



# Tubular Level Gauge

Installation and Operation Manual

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Globe United FZE

# Product Overview - Reliable Visual Level Indication for Process Vessels

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The Tubular Level Gauge delivers direct visual indication of liquid levels in process vessels and storage tanks through a high-strength borosilicate glass tube assembly. This precision-engineered solution ensures clear observation of liquid levels while maintaining structural integrity and leak-tight performance.

## Key Design Features:

- **End Blocks:** Machined from solid round bar for superior rigidity and leak-tight seating
- **Sealing System:** PTFE gaskets provide reliable chemical resistance and temperature stability
- **Structural Support** 8 mm tie rods with compression sleeves ensure mechanical reinforcement
- **Connection Flexibility:** Available with screwed or flanged end connections (ASME/DIN/JIS/BS standards)
- **Optional Enhancements:** Needle, Ball, or Ball-Check valves; drain and vent fittings; graduated scale plates; protective guards with painted or powder-coated finishes

# Design Standards and Quality Compliance



Globe United FZE manufactures Tubular Level Gauges in full compliance with internationally recognized standards, ensuring safety, reliability, and quality assurance for critical process applications.

## Applicable Standards:

### ASME B31.3

Process Piping Code for safe piping system design

### ASME B16.5 / B16.11

Flanges and Fittings dimensional and material specifications

### ASTM A276 / A479

Stainless Steel Bars for corrosion-resistant construction

### ISO 9001

Quality Management System certification

#### Note:

Pressure Equipment Directive (PED) is not applicable for this product line.



# Safety Requirements - Protecting Personnel and Equipment



Installation, operation, and maintenance of Tubular Level Gauges must prioritize personnel safety and equipment integrity through adherence to established safety protocols.

## General Safety Instructions:

- All installation and maintenance activities must be performed exclusively by qualified personnel with appropriate training
- Vessel isolation and complete pressure relief are mandatory before any installation or disassembly work
- Avoid applying excessive torque on tie rods or glass seating surfaces to prevent mechanical failure
- Never exceed design pressure or temperature limits specified on the equipment nameplate



## Required Personal Protective Equipment (PPE):

Safety goggles, chemical-resistant gloves, face shield, and flame-retardant clothing must be worn during all handling and maintenance operations.

# Installation Procedure - Pre-Installation Verification

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Proper installation is critical for safe operation and long-term reliability of the Tubular Level Gauge system. Before beginning the mounting process, comprehensive pre-installation verification ensures all components meet specifications and are ready for assembly.

## Pre-Installation Verification:

- Verify nameplate details including material specification, pressure and temperature ratings, and tag number to ensure the gauge matches project requirements and vessel specifications
- Confirm end connection orientation matches vessel nozzle configuration to prevent installation errors and ensure proper alignment with process connections
- Inspect glass tube and PTFE gaskets for any cracks, chips, or deformation that could compromise sealing integrity or structural performance during operation



*Following successful pre-installation verification, proceed to the step-by-step mounting process detailed in the next section.*

# Installation Procedure - Step-by-Step Mounting Process



## Mounting Steps:

- 1 Isolate and fully depressurize the vessel before beginning installation
- 2 Install isolation valves (if supplied) at both top and bottom connections
- 3 Align end blocks precisely with vessel nozzles and position gaskets correctly
- 4 Insert glass tube between end blocks with PTFE gaskets at each end
- 5 Insert 8 mm tie rods with compression sleeves and tighten gradually in a cross pattern to ensure even pressure distribution
- 6 Connect drain and vent fittings according to the approved layout drawing
- 7 Install graduated scale plate behind glass tube for accurate level reading
- 8 Fit protective guard or apply paint finish only after successful leak testing

### Critical Alignment:

Ensure vertical installation within  $\pm 2^\circ$  tolerance for accurate level indication.

# Commissioning and Leak Testing - Validating System Integrity



Systematic commissioning and rigorous leak testing ensure the Tubular Level Gauge operates safely and reliably from the first day of service.

## Commissioning Sequence:

- 1 Open the vent plug slowly to release trapped air from the gauge assembly
- 2 Gradually open the lower isolation valve to allow controlled filling of the gauge
- 3 Inspect all joints, connections, and sealing surfaces for any signs of leakage
- 4 Once liquid level stabilizes and matches vessel level, open the upper valve to balance system pressure
- 5 Close vent plug after all trapped air has been completely removed

### Hydrostatic Testing Requirement

Conduct hydrostatic test at **1.5 times the design pressure** in accordance with **ASME B31.3** requirements before placing the gauge into active service.

This validates structural integrity and leak-tight performance under maximum operating conditions.

## Operational Best Practices

- Operate exclusively within rated pressure and temperature limits specified on the nameplate
- Keep vent and drain valves securely closed during normal operation to prevent leakage
- Protect gauge assembly from mechanical impact and excessive vibration
- For extreme temperature services (hot or cryogenic), implement protective insulation or heat tracing systems

## Routine Inspection Schedule

### Every 6 Months:

- Inspect glass tube and PTFE gaskets for wear, damage, or degradation
- Verify tie-rod tightness and overall gauge alignment
- Confirm clarity of level indication and scale plate visibility

## Cleaning and Maintenance

- Isolate both valves and drain the gauge completely
- Remove vent plug to allow drainage
- Flush internal surfaces with compatible cleaning solution
- Remove glass tube for external cleaning if internal cleaning is insufficient
- Replace PTFE gaskets if any wear or deformation is observed

Category	Essential Tools	Maintenance Tips
Inspection & Monitoring	Infrared Thermometer, Vibration Analyzer, Pressure Gauges	Conduct routine inspections for wear and tear
Lubrication & Cleaning	Grease Gun, Oil Dispensers, Industrial Cleaners	Lubricate moving parts regularly to reduce friction
Fastening & Adjustments	Torque Wrench, Screwdrivers, Allen Keys	Tighten loose bolts and screws to prevent malfunctions
Electrical Maintenance	Multimeter, Insulation Tester, Wire Strippers	Check wiring connections and test voltage levels
Fluid Management	Hydraulic Fluid Tester, Oil Filter Wrench	Monitor fluid levels and replace old lubricants
Calibration & Alignment	Laser Alignment Tool, Dial Indicator	Ensure precise calibration for optimal performance
Safety & PPE	Safety Glasses, Gloves, Hearing Protection	Always wear PPE when performing maintenance tasks



# Glass Tube Replacement Procedure

Proper replacement technique ensures safe operation and prevents damage to precision components. Follow these systematic steps for reliable replacement.



## Replacement Steps

1

Isolate system and fully depressurize before beginning work

2

Loosen tie rods evenly and gradually to prevent sudden stress release

3

Carefully remove damaged glass tube and worn gaskets

4

Thoroughly clean seating faces of both end blocks to remove residue

5

Insert new glass tube with fresh PTFE gaskets at both ends

6

Tighten 8 mm tie rods uniformly using a cross pattern

**Recommended torque: 5–6 Nm**

7

Conduct leak test before returning gauge to service



### Critical Safety Note

Handle glass tubes with extreme care to prevent breakage and personal injury. Always wear appropriate PPE including safety goggles and gloves during replacement operations.

# Troubleshooting Common Issues



Rapid diagnosis and resolution of common operational issues minimize downtime and maintain process safety.

Problem	Possible Cause	Recommended Action
No level visible	Isolation valves closed or blocked	Open valves; clean or clear blockages
Leakage at end connections	Gasket damaged or tie rods loose	Replace gaskets and retighten tie rods evenly
Fogging or condensation	Temperature differential across glass	Install insulation or heat tracing system
Glass tube cracked	Thermal shock or overpressure event	Replace glass immediately; verify design limits and operating conditions

**Preventive Approach:**

Regular inspection and adherence to operational limits significantly reduce the frequency and severity of these issues.

# Documentation and Quality Assurance

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Each Tubular Level Gauge is supplied with comprehensive documentation ensuring full traceability, quality verification, and compliance with project specifications.

## Standard Documentation Package:

- **Material Test Certificates** (EN 10204 3.1) – Verifying material composition and mechanical properties
- **Hydrostatic Test Certificate** – Confirming pressure integrity at 1.5× design pressure
- **Visual and Dimensional Inspection Record** – Documenting compliance with approved drawings
- **Installation and Operation Manual** – Complete guidance for safe installation, operation, and maintenance

### Client Advisory:

The design pressure must be reconfirmed and validated by the client during project execution phase. The confirmed design pressure shall be explicitly stated in project-specific test certificates and approved drawings submitted with project documentation.

# Optional Accessories and Customization

Globe United FZE offers a comprehensive range of optional accessories to enhance functionality, safety, and operational convenience based on specific application requirements.

## Available Accessories:

- **Protective Guard**  
Stainless steel or mild steel housing with inspection slot for impact protection
- **Scale Plate**  
Aluminum or acrylic graduated plates in millimeters or inches for precise level reading
- **Drain Valve**  
SS316 needle valve for convenient maintenance drainage
- **Vent Plug**  
Brass or stainless steel removable plug for air removal during commissioning
- **Custom Painting**  
Epoxy or polyurethane finish in client-specified colors for corrosion protection and aesthetic integration

### Customization Capability:

All accessories can be tailored to meet specific project requirements and environmental conditions.



Reflex Level Gauge with Protective Housing



Level Gauge with Graduated Scale Plate

## Contact and Support Information

### Warranty Coverage

The Tubular Level Gauge is warranted against manufacturing defects for 12 months from the date of manufacturing. This warranty covers material and workmanship defects under normal operating conditions within specified design limits.

### Technical Support and Service

#### Globe United FZE

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Our experienced technical team is ready to support your installation, commissioning, and maintenance requirements.