

# Mid-West<sup>®</sup> Instrument



## “Bellows Type Tank Level” Differential Pressure Level Gauge & Switch

### Model 115/116



Industrial Controls



**Model 115, 0-10” H<sub>2</sub>O to 0-69.9” H<sub>2</sub>O (25 mbar to 2.5 PSID)**

**Model 116, 0-70” H<sub>2</sub>O to 0-800” H<sub>2</sub>O (2.5 PSID to 30 PSID)**

Model 115/116 multiple diaphragm/bellows design provides a simple, highly accurate, direct-acting, differential pressure indicator. Full Scale Accuracy of  $\pm 1\%$ .

Typical applications include; Level measurement in closed tanks for the Industrial Liquid Gas Industry. Use with gaseous and liquid media, provide they are not highly viscous. Various Dial scales available to match a wide variety of gases such as He, Ar, O<sub>2</sub>, N<sub>2</sub>, CO<sub>2</sub>, Helium and Hydrogen

### **BENEFITS:**

“Engineered Plastic” gauge front and stainless steel body bolts provide corrosion resistance in “over the road Trailers” outdoor and 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

Low & High range capabilities

- Ideal for He, Ar, O<sub>2</sub>, N<sub>2</sub>, CO<sub>2</sub>, Helium and Hydrogen tank level applications
- For use on Stationary, Over the Road, ISO/IMO containers and LNG bulk 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*

**OVER 50 YEARS** experience in the field of supplying quality Differential Pressure Gauges. Tank Level applications are for stationary, over the road, ISO/IMO containers and LNG bulk tanks

**Product Description:**

Model 115 and 116 design is an all-metal differential pressure gauge capable of operating at low differential pressures. Safe working pressure is 500 PSIG (STD) 1,000 PSIG (optional)

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 sides. 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 brass with 316 Stainless Steel internals. Viton Seals are provided as standard. The Dial is 6" diameter with white lettering on a black dial. (white dial with black lettering optional) The 115/116 temperature limits are rated at -40°C to 200°F. Proof pressure is Two Times working pressure at ambient temperature.

Model 116 can be equipped with one or two independently adjustable SPDT snap acting Micro-Switches which can be set on decreasing or on increasing pressure. A switch adjustment screw and a switch lock screw is accessible after removal of the lens and bezel (removal of 4 screws). Interface to the snap acting micro-switch is via color coded 18 AWG flying leads and a ½' FNPT conduit connection. Model 116 with switch temperature limits are rated at -20°C to +185°F



Model 115 shown with Optional model 107467 S.S. Direct Mount 3-Valve manifold with pressure gauge port



Model 116 shown with Optional model 107467 S.S. Direct Mount 3-Valve manifold with (Customer supplied) pressure gauge



**MANIFOLD SPECIFICATIONS:**

**Pressure rating:** 6000 PSIG (414 bar) @ 200°F (93°C) or 4000 PSIG (276 bar) @ 500°F (260°C)

**Mini-Manifold:** 3000 PSIG (207 bar) @ 200°F (93°C)

**Isolated stem threads:** Adjustable packing below stem keeps process fluid away. Ensures leak proof long service life. Bubble-tight shutoff.

**Instrument Connections:** Standard 3-Valve 107470, 5-Valve 107469 = ½" FNPT 3-Valve Mini 113343 & Direct Mount 107467 & = ¼" FNPT

**Process Connections:** Standard 3-Valve 107470 & 5-Valve 107469 = ½" FNPT 3-Valve Mini 113343 & Direct Mount 107467 = ¼" FNPT

**Replaceable seat design:** Standard 3/16 inch diameter orifice.

**Bonnet cap protection:** Increases valve life 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:** 3 & 5 Valve Manifold = 1/4" FNPT ports which may be used as test connections 3-Valve Mini-Manifold does not have port test connections.

Gland Packing PTFE/Graphite, Integral (Body Material) Seat, and Stainless Steel Body

Model 115 & 116 can be direct mounted to anyone of 4 different manifolds.

**See Bulletin MFLD/18  
For more Information**

# Mid-West<sup>®</sup> Instrument

## Standard Tank Level Gauge Ranges: Model 115/116

Range Type						
PSID	H2O	Kpa	Bar	Dual Scale IN/CM	CM & MMH2O	
0-2	0-10"	0-2.5	0-.35	0-80 IN H2O/0-200 CM H2O	0-200 CM H2O	
0-3	0-20"	0-5	0-.7	0-100 IN H2O/0-250 CM H2O	0-380 CM H2O	
0-5	0-30"	0-7	0-1.0	0-150 IN H2O/0-380 CM H2O	0-500 CM H2O	
0-10	0-40"	0-10	0-1.4	0-200 IN H2O/0-500 CM H2O	0-1000 CM H2O	
0-15	0-50"	0-15	0-1.75	0-300 IN H2O/0-750 CM H2O	0-1024 CM H2O	
0-20	0-60"	0-20	0-2.0	0-400 IN H2O/0-1000 CM H2O	0-1250 CM H2O	
0-25	0-70"	0-25		0-500 IN H2O/0-1270 CM H2O	0-1500 CM H2O	
0-30	0-80"	0-30		0-600 IN H2O/0-1500 CM H2O	0-1524 CM H2O	
	0-100"	0-40		0-700 IN H2O/0-1800 CM H2O	0-2500 MM H2O	
	0-120"	0-70		0-800 IN H2O/0-2050 CM H2O	0-3,000 MM H2O	
	0-150"	0-100			0-5,000 MM H2O	
	0-200"	0-140			0-7,600 MM H2O	
	0-250"	0-150			0-10,000 MM H2O	
	0-300"	0-200			0-12,700 MM H2O	
	0-400"				0-15,000 MM H2O	
	0-450"					
	0-500"					
	0-600"					
	0-700"					
	0-800"					

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
0-50	0-126.5	0-1265	0-1.80	0-.12	0-125	0-12
0-60	0-152.6	0-1525	0-2.17	0-.15	0-150	0-15
Model 116 Range Conversions						
0-70	0-180	0-1775	0-2.5	0-.17	0-174	0-17.3
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
0-700	0-1800	0-17,750	0-25.3	0-1.74	0-1740	0-174
0-800	0-2000	0-20,300	0-28.9	0-2.00	0-2000	0-200

Listed below are examples of tank level dial ranges requested and provided to our customers based on their specific requirements. Mid-West has the capability to provide special dials to fit your specific needs.

Range	
0-100,000LBS CO2/0-46,000 KGS	0-28,000 LBS N2O
0-100% CARBON DIOXIDE	0-28,000LBS CO2/0-12,800 KGS
0-100% CO2	0-3,935 LBS CO2/0-1,785 KGS
0-100% LINEAR	0-36,000 LBS CO2/0-16,000 KGS
0-100,000 LBS CO2	0-400 IN H2O/0-10,160 MM H2O
0-100,000 LBS CO2/0-46,000 KGS	0-42,000 LBS CO2/0-19,000 KGS
0-100,000 LBS CO2/0-50 TONS	0-42,000 LBS N2O/0-21 TONS
0-100,000 LBS N2O	0-4300 GALLONS
0-100,000 LBS N2O/0-100%	0-5,500 LBS CO2/0-2,500 KGS
0-11 IN H2O/0-220 CM HE	0-50 IN H2O/0-1140 KG LOX
0-11 IN H2O/0-220 LHE	0-50,000 TONS & 0-100,000 LBS CO2
0-11 IN H2O/0-28 CM H2O	0-52,000 LBS CO2/0-24,000 KGS
0-11,000 LITRES O2/N2/AR	0-52,000 LBS CO2/0-26,000 TONS
0-12,000 Lbs CO2 / 0-6 TONS	0-56,000 LBS CO2/0-25,000 KGS
0-12,000 LBS CO2/0-5,400 KGS	0-6,000 LBS CO2/0-2,700 KGS
0-12,000 LBS CO2/0-5,500 KGS	0-60,000 LBS CO2
0-12,000 LBS CO2/0-6 TONS	0-60,000 LBS CO2/0-100%
0-120,000 LBS CO2/0-55,000KGS	0-60,000 LBS CO2/0-27,500 KGS
0-13,000 LBS CO2	0-60,000 LBS CO2/0-28,000 KGS
0-13,000 LBS H2O	0-60,000 LBS CO2/0-30,000 KGS
0-13000 LBS N2O	0-63 METRIC TONNES
0-16,000 LBS CO2/0-7,200 KGS	0-7,000 LBS CO2/0-3,150 KGS
0-182,000 LBS CO2 / 0-82,500 KGS	0-7,500LBS CO2/0-3,400 KGS
0-20,000 LBS CO2/0-9,000 KGS	0-70,000 Lbs CO2 / 0-35 TONS
0-200 IN H2O/0-5,080 MM H2O	0-70,000 LBS CO2/0-35 TONS
0-270 METRIC TONNES	0-700 IN H2O
0-28,000 LBS CO2	0-75 IN H2O/0-190 CM H2O
0-28,000 Lbs CO2 / 0-14,000 TONS	0-75 IN H2O/0-190 CM H2O
0-28,000 LBS CO2/0-12,800 KGS	0-76,000 LBS CO2/0-34,500 KGS
0-28,000 LBS H2O	0-8,000 LBS CO2 / 0-3,600 KGS

**Proof Pressure:**

Two times working pressure at ambient temperatures

**Temperature Limits:**

Gauge w/o/ switch -40°F to 200°F  
 Gauge with Snap Acting Switch -20°F to 185°F

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 115/116 Series gauges either conform to and/or are designed to the requirements of the following standards:

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

# Model 115/116 Tank Level Gauge



**0-10" H<sub>2</sub>O  
Single Scale**



**Ar, O<sub>2</sub>, N<sub>2</sub>  
Tri-Scale Dial**



**Optional  
3/4" FNPT  
Stub Mount Shown  
Shown on Model 116**



**Model 115  
Brass Body**



**Model 116  
Cast Brass Body**

	<b>115</b>	<b>**116</b>
<b>Accuracy</b>	±1% of Full Scale	
<b>DP Range</b>	0-10" H <sub>2</sub> O to 0-69.9" H <sub>2</sub> O (25 mbar to 2.5 PSID)	0-70" H <sub>2</sub> O to 0-800" H <sub>2</sub> O (2.5 PSID to 30 PSID)
<b>Safe Working Pressure</b>	1500 PSIG	500 PSIG (Standard) 1000 PSIG (Optional)
<b>Body Material</b>	Brass	Brass
<b>Internals</b>	316 S.S. Welded Multiple Diaphragm	316 S.S. Convuluted Bellows
<b>Port</b>	Dual Top and Bottom, 1/4" FNPT connections with optional snubbers	
<b>Seals</b>	Viton Standard, other elastomers available	
<b>Dial</b>	6" Black dial with White lettering (White dial with Black lettering optional)	
<b>Warranty</b>	One Year	
<b>**Model 116 Snap Acting Micro-Switch for Alarm (optional) Ranges: 0-80" H<sub>2</sub>O &amp; above.</b>		
<b>Aluminum, Carbon Steel, &amp; Stainless Steel Body Materials Available... Ask about Model's 105, and 106 ( SWP of 1,500 &amp; 3,000 PSIG)</b>		



**MICRO - SWITCH SPECIFICATION**  
**Model 116 Electrical 0-80" H<sub>2</sub>O and above**

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

**Proof Pressure:**

Two times working pressure at ambient temperatures

**Temperature Limits:**

Gauge w/o/ switch -40°F to 200°F  
 Gauge with Snap Acting Switch -20°F to 185°F

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 115/116 Series gauges either conform to and/or are designed to the requirements of the following standards:

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

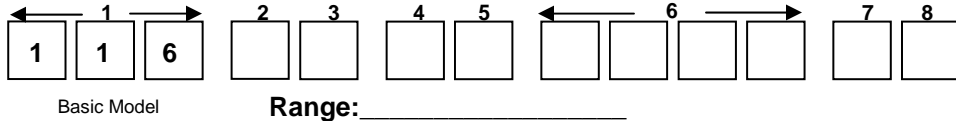
## Standard Model Number Sequence: 116BB-10-APT-O

500 PSIG Working Pressure, Brass Body, Stainless Steel Bellows, Stainless Steel Internals  
 Viton Seals, 1/4" 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,  
 Oxygen Cleaned, Accuracy ±1% Full Scale (Ascending)

**Range 115: 0-10" H2O to 0-69.9" H2O (0-125 mbar to 0-2.5 PSID)**

**Range 116: 0-70" H2O to 0-800" H2O (0-2.5 PSID to 0-30 PSID)**

*Gauge Body and Internal components are considered wetted parts.*



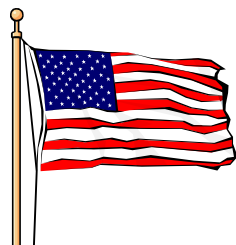
<b>2</b>	<b>Material</b>
<b>B</b>	500 PSIG, Brass Body, Stainless Steel Internals
<b>Z</b>	Special ( <i>Un-coded Options</i> )
<b>3</b>	<b>Dial Size Type</b>
<b>B</b>	Accuracy ±1% Full Scale Uni-Directional, White on Black Dial
<b>W</b>	Accuracy ±1% Full Scale Uni-Directional, Black on White Dial
<b>Z</b>	Special ( <i>Un-coded Options</i> )
<b>4</b>	<b>Seal Materials</b>
<b>0</b>	Buna-N
<b>1</b>	Viton®-A Registered Trademark of Dupont ( <b>Standard</b> )
<b>5</b>	Ethylene Propylene
<b>9</b>	Special ( <i>Un-coded Options</i> )
<b>5</b>	<b>Process Connections / Orientation</b>
<b>0</b>	1/4" FNPT Dual Top & Bottom (Hi port on the right side when facing the dial) ( <i>Standard</i> )
<b>1</b>	1/4" FNPT Dual Top & Bottom (Hi port on the left side when facing the dial) ( <i>Not available with switches</i> )
<b>9</b>	Special ( <i>Un-coded Options</i> )
<b>6</b>	<b>Additional Options</b>
<b>O</b>	None
<b>A</b>	Brass snubber fittings mounted in bottom process connections ( <i>Standard</i> )
<b>B</b>	Brass snubber fittings mounted in top process connections
<b>D</b>	3/4" NPT S.S. Stub Mount Bracket
<b>F</b>	Carbon Steel 2" Pipe Mounting Kit
<b>J</b>	3-Valve S.S. Mini-Manifold #113343 mounted to bottom process connections ( <i>1/4" FNPT Process Connections</i> )
<b>K</b>	3-Valve S.S. Manifold #107470 mounted to bottom process connections ( <i>1/2" FNPT Process Connections</i> )
<b>L</b>	3-Valve S.S. Direct Mount Manifold mounted to bottom process connections ( <i>1/4" FNPT Process Connections</i> )
<b>P</b>	Panel Mount Kit
<b>Q</b>	CRN ( <i>Canadian Registration Number</i> )
<b>S</b>	Shatter Proof Glass Lens
<b>T</b>	Oxygen Cleaning
<b>U</b>	Stainless Steel Tag with S.S. Wire
<b>Z</b>	Special ( <i>Un-coded Options</i> )

## Model 115/116 - continued

7	Electrical Configurations
O	None
A	One (1) Switch in Weather Resistant Enclosure <i>Accuracy ±2% (Descending Pressure)</i>
B	Two (2) Switches in Weather Resistant Enclosure <i>Accuracy ±4%</i> 0-80" – 199" H2O only. (Descending Pressure) <i>Accuracy ±2%</i> 0-200" H2O and above.. (Descending Pressure)
C	One (1) Switch in Weather Resistant Housing with Condulet Enclosure <i>Accuracy ±2% (Descending Pressure)</i>
D	Two (2) Switches in Weather Resistant Housing with Condulet Enclosure <i>Accuracy ±4%</i> 0-80" – 199" H2O only. (Descending Pressure) <i>Accuracy ±2%</i> 0-200" H2O and above.. (Descending Pressure)
Z	Special ( <b>Un-coded Options</b> ) Switches CSA Listed, Type 4, Industrial Control Equipment <i>Accuracies and repeatability values for 2 switch units are based upon one switch set low (approximately 25% for FSR) and one switch set High approx. 75% FSR.</i>
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 ( <b>Un-coded Options</b> )
<b>Electrical Interface:</b> 18", 18 Awg, 600 V, 105°C / Color coded wire leads from 1/2" FNPT Connection Operating Temperature: -20° F to +185° F	
<b>Factory preset switches at no charge (specify setting)</b>	

### 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**



**CMC TECHNOLOGIES**

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