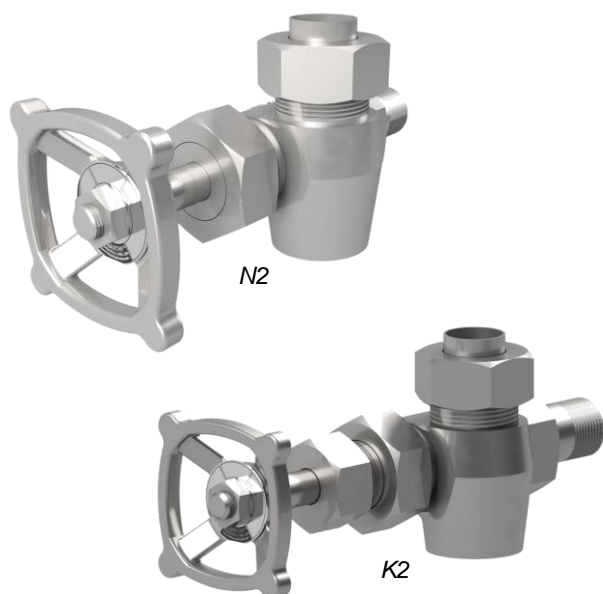


PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECKS

Low to medium pressure gauges and gaugecocks for direct visual identification of liquid levels.



FEATURES

- Reliable easy to understand level reference.
- Gives users the ability to inspect liquid characteristics visually.
- Non-intrusive.
- No electrical power required. Provide accurate direct liquid level measurement in remote locations where power is not available. Not affected by power failures.
- Provide a near-unlimited length of measure.
- Plain transparent and redline glass available.
- Wide range of glass protectors provide improved protection.
- Glass unions provide superior pressure and temperature ratings.
- Can be supplied to meet ASME requirements.
- Offset pattern valve bodies to allow for cleaning of the valve.
- Ball check shut-off prevents loss of process fluid in the event of an accidental breakage of the gauge glass.

GENERAL APPLICATION

Used to register liquid levels in low to medium pressure applications in the petroleum, chemical and general process industries, including steam boiler service.

TECHNICAL DATA

Materials:

Glass	High pressure, heavy wall or red line
Gaugecocks:	Carbon and 316 stainless steel
Glass size:	5/8" and 3/4" (DN 18 and 20)
Connections:	1/2" to 1" (DN 15 to 25)
Pressure ratings	
Glass:	to 600 psi (41.4 bar)
Temperature rating	
Glass:	to 425°F (218°C)
Gaugecocks:	-325°F to 750°F (-198°C to 399°C)

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PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECKOCKS

GAUGES

OVERVIEW

Penberthy tubular glass gauges are mounted to the vessel externally and use tubular glass to provide direct visual verification of the liquid level present. The transparent glass also provides an excellent means to inspect fluid characteristics optically.

Liquid enters the gauge through the lower tank connection. The meniscus present in the glass tube corresponds to the liquid level in the tank.

A wide range of accessories allows you to customize each gauge to your specific application requirements. These options can also provide enhanced level indication and protection for the tubular glass.

Protectors

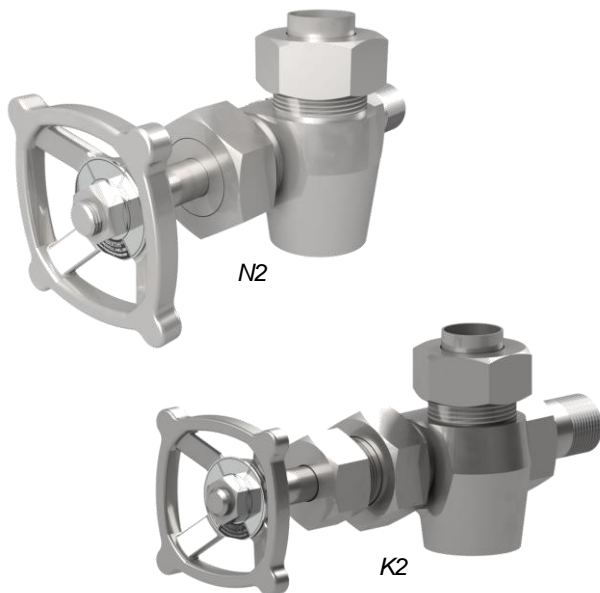
Tubular glass is susceptible to accidental breakage. To counteract this condition, a variety of protectors is offered which prevent damage to the glass but do not restrict level indication capability. In some cases, the protector actually enhances it. Protectors can be adapted to fit most major manufacturers' gaugecocks.

Guard rods – Two or four metallic rods placed next to the glass tube.

Plastic – A transparent box surrounding the tubular glass constructed from plastic.

Center Fitting

Intended for use in gauges over 48" in height, it allows you to join two pieces of glass within the same gauge. This increases the length of the gauge to a max of 144" (with 2 center fittings).



PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECKS GAUGES

TABLE 1 - PRESSURE/TEMPERATURE RATINGS FOR GAUGES WITH A SINGLE PIECE OF TUBULAR GLASS (BOTH 5/8" AND 3/4")

Center to center distance for vessel connections inch (mm)	No corrosion up to 150°F (66°C) psig (kPa)			Steam boiler service up to 425°F (218°C) psig (kPa)		
	High pressure	Heavy wall	Red line	High pressure	Heavy wall	Red line
10 (254)	410 (2830)	600 (4140)	340 (2340)	310 (2140)	345 (2380)	275 (1900)
15 (381)	385 (2650)	600 (4140)	310 (2140)	280 (1930)	325 (2240)	265 (1830)
20 (508)	355 (2450)	600 (4140)	285 (1960)	265 (1830)	315 (2170)	260 (1790)
25 (635)	300 (2070)	580 (4000)	260 (1790)	250 (1720)	300 (2070)	250 (1720)
30 (762)	275 (1900)	550 (3790)	230 (1590)	-	-	-
35 (889)	240 (1650)	500 (3450)	200 (1380)	-	-	-
40 (1016)	210 (1450)	420 (2890)	180 (1240)	-	-	-
45 (1143)	200 (1380)	360 (2480)	170 (1170)	-	-	-
50 (1270)	180 (1240)	340 (2340)	160 (1100)	-	-	-
55 (1397)	150 (1030)	N/A	140 (970)	-	-	-
60 (1524)	140 (970)	N/A	120 (830)	-	-	-
65 (1651)	125 (860)	N/A	100 (690)	-	-	-
70 (1778)	100 (690)	N/A	90 (620)	-	-	-

Using secured glass unions and multiple pieces of tubular glass will increase the pressure/temperature rating over that of an equivalent length of single glass.

TABLE 2 - OPTIONS AVAILABLE FOR THE DIFFERENT TYPES OF TUBULAR GLASS

Glass type (both 5/8" and 3/4")	Options		
	Gaugecocks	Guard Rods	Plastic
High Pressure	X	X	X
Heavy Wall	X	X	X
Red Line	X	X	X

Centerline factor to calculate lengths

Model	Visible Range		Tubular Glass		Guard Rods	
	in	mm	in	mm	in	mm
K2 / N2	4.625	-117	-1.375	-35	-2.125	-54

PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECKS

GAUGECKS

OVERVIEW

Penberthy tubular glass gaugecocks are used in low to medium pressure applications. Available in offset and straight patterns, they isolate the tubular glass from the liquid contents of the vessel.

They are available with a combination of features for a range of users, including union vessel connections and a choice of stuffing box sizes for various glass diameters. All stuffing box connections are designed for positive seal with minimum radial compression.

Offset gaugecocks have the advantage of permitting the inside of the tubular glass to be cleaned easily with a minimum of disassembly. By removing the vent and drain plugs (or other connection), a straight passage is opened through the tubular glass. A brush can be inserted through the gaugecock vent and drain for glass cleaning.

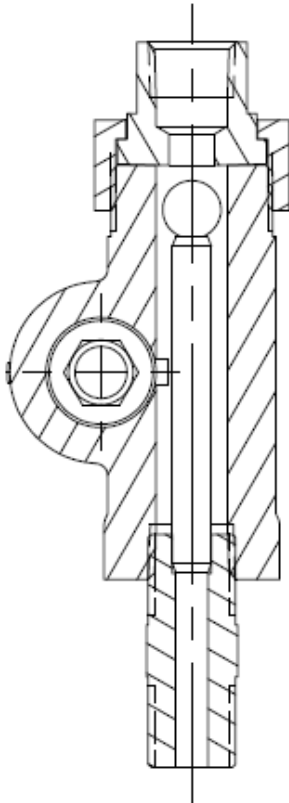
Automatic ball check shut-off

To prevent rapid loss of fluid in the event of accidental glass breakage. Penberthy gaugecocks are supplied with automatic ball check shut-off. Should the glass break, the pressure drop causes the ball checks to seat to prevent loss of tank contents. To unseat these ball checks during the liquid level readings, the tip of the gaugecock stem has an extension that pushes the ball away from its seat while allowing the gauge column to fill as liquid contents pass around the ball. Stainless steel retainers prevent reverse seating of balls or loss of balls during installation.

Both upper and lower gaugecocks in each set are equipped with horizontal ball checks. Balls are located on the vessel side of the gaugecock seats.

Gaugecocks with ball checks omitted meet ASME boiler requirements. As an alternative method to ASME boiler requirements, the lower gaugecock is available with an optional vertical rising ball check located in the offset portion of the gaugecock body and the upper gaugecock has a leaky seat.

Vertically Rising Ball Check



PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECOCKS

SERIES N2/K2 OFFSET PATTERN GAUGECOCKS

OVERVIEW

The N2 and K2 Series include models N2A/K2A, N2B/K2B and N2C/K2C. They are offered in steel or 316 stainless steel materials, in ½" to 1" (DN 15 to 25) sizes, with a 300 P-CL-ANSI rating and a wide range of features in offset pattern design.

FEATURES

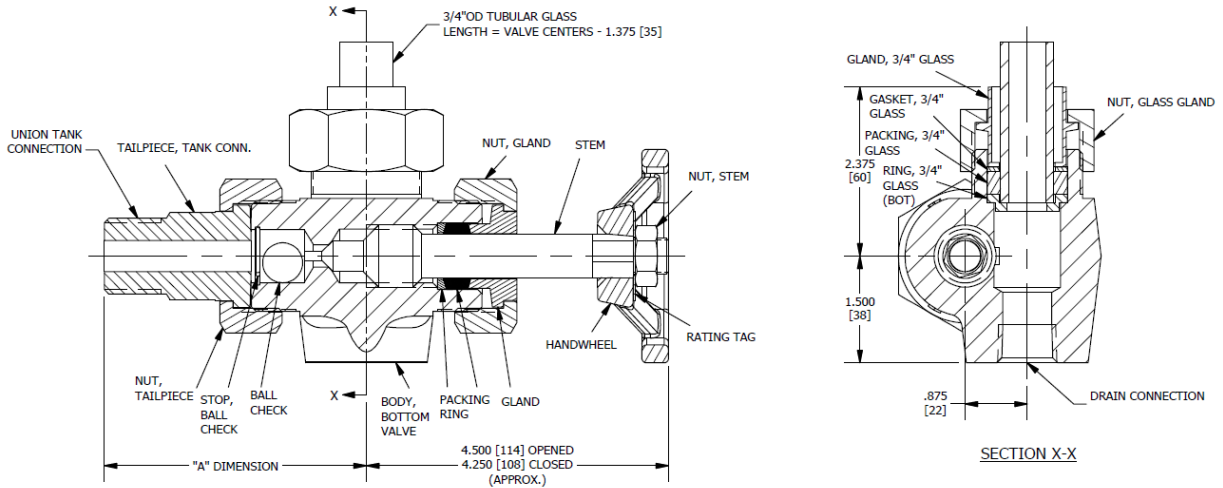
- Offset pattern allows easy cleaning.
- Integral bonnet (N2 series).
- Union bonnet (K2 series).
- Union vessel connection.
- Ball check shut-off prevents loss of process fluid in the event of an accidental breakage of the tubular glass.
- Integral seat (N2 series).
- Threaded renewable seat (K2 series).
- Can be supplied to meet ASME requirements.
- Wide variety of vessel connections available.

A variety of optional features are available when specified. Optional materials can be specified for the gaugecock body and trim (trim consists of the stem, stem packing retainer, ball check and seat (K2 series only)). Standard and optional materials conform to ASTM specifications.

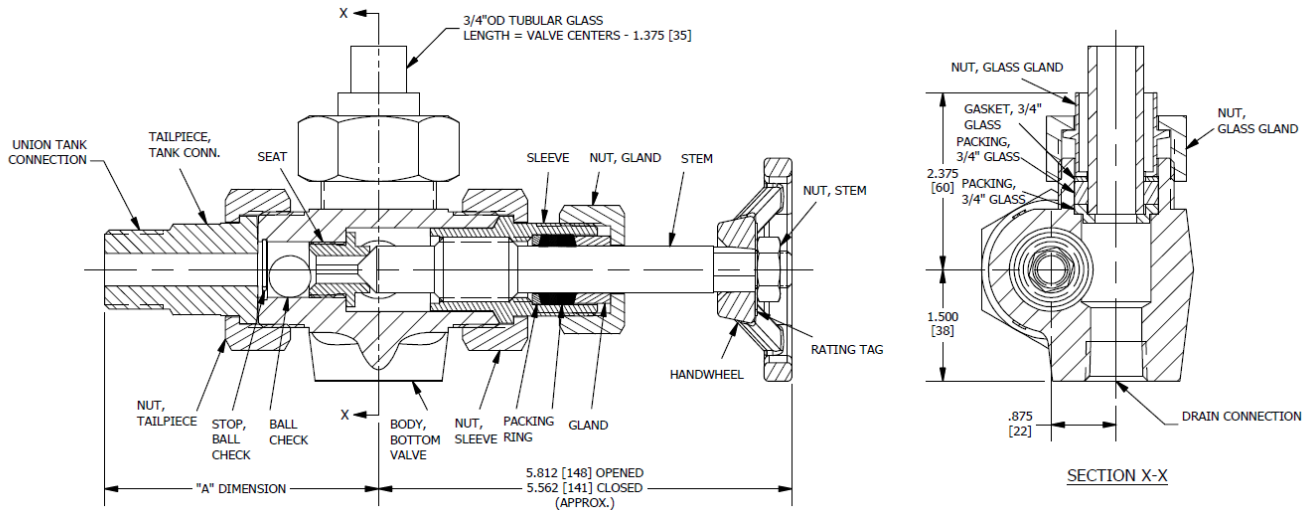
PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECOCKS

SERIES N2/K2 OFFSET PATTERN GAUGECOCKS

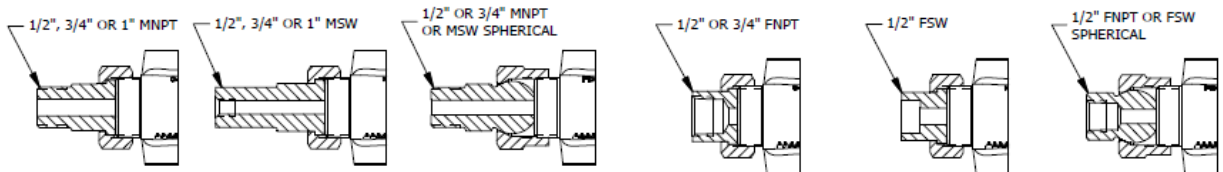
SERIES N2



SERIES K2



UNION TANK CONNECTION ("A" DIMENSION)								
1/2" MNPT (OR MSW)	1/2" FNPT (OR FSW)	1/2" MNPT SPH. (OR MSW)	1/2" FNPT SPH. (OR FSW)	3/4" MNPT	3/4" MSW	3/4" FNPT	3/4" MNPT SPH. (OR MSW)	1" MNPT (OR MSW)
3.688 [94]	2.813 [71]	4.313 [110]	3.438 [87]	3.688 [94]	4.500 [114]	2.813 [71]	4.313 [110]	4.125 [105]
VENT / DRAIN CONNECTION								
1/2" OR 3/4" FNPT (OR FSW) ONLY								



PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECKS
SERIES N2/K2 OFFSET PATTERN GAUGECKS

TABLE 3 - SERIES N2/K2 STANDED/OPTIONAL FEATURES

Feature		N2A		K2A		N2B		K2B		N2C		K2C	
		Std.	Opt.	Std.	Opt.	Std.	Opt.	Std.	Opt.	Std.	Opt.	Std.	Opt.
Pattern													
Offset		X	-	X	-	X	-	X	-	X	-	X	-
Bonnet													
Integral		X	-	-	-	X	-	-	-	X	-	-	-
Union		-	-	X	-	-	-	X	-	-	-	X	-
Gauge Connection													
Stuffing Box	5/8" glass diameter	X	-	X	-	-	-	-	-	-	-	-	-
	1/2" glass diameter	-	-	-	-	X	-	X	-	X	-	X	-
Vessel Connection													
Union	1/2" NPTM	X	-	X	-	-	-	-	-	-	-	-	-
	3/4" NPTM	-	-	-	-	X	-	X	-	-	-	-	-
	1" NPTM (non floating)	-	-	-	-	-	-	-	-	X	-	X	-
Solid Shank	1/2" NPTM	-	X	-	X	-	-	-	-	-	-	-	-
	3/4" NPTM	-	-	-	-	-	X	-	X	-	-	-	-
	1" NPTM	-	-	-	-	-	-	-	-	-	X	-	X
Socketweld	1/2" Male	-	X	-	X	-	-	-	-	-	-	-	-
	3/4" Male	-	-	-	-	-	X	-	X	-	-	-	-
	1" Male	-	-	-	-	-	-	-	-	-	X	-	X
Flanged		-	X	-	X	-	X	-	X	-	X	-	X
Spherical Union	1/2" NPTM	-	X	-	X	-	-	-	-	-	-	-	-
	3/4" NPTM	-	-	-	-	-	X	-	X	-	-	-	-
Vent Connection													
3/4" NPTF		X	-	X	-	X	-	X	-	X	-	X	-
Drain Connection													
1/2" NPTF		X	-	X	-	X	-	X	-	X	-	X	-
Ball Check Shut-Off													
Horizontal Lower and Upper Gaugecocks		X	-	X	-	X	-	X	-	X	-	X	-
Vertical Lower/Horizontal Upper Gaugecocks*		-	X	-	X	-	X	-	X	-	X	-	X
Omitted*		-	X	-	X	-	X	-	X	-	X	-	X
Vacuum - Horizontal Upper and Lower		-	X	-	X	-	X	-	X	-	X	-	X
Seat													
Integral		X	-	-	-	X	-	-	-	X	-	-	-
Threaded (Renewable)		-	-	X	-	-	-	X	-	-	-	X	-
Handwheel													
w/ Standard Pitch Threads		X	-	X	-	X	-	X	-	X	-	X	-
w/ Quick Closing Threads		-	X	-	X	-	X	-	X	-	X	-	X
Lever													
w/ Quick Closing Thread (1/4 turn)		-	X	-	X	-	X	-	X	-	X	-	X
Guard Rods (4 per Gaugecock Set)													
¼" (6.4 mm) Diameter		-	X	-	X	-	X	-	X	-	X	-	X

* Acceptable for ASME service

PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECKOCS

SELECTION GUIDE – PART 1

SELECTION GUIDE - PART 1

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Example:		N2A	S	S	X	C	A	X	D	E	A	C	A	G	G	S	S
Model																	
N2A	Model N2A tubular gaugecock																
N2B	Model N2B tubular gaugecock																
N2C	Model N2C tubular gaugecock																
K2A	Model K2A tubular gaugecock																
K2B	Model K2B tubular gaugecock																
K2C	Model K2C tubular gaugecock																
Body Material																	
C	Carbon steel																
S	316/316L Stainless																
Trim Material																	
C	416 SST (standard on Carbon steel and ductile iron body)																
S	316/316L SST (standard on 316 SST body)																
NACE MR-01-75 and/or MR-0103																	
X	None																
E	NACE Environmental																
Vessel Connection Size																	
C	1/2"																
E	3/4"																
F	1"																
Vessel Connection Type																	
A	NPT male union																
B	NPT female union																
C	Socket weld male union																
D	Socket weld female union																
E	Spherical union NPT male																
J	Solid shank NPT male																
K	Solid shank SW male																
N	Raised face SO																
P	Flat face SO																
Pressure Class (if flanged)																	
X	None																
1	P CL 150																
3	P CL 300																
6	P CL 600																
Gauge Connection Size																	
D	5/8"																
E	3/4"																

PENBERTHY TUBULAR GLASS LIQUID LEVEL GAUGES AND GAUGECKS
SELECTION GUIDE – PART 2

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SELECTION GUIDE - PART 2

N2A	S	S	X	C	A	X	D	Example:	E	A	C	A	G	G	S	S	XXX
								Vent Connection Size									
								X None									
								C 1/2"									
								E 3/4" (standard on N2, K2)									
								Vent Connection Type									
								X None									
								A NPT Female (standard)									
								B Socket Weld Female									
								F Plugged									
								Drain Connection Size									
								X None									
								C 1/2" (standard on N2, K2)									
								E 3/4"									
								Drain Connection Type									
								X None									
								A NPT Female (standard)									
								B Socket Weld Female									
								F Plugged									
								G Drain Cock									
								Stem Packing Material									
								B Braided Carbon Fiber									
								G Grafoil® (standard)									
								T Teflon®									
								Glass Packing Material									
								B Buna N									
								T Teflon®									
								Stem Operation									
								S Standard close w/ handwheel (standard)									
								A Quick close w/ lever									
								B Quick close w/ handwheel									
								F Standard close w/ lever									
								Paint Specification									
								X None									
								S Standard									
								Options									
								XXX None									
								* Plastic Protector									
								* Horizontal ball check									
								* Vertical rise ball check lower gaugecock									
								* ASME vertical rise ball check lower gaugecock plug									
								* Ball check shut off omitted (ASME)									
								* Vacuum service vessel connection									

* Option code assigned
at time of order



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