

1187, 1188, 1189 Low Pressure Bellows Gauge

FEATURES

- Inches of water ranges
- Solid front safety case with pressure relief back
- Bronze, 316 SS or Monel® wetted parts
- Available with diaphragm seals



SPECIFICATIONS

Accuracy:	2%-1%-2% of span (ASME B40.100 Grade A)
Process Connection:	¼ NPT, ½ NPT
Case Style:	1187 & 1189 - Aluminum, black epoxy coated 1188 - Phenolic
Movement:	Adjustable
Window Material:	Glass (STD.), safety glass or acrylic (OPT.)
Pointer:	Aluminum
Weather Protection:	Case is not sealed, recommended for weather protected environment only
Mounting Options:	Flush, stem or surface
Dampening Options:	Throttle screw, dampeners, capillary, diaphragm seals and snubbers

WETTED COMPONENTS

Model	Bellows	Process Connection Materials	Joints
1187	Brass, 316 SS, Monel®	Brass, 316 SS, Monel®	Threaded & Soldered
1188	Brass, 316 SS, Monel®	Brass, 316 SS, Monel®	Threaded & Soldered
1189	Brass, 316 SS, Monel®	Brass, 316 SS, Monel®	Threaded & Soldered

NON-WETTED COMPONENTS

Model	Case	Ring	Back Cover
1187	Aluminum, black epoxy coated	Steel, black epoxy coated	Polypropylene
1188	Phenolic	Polycarbonate	Polypropylene
1189	Aluminum, black epoxy coated	Polycarbonate	Polypropylene

MIN/MAX TEMPERATURE LIMITS

Version	Ambient	Process	Storage
Dry	-20°F to 150°F (-29°C to 66°C)	-20°F to 150°F (-29°C to 66°C)	-40°F to 150°F (-40°C to 66°C)



1187
4½" dial size



1188
4½" dial size



1189
4½", 6" dial size

ORDERING CODE	Example:	451187	S	D	02	B	XC4	10IW
Dial Size/Model Code								
451187 - 4½" aluminum case, solid front		451187						
451188 - 4½" phenolic case, solid front								
451189 - 4½" aluminum case, solid front								
601189 - 6" aluminum case, solid front								
System (tube and process connection)								
A - Brass bellows, brass process connection								
S - 316 SS bellows, stainless steel process connection			S					
P - K-Monel [®] 500 bellows, Monel [®] 400 process connection								
Case Design								
D - Dry, (IP54)				S				
Process Connection Sizes								
02 - ¼ NPT Male					02			
04 - ½ NPT Male								
Process Connection Location								
L - Lower, (1188 and 1189 only.)								
B - Back mount connection, (1188 and 1187 only.)						B		
Options (if choosing an option(s) must include an "X")								
C4 - Individual calibration chart (in accordance with ASME B40.100:2013. Accuracy traceable to NIST)							X__	C4
6B - Cleaned for oxygen service								
F8 - Gauge, flexible line assembly and diaphragm seal								
PD - Acrylic window								
SG - Safety glass								
NG - Non-glare glass								
DA - Marking on dial								
NH - SS tag wired to case								
NN - Paper tag bonded to case								
56 - Flush mounting ring, (1188 and 1189 only)								
Range (coding examples only, see range table on page 18 for all standard ranges)								
Single Scales								
10IW - 10" inH ₂ O								10IW

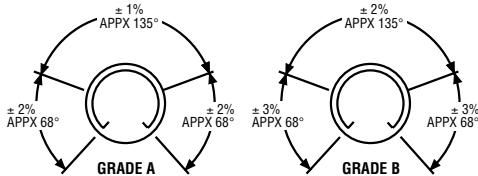
1187, 1188, 1189							
	in. H ₂ O	mmHg	inHg	mmH ₂ O	psi	mbar	kPa
Vacuum	N10IW	N18MM	-	-	-	-	-
	N15IW	N28MM	-	-	-	-	-
	N20IW	N37MM	-	-	-	-	-
	N30IW	N56MM	-	-	-	-	-
	N40IW	N75MM	-	-	-	-	-
	N60IW	N110MM	-	-	-	-	-
	N80IW	N150MM	-	-	-	-	-
	N100IW	N180MM	-	-	-	-	-
	N150IW	N270MM	-	-	-	-	-
	-	-	N10IM	-	-	-	-
-	-	N15IM	-	-	-	-	-
-	-	N20IM	-	-	-	-	-
-	-	-	N125/125MW	-	12.5MBL*	1.25KPL*	-
N5/5IW	-	-	-	-	-	-	-
-	-	-	N200/200MW	-	N20/20MB	N2/2KP	-
N10/10IW	-	-	-	-	-	-	-
-	-	-	N300/300MW	-	N30/30MB	N3/3KP	-
-	-	-	N500/500MW	-	N50/50MB	N5/5KP	-
Compound	N30/10IW	-	-	-	-	-	-
	N20/20IW	-	-	-	-	-	-
	N10/30IW	-	-	-	-	-	-
	N30/30IW	-	-	-	-	-	-
	N40/20IW	-	-	N800/800MW	-	N80/80MB	N8/8KP
	-	-	-	1250MWL*	-	N125/125MB	12.5KPL*
	N70/30IW	-	-	-	-	-	-
	-	-	-	2000MWL*	-	N200/200MB	N20/20KP
	-	-	-	3000MWL*	-	N300/300MB	N30/30KP
	-	-	-	-	-	-	-
Positive Pressure	5IW	-	-	-	-	-	-
	10IW	-	-	250MW	-	25MB	2.5KG
	15IW	-	-	-	-	-	-
	-	-	-	400MW	-	-	-
	-	-	-	-	-	40MB	4KG
	20IW	-	-	-	-	-	-
	-	-	-	600MW	-	-	-
	-	-	-	-	-	60MB	6KG
	30IW	-	-	-	-	-	-
	-	-	-	1000MW	-	-	-
	40IW	-	-	-	-	100MB	10KG
	-	-	-	-	-	-	-
	60IW	-	-	-	-	-	-
	-	-	-	1600MW	-	-	-
	-	-	-	-	-	160MB	16KG
	80IW	-	-	-	-	-	-
	-	-	-	2500MW	-	-	-
	100IW	-	-	-	-	250MB	25KG
	-	-	-	-	5#	-	-
	150IW	-	-	-	-	-	-
-	-	-	4000MW	-	-	-	
-	-	-	-	-	400MB	40KG	
-	-	-	-	8#	-	-	
-	-	-	6000MW	-	-	-	
-	-	-	-	-	600MB	60KG	
-	-	-	-	10#	-	-	

L* = Compound scale. Vacuum same range and unit of measure as pressure scale.

ACCURACY:

Accuracy – the conformity of indication to an accepted standard or true value. Accuracy is the difference (error) between the true value and the indication expressed as a percent of the span. It includes the combined effects of method, observer, apparatus and environment. Accuracy error includes hysteresis and repeatability errors but not friction error. It is determined under specific conditions. (Normal position, 73.4°F (23°C), and 29.92 in Hg barometric pressure.)

The following tables define the ASME B40.1* accuracy grades used by Ashcroft products.



Accuracy of a pressure gauge may be expressed as percent of span or percent of indicated reading. Percent of span is the most common method. Percent of indicated reading is usually limited to precision test gauges and unless specifically spelled out, it may be assumed that an accuracy of $\pm 0.5\%$ means $\pm 0.5\%$ of span.

GRADE 4A:

Gauges offering the highest accuracy and calibrated to $\pm 0.1\%$ of span over the entire range of the gauge. These gauges are called laboratory precision test gauges and are generally 8½", 12" or 16" dials. These high-accuracy gauges may be temperature compensated. They must be handled carefully in order to retain accuracy.

ACCURACY EXAMPLES

Range	Accuracy Span	Grade	Permissible Error % of Span
0/100 psi	100 psi	1A	1.0
0/400 kPa	400 kPa	2A	0.5
0/1000 bar	1000 bar	B	3 (0/250 & 750/1000 bar) 2 (250/750 bar)
-100/400	400 kPa	2A	0.5
30 inHg/ 30 psi	44.7 psi	4A	0.1

The last item (30 inHg/30 psi) deserves some explanation. The span is defined as the algebraic difference between the limits of the scale. 30 inHg = -14.7 psi Span = 30 psi - (-14.7) = 44.7 psi. 0.1% of 44.7 psi = 0.045 psi or 0.022 Hg.

*ASME B40.1 may be ordered from:
 American Society of Mechanical Engineers
 Three Park Avenue, New York, NY 10016

GRADE 3A:

Gauges are calibrated to an accuracy of $\pm 0.25\%$ of span over the entire range of these gauges. These gauges are called test gauges and are generally 4½", 6" or 8½" dials. The gauges are generally not temperature compensated (except Ashcroft Type 1082).

GRADE 2A:

Gauges are calibrated to an accuracy of $\pm 0.5\%$ of span over the entire range of the gauge. They are often referred to as process gauges and are usually supplied as 4½" and 6" cases and are not temperature compensated.

GRADE 1A:

Gauges are calibrated to an accuracy of $\pm 1\%$ over the entire range of the gauge. These gauges are high-quality industrial gauges and are supplied in 2½", 3½" and 4½" sizes.

GRADE A:

Gauges are calibrated to an accuracy of $\pm 1\%$ of span over the middle half of the scale and $\pm 2\%$ of span over the first and last quarters of the scale.

GRADE B:

Gauges are calibrated to an accuracy of $\pm 2\%$ of span over the middle half of the scale and $\pm 3\%$ of span over the first and last quarters of the scale. These gauges are often referred to as commercial or utility gauges and are supplied in 1½", 2", 2½", 3½" and 4½" case sizes.

GRADE C:

Gauges are calibrated to an accuracy of $\pm 3\%$ of span over the middle half of the scale and $\pm 4\%$ of span over the first and last quarters of the scale.

GRADE D:

Gauges are calibrated to an accuracy of $\pm 5\%$ of span over the entire scale.

ACCURACY EXAMPLES

Type of Gauge	Grade	Permissible Error % of Span			Max. Friction (% of Span)
		Lower 25%	Middle 50%	Upper 25%	
Precision Test (A4A)	4A	0.1	0.1	0.1	See Note
Test (1082)	3A	0.25	0.25	0.25	0.25
Process (1279)	2A	0.5	0.5	0.5	0.5
Industrial/Hydraulic (1009)	1A	1.0	1.0	1.0	1.0
Industrial/Hydraulic (1010, 1188, 1490)	A	2.0	1.0	2.0	1.0
Commercial/Utility (1005, 3005, 1008A)	B	3.0	2.0	3.0	2.0

Note: Grade 4A gauges must remain within 0.1% before and after being lightly tapped.