



Direct Pressure Gauge

DIRECT DRIVE BOURDON TUBE

The advantage of Perma-Cal® direct drive over conventional C- tube gauges is simple, there is only one moving part. No gears, linkages, or springs to wear or break. Perma-Cal® gauges have a unique helical-wound elastic element that is attached directly to the pointer shaft. This eliminates the need for any movement-amplifying gears or linkages (the parts of a C-tube that fail most frequently). Perma-Cal® gauges maintain their structural integrity and accurate calibration in the most demanding environments, even during prolonged and rugged use. Perma-Cal® direct drive pressure gauges provide the lowest cost of ownership by giving the best value in durability, reliability, and accuracy.

NO LIQUID FILL

Perma-Cal® gauges have more durability and longevity than liquid-filled gauges, without the mess or problems of liquid fill. Perma-Cal® gauges do not have any of the problems filling solves. There are no gears or linkages to lubricate, and Perma-Cal® gauges are internally dampened with a small application of heavy (600,000 centistokes) silicone grease that eliminates pointer flutter. Perma-Cal® provides a longer life gauge than liquid filled gauges without the leaking or discoloring problems of liquid fill.



GAUGE HIGHLIGHTS

- ◆ Front flange, rear flange, no flange, or turret cases
- ◆ PSI, Feet of Sea Water, and Metric scales
- ◆ 8 1/2", 6", 4 1/2", 3 1/2", and 2 1/2" dials
- ◆ Standard Solid Front Case
- ◆ Unique Inconel X-750 helical-wound sensing element provides unmatched accuracy, sensitivity, and longevity
- ◆ Rugged and safe ABS, Aluminum, GFN cases
- ◆ Standard 316SS fitting - bottom or rear position
- ◆ Internal, replaceable 316SS filter snubber, elastomer isolator, or low volume diaphragm seal for added freeze and corrosion protection

SAFETY FEATURES

Perma-Cal® gauges have a very low volume elastic element and solid front case that provide the safest gauge possible. C-tube gauges have a relatively large volume elastic element that in cases of catastrophic failure could spill large amounts of process. Not all direct drive gauges offer the industry standard solid front for case safety. The Perma-Cal® configuration of solid front and rear blowout features provides the customer with the safest possible case style. Perma-Cal® furnishes the safest, most durable gauge in the industry.

CERTIFIED ACCURACY

All Perma-Cal® gauges have a high repeatable accuracy, instantaneous action, and are available as Grade 3A (+.25% full scale), Grade 2A (+.5% full scale), or +.5% mid-scale/ + 1% full scale. The full scale accuracy rating is applicable in both ascending and descending modes on all gauges, except for gauges rated 8,000 PSI and above, where the descending accuracy is +1% of full scale. Test gauges (Grade 3A) come with a calibration certificate traceable to the National Institute of Standards and Technology (NIST) included in the price. Perma-Cal® provides the best in durability, reliability and accuracy.

Southeastern Automation, Inc., PO Box 22620, Knoxville, TN 37933

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Perma-Cal Gauge Specifications

PROOF PRESSURE WITHOUT CALIBRATION SHIFT:

150% of F.S. pressure¹

RESPONSE TIME:

Approximate, 100 msec to F.S³

LIFE:

250,000 cycles minimum, 20% to 80% F.S. on ranges below 3,000 psi

BURST PRESSURE:

500% of F.S²

ACCURACY:

Grade 3A $\pm .25\%$ full scale⁵,
Grade 2A $\pm .5\%$ full scale⁵,
.5% M.S. $\pm 1\%$ full scale⁵,
 $\pm .5\%$ midscale.

WETTED PARTS:

Inconel X-750, 316SS, 304SS and silver solder. Other options available.

REPEATABILITY AND SENSITIVITY:

$\pm .01\%$ full scale

CALIBRATION:

Vertical position standard²

MEDIA TEMPERATURE:

-65° to +250°F w/ABS case
-65° to +600°F w/GFN or AI case

AMBIENT TEMPERATURE:

-65° to +190°F w/ABS case
-65° to +400°F w/GFN or AI case



NOTES:

1. 125% of F.S pressure, 8,000 psi and above
2. Or 25,000 psi, whichever is less
3. Gas operation, no dampening
4. Specified accuracy includes all friction error, hysteresis, and linearity variations
5. On 8,000 psi and above, accuracy is 1% descending
6. Calibration in other mounting positions available

Perma-Cal Gauge Configuration Chart

The following chart will guide you in determining the Perma-Cal product needed to meet the exact specifications you require. The example below demonstrates how to build your part number.

A	B	C	D	E	F	G	H	I	J	K
1	0	1	F	T	M	XX	Y	0	1	V
Product Type A Pressure Gauges 1 Seawater Depth Gauges 2					Dial Trim F Mirror Band Zero Adj. Dial M 2 1/2", 4 1/2", 6", 8 1/2" Yes Yes M 2 1/2", 3 1/2", 4 1/2" No No M 2 1/2", 4 1/2", 6" No Yes					
Accuracy B 1/4 % Full scale (8 1/2", 6", 4 1/2", and 2 1/2"; calibration certification included) 0 1/2 % Full scale (6", 4 1/2", 3 1/2", and 2 1/2" dials) 1 1 % Full scale, 1/2% Mid scale (6", 4 1/2", 3 1/2", and 2 1/2" dials) 2					Pressure Range G XX Specify pressure range and units of measurement, i.e., PSI, Pasclas, Bar, etc. or see Bulletin T-103 for pressure codes.					
Dial Size C 8 1/2" (zero adjust dial included) 8 6" (zero adjust dial included) 0 4 1/2" (zero adjust dial included on test gauges; opt'l on process gauges) 1 3 1/2" (zero adjust dial not available; zero adjust pointer included) 2 2 1/2" (zero adjust dial included on test gauges; opt'l on process gauges) 3					Color H A Black B Blue G Green R Red W White Y Yellow H High Temp (GFN, 4 1/2" yellow turret)					
Case Type D (Solid front case standard on all models) Front flange (8 1/2", 6", 4 1/2", and 2 1/2" only) F Rear flange (6" and 4 1/2" only) R No Flange (6", 4 1/2", and 2 1/2" only) N Turret (4 1/2", and 3 1/2") T					Fitting Position I 0 Rear 4 Top 2 Bottom (6 o'clock)					
Pointer Type E Process (bold, easy reading) I Test (knife-edged, precision reading) T					Fitting Type J 1 1/4" NPT 6 MS 33649E4 3 1/2" NPT 7 1/4" Aminco 4 MS 33514E4 8 MIL-G 18997 5 SAE AS 4395 9 1/4" BSP					
Miscellaneous Options K C Calibration certificate (not apropos on 1/4%) O Cleaned for oxygen service E EPDM Isolator installed T Stainless steel tag L Tempered glass (no zero adj. avail.) V Viton Isolator installed N Microbraze Z Aluminum case										

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Perma-Cal Range Specifications and Codes

The following chart will guide you in determining the range codes needed to meet the exact specifications you require. Consult us for special or custom dials.

PSI RANGES & CORRESPONDING CODES

Process Gauge Dial Sizes: 2 1/2", 3 1/2", 4 1/2", and 6"
 Test Gauge Dial Sizes: 2 1/2", 4 1/2", 6", and 8 1/2"

Perma-Cal® has over 200 "standard" pressure ranges. Consult us for ranges not shown above, as well as your needs for special or custom ranges.

RANGE	CODE	RANGE	CODE	RANGE	CODE
30	01	400	08	3000	14
30 (135°)	02	500	20	4000	22
60	03	600	09	5000	15
100	04	800	10	6000	16
150	05	1000	11	8000	21
160	23	1500	12	10,000	17
200	06	2000	13	15,000	18
300	07	--	--	--	--

BAR RANGES & CORRESPONDING CODES

Process Gauge Dial Sizes: 2 1/2", 3 1/2", 4 1/2", and 6"
 Test Gauge Dial Sizes: 4 1/2", and 6"

RANGE	CODE	RANGE	CODE	RANGE	CODE
2	40	20	46	140	51
2 (135°)	41	28	56	200	52
4	42	35	47	280	55
7	43	40	48	350	53
10	44	70	49	400	57
14	45	100	50	700	54

VACUUM / COMPOUND RANGES & CORRESPONDING CODES

Process Gauge Dial Sizes: 2 1/2", 3 1/2", 4 1/2", and 6"
 Test Gauge Dial Sizes: 4 1/2", 6", and 8 1/2"

RANGE	CODE	RANGE	CODE	RANGE	CODE
30"hg - 0 (135°)	25	30"hg - 0 - 150	28	30"hg - 0 - 400	32
30"hg - 0 - 30	27	30"hg - 0 - 200	30	30"hg - 0 - 500	33
30"hg - 0 - 60	24	30"hg - 0 - 300	31	30"hg - 0 - 600	34
30"hg - 0 - 100	29	--	--	--	--

REFRIGERANT RANGES & CORRESPONDING CODES

Refrigerant Dial Sizes: 3 1/2", and 4 1/2"

RANGE	CODE	RANGE	CODE
30"hg - 0 - 150 Ammonia	RG	30"hg - 0 - 300 Ammonia	RQ
30"hg - 0 - 150 R12	RH	30"hg - 0 - 300 R12	RR
30"hg - 0 - 150 R22	RI	30"hg - 0 - 300 R22	RS

RECEIVER RANGES & CORRESPONDING CODES

Refrigerant Dial Sizes: 3 1/2", and 4 1/2"

RANGE (with numerals)	CODE	RANGE (less numerals)	CODE
0 - 100%	35	0 - 100 linear	37
0 - 10 sq.rt.	36	0 - 10 sq.rt.	38
3 - 15 psi	39	--	--

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Perma-Cal Range Specifications and Codes

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FSW RANGES & CORRESPONDING CODES

Process Gauge Dial Sizes: N.A.
 Test Gauge Dial Sizes: 4 1/2", 6", and 8 1/2"

Perma-Cal® has over 200 "standard" pressure ranges. Consult us for ranges not shown above, as well as your needs for special or custom ranges.

RANGE	CODE	RANGE	CODE	RANGE	CODE
70 (135°)	70	300	74	700	78
100 (135°)	71	350	75	1000	79
150	72	450	76	1500	80
250	73	600	77	2000	81

DUAL SCALE MSW / FSW RANGES & CORRESPONDING CODES

Process Gauge Dial Sizes: N.A.
 Test Gauge Dial Sizes: 4 1/2", and 6"

RANGE	CODE	RANGE	CODE	RANGE	CODE
76 / 250	88	93 / 300	89	140 / 450	91

kPa VACUUM / COMPOUND RANGES & CORRESPONDING CODES

Process Gauge Dial Sizes: 2 1/2", 3 1/2", 4 1/2", and 6"
 Test Gauge Dial Sizes: 4 1/2", and 6"

RANGE	CODE	RANGE	CODE	RANGE	CODE
200	CA	1600	CL	14,000	CN
250	CB	2000	CG	20,000	CP
400	CC	2800	CI	25,000	CQ
700	CD	4000	CJ	35,000	CR
1000	CE	7000	CK	60,000	CS
1400	CF	10,000	CM	70,000	CT

DUAL SCALE PSI/kPa RANGES & CORRESPONDING CODES

Process Gauge Dial Sizes: 3 1/2", 4 1/2", and 6"
 Test Gauge Dial Sizes: 4 1/2", and 6"

RANGE	CODE	RANGE	CODE	RANGE	CODE
30 / 200	BA	300 / 2000	BG	2000 / 14,000	BN
60 / 400	BC	500 / 3500	BI	3000 / 20,000	BP
100 / 700	BD	600 / 4000	BQ	5000 / 35,000	BR
150 / 1000	BE	1000 / 7000	BK	10,000 / 70,000	BT
200 / 1400	BF	1500 / 10,000	BM	--	--

Dual Scale Kg/cm²/PSI RANGES & CORRESPONDING CODES

Process Gauge Dial Sizes: 4 1/2", and 6"
 Test Gauge Dial Sizes: 4 1/2", and 6"

RANGE	CODE	RANGE	CODE	RANGE	CODE
2 / 30	AA	28 / 400	AH	210 / 3000	AP
4 / 60	AC	35 / 500	AI	280 / 4000	AQ
7 / 100	AD	42 / 600	AJ	350 / 5000	AR
10 / 150	AE	56 / 800	AY	420 / 6000	AS
11 / 160	AL	70 / 1000	AK	700 / 10,000	AT
14 / 200	AF	105 / 1500	AM	1000 / 15,000	AU
21 / 300	AG	140 / 2000	AN	--	--

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