

PG-60.1 Water Level Indicators

Color-Port gages provide continuous indication of boiler water levels as required by the ASME* Boiler and Pressure Code. Under PG-60, the Code states:

PG-60.1 All boilers having a fixed water level (steam and water interface) shall have at least one gage glass (a transparent device that permits visual determination of the water level). Boilers not having a fixed water level, such as forced-flow steam generators and high-temperature water boilers of the forced circulation type, are not required to have a gage glass...Electrode type electric boilers are required to have only one gage glass, regardless of MAWP.

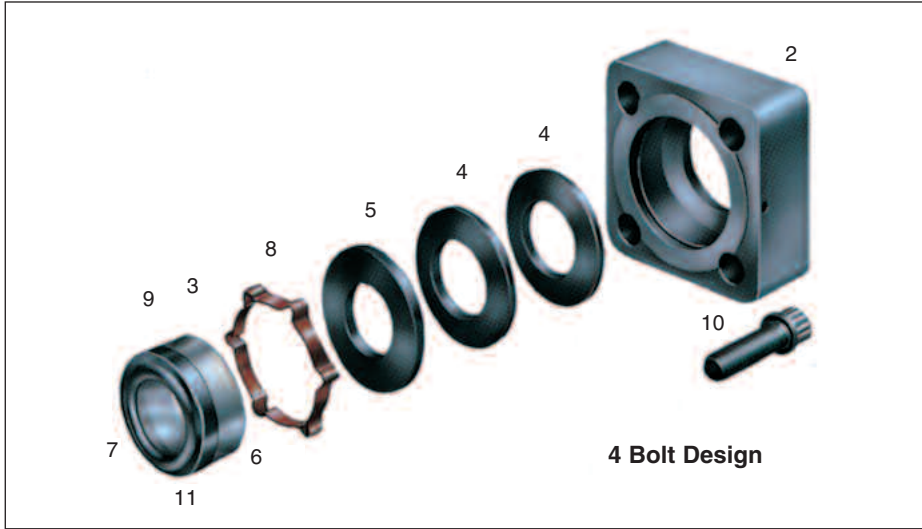
PG-60.1.1 Boilers having a maximum allowable working pressure exceeding 400 psi (2800 kPa) shall have two gage glasses.

Instead of one of the two required gage glasses, two independent remote water level indicators (two discrete systems that continuously measure, transmit, and display water level) may be provided.

PG-60.1.1.1 When the water level in at least one gage glass is not readily visible to the operator in the area where control actions are initiated, either a fiber optic cable (with no electrical modification of the optical signal) or mirrors shall be provided to transfer the optical image of the water level to the control area. Alternatively, any combination of two of the following shall be provided: (a) an independent remote water level indicator; (b) an independent continuous transmission and display of an image of the water level in a gage glass.

* The American Society of Mechanical Engineers, Boiler and Pressure Vessel Committee, establishes rules of safety governing the design, fabrication and inspection of boilers and unfired pressure vessels.

Color-Port Gages



Standard Parts

Item No.	Part	Part No.
1	Body	
2	Cover - 4 Bolt	112925
3	Glass	*
4	Spring Cone	102875-01
5	Washer	917211-01
6	Cushion Gasket	*
7	Clip Ring	*
8	Retaining Ring	919051
9	Mica	*
10	Cap Screw	954181-10
11	Sealing Gasket	*

*Supplied in kit form. Kit number 923321.
High pressure gage (4-bolt covers).

Illuminators

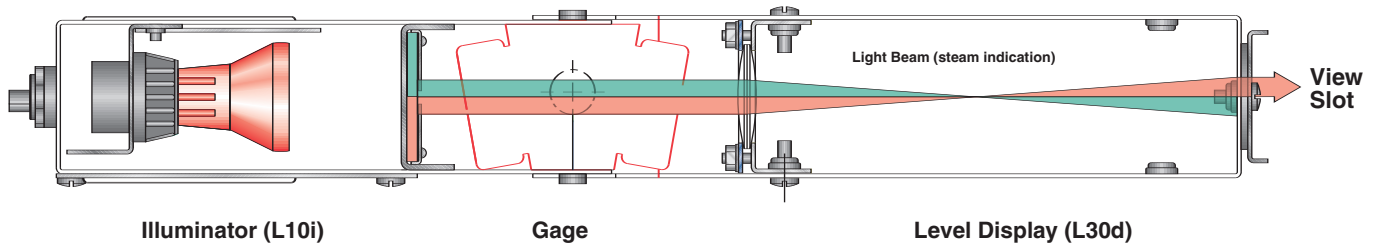
Illuminators can be provided in two different designs:

1. Indoor or Outdoor halogen spotlight.
2. High Intensity, quartz halogen bulb for fiber port.

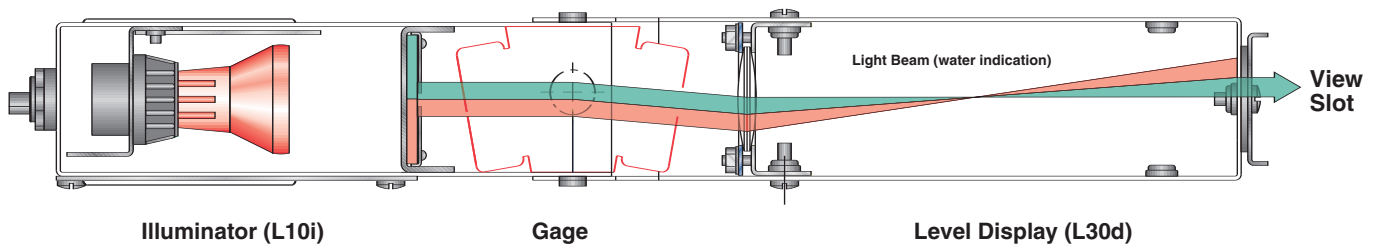
All illuminators are complete with a color screen containing two strips of glass - one red and one green. Due to the difference in the index of refraction of light through water and steam, only the corresponding color is seen: green for water, red for steam.

A complete Color-Port system includes the gage, a water column or tie bar, two gage valves and an illuminator/display.

Showing Steam Present

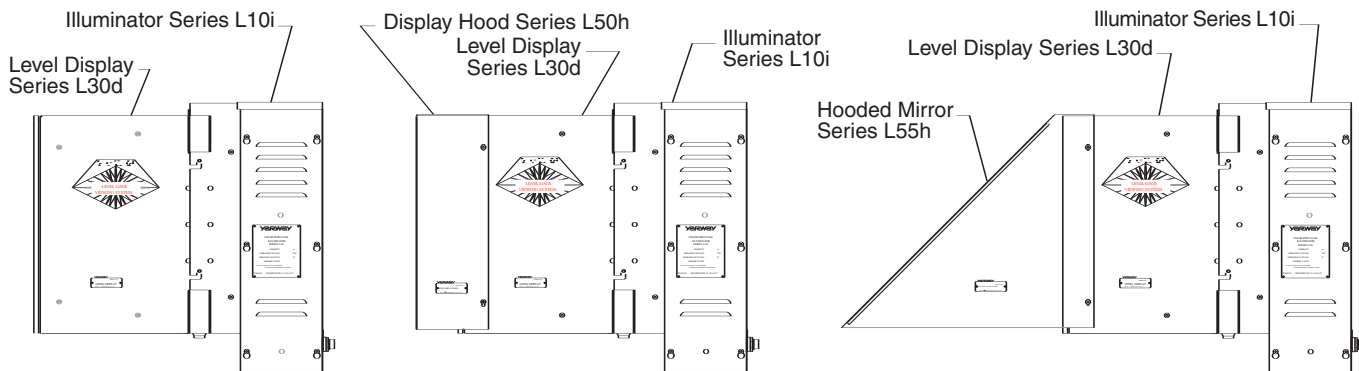


Showing Water Present



Color-Port Viewing Systems

Typical Viewing Systems



FiberPort

Fiber Optic Viewing System

The FiberPort system consists of five basic items:

- High Intensity Illuminator with Halogen Lamps (75W)
- Step-down Transformer (120/230 vac to 12 vac)
- Transmitter Section
- Fiber Optic Cable
- Remote Wide Angle Viewer

In FiberPort viewing, each light image as seen through the ports of the Yarway Color-Port gage is transmitted through a fiber optic strand in a fiber optic cable that has as many strands as the gage has ports. These strands are housed in a flexible polyurethane flame retardant sheathed cable. One end of this cable is attached to the transmitter section mounted on the face of the gage. The opposite end terminates at the remote wide angle viewer in the control room.



Wide angle remote readout indicator displays Color-Port gage's level readings



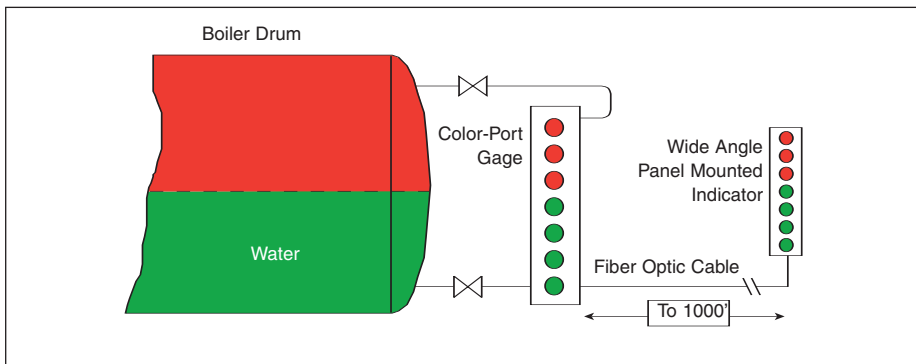
Wide angle trunnion-mounted lens bank swings through a 170° arc.

Features and Benefits


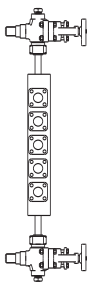
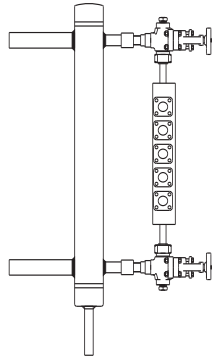
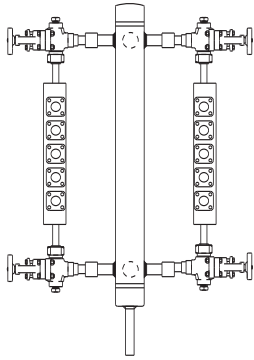

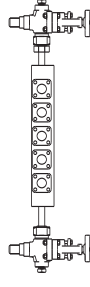
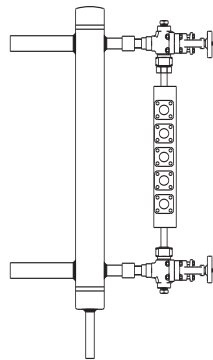
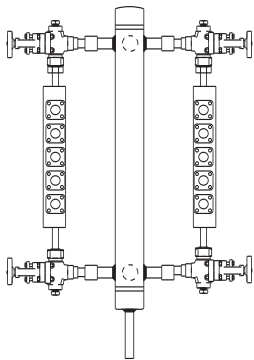
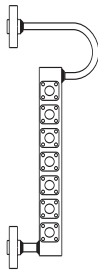
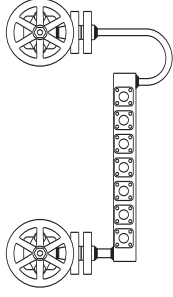
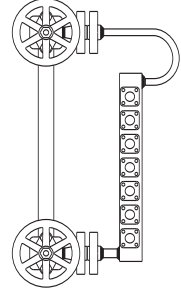
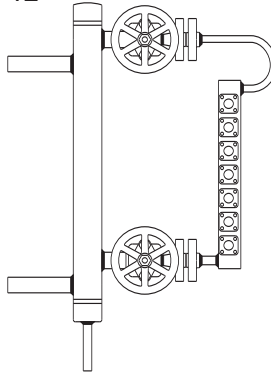
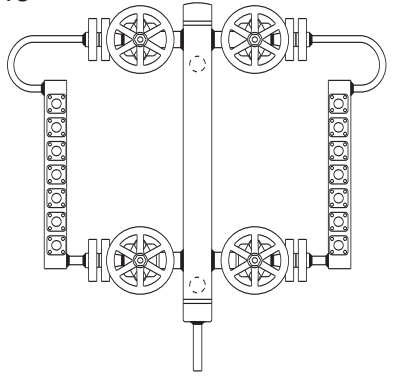
- Meets ASME Boiler Code requirements for direct gage viewing.
- System is immune to electromagnetic fields, noise and vibration.
- Remote viewer has 85° viewing angle and adjustment feature, allowing rotation for optimum viewing up to 170°.

- Fiber optic cable lengths to 1000 ft.
- Cable rating +185°F to -40°F.
- Two wide angle remote viewer locations possible from one transmitting source.
- Dust resistant lens and lamp configuration.
- Local viewing feature provided at gage location.
- Lamps of illuminator normally provide 3500 hour service.
- Adjustment features are external.
- Available for 12", 16¹/₂" and 21" visibility Yarway ColorPort gages.

Schematics of the FiberPort System



Color-Port Gage Column Charts

850 psi [59 bar]	<p>1</p>  <p>4511N</p>	<p>2</p>  <p>4511N</p>	<p>3</p>  <p>4511N</p>	<p>4</p>  <p>4511N - 4511N</p>
1800 psi [124 bar]	<p>5</p>  <p>4511N</p>	<p>6</p>  <p>4511N</p>	<p>7</p>  <p>4511N</p>	<p>8</p>  <p>4511N - 4511N</p>
3000 psi [207 bar]	<p>9</p>  <p>4595F</p>	<p>10</p>  <p>4595F</p>	<p>11</p>  <p>T4595F</p>	
	<p>12</p>  <p>4595F</p>	<p>13</p>  <p>4595F - 4595F</p>		

Color-Port Gage Standard Installation Arrangements

Wide Range of Assemblies

Various assemblies and visibilities are available with either low pressure, intermediate pressure or high pressure gages by using single or multiple gages and various columns. Low pressure gages up to 1800 psi [124 bar] and high pressure gages 1800 to 3000 psi [124 to 207 bar] have visibility range of 12" to 48" [305 mm to 1219 mm].

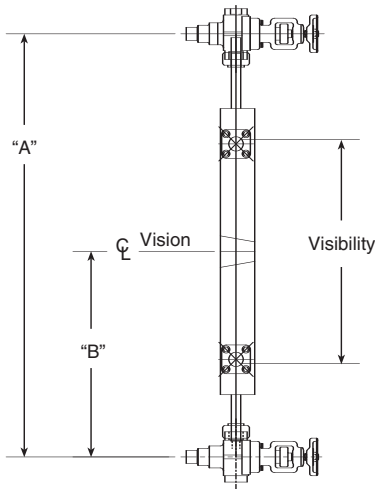
How to Order Color-Port Gages

For proper Color-Port Gage assembly, pressure, visibility, and gage connections consult selection chart, and visibility chart, pages 5 and 6.

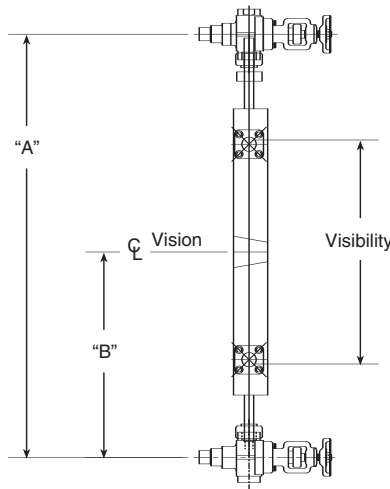
Use the order form at the end of the bulletin to order a complete Yarway Color-Port gage unit. When ordering a separate replacement gage, provide the serial number of the existing gage.

Other Gage Glass Availability

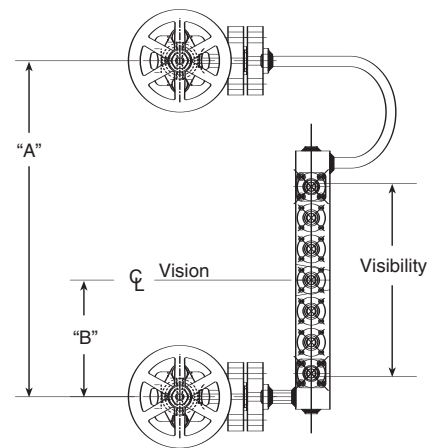
Yarway also offers medium and high pressure Flat Glass Gages as well as low pressure (250 psi to 650 psi) Flat and Reflex gages (shown in our "low pressure" Flat Glass gage brochures).



4511N/4000S Up To 850 psig



4511N/4000 With Spacer Up To 1800 psig



4595F/Welbloc® Up To 3000 psig

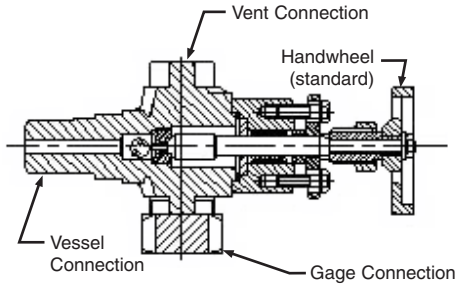
Visibility Chart, inches [mm]

Visibility	12 [305]	15 [381]	16.5 [419]	18 [457]	21 [533]	24 [610]	27 [686]	30 [762]	33 [838]	36 [914]	39 [991]	42 [1067]	45 [1143]	48 [1219]
No. of Ports	5	6	7	8	9	10	11	12	13	14	15	16	17	18
4511N with 4000 Series valves - up to 850 psi [59 bar]														
Dimension "A"	24.5	27.5	29	30.5	33.5	36.5	39.5	42.5	45.5	48.5	51.5	54.5	57.5	60.5
Minimum	[622]	[699]	[737]	[775]	[851]	[927]	[1,003]	[1,080]	[1,156]	[1,232]	[1,308]	[1,384]	[1,461]	[1,537]
Dimension "B"	12.25	13.75	14.5	15.25	16.75	18.25	19.75	21.25	22.75	24.25	25.75	27.25	28.75	30.25
Minimum	[311]	[349]	[368]	[387]	[425]	[464]	[502]	[540]	[578]	[616]	[654]	[692]	[730]	[768]
4511N with 4000 Series valves and spacer - up to 1800 psi [124 bar]														
Dimension "A"	25.5	28.5	30	31.5	34.5	37.5	40.5	43.5	46.5	49.5	52.5	55.5	58.5	61.5
Minimum	[648]	[724]	[762]	[800]	[876]	[953]	[1,029]	[1,105]	[1,181]	[1,257]	[1,334]	[1,410]	[1,486]	[1,562]
Dimension "B"	12.75	14.25	15	15.75	17.25	18.75	20.25	21.75	23.25	24.75	26.25	27.75	29.25	30.75
Minimum	[324]	[362]	[381]	[400]	[438]	[476]	[514]	[552]	[591]	[629]	[667]	[705]	[743]	[781]
4595F with Welbloc® valves - up to 3000 psi [207 bar]														
Dimension "A"	21	24	25.5	27	30	33	36	39	42	45	48	51	54	57
Minimum	[533]	[610]	[648]	[686]	[762]	[838]	[914]	[991]	[1,067]	[1,143]	[1,219]	[1,295]	[1,372]	[1,448]
Dimension "B"	7.53	9.03	9.78	10.53	12.03	13.53	15.03	16.53	18.03	19.53	21.03	22.53	24.03	25.53
Minimum	[191]	[229]	[248]	[267]	[306]	[344]	[382]	[420]	[458]	[496]	[534]	[572]	[610]	[648]

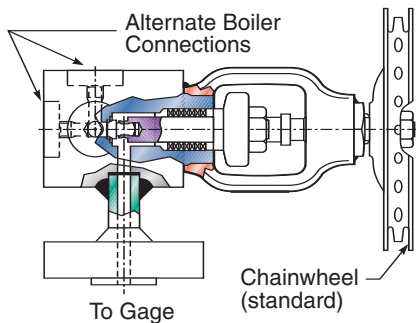
Note: "Traditional" Yarway Color-Port visibilities available as replacement. Contact factory for information.

Gage Accessories

Upper Stuffing Box Gage Valve (Side View)

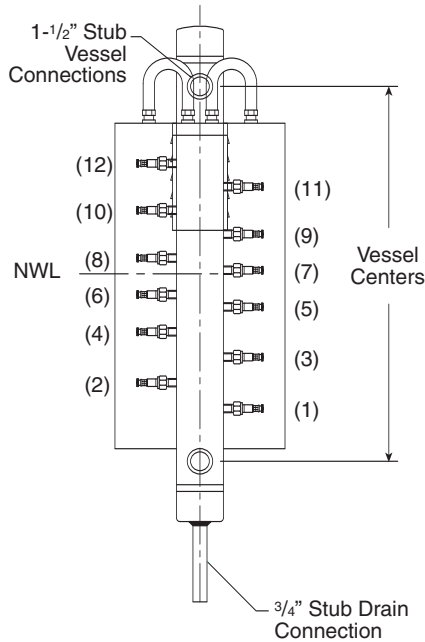


Upper Welbloc® Gage Valve (Left Hand Plan View Shown)



Determining Gage Valve "Hand". When facing chain wheels, valve is left hand when gage is on your left; valve is right hand when gage is on your right.

Column With Optional Level Probe Control System



Gage Valves

Stuffing Box Type (Nipple End) Low pressure gages (up to 1800 psi, 124 bar) feature a gage valve with stainless steel disc at top and bottom with a stuffing box which allows insertion of the nipple ends of the gage. For flanged ends, Welbloc® type gage valves are used.

Welbloc® Type (Flanged End) High pressure gages (3000 psi, 207 bar) must use the Welbloc® type gage valve with Stellite disc and integral Stellite seat. Internals are completely accessible with the valve connected in the line.

Chain and line pulls for stuffing box and Welbloc® gage valves are available.

Drain Connections

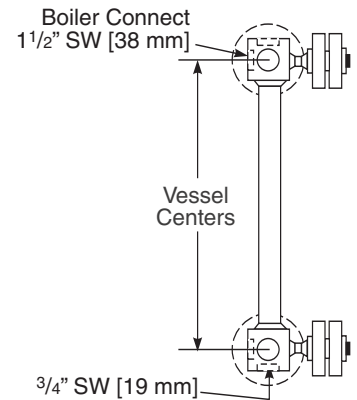
Stuffing Box Gage Valves: 1/2" and 3/4" NPTF and socketwelding available; located on lower gage valve.

Welbloc® Gage Valves: 3/4" socketweld connection located at bottom on lower valve block.

Water Columns: 3/4" socketweld connection located at bottom of column.

Tie Bar: 3/4" socketweld connection located at bottom of tie bar assembly.

Circulating Tie Bar



Water Column

As an option, Yarway's gage glasses can be supplied with any of our Electronic Remote Level Indicator systems, which consist of a water column with low voltage conductivity probes, a detection and verification unit, and a remote display (optional with some systems). These systems can be installed for pressures up to 3000 psig and temperatures up to 1200°F [207 barg and 650°C]. Customers can select the number and spacing of the probes, which are mounted horizontally in the column at the desired distance from the normal water level or lower tap to either indicate level or energize alarms and/or trips for high and low water. A low voltage signal is supplied and sensed by the detection and verification unit. The detection and verification unit uses this signal to activate the display device(s) and/or relays to perform the required functions. For more detailed information, please see the brochures for the following models:

1 probe:	Model 1001
2 probes:	Model 1002
3-4 probes:	Model 1004
5+ probes:	Model 2000
	Model 3000
	Model 4000

Water column: For working pressure up to 3000 psi [207 bar]. Can be provided with special boiler centers and special connections for level control probes.

Circulating Tie Bar: For working pressure up to 3000 psi [207 bar]. This compact design reduces installation space, provides greater rigidity and assures minimum temperature differential by allowing more direct flow between drum and gage. 27" [686 mm] standard gage and boiler connections.