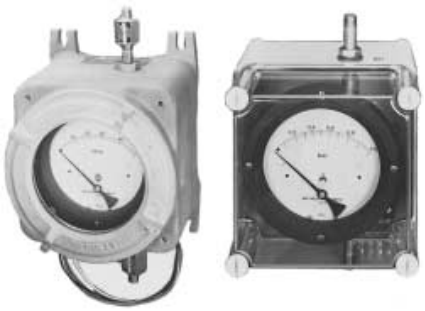
Mid-West Instrument
1-800-648-5778

Range 0-5 IN H_2O to 0-400 IN H_2O (0-12.4 mbar to 0-1 bar)

1	2	3	4	5	6	7	8
1 3 0							

Basic Model

Range:_____



2	Material
P	Glass-Reinforced Engineered Plastic Body / 316 Stainless Steel Internal Metal Parts **(300 PSIG SWP)**
A	Aluminum Body / 316 Stainless Steel Internal Metal Parts **(500 PSIG SWP)**
B	Brass Body / 316 Stainless Steel Internal Metal Parts **(500 PSIG SWP)**
S	316 Stainless Steel Body / 316 Stainless Steel Internal Metal Parts **(500 PSIG SWP)**
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Housing Assembly
E	3-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
G	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N
1	Viton®-A Registered Trademark of Dupont **(0-20" H2O to 0-400" H2O)**
2	Silicone **(0-5" H2O to 0-100" H2O)**
5	Ethylene Propylene **(0-20" H2O to 0-400" H2O)**
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/4" C.S. compression tube fittings **(2 ea. Model P)** or ¼" FNPT Top & Bottom Connections **(Models A, B, & S)**
1	1/4" 316 Stainless Steel compression tube fittings (2)
2	1/4" FNPT Brass Adapters **(Model P only)**
3	1/4" FNPT Stainless Steel Adapters (2) **(Model P only)**
4	1/2" FNPT Stainless Steel Adapters (2) **(all models except P)**
9	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Standard Model Specifications – continued Model 130

6	Additional Options
O	None
B	Drain & Bleed Plugs, 316 Stainless Steel (2) **(Model 130 P only)**
D	Drain & Bleed for Model 130 P in NEMA 4X Enclosure
E	Drain & Bleed for all other Model 130's in NEMA 4X Enclosure
F	Carbon Steel 2" Pipe Mounting Kit
G	Stainless Steel 2" Pipe Mounting Kit
H	Hastelloy C Internal Wetted Parts & Fittings **(Contact Factory for Availability)**
M	Maximum Indicator Follower Pointer
N	NACE
Q	CRN **(Canadian Registration Number)**
S	Shatter Proof Glass Lens **(Available only with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag and S.S. Screw **(Contact Factory on Switch Options) Not on Gauge Body for Hazardous Locations**
W	Wall Mount Kit **(Not Available with Back Connections)**
Z	Special ***(Un-coded Options)***
	NOTE: Not All Options Available in Combination with other Options

7	Electrical Configurations (CE marked, except N & P) **option not available for 130-PC Models**	Switch
H	One (1) Reed Switch with Condulet Enclosure	
I	Two (1) Reed Switches with Condulet Enclosure	
J	One (1) Reed Switch with Condulet Enclosure with Plug-in connector (DIN 43650/IP65-PG11)	
K	Two (1) Reed Switches with Condulet Enclosure with Plug-in connector (DIN 43650/IP65-PG11)	
L	One (1) Switch in NEMA 4X Plastic Enclosure	
M	Two (2) Switches in NEMA 4X Plastic Enclosure	
N	One (1) Switch in explosion proof enclosure with glass window cover. CSA & UL Listed **(1)**	
P	Two (2) Switches in explosion proof enclosure with glass window cover. CSA & UL Listed **(1)**	
Z	Special ***(Un-coded Options)***	

(1) Complete assembly 3rd Party Certified Class I, Div.1, Groups C & D; Class II, Div. 1, Groups E, F, & G.

8	Electrical Specifications (For Resistive Loads)
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 10-90%)
Z	Special ***(Unc-oded Options)***
Note:	The use of diaphragm seals is not recommended for Model 130 gauges
WARNING	**Attempts to install such seals on Model 130 gauges will void warranty**

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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you.

Standard Model Specifications: 140-AA-00-OO

3000 PSIG Working Pressure, Aluminum body, 316L Stainless Steel Internal Metal Parts, Ceramic Magnets, Buna-N Diaphragm and Seals, Teflon Guide Bushings, ¼" FNPT Back Connections, 2-1/2" round dial, Engineered Plastic Case with Shatter Resistant Acrylic Lens
Accuracy ±2% Full Scale (Ascending)

Mid-West Instrument
1-800-648-5778

Range 0-25 PSID to 0-100 PSID (0-1.7 bar to 0-7.0 bar)

1	2	3	4	5	6	7	8
1 4 0							

Basic Model

Range:_____

2	Material
A	Aluminum Body / 316 Stainless Steel Internal Metal Parts & Teflon Guide Bushings
B	Brass Body / 316 Stainless Steel Internal Metal Parts & Teflon Guide Bushings
S	316 Stainless Steel Body / 316 Stainless Steel Internal Metal Parts & Teflon Guide Bushings
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
A	2-1/2" Round Uni-Directional Dial w/Engineered Plastic Housing Assembly
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Housing Assembly
E	3-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
G	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
2	Silicone
4	Neoprene **(25 PSID and below)**
5	Ethylene Propylene
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/4" FNPT Back Connections ***(Standard)***
2	Dual 1/4" FNPT Top & Bottom Connections **(Non-Electrical Option Units Only)**
3	1/4" FNPT Bottom Connections
4	7/16"-20 straight thread O-Ring **(Back Connections only)**
5	1/2" FNPT Stainless Steel Adapters **(Back Connections)**
6	1/2" FNPT Stainless Steel Adapters **(Bottom Connections)**
8	1/4" FNPT End Connections **(not available with C & D options) (2000 PSIG SWP for Stainless Steel & Aluminum)**
9	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Standard Model Specifications – continued Model 140

6	Additional Options
O	None
A	Reversed High / Low Process Connections**. (Not available with electrical options C, D, T & W)**
F	Carbon Steel 2" Pipe Mounting Kit **(not available with reversed port switch option)**
G	Stainless Steel 2" Pipe Mounting Kit **(not available with reversed port switch option)**
L	Liquid Fill **(2-1/2" & 4-1/2" Dials Only)** Not Available with Maximum Follower Pointer
M	Maximum Indicator Follower Pointer
N	NACE
Q	CRN **(Candian Registration Number)**
S	Shatter Proof Glass Lens **(Available only with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag and S.S. Screw **(Not on Gauge Body for Hazardous Locations)**
W	Wall Mount Kit **(Not Available with Back Connections)**
X	Chemical Seals **(Contact Factory for Accuracy)**
Z	Special ***(Un-coded Options)***
	NOTE: Not All Options Available in Combination with other Options
7	**Electrical Configurations (CE marked, except C, D, T & W)**
A	One (1) Reed Switch in NEMA 4X/IP66 Enclosure
B	Two (2) Reed Switches in NEMA 4X/IP66 Enclosure
C	One (1) Switch in Explosion Proof Enclosure. Division 1 Hazardous Locations **(2)**
D	One (2) Switches in Explosion Proof Enclosure. Division 1 Hazardous Locations **(2)**
E	One (1) Reed Switch in NEMA 4X/IP66 Aluminum Enclosure, Division 2 Hazardous Locations **(3)**
F	Two (2) Reed Switches in NEMA 4X/IP66 Aluminum Enclosure, Division 2 Hazardous Locations **(3)**
T	4-20 mA Transmitter in NEMA-4X/IP66 aluminum enclosure
W	4-20 mA Transmitter in general purpose enclosure, Division 2 Hazardous Locations **(3)**
Z	Special ***(Un-coded Options)***
	(2) Complete assembly 3rd Party Certified Class I, Div.1, Groups C & D; Class II, Div. 1, Groups E, F, & G.
	(3) Complete assembly 3rd Party Certified Class I, Div.2, Groups A, B, C, & D; Class II, Div.2, Groups F and G.
	Electrical Specifications (For Resistive Loads)
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 15-90%)
B	SPST, 25W, 0.5 Amp., 230 VAC/VDC (Normally Open) (Switch adjustable range of 15-90%)
T	4-20 mA Transmitter (8-28 VDC Loop Power) (± 2% Accuracy from 20-100% of scale, Ascending)
Z	Special ***(Un-coded Options)***

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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you.

Standard Model Specifications: 142-AA-00-OO

3000 PSIG Working Pressure, Aluminum body, 316L Stainless Steel Internal Metal Parts, Ceramic Magnets, Buna-N Diaphragm and Seals, Teflon Guide Bushings, ¼" FNPT Back Connections, 2-1/2" round dial, Engineered Plastic Case with Shatter Resistant Acrylic Lens
Accuracy ±2% Full Scale (Ascending)

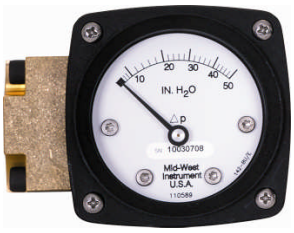
Mid-West Instrument
1-800-648-5778

Range 0-20" H_2O to 0-25 PSID (0-50 mbar to 0-1.7 bar)

1	2	3	4	5	6	7	8
1	4	2					

Basic Model

Range:_____



2	Material
A	Aluminum Body / 316 Stainless Steel Internal Metal Parts & Teflon Guide Bushings
B	Brass Body / 316 Stainless Steel Internal Metal Parts & Teflon Guide Bushings
S	316 Stainless Steel Body / 316 Stainless Steel Internal Metal Parts & Teflon Guide Bushings
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
A	2-1/2" Round Uni-Directional Dial w/Engineered Plastic Housing Assembly
C	4-1/2" Round Uni-Directional Dial w/Engineered Plastic Housing Assembly
E	3-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
G	4-1/2" Round Uni-Directional Dial w/Anodized Aluminum Housing Dial Case
T	Non-Indicating DP Switch Only
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**
0	1/4" FNPT Back Connections ***(Standard)***
2	Dual 1/4" FNPT Top & Bottom Connections **(Non-Electrical Option Units Only)**
3	1/4" FNPT Bottom Connections
4	7/16"-20 straight thread O-Ring **(Back Connections only)**
5	1/2" FNPT Stainless Steel Adapters
8	1/4" FNPT End Connections **(not available with C & D options)** **(2000 PSIG SWP for Stainless Steel & Aluminum)**
9	Special ***(Un-coded Options)***

Factory preset switches at no charge (Specify Setting)

Standard Model Specifications – continued Model 142

6	Additional Options
O	None
A	Reversed High / Low Process Connections. **(not available with Transmitter options T, & W)**
F	Carbon Steel 2" Pipe Mounting Kit **(not available with reversed port switch option)**
G	Stainless Steel 2" Pipe Mounting Kit **(not available with reversed port switch option)**
L	Liquid Fill **(2-1/2" & 4-1/2" Dials Only)** Not Available with Maximum Follower Pointer
M	Maximum Indicator Follower Pointer
N	NACE
Q	CRN **(Canadian Registration Number)**
S	Shatter Proof Glass Lens **(Available only with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag and S.S. Screw **(Not on Gauge Body for Hazardous Locations)**
W	Wall Mount Kit **(Not Available with Back Connections)**
X	Chemical Seals **(Contact Factory for Accuracy)**
Z	Special ***(Un-coded Options)***
	NOTE: Not All Options Available in Combination with other Options
7	**Electrical Configurations (CE marked, except T & W)**
A	One (1) Reed Switch in NEMA 4X/IP66 Enclosure
B	Two (2) Reed Switches in NEMA 4X/IP66 Enclosure
E	One (1) Reed Switch in NEMA 4X/IP66 Aluminum Enclosure, Division 2 Hazardous Locations **(3)**
F	Two (2) Reed Switches in NEMA 4X/IP66 Aluminum Enclosure, Division 2 Hazardous Locations **(3)**
T	4-20 mA Transmitter in NEMA-4X/IP66 aluminum enclosure
W	4-20 mA Transmitter in general purpose enclosure, Division 2 Hazardous Locations **(3)**
Z	Special ***(Un-coded Options)***
(2) Complete assembly 3rd Party Certified Class I, Div.1, Groups C & D; Class II, Div. 1, Groups E, F, & G.	
(3) Complete assembly 3rd Party Certified Class I, Div.2,Groups A, B, C, & D; Class II, Div.2, Groups F and G.	
	Electrical Specifications (For Resistive Loads)
A	SPDT 3W, 0.25 Amp, 125 VAC/VDC (standard) (Switch adjustable range of 15-95%)
B	SPST, 25W, 0.5 Amp., 230 VAC/VDC (Normally Open) (Switch adjustable range of 15-95%)
T	4-20 mA Transmitter (8-28 VDC Loop Power) (± 2% Accuracy from 20-100% of scale, Ascending)
Z	Special ***(Un-coded Options)***

MID-WEST INSTRUMENT has been serving a variety of industries (Power, Chemical, Petro-Chemical, HVAC, Water Filtration etc…) for over 50 years. Over 2,000,000 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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you.

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

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: Two times rated working pressure at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Model 240 Series gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1
NEMA Std. No. 250
SAE J514
UL Std. No. 50,508 and 1203
ASME B40.100
CSA-C22.2 No. 14.25 and 30
EN-61010-1

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

INTENTIONALLY BLANK

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
1-800-648-5778

3rd Party Certified

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

1			2	3	4	5	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 only with 4-1/2" metal front)**
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag with S.S. Screw
W	Wall Mount Kit **(Not Available with Back Connections)**
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) **(2) (9)**
S	Two (2) Control switches in Ex d Enclosure (CE marked) **(2) (7) (9)**
T	4-20 mA Transmitter in NEMA7/EExd (Explosion Proof Enclosure)***(Temperature Limits -20°F to +150°F)** **Transmitter not yet CSA or UL certified**
Z	Special (Uncoded 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
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 15-90% of full scale ascending)**
E	SPST, 60W, 3.0 Amp., 240 VAC/VDC (Normally Open) **(Switch Adjustable 15-90% of full scale ascending)**
H	SPDT, 60W, 1.0 Amp., 240 VAC/VDC **(Switch Adjustable 25-90% of full scale ascending)**
R	DPDT, Relay, 10A @ 30 VDC, 120/240 VAC **(Switch Adjustable 15-90% of full scale ascending) (8)**
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 Rated CE marked Ex d IIB + H2 , Ex tD A21 II 2GD IP65

(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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you.

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Series 6000
Differential Pressure Gauges

Measure Positive, Negative or Differential Pressures

Large easy-to-read 4" dial.

Applications:

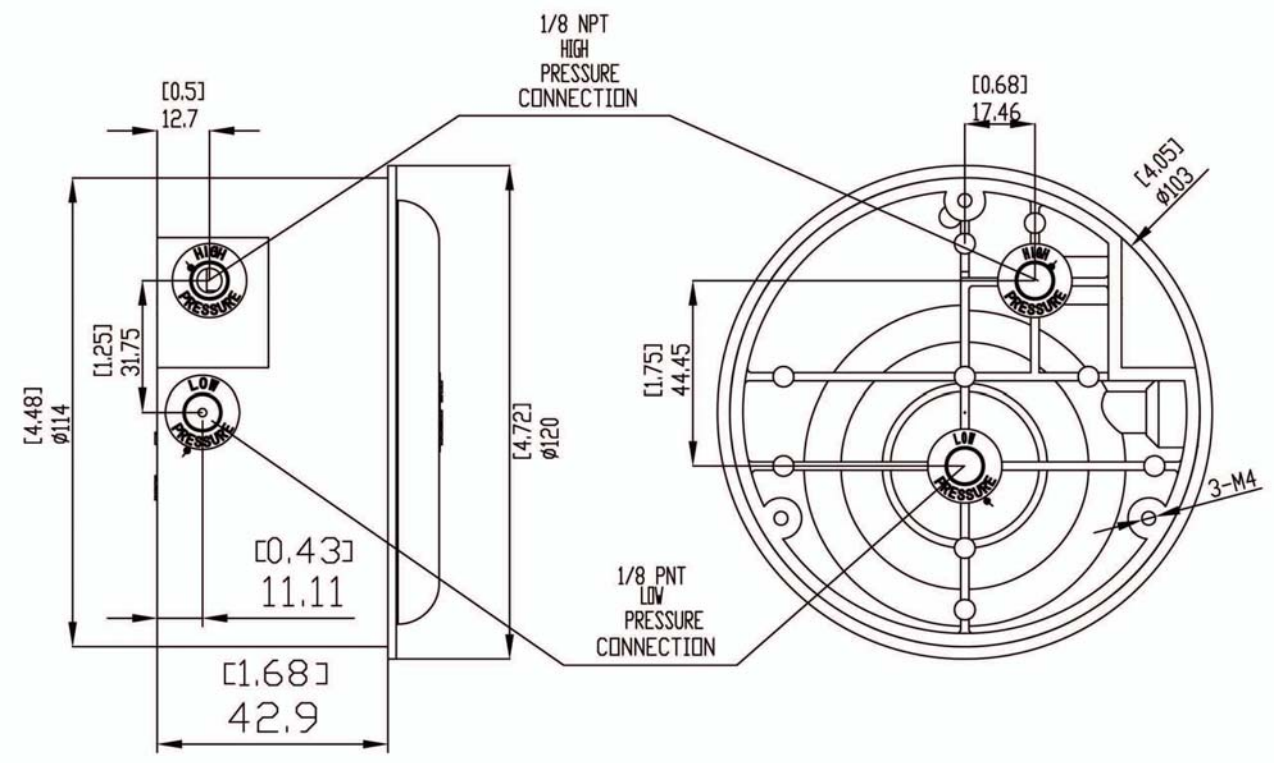
- **Air Velocity**
- **Filter Resistance**
- **HVAC**
- **Furnace Draft**
- **Pressure Drop across Orifice plates**
- **Duct Static Pressure**
- **Clean Room Pressure**
- **Building Pressure**
- **Fan and Blower Pressure**
- **Dust Collectors**
- **Bubbler Systems**
- **Pharmaceutical Industry**
- **Semi Conductor Industry**
- **System Purge**

Mid-West Series 6000 low range differential pressure gauge — guaranteed within 2% of full scale — choose the DP range to match your specific application. The frictionless series 6000 gauge movement quickly indicates low air or non-corrosive gas pressures — either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures.

Mid-West Series 6000 low range differential pressure gauge design is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment as well as other applications in the pharmaceutical and semiconductor manufacturing industry.

SPECIFICATIONS:

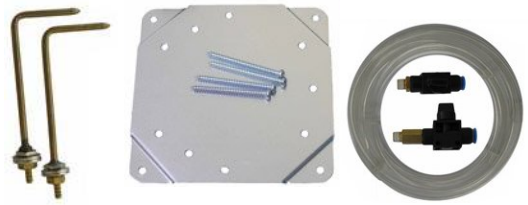
Use: Air and non-combustible, compatible gases.
Wetted Materials: Silicone Rubber Diaphragm, Aluminum and 304 SS internal metal parts
Case and Bezel Material Die Cast Aluminum Housing with acrylic lens.
Dial Size: 4″ (101.6 mm) Diameter.
Accuracy: Full scale at 70°F (21.1°C)
±4% on 0-0.25” H_2O / ±3% on 0-0.50” H_2O. / ±2% on 0-1.0” to 0-20 PSID
Accuracy Bi-Directional:
±3% on 0.25”-0-0.25” H_2O
±2% on 0.50”-0-0.50”, 1.0”-0-1.0”, 2.0”-0-2.0”, 5.0”-0-5.0”, 10.0”-0-10” & 15.0”-0-15.0” H_2O
Pressure Limits: -68 kPa (-20 Hg) to +15 PSI (100 kPa) 35 PSI option (241 kPa)
Temperature Limits: 20 to +140°F.* (-6.67 to 60°C).
Mounting Position: Diaphragm in Vertical Position.
Process Connections: 1/8″ FNPT duplicate high and low pressure taps:
One (1) pair side and one (1) pair back
Weight: 1 lb 2 oz (510 g) 15 PSI SWP / 2 lb 2 oz (963 g) 35 PSI SWP
Standard Accessories: (2) 1/8″ NPT plugs for duplicate pressure taps,
(2) 1/8″ pipe thread to rubber tubing adapter and three flush mounting adapters with screws.



Model Number	Range
60001	0-0.25" H2O
60002	0-0.50" H2O
60003	0-0.50" H2O & 0-125 Pa
60004	0-1.0" H2O
60005	0-1.0" H2O & 0-250 Pa
60007	0-2.0" H2O & 0-500 Pa
60009	0-3.0" H2O & 0-750 Pa
60011	0-4.0" H2O & 0-1.0 kpa
60012	0-5.0" H2O
60013	0-6.0" H2O & 0-1.5 kpa
60014	0-8.0" H2O & 0-2.0 Kpa
60015	0-10" H2O
60016	0-10" H2O & 0-2.5 kpa
60017	0-15" H2O
60018	0-20" H2O
60019	0-30" H2O
60020	0-40" H2O
60021	0-50" H2O
60022	0-60" H2O
60023	0-100" H2O

Model Number	Range
61005	0-5 PSID
*61006	0-10 PSID
*61007	0-15 PSID
*61008	0-20 PSID
62100	.25-0-.25 In H2O
62101	.50-0-.50 In H2O
62102	1.0-0-1.0 In H2O
62103	2.0-0-2.0 In H2O
62106	5.0-0-5.0 In H2O
62107	10-0-10 In H2O
62108	15-0-15 In H2O

*** Body 35 PSIG SWP**



#69003 Filter Kit

Air Filter Kit: #69003 - adapts any standard Mid-West Series 6000 Low range Differential Pressure gauge for use as an air filter gage. Includes aluminum surface mounting bracket with screws, (2) 5 ft (1.5 m) lengths of 1/4" aluminum tubing, (2) static pressure tips & (2) cast metal vent valves.

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Series 6000

Differential Pressure Gauges

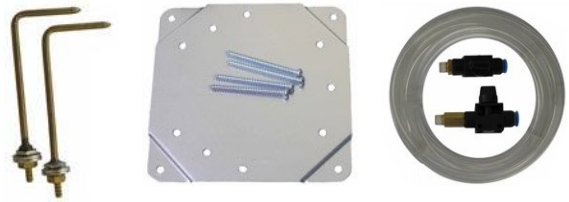
Model Number	Range	Price
60001	0-0.25" H2O	$69.25
60002	0-0.50" H2O	$60.25
60003	0-0.50" & 0-125 Pa	$60.25
60004	0-1.0" H2O	$60.25
60005	0-1.0" & 0-250 Pa	$60.25
60007	0-2.0" & 0-500 Pa	$60.25
60009	0-3.0" & 0-750 Pa	$60.25
60011	0-4.0" & 0-1.0 kPa	$60.25
60012	0-5.0" H2O	$60.25
60013	0-6.0 & 0-1.5 kPa	$60.25
60014	0-8.0 & 0-2.0 kPa	$60.25
60015	0-10" H2O	$60.25
60016	0-10 & 0-2.5 kPa	$60.25
60017	0-15" H2O	$60.25
60018	0-20" H2O	$60.25
60019	0-30" H2O	$60.25
60020	0-40" H2O	$60.25
60021	0-50" H2O	$60.25
60022	0-60" H2O	$60.25
60023	0-100" H2O	$60.25

Model Number	Range	Price
61005	0-5 PSID	$60.25
*61006	0-10 PSID	$116.00
*61007	0-15 PSID	$116.00
*61008	0-20 PSID	$116.00
62100	.25-0-.25 In H2O	$69.25
62101	.50-0-.50 In H2O	$69.25
62102	1.0-0-1.0 In H2O	$69.25
62103	2.0-0-2.0 In H2O	$69.25
62106	5.0-0-5.0 In H2O	$69.25
62107	10-0-10 In H2O	$69.25
62108	15-0-15 In H2O	$69.25

***Body 35 PSI SWP.**

Model Number	Description	Price
AIR FILTER KIT		
69003	Air filter gauge accessory kit	$37.25

Air Filter Kit: #69003 - adapts any standard Mid-West Series 6000 Low range Differential Pressure gauge for use as an air filter gage. Includes aluminum surface mounting bracket with screws, (2) 5 ft (1.5 m) lengths of 1/4" aluminum tubing, (2) static pressure tips & (2) cast metal vent valves.



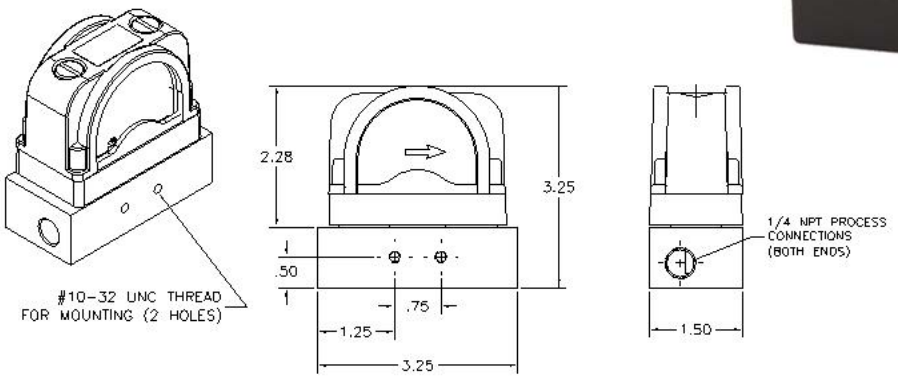
#69003 Filter Kit

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Model 555A
Differential Pressure Indicator

Colored bands allow you to quickly identify pressure drop across element.
Divided into three sections, each clearly marked for ease of understanding.
Commonly used to indicate when to change or clean a filter.
Example: 555A-10.0 changes from green to yellow at 5 PSID and from yellow to red at 7.5 PSID.
Mounting block has ¼" FNPT in-line process connections for ease of installation.
Accuracy is ±5% Full Scale



Model Number	DP Range	Transition Points			Price
		Green	Yellow	Red	
555A-3.5	0-3 PSID	0-2.0	2.0-2.5	2.5-3.5	$59.00
555A-5.0	0-5 PSID	0-3.0	3.0-4.5	4.5-5.0	$59.00
555A-10.0	0-10 PSID	0-5.0	5.0-7.5	7.5-10.0	$59.00
555A-12.0	0-12 PSID	0-6.0	6.0-9.0	9.0-12.0	$59.00
555A-15.0	0-15 PSID	0-7.5	7.5-12.0	12.0-15.0	$59.00
555A-25.0	0-25 PSID	0-11.0	11.0-18.5	18.5-25.0	$59.00
555A-30.0	0-30 PSID	0-13.0	13.0-20.0	20.0-30.0	$59.00
555A-43.0	0-43 PSID	0-19.5	19.5-29.5	29.5-43.0	$59.00

SPECIFICATIONS:			Comments:
	Pressure (Ratings)		
	Maximum Working	300 PSIG	
	Maximum Differential	150 PSID	
	Accuracy	± 5% of Rated Differential Pressure Range	Calibrated at Color Transitions
	Operating Temperature (Max.)	93°C (200°F)	
	Materials of Construction		
	Body Material	Glass Filled Nylon (GFN)	
	Wetted Internals	Stainless Steel, Ceramic, & GFN	
	Elastomers	Buna	
	Movement	Magnetic Piston and Follower Pointer	
	Dial	Plastic Lens with 3 Color Dial	
	INTERFACE:		
	Process Connections:	¼" FNPT End Connections. To switch HIGH and LOW pressure connections: (Remove Indicator from base and rotate 180° - Retighten plastic bolts to 20-25 inch pounds.)	Flow Direction Identified on Dial. (Arrow Points to Low Pressure Port)

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

"Bellows Type"

Differential Pressure Gauges & Switches

Model's 105 & 106

Dry Gauge Design with
No Internal Liquid Fill

No Gauge damage/accuracy loss caused by liquid fill expansion/contraction when exposed to temperature shocks.

Over Range Protection high-low and low-high to rated working pressure with use of a bi-directional relief valve

Model 105/106 DP Range: 0-10" H2O to 0-600" H2O (25 mbar to 1.4 bar)

- Diaphragm Bellows design provides a simple, compact, accurate, direct-acting, low range high accuracy differential pressure indicator.
- Easier and less expensive to service/repair than competitive units.
- Working pressures of 500, 1500, 3000, or 6000 PSIG (400 bar).
- Housing materials: Aluminum, Brass, Carbon Steel, or 316L S.S.
- Internals: Copper-Alloy or Stainless Steel Diaphragm Bellows.
- Buna-N seals are standard other elastomers available.
- Mechanical over-range protection high to low and low to high.
- Weather resistant case of Engineered Plastic / Shatter resistant acrylic lens
- Panel Mounting Kit Standard
- Uni-directional or Bi-directional dials are readily available.
- Gauges are optionally available with one or two switches which offer's the ability to have alarm or control.

Model's 105/106 (± 1/2% or ± 1% Full Scale Accuracy) System pressure is applied to the internal volume of a bellows and mechanical linkage assembly. - As pressure changes, the bellows and linkage assembly move to cause an electrical signal to be produced or to cause a gauge pointer to move. The major components are a two-piece body, multiple diaphragm/bellows sensing element and over-pressure assembly, a torque tube assembly, a range spring and the gauge front assembly. The body halves provide the pressure containment function. They also clamp the sensing element and over-pressure assembly between the halves, isolating the high side and low side pressures of the system. The high side body half also provides a mount for the torque tube assembly and the gauge front assembly.

Model	Accuracy	Min. ΔP Range	Max. ΔP Range	Safe Working Pressure PSIG (bar)	Optional Switches
105	±1/2% or 1%	0-10" H_20 (0-25 mbar)	0-80" H2O (0-200 mbar)	500-6000 (34-400)	1 or 2
106	±1/2% or 1%	0-80" H_20 (0-200 mbar)	0-600" H_20 (0-1.4 bar)	500-6000 (34-400)	1 or 2

Model's 105/106 assembly incorporates a bidirectional relief valve which provides over-pressure protection in both directions. When over-pressured from the high side, the valve is opened by a mechanical stop as the sensing element deflects to its maximum travel. When over-pressured from the low side, the spring-loaded valve opens when the differential pressure exceeds its maximum rating. The opening of the valve in either direction equalizes the pressure and protects the unit. A range spring is provided to adjust the spring rate of the system to suit the various differential pressure ranges of the instrument.

"Bellows Type"

Type Switch Options

Models 105 & 106

"LOCKED LOGIC" SOLID STATE ALARM-CONTROL FOR ALL 105 & 106 GAUGES
(NOTE - 6" DIAL SIZE ONLY)

If your application requires switching in addition to local indication, our all solid state "Locked Logic" system is the most accurate available. With no moving cams, levers, etc. it does not affect the accuracy of the gauge on which it is installed. Switch accuracy is the same as the gauge accuracy. Visible set pointers are provided, adjustable to within 5% of full scale of each other. The set points are adjustable from 5 to 95% of full scale. Internal adjustment is standard. 1-2 Independently adjustable switches with Set Point Feedback , SPDT or DPDT Output options, Adjustable deadband option for single SPDT or DPDT output (2 set pointers) Accuracy of Gauge unaffected by the

OPTION	INTERFACE	MARKINGS	ENVIRONMENTAL	COMMENTS
A,B	1/2" Conduit, Flying Leads, 18 Awg, Color Coded	None	NEMA 4X	Requires Input Power to operate.
C,D	1/2" Conduit, Flying Leads, 18 Awg, Color Coded	None: Designed for Class I, Div 1, Groups B,C, D; Class II, Div 1, Groups E,F, & G.	NEMA 7, NEMA 4X (OPTIONAL)	Explosion-proof enclosure. Needs Input Power to Operate.

"MODELS 105 & 106 ELECTRICAL CONFIGURATIONS	
	DESCRIPTION
A	One (1) Switch in Weather Proof enclosure
B	Two (2) Switches in Weather Proof enclosure
C	One (1) Switch in explosion proof enclosure Class I, Groups B, C, & D (Pipe Mounting Kit Standard)
D	Two (2) Switch in explosion proof enclosure Class I, Groups B, C, & D (Pipe Mounting Kit Standard)
	"INPUT OPTIONS" ELECTRICAL SPECIFICATIONS (Select (1) input and (1) output option)
A	8-28 Vdc
B	115 VAC 50/60 Hz
C	220/240 VAC 50/60Hz
Z	Special ***(Un-coded Options)***
	"OUTPUT OPTIONS" ELECTRICAL SPECIFICATIONS (Resistive Load)
	(Resistive load) – 10 Amp @ 28 VDC, 115/230 VAC (50/60 Hz) (1/2" NPT, 24" Flying Leads standard interface) (1/2" NPT, 24" Flying for two (2) DPDT switches)
A	SPDT Relays
C	SPST Relays
D	Adjustable deadband, one (1) SPDT output (two (2) control switches only)
E	Adjustable deadband, one (1) DPDT output (two (2) control switches only)

Proof Pressure: Two times rated working pressure or 10,000 PSI whichever is lower at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1	NACE MR0175
ASME B40.100	NEMA Std. No. 250
CSA-C22.2 No. 14.25 and 30	SAE J514
EN-61010-1	UL Std. No. 50,508 and 1203

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Now Available!

Model 105
TANK LEVEL GAUGE
LIQUID HYDROGEN SERVICE




No Liquid Fill required

<u>Over-Range Protection</u>
High over Low
and Low over High!


Mid-West Model 105 bellows design provides a simple, compact, accurate, direct-acting, low range differential pressure level indicator. Accuracy ±1% of Full Scale

Range Model 105: 0-10” H_2O to 0-50” H_2O (25 mbar to 125 mbar)

Benefits:

- Stainless Steel Gauge Front, Stainless Steel Body, S.S. Bolts & Shatter-Proof Glass Lens.
  - Provides superior safety and corrosion resistance.
- Dry gauge design with no internal liquid fill
  - No costly clean up from liquid fill leaking
  - No chance of unacceptable or incompatible fill fluid being in the gauge.
  - No gauge damage/accuracy loss caused by liquid fill expansion or contraction when exposed to temperature extremes in Hydrogen level applications.
- Single bellows design is more compact and light weight.
  - Substantial weight savings over competitive range gauges.
  - Can be panel mounted in a one piece panel.
  - Can be mounted on tanks using std. 2” pipe mount brackets or ¾” pipe nipple brackets.
- Mid-West Instrument performs Helium leak testing on units for Hydrogen service.

Product Description:

The Model 105 design is an all-stainless steel differential pressure gauge capable of operating at low differential pressures. Safe working pressure is 1500 PSIG standard. The DPI is equipped with a Bi-directional Over Pressure Relief Valve (OPV). When the Differential Pressure exceeds 130% of the range the OPV equalizes the pressure between the Hi and Lo side’s ¼” FNPT Dual top and bottom connections are provided as standard. The DPI is also equipped with a Micro adjust pointer, If necessary the pointer can be re-zeroed. Body is made of Stainless Steel with Stainless Steel Bolts and 316 Stainless Steel internals. Viton Seals are provided as standard with other elastomers available. Dial is 6” diameter with white lettering on a black dial.(white dial with black lettering optional) The temperature limits are rated at -40°C to 200°F. Proof pressure is two times working pressure at ambient temperatures.

Product Features:

- Ability to create custom dials for horizontal and vertical tanks
- Various Dial layouts available: ***Single Scale, Dual Scale and Tri-Scale***
- Micro-Adjust pointer (if necessary the pointer can be re-zeroed)
- In house Oxygen Cleaning (optional)
- Private Labeling (optional)
- White ink on Black dial or Black ink on White dial
- **Industry best lead time reduces inventory requirements**

Gauge Specifications

	105
Accuracy	±1% of Full Scale
DP Range	0-10" H2O to 0-50" H2O (25 mbar to 125 mbar)
Safe Working Pressure	1500 PSIG (3000 PSIG optional)
Body Material	316 Stainless Steel
Dial Case & Bezel	316 Stainless Steel
Internals	316 Stainless Steel Multiple Bellows
Port	Dual Top and Bottom, 1/4" FNPT connections with optional snubbers
Seals	Viton® Standard, other elastomers available
Dial	6" Black dial with White lettering (White dial with Black lettering optional)
Standard Mounting	Panel Mountable
Optional Mounting	2" Pipe Mount
Warranty	Five Year

50 YEARS experience in the field of supplying quality Differential Pressure Gauges.

Proof Pressure: Two times working pressure at ambient temperatures

Temperature Limits: -40°F (-40°C) to 200°F (93°F)

Standards:

ASME B1.20.1 **CSA-C22.2 No.14** **NEMA Std. No. 250**
ASME B40.100 **UL Std. No. 50** **SAE J514**

6500 Dobry Dr. • Sterling Heights, MI, USA 48314 • Tel: 586-254-6500 Toll Free: 800-648-5778 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Bulletin 115/116/08
July 2008

Mid-West® Instrument

MODEL 115/116

Level Gauges & Switches for Tank Level Applications

Audited & Approved Oxygen Cleaning Available….

Also Available White Dial with Black letters

Switch Units

Switch Flags can be precisely adjusted to switch set point for highly visible alarm indication

"Dry Gauge Design No Internal Liquid Fill"

Ability to create and design custom dials.

Mid-West can deliver tank level gauges in 4-6 weeks ARO.

50 YEARS **experience in the field of supplying quality Differential Pressure Gauges.**

Tank Level Indication applications are for stationary, over the road, and portable tanks.

Models 115/116 multiple diaphragm/bellows design provides a simple, compact, accurate, direct-acting, low range differential pressure indicator. Models 115/116 are equipped with a Bi-directional Over Pressure Relief Valve (OPV).

When the Differential Pressure exceeds 130% of the range the OPV equalizes the pressure between the Hi and Lo sides. ¼" FNPT Dual top and bottom connections are provided as standard.

Models 115/116 is also equipped with a Micro adjust pointer, If necessary the pointer can be re-zeroed. Body is made of brass with 316 Stainless Steel internals. Viton Seals are standard with other elastomers available.

BENEFITS:

- **"Engineered Plastic" gauge front and stainless steel body bolts provide corrosion resistance in "over the road" trailers, outdoor or salt air environments.**
- **Up to a 30 lb. weight savings over competitive Liquid Helium range gauges**
  - **Allows more product to be transported in mobile trailers**
  - **Easier and less labor to panel mount**
- **Dry gauge design with no internal liquid fill**
  - **Eliminates costly clean up from liquid fill leaking and fouling the tank and system**
  - **No gauge damage/accuracy loss caused by liquid fill expansion/contraction when exposed to temperature shocks in cryogenic applications**
- **Low & High range capabilities**
  - **Ideal for He, Ar, O_2, N_2, and CO_2 tank level applications**
  - **For use on Stationary, Over the Road, and Portable tanks**
- **Industry best lead time reduces inventory requirements**
- **Adaptable to wide variety of mounting configurations**
- **Private Brand and Custom Dials available: *Single Scale, Dual Scale, and Tri-Scale***

0-100" H_2O / Single Scale
White on Black Dial

0-10" H_2O / Single Scale
Black on White Dial

Ar, O_2, N_2
Tri-Scale Dial

GAUGE SPECIFICATIONS

	115	**116
Accuracy	±1% of Full Scale	
DP Range	0-10" H2O to 0-50" H2O (25 mbar to 125 mbar)	0-50" H2O to 0-600" H2O (125 mbar to 1.5 bar)
Safe Working Pressure	1500 PSIG	500 PSIG (Standard) 1000 PSIG (Optional)
Body Material	Brass	Brass
Internals	316 S.S. Welded Multiple Diaphragm	316 S.S. Convoluted Bellows
Port	Dual Top and Bottom, 1/4" FNPT connections with optional snubbers	
Seals	Viton® Standard, other elastomers available	
Dial	6" Black dial with White lettering (White dial with Black lettering optional)	
Warranty	One Year	

****Model 116 Snap Acting Micro-Switch for Alarm (optional) 0-80" H_2O & above.**

Aluminum, Carbon Steel, & Stainless Steel Body Materials Available...
Ask about Model's 105, and 106 (SWP of 1,500 & 3,000 PSIG)

Tank Level / Industrial Gas
Differential Pressure Micro-Switch

Benefit:

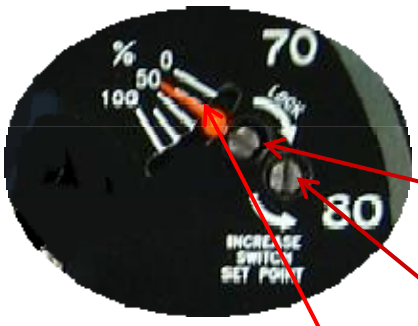
Switch Flags - Can be precisely adjusted to switch set point for highly visible alarm indication.

Tamper Proof – All adjustments require removal of the bezel for access.

Benefit:

1. **Switch Adjust** - Adjustable set point from 3% to 100 % of Full Scale on decreasing pressure.
2. **Switch Set Feedback** – Provides feedback of the approximate switch set point during adjustment of the switch.
3. **Switch Lock** - Locks Switch Set to prevent shift in set point due to vibration.

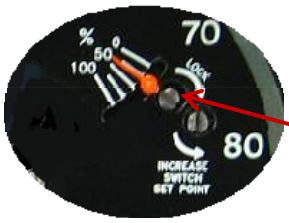
1. Remove Bezel



2. Unlock Switch Adjust

3. Adjust switch to approximate alarm point using the switch set feedback.

4. Using the appropriate equipment & pressure source, precisely set the switch using the dial indicator.



5. Once the switch is adjusted to the desired alarm point, tighten the lock screw.

6. Loosen the screw on the switch flag and adjust to the precise alarm point.

7. Lock Switch Flag to provide a Highly Visible Alarm Point Indication.

8. Replace the Bezel

MICRO - SWITCH SPECIFICATION

Model 116 Electrical 0-80" H_2O and above

Input Voltage:	None Required		
Set Pointers:	Quantity Adjustment:	1 3% to 100% of Full Scale	With visual set point set on decreasing pressure
Output(s)	Contact(s) Contact Rating:	1 SPDT 4 Amps Maximum 3 Amps Maximum 5 Amps	 @ 30 VDC @ 240 VAC @ 120 VAC
Temperature:	Operating:	-20°F to +185°F	
Environment:	Standard:	Weather-Proof Housing	NEMA 4
Electrical Interface:	Standard:	18", 18 Awg., 600 V 105C Color Coded Wire Leads	1/2" FNPT
Gauge Accuracy:	2%	Including Effects of the switch	
Switch Repeatability:	2%	Maximum	

Proof Pressure: **Two times working pressure at ambient temperatures**

Temperature Limits: **-40°F (-40°C) to 200°F (93°F)**

Standards:

ASME B1.20.1 **CSA-C22.2 No.14** **NEMA Std. No. 250**
ASME B40.100 **UL Std. No. 50** **SAE J514**

6500 Dobry Dr. • Sterling Heights, 48314, MI USA • Tel: 800-648-5778 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Standard Dial Ranges Models: 105, 106

Range Type				
PSID	H_2O	Kpa	Bar	Bi-Directional
0-2	0-20"	0-25	0-1.0	20-0-20 PSID
0-3	0-30"	0-35		
0-5	0-40"	0-60		
0-10	0-50"	0-100		
0-15	0-60"	0-135		
0-20	0-70"			
	0-80"			
	0-100"			
	0-150"			
	0-200"			
	0-250"			
	0-300"			
	0-400"			
	0-500"			
	0-600"			

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.

Uni-Directional Dial Ranges are available in either LINEAR or SQUARE ROOT FLOW SCALES with any appropriate legend (I.E. PSID, Kpa, IN H_2O, GPM, SCFM, ETC) at no extra charge			LINEAR Bi-Directional Dials are available with any appropriate Legend at No Charge	
0-0.5	0-30	0-300	1.0-0-1.0	75-0-75
0-1.0	0-35	0-400	2.0-0-2.0	100-0-100
0-1.6	0-40	0-500	5.0-0-5.0	150-0-150
0-2.0	0-50	0-600	10-0-10	200-0-200
0-3.0	0-60	0-700	15-0-15	300-0-300
0-4.0	0-70	0-800	25-0-25	400-0-400
0-5.0	0-75	0-900	30-0-30	750-0-750
0-6.0	0-80	0-1000	50-0-50	1000-0-1000
0-7.0	0-100	0-1500		
0-8.0	0-135	0-1600		
0-10	0-150	0-2000		
0-15	0-160	0-3000		
0-20	0-200	0-4000		
0-25	0-250	0-5000		
		0-6000		

Model	Min. ΔP Range	Max. ΔP Range
105	0-10" H_20 (0-25 mbar)	0-80" H2O (0-200 mbar)
106	0-80" H_20 (0-200 mbar)	0-600" H_20 (0-20 PSID) (0-1.4 bar)

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Standard Dial Ranges Models: 115 & 116

Range Type					
PSID	H2O	Kpa	Bar	Dual Scale IN/CM	CM & MMH2O
0-2	0-10"	0-25	0-1.0	0-60 IN H2O/0150 CM H2O	0-200 CM H2O
0-3	0-20"	0-35		0-80 IN H2O/0-200 CM H2O	0-380 CM H2O
0-5	0-30"	0-60		0-100 IN H2O/0-250 CM H2O	0-500 CM H2O
0-10	0-40"	0-100		0-150 IN H2O/0-380 CM H2O	0-1000 CM H2O
0-15	0-50"	0-135		0-200 IN H2O/0-500 CM H2O	0-1024 CM H2O
0-20	0-60"			0-300 IN H2O/0-750 CM H2O	0-1250 CM H2O
	0-70"			0-400 IN H2O/0-1000 CM H2O	0-1500 CM H2O
	0-80"			0-500 IN H2O/0-1270 CM H2O	0-1524 CM H2O
	0-100"			0-600 IN H2O/0-1500 CM H2O	0-2500 MM H2O
	0-120"				0-3000 MM H2O
	0-150"				
	0-200"				
	0-250"				
	0-300"				
	0-400"				
	0-450"				
	0-500"				
	0-600"				

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 115 Range Conversions						
"H2O	CM H2O	MM H2O	PSID	Bar	mBar	Kpa
0-10	0-25	0-254	0-.36	0-.02	0-25	0-2.5
0-15	0-38	0-381	0-.54	0-.03	0-37	0-3.7
0-20	0-50.8	0-508	0-.72	0-.05	0-50	0-5
0-25	0-64	0-635	0-.90	0-.06	0-62	0-6.2
0-30	0-76.2	0-762	0-1.08	0-.07	0-75	0-7.5
0-40	0-101.6	0-1016	0-1.44	0-.09	0-100	0-10
Model 116 Range Conversions						
" H2O	CM H2O	MM H2O	PSID	Bar	mBar	Kpa
0-50	0-127	0-1270	0-1.8	0-.125	0-124	0-12.4
0-60	0-150	0-1524	0-2.1	0-.15	0-150	0-14.9
0-75	0-190	0-1904	0-2.7	0-.18	0-186	0-18.6
0-80	0-200	0-2032	0-2.9	0-.20	0-200	0-20
0-100	0-250	0-2540	0-3.6	0-.25	0-250	0-25
0-150	0-380	0-3810	0-5.4	0-.37	0-373	0-37
0-200	0-500	0-5080	0-7.2	0-.50	0-498	0-50
0-300	0-760	0-7620	0-10.8	0-.75	0-747	0-75
0-400	0-1000	0-10,200	0-14.5	0-.99	0-996	0-100
0-500	0-1270	0-12,700	0-18.0	0-1.2	0-1245	0-124
0-600	0-1500	0-15,240	0-21.6	0-1.5	0-1494	0-150

Model	Min. ΔP Range	Max. ΔP Range
115	0-10" H_20 (0-25 mbar)	0-80" H2O (0-200 mbar)
116	0-80" H_20 (0-200 mbar)	0-600" H_20 (0-20 PSID) (0-1.4 bar)

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Standard Model Specifications: 105-FE-00-OO / 106-FE-00-OO

1500 PSIG Working Pressure, Aluminum Body, Stainless Steel Bellows, Stainless Steel Internals
Buna-N Seals, ¼" FNPT Dual Top & Bottom Connections, 6" Uni-Directional Round Dial,
Weather Resistant Engineered Plastic Case with Shatter Resistant Acrylic Lens,
Accuracy ±1% Full Scale (Ascending)

Mid-West Instrument
1-800-648-5778

Range 105: 0-10 IN H_2O to 0-80 IN H_2O (0-25 mbar to 0-200 mbar)
Range 106: 0-80 IN H_2O to 0-600 IN H_2O (0-200 mbar to 0-1.5 bar)

1			2	3	4	5	6				7	8
1	0	5										

Basic Model

Range:_____

2	Material
C	1500 PSIG, Aluminum Body, Copper Alloy Internals
D	3000 PSIG, Aluminum Body, Copper Alloy Internals
F	1500 PSIG, Aluminum Body, Stainless Steel Internals
G	3000 PSIG, Aluminum Body, Stainless Steel Internals
M	1500 PSIG, Mild Carbon Steel Body, Stainless Steel Internals
N	3000 PSIG, Mild Carbon Steel Body, Stainless Steel Internals
Q	1500 PSIG, 316 Stainless Steel Body, Stainless Steel Internals
R	3000 PSIG, 316 Stainless Steel Body, Stainless Steel Internals
T	6000 PSIG, 316 Stainless Steel Body, Stainless Steel Internals
U	1500 PSIG, Brass Body, Copper Alloy Internals
V	500 PSIG, Brass Body, Copper Alloy Internals
X	1500 PSIG, Brass Body, Stainless Steel Internals
Y	500 PSIG, Brass Body, Stainless Steel Internals
3	**Dial Size Type**
E	Accuracy ±1% Full Scale Uni-Directional Dial w/Engineered Plastic Dial Case ***(Standard)***
F	Accuracy ±1% Total Span Bi-Directional Dial w/Engineered Plastic Dial Case
G	Accuracy ±1/2% Full Scale Uni-Directional Dial w/Engineered Plastic Dial Case **(30" WC & above only)**
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
2	Neoprene
5	Ethylene Propylene
6	Perfluorelastomers
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/4" FNPT Top & Bottom Connections ***(Standard)***
1	1/4" Carbon Steel Compression Tube Fittings
2	1/4" Stainless Steel Compression Tube Fittings
3	1/2" FNPT Brass Adapters
4	1/2" FNPT Stainless Steel Adapters
9	Special ***(Un-coded Options)***

Standard Model Specifications – continued Model 105 / 106

6	Additional Options
O	None
F	Carbon Steel 2" Pipe Mounting Kit **(Standard with Explosion Proof Enclosure)**
N	NACE
Q	CRN **(Canadian Registration Number)**
S	Shatter Proof Glass Lens
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag and S.S. Screw
W	Wall Mount Kit
Y	4-1/2" Dial
Z	Special ***(Un-coded Options)***
7	**Electrical Configurations**
A	One (1) Switch in Weather Proof enclosure
B	Two (2) Switches in Weather Proof enclosure
C	One (1) Switch in explosion proof enclosure Class 1, Groups B, C, & D **(Pipe Mounting Kit Standard)**
D	Two (2) Switch in explosion proof enclosure Class 1, Groups B, C, & D **(Pipe Mounting Kit Standard)**
G	One (1) Micro-Switch in Weather Resistant Enclosure **(MODEL 106 0-80" to 0-600" H2O ONLY)**
H	Two (2) Micro-Switches in Weather Resistant Enclosure **(MODEL 106 0-80" to 0-600" H2O ONLY)**
Z	Special (Uncoded Options)
	Note: Standard control relays are SPDT
8	**"Input Options" Electrical Specifications (Select (1) input and (1) output option)**
A	8-28 Vdc
B	115 VAC 50/60 Hz
C	220/240 VAC 50/60Hz
N	**No Input Required for Micro-Switch(es)**
Z	Special (Uncoded Options)
	"Output Options" (Resistive Load)
	(Resistive load) – 10 Amp @ 28 VDC, 115/230 VAC (50/60 Hz) (1/2" NPT, 24" Flying Leads standard interface) (1/2" NPT, 24" Flying for two (2) DPDT switches)
A	SPDT Relays
C	SPST Relays
D	Adjustable deadband, one (1) SPDT output (two (2) control switches only)
E	Adjustable deadband, one (1) DPDT output (two (2) control switches only)
	Micro Switch Electrical Interface: 18", 18 Awg, 600 V, 105°C Color coded wire leads from 1/2" FNPT Connection
	SPDT Micro-Switch
M	Contact Ratings:**(MAX)** 4 Amps @ 30 VDC / 3 Amps @ 240VAC / 5 Amps @ 12 VAC
Z	Special (Uncoded Options)
	NOTE: Not All Options Available in Combination with other Options

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.

If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you…

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Standard Model Specifications: 115-BB-10-(AP)O / 116-BB-10-(AP)O

500 PSIG Working Pressure, Brass Body, Stainless Steel Bellows, Stainless Steel Internals
Viton Seals, ¼" FNPT Dual Top & Bottom Process Connections, 6" Uni-Directional Round Dial,
Brass snubber fittings mounted in bottom process connections, Panel mount gauge front
Weather Resistant Engineered Plastic Case with Shatter Resistant Acrylic Lens,
Accuracy ±1% Full Scale (Ascending)

Mid-West Instrument
1-800-648-5778

Range 115: 0-10" H20 to 0-50" H20 (0-25 mbar to 0-125 mbar)
Range 116: 0-50" H20 to 0-600" H20 (0-125 mbar to 0-1.5 bar)

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

Basic Model

Range:_____

2	Material
B	500 PSIG, Brass Body, Stainless Steel Internals
Z	Special ***(Un-coded Options)***
3	**Dial Size Type**
B	Accuracy ±1% Full Scale Uni-Directional, White on Black Dial
W	Accuracy ±1% Full Scale Uni-Directional, Black on White Dial
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N
1	Viton®-A Registered Trademark of Dupont ***(Standard)***
5	Ethylene Propylene
9	Special ***(Un-coded Options)***
5	**Process Connections / Orientation**
0	¼" FNPT Dual Top & Bottom (Hi port on the right side when facing the dial) ***(Standard)***
1	¼" FNPT Dual Top & Bottom (Hi port on the left side when facing the dial)
9	Special ***(Un-coded Options)***
6	**Additional Options**
O	None
A	Brass snubber fittings mounted in bottom process connections ***(Standard)***
B	Brass snubber fittings mounted in top process connections
C	¾" NPT S.S. C-Clamp Bracket
D	¾" NPT S.S. Stub Mount Bracket
F	Carbon Steel 2" Pipe Mounting Kit
P	Panel Mount Kit
Q	CRN **(Canadian Registration Number)**
S	Shatter Proof Glass Lens
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
Z	Special ***(Un-coded Options)***

Standard Model Specifications – continued Model 115/116

7	Electrical Configurations
O	None
A	One (1) Switch in Weather Resistant Enclosure ***Accuracy ±2% (1) Switch unit including effects of the switch (Descending Pressure)***
B	Two (2) Switches in Weather Resistant Enclosure ***Accuracy ±4% (2) Switch units including effects of the switch.*** ***For ranges 80" – 199" H2O only. (Descending Pressure)*** ***Accuracy ±2% (2) Switch units including effects of the switch*** ***For ranges 200" H2O and above.. (Descending Pressure)***
Z	Special ***(Un-coded Options)***
Accuracies and repeatability values for 2 switch units are based upon one switch set low (approx 25% FSR & one switch set High approx. 75% FSR.).	

8	Electrical Specifications
A	SPDT Micro Switch High Current Contact Ratings.(MAX): 4 Amps Maximum @ 30 VDC 3 Amps maximum @ 240 VAC 5 Amps @ 120 VAC
Z	Special ***(Un-coded Options)***
	Electrical Interface: 18"., 18 Awg., 600V, 105 C, ½" FNPT Color coded wire leads
Operating Temperature: -20° F to +185° F	

The Mid-West Instrument Advantage:

- "Engineered Plastic" gauge front and optional stainless steel body bolts provide superior corrosion resistance.
- Up to a 30 lb. weight savings over competitive range gauges
- Easier and less labor to panel mount
- Dry gauge design with no internal liquid fill
- No gauge damage/accuracy loss caused by liquid fill expansion/contraction when exposed to temperature shocks.
- Low range capability
- Industry best lead time reduces inventory requirements

MADE IN USA

6500 Dobry Dr. • Sterling Heights, 48314 MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

"Bourdon Tube Type"

Differential Pressure Gauge & Switches

Model 109

"LOCKED LOGIC" ALARM CONTROLS
(Available with 1 or 2 switches for alarm & control)

Over Range Protection high-low and low-high to rated working pressure by use of a bi-directional relief valve

Model 109 DP Range: 0-15 PSID (0-1.0 bar) to 0-6000 PSID (0-400 bar)

- Bourdon Tube design provides a simple, compact, accurate, direct-acting, high accuracy differential pressure indicator.
- Easier and less expensive to service/repair than competitive units.
- Working pressures of 500, 1500, 3000, or 6000 PSIG (400 bar).
- Housing materials: Aluminum, Brass, Carbon Steel, or 316L Stainless Steel
- Internals: Copper-Alloy or Stainless Steel Bourdon Tube.
- Buna-N seals are standard other elastomers available.
- Mechanical over-range protection to maximum working pressure
- Weather resistant dial case of Engineered Plastic and Shatter resistant acrylic lens
- Panel Mounting Standard
- Uni-directional or Bi-directional dials are readily available.
- Gauges are optionally available with one or two switches which offer's the ability to have alarm or control.

Model 109 (± 1/2% or ± 1% Full Scale Accuracy) System pressure is applied to the inside of a slightly flattened arc- shaped tube. As pressure increases, the tube tends to restore to its original round cross-section. This change in cross-section causes the tube to straighten. Since the tube is permanently fastened at one end, the tip of the tube traces a curve that is the result of the change in angular position with respect to the center. Powered by a test quality Bourdon Tube assembly, the assembly is encapsulated in a high pressure chamber that is fitted with a pressure connection to the inside of the Bourdon Tube and a second connection to the pressure chamber.

Model	Accuracy	Min. ΔP Range	Max. ΔP Range	Safe Working Pressure PSIG (bar)	Optional Switches
109	±1/2% or 1%	0-15 PSID (0-1.0 bar)	0-6000 PSID (0-400 bar)	500-6000 (34-400)	1 or 2

Model 109 assembly incorporates a bi-directional relief valve which provides over-pressure protection in both directions. When over-pressured from the high side, the valve is opened by a mechanical stop as the sensing element deflects to its maximum travel. When over-pressured from the low side, the spring-loaded valve opens when the differential pressure exceeds its maximum rating. The opening of the valve in either direction equalizes the pressure and protects the unit. A range spring is provided to adjust the spring rate of the system to suit the various differential pressure ranges of the instrument.

"Bourdon Tube Type"
Switch Options
Model 109

"LOCKED LOGIC" SOLID STATE ALARM-CONTROL FOR ALL 109 GAUGE
(NOTE - 6" DIAL SIZE ONLY)

If your application requires switching in addition to local indication, our all solid state "Locked Logic" system is the most accurate available. With no moving cams, levers, etc. it does not affect the accuracy of the gauge on which it is installed. Switch accuracy is the same as the gauge accuracy. Visible set pointers are provided, adjustable to within 5% of full scale of each other. The set points are adjustable from 5 to 95% of full scale. Internal adjustment is standard. 1-2 Independently adjustable switches with Set Point Feedback , SPDT or DPDT Output options, Adjustable deadband option for single SPDT or DPDT output (2 set pointers) Accuracy of Gauge unaffected by the switch

OPTION	INTERFACE	MARKINGS	ENVIRONMENTAL	COMMENTS
A,B	1/2" Conduit, Flying Leads, 18 Awg, Color Coded	None	NEMA 4X	Requires Input Power to operate.
C,D	1/2" Conduit, Flying Leads, 18 Awg, Color Coded	None: Designed for Class I, Div 1, Groups B,C, D; Class II, Div 1, Groups E,F, & G.	NEMA 7, NEMA 4X (OPTIONAL)	Explosion-proof enclosure. Needs Input Power to Operate.

"MODEL 109 ELECTRICAL CONFIGURATIONS	
	DESCRIPTION
A	One (1) Switch in Weather Proof enclosure
B	Two (2) Switches in Weather Proof enclosure
C	One (1) Switch in explosion proof enclosure Class I, Groups B, C, & D (Pipe Mounting Kit Standard)
D	Two (2) Switch in explosion proof enclosure Class I, Groups B, C, & D (Pipe Mounting Kit Standard)
	"INPUT OPTIONS" ELECTRICAL SPECIFICATIONS (Select (1) input and (1) output option)
A	8-28 Vdc
B	115 VAC 50/60 Hz
C	220/240 VAC 50/60Hz
Z	Special ***(Un-Coded Options)***
	"OUTPUT OPTIONS" ELECTRICAL SPECIFICATIONS (Resistive Load)
	(Resistive load) – 10 Amp @ 28 VDC, 115/230 VAC (50/60 Hz) (1/2" NPT, 24" Flying Leads standard interface) (1/2" NPT, 24" Flying for two (2) DPDT switches)
A	SPDT Relays
C	SPST Relays
D	Adjustable deadband, one (1) SPDT output (two (2) control switches only)
E	Adjustable deadband, one (1) DPDT output (two (2) control switches only)

Factory preset switches at no charge (Specify Setting)

Proof Pressure: Two times rated working pressure or 10,000 PSI whichever is lower at ambient temperature

Temperature Limits: -40°F (-40°C) to +200°F (+93°C) - 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.

Standards: Gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1	NACE MR0175
ASME B40.100	NEMA Std. No. 250
CSA-C22.2 No. 14.25 and 30	SAE J514
EN-61010-1	UL Std. No. 50,508 and 1203

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Standard Dial Ranges Model: 109

Range Type					
PSID	H_2O	Kpa	Bar	Bi-Directional	Dual Scale
0-15	0-400"	0-160	0-1.6	20-0-20 PSID	0-15 PSID & 0-1 Kg/cm2
0-20	0-500"	0-200	0-2.5	30-0-30 PSID	0-25 PSID & 0-1.75 Kg/cm2
0-25	0-600"	0-250	0-4.0	50-0-50 PSID	0-30 PSID & 0-200 Kpa
0-30		0-400	0-6.0	100-0-100 PSID	0-50 PSID & 0-350 Kpa
0-50		0-600	0-7.0	150-0-150 PSID	0-60 PSID & 0-400 Kpa
0-60		0-700		150-0-150 Kpa	0-100 PSID & 0-700 Kpa
0-75					0-100 PSID & 0-7 Kg/cm2
0-100					
0-150					
0-200					
0-250					
0-300					
0-500					

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.

Uni-Directional Dial Ranges are available in either LINEAR or SQUARE ROOT FLOW SCALES with any appropriate legend (I.E. PSID, Kpa, IN H_2O, GPM, SCFM, ETC) at no extra charge			LINEAR Bi-Directional Dials are available with any appropriate Legend at No Charge	
0-0.5	0-30	0-300	1.0-0-1.0	75-0-75
0-1.0	0-35	0-400	2.0-0-2.0	100-0-100
0-1.6	0-40	0-500	5.0-0-5.0	150-0-150
0-2.0	0-50	0-600	10-0-10	200-0-200
0-3.0	0-60	0-700	15-0-15	300-0-300
0-4.0	0-70	0-800	25-0-25	400-0-400
0-5.0	0-75	0-900	30-0-30	750-0-750
0-6.0	0-80	0-1000	50-0-50	1000-0-1000
0-7.0	0-100	0-1500		
0-8.0	0-135	0-1600		
0-10	0-150	0-2000		
0-15	0-160	0-3000		
0-20	0-200	0-4000		
0-25	0-250	0-5000		
		0-6000		

Model	Min. ΔP Range	Max. ΔP Range
109	0-15 PSID (0-1.0 bar)	0-6000 PSID (0-400 bar)

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

INTENTIONALLY BLANK

Standard Model Specifications: 109-FE-00-OO

1500 PSIG Working Pressure, Aluminum Body, Stainless Steel Bourdon Tube, Stainless Steel Internals
Buna-N Seals, ¼" FNPT Back Connections (Stainless Steel), 6" Uni-Directional Round Dial,
Weather Resistant Engineered Plastic Case with Shatter Resistant Acrylic Lens,
Accuracy ±1% Full Scale (Ascending)

Mid-West Instrument
1-800-648-5778

Range: 0-15 PSID to 0-6000 PSID (0-1.0 bar to 0-400 bar)

1	2	3	4	5	6	7	8
1 0 9							

Basic Model

Range:_____




2	Material
C	1500 PSIG, Aluminum Body, Copper Alloy Internals
D	3000 PSIG, Aluminum Body, Copper Alloy Internals
F	1500 PSIG, Aluminum Body, Stainless Steel Internals
G	3000 PSIG, Aluminum Body, Stainless Steel Internals
M	1500 PSIG, Mild Carbon Steel Body, Stainless Steel Internals
N	3000 PSIG, Mild Carbon Steel Body, Stainless Steel Internals
Q	1500 PSIG, 316 Stainless Steel Body, Stainless Steel Internals
R	3000 PSIG, 316 Stainless Steel Body, Stainless Steel Internals
T	6000 PSIG, 316 Stainless Steel Body, Stainless Steel Internals
U	1500 PSIG, Brass Body, Copper Alloy Internals
V	500 PSIG, Brass Body, Copper Alloy Internals
X	1500 PSIG, Brass Body, Stainless Steel Internals
Y	500 PSIG, Brass Body, Stainless Steel Internals
3	**Dial Size Type**
E	Accuracy ±1% Full Scale Uni-Directional Dial w/Engineered Plastic Dial Case ***(Standard)***
F	Accuracy ±1% Total Span Bi-Directional Dial w/Engineered Plastic Dial Case **(±3% above 1500-0-1500 PSI)**
G	Accuracy ±1/2% Full Scale Uni-Directional Dial w/Engineered Plastic Dial Case **(Not available above 1000 PSID)**
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N ***(Standard)***
1	Viton®-A Registered Trademark of Dupont
2	Neoprene
5	Ethylene Propylene
6	Perfluorelastomers
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/4" FNPT Back Connections ***(Standard)***
1	1/4" Carbon Steel Compression Tube Fittings
2	1/4" FNPT Brass Adapters
3	1/4" FNPT Stainless Steel Adapters ***(Standard Connection on Stainless Steel Body Gauges)***
4	1/2" FNPT Brass Adapters
5	1/2" FNPT Stainless Steel Adapters
9	Special ***(Un-coded Options)***

Standard Model Specifications – continued Model 109

6	Additional Options
O	None
B	Drain & Bleed Connections **(1/8" FNPT Brass)**
C	Drain & Bleed Connections **(1/8" FNPT 316 Stainless Steel)**
F	Carbon Steel 2" Pipe Mounting Kit **(Standard with Explosion Proof Enclosure)**
L	Liquid Filled
M	Maximum Follower Pointer
N	NACE
Q	CRN **(Canadian Resitration Number)**
S	Shatter Proof Glass Lens
T	Oxygen Cleaning
U	Stainless Steel Tag with S.S. Wire
V	Stainless Steel Tag and S.S. Screw
W	Wall Mount Kit
Y	4-1/2" Dial
Z	Special ***(Un-coded Options)***
7	**Electrical Configurations**
A	One (1) Switch in Weather Proof enclosure
B	Two (2) Switches in Weather Proof enclosure
C	One (1) Switch in explosion proof enclosure Class I, Groups B, C, & D **(Pipe Mounting Kit Standard)**
D	Two (2) Switch in explosion proof enclosure Class I, Groups B, C, & D **(Pipe Mounting Kit Standard)**
8	**"Input Options" Electrical Specifications (Select (1) input and (1) output option)**
A	8-28 Vdc
B	115 VAC 50/60 Hz
C	220/240 VAC 50/60Hz
Z	Special (Un-coded Options)
	"Output Options" (Resistive Load)
	(Resistive load) – 10 Amp @ 28 VDC, 115/230 VAC (50/60 Hz)
	(1/2" NPT, 24" Flying Leads standard interface)
	(1/2" NPT, 24" Flying for two (2) DPDT switches)
A	SPDT Relays
C	SPST Relays
D	Adjustable deadband, one (1) SPDT output (two (2) control switches only)
E	Adjustable deadband, one (1) DPDT output (two (2) control switches only)
Z	Special (Un-coded Options)
	NOTE: Not All Options Available in Combination with other Options

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. If you are in need of additional information please visit our web site at www.midwestinstrument.com or contact us toll free at **1-800-648-5778** and one of our knowledgeable sales coordinators will be happy to assist you.

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

FLOW MEASUREMENT PRODUCTS

Veris Verabar
Flow Sensor

Veris Accelabr
Flow Meter

Flow measurement using Mid-West Instrument differential pressure gauge technology will provide accuracy and reliability you've come to know and trust. Our industrial quality differential pressure flow gauge uses modern materials and current technology to provide an easy to read flow scale.

Mid-West differential pressure flow gauges indicate such flow rates as liters per minute up to gallons per hour even when used at high line pressures. Units can be supplied with reed switches or relays to initiate alarms, activate other equipment, or shut the system down. Two switches are available when high and low limits are required. 4-20 mA Transmitter also available.

Here are some typical flow designators: GPM, USGPM, ACFM, SCFM, NM3/HR, LBS/HR,L/MIN, L/SEC, KG/HR, TONS/HR. Flow scale dials are available for the following Mid-West differential pressure gauges: Model 150, 106, 109, 130, 140 and 142

Model 105/106 Range: 0-10" H2O to 0-400" H2O (25 mbar to 1 bar)
Model 109 DP Range: 0-15 PSID (0-1.0 bar) to 0-6000 PSID (0-400 bar)
± 1/2% or ± 1% Full Scale Accuracy
Working pressures of 500, 1500, or 3000, PSIG (210 bar).
Housing materials: Aluminum, Brass, Carbon Steel, or 316L Stainless Steel
Uni-Directional Dial Ranges are available in either
LINEAR or SQUARE ROOT FLOW SCALES

Available Flow Scales Models: 105, 106, & 109

Uni-Directional Dial Ranges are available in either LINEAR or SQUARE ROOT FLOW SCALES with any appropriate legend (I.E. GPM, SCFM, USGPM, NM3/HR, L/MIN, ETC) at no extra charge			LINEAR Bi-Directional Dials are available with any appropriate Legend at No Charge	
0-0.5	0-30	0-300	1.0-0-1.0	75-0-75
0-1.0	0-35	0-400	2.0-0-2.0	100-0-100
0-1.6	0-40	0-500	5.0-0-5.0	150-0-150
0-2.0	0-50	0-600	10-0-10	200-0-200
0-3.0	0-60	0-700	15-0-15	300-0-300
0-4.0	0-70	0-800	25-0-25	400-0-400
0-5.0	0-75	0-900	30-0-30	750-0-750
0-6.0	0-80	0-1000	50-0-50	1000-0-1000
0-7.0	0-100	0-1500		
0-8.0	0-135	0-1600		
0-10	0-150	0-2000		
0-15	0-160	0-3000		
0-20	0-200	0-4000		
0-25	0-250	0-5000		
		0-6000		

Model 130
Range: 0-5" H2O to 0-400" H2O
0-5" to 0-9.9" H2O ± 5%
0-10" to 0-400" H2O ± 2%
Full Scale Accuracy

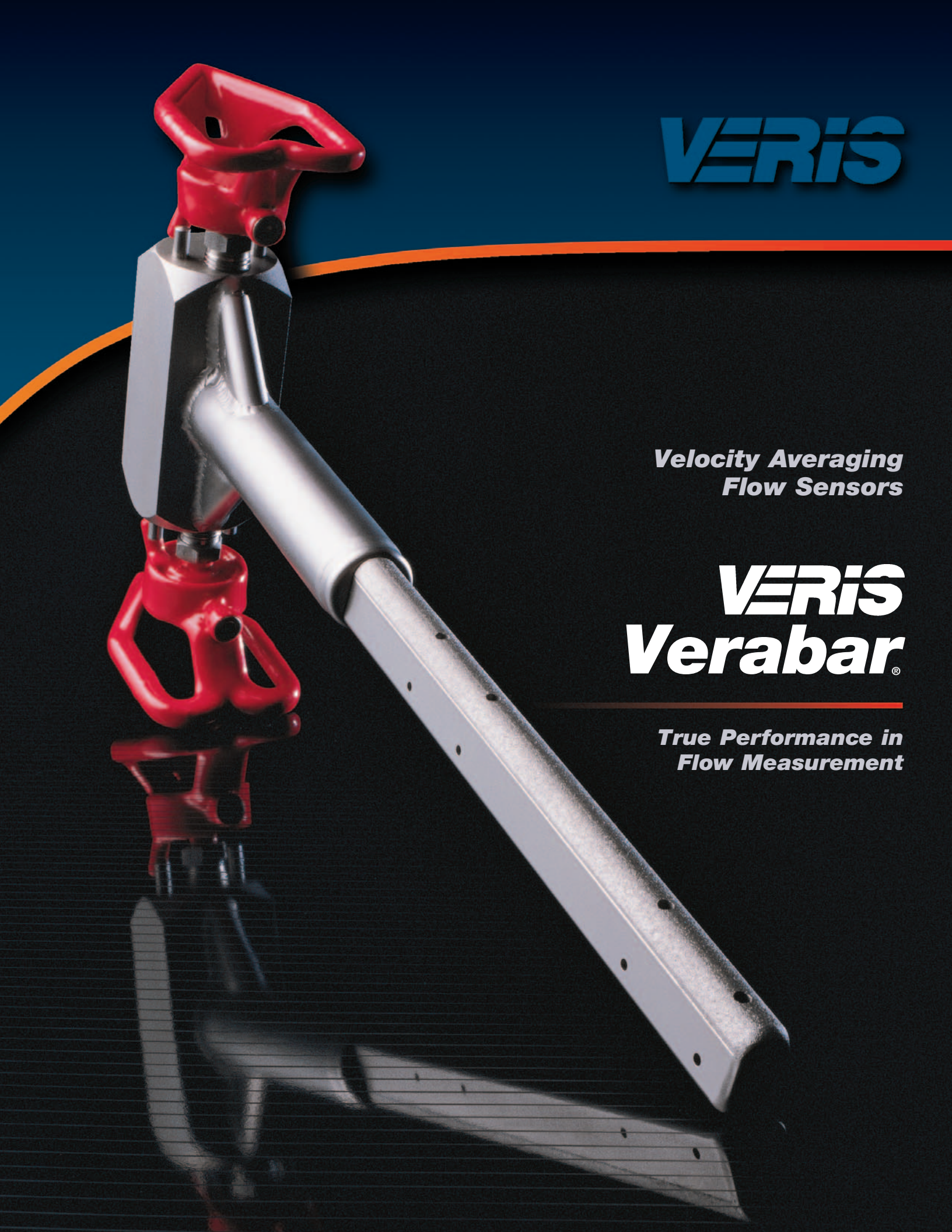
Model 140 or 142
142 Range:
0-20" H2O to 0-25 PSID
140 Range:
0-25 PSID to 0-100 PSID
± 2% Full Scale Accuracy

Uni-Directional Dial Ranges are available in either LINEAR or SQUARE ROOT FLOW SCALES

Available Flow Scales Models: 130, 140, 142

Uni-Directional Dial Ranges are available in either LINEAR or SQUARE ROOT FLOW SCALES with any appropriate legend (I.E.GPM, SCFM, USGPM, NM3/HR, L/MIN, ETC) at no extra charge		
Model 130 Flow Dials		**Models 140/142 Flow Dials**
0-1.0		0-1.0
0-1.25		0-1.5
0-1.5		0-2.0
0-1.75		0-2.5
0-2.0		0-5.0
0-2.5		0-10.0
0-3.0		
0-3.5		
0-4.0		
0-4.5		
0-5.0		
0-5.5		
0-6.0		
0-6.5		
0-7.0		
0-7.5		
0-8.0		
0-8.5		
0-9.0		
0-9.5		
0-10		
Available Multipliers for Flow Dials: X10, X100, X1000, and X10,000		
Note: Not all ranges available in all diaphragm materials		

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com



Velocity Averaging Flow Sensors

VERIS Verabar®

True Performance in Flow Measurement

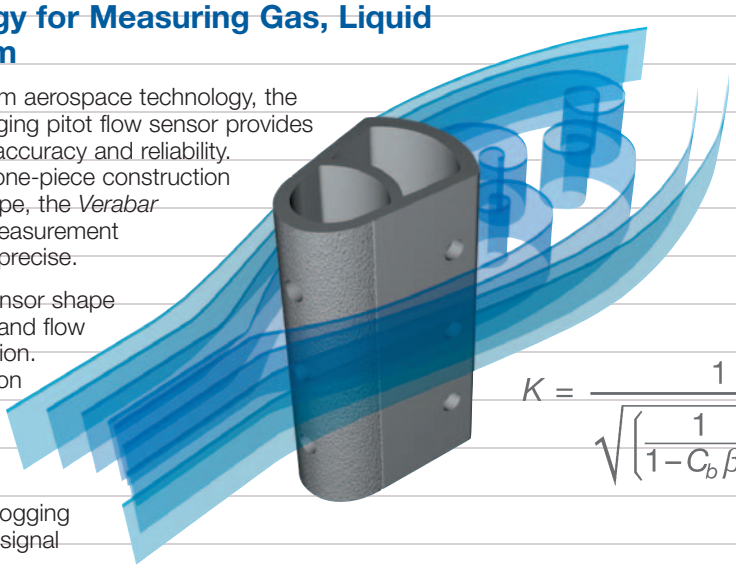
VERIS Verabar®
Advanced DP Flow Measurement Technology

From Veris Research…*True Performance in DP Flow Measurement*

The Most Accurate and Reliable Technology for Measuring Gas, Liquid and Steam

Developed from aerospace technology, the *Verabar* averaging pitot flow sensor provides unsurpassed accuracy and reliability. With its solid one-piece construction and bullet shape, the *Verabar* makes flow measurement clog-free and precise.

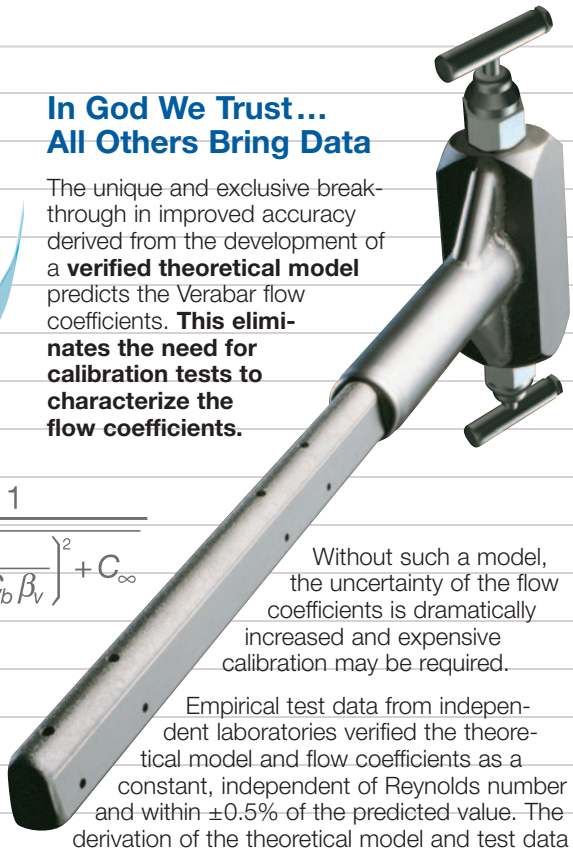
The unique sensor shape reduces drag and flow induced vibration. And the location of the low pressure ports eliminates the potential for clogging and improves signal stability.



$$K = \frac{1}{\sqrt{\left(\frac{1}{1-C_b\beta_v}\right)^2 + C_\infty}}$$

In God We Trust… All Others Bring Data

The unique and exclusive breakthrough in improved accuracy derived from the development of a **verified theoretical model** predicts the Verabar flow coefficients. **This eliminates the need for calibration tests to characterize the flow coefficients.**

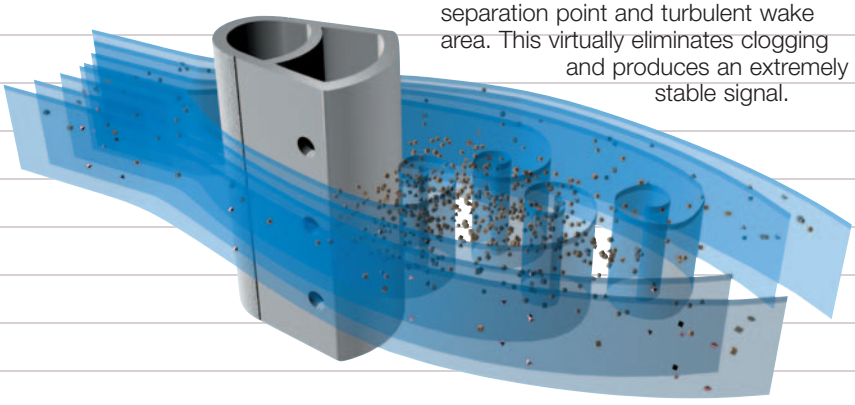


Without such a model, the uncertainty of the flow coefficients is dramatically increased and expensive calibration may be required.

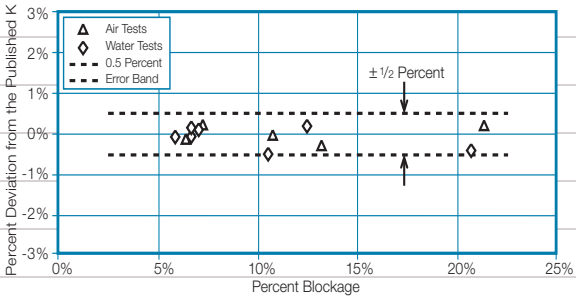
Empirical test data from independent laboratories verified the theoretical model and flow coefficients as a constant, independent of Reynolds number and within ±0.5% of the predicted value. The derivation of the theoretical model and test data is published in the Verabar Flow Test Report (ED-100).

Superior Signal Stability and Greater Resistance to Clogging

Clogging can occur in low pressure ports located in or near the partial vacuum at the rear of the sensor. The *Verabar* design locates the low pressure ports on the sides of the sensor, forward of the fluid separation point and turbulent wake area. This virtually eliminates clogging and produces an extremely stable signal.



Test Data Summary

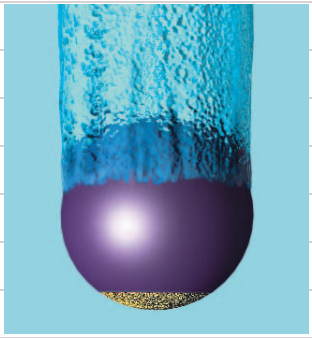


Lower Drag and Extended Turndown

Golf balls fly farther because they have a dimpled surface that lowers aerodynamic drag.

The grooves and roughness on the *Verabar's* frontal surface apply the same principle. This simple design feature relieves the partial vacuum at the rear of the sensor, reducing the pressure drag. This extends the accuracy and rangeability to very low velocities.

Rough Surface



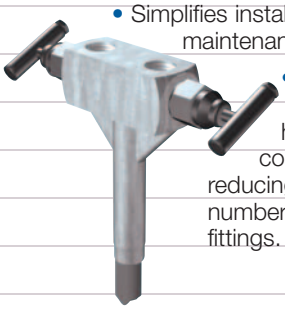
Smooth Surface

Verabar... New Ideas That Work

Unique Valve Head

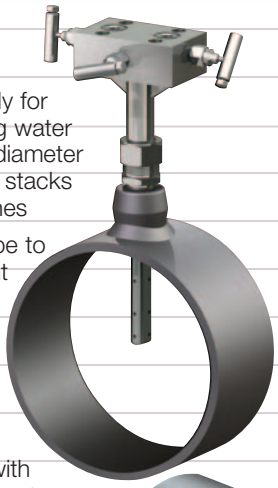
Verabar offers a new concept… built-in valves in the head of the instrument.

This superior design:



- Simplifies installation and maintenance.
- Lowers the connecting hardware cost by reducing the number of fittings.

Partial Insert



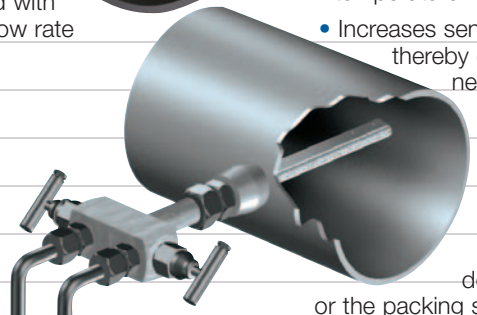
- Designed specifically for high velocity cooling water applications, large diameter pipes, large vertical stacks and buried water lines
- Extends 1/3 into pipe to reduce procurement and installation costs — specifically useful when a hot tap is required
- Partial Insert hot tap sensors can be inserted/retracted with no reduction in flow rate

Spring-Lock… Offers a Superior Mounting Method

This advanced, patented design ensures the sensor remains sealed, locked and pre-loaded to the opposite wall regardless of changes in pipe diameter due to pressure, temperature or mechanical force.

This design has important advantages:

- Fugitive emission and leak prevention… The Spring-Lock continually compensates for the differential in packing and body growth rates due to increased temperature.
- Increases sensor strength, thereby eliminating the need for an opposite wall support. A locked, pre-loaded sensor is four times stronger than a non-preloaded, cantilevered sensor.
- Other mounting methods do not pre-load the sensor or the packing seal and are subject to increased sensor vibration, metal fatigue, breakage and leakage.

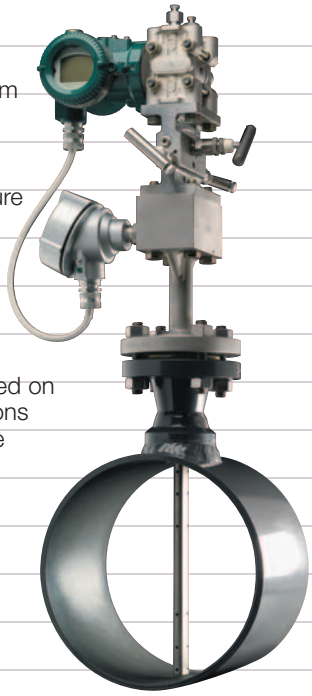


Transmount

A Transmount flow system is the first choice for all liquids; and for gas and steam applications, with slight variations in pressure and temperature.

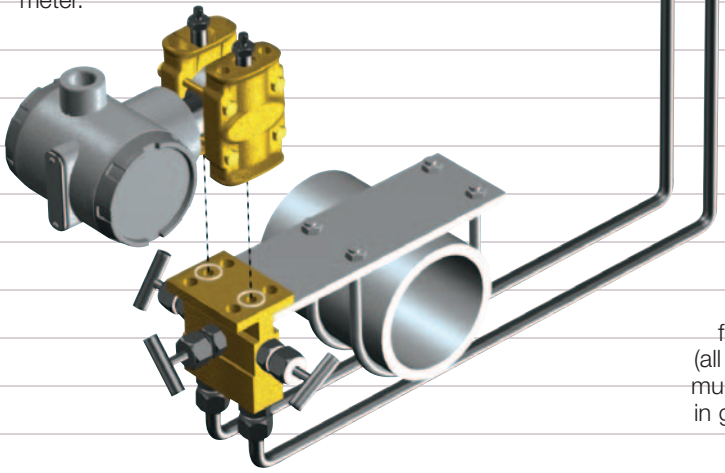
Mass Transmount

A Mass Transmount flow system should be selected on steam and gas applications with variable temperature and pressure.

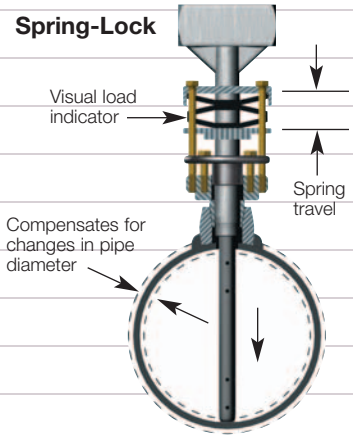


Field Flow Systems

Ready to install, the Verabar can be ordered with a manifold, transmitter or local indicating meter.



Complete Installation in Less than an Hour

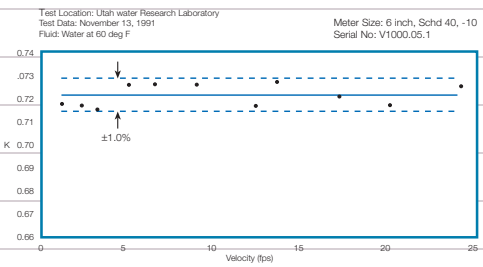


The Proof of *Verabar* Accuracy

Accurate Flow Coefficients

The true test of a flow measurement device is its ability to repeat its published flow coefficient within its accuracy band. *Verabar* has been thoroughly tested at independent flow laboratories (all sensor sizes, in multiple pipe sizes, in gas and liquids).

Actual Flow Test



Verabar...The Versatile Flow Sensor

Fast and Easy Model Selection

The easy-to-operate Veracalc computer program features:

- **Flow Calculations:** DP from flow rate, or flow rate from DP.
- **Model Selection:** Complete model selection from drop down menus.
- **Structural Analysis:** Verifies sensor strength at flowing conditions.
- **Temperature and Pressure Limits:** Error warnings if limits are exceeded.

The Veracalc PC program is available from your local representative, the factory or it can be downloaded from our website at *www.veris-inc.com*.

Verabar Model Selector

Regular Models — (Threaded Components)

Model Number	Type of Mounting
V100, V110, V150	**Tube Fitting** **V100** (Single Support) **V110** (Double Support)
	Spring-Lock **V150** (No opposite support required)

Hot Tap Models — (Threaded Components)

V200, V250	**Screw Drive** **V200**
	Low Pressure Hand Insertion **V250**

Hot Tap Models — (Flanged Components)

Model Number	Type of Mounting
V400, V450	**Screw Drive** **V400**
	Low Pressure Hand Insertion **V450**

Flanged Models — (Flanged Components)

V500, V510, V550	**Flanged** **V500** (Single Support) **V510** (Double Support)
	Flanged Spring-Lock **V550** (No opposite support required)

Verabar Applications

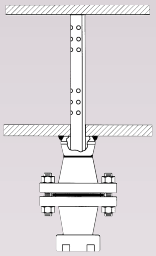
The *Verabar* offers the widest application range of any flow sensor. It accurately measures gas, liquid and steam.

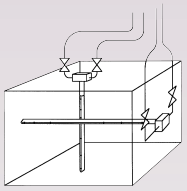
Gas	Liquid	Steam
Natural Gas	Cooling/Chilled water	Saturated
Compressed Air	Boiler Feed Water	Superheated
Combustion Air	De-Mineralized Water	Main Header
Hydrocarbon Gas	Hydrocarbon Liquids	Custody Transfer
Hot Air	Cryogenic	Distribution
Blast Furnace Gas	Thermal Transfer Fluids	Energy Studies

Extended Range Applications

The *Verabar's* versatile design lends itself to a wide range of applications. Contact Veris application engineering for your special requirements.

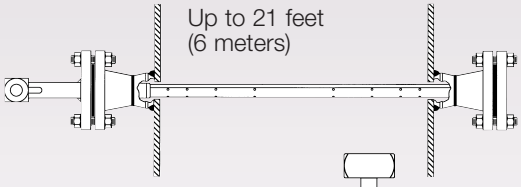
High Pressure Design
2500# ANSI Class
6000PSI and 1000ºF





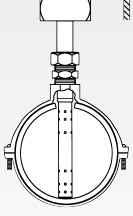
Square and Rectangular Ducts

Large Stacks and Ducts
Up to 21 feet
(6 meters)



Specialized Mounting

- PVC
- FRP
- Concrete
- Cast Iron Pipe



Verabar Compared to Orifice Plates

Through Accuracy of Measurement, Low Installed and Operating Costs, *Verabar* Proves Its Performance, Efficiency and Value.

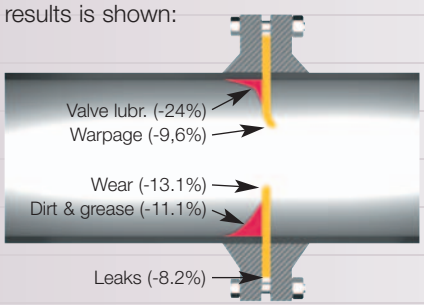
Verabar Maintains Its Accuracy

Orifice plates show long term deterioration of accuracy.

The initial accuracy of the orifice plate is ±1%. However, long term accuracy deteriorates unless the plate is periodically inspected. Senior, dual chamber fittings are available to check the plate without requiring system shutdown, but such fittings are very expensive.

Orifice Plate Test Results

Florida Gas Transmission Company conducted a test to quantify various conditions which can result in inaccurate measurement. A partial list of the results is shown:



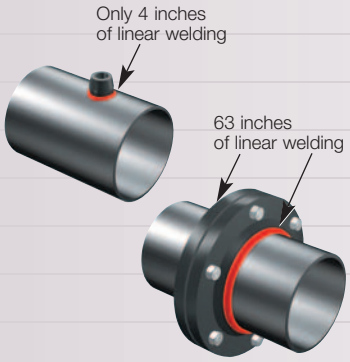
Condition	% Deviation
Wear of knife edge:	
0.010”	-2.2
0.020”	-4.5
0.050”	-13.1
Dirt and grease deposits in pipe	-11.1
Valve lubrication upstream:	
one side of plate	-15.8
both sides	-24.0
Leaks around plate	-8.2
Plate warpage	-9.6

Verabar Lowers Installed Costs

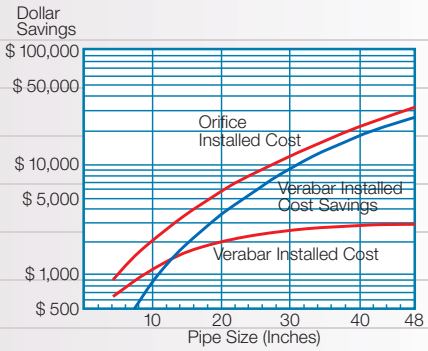
Verabar can save you more than 60% in installation costs over an orifice plate in a 10” pipe.

The graph shows the total installed cost by pipe size of the orifice plate, the *Verabar*, and the resultant *Verabar* savings. The most significant portion of the savings is the reduction in the linear inches of weld.

Savings in Weld Time



Installed Cost Savings

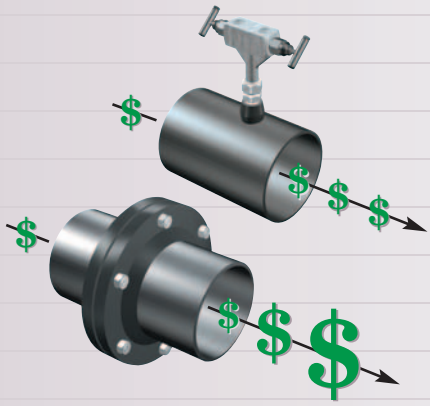


Verabar Has the Lowest Operating Costs

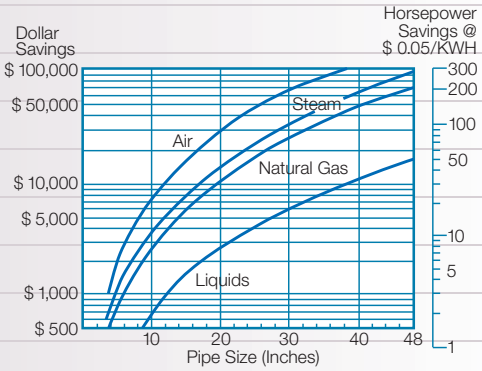
Verabar pays for itself in less than a year.

The graph shows the yearly operating cost savings and equivalent horsepower savings of the non-constricting, low permanent pressure loss *Verabar* compared to the extremely constricting, high permanent pressure loss orifice plate. Savings are shown for gases, liquids and steam — at typical design velocities, by pipe size.

Verabar vs. Orifice



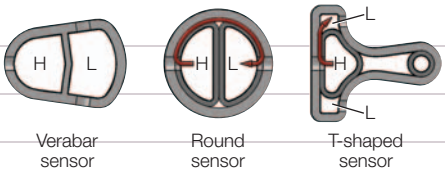
Operating Cost Savings



Verabar Compared To Other Insert Flow Sensors

Quality Assurance

Veris manufactures its own leak-proof, solid *one-piece* sensor. Our primary goal is to provide the highest quality and most accurate sensor in the industry.



Verabar sensor | Round sensor | T-shaped sensor

Other manufacturers use a *three-piece* sensor design that has no positive mechanical method of maintaining a seal between the tubes. Therefore, temperature, pressure, vibration and even manufacturing variations can *cause leakage between the chambers.*

This can result in a significant undetectable loss in accuracy.

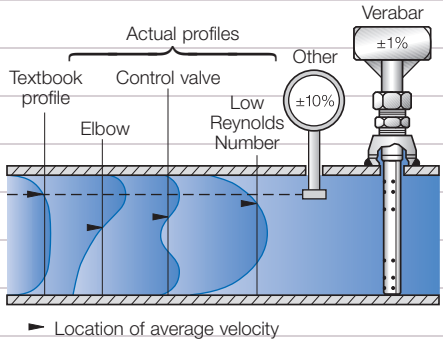
Verabar is designed to meet or exceed applicable ANSI and ASME codes. The *Verabar* is available to meet B31.1, B31.3, B31.8, NACE MR-01-75, etc.

Additional QA capabilities include code welding, hydrostatic and other non-destructive testing.

Why Average the Velocity Profile?

Verabar averages the velocity profile through multi-sensing ports which span the entire pipe diameter. Other types of non-averaging insert meters are SINGLE POINT INSERT METERS (turbine, vortex, magnetic, sonic, etc.). They assume a "textbook: turbulent velocity profile, and use a single "critical" point to infer an average velocity. In actual industrial applications, sensors are located downstream of disturbances, such as elbows or valves, which produce non-uniform velocity profiles. This makes it virtually impossible to locate a single point that represents the average velocity.

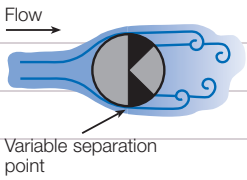
Result: *Inaccuracy ranging from ±10% to ±20%.*



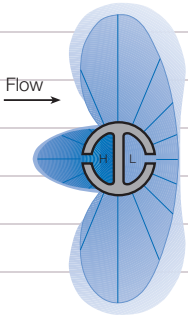
Problems with Other Sensor Shapes

Round Sensors

Round sensors produce unpredictable accuracy. The original round sensors were designed for economical fluid balancing and did not meet industrial demands for accuracy. Round sensors have a variable fluid separation point that causes an unstable low pressure distribution around the sensor.

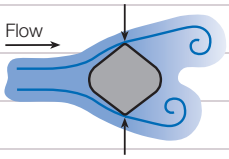


Result: *Inaccuracy in excess of ±5% and as high as ±10%.*

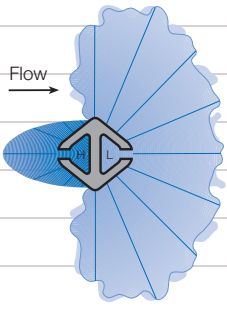


Diamond and T-Shaped Sensors

These sensors produce pulsating, noisy signals. They improved accuracy by use of a sharp edge to fix the fluid's separation point. However, this greatly amplified the vortex shedding forces.

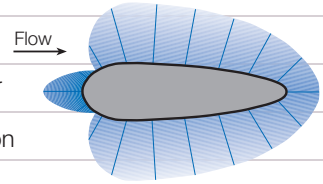


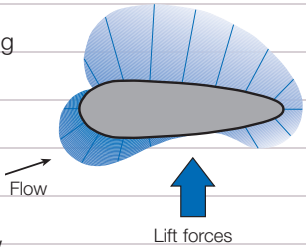
Result: *The sharp edges generate extreme vortices, causing sensor vibration, pulsations and a noisy signal to the point that transmitter dampening and signal averaging are recommended.*



Aerodynamic-Shaped Sensors

Extreme aerodynamic shapes that permit the stream lines to reattach are subject to airfoil type lift forces. This occurs when the angle of attack varies due to sensor misalignment, or the direction of the fluid varies, as is common in industrial piping with upstream disturbances.





Result: The lift forces can cause an unpredictable shift in the low pressure distribution, producing inaccurate measurement.

Mid-West® Instrument

ISO 9001 Certified

Verabar…True Performance in Flow Measurement

6500 Dobry Drive
Sterling Heights, MI 48314

Phone: 586-254-6500
Fax: 586-254-6509

E-mail: sales@midwestinstrument.com
Website: www.midwestinstrument.com

VB-100 (2/09)
Printed in USA

VERIS

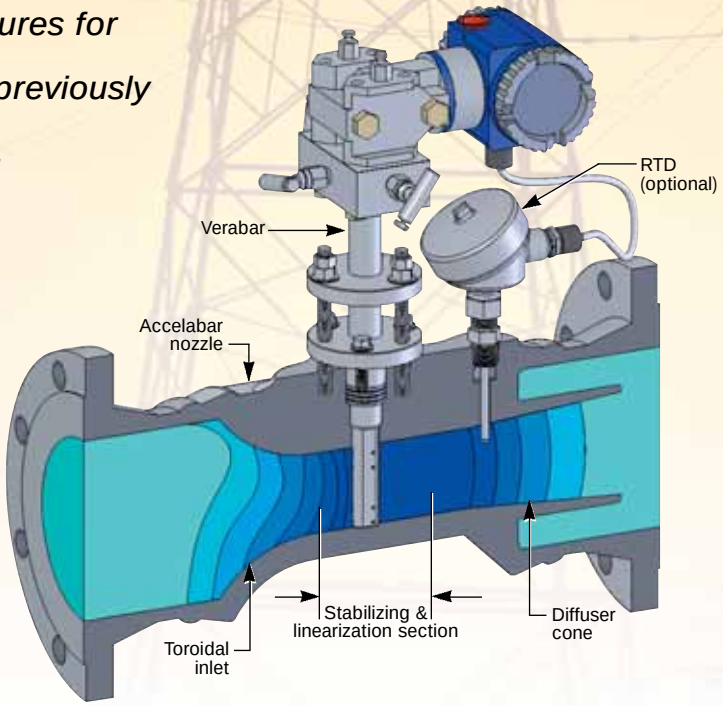
Superior Flow Measurement Accuracy
with ***No Straight Run Requirements*** *and*
Operating Ranges Never Before Attainable

...Until Now

Accelabar®

The Unique Accelabar Flow Meter

The Accelabar is a new and unique flow meter that combines two differential pressure technologies to produce operating ranges never before attainable in a single flow meter. It is capable of generating high differential pressures for measuring gas, liquids and steam at turndowns previously unattainable—with no straight run requirements.



How the Accelabar Works

The Accelabar consists of a unique toroidal nozzle design and a Verabar® averaging pitot. The nozzle has a patented straight run "settling distance" that accelerates, linearizes and stabilizes the velocity profile sensed by the Verabar. The Verabar located within the nozzle accurately measures and significantly increases the differential pressure output to increase the operating range (turndown). The Accelabar has a constant flow coefficient and produces an accuracy of up to ±0.50%.

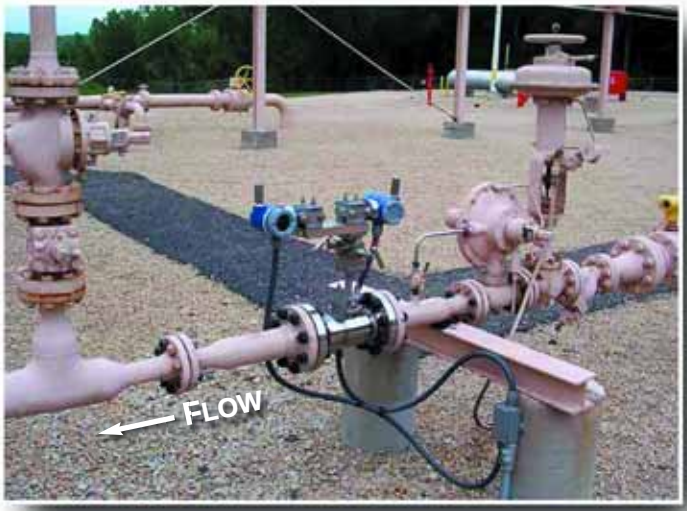
Other manufacturers claim high accuracy, but over a limited turndown.

No Straight Run Required

The Accelabar can be used in extremely limited straight run piping configurations. The straight run is integral to the meter. The stabilization and linearization of the velocity profile within the throat of the nozzle eliminates the need for any upstream run.

Engineering Specifications

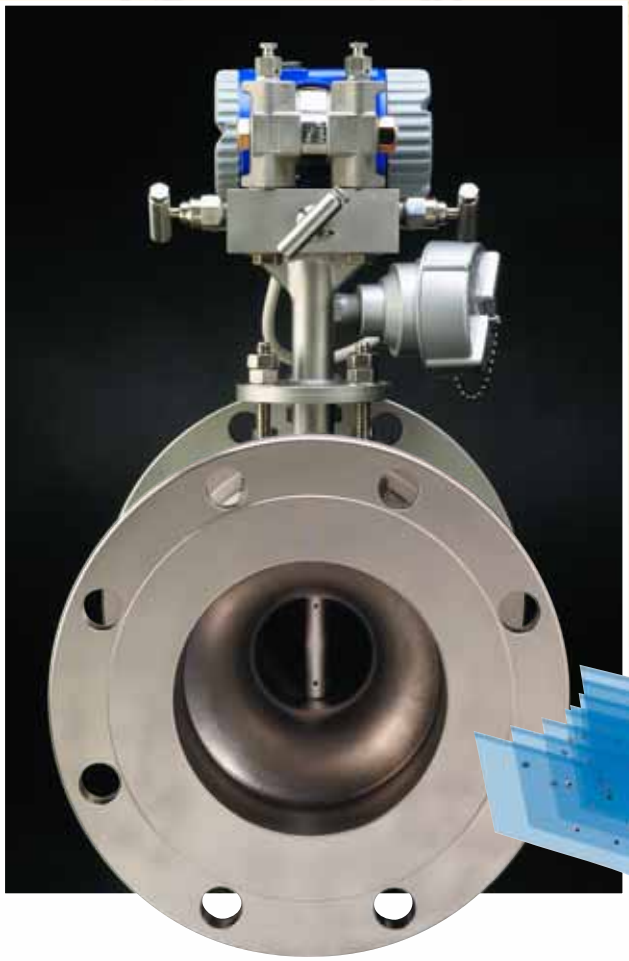
- Low velocity flow rates
- High accuracy: to ± 0.50%
- Repeatability: ±0.050%
- Verified flow coefficients
- No calibration required
- Extended turndown
- No straight run requirements
- Low permanent pressure loss
- Mass or volumetric flow



Actual Application (see data on page 4)

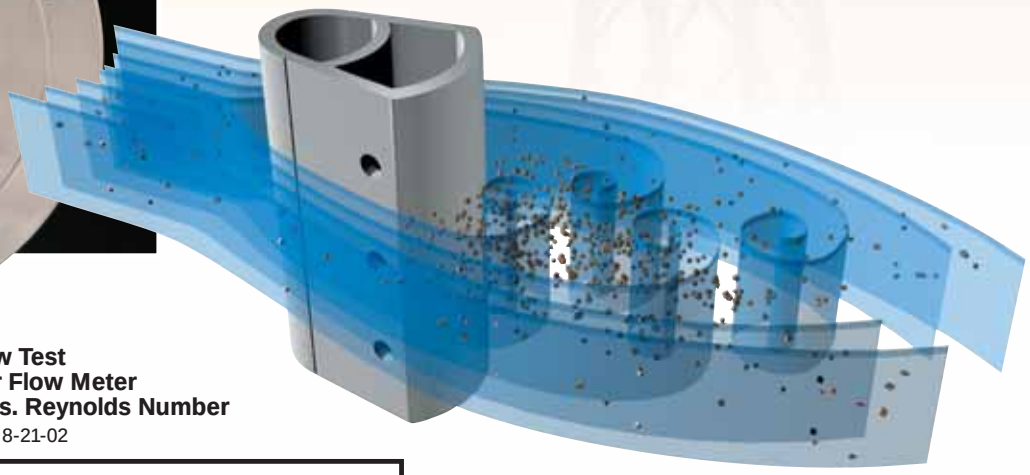
Application:	3" Sch 40 Natural Gas
Operating Pressure/ Temperature:	50 PSIG/70° F
Max/Min Flow Rate:	60,000 SCFH/1,000 SCFH
Flow Turndown:	60:1
Straight Run:	0"

US Patent No. 6,868,741 B2 and various foreign patents pending.

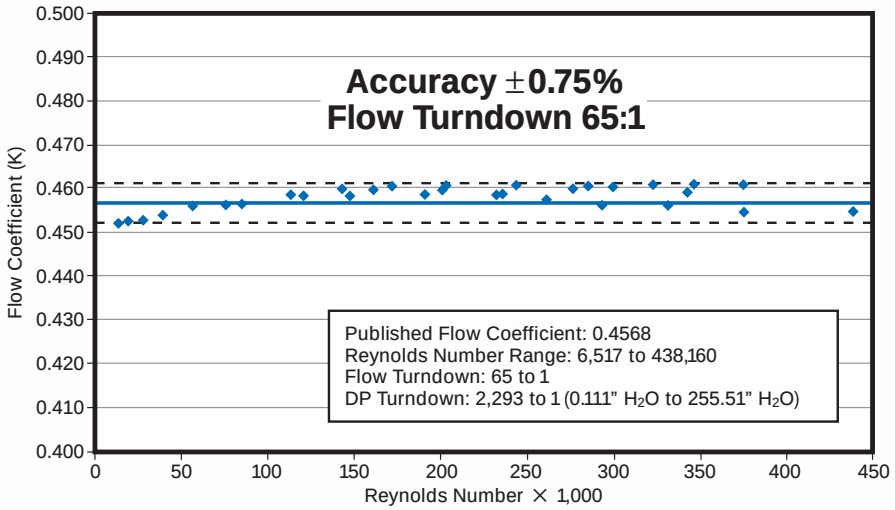


Verabar Provides the Accuracy

The proven technology of the Verabar makes the Accelabar work. It accurately measures the flow rate within the nozzle. Its unique bullet shape, constant flow coefficient, solid one-piece construction, non-clog design and signal stability make it the only design capable of producing the overall performance.



Flow Test
Accelabar Flow Meter
Flow Coefficient vs. Reynolds Number
Date 8-21-02



Verified Accuracy and Flow Coefficients

Empirical test data from independent laboratories verified an analytical model and flow coefficients as constant and independent of Reynolds Number and within ±0.75% of the predicted value over a flow turndown of 65:1 (see actual test). ***This eliminates the need for calibration.***

Comparative Analysis vs. Other Flow Meters

The Accelabar fills the need not presently being filled by other flow meters for applications that:

- Do not have sufficient velocity to produce a readable signal or sufficient turndown
- Require the highest accuracy over an extended range
- Have little or no straight run piping before the meter

The Accelabar performance characteristics far exceed those of other DP meters, vortex meters and many other flow meters.

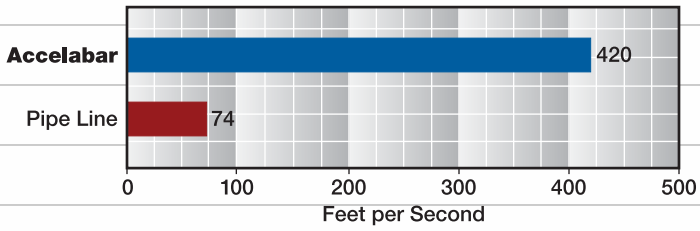
These charts show the actual performance characteristics of the Accelabar versus other flow meters based on the following flow conditions:

Flow Conditions

Fluid	Natural Gas
Pipe Size	3" Sch 40
Max Flow	60,000 SCFH
SG	0.6
Pressure	50 psig
Temperature	70°F
Pipe Line Velocity	74 ft/sec

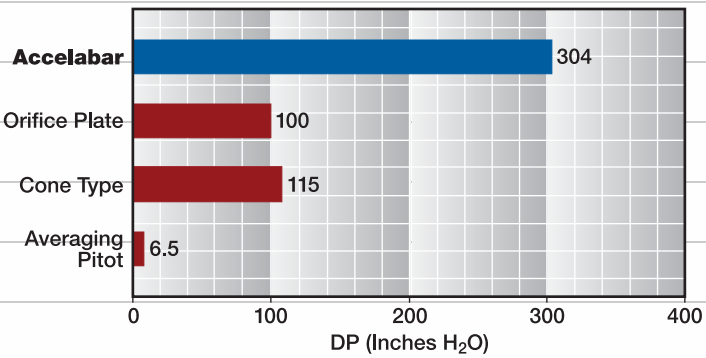
Accelabar Increased Velocity

Fluid Velocity — Pipe Line vs. Accelabar Throat



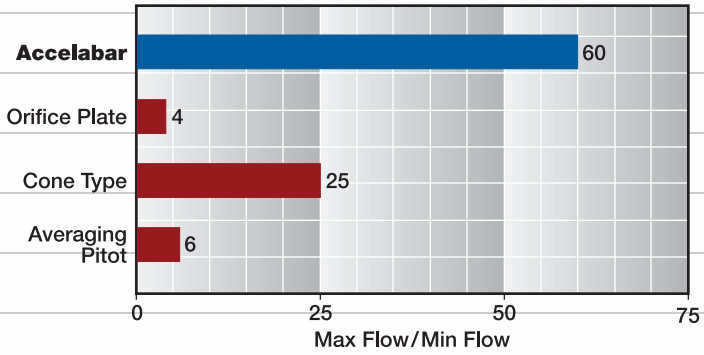
DP at Maximum Flow

Inches H_2O — 3" Natural Gas 60,000 SCFH



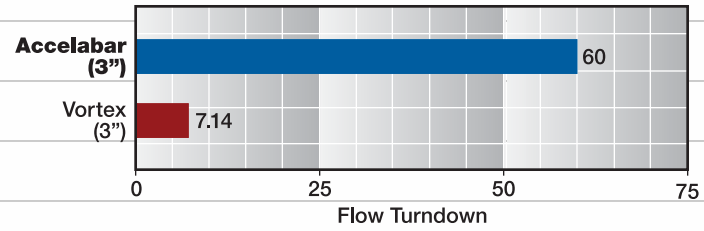
Flow Turndown

Maximum & Minimum

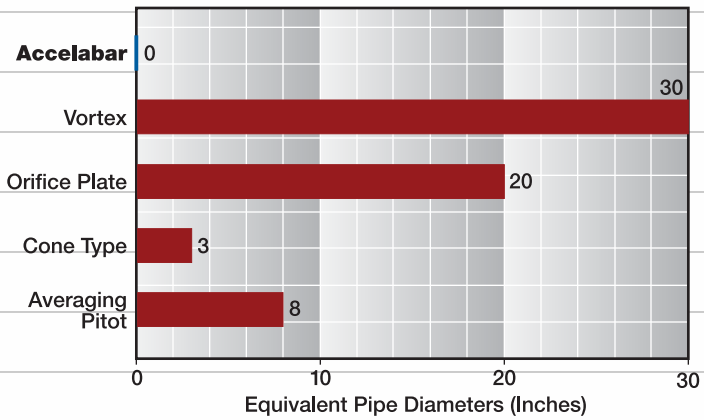


Flow Turndown

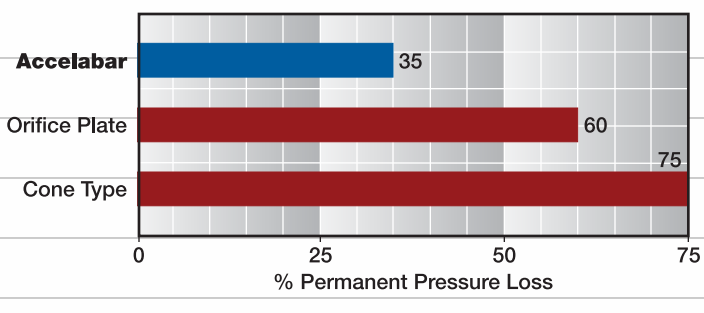
Accelabar vs. Vortex



Minimum Straight Run Requirements



Permanent Pressure Loss

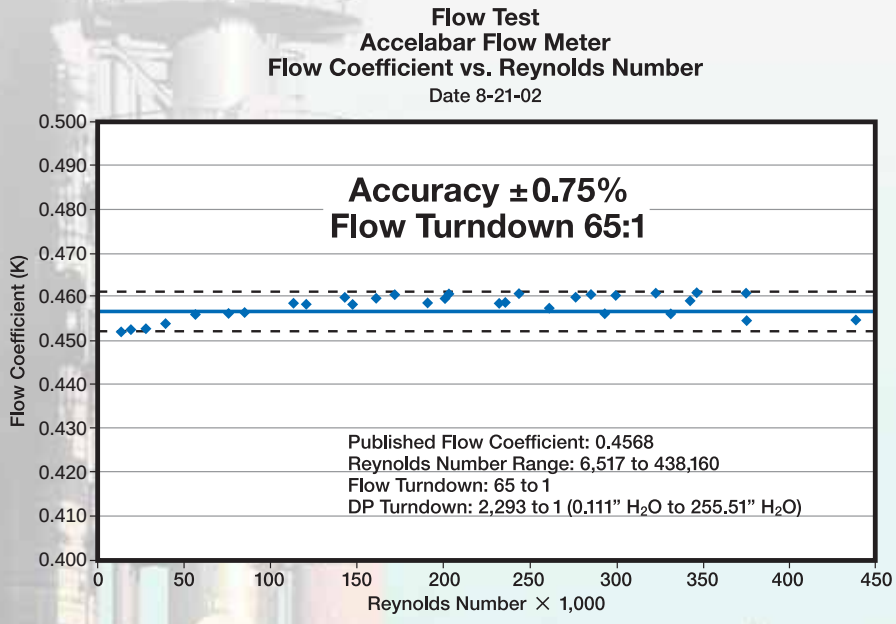


Accelabar® Test Data

The Proof Is In The Data

Many flow meters claim high accuracy and rangeability or turndown. However, few manufacturers define their limitations and even fewer can support it with actual test data. The tests below show the performance capabilities of the Accelabar.

Turndown Test



Test Specifications*

Pipe Size:	3" sch 40
Fluid:	Air
Flow Rate:	145 ACFM
Max Pressure:	60 psig
Max Temperature:	75°F

Results

The Accelabar produced a DP of 255.5" H_2O at 145 ACFM. An accuracy of ±0.75% was maintained over a Reynolds Number range of 65 to 1. No other flow meter is capable of this operating range.

*Independent, NIST traceable tests were performed as follows:

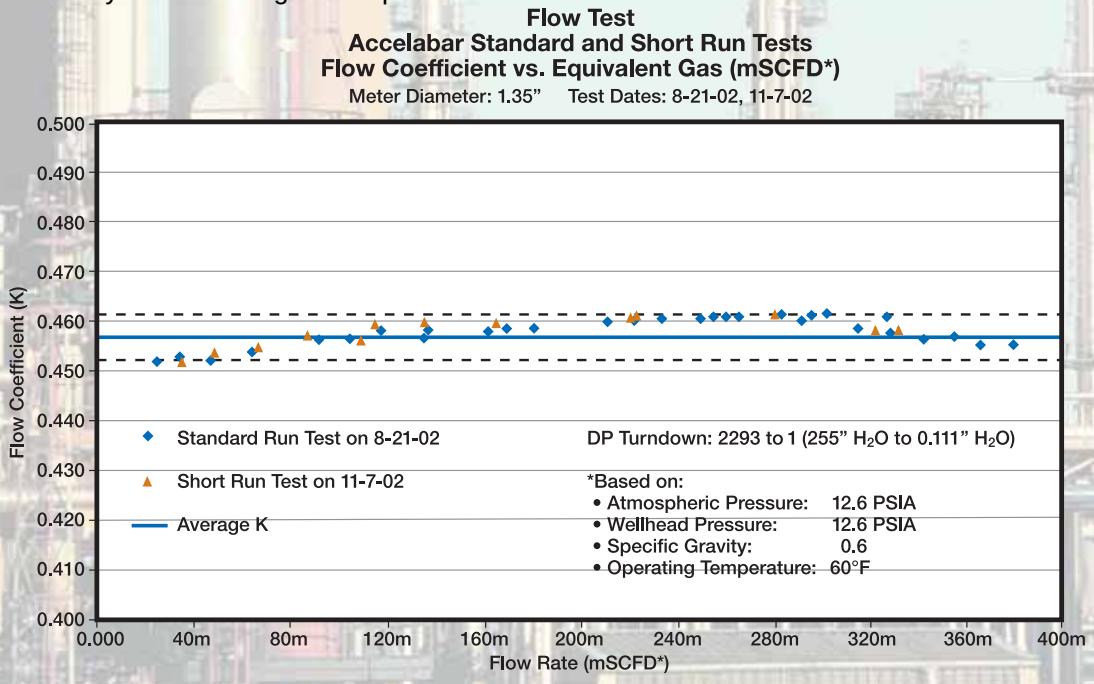
- Air tests in 3", 4", 6" and 12" pipes
- NIST traceable water tests
- Large turndown natural gas testing
- Short straight-run testing

Consult factory for a copy of certified tests.

No Straight Run Test Comparison

Test Specifications

The Accelabar was tested immediately downstream of a valve, tee and expander assembly with no straight run upstream.



Results

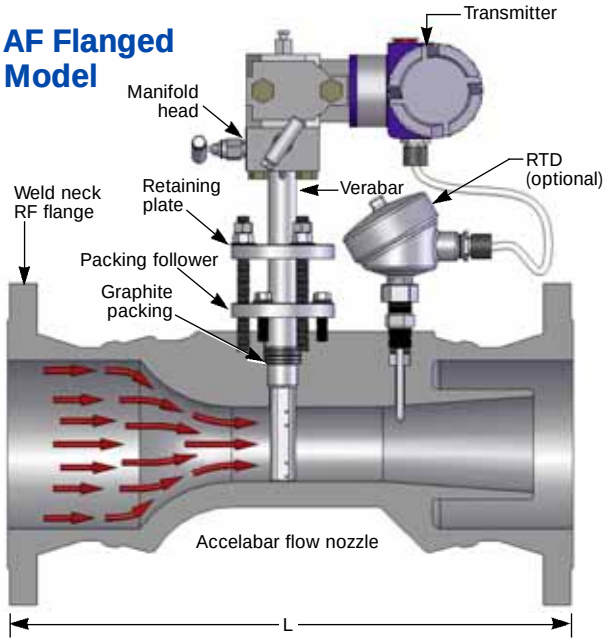
The short run test plotted with the standard straight run test verifies there is no shift in the flow coefficient.

Ready to Install

The Accelabar is a complete flow meter ready to install. It comes complete with single or dual transmitters depending on the turndown requirements.

An optional RTD is supplied in a Thermowell for dynamic compensation (required for use with multivariable transmitter).

AF Flanged Model



Single Transmitter

Dual Transmitter

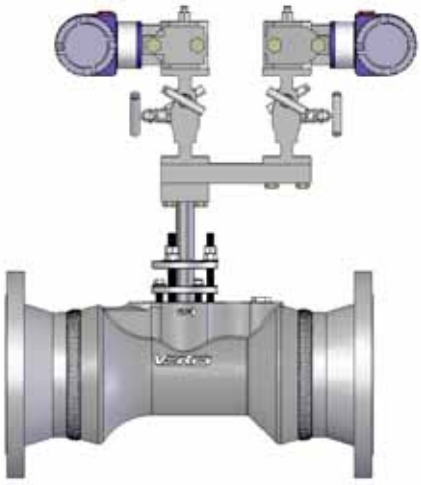


Chart A

Meter Size	Verabar Sensor	Face to Face "L"*		
		150#	300#	600#
3" (75mm)	-05 1/2"	13.78"	14.53"	15.28"
4" (100mm)	-05 1/2"	15.15"	15.90"	17.65"
6" (150mm)	-10 1"	19.15"	19.90"	21.90"
8" (200mm)	-10 1"	21.40"	22.15"	24.40"
10" (250mm)	-10 1"	23.15"	24.40"	27.65"
12" (300mm)	-10 1"	26.17"	27.78"	29.67"

* Face to face dimensions nominal. Custom lengths available.

Accelabar Model Selection

1. Furnish your flowing conditions. A flow calculation is required to determine the DP and verification of the operating limits.
   - Each meter size has a standard beta ratio sized for the optimal operating range.
   - The maximum operating limits are determined by the Accelabar flow calculation.
2. If your flowing conditions exceed the operating limits, a larger or smaller model (meter size) must be selected.

Specifications

Accuracy	Repeatability	Sensor, Body & Flange
to ± 0.50%	±0.050%	316SS

Flowing Conditions

General Data	Fluid Parameters	Maximum	Normal	Minimum	Units
Tag number	Flow Rate				
Pipe size & schedule or exact ID & wall thickness	Pressure				
	Temperature				
Fluid name:	Density*				

*Density is not required for steam applications.

Ordering Information

Model	Accelabar 316SS
AFS **ABS**	Flanged Connections Bevel for Weld

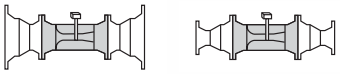
User Mating Pipe Size and Schedule or Exact ID and Wall Thickness

Code	User Mating Flange (Model AFS Only)
150 **300** **600**	150# ANSI Class 275 psig @ 100°F, 80 psig @ 800°F (19 Bars @ 38°C, 5.5 Bars @ 426°C) 300# ANSI Class 720 psig @ 100°F, 330 psig @ 800°F (49.6 Bars @ 38°C, 22.8 Bars @ 426°C) 600# ANSI Class 1440 psig @ 100°F, 660 psig @ 800°F (99.3 Bars @ 38°C, 45.5 Bars @ 426°C) If other than ANSI, specify Standard (DIN, JIS) Size and Rating

Code	Flange Material
C	Carbon Steel
S	Stainless Steel

Accelabar Meter Size

Important: If the selected meter size is larger or smaller than the user's mating pipe and flange, expanders or reducers are required. Consult the factory for price and delivery.

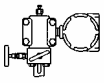
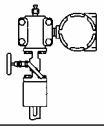
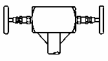


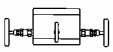
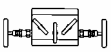
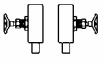
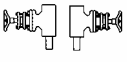
3" (75mm)	4" (100mm)	6" (150mm)	8" (200mm)	10" (250mm)	12" (300mm)

Code	Verabar Size
05	7/16" (11mm)
10	7/8" (22mm)

Code	Pipe Orientation
H	Horizontal
V	Vertical

Instrument Head Connections (Select Remote or Direct Mount Transmitter—Sold Separately)

Direct Mount Transmitter (Flanged 450°F/232°C Max.)		Remote Mount Transmitter (1/2" NPT)		
Manifold	Transmount	Valve	Regular	Parallel
 Integral		 Integral		
M	**F**	**T**	**R**	**P**

Manifolds (Optional)				Instrument Valves (Optional)	
Direct Mount				Remote Mount	
3-Valve		5-Valve		Needle	Gate
 Soft Seat	Hard Seat	 Soft Seat	Hard Seat	 1/2" NPT	 1/2" NPT
F3SC (CS) **F3SS** (SS)	**F3HC** (CS) **F3HS** (SS)	**F5SC** (CS) **F5SS** (SS)	**F5HC** (CS) **F5HS** (SS)	**C2NC** (CS) **C2NS** (SS)	**C2GC** (CS) **C2GS** (SS)

Code	RTD in Thermowell
H1	Hazardous Location, Class 1 Div 1, Explosion Proof
H2	Hazardous Location, Class 1 Div 2, Non-Incendive Wiring
HT	High Temperature (500ºF to 900ºF, 260ºC to 482ºC)
NH	Non-Hazardous Location

Optional

Code	Connection Cable to Transmitter (Direct Mount Only)
XP	Explosion Proof (hazardous locations)
N4	NEMA 4

Optional

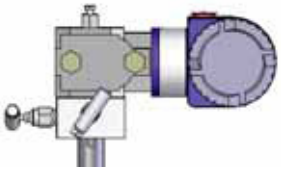
Optional

AFS	6" Sch 40	150	SS	4"	05	H	R	C2NC	H2	XP	For Transmitter Selection, see Page 8.

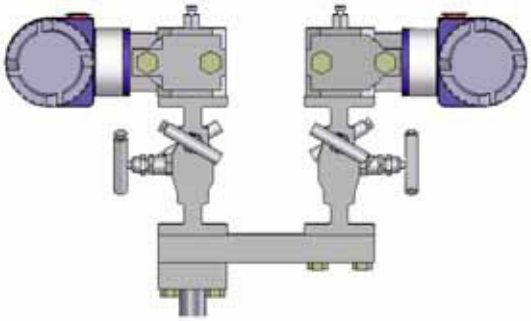
Transmitter Selection

Accelabar accuracy is *percent of rate.* The Accelabar maintains a constant flow coefficient over a wide range of flow rates and differential pressures.

Single Transmitter



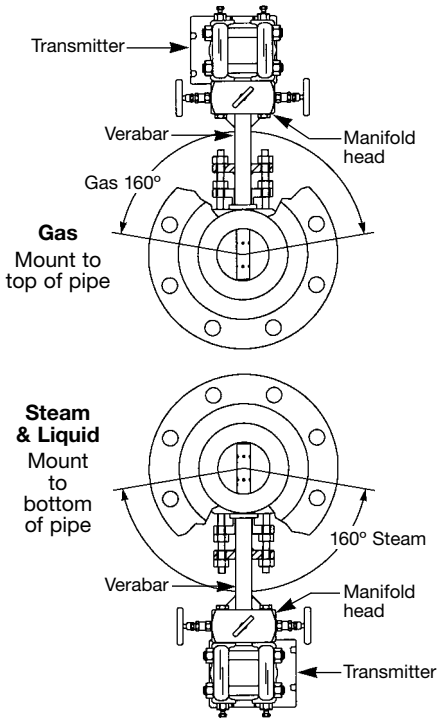
Dual Transmitter



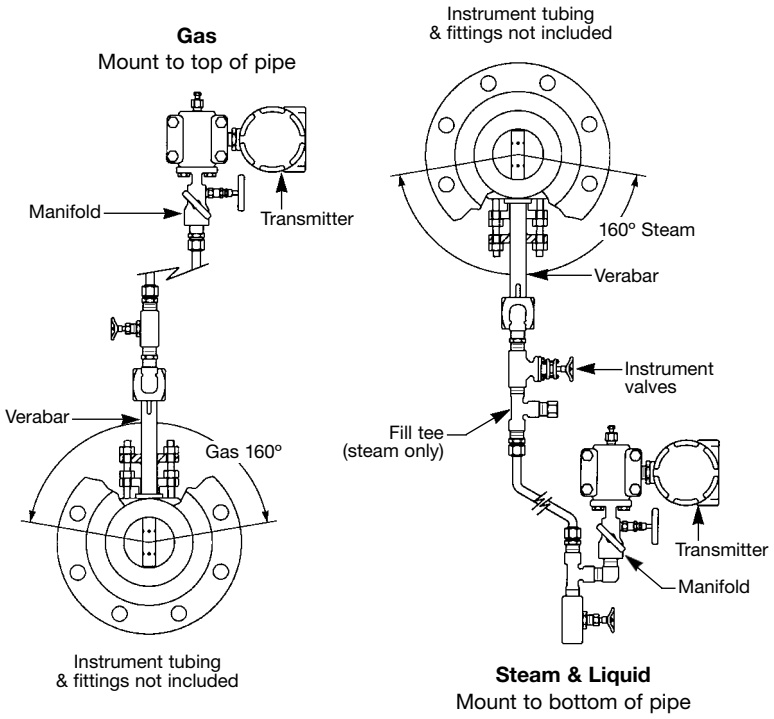
DP transmitter accuracy is *percent of scale.* While most Accelabar installations are equipped with one DP transmitter, some applications requiring superior accuracy over an extreme DP turndown may require a dual DP transmitter installation.

Installation Orientation

Direct Mount



Remote Mount



Mid-West® Instrument

True Performance in Flow Measurement

6500 Dobry Dr.
Sterling Heights, MI 48314

Phone: 586-254-6500
Fax: 586-254-6509

E-mail: sales@midwestinstrument.com
Website: www. midwestinstrument.com

VB-7100F (6/08)
Printed in USA

Mid-West® Instrument

O.E.M "Piston Type"

Differential Pressure Gauges & Switches

Models 126 & 127

Common Applications

- Filter Monitoring
- Strainer Monitoring
- Water System Applications
- Refrigerant Filtration Systems

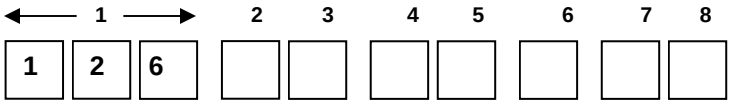
126/127 Specifications:

- (126) Differential Pressure Range 0-5 PSID (0-0.35 bar) to 0-20 PSID (0-1.4 bar)
- (127) Differential Pressure Range 0-25 PSID (0-1.7 bar) to 0-100 PSID (0-7 bar)
- Accuracy ±5% Full Scale Ascending
- Dial Size
  - Single 1-1/4" x 2-1/4" Oval (Std.)
  - Dual 1-1/4" x 2-1/4" Oval (Opt.)
- Working Pressure 3,000 PSIG (200 bar)
- Operating Temp. -40º F To +200º F (-40ºC to 93ºC)
- Body Material - Aluminum (Std.), 316/316L SS (Opt.)
- Internal Materials - 316 Stainless Steel
- Elastomers - Buna-N (Std), Viton®* , Neoprene, Ethylene-Propylene,
- Switch Option
  - SPDT 3W, 125 VAC/VDC, 0.25 Amp
  - SPST 60W, 240 VAC/VDC, 3 Amp
- Switch Mounting Clamp On, Stick On Flat Pack
- Process Connections 1/8" FNPT Bottom (Std) 1/8" FNPT End Conn. (Opt.)
- Dimensions 1.25H" x 1.62W" x 2.48L"
- Weight 0.5#

* Viton® is a Registered Trademark of DuPont Dow Elastomers

Model "126" 3000 PSIG Working Pressure, S.S. Piston, Aluminum or S.S. Body & End Plug, Accuracy ±5% F.S. (Ascending), 1/8" FNPT Bottom Mount,
Range**: 0-5 PSID thru 0-20 PSID**

Model "127" 3000 PSIG Working Pressure, S.S. Piston, Aluminum or S.S. Body & End Plug, Accuracy ±5% F.S. (Ascending), 1/8" FNPT Bottom Mount, Range:
0-25 PSID thru 0-100 PSID



Basic Model **Range:**_____

2	**Material**
A	Aluminum Body / Stainless Steel Piston
S	316 S.S Body / Stainless Steel Piston
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
W	One
X	Two
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N
1	Viton®-A Registered Trademark of Dupont
2	Neoprene
5	Ethylene Propylene
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/8" FNPT Bottom Connections
2	1/8" FNPT End Connections
9	Special ***(Un-coded Options)***
6	**Options**
O	None
Z	Special ***(Un-coded Options)***
7	**Electrical Configuration**
A	(1) Switch (clamp-on) Switch adjustable range10 to 100%
B	(2) Switches (clamp-on) Switch adjustable range10 to 100%
C	(1) Switch (Flat Pack) Non-Adjustable
D	(1) Switches (Flat Pack) Non-Adjustable
E	(1) Switch (clamp-on) Switch adjustable range ±15%
F	(2) Switches (clamp-on) Switch adjustable range ±15%
Z	Special ***(Un-coded Options)***
8	**Electrical Specifications**
A	SPDT 3W .025 Amp 125 VAC/VDC (Flat-Pack)
C	SPST 60W 3.0 Amp 240 VAC/VDC (Clamp-On &Flat-Pack)
Z	Special ***(Un-coded Options)***

*** Special "OEM" Box car number will be assign upon order.**
***Gauges must be puchased in quantities of 50 units.**

6500 Dobry Dr. • Sterling Heights, MI USA • Tel: 800-648-5778 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

O.E.M "Diaphragm Type"
Differential Pressure Gauge & Switch
Model 146

Common Applications

- Filter monitor for initiating backwash cycles
- Strainer Monitoring
- Water Systems applications
- Hydro applications
- Pump performance monitoring
- Refrigerant filtration systems
- Replacement indicating switch for competitor switches that do not offer local indication

Specifications:

- Differential Pressure 0-50" H2O (0-125 mbar) to 0-30 PSID (0-2.0 bar)
- Accuracy ±5% Full Scale Ascending
- Dial Size
  - Single 1-1/4" x 2-1/4" Oval (Std.)
  - Dual 1-1/4" x 2-1/4" Oval (Opt.)
- Working Pressure 1,000 PSIG (200 bar)
- Operating Temp. -40º F To +200º F (-40ºC to 93ºC)
- Body Material – Aluminum, Brass & 316L Stainless Steel
- Internal Materials - 316 Stainless Steel
- Elastomers - Buna-N (Std), Viton®* , Silicone, Neoprene (25 PSID & Below), Ethylene Propylene
- <u>Switch Option</u>
  - SPDT 3W, 125 VAC/VDC, 0.25 Amp
  - SPST 60W, 240 VAC/VDC, 3 Amp
- Process Connections 1/8" FNPT Bottom
- Dimensions 1.7H" x 2.5W" x 2.9L"
- Weight 2.5#

* Viton® is a Registered Trademark of DuPont Dow Elastomers

Model "146" 1000 PSIG Working Pressure, Buna-N Diaphragm,
Aluminum, Brass or 316 Stainless Steel Body, 316 S.S. Internal Metal Parts
Accuracy ±5% F.S. (Ascending), 1/8" FNPT Bottom Mount
Range**: 0-50" H_2O thru 0-30 PSID**

← 1 →			2	3	4	5	6	7	8
1	4	6							

Basic Model

Range:_____

2	Material
A	Aluminum Body
B	Brass Body
S	316 Stainless Steel Body
Z	Special ***(Un-coded Options)***
3	**Dial Size & Type**
W	One
X	Two
Z	Special ***(Un-coded Options)***
4	**Seal Materials**
0	Buna-N
1	Viton®-A Registered Trademark of Dupont
2	Silicone
4	Neoprene ***(25 PSID & below)***
5	Ethylene Propylene
9	Special ***(Un-coded Options)***
5	**Process Connections**
0	1/8" FNPT Bottom Connections **(STD)**
2	1/8" FNPT Back Connections
6	**Options**
O	None
Z	Special ***(Un-coded Options)***
7	**Electrical Configuration**
A	(1) Switch (non-adjustable)
B	(2) Switches (non-adjustable)
C	(1) Switch (non-adjustable) DIN Plug-In Connector
D	(1) Switch (Flat Pack) Non-Adjustable
E	(2) Switches (Flat Pack) Non-Adjustable
F	(1) Switch (Flat Pack) Switch adjustablility ±15%
G	(2) Switches (Flat Pack) Switch adjustablility ±15%
Z	Special ***(Un-coded Options)***
8	**Electrical Specifications**
A	SPDT 3W .025 Amp 125 VAC/VDC (Flat-Pack)
C	SPST 60W 3.0 Amp 240 VAC/VDC (Clamp-On &Flat-Pack)
Z	Special ***(Un-coded Options)***

**Product of switching voltage and current shall not exceed the power rating. Ratings are resistive loads.

*** Special "OEM" Box car number will be assign upon order.**
***Gauges must be puchased in quantities of 50 units.**

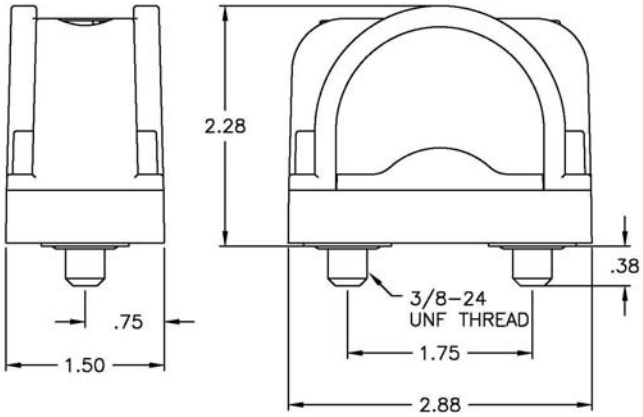
6500 Dobry Dr. • Sterling Heights, MI USA • Tel: 800-648-5778 Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Model 555

Differential Pressure Indicator

Colored bands allow you to quickly identify pressure drop across element.
Divided into three sections, each clearly marked for ease of understanding. Commonly used to indicate when to change or clean a filter. **Example:** 555A-10.0 changes from green to yellow at 5 PSID and from yellow to red at 7.5 PSID. Accuracy is ±5% Full Scale



Model Number	DP Range	Transition Points		
		Green	Yellow	Red
555-3.5	0-3 PSID	0-2.0	2.0-2.5	2.5-3.5
555-5.0	0-5 PSID	0-3.0	3.0-4.5	4.5-5.0
555-10.0	0-10 PSID	0-5.0	5.0-7.5	7.5-10.0
555-12.0	0-12 PSID	0-6.0	6.0-9.0	9.0-12.0
555-15.0	0-15 PSID	0-7.5	7.5-12.0	12.0-15.0
555-25.0	0-25 PSID	0-11.0	11.0-18.5	18.5-25.0
555-30.0	0-30 PSID	0-13.0	13.0-20.0	20.0-30.0
555-43.0	0-43 PSID	0-19.5	19.5-29.5	29.5-43.0

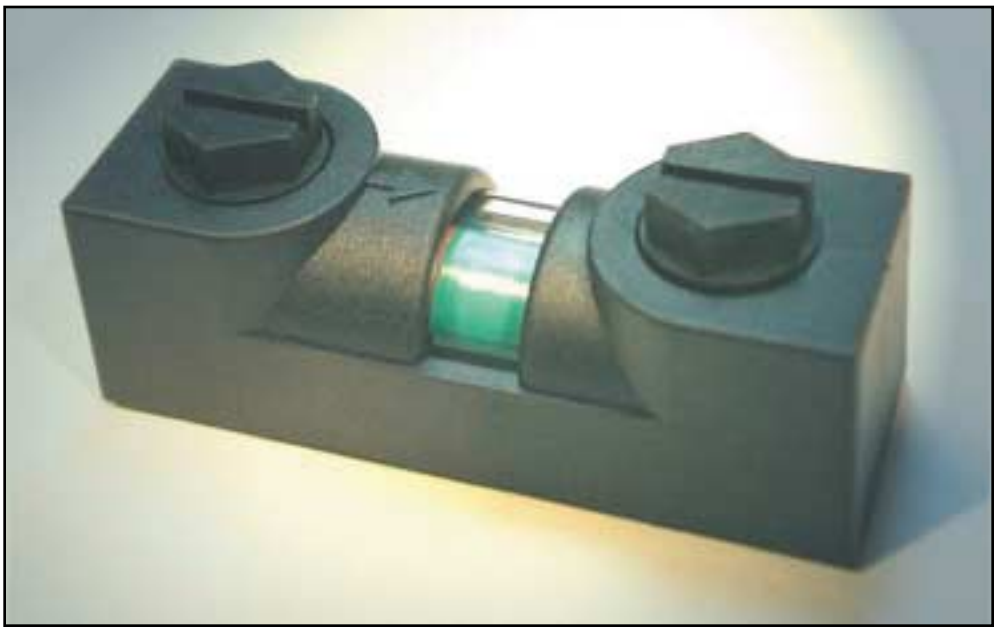
50 Pieces per Shipment Minimum Order Quantity

OEM applications quoted. Please call with specifications.

SPECIFICATIONS:			Comments:
	Pressure (Ratings)		
	Maximum Working	300 PSIG	
	Maximum Differential	150 PSID	
	Accuracy	± 5% of Rated Differential Pressure Range	Calibrated at Color Transitions
	Operating Temperature (Max.)	93°C (200°F)	
	Materials of Construction		
	Body Material	Glass Filled Nylon (GFN)	
	Wetted Internals	Stainless Steel, Ceramic, & GFN	
	Elastomers	Buna	
	Movement	Magnetic Piston and Follower Pointer	
	Dial	Plastic Lens with 3 Color Dial	
	INTERFACE:		
	Process Connection:	**¼" FNPT End Connections.** To switch HIGH and LOW pressure connections: Remove Indicator from base and rotate 180° - Retighten plastic bolts to 20-25 inch pounds.	Flow Direction Identified on Dial. Arrow Points to Low Pressure Port.

6500 Dobry Dr. • Sterling Heights, MI USA • Tel: 586-254-6500 • Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

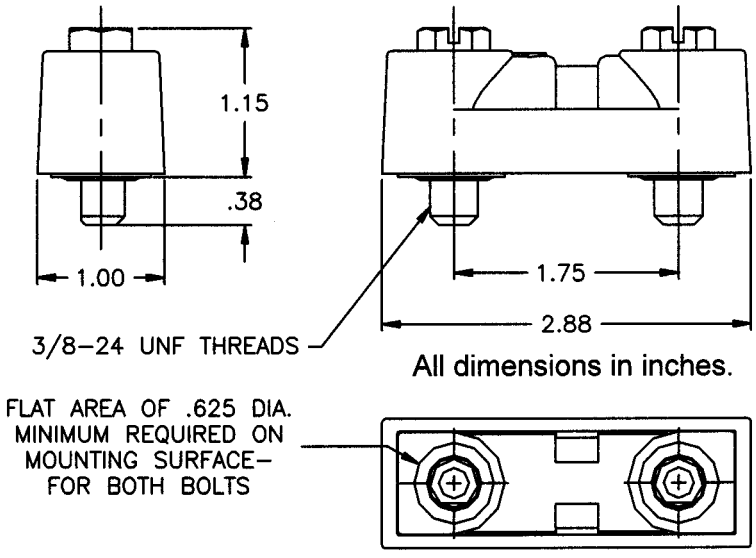
MODEL 444 SERIES
DIFFERENTIAL PRESSURE INDICATOR



The Model 444 Series differential pressure indicator offers a simple, yet functional design for use with filters, strainers, etc. This low cost indicator makes the perfect alternative to more costly differential pressure gauges where readability, small size and price are important considerations. **Design features include:**

- Glass-filled Nylon 6/6 Body
- Clear Nylon Lens
- Buna-N Elastomers
- Ranges from 0-5 thru 0-25 psid*
  *Contact factory for other ranges
- Slotted Hex Bolt 3/8-24UNF
- Directional Flow Arrow
- 200°F (93°C) Temperature Rated
- 300 psig Rated Working Pressure
- Internals: Glass-filled Nylon & Stainless Steel
- Green to Red Sliding Indication
- Chamfered Bolts Ease Installation

REPRESENTED BY:



Mid-West®
Instrument

6500 Dobry Dr. □ Sterling Heights, MI 48314
(586) 254-6500 □ FAX (586) 254-6509
E-mail: sales@midwestinstrument.com
Website: www.midwestinstrument.com

Printed in U.S.A.

Mid-West® Instrument

“Diaphragm Type”
Differential Pressure Gauge & Switch
Model 522

RANGE: 0-5 P.S.I.D. TO 0- 50 P.S.I.D. (.3 bar to 3.4 bar)

Gauge Features:
- Safe Working Pressure: 1000 PSIG (69 bar).
- Aluminum or 316 / 316L SS Gauge Body.
- Wetted Parts: 316 SS, Ceramic, & Acetal components.
- Seal & Diaphragm Material: Buna-N or Viton
- ¼” FNPT Process Connections (End Connected)
- Weather-resistant construction standard.
- Dial Accuracy ± 5% standard.
- Switch Only (No Dial) available
- Dial: 0.80” or 2-1/2” weatherproof multicolored

Switch Features:
- Switches are optional
- Hermetically Sealed Switch Outputs up to 3 amps in SPST and up to .25 Amp in SPDT configuration.
- Switch Adjustable from 40% - 95% of Range *****
- Up to 240 VAC/VDC voltage ratings
- Available with Flat Pack case with Jacketed Flying Leads or with DIN IP65 / NEMA 4X Plug-in Connector.
- Optional Switch Set Feedback Decal
- Switch Location Top or Bottom
- CE Marking for Compliance with the Low Voltage Directive is available upon request.

***Dependent on selected switch option.**

Operation: Differential pressure is sensed by the movement of a piston magnet against a calibrated spring. The gauge pointer, outside the pressure housing, follows the movement of the piston magnet and indicates differential pressure. When equipped, magnetically operated reed switches, also located outside the pressure housing, actuate dependent upon the positional relationship between the reed switch and the internal magnetic piston. The reed contact(s) can be positioned to actuate within a defined percentage of the full-scale range of the gauge.

Temperature Limits: -40 °F (-40° C) to 200°F (93°C). 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.

Standards: All Model 522 Series differential pressure gauges either conform to and/or are designed to the requirements of the following standards: ASME B1.20.1 NACE MR0175, ASME B40.100 NEMA Std. 250, EN-61010-1 UL Std. No. 50 & 508, CSA-C22.2 No. 14

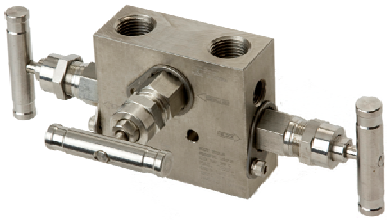
Factory Preset of switches available at no charge (Specify switch setting on the order)
The use of diaphragm seals is not recommended.
Attempts to install such seals on this gauge will void the warranty

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 • Tel: 586-254-6500 • Fax 586-254-6509
Web Site: www.midwestinstrument.com • Email Contact: sales@midwestinstrument.com

INTENTIONALLY BLANK

Mid-West® Instrument

3 & 5 Valve
Differential Pressure Manifolds



KEROTEST SINCE 1909

These 3 & 5 valve manifolds are designed for applications where direct mounting to an instrument is impractical or undesirable. The manifold is mounted to the lines from the instrument and signal rather than directly to instrument.
Pressure rating up to 6000 PSIG (414 bar) @ 200°F (93°C) or 4000 PSIG (276 bar) @ 500°F (260°C).
Isolated stem threads: Adjustable packing below stem keeps process fluid away.
Ensures leak proof long service life.
Replaceable seat design: Standard 3/16 inch diameter orifice.
Bonnet cap protection: Increases valve life by protecting stem threads from atmospheric corrosion.
Rolled stem threads: Increased strength and life
No more stem blowouts: Backseat stem design prevents blowout problems.
Less Parts: Less leak points and less fugitive emissions.
Test Ports: Are ¼" FNPT ports which may be used as test connections

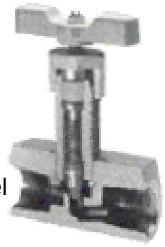
Teflon Packing, Integral (Body Material), Stainless Steel Body

Model Number	Description	Price
107470	3-Valve 316 S.S. Single Block Manifold (1/2" FNPT Connections) **KM1VIS-4**	**$230.00**
107469	5-Valve 316 S.S. Single Block Manifold (1/2" FNPT Connections) **KM6AVIS-4**	**$350.00**

Kerotest/Marsh Needle Valves
Series "N"

Alloy Steel

316 Stainless Steel



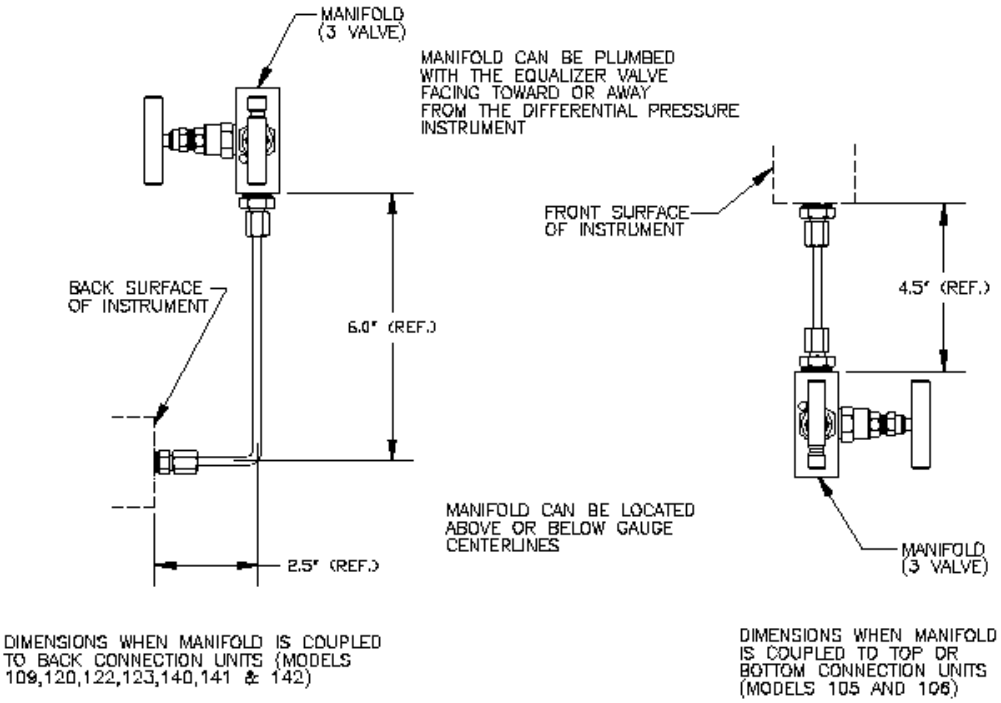
N1512/N1514 economical valve for regulating pressure up to 10,000 PSI. Suitable for air, water, oil and other fluids with low-level corrosiveness. N1312/N1314 designed for applications where caustic liquids and corrosive media are common.

Operating Specifications & Design Features

Max. Operating Pressure- 10,000 PSI (70,000 kPa)
Min. Burst Pressure- 20,000 PSI (140,000 kPa)
Temperature Limits- N1512/N1514: -20° to 500°F (-28°C to 426°C)
N1312/N1314: -100° to 500°F (-73°C to 426°C)
Stem Material: N1512/N1514: 416 Stainless steel, Hardened / N1312/N1314: 17-4 PH Stainless Steel
Packing: Teflon
Handle: Two-prong. Cast Aluminum for N1512/N1514 **/** Stainless Steel for N1312/N1314
Assembly: Bonnet is threaded into body and skated to prevent turning.

Model Number	Description	Price Ea
107485	Needle Valve Alloy Steel AISI 1213 or 1215 1/4 FNPT x 1/4 FNPT (N1512)	$28.95
107486	Needle Valve Alloy Steel AISI 1213 or 1215 1/2 FNPT x 1/2 FNPT (N1514)	$36.25
107487	Needle Valve 316 Stainless Steel 1/4 FNPT x 1/4 FNPT (N1312)	$91.65
107488	Needle Valve 316 Stainless Steel 1/2 FNPT x 1/2 FNPT (N1314)	$119.50

Typical Manifold Installations



Mid-West Instrument offers multi valve isolation manifolds that protect our differential pressure gauges, switches and transmitters. This allows the user to install a complete assembly saving installation time and transactional cost. Assembles can be custom designed to fit each specific application.

Typical Manifold Installations

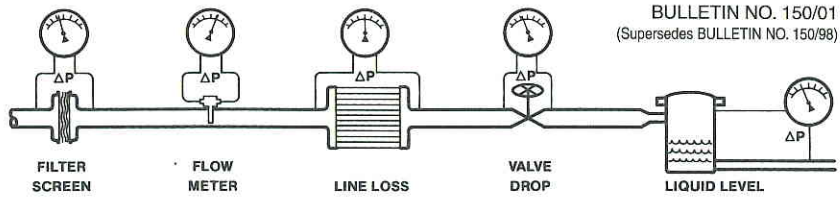






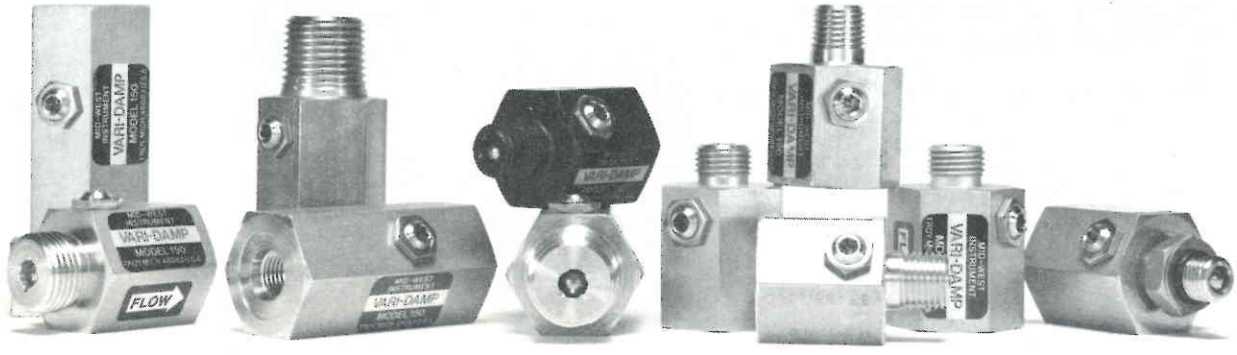

6500 Dobry Dr. • Sterling Heights, MI USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West®
Instrument



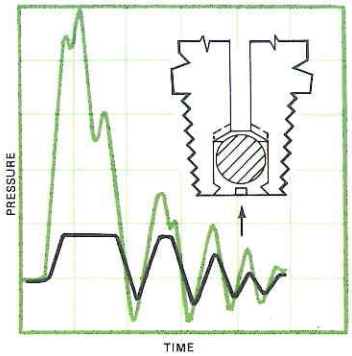
BULLETIN NO. 150/01
(Supersedes BULLETIN NO. 150/98)

MODEL 150 "VARI-DAMP®" PULSATION DAMPENER

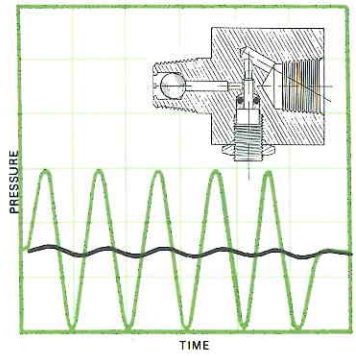


- Provides Infinitely adjustable dampening
- Protects against surges and pressure shocks
- Use with all types of instruments and pressure gauges including differential pressure and compound.
- Optional swivel design eliminates gauge orientation problems

The Model 150 "Vari-Damp®" all purpose pulsation dampener features both a find thread adjustable needle valve for dampening characteristics and a precision ball check to block line surges, shock waves, or fluid hammer. The Model 150 provides outstanding protection for applications where low displacement devices such as bourdon tube gauges or electronic transmitters are used or in high displacement devices where diaphragm, piston, or bellows operated gauges, recorders, or controllers are required. Double-ported instruments should be installed with a Model 150 on each input pressure line.



The Model 150 needle valve provides adjustable dampening characteristics by simply loosening the lock-nut on the adjusting screw and making a slight readjustment to the needle valve setting. Use of the Model 150 is preferred over other commercially available designs that feature several piston diameters or porous metal discs requiring removal and/or disassembly to readjust. The Model 150 adjustable needle valve can be used as a complete shutoff to facilitate changing out of a gauge or instrument. This method is not intended to replace instrument block valves as continual over-torquing could damage the valve seat.

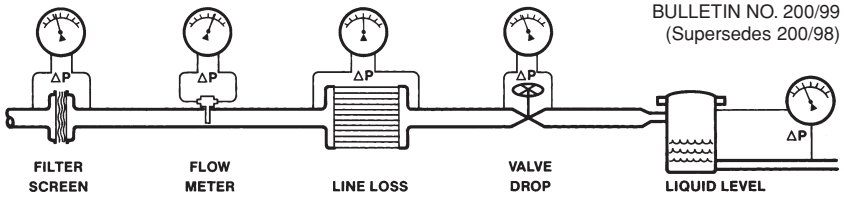


The Model 150 ball check offers protection against surge and/or pressure spikes as indicated by the black lines in the graphs. The 316 stainless steel ball is driven on seat by the pressure surge and held on seat as long as the differential pressure exists across the ball, while metering pressure to the instrument through a calibrated, groove across the ball seating area.

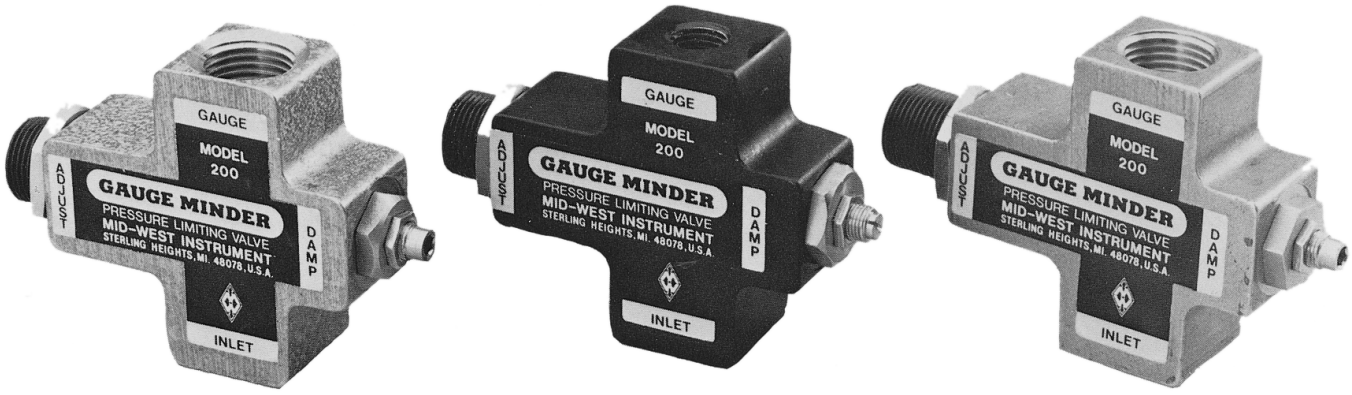
The Model 150 is available in aluminum, brass, or 316 stainless steel. It is offered with a variety of end configurations to handle virtually any application.

BULLETIN NO. 200/99
(Supersedes 200/98)

Mid-West®
Instrument



MODEL 200 "GAUGE MINDER®" PRESSURE LIMITING VALVE



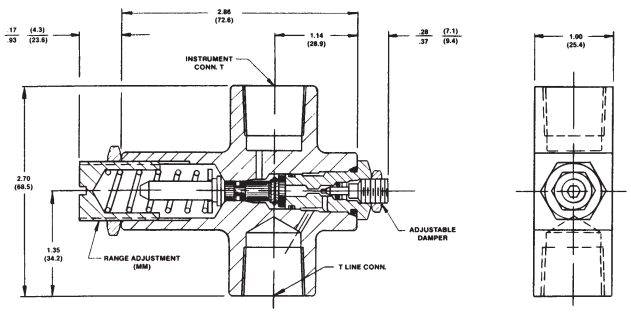
- Pressure limiting valve prevents instrument over-range
- Adjustable needle valve dampens pulsation
- Use with all types of instruments and pressure gauges
- Can be mounted in any position
- Available in aluminum, brass, and 316 S.S.

The Model 200 "Gauge Minder" features a pressure limiting valve that blocks off excess pressure to the instrument, preventing calibration failure, internal damage, and "blow-out" from over-ranging - a principal cause of instrument failure.

The Model 200 is supplied with a set of range springs designed to set the shutoff pressure point at any pressure from 50 to 5000 PSI. The automatic shutoff valve is positive on closing and is non-chattering. Once closed, pressure need only be reduced approximately 10% of set pressure to re-open the valve. The accuracy of the instrument used with the Model 200 is in no way affected up to the set point of the pressure shutoff.

The Model 200 also features an adjustable needle valve designed to dampen system pulsation reducing instrument oscillation, improving readability, and extending instrument life without the addition of a snubber. Instrument reliability is improved and the cost to repair, re-calibrate, or replace the instrument is lowered. Operating safety is also enhanced.

The Model 200 is available in aluminum, brass, or 316 stainless steel with 1/4" FNPT connections for 5000 PSI working pressure and in brass or 316 stainless steel with 1/2" FNPT connections for 10,000 PSI working pressure. Buna N O-rings and Teflon backup rings are standard. Optional seal materials include Viton, Neoprene, and Ethylene Propylene.



NOTES: 1. Drawings show standard gauge nominal dimensions. (not to scale)
2. Dimensions shown in parentheses are in millimeters.

PART NUMBERING SYSTEM

2 0 0 – □ □ – □ □

① **BASIC MODEL NUMBER**

② **MATERIAL (BODY)**
- A. Aluminum
- B. Brass
- S. 316 Stainless Steel
- Z. Special

③ **SIZE***
- O. 1/4" FNPT
- H. 1/2" FNPT
- Z. Special

*Metric Connections Available

④ **SEALS**

0.	Buna N & Teflon	-30° to +250°
1.	Viton & Teflon	-15° to +400°
2.	Neoprene & Teflon	-45° to +300°
5.	Ethylene Propylene & Teflon	-70° to +250°
9.	Special	

⑤ **OPTIONS**
- 0. None
- 7. Factory Presetting of Shut-off Point (Above 1500 psig)
- 8. Preset Shut Off
- 9. Special

The range springs are identified by color, as follows:

Color of Spring	Shut-off Range, PSI
Silver	50 to 120 PSI
Black	100 to 1100 PSI
Gold	1000 to 5000 PSI

Model	Max. Working Pressure PSIG (kg/cm)	Body Material	T
200AO	5,000 (350)	ALUMINUM	1/4" F.N.P.T.
200BO	5,000 (350)	BRASS	1/4" F.N.P.T.
200SO	5,000 (350)	316 S.S.	1/4" F.N.P.T.
200BH	10,000 (700)	BRASS	1/2" F.N.P.T.
200SH	10,000 (700)	316 S.S.	1/2" F.N.P.T.

Manufacturer reserves the right to change specifications without prior notice.

MODEL 200 "GAUGE-MINDER®"

INSTALLATION AND MAINTENANCE INSTRUCTIONS

The Model 200 "Gauge Minder" is mounted in-line with the instrument to be protected and may be mounted in any position. The automatic shutoff set point is adjusted by loosening the lock nut marked "adjust" and turning the adjustment screw. Turning "clock-wise" increases the shutoff pressure and turning "counter clock-wise" reduces the shutoff pressure. The Model 200 is shipped with a 50 to 120 PSI range spring installed, unless otherwise requested. Two additional springs for higher ranges are included as separate parts. The range spring can be changed by removing the adjustment screw.

The operating limits of the instrument to be protected must be considered when determining the point to set the Model 200 shutoff pressure. Commonly, a setting of 110% of full scale of the instrument is used. Instruments with full scale ranges above 1000 PSI generally have a lower safety factor. It is necessary in this instance to set the shutoff point to 100% of full scale of the instrument to prevent calibration failure. After adjustment of the shut-off pressure of the Model 200 is completed the instrument should be over-pressured for several minutes to verify operation. If indicated instrument pressure falls with the shut-off valve closed, there is a connection leak from the Model 200 to the instrument which must be corrected. If indicated instrument pressure rises beyond the shut-off point, the Model 200 is defective and should be returned if new or repaired by cleaning or installing new seals if previously used. **CAUTION: Do not adjust the set point with system pressurized and in the shutoff mode. Reduce system pressure until shutoff valve is open, then make set point adjustment.**

The Model 200 can be shut off manually with the needle valve marked "damp". The lock nut must be loosened. The valve screw is turned "clock-wise" to close. Turning the valve screw "counter clock-wise" one turn from closed position gives a range of pulsation dampening. Adjust the amount of dampening necessary to stop pointer oscillation on the instrument. **NOTE: Caution must be exercised when adjusting needle valve. Do not adjust more than two turns from closed position. Leakage can occur.**

VISA MasterCard AMERICAN EXPRESS

REPRESENTED BY:

Mid-West Instrument

6500 Dobry Dr. ☐ Sterling Heights, MI 48314
(586) 254-6500 ☐ FAX (586) 254-6509
E-mail: sales@midwestinstrument.com
Website: www.midwestinstrument.com

Printed in U.S.A.

Mid-West® Instrument

Model 150 Series Pulsation Dampener Pricing

1. Base Model Number		Maximum Working Pressure	Base Price
150-BO	Brass Body, ¼" NPT, Male by Female Pipe	3000 PSIG	$30.00
150-BH	Brass Body, ½" NPT, Male by Female Pipe	5000 PSIG	$37.50
150-SO	316 S.S. Body, ¼" NPT, Male by Female Pipe	5000 PSIG	$70.00
150-SH	316 S.S. Body, ½", NPT, Male by Female Pipe	10000 PSIG	$96.00
2. Seal Materials		**Adder to Base**	
0.	Buna N & Teflon	Standard	
1.	Viton & Teflon	$3.00	
2.	Neoprene & Teflon	$3.00	
5.	Ethylene Propylene & Teflon	$3.00	
3. Options		**Adder to Base**	
0.	None	Standard	
9.	Special	Contact Factory	

Model 200 Series Pressure Limiting Valve Pricing

1. Base Model Number		Valve Shutoff Pressure Range	Maximum Working Pressure	Base Price
200-AO	Alum. Body, ¼" FNPT	50 to 5000 PSIG	5000 PSIG	$120.00
200-BO	Brass Body, ¼" FNPT	50 to 5000 PSIG	5000 PSIG	$155.00
200-BH	Brass Body, ½" FNPT	50 to 5000 PSIG	10000 PSIG	$181.50
200-SO	316 S.S. Body, ¼" FNPT	50 to 5000 PSIG	5000 PSIG	$195.00
200-SH	316 S.S. Body, ½" FNPT	50 to 5000 PSIG	10000 PSIG	$220.00
2. Seal Materials		**Adder to Base**	**3. Options**	**Adder to Base**
0.	Buna N & Teflon	Standard	None	Standard
1.	Viton & Teflon	$10.00	**7.** Preset Shutoff Point (Above 1500 PSIG)	$35.00
2.	Neoprene & Teflon	$10.00	**8.** Preset Shutoff Point (Up to 1500 PSIG)	$10.00
5.	Ethylene Propylene & Teflon	$10.00	**9.** Special	Contact Factory
9.	Special	Contact Factory		

Ordering Examples:
150-SO-10 (150 WITH 316 S.S. Body, Viton Seals, ¼" Male by Female Pipe and no options)
200-BH-27 (200 w/Brass Body, Neoprene & Teflon seals, ½" Connections & preset shutoff point above 1500 PSIG)

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Tel: 586-254-6500 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com

Mid-West® Instrument

Diaphragm / Chemical Seals

Diaphragm Seals *(or Chemical Seals) use a flexible barrier, or diaphragm, to isolate a pressure sensor (gauge, switch, transmitter, or transducer) from adverse effects of the process fluid.*

HOW IT WORKS:
A diaphragm seal, when properly mounted to its sensor and filled will accurately transmit process pressure to the instrument. Pressure exerted on the flexible diaphragm is transmitted hydraulically to the instrument through the fill fluid, which fills the void between the diaphragm and the instrument, (including the bourdon tube, in the case of a pressure gauge.)

APPLICATION CONSIDERATIONS:
The following should be considered when choosing a diaphragm seal:

1. Process Characteristics: Pressure, temperature, (see tables, this page) chemical compatibility and viscosity.
2. Seal Mounting: Connection to process (threaded, flanged, clamped, in-line) Connection to instrument (usually NPT).
3. Ambient Characteristics: Temperature, corrosive atmosphere, etc.
4. Instrument Considerations: Sufficient fluid displacement is required to drive instrument through its full range (this means, for example, you can't put a large gauge on a small seal); remote instrument placement requires a capillary connecting instrument to seal.
5. Vacuum Considerations: High vacuums (over 25" Hg vac.) or vacuums with high temperatures require special fill selection, preparation, and procedures, as well as careful diaphragm selection.
NOTE: Improper selection may result in system failure and possible damage or injury. *Mid-West* can provide application assistance, but final compatibility is the responsibility of the buyer. Proper selection of seal can reduce or eliminate any additional system error caused by adding a Diaphragm Seal to your instrument.

SEAL TYPES:
Standard Seals (pages 2&3) include Threaded off-line, threaded in-line, and flanged off-line types in many materials for a variety of applications:

Maximum Temperature	Diaphragm Material	Lower Housing
650°F	Welded Metal	Metal
450°F	Teflon	Metal
300°F	Viton	Metal
140°F	n/a	Nonmetal

	PSI	Lower Housing	
Maximum working pressure	1,500	Metal, w/S.S. Bolting	(at 100°F)
	2,500	Metal,w/Std. Bolting	(at 100°F)
	5,000	Metal, w/Hi-Press. Bolting	(at 100°F)
	Per flange rating	ASA Flange	(Per Flange Spec)
	300	Non-Metalic	(at 140°F)
	Diaphragm	**Size 5 Seal**	**Size 6 Seal**
Min. working pressure	Metal	25 PSI	10 PSI
	Teflon	20 PSI	8" WC
	Viton	5" WC	N/A
Vacuum Limits	Metal	-21" hg	-24" hg
	Teflon	-23" hg	-26" hg
	Viton	-29" hg	N/A

SPECIAL DESIGNS: Mid-West is ready to work with you on any high-performance diaphragm seal application, (that might exceed the stated limit below) such as high vacuum, high temperature, high sterility, custom design or high static pressure with a low differential span, or high vacuum with high temperature.

MATERIALS:
Lower housings: 316 S.S. is standard with a large selection to suit a wide variety of applications **(see table 1, page 3)**
Diaphragms: Standard metal diaphragms are convoluted and made of 316 S.S. Many other materials are available for corrosion resistance or extra sensitivity. **(see table 6, page 3)**
Gaskets: Standard gaskets are Teflon on the process side of diaphragm (Grafoil for hi temp.), and Viton on the fill side. Other materials are available.

DIAPHRAGM SEALS

HOW TO ORDER

TABLE 1 Seal Series	TABLE 2 Seal Size	TABLE 3 Configuration	TABLE 4 Instrument Connection	TABLE 5 Process Connection	TABLE 6 Diaphragm Material	TABLE 7 Lower (process) Housing Material	TABLE 8 Upper (instrument) Housing Material
EXAMPLE:							
W	5	15	4	2	S	S	C

TABLE 1 Seal Series

- W - Welded metal diaphragm
- T - Teflon diaphragm (high sensitivity, chemical resistance)
- V - Viton diaphragm - (most sensitive, for low pressures)

TABLE 2 Seal Size

- 5 - Standard size Seal dia. = 3.25" in threaded models Diaphragm dia. = 2.25"
- 6 - Large size - (Preferred for low pressure, hi displacement, or hi sensitivity.) Seal dia. = 4" in threaded models Diaphragm dia. = 3"
- 7 - Large size Seal diameter; 5.2" Diaphragm dia. = 4.1"

TABLE 4 Instrument Connection

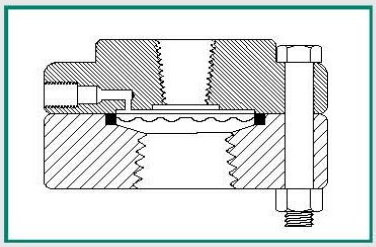
- 4 - 1/4" NPTF
- 2 - 1/2" NPTF

TABLE 5 Process Connection

- 4 - 1/4" NPTF
- 2 - 1/2" NPTF
- 3 - 3/4" NPTF
- 1 - 1" NPTF
- F - Flanged - specify flange size and pressure rating (e.g. 1 1/2", 150 lb) or insert "V" codes from Table A see p. 24 (e.g. V41=1 1/2" 150#)

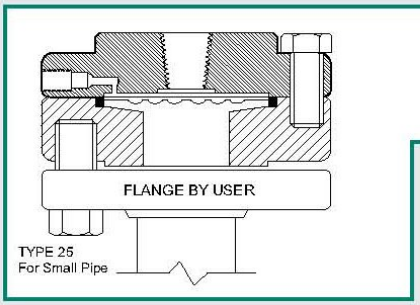
TABLE 3 - Configuration

Threaded, Off-Line

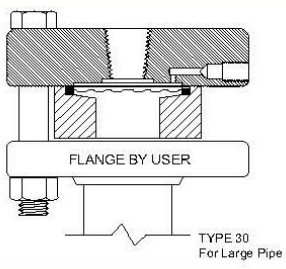


- 10 - Replaceable diaphragm - non cleanout (not available with series "W")
- 11 - Same as 10, with flush port
- 15 - Cleanout style - lower housing can be removed without losing fill. (Available with Series W, T, V)
- 16 - Same as 15, with flush port

Flanged, Off-Line - with cleanout

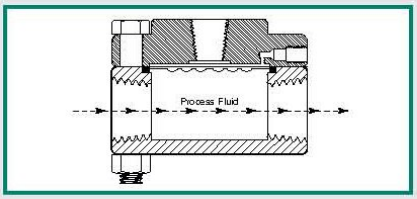


- 25 - for 1/2", 3/4" pipe size (1" in size 6)
- 26 - Same as 25, with flush port



- 30 - for 1 1/2" pipe to 3" pipe size (1" in size 5)
- 31 - Same as 31, with flush port

In-Line, Flow-Thru - with cleanout



- 35 - Threaded (shown) - for 1/4" to 1" pipe
- 40 - Socket Weld - for 1/4" to 1" pipe
- 45 - Saddle Weld - for 1" to 8" pipe
- 50 - Butt Weld - for 1" to 12" pipe

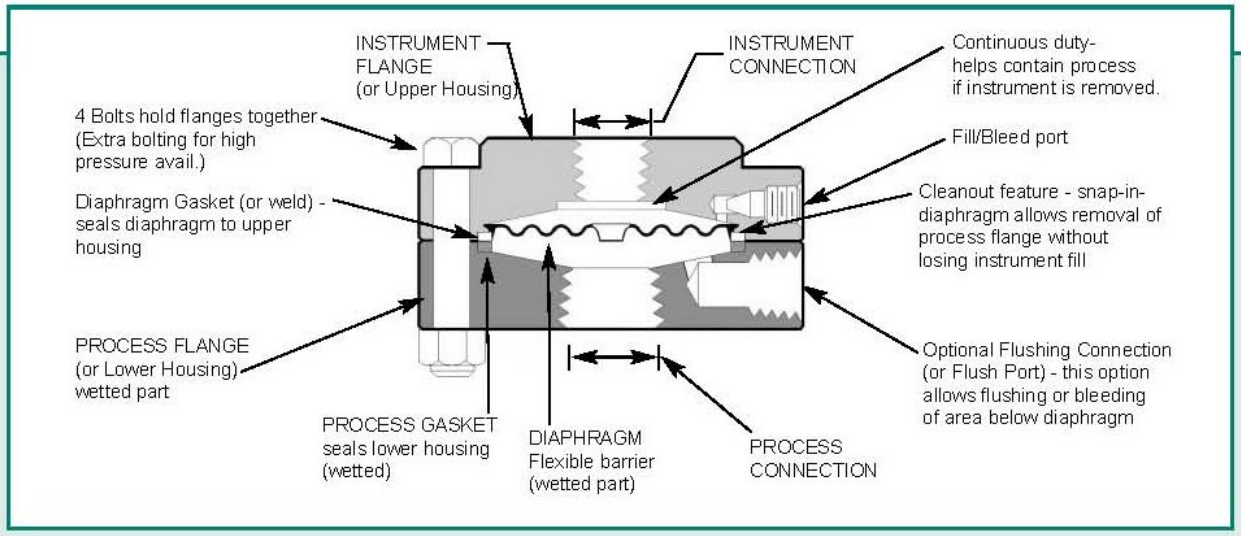


TABLE 6
Diaphragm Material (wetted)

MOST COMMON
- S - 316 S.S.
- T - Teflon
- *V - Viton
- D - Carpenter 20
- *F - 304 S.S.
- G - Hastelloy B
- H - Hastelloy C
- J - Titanium
- L - 316LSS, teflon coated
- M - Monel
- N - Nickel
- U - Tantalum
- X - Gold Plated Diaphragm
- *Y - Inconel

Size 5 only.

TABLE 7
Lower Housing Material (wetted)

MOST COMMON
- S - 316 S.S.
- T - Teflon
- *L - Teflon lined
- Z - PVC
- B - Brass
- C - Steel
- D - Carpenter 20
- F - 304 S.S.
- G - Hastelloy B
- H - Hastelloy C-276
- J - Titanium
- K - Kynar
- M - Monel
- N - Nickel
- P - Polypropylene
- U - Tantalum
- UL - Tantalum Lined
- W - CPVC
- Y - Inconel

Available only on types 25 & 30, 1" and larger.

TABLE 8
Upper Housing Material (including bolts)

- C - Carbon Steel (standard)
- S - 316 Stainless
- F - 304 Stainless

OPTIONS:

- Hi Pressure bolting
- Non-Stick Teflon coating on metal diaphragm
- Socket weld connections
- High temp. gasketing
- Stainless steel bolting (reduces pressure rating up to 50%)
- Capillary Lines

Fill Fluids

Fill Fluids should be chosen with care. The fluid must be compatible with the process medium in case the diaphragm is ruptured. Compatibility of fill fluid with process is the user's responsibility.

FLUID	TEMPERATURE LIMITS	VISCOSITY, CS. 77° F	NOTES
Silicone, DC 200	-50 to 450° F	20	our standard fill
Silicone, DC 704	+50 to 600° F	44	Hi-temp fill
Silicone, DC 710	+30 to 700° F	500	Hi-temp fill
Neobee M-20	-4 to 320° F	10	food grade
Glycerin	+30 to 300° F	1110	for food; not recomm. for capillary
Halocarbon	-40 to 400° F	6	inert, for use with oxidizers (must not contact Al, Mg)

not to be used with strong oxidizers, such as chlorine, oxygen, etc

Other fills available: consult factory.

Credits: Viton, Teflon, Kynar, TM DuPont, Inc.; Carpenter 20 - TM Carpenter Steel Co.; Inconel, Monel - TM Huntington Alloys, Inc.; Hastelloy - TM Cabot Corp.; Halocarbon - TM Halocarbon Corp.

6500 Dobry Dr. · Sterling Heights, MI 48314 USA · Tel: 800-648-5778 Fax: 586-254-6509
Web Site: www.midwestinstrument.com · Email: sales@midwestinstrument.com

Mid-West® Instrument

Diaphragm Seal Worksheet

Customer Information:

- Company Name:_____
- Address_____
- Contact:_____
- Phone number: _____
- Email address: _____
- Date: _____

Process Information:

- Process Temperature Range: _____
- Ambient Temperature Range: _____
- Process Fluid/Media: _____
- Current Pipe/Tank Material: _____
- Maximum Pressure on Seal: _____
- Differential Pressure Range: _____
- Working Pressure on Seal: _____
- Other (vibration, pulsation, etc.): _____

Seal Information:

- Mounting - Direct or Remote: _____
- (if remote) Capillary Length: _____
- Process Connection: _____
- Required date for completed seal assembly?_____

Midwest Differential Gauge Information:

Model number used in application:_____
Quantity of differential gauges used in application:_____

Additional Notes:

_____
_____
_____
_____
_____
_____

6500 Dobry Dr. • Sterling Heights, MI 48314 USA • Tel: 800-648-5778 Fax: 586-254-6509
Web Site: www.midwestinstrument.com • Email: sales@midwestinstrument.com