

Accessories

Autoclave Engineers offers a complete selection of accessories to complete your system requirements.

Components such as thermocouples are used for monitoring and controlling temperatures, up to 100,000 psi (6895 bar).

Safety head assemblies are used to protect systems and pressure vessels from over-pressure conditions. Rupture discs are available in various pressure ranges and material options suitable for the application.

Pressure gauges are used to monitor and control pressure. Pressure gauges are available in two sizes, 4 1/2" and 6" (114.3 mm and 152.4 mm), and ranges from 0 to 80,000 psi (0 to 5116 bar). Optional electrical contact faces for pressure control are used to set high and low limits. Gauges are standard panel mount or can be flush mounted with an optional flush mount kit.

Accessories are also available as specials or non-standard items. Contact your local sales representative for more information.



**Autoclave
Engineers** 

Fluid Components
Division of Snap-tite, Inc.
www.autoclaveengineers.com

Accessories - Pencil-type Thermocouples

Pressures to 15,000 psi (1034 bar)

Thermocouples provide reliable temperature measurement within a fluid system.

The design permits installation of the element in direct contact with the fluid stream, thereby providing reliable temperature measurement. The quick-connector affords system flexibility. The thermocouple tip has a grounded-type junction.

Materials

Precision-molded plastic connectors have heavy duty, spring-loaded jack inserts for positive contact. The sheath is type 316 stainless steel with 316 SS ferrule and gland. We offer a choice of iron constantan (J) or chromel-alumel (K) type elements (please specify when ordering). Basic assembly includes 1/8" Autoclave Speedbite connection with adapters for other connection sizes.

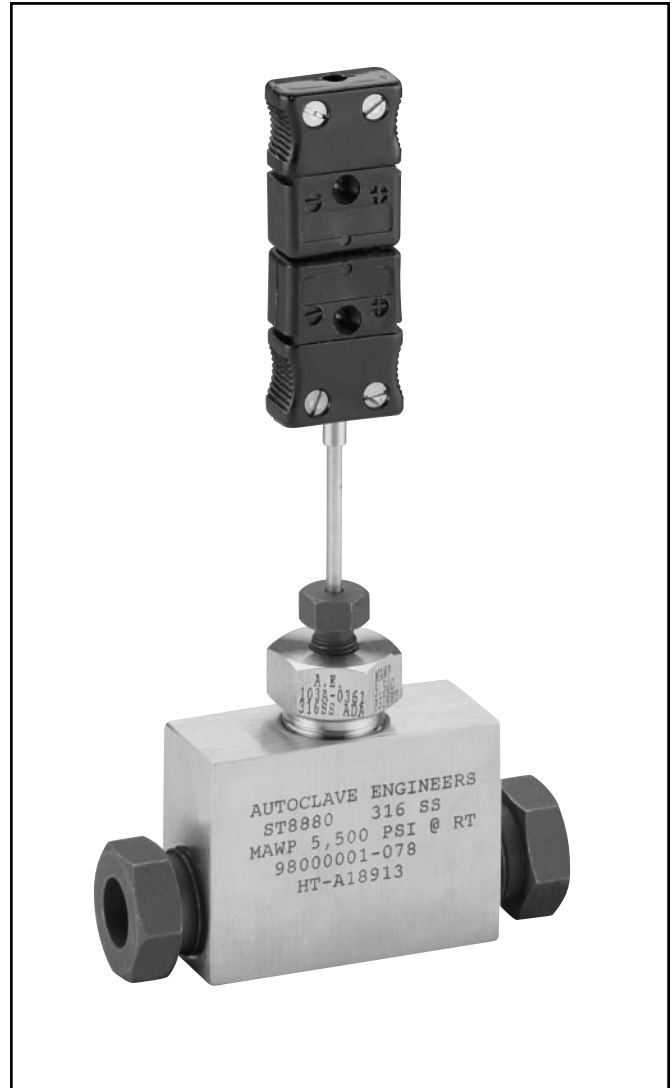
Pressure/Temperature Ratings

Ratings to 15,000 psi (1034 bar) maximum working pressure. Temperatures at thermocouple tip can range to 1,200°F (649°C) (SpeedBite connection not recommended below 0°F (-17.8°C) or above 650°F (343°C).)

Ordering Information

Catalog order numbers in the table refer to the complete assembly. Add suffix "J" for iron constantan element or "K" for chromel-alumel. To order a basic thermocouple with plug/jack assembly and connection (without through or angle block), change last digit in order number to "0" and specify sheath length if different from standard 3.62" (91.94 mm) length.

Ordering examples: TP4400K 6" (152.4 mm) denotes basic thermocouple to fit into a 1/4" Autoclave SpeedBite connection with chromel-alumel element and 6" (152.4 mm) sheath. TP 4401K denotes the above unit complete with through-type block and standard 3.62" (91.94 mm) sheath.



Accessories - Pencil-type Thermocouples

Catalog Number	Fits Connection Type	Tubing Size Inches (mm)	Dimensions - inches (mm)						Block Thickness	Fitting Pattern
			A	B	C	D	E	H		

Through-Type

TP2201	W125	1/8 (3.18)	1.38 (35.05)	0.69 (17.53)	0.31 (7.87)	3.62 (91.95)	1.00 (25.40)	7.18 (182.37)	0.50 (12.70)	See Figure 1
TP4401	SW250	1/4 (6.35)	1.75 (44.45)	0.88 (22.35)	0.44 (11.18)	3.62 (91.95)	1.19 (30.23)	7.25 (184.15)	0.62 (15.75)	
TP6601	SW375	3/8 (9.52)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	3.62 (91.95)	1.38 (35.05)	7.31 (185.67)	0.75 (19.05)	
TP8801	SW500	1/2 (12.70)	2.50 (63.50)	1.25 (31.75)	0.53 (13.46)	3.62 (91.95)	1.75 (44.45)	7.44 (188.98)	1.00 (25.40)	

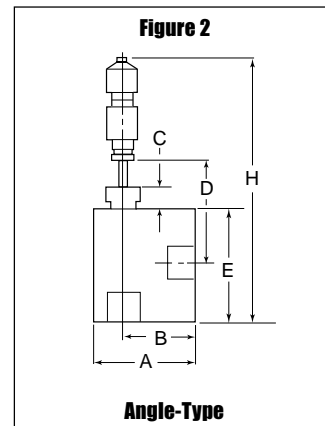
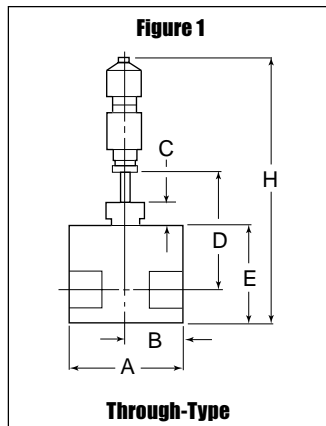
Angle-Type

TP2202	W125	1/8 (3.18)	1.00 (25.40)	0.75 (19.05)	0.31 (7.87)	3.62 (91.95)	1.38 (35.05)	7.62 (193.55)	0.50 (12.70)	See Figure 2
TP4402	SW250	1/4 (6.35)	1.19 (30.23)	0.88 (22.35)	0.44 (11.18)	3.62 (91.95)	1.75 (44.45)	7.81 (198.37)	0.62 (15.75)	
TP6602	SW375	3/8 (9.52)	1.38 (35.05)	1.00 (25.40)	0.53 (13.46)	3.62 (91.95)	2.00 (50.80)	7.94 (201.68)	0.75 (19.05)	
TP8802	SW500	1/2 (12.70)	1.75 (44.45)	1.25 (31.75)	0.53 (13.46)	3.62 (91.95)	2.50 (63.50)	8.19 (208.03)	1.00 (25.40)	

Note: All thermocouples are furnished complete with connection components unless otherwise specified.

All dimensions for reference only and subject to change.
For prompt service, Autoclave stocks select products. Consult your local representative.

Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.



Accessories - Sheath-type Thermocouples

Pressures to 60,000 psi (4137 bar)

Thermocouples provide reliable temperature measurement within a fluid system.

Similar to low pressure thermocouples, this design also permits direct temperature monitoring at any point in a fluid system. The sheath type thermocouple features grounded junction and rapid response - 100 milliseconds or less at 63.3% of a step charge.

Temperature Rating

Rating to 2,000 °F (1093°C) at tip of thermocouple. (Refer to adjacent Pressure/Temperature chart for elevated temperatures.) Minimum operating temperature 0°F (-17.8°C)

Sheath Length

Differs for each size connection for optimum tip contact with fluid stream.

Materials

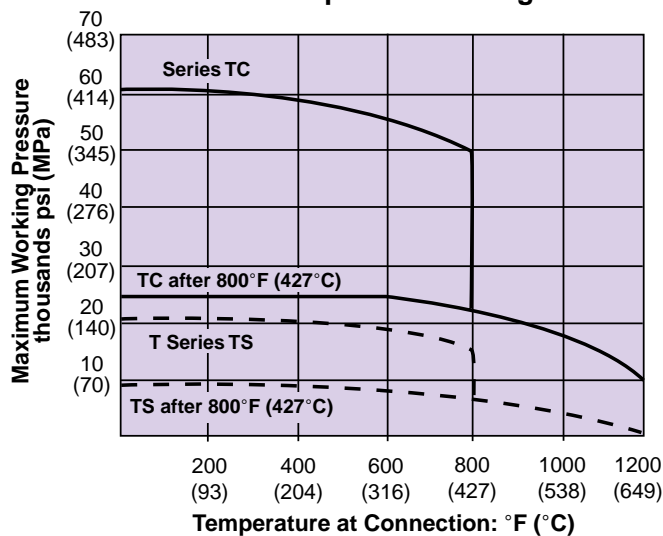
Bodies heat-treated 15-5 PH SS. 316 sheath brazed into body with gold-nickel alloy brazing material. An aluminum terminal housing is threaded into the body for ready access to terminals. An o-ring seal provides moisture protection.

Ordering Information

To order thermocouples for use in standard Autoclave tees or crosses, use order numbers listed in table. For custom length sheaths, to extend through a vessel wall or cover, calculate sheath length as follows:

1. Add vessel wall or cover thickness to the distance the sheath will extend into vessel.
2. When using a basic 1/4" Autoclave connection, subtract dimension "M" for proper sheath length to order.
3. For all other connection sizes, add dimension "N" to measurement obtained in step 1.
4. Order a custom length sheath by adding desired length in inches as suffix to order number.

Pressure/Temperature Rating Curve



Standard collar and gland are cold worked 316 SS for use up to 1200°F (649°C). When cold worked 316 SS collar and gland are used, the physical properties are permanently altered after use above 800°F (427°C).

CAUTION: While testing has shown O-rings to provide satisfactory service life, both cyclic and shelf life may vary widely with differing service conditions, properties of reactants, pressure and temperature cycling, and age of the O-ring. FREQUENT INSPECTION SHOULD BE MADE to detect any deterioration, and O-rings replaced as required.

CAUTION: See appropriate pressure section in reference to proper selection of tubing.

Accessories - Universal Safety Heads

Pressures to 110,000 psi (7584 bar)

Safety Heads/Rupture Discs - Safety Heads and Rupture Discs offer an economical and dependable relief port to guard against system over-pressure.

Autoclave Engineers offers universal safety heads in three series compatible in orifice size and maximum pressure rating with Autoclave Low Pressure, Medium Pressure and High Pressure valves, fittings and tubing.

Autoclave Low Pressure Series SS: Autoclave SpeedBite Ermeto-type tube connection, maximum rupture pressures to 15,000 psi (1034 bar).

Autoclave Medium Pressure Series SFCX: Autoclave Medium-Pressure coned-and-threaded tube connection, maximum rupture pressures to 20,000 psi (1379 bar).

Autoclave High Pressure Series FC: Autoclave High Pressure coned-and-threaded tube connection, maximum rupture pressure to 110,000 psi (7584 bar).

The 3/16F style features a 3/16" blow-out diameter and a flat seat which can be ordered in pressure range from 200 to 27,000 psi (13.8 to 1862 bar).

The 1/4A style features a 1/4" blow-out diameter and an angular seat which can be ordered in pressures from 900 to 60,000 psi (62 to 4137 bar).

The 1/4F style features a 1/4" blow-out diameter and a flat seat which is used for pressure above 60,000 psi (4137 bar).

The 1/2F style features a 1/2" blow-out diameter and a flat seat which can be ordered in pressures from 500 to 10,000 psi (35 to 690 bar).



Materials and Features

- Non-rotating double-cone plug design avoids galling and scoring of safety head or connection during installation. Reduces likelihood of leakage.
- Interchangeable hold-down rings permit use of several different sizes and types of rupture discs in a single safety head. Accommodates discs with rupture pressures as low as 90 psi (6.2 bar) and ranging to 60,000 psi (4137 bar) and above.
- Install in any standard Autoclave coupling, elbow, cross or tee, directly into a pressure vessel.
- Cold-worked Type 316 SS body hold down gland and plug, all series.
- Hold down rings are corrosion resistant steel.

Consult Local Sales Representative for safety head assemblies rated above 60,000 psi (4137 bar).

Rupture Disc Stock Part List - 3/16 Flat Disc

Part Number	Description	Material	Pressure Range (psi)	Pressure Range (bar)
P-7003	3/16F DISC	Inconel	1940-2120	134-146
P-7674	3/16F DISC	Inconel	2231-2438	154-168
P-7005	3/16F DISC	Inconel	2910-3180	201-219
P-7007	3/16F DISC	Inconel	3201-3498	221-241
P-7009	3/16F DISC	Inconel	3880-4240	268-292
P-7011	3/16F DISC	Inconel	4365-4700	301-324
P-7013	3/16F DISC	Inconel	4850-5300	334-365
P-7015	3/16F DISC	Inconel	5141-5618	355-387
P-7017	3/16F DISC	Inconel	5335-5830	368-402
P-7018	3/16F DISC	Inconel	5626-6148	388-424
P-7019	3/16F DISC	Inconel	5723-6254	395-431
P-7020	3/16F DISC	Inconel	5820-6360	401-439
P-7021	3/16F DISC	Inconel	6014-6572	415-453
P-7022	3/16F DISC	Inconel	6111-6678	421-460
P-7024	3/16F DISC	Inconel	6305-6890	435-475
P-7026	3/16F DISC	Inconel	6790-7420	468-512
P-7028	3/16F DISC	Inconel	7275-7950	502-548
P-7030	3/16F DISC	Inconel	7760-8480	535-585
P-7032	3/16F DISC	Inconel	8245-9010	568-621
P-7034	3/16F DISC	Inconel	8730-9540	602-658
P-7040	3/16F DISC	Inconel	10185-11130	702-767
P-7044	3/16F DISC	Inconel	11155-12190	769-840
P-7046	3/16F DISC	Inconel	11640-12720	803-877
P-7048	3/16F DISC	Inconel	12125-13250	836-914
P-7050	3/16F DISC	Inconel	12610-13780	869-950
P-7052	3/16F DISC	Inconel	13095-14310	903-987
P-7054	3/16F DISC	Inconel	13580-14840	936-1023
P-7056	3/16F DISC	Inconel	14065-15370	970-1060
P-7058	3/16F DISC	Inconel	14550-15900	1003-1096
P-7060	3/16F DISC	Inconel	15035-16430	1037-1133
P-7062	3/16F DISC	Inconel	15520-16960	1070-1169
P-7064	3/16F DISC	Inconel	16005-17490	1103-1206
P-7068	3/16F DISC	Inconel	16975-18550	1170-1279
P-7072	3/16F DISC	Inconel	17945-19610	1237-1352
P-7074	3/16F DISC	Inconel	18430-20140	1271-1389
P-7080	3/16F DISC	Inconel	19885-21730	1371-1498
P-7082	3/16F DISC	Inconel	20370-22260	1404-1535
P-7084	3/16F DISC	Inconel	20885-22790	1440-1571
P-7086	3/16F DISC	Inconel	21340-23320	1471-1608
P-7088	3/16F DISC	Inconel	21825-23850	1505-1644
P-7094	3/16F DISC	Inconel	23280-25440	1605-1754
P-7096	3/16F DISC	Inconel	24250-26500	1672-1827
P-7098	3/16F DISC	Inconel	24735-27030	1705-1864

Rupture Disc Stock Part List - 1/4 Angle Disc

Part Number	Description	Material	Pressure Range (psi)	Pressure Range (bar)
P-7301	1/4A DISC	Inconel	970-1060	67-73
P-7303	1/4A DISC	Inconel	1164-1272	80-88
P-7305	1/4A DISC	Inconel	1445-1590	100-110
P-7307	1/4A DISC	Inconel	1697-1855	117-128
P-7309	1/4A DISC	Inconel	1940-2120	134-146
P-7311	1/4A DISC	Inconel	2425-2650	167-183
P-7313	1/4A DISC	Inconel	2910-3180	201-219
P-7315	1/4A DISC	Inconel	3395-3710	234-256
P-7317	1/4A DISC	Inconel	3880-4240	268-292
P-7319	1/4A DISC	Inconel	4365-4770	301-329
P-7321	1/4A DISC	Inconel	4850-5300	334-365
P-7323	1/4A DISC	Inconel	5335-5830	368-402
P-7325	1/4A DISC	Inconel	5820-6360	401-438
P-7327	1/4A DISC	Inconel	6305-6890	435-475
P-7329	1/4A DISC	Inconel	6790-7420	468-512
P-7331	1/4A DISC	Inconel	7275-7950	502-548
P-7333	1/4A DISC	Inconel	7760-8480	535-585
P-7335	1/4A DISC	Inconel	8245-9010	568-621
P-7337	1/4A DISC	Inconel	8730-9540	602-658
P-7339	1/4A DISC	Inconel	9215-10070	635-694
P-7341	1/4A DISC	Inconel	9700-10600	669-731
P-7343	1/4A DISC	Inconel	10185-11130	702-767
P-7345	1/4A DISC	Inconel	10670-11660	736-804
P-7347	1/4A DISC	Inconel	11155-12190	769-841
P-7349	1/4A DISC	Inconel	11640-12720	803-877
P-7351	1/4A DISC	Inconel	12125-13250	836-914
P-7353	1/4A DISC	Inconel	12610-13780	869-950
P-7355	1/4A DISC	Inconel	13095-14310	903-987
P-7357	1/4A DISC	Inconel	13580-14840	936-1023
P-7361	1/4A DISC	Inconel	14550-15900	1003-1096
P-7363	1/4A DISC	Inconel	15035-16430	1037-1133
P-7365	1/4A DISC	Inconel	15520-16960	1070-1169
P-7367	1/4A DISC	Inconel	16005-17490	1103-1206
P-7369	1/4A DISC	Inconel	16490-18020	1137-1242
P-7371	1/4A DISC	Inconel	16975-18550	1170-1279
P-7373	1/4A DISC	Inconel	17460-19080	1204-1315
P-7375	1/4A DISC	Inconel	17945-19610	1237-1352
P-7377	1/4A DISC	Inconel	18915-20670	1304-1425
P-7379	1/4A DISC	Inconel	19400-21200	1338-1462
P-7381	1/4A DISC	Inconel	19885-21730	1371-1498
P-7382	1/4A DISC	Inconel	21000-22000	1448-1517
P-7383	1/4A DISC	Inconel	21825-23850	1505-1644
P-7385	1/4A DISC	Inconel	24250-26500	1672-1827

Rupture Disc Stock Part List - 1/4 Angle Disc - con't

Part Number	Description	Material	Pressure Range (psi)	Pressure Range (bar)
P-7387	1/4A DISC	Inconel	25220-27560	1739-1900
P-7389	1/4A DISC	Inconel	26190-28620	1806-1973
P-7391	1/4A DISC	Inconel	27160-29680	1873-2046
P-7393	1/4A DISC	Inconel	29100-31800	2006-2192
P-7395	1/4A DISC	Inconel	30070-32860	2073-2266
P-7397	1/4A DISC	Inconel	31525-34450	2174-2375
P-7399	1/4A DISC	Inconel	33950-37100	2341-2558
P-7401	1/4A DISC	Inconel	36375-39750	2508-2741
P-7403	1/4A DISC	Inconel	38880-42400	2681-2923
P-7405	1/4A DISC	Inconel	41255-45050	2844-3106
P-7407	1/4A DISC	Inconel	43650-47700	3010-3289
P-7409	1/4A DISC	Inconel	48500-53000	3344-3654
P-7411	1/4A DISC	Inconel	53350-58300	3678-4020
P-7413	1/4A DISC	Inconel	58200-63600	4013-4385
P-7415	1/4A DISC	Inconel	62155-66000	4285-4550
P-7417	1/4A DISC	Inconel	65960-72080	4548-4970
P-7419	1/4A DISC	Inconel	68870-75260	4748-5189

Rupture Disc Stock Part List - 1/2 Flat Disc

Part Number	Description	Material	Pressure Range (psi)	Pressure Range (bar)
P-7601	1/2F DISC	Inconel	485-530	33-37
P-7603	1/2F DISC	Inconel	679-742	47-51
P-7605	1/2F DISC	Inconel	727-795	50-55
P-7607	1/2F DISC	Inconel	873-954	60-73
P-7609	1/2F DISC	Inconel	970-1060	67-75
P-7610	1/2F DISC	Inconel	1006-1100	69-76
P-7611	1/2F DISC	Inconel	1164-1272	80-88
P-7613	1/2F DISC	Inconel	1213-1323	84-91
P-7615	1/2F DISC	Inconel	1358-1484	94-102
P-7617	1/2F DISC	Inconel	1455-1590	100-110
P-7619	1/2F DISC	Inconel	1552-1696	107-117
P-7621	1/2F DISC	Inconel	1697-1855	117-128
P-7623	1/2F DISC	Inconel	1746-1908	120-132
P-7625	1/2F DISC	Inconel	1940-2120	134-146
P-7627	1/2F DISC	Inconel	2183-2385	151-164
P-7629	1/2F DISC	Inconel	2271-2438	157-168
P-7631	1/2F DISC	Inconel	2425-2650	167-183
P-7633	1/2F DISC	Inconel	2619-2862	181-197
P-7635	1/2F DISC	Inconel	2716-2968	187-204
P-7637	1/2F DISC	Inconel	2910-3180	201-219
P-7639	1/2F DISC	Inconel	3104-3392	214-234
P-7641	1/2F DISC	Inconel	3395-3710	234-256
P-7643	1/2F DISC	Inconel	3589-3922	247-270
P-7645	1/2F DISC	Inconel	3637-3975	251-274
P-7647	1/2F DISC	Inconel	3880-4240	268-292
P-7649	1/2F DISC	Inconel	4365-4770	301-329
P-7651	1/2F DISC	Inconel	4462-4876	308-336
P-7653	1/2F DISC	Inconel	4850-5300	334-365
P-7655	1/2F DISC	Inconel	5335-5830	368-402
P-7657	1/2F DISC	Inconel	5626-6148	388-424
P-7659	1/2F DISC	Inconel	5820-6360	401-438
P-7661	1/2F DISC	Inconel	6305-6890	435-475
P-7663	1/2F DISC	Inconel	6790-7420	468-512
P-7665	1/2F DISC	Inconel	7275-7950	502-548
P-7667	1/2F DISC	Inconel	7760-8480	535-585
P-7669	1/2F DISC	Inconel	8245-9010	568-621
P-7671	1/2F DISC	Inconel	8730-9540	602-658
P-7673	1/2F DISC	Inconel	9700-10600	669-731

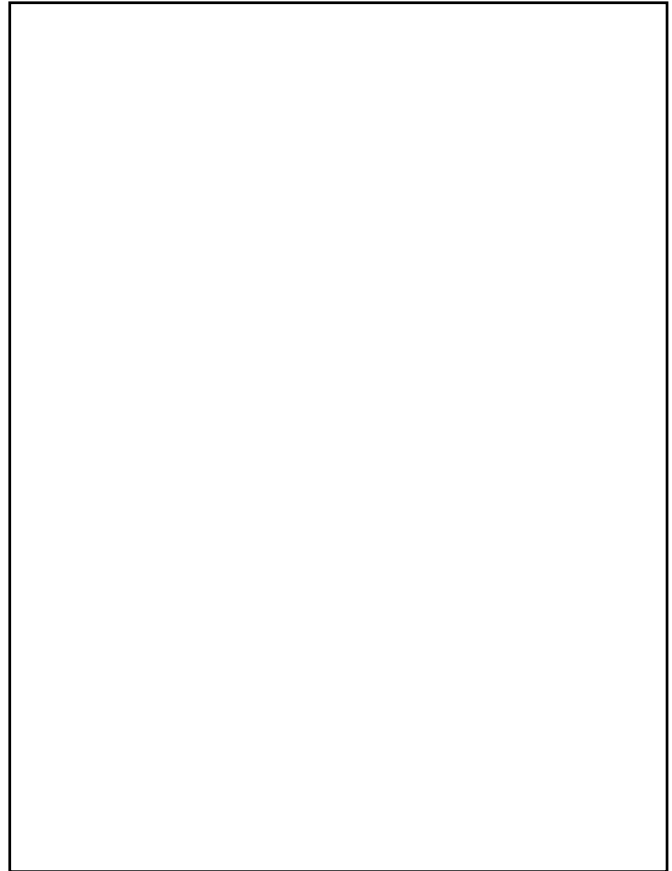
Accessories - Instrument Quality Pressure Gauges

Pressures to 80,000 psi (5116 bar)

Gauges - Pressure gauges are offered for use in low, medium and high pressure systems. Instrument quality gauges are available with pressure to 80,000 psi (5115.7 bar).

Materials and Features

- Accuracy within $\pm 0.5\%$ of full scale range.
- Plastic dial cover/solid front aluminum alloy case.
- Blow-out back panel for pressure relief in the event of Bourdon tube failure.
- 316 Stainless steel Bourdon tubes**
- Precision stainless steel movement for accuracy and resistance to atmospheric corrosion.
- Pointer zero adjustment located on front of gauge behind dial cover for convenience
- Gauges are commercially cleaned when shipped.
- Gauges available oxygen cleaned up to 20,000 psi (1379 bar) upon request.
- Gauges glycerin filled upon request.
- Gauges available with dual scale face plates.



Instrument quality gauges

- **Flush panel mounting** - Interchangeable dial cover retaining rings are stocked to permit flush panel mounting of any instrument quality gauge. These will be furnished at an additional charge when specified - add "PM" to order number.
- **Optional electrical contact face** - Available for all instrument quality gauges. With adjustable low and high electrical contacts, this option permits gauges to provide pressure control for automatic or remote operation, or for fail-safe set points.

** Bourdon tube material for 0-30,000 psi (0-2068 bar) gauge is K Monel. Bourdon tube material for 0-50,000 psi (0-3447 bar) and 0-80,000 psi (0-5116 bar) gauge is Inconel 718.

