Reflex / Transparent Flat Glass Level Gauges

RFG / TFG

Techtrol
SINCE 1984

Reflex & Transparent Flat Glass Level Gauges are designed for safe and positive visual indication of liquid level in vessels under high pressure & temperature conditions.

Reflex Flat Glass has precision moulded 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.

Fig. 1 : REFLEX

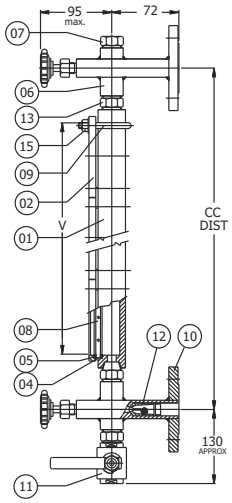
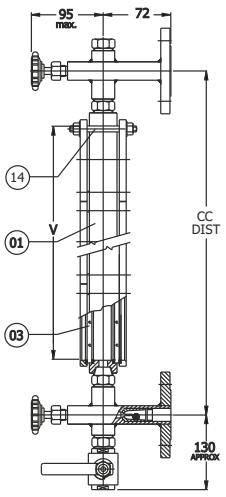


Fig. 2 : TRANSPARENT



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 & Washer

CE Pressure Equipment Directive 97/23/EC

REFLEX-RFG

TRANSPARENT-TFG

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 machine 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

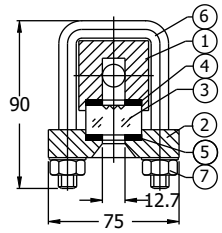
Gauge classification X	: Low pressure X 30Kg/cm², Medium pressure X 85Kg/cm²
Test pressure	High pressure X 165Kg/cm², Very high pressure X 210Kg/cm²
Gauge glass	: Tempered soda ash/ Borosilicate (30W x 17mm Thk) /
	Tempered borosilicate (34W x 17mm Thk)
Cushion/Gasket	: CAF, CNAF, PTFE, SS304 Spiral wound with Graphite Filler &
	SS316 Spiral wound with Graphite Filler
Body (liquid chamber)	: CS, ASTM A -105, SS304, SS316 or PP (CS Reinforced)
Cover plate	: CS, ASTM A -105, SS304, SS316 or FRP
Chamber connection	: ½" NPT (F)
Bolts	: CS or SS304 or A 193 Gr. B7
Nuts	: CS or SS304 or A 194 Gr. B4
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 (85 Kg/cm²) /
	Union bonnet (165Kg/cm²) / Bolted bonnet (210Kg/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
	15W bulb x 230VAC supply on 20mm perspex shield
CC Distance (mm)	: Metallic : a)170 to 2120 (hook up), b) 330 to 2280 (straight thru)
	PP : 320 to 1600 (straight thru)

Longer CC Distance are provided in 2 chambers coupled with flange coupler

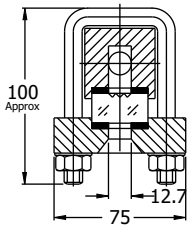
Fig. 3 Gauge Type with Classification (Sectional view)

Reflex

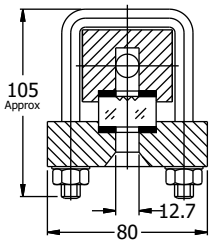
Low Pressure



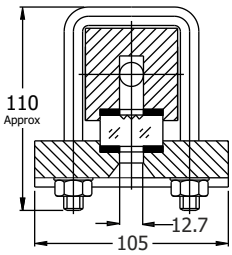
Medium Pressure



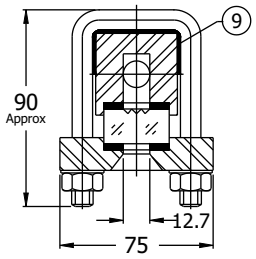
High Pressure



V-High Pressure

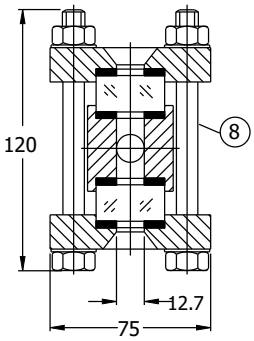


PP Chamber & FRP Cover plate

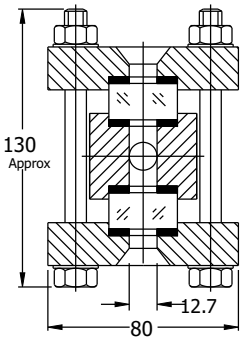


Transparent

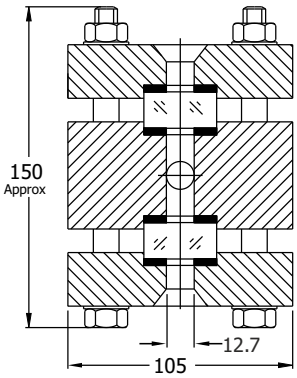
Low Pressure



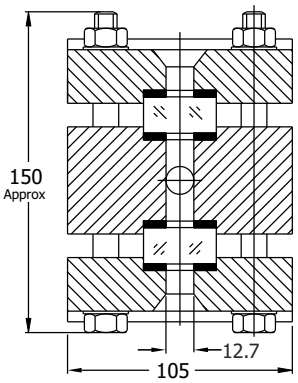
Medium Pressure



High Pressure



V-High Pressure



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

Fig. 4 Exploded View

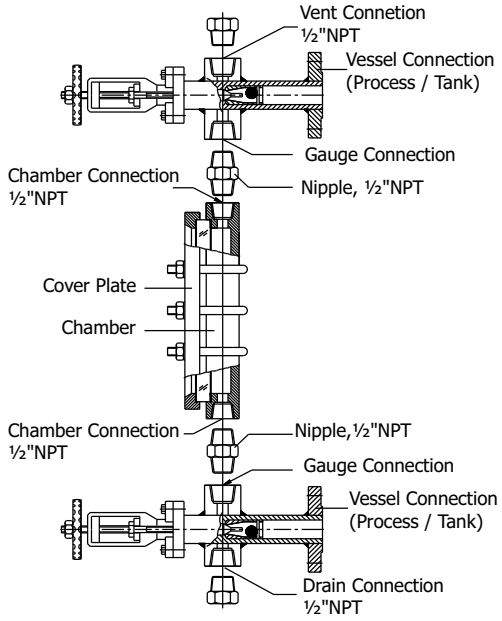
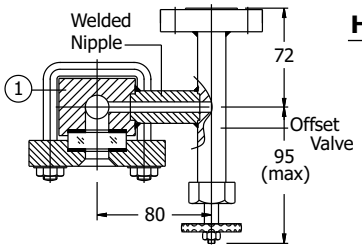
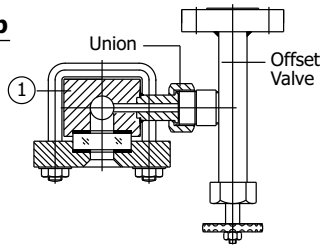


Fig. 5 Gauge Connection & Isolating Valve



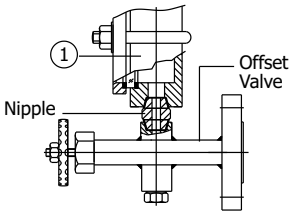
Welded Nipple x Offset NV

Hook-up

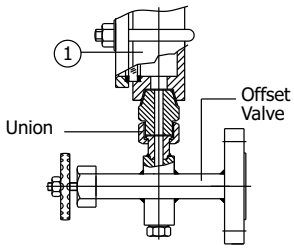


Union x Offset NV

St-thru'



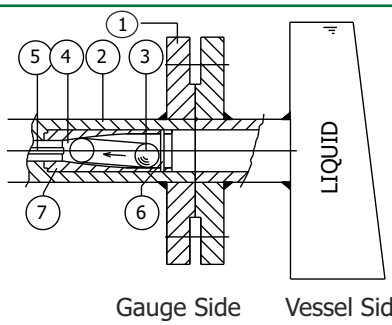
Screwed Nipple x Offset NV



Union x Offset NV

Fig. 6 Function of Auto Ball Check

Autoball check facility is provided to prevent 'liquid loss' from vessel during breakage of gauge glass. It consist 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.



1) Process Flange
2) Neck
3) Ball
4) Orifice
5) Needle
6) Ball stopper
7) Capsule

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

Fig. 7 — **Isolating Valve Bonnet**

Screwed Bonnet | **Union Bonnet** | **Bolted Bonnet**

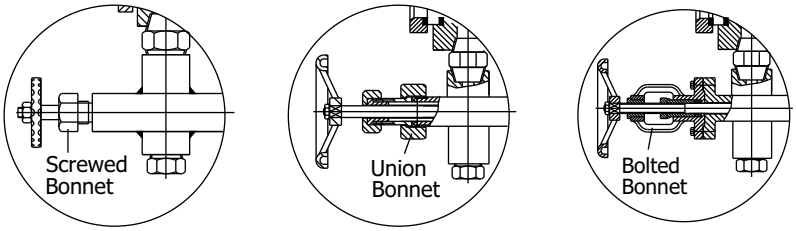


Fig. 8 — **Process (Vessel) Connections**

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

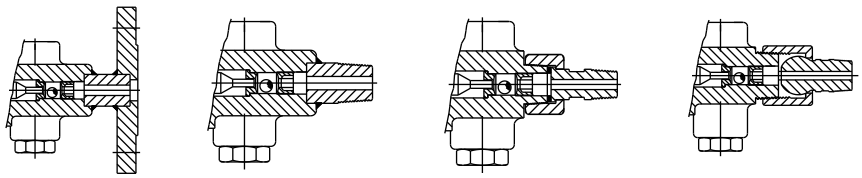
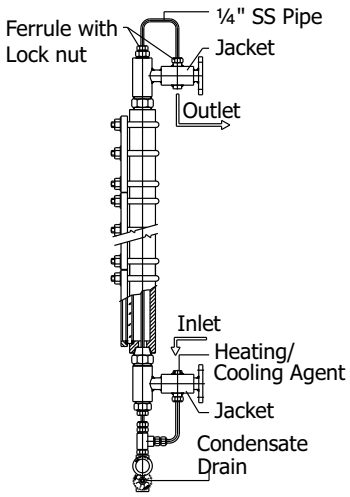
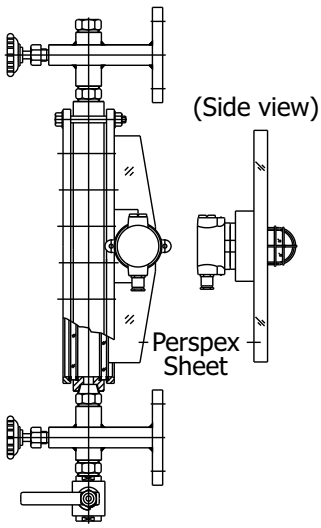


Fig. 9 — **Jacketing**



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.

Fig. 10 — **Illuminator**



Illuminates poorly lit areas for proper visual indication

Fig. 11 — **Frost Free Extension (Sectional view)**

'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**

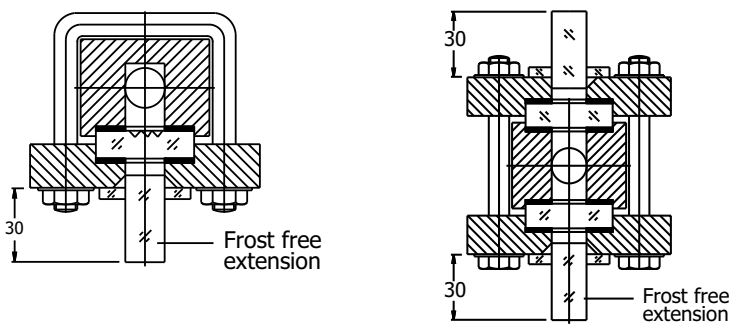


Fig. 12 — **Long CC. Distance with 2-Chambers**

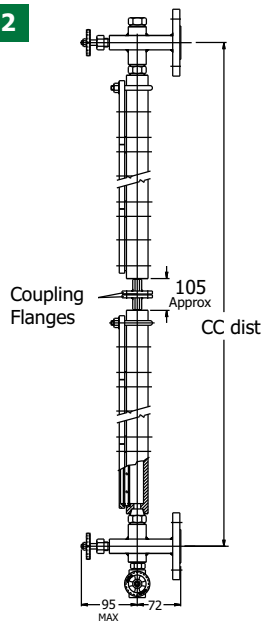


Fig. 13 — **Staggered Installation**

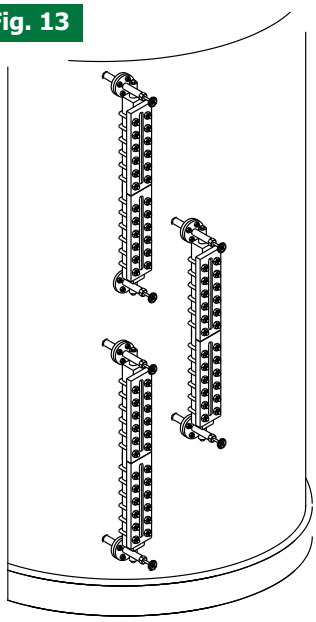
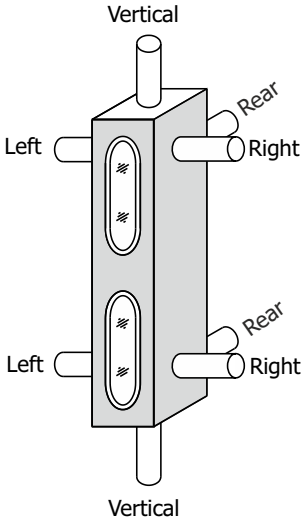


Fig. 14 — **Orientation of Process Conn.**



RFG / TFG

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
- Non std — 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 — 4
- SS304 Spiral Wound Graphite filler — 5
- Other — 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 — 3
- Integral Offset NV x Bolted Bonnet 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

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
- Non-Std — 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
- Non std — O

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

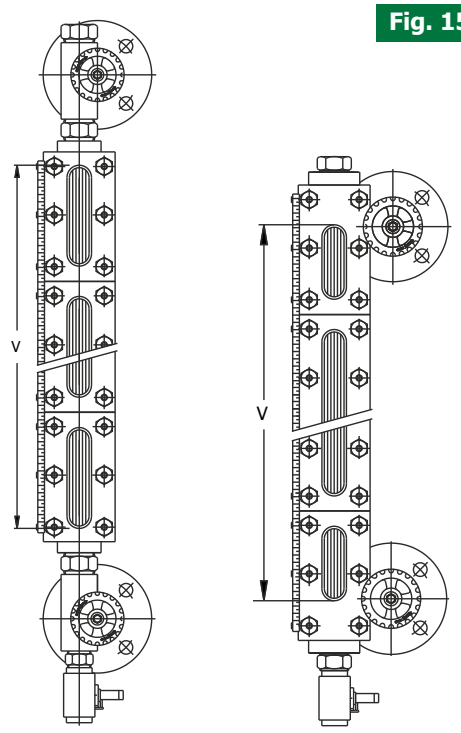
Process Connection Orientation
- Rear x Rear — B
- Left x Left — L
- Right x Right — R
- Vertical x Vertical — V
- Non std — O

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

Gauge classification

Gauge classification	Body MOC	Gauge Glass MOC	Gauge Glass Size (mm)	Max Temp (°C)	Test Press at amb temp (Kg/cm²)
Low pressure	Metallic	Soda ash	30W x 17 Thk	100	30
		Borosilicate		400	30
	PP	Soda ash		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	34W x 17 Thk	400	210

Fig. 15



Straight Thru' **Hook up**

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

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All Dimensions are in mm except specified