

## X-MAS TREE GAUGE

- Accuracy  $\pm 1\%$
- Polished Stainless Steel Case
- Ranges to 10,000 psi
- Adjustable Micrometer Pointer

Marsh Instruments has been on top of X-mas Trees and well-heads longer than any other name. Marsh offers the same high-performance gauge for replacement. Other gauge manufacturers can state X-mas Tree Gauge on their products but only Marsh Instruments can offer you all the special features, and dependability, that you expect! Features include a polished stainless steel case with stainless steel tube, tip, and socket, and an easy to adjust micrometer pointer.

Marsh Instruments X-mas Tree gauges are designed for the oil patch, well heads and offshore oil platforms.



### STANDARD RANGES & PART NUMBERS

TYPE	X-MAS TREE GAUGE
Size	4½"
Case Material	304 Stainless Steel
Internals	Stainless Steel
Mounting / Case Style	LM
Connection	½" NPT
Scale Standard	psi
0 to 1,000 psi	W0574
0 to 1,500 psi	W0578
0 to 2,000 psi	W0582
0 to 3,000 psi	W0586
0 to 5,000 psi	W0590
0 to 10,000 psi	W0594

### SPECIFICATIONS

#### ACCURACY

ASME Grade A –  $\pm 1\%$   
( $\pm 1\%$  of range across full scale)

#### CASE SIZES

4½" diameter

#### CASE MATERIAL

304 Stainless Steel

#### CASE STYLE

LBM – Lower Mount  
with blowout plug

#### TUBE & SOCKET

Stainless Steel

#### MOVEMENT

316 Stainless Steel

#### CONNECTION

½" NPT

#### RANGES

1,000 to 10,000 psi

#### DIAL STANDARD

Single scale psi

#### DIAL COLOR

Black markings on white

#### POINTER


Aluminum, black painted,  
micro-adjustable.

#### WINDOW & RING

Acrylic window with bayonet ring





PART#	DESCRIPTION
	
<b>GAUGE COCK AND SIPHONS</b>	
111025	¼" F x ¼" F Brass Gauge Cock (T-Handle #123)
111028	¼" M union x ¼" F Brass Gauge Cock (Lever Handle #125)
111029	¼" M x ¼" M Steel Straight Siphon (600psi @ 400°F)
111030	¼" M x ¼" M Brass Straight Siphon (250psi @ 400°F)
111031	¼" M x ¼" M Steel Angle Type Siphon (600psi @ 400°F)
111032	¼" M x ¼" M Brass Angle Type Siphon (250psi @ 400°F)
<b>CLEARLOK (ACRYLIC) CONVEX WINDOW INTERNAL THREAD "G" Series Fig. 83 Diaphragm Gauges</b>	
124602	2½" for 83K & 83KC
127985	2½" for 83KB & 83KD
125448-001	3½" for all models (knurled edge)
<b>CLEARLOK (ACRYLIC) WINDOWS (INTERNAL THREAD) "J" SERIES</b>	
W15CL	1½" for LM or CB
W20CL	2" for LM or CB
W20CLUC	2" for U-Clamp or Front Flange
W25CL	2½" for LM or CB
W25CLUC	2½" for U-Clamp or Front Flange
W35CL	3½" for LM or CB
W35CLUC	3½" for U-Clamp or Front Flange
<b>RESTRICTOR SCREWS ½" &amp; ¼" NPT Threaded Brass 8-40</b>	
100116-008	AIR (.008)
100116-013	WATER (.013)
100116-016	OIL (.016)
<b>RESTRICTOR SCREWS LARGE DIAL (D, E, H, &amp; P) ¼" &amp; ½" NPT Threaded Brass M5 X 0.8</b>	
RES008BRLD	AIR (.008)
RES013BRLD	WATER (.013)
RES016BRLD	OIL (.016)
<b>RESTRICTOR SCREWS LARGE DIAL (D, E, H, &amp; P) ¼" &amp; ½" NPT Threaded 316 SST M5 X 0.8</b>	
RES018SSLD	All Apps. (.018)
<b>RESTRICTOR SCREWS GENERAL SERVICE (J)</b>	
150139-013	Air (.013)
150139-018	"Standard" (.018)
150139-025	Water (.025)
150139-040	Oil (.040)
<b>RESTRICTOR SCREWS SEVERE SERVICE SERIES (J &amp; X) ⅝", ¼" &amp; ½" NPT Push-In Brass</b>	
RES018PB	"Standard" (.018)
RES013PB	AIR (.013)
RES025PB	WATER (.025)
RES040PB	OIL (.040)

PART#	DESCRIPTION
<b>RESTRICTOR SCREWS SEVERE SERVICE SERIES J &amp; X ⅝", ¼" &amp; ½" Push-In 316 SST</b>	
RES018PBSS	"Standard" (.018)
<b>FRONT FLANGE (3-HOLE) CASE &amp; WINDOW ASS'Y FOR BACK CONNECT (CB) "J" Series Gauge</b>	
CS25FF	2½" Front Flange Case
W25CLUC	2½" Window Assembly
CS35FF	3½" Front Flange Case
W35CLUC	3½" Window Assembly
<b>LIQUID FILL CONVERSION KIT</b>	
9-79999-93	Liquid Fill Kit
127656	Silicone, 1000 cs, 1 quart
133426	Glycerine, 1 quart
	
<b>MAX. HAND ASSEMBLY WITH THUMB SCREW</b>	
W20CLMAX	2" Steel Case (J) LM & CBM only
W25CLMAX	2½" Steel Case (J) LM & CBM only
W35CLMAX	3½" Steel Case (J&W) LM & CBM only
128311-001	3½" Large Dial (H)
128311-002	4½" Large Dial (D, H, & P)
	
<b>HAND JACK &amp; DUPLEX HAND JACK</b>	
110983	Duplex Hand Jack/Driver Set
110985	Hand Jack (Pointer Remover)
<b>ADJUSTABLE (SLOTTED) POINTER</b>	
PTR20ADJ-B	Adjustable Pointer - 2"
PTR25ADJ-B	Adjustable Pointer - 2½"
PTR35ADJ-B	Adjustable Pointer - 3½"
PTR45ADJ-B	Adjustable Pointer - 4½"
<b>MICROMETER POINTER, LARGE DIAL SERIES</b>	
PTRP45	4½" Dial (D, H & P)
PTRP60	6" Dial (D, H & P)



PART#	DESCRIPTION
<b>SEVERE SERVICE GAUGE ACCESSORIES</b>	
127794	Adapter ring, 63mm to 2½"
Flange63	Front Flange for 63mm: C Case
133279	Front Flange for 63mm: CB or UC case (no holes)
Flange100	Front Flange for 100mm: C Case
<b>CERTIFICATION FORMS</b>	
134476	Material Certification
134477	Certificate of Conformance
134478	Certificate of Compliance
134479	Certificate of Origin
134480	Certificate of Calibration
134481	Certificate of Accuracy



PART#	DESCRIPTION	MEDIA	MAXIMUM PRESSURES
<b>INDUSTRIAL PRESSURE SNUBBERS</b>			
S20BD	¼" NPT, Brass	Heavy Oil	5,000 psi
S20BE	¼" NPT, Brass	Water & Light Oil	5,000 psi
S20BG	¼" NPT, Brass	Air & Gases	5,000 psi
S20SD	¼" NPT, 303SS	Heavy Oil	15,000 psi
S20SE	¼" NPT, 303SS	Water & Light Oil	15,000 psi
S20SG	¼" NPT, 303SS	Air & Gases	15,000 psi
S40BD	½" NPT, Brass	Heavy Oil	5,000 psi
S40BE	½" NPT, Brass	Water & Light Oil	5,000 psi
S40BG	½" NPT, Brass	Air & Gases	5,000 psi
S40SD	½" NPT, 303SS	Heavy Oil	15,000 psi
S40SE	½" NPT, 303SS	Water & Light Oil	15,000 psi
S40SG	½" NPT, 303SS	Air & Gases	15,000 psi



# Diaphragm Seals



## MODEL 12000 MINI SERVICEABLE RUBBER DIAPHRAGM SEAL

The Model 12000 Serviceable Mini Diaphragm Seal is designed for gauges and instruments with operating pressures of 2500 psi with stainless and 500 psi with PVC models. Ideally suited for small applications and corrosive installations. The optional 'Easy Clean Out' feature allows the removal of the process side housing without losing the instrument side fill fluid. Fill / bleed screw port in the instrument side housing, and stainless steel build screws are standard.

FILLED & CALIBRATED TO GAUGES ONLY.



## MODEL B8498 GAUGE PROTECTOR WITH RUBBER DIAPHRAGM SEAL

The Model B8498 Gauge Protector is designed for extremely high volume displacement. Ideally suited for gauges and instruments with operating pressures up to 200 psi and vacuum applications. Available in 1/4" threaded connections and chrome plated zinc construction. A 3/8" flush plug is standard in the process side housing.

FILLED & CALIBRATED TO GAUGES ONLY.

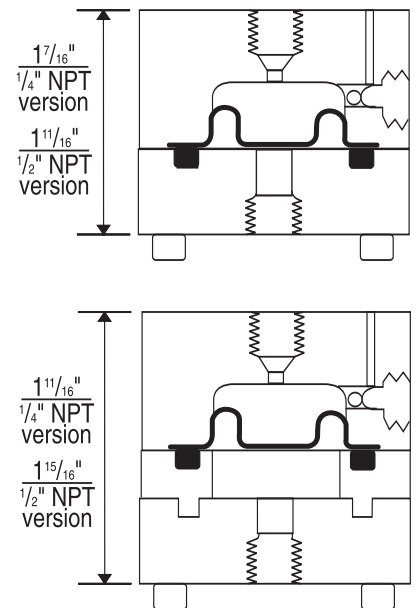
Diaphragm seals are isolation devices which separate pressure gauges and other instruments from the process media while allowing the instrument to measure the process pressure. The service life of the instrument is greatly extended, because it is protected from corrosion, clogging, freezing, or pulsation.

### LIQUID FILLINGS

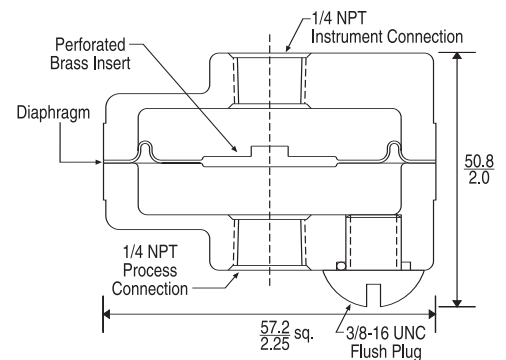
The selection of the fill depends on the temperature expected in any given application. Temperature ratings for available fillings are listed below.

Glycerine	0 to 400°F
Silicone	-40 to 600°F
Syltherm	-40 to 750°F

12000	
<b>UPPER 316SS</b>	
1/4"	22
1/2"	24
<b>PVC</b>	
1/4"	52
1/2"	54
<b>LOWER 316SS</b>	
1/4"	22
1/2"	24
<b>PVC</b>	
1/4"	52
1/2"	54
<b>DIAPHRAGM</b>	
Nitrile	3
Fluorocarbon	4
Neoprene	5
<b>EASY CLEAN OUT</b>	
None	0
Clean Out	2
<b>FILL</b>	
No Fill	0
Glycerine	G
Silicone	S
Syltherm	Y



B8498	
<b>ASSEMBLY</b>	
1/4"	22
<b>DIAPHRAGM</b>	
Nitrile	3
Fluorocarbon	4
Neoprene	5
<b>FILL</b>	
No Fill	0
Glycerine	G
Silicone	S
Syltherm	Y



# Diaphragm Seals



## MODEL 13000 MINI / ALL WELDED DIAPHRAGM SEAL

The Model 13000 Mini Welded Seal is designed for 2" to 3½" bourdon tube gauges with a minimum pressure of 100 psi. The maximum operating pressure is 2000 psi at 100° F. Available in all 316 SS or Hastelloy C process housing and diaphragm.

FILLED & CALIBRATED TO GAUGES ONLY.



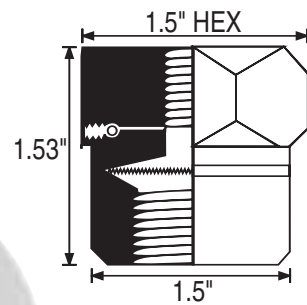
## MODEL 13040 ALL WELDED DIAPHRAGM SEAL

The Model 13040 All Welded Seal is designed for 2" to 4½" bourdon tube gauges with pressure ranges from vacuum to 1000 psi. Available in all 316SS or Hastelloy C process housing and diaphragm, with threaded connections. Optional flushing connections also available.

FILLED & CALIBRATED TO GAUGES ONLY.

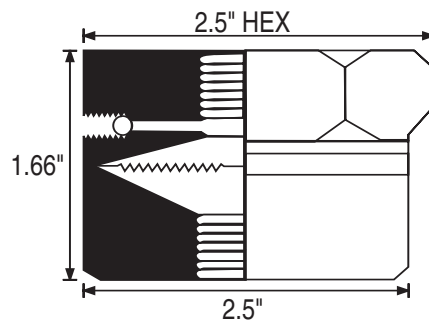
13000

UPPER 316SS	
¼"	22
½"	24
LOWER 316SS	
¼"	22
½"	24
Hastelloy	
¼"	42
½"	44
DIAPHRAGM 316SS	1
Hastelloy C	2
FILL	
No Fill	0
Glycerine	G
Silicone	S
Syltherm	Y



13040

UPPER 316SS	
¼"	22
½"	24
LOWER 316SS	
¼"	22
½"	24
¾"	26
1"	28
Hastelloy	
¼"	42
½"	44
¾"	46
1"	48
DIAPHRAGM 316SS	1
Hastelloy C	2
FLUSH CONNECTION	
None	0
¼"	2
FILL	
No Fill	0
Glycerine	G
Silicone	S
Syltherm	Y



# Diaphragm Seals



## MODEL 14000 REMOVABLE DIAPHRAGM SEAL

The Model 14000 Diaphragm Seal is a clamped metal design featuring interlocking construction inside the bolt circle for perfect alignment. The upper and lower housings clamp the diaphragm in place and allow for field servicing. The 14000 is available in threaded connections for pressures from vacuum to 2500 psi. Fill/bleed port screw in the upper is standard and an optional flush connection is available.

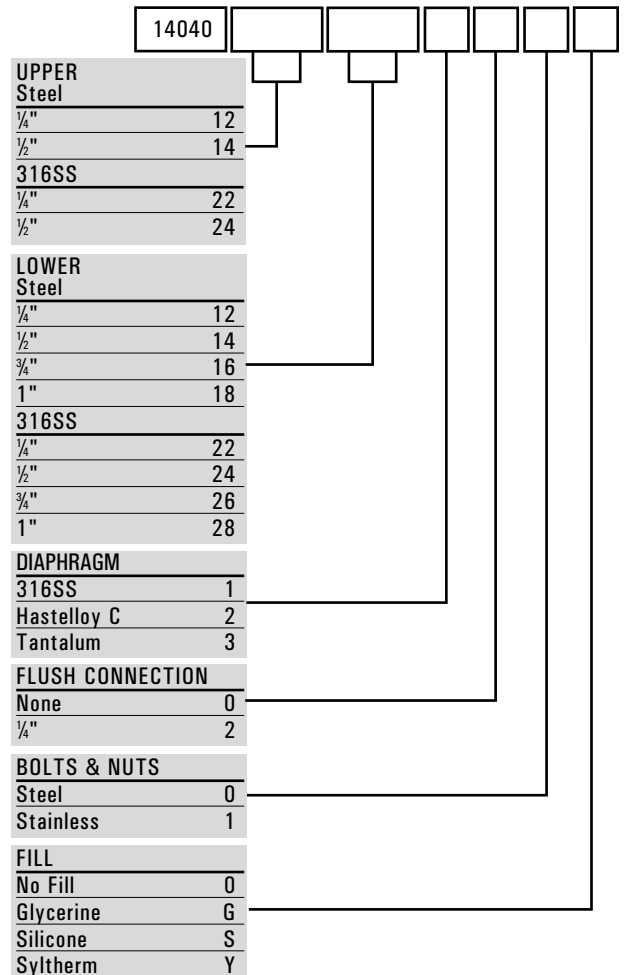
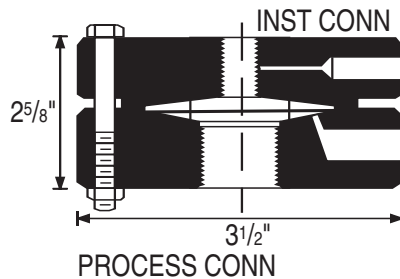
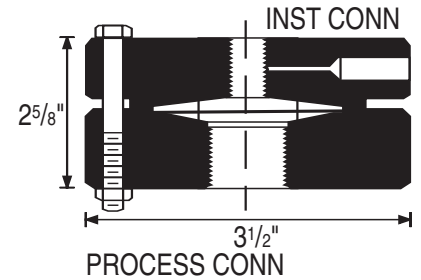
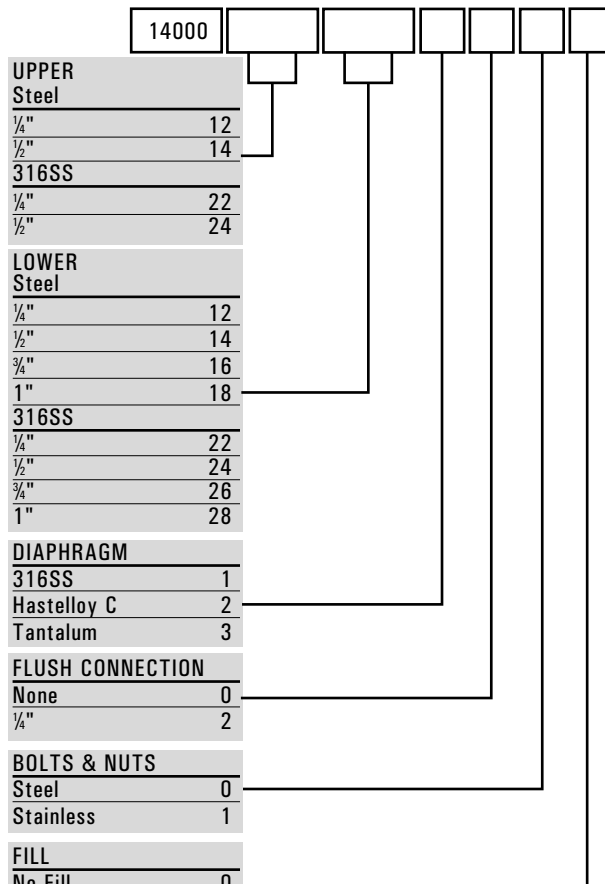
FILLED & CALIBRATED TO GAUGES ONLY.



## MODEL 14040 WELDED DIAPHRAGM SEAL

The Model 14040 Welded Diaphragm Seal is a welded diaphragm-to-upper design allowing the upper housing to be removed with the instrument in place without losing fill. The same interlocking feature as the 14000 is used to assure alignment of the upper to the lower. Available in threaded connections for pressures from vacuum to 2500 psi. Fill/bleed port screw in the upper is standard and an optional flush connection is available.

FILLED & CALIBRATED TO GAUGES ONLY



## HOT WATER THERMOMETER

- ± 1% of span throughout entire range
- Aluminum stem and case material
- Bi-metallic element

Thermometer is available with standard 1/2" or 3/4" NPT male separable socket or 1/2" or 3/4" sweatwell connection that allows easy thermometer removal while maintaining a "sealed" system.

Marsh Instruments Hot Water Thermometers are designed for accurate temperature readings in hot water lines, boilers and hydronic systems.



DESCRIPTION	P/N
1/2" NPT	L8004-1
3/4" NPT	L8004-2
1/2" sweatwell	L8004-3
3/4" sweatwell	L8004-4

### SPECIFICATIONS

**ACCURACY**  
± 1% of span throughout entire range

**CASE SIZE**  
2 1/2" Diameter

**CASE MATERIAL**  
Aluminum

**STEM**  
Aluminum

**MOVEMENT**  
Bi-metallic element

**CONNECTION**  
1/2" or 3/4" NPT Center Back,  
1/2" or 3/4" Sweatwell Center Back

**RANGE**  
30-250° F & 0-120° C

**DIAL COLOR**  
White with Black & Red Markings

**POINTER**  
Aluminum, Black Painted

**RECALIBRATOR**  
Standard





## BIMETAL THERMOMETERS

- External Reset Feature for Field Recalibration (3" & 5")
- 9 Dual Scale Ranges to 1,000°F (525°C)
- Hermetically Sealed Case Design
- 2", 3" and 5" Dials
- Stem Lengths to 24"
- 1% Full Scale Accuracy

Marsh Instruments Bimetal Thermometers combine the benefits of economy and reliability for local mounted temperature indication in the dual scale ranges from -50° to 1,000°F (-40° to 525°C). Additional advantages offered by the Series "L" Bimetal Thermometers include an easy-to-read dual scale, fast speed of response, and accurate temperature indication. The hermetically sealed and ruggedly built case is resistant to shock, vibration, dust and moisture. Corrosion resistance to most chemicals is provided by the all welded type 304 Stainless Steel construction. The extremely responsive bimetal sensing element provides an accuracy to within  $\pm 1\%$  of scale. An external adjustment screw on the back of the 3" and 5" case provides convenient reset and field recalibration. Built-in over range protection is a standard feature.

Typical applications include process, offshore, power, chemical industries, HVAC and OEM applications.

### SPECIFICATIONS

#### ACCURACY

$\pm 1\%$  of span throughout entire range for 2" immersion in liquids, 4" in gases

#### CASE SIZES

2", 3", and 5" sizes

#### CASE MATERIAL

304 Stainless steel

#### STEM

2½", 4", 6", 9", 12", 15", 18" & 24" Stainless Steel; ¼" diameter

#### CONNECTIONS

½" NPT: CB—Center Back connection (2" case only)

½" NPT: CB—Center Back connection or AJ—Adjustable connection (3" & 5")

#### DIALS

Dual scale in degrees Celsius and Fahrenheit

#### WINDOW

Glass, hermetically sealed

### STANDARD RANGES & PART NUMBERS

TYPE	BIMETAL THERMOMETERS					
Size	2"					
Connection	½" NPT					
Mounting	CB	CB	CB	CB	CB	CB
Stem Length	2½"	4"	6"	9"	12"	
-50° to 120°F / -40° to 50°C	L11101	L11201	L11301	L11401	L11501	
-40° to 160°F / -40° to 70°C	L11102	L11202	L11302	L11402	L11502	
0° to 200°F / -20° to 90°C	L11104	L11204	L11304	L11404	L11504	
0° to 250°F / -20° to 120°C	L11105	L11205	L11305	L11405	L11505	
50° to 300°F / 10° to 150°C	L11106	L11206	L11306	L11406	L11506	
50° to 400°F / 10° to 200°C	L11107	L11207	L11307	L11407	L11507	
50° to 550°F / 10° to 300°C	L11108	L11208	L11308	L11408	L11508	
150° to 750°F / 70° to 400°C	L11110	L11210	L11310	L11410	L11510	
200° to 1000°F / 100° to 525°C	L11111	L11211	L11311	L11411	L11511	
Size	3"					
Connection	½" NPT					
Mounting	CB	CB	CB	CB	CB	CB
Stem Length	2½"	4"	6"	9"	12"	15"
-50° to 120°F / -40° to 50°C	L31101	L31201	L31301	L31401	L31501	L31601
-40° to 160°F / -40° to 70°C	L31102	L31202	L31302	L31402	L31502	L31602
0° to 200°F / -20° to 90°C	L31104	L31204	L31304	L31404	L31504	L31604
0° to 250°F / -20° to 120°C	L31105	L31205	L31305	L31405	L31505	L31605
50° to 300°F / 10° to 150°C	L31106	L31206	L31306	L31406	L31506	L31606
50° to 400°F / 10° to 200°C	L31107	L31207	L31307	L31407	L31507	L31607
50° to 550°F / 10° to 300°C	L31108	L31208	L31308	L31408	L31508	L31608
150° to 750°F / 70° to 400°C	L31110	L31210	L31310	L31410	L31510	L31610
200° to 1000°F / 100° to 525°C	L31111	L31211	L31311	L31411	L31511	L31611



## STANDARD RANGES & PART NUMBERS

TYPE		BIMETAL THERMOMETERS							
Size	3" Adjustable Angle								
Connection	½" NPT								
Mounting	AJ	AJ	AJ	AJ	AJ	AJ			
Stem Length	2½"	4"	6"	9"	12"	15"			
-50° to 120°F/-40° to 50°C	L33101	L33201	L33301	L33401	L33501	L33601			
-40° to 160°F/-40° to 70°C	L33102	L33202	L33302	L33402	L33502	L33602			
0° to 200°F/-20° to 90°C	L33104	L33204	L33304	L33404	L33504	L33604			
0° to 250°F/-20° to 120°C	L33105	L33205	L33305	L33405	L33505	L33605			
50° to 300°F/ 10° to 150°C	L33106	L33206	L33306	L33406	L33506	L33606			
50° to 400°F/ 10° to 200°C	L33107	L33207	L33307	L33407	L33507	L33607			
50° to 550°F/ 10° to 300°C	L33108	L33208	L33308	L33408	L33508	L33608			
150° to 750°F/ 70° to 400°C	L33110	L33210	L33310	L33410	L33510	L33610			
200° to 1000°F/ 100° to 525°C	L33111	L33211	L33311	L33411	L33511	L33611			
Size	5"								
Connection	½" NPT								
Mounting	CB	CB	CB	CB	CB	CB	CB	CB	
Stem Length	2½"	4"	6"	9"	12"	15"	18"	24"	
-50° to 120°F/-40° to 50°C	L51101	L51201	L51301	L51401	L51501	L51601	L51701	L51801	
-40° to 160°F/-40° to 70°C	L51102	L51202	L51302	L51402	L51502	L51602	L51702	L51802	
0° to 200°F/-20° to 90°C	L51104	L51204	L51304	L51404	L51504	L51604	L51704	L51804	
0° to 250°F/-20° to 120°C	L51105	L51205	L51305	L51405	L51505	L51605	L51705	L51805	
50° to 300°F/ 10° to 150°C	L51106	L51206	L51306	L51406	L51506	L51606	L51706	L51806	
50° to 400°F/ 10° to 200°C	L51107	L51207	L51307	L51407	L51507	L51607	L51707	L51807	
50° to 550°F/ 10° to 300°C	L51108	L51208	L51308	L51408	L51508	L51608	L51708	L51808	
150° to 750°F/ 70° to 400°C	L51110	L51210	L51310	L51410	L51510	L51610	L51710	L51810	
200° to 1000°F/ 100° to 525°C	L51111	L51211	L51311	L51411	L51511	L51611	L51711	L51811	
Size	5" Adjustable Angle								
Connection	½" NPT								
Mounting	AJ	AJ	AJ	AJ	AJ	AJ	AJ	AJ	
Stem Length	2½"	4"	6"	9"	12"	15"	18"	24"	
-50° to 120°F/-40° to 50°C	L53101	L53201	L53301	L53401	L53501	L53601	L53701	L53801	
-40° to 160°F/-40° to 70°C	L53102	L53202	L53302	L53402	L53502	L53602	L53702	L53802	
0° to 200°F/-20° to 90°C	L53104	L53204	L53304	L53404	L53504	L53604	L53704	L53804	
0° to 250°F/-20° to 120°C	L53105	L53205	L53305	L53405	L53505	L53605	L53705	L53805	
50° to 300°F/ 10° to 150°C	L53106	L53206	L53306	L53406	L53506	L53606	L53706	L53806	
50° to 400°F/ 10° to 200°C	L53107	L53207	L53307	L53407	L53507	L53607	L53707	L53807	
50° to 550°F/ 10° to 300°C	L53108	L53208	L53308	L53408	L53508	L53608	L53708	L53808	
150° to 750°F/ 70° to 400°C	L53110	L53210	L53310	L53410	L53510	L53610	L53710	L53810	
200° to 1000°F/ 100° to 525°C	L53111	L53211	L53311	L53411	L53511	L53611	L53711	L53811	



# Temperature



## POCKET THERMOMETER

- 1" Dial
- 304 Stainless Steel Hermetically Sealed Case
- 5" long stem
- Protective Case with Stainless Steel Clip

Marsh pocket thermometers have a 1" dial, 304SS hermetically sealed case, 304SS 0.4mm diameter 5" long stem, and plastic lens. The accuracy is  $\pm 1.5\%$  of scale range. Each unit comes with a protective case with SS clip, that allows it to be safely carried in your pocket and also can be used to hold the thermometer in the medium to be tested.

Typical applications include the food industries, HVAC/R industries, and any applications requiring fast and accurate temperature.

### SPECIFICATIONS

#### ACCURACY

$\pm 1.5\%$  of span throughout entire range

#### CASE MATERIAL

304 Stainless Steel

#### RANGES

-40/160°F, -220°F, 50/550°F

### STANDARD RANGES & PART NUMBERS

PART NUMBER	DESCRIPTION & RANGE
L020E	1" dial, 5" stem, -40/160°F
L041E	1" dial, 5" stem, 0/220°F
L080E	1" dial, 5" stem, 50/550°F



## DIGITAL POCKET THERMOMETER

- 3.5 Digit LCD display
- ABS Plastic Case
- 5" long stem
- Protective Case with Stainless Steel Clip

Marsh Digital Pocket Thermometers have a 3.5 digit LCD display, ABS case and a 304SS 5" long stem. The accuracy is  $\pm 2^\circ\text{F}$  with an update time of 10 seconds. Each unit has an on-off switch for longer battery life and comes with the protective carrying case.

Typical applications include the food industries, HVAC/R industries, and any applications requiring fast and accurate temperature.

### SPECIFICATIONS

#### ACCURACY

$\pm 2^\circ\text{F}$

#### CASE MATERIAL

ABS Plastic

#### RANGE

-58 to 302 °F / -50 to 150 °C

### STANDARD RANGES & PART NUMBERS

PART NUMBER	DESCRIPTION & RANGE
L021DG	3.5 digit display, 5" stem, -58 to 302 °F / -50 to 150 °C



## INDUSTRIAL THERMOMETER

- Standard Well & Lagging Well Option
- Mounting Options: Adjustable Angle
- Easy to Read Dual Scale
- 5 Temperature Ranges
- Aluminum or Molded Glass Fiber Case

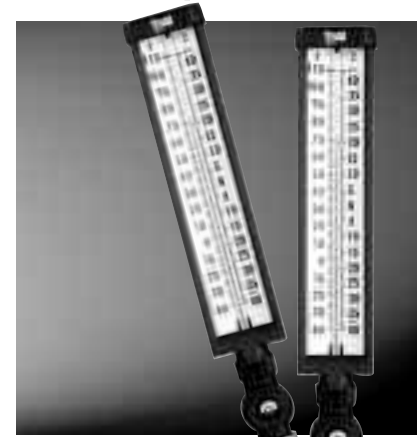
Marsh Industrial Thermometers are designed for demanding applications. The large 9" scale permits easy reading at longer distances. The glass-reinforced nylon case is lightweight yet rugged enough for demanding installations. The adjustable stem can be locked into any position through a 180° arc. These thermometers are commonly used on hot or chilled water lines in commercial/industrial buildings.

The Marsh Industrial Thermometers have a compact design that is well suited for limited space applications such as diesel engines, steam turbines, reduction gears, pumps, condensers and pipelines.

### STANDARD RANGES & PART NUMBERS

TYPE	INDUSTRIAL THERMOMETERS 9" ADJUSTABLE		
	With 3½" Stem		
Stem & Well	3½" (NO)	3½" SW	3½" LW
Dual Scale	°F & °C	°F & °C	°F & °C
Range			
-40° to 110°F / -40° to 40°C	Y1210	Y1202	Y1242
0° to 120°F / -15° to 45°C	Y1211	Y1203	Y1243
0° to 160°F / -15° to 65°C	Y1212	Y1204	Y1244
30° to 240°F / 0° to 115°C	Y1214	Y1206	Y1246
30° to 300°F / 0° to 150°C	Y1216	Y1208	Y1248
	With 6" Stem		
Stem & Well	6" (NO)	6" SW	6" LW
Dual Scale	°F & °C	°F & °C	°F & °C
Range			
-40° to 110°F / -40° to 40°C	Y1218	Y1226	Y1234
0° to 120°F / -15° to 45°C	Y1219	Y1227	Y1235
0° to 160°F / -15° to 65°C	Y1220	Y1228	Y1236
30° to 240°F / 0° to 115°C	Y1222	Y1230	Y1238
30° to 300°F / 0° to 150°C	Y1224	Y1232	Y1240

TYPE	SEPARABLE SOCKETS (THERMOWELLS)	
Process Connection	¾" NPT	¾" NPT
Material	Brass	304 SST
Stem Length & Well Style		
3½" Standard	223499-001	223502
6" Standard	223371	223512
6" with 2" Lagging	223389	223538



### SPECIFICATIONS

#### ACCURACY

± 1% of scale range

#### INDICATING COLUMN

Blue liquid fill

#### SCALE

Dual scale °F & °C.

White coated aluminum

#### SCALE LENGTH

9 inches

#### CASE MATERIAL

Molded black nylon, glass fiber reinforced or Aluminum

#### WINDOW

Glass

#### CONNECTION & STEM

1½"-18 swivel nut, for use with separable socket. Adjustable aluminum 3½" or 6" stem with 360° rotation

#### SEPARABLE SOCKET (THERMOWELL)

Choice of (NO) well, (SW) Standard Brass Well, or (LW) 2" Lagging Brass Extension Well.

## SUBMARINE THERMOMETER

- 5" Scale Size
- V-Shaped aluminum scale with black markings
- Lens front, red reading organic filled tube
- Gray ABS Case
- 2" nominal stem length for 3/4" OA socket

Each thermometer is manufactured to a standard accuracy of 1% of span. Gray case with red reading spirit filled tube with magnifying lens for easy readability. White aluminum scale with bold black graduations and figures. Typical applications include diesel engines, steam turbines, pumps, condensers, pipelines, boilers and chillers.



### SPECIFICATIONS

#### ACCURACY

± 1% of scale range

#### INDICATING COLUMN

Red liquid fill

#### SCALE

Dual scale °F & °C.

White coated aluminum

#### SCALE LENGTH

5 inches

#### CASE MATERIAL

Gray ABS

#### WINDOW

Glass

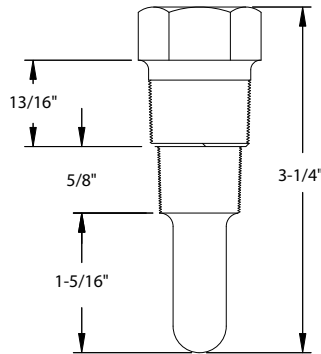
#### CONNECTION & STEM

3/4"-28" swivel nut, for use with separable socket (thermowell).

### STANDARD RANGES & PART NUMBERS

TYPE	SUBMARINE THERMOMETERS	
Stem Length	2"	
Dual Scale	°F & °C	
	STRAIGHT	90° BACK ANGLE
Range		
-40° to 110°F / -40° to 40°C	Y1402	Y1412
20° to 180°F / -6° to 82°C	Y1404	Y1414
30° to 240°F / 0° to 114°C	Y1406	Y1416
50° to 400°F / 10° to 200°C	Y1408	Y1418

TYPE	THERMOWELL
Connection	1/2" and 3/4" NPT
Material	Brass
Stem/Well Length	
2" / 3/4" OA	223666



THERMOWELL DIMENSIONS—3/4"-28" Female Thread (internal)

## TRIDICATORS

- Back and Bottom Mounting Options
- Rotatable Set Pointer
- Rugged Construction
- Three-Color Dial
- Three Pressure Ranges
- 2½" & 3½" Sizes

Marsh Instruments Tridicators (Boiler Gauges) are designed and suitable for hot water heating systems. These instruments indicate pressure in psi and altitude for pools and spa's in feet of H<sub>2</sub>O; in °F and °C. All models feature a set hand for setting the desired pressure and altitude of the installation.

Typical applications include hot water boilers, heated pools, spa's and hot tubs.

### STANDARD RANGES & PART NUMBERS

TYPE	TRIDICATORS		
Size	2½"	3½"	3½"
Case Material	Steel	Steel	Steel
Internals	Copper Alloy	Copper Alloy	Copper Alloy
Mounting/Case Style	CB	LBM	LM
Connection	¼" NPT	½" NPT	½" NPT
Scale Standard	psi/Feet of Water	psi/Feet of Water	psi/Feet of Water
0 to 60 psi / 0 to 130 ft H <sub>2</sub> O	Y22026	Y22006	Y22002
0 to 100 psi / 0 to 230 ft H <sub>2</sub> O		Y22008	Y22004
0 to 200 psi / 0 to 460 ft H <sub>2</sub> O		Y22016	Y22012
0 to 300 psi / 0 to 680 ft H <sub>2</sub> O		Y22018	Y22014



### SPECIFICATIONS

**ACCURACY**  
ASME Grade B = ±3/2/3% (±2% of range across middle half of scale)

**CASE SIZE**  
2½" Round & 3½" Square

**CASE MATERIAL**  
Steel, black painted

**CONNECTION**  
2½" case: ¼" NPT Center Back Mount, 3½" case: ½" NPT Lower Mount or Lower Back Mount

**PRESSURE RANGES**  
Dual scale in 4 ranges:  
0 to 60 psi & 0 to 130 ft. of water  
0 to 100 psi & 0 to 230 ft. of water  
0 to 200 psi & 0 to 480 ft. of water  
0 to 300 psi & 0 to 680 ft. of water

**TEMPERATURE RANGE**  
60° to 260°F & 20° to 120°C

**DIALS**  
Black markings on white

**TUBE & SOCKET**  
Copper Alloy

**POINTERS**  
Aluminum, red painted with black painted set pointer

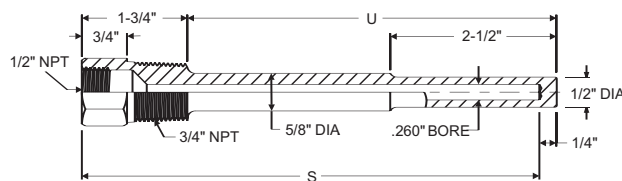
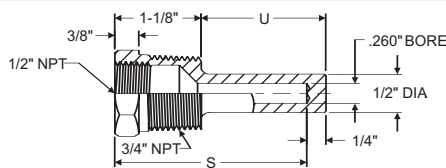
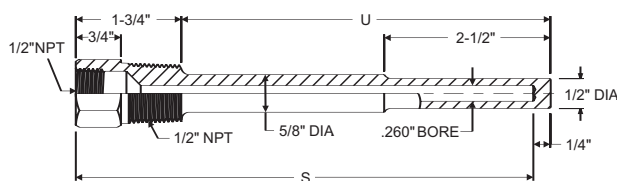
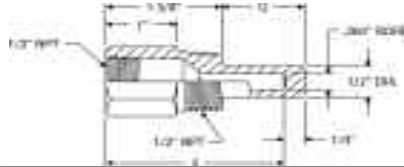
**WINDOW**  
3½" Glass  
2½" Acrylic



## THERMOWELLS

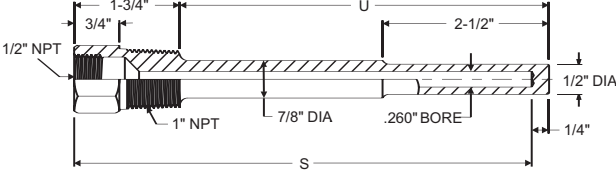
- In-Stock Thermowells for fast delivery
- Brass, 304 Stainless Steel or 316 Stainless Steel
- Tapered or Straight Shank
- 0.260/0.385 Standard Bore Sizes
- Threaded for easy connection

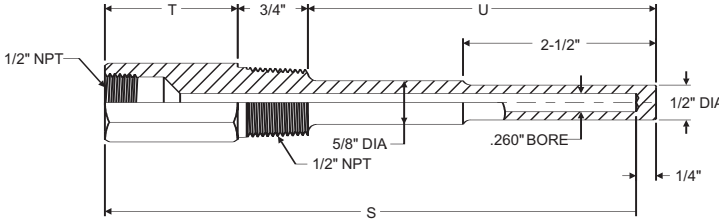
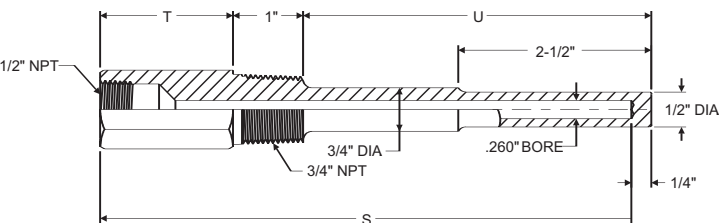
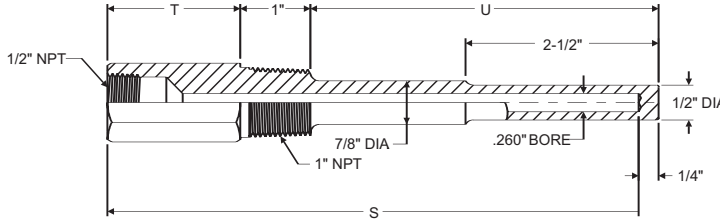
### THERMOWELLS

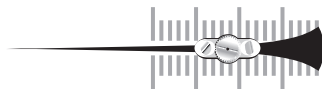


PART #	"S" STEM	"U" INSERTION	WELL MATERIAL
M3957K67	2½	1½	Brass
M3957K68	2½	1½	304SS
M3957K69	2½	1½	316SS
M3957K64	4	2½	Brass
M3957K65	4	2½	304SS
M3957K66	4	2½	316SS
M3957K37	6	4½	Brass
M3957K38	6	4½	304SS
M3957K51	6	4½	316SS
M3957K39	9	7½	Brass
M3957K41	9	7½	304SS
M3957K52	9	7½	316SS
M3957K42	12	10½	Brass
M3957K43	12	10½	304SS
M3957K53	12	10½	316SS
M3957K71	18	16½	Brass
M3957K72	18	16½	304SS
M3957K73	18	16½	316SS
M3957K75	24	22½	304SS
M3957K76	24	22½	316SS
M3951K77	2½	1½	Brass
M3957K78	2½	1½	304SS
M3957K79	2½	1½	316SS
M3957K11	4	2½	Brass
M3957K21	4	2½	304SS
M3957K54	4	2½	316SS
M3957K12	6	4½	Brass
M3957K22	6	4½	304SS
M3957K55	6	4½	316SS
M3957K13	9	7½	Brass
M3957K23	9	7½	304SS
M3957K56	9	7½	316SS
M3957K44	12	10½	Brass
M3957K45	12	10½	304SS
M3957K57	12	10½	316SS
M3957K84	18	16½	Brass
M3957K85	18	16½	304SS
M3957K86	18	16½	316SS
M3957K87	24	22½	Brass
M3957K88	24	22½	304SS
M3957K89	24	22½	316SS



THERMOWELLS	PART #	"S" STEM	"U" INSERTION	WELL MATERIAL
	M3957K46	4	2½	Brass
	M3957K47	4	2½	304SS
	M3957K58	4	2½	316SS
	M3957K48	6	4½	Brass
	M3957K49	6	4½	304SS
	M3957K59	6	4½	316SS
	M3957K91	9	7½	Brass
	M3957K92	9	7½	304SS
	M3957K93	9	7½	316SS
	M3957K94	12	10½	Brass
	M3957K95	12	10½	304SS
	M3957K96	12	10½	316SS
	M3957K14	18	16½	Brass
	M3957K15	18	16½	304SS
	M3957K16	18	16½	316SS
	M3957K18	24	22½	304SS
	M3957K19	24	22½	316SS

THERMOWELLS	PART #	"S" STEM	"U" INSERTION	"T" LAG	WELL MATERIAL
	M3957K24	9	4½	4	Brass
	M3957K25	9	4½	4	304SS
	M3957K26	9	4½	4	316SS
	M3957K27	12	7½	4	Brass
	M3957K28	12	7½	4	304SS
	M3957K29	12	7½	4	316SS
	M3957K4	18	13½	4	Brass
	M3957K5	18	13½	4	304SS
	M3957K6	18	13½	4	316SS
M3957K8	24	19½	4	304SS	
M3957K9	24	19½	4	316SS	
	M3957K31	6	2½	2¾	Brass
	M3957K32	6	2½	2¾	304SS
	M3957K61	6	2½	2¾	316SS
	M3957K33	9	4½	3¾	Brass
	M3957K34	9	4½	3¾	304SS
	M3957K62	9	4½	3¾	316SS
	M3957K35	12	7½	3¾	Brass
	M3957K36	12	7½	3¾	304SS
	M3957K63	12	7½	3¾	316SS
	M3957K115	18	13½	3¾	304SS
	M3957K116	18	13½	3¾	316SS
	M3957K117	24	19½	3¾	Brass
	M3957K118	24	19½	3¾	304SS
	M3957K119	24	19½	3¾	316SS
		M3957K121	9	4½	3¾
M3957K122		9	4½	3¾	304SS
M3957K123		9	4½	3¾	316SS
M3957K124		12	7½	3¾	Brass
M3957K125		12	7½	3¾	304SS
M3957K126		12	7½	3¾	316SS
M3957K131		18	13½	3¾	Brass
M3957K132		18	13½	3¾	304SS
M3957K133		18	13½	3¾	316SS
M3957K134		24	19½	3¾	Brass
M3957K135		24	19½	3¾	304SS
M3957K136		24	19½	3¾	316SS



THERMOWELLS	PART #	"S" STEM	"U" INSERTION	WELL MATERIAL
	M3957K137	4	2½	Brass
	M3957K138	4	2½	304SS
	M3957K139	4	2½	316SS
	M3957K141	6	4½	Brass
	M3957K142	6	4½	304SS
	M3957K143	6	4½	316SS
	M3957K144	9	7½	Brass
	M3957K145	9	7½	304SS
	M3957K146	9	7½	316SS
	M3957K147	12	10½	Brass
	M3957K148	12	10½	304SS
	M3957K149	12	10½	316SS
	M3957K162	4	2½	Brass
	M3957K163	4	2½	304SS
	M3957K164	4	2½	316SS
	M3957K165	6	4½	Brass
	M3957K166	6	4½	304SS
	M3957K167	6	4½	316SS
	M3957K168	9	7½	Brass
	M3957K169	9	7½	304SS
	M3957K171	9	7½	316SS
	M3957K172	12	10½	Brass
	M3957K173	12	10½	304SS
	M3957K174	12	10½	316SS
	M3957K221	4	2½	Brass
	M3957K222	4	2½	304SS
	M3957K223	4	2½	316SS
	M3957K231	6	4½	Brass
	M3957K232	6	4½	304SS
	M3957K233	6	4½	316SS
	M3957K241	9	7½	Brass
	M3957K242	9	7½	304SS
	M3957K243	9	7½	316SS
	M3957K261	4	2½	Brass
	M3957K262	4	2½	304SS
	M3957K263	4	2½	316SS
	M3957K271	6	4½	Brass
	M3957K272	6	4½	304SS
	M3957K273	6	4½	316SS
	M3957K281	9	7½	Brass
	M3957K282	9	7½	304SS
	M3957K283	9	7½	316SS



## DIGITAL PRESSURE INDICATOR

- Converts Pressure Input to LCD Digital Readout
- High Accuracy in Lightweight, Portable Package
- State of the Art Semi-Conductor

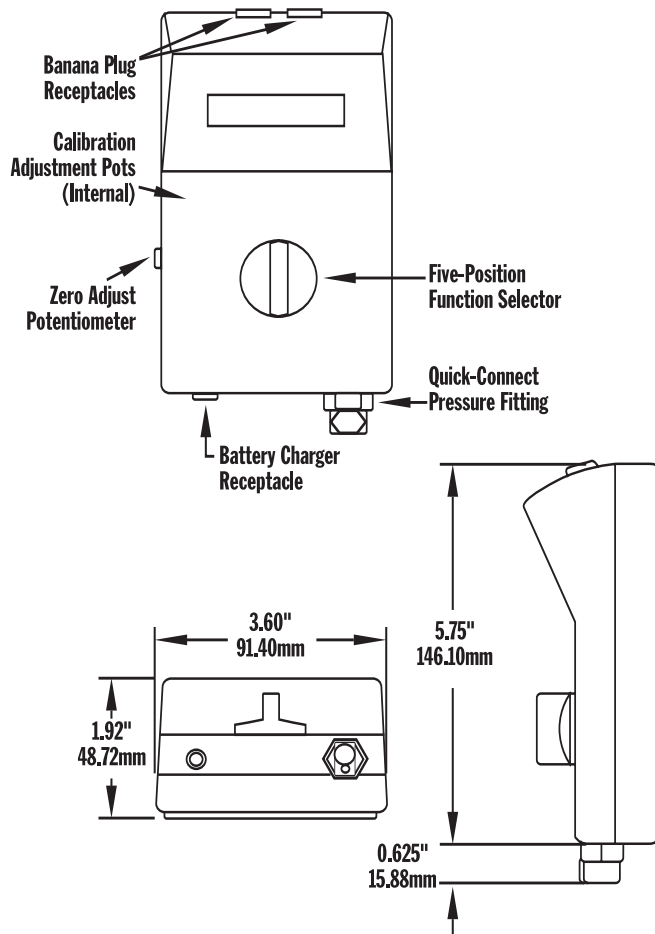
The Marsh Instruments Digital Pressure Indicator is portable, lightweight, hand-held testing and calibrating instrument indicates pressure to 50 psig at accuracy levels of  $\pm 0.50\%$  of reading  $\pm 1$  count. A state-of-the-art semiconductor-type pressure transducer converts pressure input to analog voltage, which is displayed on a  $3\frac{1}{2}$  digit LCD readout. Internal 9-volt rechargeable battery powers the indicator, and a zero adjust potentiometer standardizes the transducer bridge at zero pressure for higher accuracy.

Marsh Instruments Handheld Digital Pressure Indicator and Calibrator is ideal for calibrating DP cells, I/P's and P/I's. The indicator tests installed instruments and transmitters, verifies operation and settings of valves and switches, detects system leaks, and is used for other testing or maintenance applications.



DIGITAL PRESSURE INDICATOR	
RANGE	PART NUMBER
-14.7 to 50p	4-DPP-20050-BBC
-14.7 to 60p	4-DPP-20060-B3
-14.7 to 200p	4-DPP-20200-BBC

NOTE: Connection:  $\frac{5}{16}$ " quick connect tube fitting  
Elec. Range: 0-200 MA



## SPECIFICATIONS

### PNEUMATIC RANGE

Range: -14.7 to 200 psig; with corresponding inches of water column and inches of mercury

### BURST PRESSURE

80 psig absolute maximum

### WETTED MATERIAL

Brass fitting, silicone wafer diaphragm, suitable for instrument air (clean & dry) or any clean, non-conductive fluid

### PRESSURE FITTING

$\frac{5}{16}$ " quick-connect tube fitting standard, with mating nickel-plated brass locking quick-connector. 8" plastic hose with ferruleless  $\frac{1}{4}$ " OD has to coupling insert with shutoff valve

### DISPLAY

$3\frac{1}{2}$ " digit LCD,  $\frac{1}{2}$ " high black numerals on light background, with polarity and low battery indicators

### ACCURACY

$\pm 0.5\%$  of reading  $\pm 1$  count, must be zeroed at barometric pressure

### TEMPERATURE

Calibration range: 50°-90°F.  
Operating range: 30°-130°F.  
Effect of temperature outside calibration range is  $\pm 0.01\%$  per degree F

### POWER

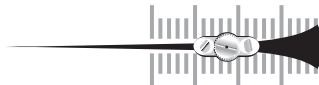
Internal: 9-volt transistor battery, Ni-Cad chargeable. External: 12-volt adapter will power unit or charge battery in approx. 14 hours. Approximate operation is 8-10 hours per charge

### CASE SIZE

3.60" wide x  $5\frac{1}{2}$ " long x 1.92" high, ABS plastic

### INCLUDES

Carrying case, battery charger, 8" plastic hose, quick-connect fitting, and technical manual



## SELECTION AND USE OF A PRESSURE GAUGE

When selecting a pressure gauge, it is important to consider the following factors to insure safety and accuracy:

1. Pressure range
2. Temperature range
3. Conditions affecting wear of the system
4. Case venting
5. Pressure fluid composition
6. Pressure fluid temperature
7. Ambient conditions
8. Method of mounting
9. Required accuracy

**PRESSURE RANGE:** A range of 2 times the operating pressure is recommended for safety and extended gauge life. The operating pressure should be limited to the middle 75% of range.

**TEMPERATURE RANGE:** Ambient temperature for General Service ("J") is -40° to 160°F. Ambient temperature for Severe Service ("J" & "X"), for Dry Gauges is -40° to 160°F and for Liquid Filled is 0° to 140°F.

**SHOCK, VIBRATION, PULSATION, OR CORROSIVE ATMOSPHERE CONDITIONS:** Liquid Filled Gauges have a fill material to lubricate the movement and reduce friction and wear. When used with a restrictor these gauges absorb vibration and dampen pressure shock and spikes. Liquid filling also prevents moisture or a corrosive atmosphere from affecting the gauge internals.

**CASE VENTING:** Process (Series "P") and Elite (Series "W") have a internal diaphragm which compensates for atmospheric changes that could affect the calibration of the filled gauge. Severe Service (Series "J" & "X") and 100mm (Series "HW") liquid filled gauges have an elastomeric vent fill plug tip which can be easily cut to permit case venting.

**PRESSURE FLUID COMPOSITION:** Since the sensing element of a pressure gauge may be exposed directly to the measured medium, consider the characteristics of this medium. It may be corrosive, it may solidify at various temperatures, or it may contain solids that will leave deposits inside the sensing element. For pressure fluids that will not solidify under normal conditions or leave deposits, a Bourdon Tube Gauge is acceptable Diaphragm Chemical Seals should be considered when gauge wetted parts are not compatible with the measured media. A chemical compatibility chart follows this section to aid in the selection of the proper sensing element or diaphragm seal material.

**PRESSURE FLUID TEMPERATURE:** Steam and other hot media may raise the temperature of the gauge components above safe working limits of the sealed joints. In these cases it is recommended that a syphon, cooling tower or chemical seal be used in conjunction with the pressure gauge Diaphragm Seals and remote capillary can also be considered for use with gauges or transducers which are subjected to very low or high ambient temperature.

**AMBIENT CONDITIONS:** The normal ambient temperature range for Marsh Instruments gauges is -40° to 160°F (-40° to +71°C) for Dry Gauges, -4° to 140°F (-20° to 60°C) for Glycerine filled gauges, and -40° to 140 °F (-40° to 60° C) for Silicone filled gauges. The error caused by temperature changes is ±0.3% per 18°F rise or fall, respectively. The reference temperature is 70°F (20°C). The correction is for the temperature of the gauge, and not the temperature of the measured medium. Remote gauge mounting using a diaphragm seal and capillary line is one alternative for applications involving extreme ambient temperature.

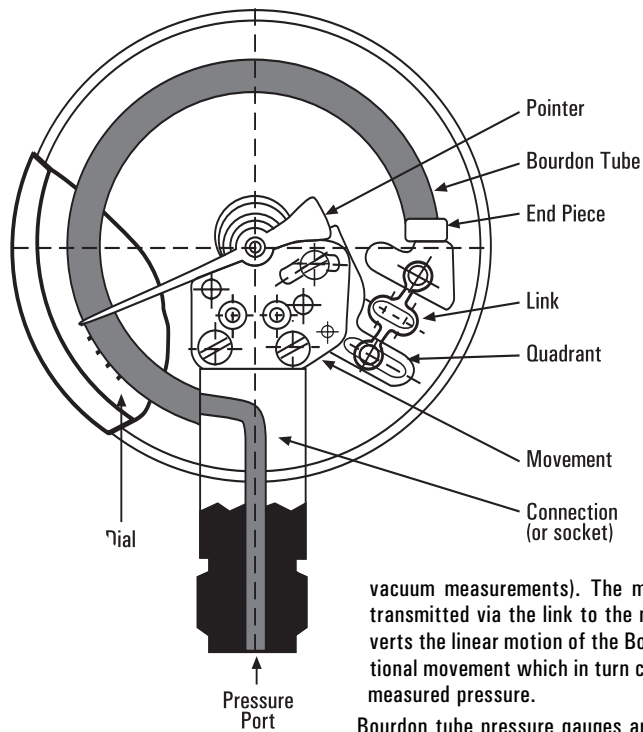
Moisture and weather effects must also be considered. Liquid Filled Gauges prevent condensation build up. For outdoor use, stainless steel, brass, or plastic cased gauges are recommended.

1-800-727-5646 SALES

1-304-387-4417 SALES FAX



## PRESSURE GAUGE OPERATING PRINCIPLE



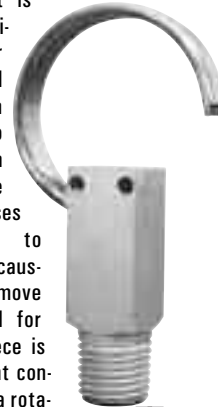
Bourdon tube pressure gauges are widely used in all branches of industry. The construction is simple yet rugged, and operation does not require any additional power source. The Bourdon tube element is directly exposed to the medium being measured and is normal made of copper alloy (brass) or stainless steel as the application demands.

The Bourdon tube measuring element is made of a thin walled tube that is either bent into a semi-circle (C-Shape tube) or spirally wound (coiled safety tube). When pressure is applied to the measuring system through the pressure port, the pressure causes the Bourdon tube to straighten itself, thus causing the end piece to move upward (or downward for vacuum measurements). The movement of the end piece is transmitted via the link to the movement. The movement converts the linear motion of the Bourdon tube end piece to a rotational movement which in turn causes the pointer to indicate the measured pressure.

Bourdon tube pressure gauges are designed for the measurement of pressure and vacuum and are generally suitable for all clean and non-clogging liquid and gaseous media.

Various types of Bourdon tubes are used. C-shape Bourdon tubes are typically used for ranges to 1,000 psi. Higher ranges use coiled Bourdon tubes for safety.

Bourdon tube pressure gauges are available to measure full vacuums, compound and pressure ranges from 0-10 psi to 0-20,000 psi with an accuracy from  $\pm 0.25\%$  to  $\pm 3/2/3\%$  of span (ASME Grade 3A to Grade B).



## HOW THE DIAPHRAGM GAUGE WORKS



Diaphragm gauges are sensitive instruments used in low pressure applications not exceeding 10 psi. The diaphragm capsule is an elastic metal sensing element comprised of two thin wall diaphragms whose sides are soldered together to make the capsule.

Whenever air or gas enters the intake port (gauge connection), it travels into the diaphragm capsule.

As vacuum or pressure is applied to the diaphragm capsule, the walls of the capsule expand and contract in response to the change in pressure. This change is then transferred to a rotating rod and arm that rest on the outside of the capsule. The rotating rod is connected to a geared movement through a linkage system. Connected to a shaft, this system then drives the pointer over a dial marked in appropriate pressure or vacuum units.





## CHEMICAL COMPATIBILITY TABLE

The media being measured must be compatible with the wetted parts of the pressure instrument. To use the chart below, locate the media whose pressure is to be measured and select a suitable material from those available. This is a simplified chart and assumes the media temperature is 200°F except for media with a "\*" which must be below 100°F, Throttling devices and/or a liquid-filled instrument are recommended in applications with pulsation or vibration. These recommendations are only a guide, as service life is dependent on temperature, concentrations, catalysts that may be added, or other conditions beyond our control. Consult factory for specific applications and for any services not listed.

Media Application	Pressure Instrument Material				Media Application	Pressure Instrument Material				Media Application	Pressure Instrument Material			
	Brass or Bronze	316 SS	Monel	Diaphragm Seals**		Brass or Bronze	316 SS	Monel	Diaphragm Seals**		Brass or Bronze	316 SS	Monel	Diaphragm Seals**
Acetone*2	•	•	•		Ethyl Oxide > 99%	•	•	•		Palmitic Acid > 99%*2	•	•		
Acetic Acid < 40%		•			Ferric Chloride < 40%				•	Paraffin	•			
Acetic Anhydride				•	Ferric Sulfate < 10%		•			Phosphoric Acid < 80%*2		•		
Acetylene (Dry)		•			Ferrous Chloride < 30%				•	Photographic Solutions		•		
Acrolein 100%				•	Ferrous Sulfate < 50%				•	Pickling Solutions		•		
Air	•	•	•		Flurine Gas (Dry)	•	•			Picric Acid 10%		•		
Alcohol, Ethyl	•	•	•		Formaldehyde < 95%	•	•			Propane (Dry)		•	•	
Aluminum Chloride.10%				•	Formic Acid*2				•	Potassium Chloride			Consult Factory	
Aluminum Sulfate 10-50%		•			Freons		•			Potassium Cyanide		•		
Ammonia Gas		•			Furfural < 10%				•	Potassium Permanganate		•		
Ammonium Chloride < 40%				•	Gallic Acid		•			Sea Water (Flowing)			•	
Ammonium Nitrate < 50%		•			Gas (for lighting)	•				Silver Nitrate < 70%			•	
Ammonium Sulfate < 60%				•	Gasoline		•			Sodium Bicarbonate < 20%		•	•	
Aniline > 99%		•			Glucose			•		Sodium Bisulfate < 30%			•	
Argon	•	•	•		Glycerine > 99%	•	•	•		Sodium Carbonate < 40%			•	
Beer		•			Hydrobromic Acid				•	Sodium Chromate < 60%	•	•	•	
Benzidine > 99%				•	Hydrochloric Acid				•	Sodium Cyanide		•		
Benzene < 50%		•	•		Hydrofluoric Acid				•	Sodium Hydroxide		•	•	
Benzoic Acid < 70%		•			Hydroflusilic Acid				•	Sodium Hypochlorite < 25%			•	
Benzol	•				Hydrogen 2	•	•			Sodium Phosphate, Tri < 60%		•	•	
Bordeaus Mixture	•				Hydrogen Peroxide < 50%		•			Sodium Silicate < 50%		•	•	
Boric Acid < 25%		•			Kerosene	•	•	•		Sodium Sulfide < 50%			•	
Bromine (Dry)				•	Lacquers	•				Stannous Chloride < 10%		•		
Butane	•	•	•		Lactic Acid < 70%*2		•			Steam (Use siphon)	•	•	•	
Butanol	•				Lysol		•			Stearic Acid		•	•	
Butyric Acid < 25%		•			Magnesium Chloride < 40%				•	Sulfur Dioxide (Dry) > 99%			•	
Calcium Chloride < 80%				•	Magnesium Sulfate		•			Sulfur Trioxide (Dry) > 99%			•	
Calcium Hydroxide < 50%				•	Mercuric Chloride < 60%		•			Sulfurous Acid			•	
Carbon Dioxide	•	•	•		Mercury > 99%				•	Tannic Acid < 80%	•	•	•	
Carbon Monoxide > 99%	•	•	•		Methyl Chloride				Consult Factory	Tanning Liquors			Consult Factory	
Chlorine (Dry)				•	Methyl Salicylate				Consult Factory	Tartaric Acid < 50%		•	•	
Chlorine (Moist)*2				•	Milk		•			Tin Chloride (ous) < 10%		•		
Chloroform (Dry)		•	•		Naphtha > 99%	•	•	•		Toluene > 99%	•	•	•	
Chromic Acid				•	Naphthalene > 99%		•			Turpentine > 98%	•	•	•	
Citric Acid 10-50%		•			Nickel Chloride > 99%				•	Vegetable Oils		•		
Corn Oil		•			Nitric Acid < 95%*2		•			Vinegar		•		
Cottonseed Oil		•			Nitrogen	•	•	•		Water	•	•	•	
Creosote (Crude)		•			Nitrous Oxide		•			Whiskey		•		
Crude Oil (Sour)				•	Oleic Acid	•	•			Zinc Chloride < 35%*2			•	
Crude Oil (Sweet)		•	•		Oxalic Acid*2				•	Zinc Sulphate < 40%			•	
Ethyl Acetate	•	•	•		Oxygen (Gas)1	•	•	•						

1. Bronze and 316 Stainless Steel are acceptable for oxygen service, provided the instrument has been cleaned for service and is free from oil.

2. Over 1000 psi – entire system must be 316 Stainless Steel.

\*Media temperature must be below 100°F

\*\*Any standard bourdon tube or material may be used in conjunction with a diaphragm seal the gauge selection should be taken into consideration the corrosive environment in which it is to operate.



ACCURACY TABLE											
GAUGE PRODUCT	PAGE #	ACCURACY	1/2"(40MM)	2 (50MM)	2 1/2"	63MM	3 1/2"	100MM	4 1/2"	6" (160MM)	
<b>GENERAL SERVICE</b>											
GG Gauges	11	B	•	•							
General Service Gauges	12-15	B	•	•	•		•		•		
<b>SEVERE SERVICE</b>											
40/50mm Severe Service	16	B	•	•							
63mm Severe Service	17	B				•					
100mm Severe Service	19	A						•			
63mm Brass	21	A				•					
100mm Brass	21	1A						•			
<b>PRECISION SERVICE</b>											
Elite Stainless Steel	27	1A						•			
100mm Stainless Steel	22	1A						•			
Quality Series 100mm	23-24	1A						•			
"HW" Stainless Steel	25-26	1A						•		•	
Quality	28	A					•		•	•	
Test	30	2A							•	•	
Master Test	32	3A								•	
Inspector's Test	33	2A					3.0				
<b>PROCESS</b>											
Process	34	2A							•	•	
<b>DIAPHRAGM GAUGE</b>											
Low Pressure	38	A			•		•		•		
<b>HVAC/R</b>											
Contractor's HVAC	46	A							•		
Heating (Ft. H <sub>2</sub> O)	47	A & B					•		•		
Refrigeration Ammonia	44	B				•	•				
Refrigeration	45	B			•		•				
Serviceman	42	B			•						
Manifold	43	B			•						
<b>SPECIAL APPLICATION</b>											
Sprinkler	48	B					•				
Water Test	49	B			•						
Paper Machine	50	A					•				
X-mas Tree Gauge	51	1A							•		
<b>ASME B40.1 GRADE</b>		<b>ACCURACY</b>									
3A	±0.25%	Full Scale									
2A	±0.50%	Full Scale									
1A	±1.0%	Full Scale									
A	±2 1/2%	±1% over middle half of scale									
B	±3 2/3%	±2% over middle half of scale									



**PRESSURE UNITS CROSS REFERENCE CHART**

psi	atms.	"H <sub>2</sub> O	mmH <sub>2</sub> O	cmH <sub>2</sub> O	oz./in <sup>2</sup>	Kg/cm <sup>2</sup>	"Hg	mmHg (Torr)	cm Hg	mbar	bar	Pa (N/m <sup>2</sup> )	kPa	MPa
1	0.0681	27.71	703.8	70.38	16	0.0704	2.036	51.715	5.17	68.95	0.0689	6895	6.895	0.0069
14.7	1	407.2	10,343	1,034.3	235.1	1.033	29.92	760	76	101.3	1.013	101,325	101.3	0.1013
0.0361	0.00246	1	25.4	2.54	0.5775	0.00254	0.0795	1.866	0.187	2.488	0.00249	248.8	0.249	0.00025
0.001421	0.000097	0.0394	1	0.1	0.0227	0.001	0.00289	0.0735	0.00735	0.098	0.000098	9.8	0.0098	0.00001
0.01421	0.000967	0.3937	10	1	0.227	0.001	0.0289	0.735	0.0735	0.98	0.00098	98	0.098	0.0001
0.0625	0.00425	1.732	43.986	4.40	1	0.0044	0.1273	3.232	0.323	4.31	0.00431	431	0.431	0.00043
14.22	0.968	394.1	100,010	1,001	227.6	1	28.96	735.6	73.56	980.7	0.981	98,067	98.07	0.0981
0.4912	0.03342	13.61	345.7	34.57	7.858	0.0345	1	25.4	2.54	33.86	0.0339	3386	3.386	0.00339
0.01934	0.001316	0.536	13.61	1.361	0.310	0.00136	0.0394	1	0.1	1.333	0.001333	133.3	0.1333	0.000133
0.1934	0.01316	5.358	136.1	13.61	3.10	0.0136	0.394	10	1	13.33	0.01333	1333	1.333	0.00133
0.0145	0.000987	0.4012	10.21	1.021	0.2321	0.00102	0.0295	0.75	0.075	1	0.001	100	0.1	0.0001
14.504	0.987	401.9	10,210	1021	232.1	1.02	29.53	750	75	1000	1	100,000	100	0.1
0.000145	0.00001	0.00402	0.102	0.0102	0.00232	0.00001	0.000295	0.0075	0.00075	0.01	0.00001	1	0.001	0.000001
0.14504	0.00987	401.9	102.07	10.207	2.321	0.0102	0.295	7.05	0.75	10	0.01	1,000	1	0.001
145.04	9.869	4019	102,074	10,207	2321	10.22,036	295.3	7500	750	10,000	10	1,000,000	1,000	1

To use this chart:

1. Find the column with the units you want to convert from
2. Move down that column until you find the "1"
3. Staying in the same row, move horizontally to the column with the units you are converting to
4. Multiply the number in that box by the amount you are changing from to get the converted value

## PART NUMBER PREFIX GUIDE

Marsh Instrument part numbers begin with a letter prefix which helps identify the product

PREFIX	PRODUCT TYPE	SEE PAGES
D	Test Gauges	30
D	Inspector's Test Gauges	33
G	Diaphragm Gauges	38
G	Water Test Gauges	49
H	Quality Gauges	28
H	100mm Stainless Steel (L.F.)	22
HW	100mm Welded Socket	25
J	General Service Gauges	12
J	63mm Severe Service Gauges (L.F.)	17
L	Bimetal Thermometers	58
P	Process Gauges	34
W	100mm Elite Gauges (L.F.)	27
W	HVAC/R (Heating System, Contractor's, Refrigeration Ammonia, Manifold)	41-47
W	Paper Machine, X-Tree, Sprinkler	50, 51, 48
X	100mm Severe Service Gauges (L.F.)	19
Y	Tridicators, Industrial Thermometers	63, 61
M	40mm & 50mm Severe Service	16
GG	Marshalltown Value Series	11

## PART NUMBER SUFFIX GUIDE

Marsh Instruments part numbers end with a letter suffix to denote a special feature or options.

SUFFIX	OPTION	DESCRIPTION
A	Ring Options	Friction-Black (FB)
		Press-Black (PB)
		Press-Chrome (PC)
		Friction Chrome (FC)
B	Accuracy	ASME Grade 2A 0.5% (H%F);
		ASME Grade 1A, 1.0% (1%F);
		ASME Grade A 2-1-2% (1%H)
D	Oxygen Cleaned	
E	Single Scale psi only Dial	
F	Window Options	Safety Glass (SG)
		Acrylic (AY)
		Instrument Glass (GS)
G	Weatherproof case	
H	Restrictors	
I	Fill Options	Silicone (SL)
		Glycerine (GL)
J	Case Options	Phenolic (PH); Brass (BR)
		Chrome (CR); Stainless Steel (SS)
		Polypropylene Turret (TR)
L	Metric Dial	L1 -Bar Only
		L2-kg/cm <sup>2</sup> Only
		L3-kPa Only
		L4-MPa only
M	Custom Name on Dial or Service Printing	
P	Liquid Filled product	
R	Front Flange	
W	Dual Scale	W1 -psi & Bar
		W2-psi & kg/cm <sup>2</sup>
		W3-psi & kPa
		W4-psi & MPa
Z	Pointers	Adjustable Pointers (AD)
		Max. Hand Assembly (MX)

NOTE: Not all options are available on all products, please consult factory

## ABBREVIATIONS AND TERMS USED

p or psi	Pounds per square inch
kPa	kilopascals
Case	The case style
oz/in <sup>2</sup>	Ounces per square inch
H <sub>2</sub> O	Inches of water
ft. H <sub>2</sub> O	Feet of water
Hg	Inches of mercury
VAC	Range is in vacuum

NOTE: Compound Ranges, where the gauge measures both vacuum and pressure are designated as: 30" Hg VAC to 100p = measures from 30 inches of mercury vacuum to 100psi pressure.

P	plain case (no flange or clamps)
F	front flange case (with U-clamp)
R	3 holed front flange (no clamp)
G	back flange case
H	hinged ring case (front flange case with U-clamp and removable cover)
UC	U-clamp case

CONNECTION : The process connection 1/8", 1/4", 1/2" – NPT diameter of connection (National Pipe Thread Standard)

LM	lower mount
LBM	lower back mount
CB	center back mount

REGISTERED TRADEMARKS: Viton®, Teflon®, & Delrin® are registered trademarks of the E.I. DuPont family of companies.

## MARSHALLTOWN CROSSOVER GUIDE

FIGURE #	MARSH SERIES
16	"G" Water Test
22 & 23K, KB, KC, KD	"J" General Service
22 & 23P, PC	N/A
24 & 25	"H" Quality
38	"W" Ammonia
42 (compound)	"H" Quality
44, 44K (ft. of H <sub>2</sub> O)	"W" Heating System
45K (compound)	"J" General Service
50K, 51 (High Pressure)	"X" Series and "J" Severe Service
52, B, C, & D	"J" 63mm SST Case (L.F.)
54, 58	"W" Ammonia Refrigeration
60	"D" Test
63	"D" Inspector's Test
71	"W" Heating System
82, 83K, 84 (Diaphragm)	"G" Diaphragm
98, 99, 100	"L" Bimetal
105, 107, 117	"Y" Tridicators
175, 179, 180-184	"P" Process
185-188 (Severe Service)	"J" & "X" 63 & 100mm Case (L.F.)
224 WF	"W" Contractors HVAC
254	"L" Bimetal (Adjustable)
286P	N/A
400-413	"P" Process



## MARSH BELLOFRAM TERMS & CONDITIONS

### I. GENERAL

- A. Customer purchase orders are binding only after written acceptance by Marsh Bellofram. Verbal orders shall not be accepted as binding until confirmed in writing by Marsh Bellofram.
- B. Prices are effective from date of publication and are subject to change without notice.
- C. Marsh Bellofram reserves the right, without prior notice to:
  1. Change and/or revoke any price.
  2. Change and/or revoke any provisions contained herein.
  3. Discontinue shipments to any customers.
  4. Resolve any inconsistencies, conflicts or ambiguities.
- D. Special production runs or product orders are subject to Marsh Bellofram requirements such as, but not limited to, minimum quantities and extended delivery times. On special production run products Marsh Bellofram reserves the right to over ship or under ship the purchase order quantity by up to 5% and invoice accordingly. Special orders are subject to cancellation charges.
- E. Minimum billing: \$60 net per order.

### II. PAYMENT TERMS

- A. For customer with established credit terms: Net 30 days from shipment date.
- B. If credit is not established, payment plus estimated (By Marsh Bellofram) freight charges shall accompany order or arrangements shall be made for collect on delivery (C.O.D.)
- C. Marsh Bellofram reserves the right to revoke any credit extended to a customer if the customer fails to pay for any shipments when due. If in Marsh Bellofram's opinion there is a material adverse change in customer's financial condition, Marsh Bellofram shall have the right to suspend further shipments until receipt of adequate assurance of customer's ability to pay therefor.
- D. All shipments are F.O.B. Plant of Manufacture.
- E. The shipment is deemed accepted in good condition by the common carrier and title and all risk of loss or damage is transferred to customer upon that acceptance by the carrier. The customer is responsible for inspection the merchandise upon receipt. The customer shall insist that visible damage be noted on its copy of the freight bill. If the product has been lost or damaged in transit, the customer must file the claim with the carrier, as Marsh Bellofram bears no responsibility for any such loss or damage.
- F. All freight, handling and insurance charges shall be invoiced to the customer or shipped freight collect.
- G. All shipments are made by carriers of Marsh Bellofram's choice. Any special arrangements requested by customer shall be at customer's additional expense.
- H. Any quantity shortages, incorrect items, or billing errors shall be reported in writing to Marsh Bellofram within 15 days of delivery. Sales order and invoice numbers are to be furnished on all claims.
- I. Marsh Bellofram reserves the right to make delivery in installments. All such installments shall be separately invoiced and paid for when due, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve customer of his obligation to accept remaining deliveries.
- J. Marsh Bellofram shall not be liable for failure to deliver or delay in delivery occasioned by causes beyond Marsh Bellofram's control, including without limitation, lock-outs, fires, embargoes, war or other breakouts of hostilities, act of inability to obtain shipping space, machinery breakdowns, delays of suppliers, and domestic or foreign governmental acts or regulations. In the event of any delay in delivery due to such causes, unless otherwise agreed, time of delivery shall be deemed extended for a period of sixty (60) days. Customer shall extend the letter of credit if payment is to be made by letter of credit. If delivery is not made within such extended sixty (60) day period, contract shall be deemed cancelled without liability to either party.

### III. CANCELED ORDERS

ORDER CANCELLATIONS CAN ONLY BE ACCEPTED BY WRITTEN REQUEST via FAX or MAIL.

All order cancellations result in a cancellation fee of at least 25% of the appropriate invoice of the finished item. Additional cancellation fees are:

1. Catalog Stock Items  
- If cancelled less than 1 week before ship date, 25% cancellation fee.
2. Catalog Non-Stock Items  
- If cancelled less than 30 days before ship date, full price.
3. Customer Specials  
- If cancelled at any time, full price.

### IV. LIMITED WARRANTY

- A. All Marsh Bellofram products are warranted against defects in workmanship materials under normal use for 1 year after date of purchase from Marsh Bellofram unless otherwise stated. (Proof of purchase is required). Any product which is determined by Marsh Bellofram to be defective in material or workmanship and returned to Marsh Bellofram, shipping costs prepaid, shall be, as the sole remedy, repaired or replaced at Marsh Bellofram's option.
- B. This warranty is expressly in lieu of all other warranties expressed or implied, including the warranties of merchantability and fitness for use and all other obligations or liabilities on the part of Marsh Bellofram, and Marsh Bellofram neither assumes nor authorizes any other person to assume for it, and other liability in connection with the sale hereunder. Marsh Bellofram disclaims any liability for product defects that are due to product misuse, improper product selection or misapplication.
- C. Marsh Bellofram shall not be liable for customer's costs, lost profits, good will or other special or consequential damages Marsh Bellofram's liability in all events is limited and shall not exceed, the value of merchandise involved.
- D. Remedies - Any controversy or claim arising out of or relating to the contract, or the breach thereof, shall be settled by arbitration in Hancock County, State of West Virginia in accordance with the commercial arbitration Rule of the American Arbitration Association, and judgement on the award render by the arbitrator(s) may be entered in a court having jurisdiction thereof.

### V. MODIFICATION OF TERMS

This contract constitutes the entire agreement between the parties, all private representations and understanding having been merged herein. It may not be modified or terminated except in writing signed by a duly authorized representative of Marsh Bellofram. This contract shall be governed by and construed according to the laws of the State of West Virginia.



## DISTRIBUTOR RETURN POLICY FOR PRESSURE GAUGES & ACCESSORIES

### I. RETURN GOODS AUTHORIZATION (RGA)

- A. Merchandise returned to Marsh Bellofram for any reason must have a Marsh Bellofram Returned Goods Authorization (RGA) number. Warranty returns also require proof of purchase (invoice number, date, and an RGA number).
- B. An RGA is valid for 45 days from issuance and merchandise must arrive at Marsh Bellofram within that validity period.
- C. All material must be shipped freight prepaid.
- D. The RGA number must be clearly visible on the outside of the package. A packing list must be included which clearly shows the RGA number, quantity, product description and reason for return.
- E. No returns will be accepted without an authorized RGA (Return Goods Authorization)

### II. MARSH BELLOFRAM CANNOT BE HELD RESPONSIBLE FOR ANY MERCHANDISE RETURNED WITHOUT AN RGA NUMBER.

- A. An RGA number is issued in good faith based upon customer's representation of the merchandise quantity, condition, age and reason for return. All returned material is subject to inspection by Marsh Bellofram. If the material is found to be other than that originally represented, the shipment will be returned at the customer's expense.
- B. An RGA may be requested by mail, fax or by telephoning Marsh Bellofram at 304-387-1200.
  1. Warranty Returns (see Warranty Policy): Limited in-warranty merchandise must have an RGA number and be returned freight prepaid. The merchandise will be repaired or replaced under Marsh Bellofram's warranty terms, it will be returned freight prepaid to the customer.
  2. Incorrect Shipments: For short shipments or incorrectly supplied merchandise, discrepancies must be reported within 15 days of receipt. For short shipments, a debit memo should be issued to Marsh Bellofram. Marsh Bellofram will then issue a credit memo, ship the missing merchandise freight prepaid and issue an invoice. For incorrectly supplied merchandise, all returns require an RGA number and must be returned freight prepaid. A debit memo should be issued to Marsh Bellofram for the freight. If a replacement is required, Marsh Bellofram will ship freight prepaid and invoice for the new product plus freight.
  3. General Terms for Returns (Exchange or Credit): Material requested to be returned will be considered if the following conditions are met:
    - a. Merchandise is unused, current standard catalog stock of latest design, with both product and packaging in saleable condition.
    - b. Merchandise shall have been purchased directly from Marsh Bellofram in the last 12 months.
    - c. Merchandise shall not have been purchased on a "product promotion" or other special pricing.
  4. Marsh Bellofram reserves the right to reject any return request. If accepted, the return will be under the terms specified herein. The following products are not returnable:

- a. Annual Merchandise Exchange Policy for Marsh Bellofram Distributors: Marsh Bellofram will normally accept one stock exchange in a 12 month period, for the purpose of increasing the flexibility of distributor's stock. This annual exchange is limited to distributors who are in good standing and whose accounts are current. The merchandise is subject to the product restrictions listed previously and limited to no more than 2% of the net invoiced sales from Marsh Bellofram to the distributor location during the previous 12 months. The value of the exchange will be determined by the current list price and current maximum published discount.

#### An offsetting order equal to the return is required.

1. The distributor shall issue a written request for an RGA number for the annual exchange showing quantity, product catalog number and description.
2. The exchange is subject to Marsh Bellofram approval and may be subject to an on-site inspection by Marsh Bellofram personnel. Please allow minimum 2 weeks for approval. Non-stock product or custom product is not returnable.
3. Upon approval of the exchange, Marsh Bellofram will inform the distributor of the net amount of the exchange for the scheduled date for return. The RGA number will be issued only upon receipt of a purchase order for an equal (net) value, calculated on current list price, current maximum published discount.
4. Upon receipt of RGA number, the distributor shall then package the authorized material and return freight prepaid to Marsh Bellofram, Newell, WV. The distributors bears liability for lost shipments or shipping damage.
5. All merchandise is subject to inspection upon receipt. Merchandise which is found to be damaged, modified, or in any other way ineligible for exchange, will be returned at the customer's expense and the value will be deducted from the exchange. A credit memo will then be issued for the net value of the exchange.
6. The replacement order will be shipped and invoiced against the new purchase order with freight at distributor's expense.
- b. Merchandise Returns for Credit: Merchandise returned for credit requires an RGA number, and is subject to a 25% restocking charge and must be returned freight prepaid. The amount of the credit will be determined as follows:
  1. Items returned within 90 days of purchase and with proof of purchase (copy of invoice) will be at invoiced price less applicable charges.
  2. All other will be calculated at current list price and current maximum published discount less 25% restocking fee.
  3. In addition to the standard restocking fee, gauges with accessories will be subject to a removal charge equal to the difference between the "installed" and "sold separately" prices.
  4. Solid fill thermometry products are non-returnable.
- c. Credit Memos:
  1. Where required, Marsh Bellofram will issue a credit memo for the returned or exchanged merchandise less any applicable restocking or removal charges.
  2. The credit memo will be issued only after receipt and inspection of merchandise.
  3. Deduction from payments shall not be made until the Marsh Bellofram issued credit memo has been received.

## PRODUCT CLASSES AND OPTIONS

- A. Stock items: Shipped in 7 days or less, with no minimum quantity. *(Large quantities may require extended lead times.)*
- B. Non-stock items: Consult factory for quantities and lead times.
- C. Custom options on stock items: Dials, rings, windows, restrictors, and cosmetic changes - 4 weeks.
- E. Customer special class: Special connections and materials consult factory for quantities and lead times.



## PRODUCT WARNINGS, CLAIMS, RECOMMENDATIONS AND NOTICES

**WARNING:** A failure resulting in injury or damage may be caused by pressure beyond top of scale, excessive vibration or pressure pulsation, excessive instrument temperature, corrosion of the pressure containing parts, or other misuse. For correct use and application of pressure gauges, refer to ASME standard B40.1 1998, entitled 'Gauges: Pressure Indicating Type: Elastic Element.' This document is available from The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10007.

**WARNING: LIQUID FILL:** Glycerine or Silicone when combined with strong oxidizing agents, including but not limited to chlorine, nitric acid, and hydrogen peroxide, can result in a spontaneous chemical reaction, ignition, or explosion which can cause property damage and personal injury. If gauges are to be used in such service, do not use glycerine or silicone fill. Consult factory for proper fill medium.

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