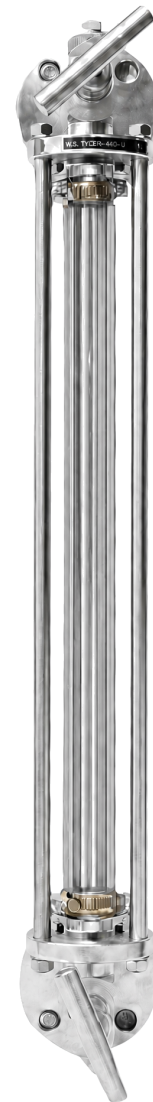


LEVEL MEASUREMENT

Tubular Level Gauge

Installation, Operation, and Maintenance Manual for
Model ITLG.



General Information

Essential safety and handling guidelines for the ITLG Tubular Level Gauge.

1.1 Purpose of this Manual

This manual provides instructions for the safe installation, operation, and maintenance of Globe United Tubular Level Gauges (Model ITLG). It is intended for qualified personnel responsible for the installation and servicing of the equipment.

IMPORTANT SAFETY NOTICE

Failure to follow the instructions in this manual may result in equipment damage, process fluid leakage, or personal injury. Ensure the system is fully depressurized and isolated before performing any maintenance.

1.2 Product Description

The Tubular Level Gauge is a highly reliable and economical instrument designed for direct liquid level measurement in tanks and vessels. It features a robust frame connected to the process via threaded or flanged connections. A toughened borosilicate glass tube provides direct visual indication of the process fluid.

ORDER DOCUMENT PRECEDENCE

Final supplied configuration, materials, dimensions, limits, process connections, accessories, inspection scope, and documentation are governed exclusively by the approved order data sheet, approved drawings, and the equipment nameplate.

1.3 Operating Principle

The liquid level inside the glass tube corresponds exactly to the level within the tank. The gauge operates on the principle of communicating vessels, providing a direct and continuous reading.

1.4 Receipt, Handling, and Storage

Upon receipt, carefully unpack the level gauge and inspect for transit damage. Verify components against the packing list and approved order data sheet. Pay special attention to the glass tube to ensure it is free from cracks. Store the gauge in its original packaging in a clean, dry, indoor environment away from direct sunlight, extreme temperatures, and mechanical vibration. Do not stack heavy items on top of the gauge packaging.

1.5 Equipment Nameplate

Every gauge is fitted with a permanent stainless steel nameplate containing critical information, including the serial number, tag number, design pressure/temperature, and materials of construction. Always refer to the nameplate before installation or operation to verify suitability for the process conditions.

02 / Technical Specifications

Design & Operating Limits

Standard specifications and material options for the ITLG series.

2.1 Standard Specifications

Parameter	Specification
Mounting	Side-Side
C-C Distance	Up to 3000 mm
Process Connection	Threaded or Flanged
Drain & Vent	Flanged & Valve
Max. Temperature	100°C
Max. Pressure	2 bar (PP, PVDF, PTFE); 10 bar (SS, CS)
Sight Glass	Toughened Borosilicate

2.2 Material Options

Component	Material Options
Body Material	Carbon Steel, SS316/SS316L, PTFE (Others on request)
Scale MOC	SS316L
Gaskets	PTFE
End Blocks	CS, SS 304, SS 316, PP
Glass Protection	SS/MS Tie Rods or 'C' Channels

2.3 Salient Features

- 360° visibility with tie rod guard for enhanced glass protection.
- Glass removal and replacement can be performed while keeping other parts connected.
- Frost-free extension prevents frost formation on the gauge glass in low-temperature applications.
- Autoball check mechanism significantly reduces liquid leakage in the event of glass breakage.
- Toughened borosilicate glass tube ensures durability and clarity.
- Optional LED illuminator available for reading in low light conditions.

SPECIFICATION CONTROL

All flanged connections are Class 150 (ASME) / PN16 (EN) unless otherwise specified. Final values for pressure, temperature, and material compatibility are defined by the approved order data sheet and nameplate.

03 / Installation

Mounting Instructions

Procedures for safe and accurate installation of the level gauge.

3.1 Pre-Installation Checks

Before proceeding with the installation, verify the following:

1. The center-to-center (C-C) distance of the vessel connections matches the gauge C-C distance.
2. The process connection types and sizes are compatible.
3. The vessel is fully depressurized, drained, and safe for work.
4. The gauge materials are compatible with the process fluid.

3.2 Mounting Procedure

Follow these steps to mount the level gauge:

1. Ensure the vessel flanges or threaded connections are clean and free of debris.
2. Position the level gauge vertically, aligning the top and bottom connections with the vessel.
3. Insert the appropriate gaskets (e.g., PTFE) between the flanged connections. For threaded connections, use suitable thread sealant.
4. Loosely install the bolting hardware (for flanged connections).
5. Ensure the gauge is perfectly vertical and free from mechanical stress. Do not force alignment, as this may stress the glass tube.
6. Tighten the connection bolts evenly in a crisscross pattern to the appropriate torque, or fully tighten threaded connections.

STRESS PREVENTION

The glass tube is sensitive to mechanical stress. Ensure the vessel connections are perfectly aligned. Misalignment can induce stress leading to glass breakage during operation.

TORQUE VALUES

Do not over-tighten flange bolts. Final tightening torque depends on the gasket material and flange rating. Refer to the approved project documentation for specific torque requirements.

04 / Operation

Commissioning & Use

Start-up procedures and operating guidelines.

4.1 Start-Up Procedure

To bring the level gauge into service, follow this sequence carefully to prevent thermal or pressure shock to the glass tube:

1. Verify that the vent and drain valves on the gauge are closed.
2. Ensure the top and bottom isolation valves (connecting to the vessel) are closed.
3. Slowly crack open the top isolation valve to equalize pressure between the vessel and the gauge. Allow the pressure to stabilize.
4. Slowly open the bottom isolation valve to allow the process fluid to enter the gauge.
5. Fully open both the top and bottom isolation valves.
6. Inspect all connections and the glass tube for any signs of leakage.

4.2 Normal Operation

During normal operation, the level gauge provides continuous visual indication of the liquid level. Ensure the gauge is protected from external mechanical impacts.

THERMAL SHOCK WARNING

Avoid rapid temperature changes. Introduce hot or cold fluids slowly to prevent thermal shock, which can cause the borosilicate glass to shatter.

AUTOBALL CHECK MECHANISM

If equipped, the autoball check mechanism will automatically restrict fluid flow in the event of glass breakage. Note that this is a safety feature and does not replace proper isolation procedures.

05 / Maintenance

Inspection & Servicing

Routine maintenance and glass replacement procedures.

5.1 Routine Inspection

Perform periodic visual inspections of the level gauge:

- Check the glass tube for clarity, etching, cloudiness, or physical damage (cracks, chips).
- Inspect all process connections, vents, and drains for leaks.
- Verify the integrity of the protection guards (tie rods or 'C' channels).
- Clean the exterior of the glass tube with a soft cloth and appropriate non-abrasive cleaner to maintain visibility.

5.2 Isolation and Draining

Before performing any maintenance, the gauge must be safely isolated:

1. Fully close the top and bottom isolation valves.
2. Slowly open the drain valve to empty the process fluid into a safe containment system.
3. Open the vent valve to fully depressurize the gauge.

5.3 Glass Replacement

The glass tube can be replaced while keeping the end blocks connected to the vessel:

1. Ensure the gauge is fully isolated, drained, and depressurized.
2. Loosen the packing nuts or glands at the top and bottom end blocks.
3. Carefully slide the glass tube upwards into the top block to clear the bottom block, then tilt and remove it.
4. Remove old packing rings and clean the seating surfaces.
5. Install new packing rings onto the new glass tube.
6. Insert the new tube into the top block, then lower it into the bottom block.
7. Hand-tighten the packing nuts evenly, then apply final tightening to secure the seal without crushing the glass.

SPARE PARTS

Use only Globe United approved replacement glass tubes and packing materials. Refer to the project documentation for exact material specifications.

06 / Configuration Reference

Model Selection Guide

Configuration codes for the ITLG series. Provided for reference against the approved order data sheet.

MODEL CODE STRUCTURE

ITLG - X₁ - X₂ - X₃ - X₄ - X₅ - X₆ - X₇ - X₈ - X₉ - X₁₀ - X₁₁ - X₁₂

BASE CONFIGURATION

Code	X1: C-C Distance
XXXX	Specify in mm

Code	X2: Guards
A	SS304 'C' Channels
B	MS 'C' Channels
C	SS Tie Rod
D	MS Tie Rod

Code	X3: MOC
SS	SS316/SS316L
CS	CS
PT	PTFE
PP	PP
PF	PVDF

Code	X4: Orientation
L	Left
R	Right
B	Back
V	Vertical

PROCESS CONNECTION

Code	X5: Type
SO	Slip on Flange
WN	Weld Neck Flange
SW	Socket Weld
RWN	RTJ Weld Neck
TH	Threaded Flange
M	Threaded NPT-M
N	Threaded NPT-F

Code	X6: Size
A	1/2" (ASME)
B	3/4" (ASME)
C	1" (ASME)
1	DN 15 (EN)
2	DN 20 (EN)
3	DN 25 (EN)

VENT & DRAIN

Code	X7/X10: Type
PV	Plug Valve
NV	Needle Valve
BV	Ball Valve
SO	Slip on Flange
WN	Weld Neck

Code	X8/X11: Conn.
N	NPT
B	BSPT
-	None (Flanged)

Code	X9/X12: Size
A	1/2" (ASME)
B	3/4" (ASME)
C	1" (ASME)
1	DN 15 (EN)
2	DN 20 (EN)
3	DN 25 (EN)

07 / Troubleshooting & Disposal

Troubleshooting & Decommissioning

Fault resolution and end-of-life disposal guidelines.

7.1 Troubleshooting

If the level gauge fails to indicate correctly or leaks, check the following:

Symptom	Possible Cause & Action
No level visible	Isolation valves closed. Open valves slowly.
Sluggish response	Blockage in connections. Isolate, drain, and clean.
Leak at glass ends	Packing loose or worn. Tighten packing nuts or replace packing.
Cloudy glass	Chemical etching. Replace glass tube with compatible material.

7.2 Decommissioning and Disposal

When removing the gauge from service permanently:

1. Follow the isolation and draining procedures (§5.2).
2. Disconnect the gauge from the vessel flanges or threaded connections.
3. Clean the gauge of any residual hazardous process fluids.
4. Separate materials (glass, steel, PTFE) and dispose of them according to local environmental regulations.

WARNING: HAZARDOUS FLUIDS

Ensure all process fluids are completely purged and neutralized before disassembly to prevent environmental contamination or personnel exposure.

08 / Support and Document Control

Support and Ordering

Quality assurance and contact information for Globe United FZE.

Quality Assurance

Globe United Tubular Level Gauges undergo rigorous inspection to ensure compliance with project specifications. Standard testing includes 100% Hydrotesting and EN 10204 3.1 Certification.

AVAILABLE PER PROJECT SPECIFICATION:

- EN 10204 3.2 Certification
- Radiographic Testing (RT)
- Positive Material Identification (PMI via OES or XRF)
- Hardness Testing (NACE MR0175 / ISO 15156)
- Ferrite measurement for duplex/austenitic SS

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