Bi-color, direct reading, ported style water level gauge for low, medium and high pressure boilers

FEATURES
- Combination of design and durable materials assures long service life.
- Individual port assemblies can be replaced in minutes with the gauge in place.
- Spring loading maintains proper pressure on glasses and gaskets at all times.
- Contrasting red and green readings show water level through high visibility illuminator display view slots.
- Choice of direct or mirror viewing systems.
- Choice of low, medium or high pressure designs for use with stuffing box gauge cocks or Welbloc L200V valves.
- Glasses accurately molded and tempered to high specifications.
- Glass, mica and gasket assembly is registered precisely in the body’s gasket groove.
- High quality mica protects the inner surface of each glass from the erosive action of steam, water and alkalis.
- Specially-molded flexible graphite gasket between mica and gauge body ensures a tight seal.
- PED 97/23/EC conformance available.

GENERAL APPLICATION
Color-Port gauges provide continuous indication of boiler water levels as required by the ASME Boiler and Pressure Code PG-60.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Sizes:</th>
<th>½” to 1¼” (15 to 19 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. pressure</td>
<td>850 psi (59 bar)</td>
</tr>
<tr>
<td>Low pressure design:</td>
<td>1800 psi (124 bar)</td>
</tr>
<tr>
<td>Medium pressure design:</td>
<td>3000 psi (207 bar)</td>
</tr>
<tr>
<td>High pressure design:</td>
<td>5 to 26</td>
</tr>
<tr>
<td>Number of ports:</td>
<td>5 to 26</td>
</tr>
<tr>
<td>Visibility:</td>
<td>12½” to 72½” (310 to 1843 mm)</td>
</tr>
</tbody>
</table>
Color-Port gauges 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 gauge glass (a transparent device that permits visual determination of the water level).

**PG-60.1.1:** boilers having a maximum allowable working pressure exceeding 400 psi [2800 kPa] shall have two gauge glasses. Instead of one of the two required gauge glasses, two independent remote water level indicators (two discrete systems that continuously measure, transmit, and display water level) may be provided. 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 gauge glass. Electrode type electric boilers are required to have only one gauge glass, regardless of MAWP.

**PG-60.1.1.1:** when the water level in at least one gauge 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 gauge 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.*
A complete Color-Port system includes the gauge, a water column or tie bar, two gauge valves and an illuminator/display.

Illuminators
Illuminators are designed to be mounted readily to the color-port gauge chamber and comprise three main components: level display, illuminator and power supply. An LED lighting source is standard.

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.

**STANDARD PARTS**

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Part Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cover - 4 bolt</td>
<td>112925</td>
</tr>
<tr>
<td>3</td>
<td>Glass</td>
<td>*</td>
</tr>
<tr>
<td>4</td>
<td>Spring cone</td>
<td>102875-01</td>
</tr>
<tr>
<td>5</td>
<td>Washer</td>
<td>917211-01</td>
</tr>
<tr>
<td>6</td>
<td>Cushion gasket</td>
<td>*</td>
</tr>
<tr>
<td>7</td>
<td>Clip ring</td>
<td>*</td>
</tr>
<tr>
<td>8</td>
<td>Retaining ring</td>
<td>919051</td>
</tr>
<tr>
<td>9</td>
<td>Mica</td>
<td>*</td>
</tr>
<tr>
<td>10</td>
<td>Cap screw</td>
<td>954181-10</td>
</tr>
<tr>
<td>11</td>
<td>Sealing gasket</td>
<td>*</td>
</tr>
</tbody>
</table>

* Supplied in kit form. Kit number 923321.

High pressure gauge (4-bolt covers)
Features and benefits

- Meets ASME Boiler Code requirements for direct gauge viewing.
- Up to 100,000 hours service.
- Designed to be assembled and disassembled from the gauge easily.
- Power supply housed in an aluminum explosion-proof housing with ¾" NPTF electrical connection.
- Input voltage 115 or 230 VAC at 50-60 Hz.
- Power consumption up to 400 mA max at 115 / 230 V AC.
- Power supply can be mounted integrally or remote mounted up to 200 feet from illuminator. Consult factory for longer distance requirements.
### COLOR-PORT GAUGE COLUMN CHARTS

<table>
<thead>
<tr>
<th>Pressure Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>850 psi [59 bar]</td>
<td>4511N, 4511N w/Series 4000 gaugecocks, Dual 4511N w/Series 4000 gaugecocks assembled to column</td>
</tr>
<tr>
<td>1800 psi [124 bar]</td>
<td>4511N w/spacer, 4511N w/spacer and Series 4000 gaugecocks, Dual 4511N w/spacer and Series 4000 gaugecocks assembled to column</td>
</tr>
<tr>
<td>3000 psi [207 bar]</td>
<td>4595F, 4595FG, 4595F w/Welbloc L200V, 4595F w/Welbloc L200V and circulating tie bar, Dual 4595F w/Welbloc L200V assembled to column</td>
</tr>
</tbody>
</table>

For locations requiring higher pressure capabilities, use the 4595F with the Welbloc L200V.
STANDARD INSTALLATION ARRANGEMENTS

Wide range of assemblies
Various assemblies and visibilities are available with low, medium or high pressure gauges by using single or multiple gauges and various columns.

Other gauge glass availability
Medium and high pressure flat glass gauges as well as low pressure [250 psi to 650 psi] armored transparent and reflex gauges are available.

How to order Color-Port gauges
For proper Color-Port gauge assembly, pressure, visibility and gauge connections consult selection and visibility charts.

When ordering a separate replacement gauge, provide the serial number of the existing gauge.

VISIBILITY CHART, INCHES (mm)

<table>
<thead>
<tr>
<th>Visibility</th>
<th>12.188 (310)</th>
<th>15.063 (383)</th>
<th>17.938 (456)</th>
<th>20.813 (529)</th>
<th>23.688 (602)</th>
<th>26.563 (675)</th>
<th>29.438 (748)</th>
<th>32.313 (821)</th>
<th>35.188 (894)</th>
<th>38.063 (967)</th>
<th>40.938 (1040)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of ports</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

4511N with 4000 Series gauge cocks - up to 850 psi (59 bar)

Dimension 'A' 24.75 27.625 30.5 33.375 36.25 39.125 42 44.875 47.75 50.625 53.5
Minimum (629) (702) (775) (848) (921) (994) (1067) (1140) (1213) (1286) (1359)

Minimum (314) (351) (387) (424) (460) (497) (533) (570) (606) (643) (679)

4511N with 4000 Series gauge cocks and spacer - up to 1800 psi (124 bar)

Dimension 'A' 25.75 28.625 31.5 34.375 37.25 40.125 43 45.875 48.75 51.625 54.5
Minimum (654) (727) (800) (873) (946) (1019) (1092) (1165) (1238) (1311) (1384)

Dimension 'B' 12.875 14.313 15.75 17.188 18.375 20.063 21.5 22.938 24.375 25.813 27.25

4595F with Welbloc L200V valves - up to 3000 psi (207 bar)

Dimension 'A' 21.188 24.063 26.938 29.813 32.688 35.563 38.438 41.313 44.188 47.063 49.938
Minimum (538) (611) (684) (757) (830) (903) (976) (1049) (1122) (1195) (1268)

Minimum (194) (230) (267) (303) (340) (376) (413) (449) (486) (522) (559)

4595FG with Welbloc L200V valves - up to 3000 psi (207 bar)

Dimension 'A' 17.5 20.375 23.25 26.125 29 31.875 34.75 37.625 40.5 43.375 46.25
Minimum (445) (518) (591) (664) (737) (810) (883) (956) (1029) (1102) (1175)

Minimum (194) (230) (267) (303) (340) (376) (413) (449) (486) (522) (559)
Gauge valves
Series 4000 gauge cocks are designed to be used with stuffing box type (nipple end) low and medium pressure gauges (up to 1800 psi, 124 barg) to isolate the gauges from the pressure vessel when it becomes necessary to drain and service them. These models feature:

- Outside screw and yoke.
- A vertical rising lower and horizontal leaky upper ball check shut-off.
- An offset pattern that allows the inside of the gauge glass to be cleaned easily with a minimum of disassembly.
- Solid shank vessel connection (NPT, socketwelding or flanged ends).
- Threaded renewable seat and backseating stem.

Welbloc L200V type gauge valves are designed to be used with flanged end high pressure gauges (up to 3000 psi, 207 barg). Welbloc L200V gauge valves feature a Stellite disc and integral Stellite seat. Internals are completely accessible with the valve connected in the line.

Chain and line pulls are available for series 4000 and Welbloc L200V gauge valves.

Drain connections
Series 4000 stuffing box gauge cocks: ½” and ¾” NPTF and socketwelding available; located on lower gauge cock.

Welbloc L200V gauge valves: ¾” socketweld connection located at bottom on lower valve block.

Water columns: ¾” socketweld connection located at bottom of column.

Tie bar: ½” socketweld connection located at bottom of tie bar assembly.

Determining gauge valve 'hand': when facing chain wheels, valve is left hand when gauge is on your left; valve is right hand when gauge is on your right.
GAUGE ACCESSORIES

Ball check shut off
Series Hy-P ball checks are designed for high pressure applications (up to 3000 psig, 207 barg) to limit the flow of process fluid due to sudden downstream pressure loss such as glass breakage. The benefit of the ball check is to safeguard personnel and property from the sudden escape of high pressure steam or water. These models are supplied in pairs (upper and lower) with a vertical rising ball for the lower mount application and a horizontal ball with leaky seat for upper mounting to meet ASME Boiler and Pressure Vessel Code Section I applications.
Water column

As an option, gauge 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 (207 barg) and temperatures up to 1200°F (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 either to 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 and is used 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

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 gauge. 27” (686 mm) standard gauge and boiler connections.