REFLEX / TRANSPARENT FLAT GLASS LEVEL GAUGE `RFG / TFG'

Techtrol™
Innovating Level Controls Since 1984

Reflex / Transparent Glass Level Gauges are designed for safe & positive visual indication of liquid level in vessels under high pressure & temperature conditions **Reflex Flat Glass** has precision molded prismatic grooves cut on inner surface, which comes in contact with liquid. Light striking on glass portion covered by liquid is refracted (absorbed) making this portion appear BLACK, whereas glass portion covering vapour space reflects light, making it appear SILVERY-WHITE. Thus, a sharp clear line marks the liquid, eliminating all possibilities of errors in reading. **Transparent Flat Glass** is a clear glass for visual level indication & specially for interface services or where the liquid is dirty or viscous.

Construction:

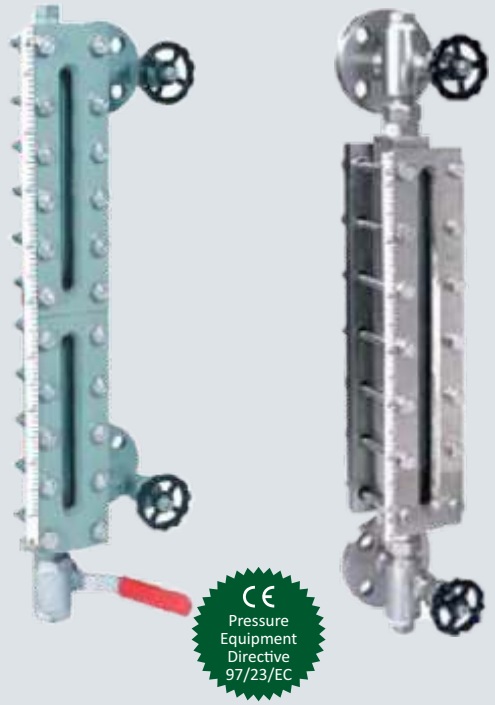
Reflex (Fig.1): The liquid chamber (01) is formed by one piece metal body, reflex gauge glass (08), sealing gasket (04), cushion (05) and cover plate (02) all held together by 'U'-bolts & nuts (09). The gauge glass sandwiched between the gasket & cushion is placed on front side for viewing of liquid level & held in the recesses machined in the body and cover plate. This ensures leak proof assembly, which prevents gasket/cushion slippages and avoids glass to metal contact. The glass section comes in lengths from 190mm to 340mm and as many as 5 can be fitted in a single gauge assembly. Longer CC distance can be provided by coupling two gauge assemblies through a flanged coupler or the level gauges can be installed in staggered manner. The level gauge is usually provided with shut-off valves at either ends, to isolate the gauge in the event of glass breakage or replacement.

Transparent (Fig. 2): The construction is similar to Reflex except that the liquid chamber (01) is formed by one piece metal body and a pair of transparent gauge glass plates(03).

Specifications:

Gauge classification	: Low pressure X 30Kg/cm², Medium pressure X 85Kg/cm²
Test Pressure	: High pressure X 165Kg/cm², Very high pressure X 210Kg/cm²
Gauge glass	: Tempered soda ash/ borosilicate (30W x 17mm Thk) / Tempered borosilicate (34W x 17mm Thk)
Cushion/Gasket	: CAF, CNAF, PTFE, Graphoil SS316 reinforced, Graphoil SS304 reinforced, CAF (steam service)
Body (liquid chamber)	: CS, ASTM A -105, SS304, SS316 or PP (CS Reinforced), Rubber lined as a special option
Cover Plate	: CS, ASTM A -105, SS304, SS316 or FRP
Chamber connection	: ½" NPT (F)
Bolts & Nuts	: CS or SS304 or A 193 Gr. B7, CS or SS304 or A 193 Gr. 2H
Gauge Connection	: Hook up (side-side chamber conn) or Straight thru` (top-bottom chamber conn)
Process (vessel) Conn.	: Flanged 20 or 25 NB to various standards & pressure ratings Screwed ¾" male shank,union & spherical union
Process Conn Orientation	: Rear/Rear or Left/Left or Right/Right or Vertical/ Vertical
Isolating Valves	: Offset needle valve x auto ball check x Screwed bonnet upto 85 Kg/cm² / Union bonnet upto 165Kg/cm² / Bolted bonnet (IS) upto 85 Kg/cm² / Bolted bonnet (OS) upto 210 Kg/cm²
Vent	: ½" NPT (BSP for PP/TEFLON MOC) plug / valve (Ball, Needle,Diaphragm, Globe, Gate as reqd.)
Drain	: ½" NPT(BSP for PP/TEFLON MOC) plug/valve (Ball, Needle, Diaphragm, Globe, Gate as reqd.)
Calibrated Scale	: Polycarbonate (LC=2mm) / SS304 (LC=10mm)
Special features	: a) Frost free extn:- Perspex shield with extension of 30mm. b) Jacketing :- ¼" SS pipe with condensate drain valve c) Illuminator :- Enclosure Cast Al, WP IP 65 or Ex-proof Gr IIA & IIB or IIC, 15 W bulb supply 230 VAC on 20mm perspex shield (LED bulb, 90 to 270 VAC on demand).
CC Distance (mm)	: Metallic : a)170 to 2120 (hook up), b) 330 to 2280 (straight thru),PP : 320 to 1600 (straight thru)
Max. Temp	: 70 deg C (PP), 400 deg C (CS/SS)

REFLEX-RFG TRANSPARENT-TFG



CE Pressure Equipment Directive 97/23/EC

IBR Approved for steam service

Fig.1 REFLEX

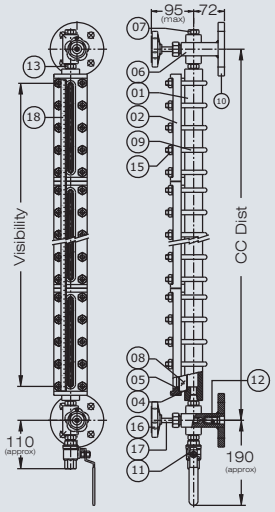
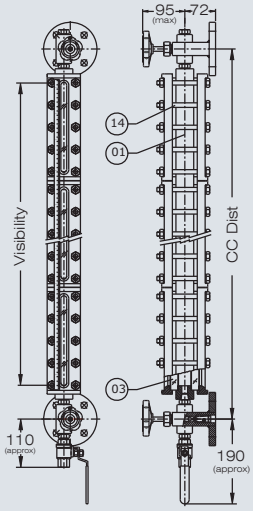


Fig.2 TRANSPARENT



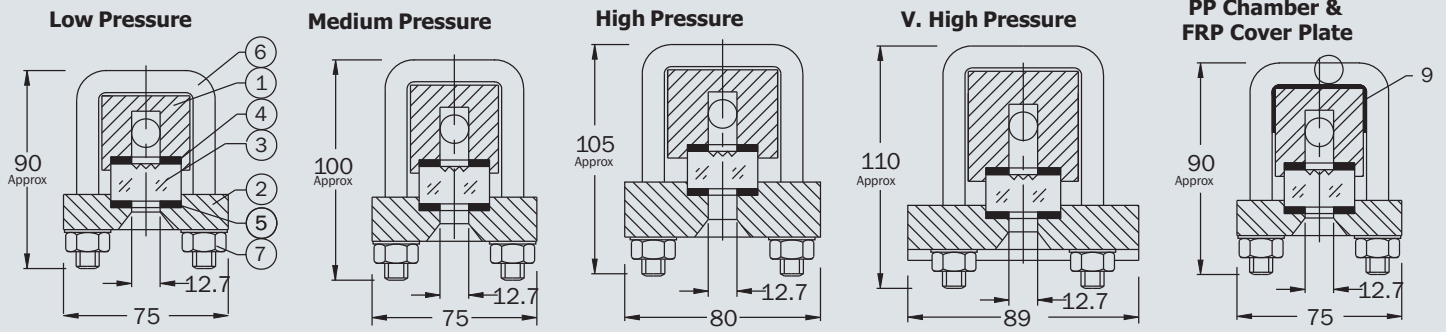
01) Liquid Chamber
02) Cover Plate
03) Gauge (Transparent)
04) Gasket
05) Cushion
06) Isolating Valve
07) Vent Plug
08) Gauge (Reflex)
09) `U' Bolts
10) Process Connection
11) Drain Valve (B.V.)
12) Auto Ball Check
13) Adapter
14) Studs
15) Nuts & Bolts
16) Hand Wheel
17) Valve Needle
18) Cal Scale

Gauge Type with Classification (Sectional view) `RFG/TFG '

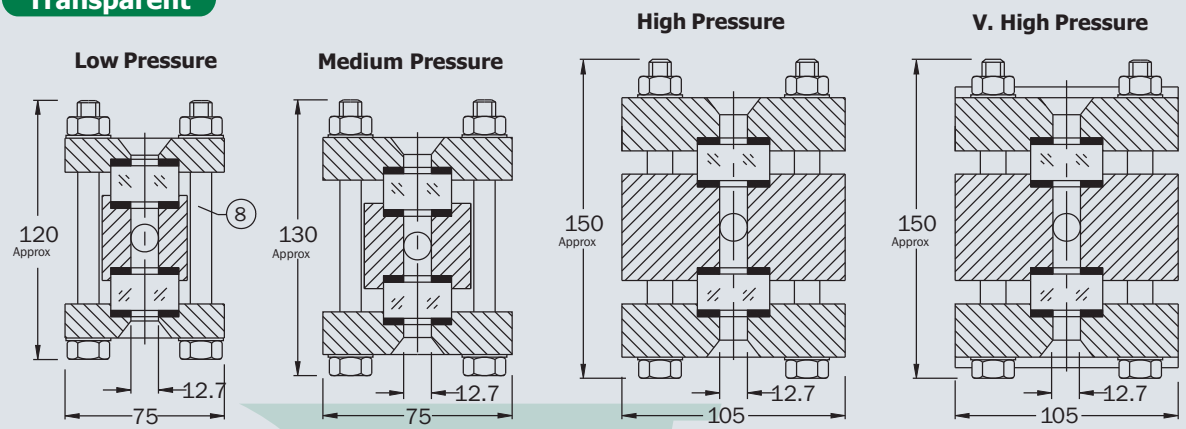
Techtrol™ Innovating Level Controls Since 1984

Reflex

Fig. 3



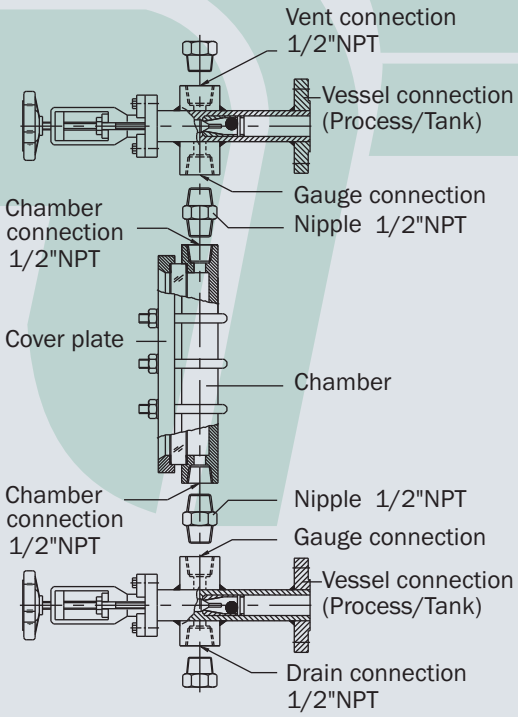
Transparent



1) Liquid chamber
2) Cover plate
3) Gauge glass
4) Gasket
5) Cushion
6) `U' bolt
7) Nuts & washers
8) Stud bolt
9) CS reinforced

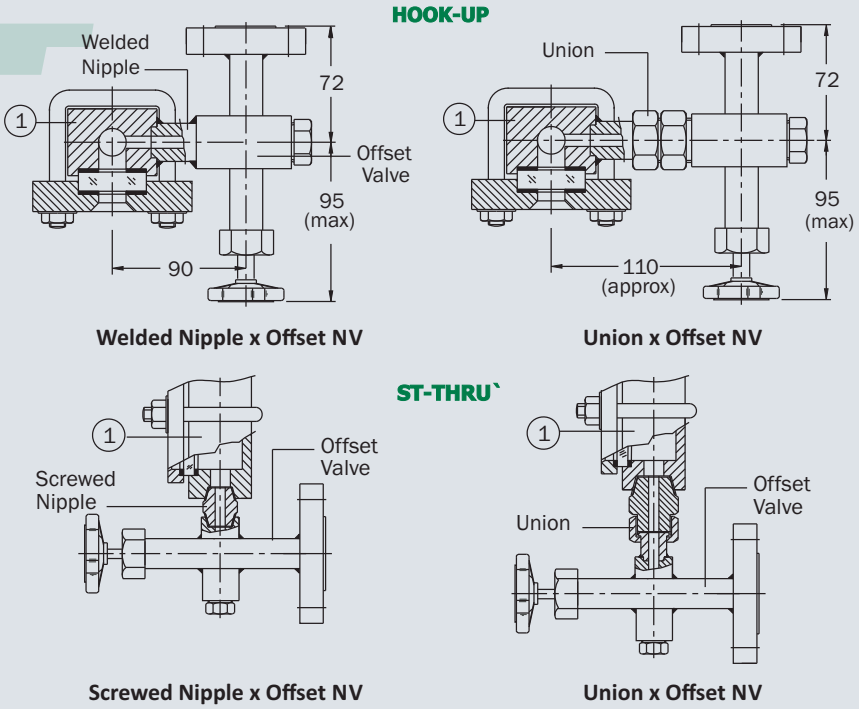
Exploded view

Fig. 4



Gauge Connection & Isolating Valve

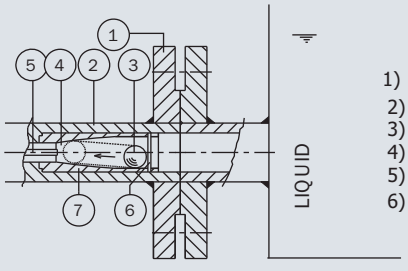
Fig. 5



Function of Auto Ball Check

Autoball check facility is provided to prevent "liquid loss" from vessel during breakage of gauge glass. It consists of a capsule located within the gauge 'neck' and contains a 'ball' which moves freely along its inner race between the stopper & orifice. During breakage, the pressure on 'ball' from gauge side will be atmospheric, whereas higher pressure from vessel side ("optg pr + liquid column") will cause the ball to move and block the orifice, to minimize liquid loss.

Fig. 6



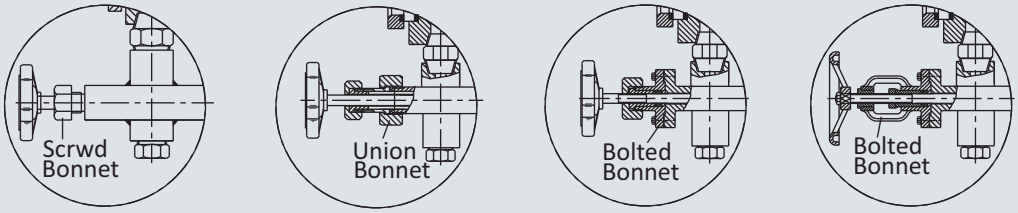
1) PROCESS FLANGE
2) NECK
3) BALL
4) ORIFICE
5) NEEDLE
6) BALL STOPPER

Enquire for IBR Certified Reflex & Transparent / Weld Pad Gauges for Dirty & Viscous Liquids Available

Isolating Valve Bonnet

Fig. 7

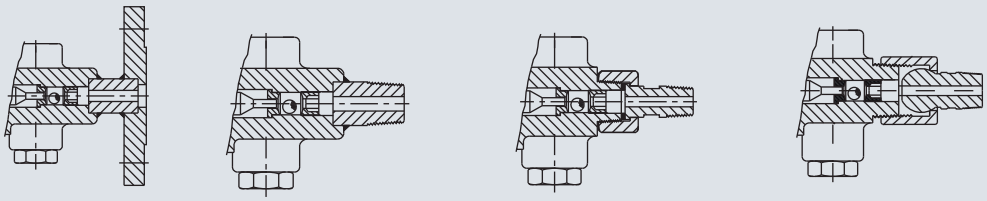
Screwed Bonnet | Union Bonnet | Bolted Bonnet Inside Screw | Bolted Bonnet Outside Screw



Process (Vessel) Connections

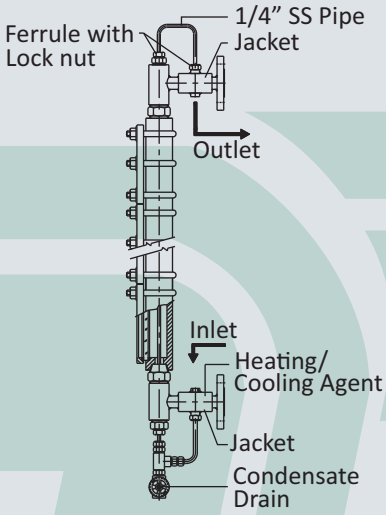
Fig. 8

1) Flanged | 2) Male Screwed Shank | 3) Male Screwed Union | 4) Male Sph. Union



Jacketing

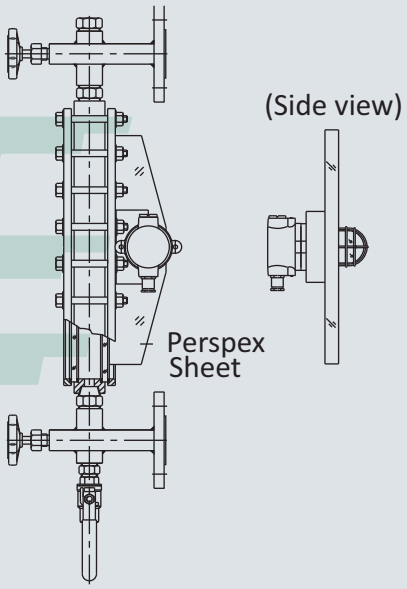
Fig. 9



Is employed for heating/cooling of process liquid at temperature other than amb temperature, to prevent its solidification. Heating is done thru` hot water / steam and cooling thru` a refrigerant like freon, propane, or ammonia, which pass internally thru` a SS pipe, gauge chamber to come in direct contact with process liquid.

Illuminator

Fig. 10



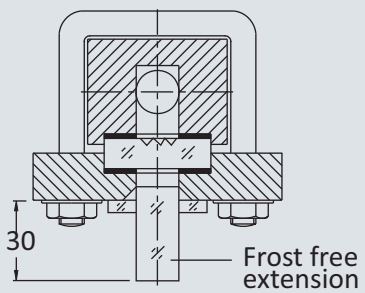
Illuminates poorly lit areas for proper visual indication

Frost Free Extension (Sectional View)

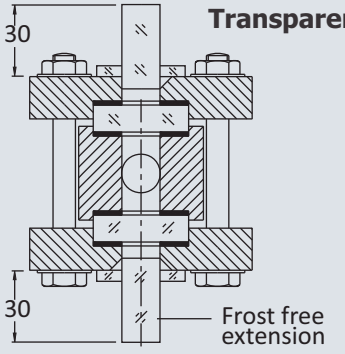
Fig. 11

'Frost Free Extension' is employed for liquids at low temperature. The protective perspex extension, clamped on to it, prevents 'Frost Formation' on outside surface of gauge glass, resulting in clear visual reading of level.

Reflex

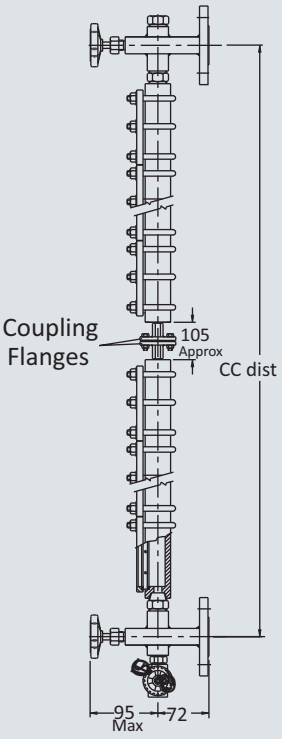


Transparent



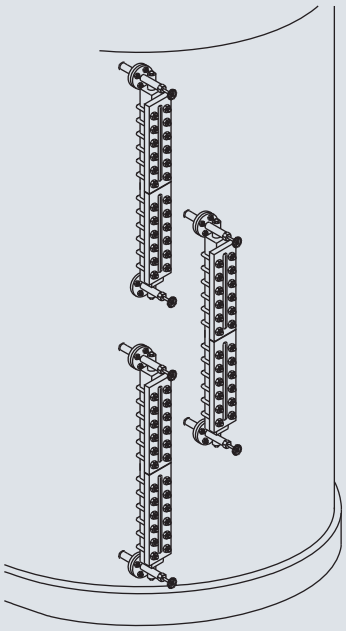
Techtrol™ Innovating Level Controls Since 1984

Fig.12



Long CC. Distance with 2-Chambers

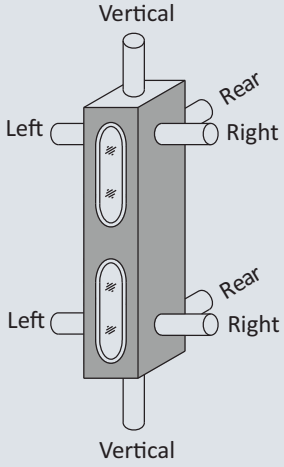
Fig. 13



Staggered Installation

Orientation of Process Conn.

Fig. 14

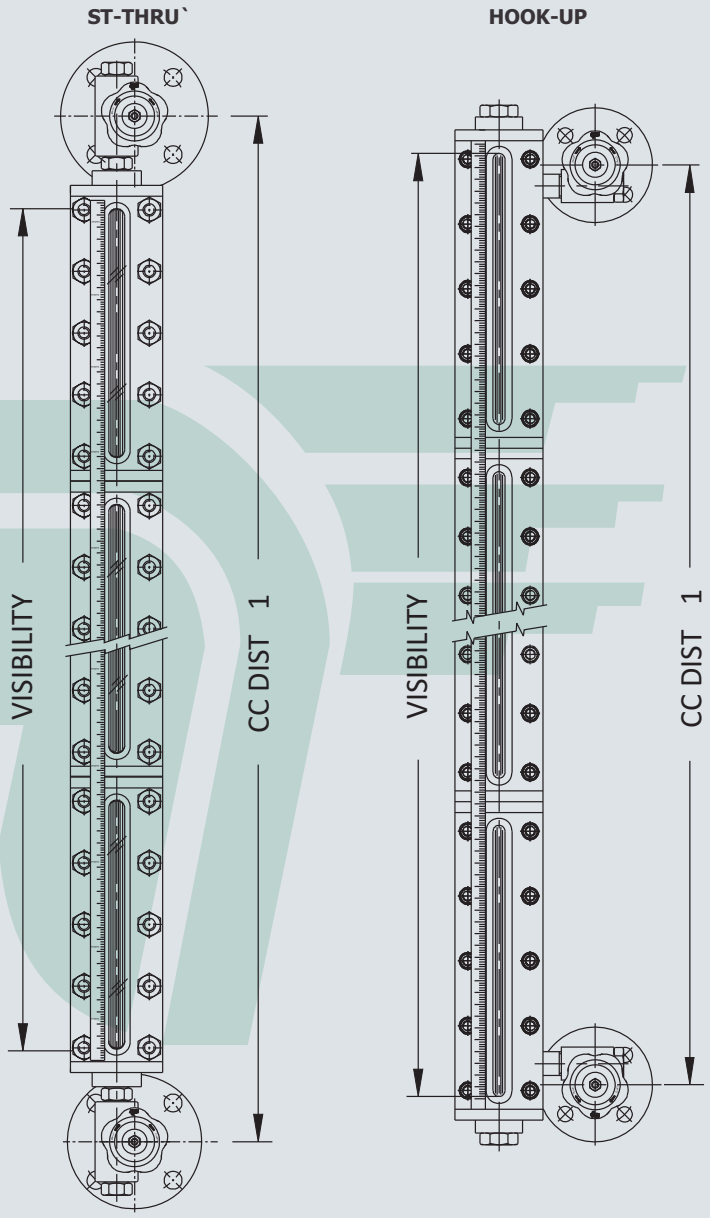


Note :
RFG (hook-up & straight thru) and TFG (straight thru) available in above orientations. **TFG (hook-up) not provided in Left x Left and Right x Right orientation.**

Gauge Classification (Non Steam Service)

Gauge classification	Body MOC	Gauge Glass MOC	Gauge Glass size (mm)	Max Temp (°C)	Test pressure at amb temp Kg/cm2)
Low	Metallic	Soda ash	30W x 17 Thk	100	30
	Metallic	Borosilicate	30W x 17 Thk	400	30
	PP	Soda ash	30W x 17 Thk	80	3
Medium pressure	Metallic	Borosilicate	30W x 17 Thk	400	75
High pressure	Metallic	Borosilicate	30W x 17 Thk	400	165
Very High pressure	Metallic	Borosilicate	30W x 17 Thk	400	210

Fig. 15



Model Identification

Model No. ☐ FG- ☐☐☐☐☐☐☐☐☐☐☐☐ x CC Dist. (mm)

Gauge Type
- Reflex — R
- Transparent — T

Gauge Classification
- Low Pressure (30Kg) — L
- Medium Pressure (85Kg) — M
- High Pressure (165Kg) — H
- Very High Pressure (210Kg) — V

Body (Liquid Chamber) x Cover Plate
- CS x CS (Low Pressure only) — 1
- ASTM A-105 x ASTM A-105 — 2
- SS304 x ASTM A-105 — 3
- SS304 x SS304 — 4
- SS316 x ASTM A-105 — 5
- PP (CS Reinforced) x FRP (Low Pressure only) — 6
- Others — O

Gauge Glass
- Tempered Soda Ash (30W) (Low Pressure only) — 1
- Tempered Borosilicate (30W) — 2
- Tempered Borosilicate (34W) — 3
- Tempered Soda Ash (30W) x Mica Shield — 4
- Tempered Borosilicate (30W) x Mica Shield — 5
- Tempered Borosilicate (34W) x Mica Shield — 6

Sealing Gasket
- CAF — 1
- CNAF — 2
- PTFE — 3
- Graphoil Ss316 reinforced — 4
- Graphoil SS304 reinforced — 5
- CAF (steam service) — 6
- Others — O

Isolating Valves
- Without — W
- Integral Offset NV x Scrwd Bonnet — 1
- Integral Offset NV x Scrwd Bonnet x Ball check — 2
- Integral Offset NV x Bolted Bonnet (OS) — 3
- Integral Offset NV x Bolted Bonnet (OS) x Ball check — 4
- Integral Offset NV x Union Bonnet — 5
- Integral Offset NV x Union Bonnet x Ball check — 6
- Inline flanged BV (Low Pressure only) — 7
- Integral Offset NV x Bolted Bonnet (IS) — 8
- Integral Offset NV x Bolted Bonnet (IS) x Ball check — 9
- Others — O

Vent x Drain
- ½" Plug x ½" Plug — 1
- ½" Plug x ½" BV (200ºC) (Low & Medium Pressure only) — 2
- ½" Plug x ½" GBV — 3
- ½" Plug x ½" GTV — 4
- Others — O

Gauge Connection
- Hook-up (Side - Side) x Welded Nipple — 1
- Hook-up (Side - Side) x Union — 2
- St-thru` (Top - Bottom) x Threaded Nipple — 3
- St-thru` (Top - Bottom) x Union — 4
- Others — O

Process (Vessel) Connection
- Flanged — F
- Male Screwed Shank — S
- Male Screwed Union — U
- Male Spherical Union — R
- Others — O

Process Connection Orientation
- Rear x Rear — B
- Left x Left — L
- Right x Right — R
- Vertical x Vertical — V
- Others — O

Special Features
- Without — W
- Frost Free Extension — F
- Jacketing — J
- Illuminator IP 65 (for TFG only) — X
- Illuminator Ex-p Gr IIA & IIB (for TFG only) — Y
- Illuminator Ex-p Gr IIC (for TFG only) — Z

Units in mm

Ordering Information

Specify Model No., Liquid, CC Dist, Optg Temperature & Pressure

Pune Techtrol Pvt Ltd [CIN : U31909PN1991PTC063403]

Address : S-18, MIDC, Bhosari, Pune - 411026. India

ho@punetechtrol.com +91-20-66342900 www.punetechtrol.com

Works : J-52/7, MIDC, Bhosari, Pune - 411026. India +91-20-67313600