Technical Information
Ti 016G/03/en

2500 Automatic Tank Gauge

Mechanical float gauge for continuous level measurement in storage tanks

2500 Automatic Tank Gauge (ATG) left with 2520 High Pressure version above









Applications
The Model 2500 Automatic Tank Gauge (ATG) is a float and tape operated instrument designed to provide continuous liquid level measurement in bulk storage applications. The Model 2520 High Pressure Automatic Tank Gauge is specifically designed for pressurised vessels. Endress+Hauser Systems & Gauging has maintained these simple and reliable products, which have been the market leaders in float and tape instrumentation for over 50 years.

Features
- Low cost continuous measurement – 0.2" (4 mm) accuracy per SIRA Report E1588583
- Units of measurement to suit your requirements – Metric or Imperial in decimals or fractions
- Wide variety of material available for extreme products or environmental conditions
- Cone roof, floating roof and bolted tank kits available for stilling wells or water interface applications
- Mounting for optional transmitters or limit switches for future site upgrades
- 1136 and 2170 kPa (11.4 and 21.7 bar) service ratings for the Model 2520
- Sphere, horizontal cylinder and top mount kits for the Model 2520

Online
www.systems.endress.com

Endress+Hauser
Systems & Gauging

Measuring System

The 2500 ATG is designed to provide continuous liquid level measurement for bulk storage applications. It displays liquid level at the gaugehead mechanically. If electronic transmission of level data is required in the control room, then the 2500 ATG can be fitted with an optional Endress+Hauser tank gauging transmitter.

Operation
As standard, the 2500 ATG utilises a large stainless steel float that is attached to the stainless steel perforated tape to detect the liquid level. The float follows the liquid level as it rises and falls due to the constant pullback tension provided by a powerful negator spring or cartridge motor. The precisely perforated tape engages pins on a sprocket wheel that in turn drives the counter assembly and any shaft position devices attached to the gaugehead, such as a transmitter. This simple design and operation allows the gauge to perform with negligible maintenance throughout its working life.

The Model 2520 High Pressure Automatic Tank Gauge is designed to provide continuous liquid level measurement of products stored in pressurised vessels. The 2520 requires specific considerations or options for installation on high pressure vessels. The magnetic drive operates the dial reading mechanism, as well as a transmitter or other auxiliary equipment. It provides a positive seal-off of the counter compartment and the transmitter housing, eliminating danger of glass breakage, loss of product and the escape of vapours, making it an important safety feature for both personnel and plant facilities.

Installation

The 2500 ATG and 2520 ATG have various installation options and accessories to suit user accuracy and installation requirements for virtually every application. They may be mounted on the tank roof or at grade level, which would facilitate ground level reading by the operator. The 2500 ATG can be installed on the following types of tanks while the the tank is in service:

- Internal and external floating roof tanks
- Fixed roof tanks

Endress+Hauser recommends guidewire installations for the 2500 and 2520 ATGs, with standard guidewire centers of 432 mm (17"). A 368 mm (14.5") diameter Type 316 stainless steel hollow shell float is provided with the 2500 ATG for use with all standard applications.

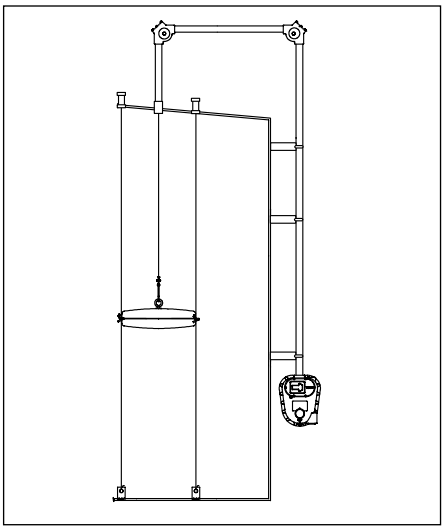
The 2520 ATG is provided with a standard 203 mm (8") diameter multi-sphere 316 stainless steel float. In order to ensure the highest possible measurement accuracy, the specific gravity of the product being measured is required to properly adjust the weight of the float.

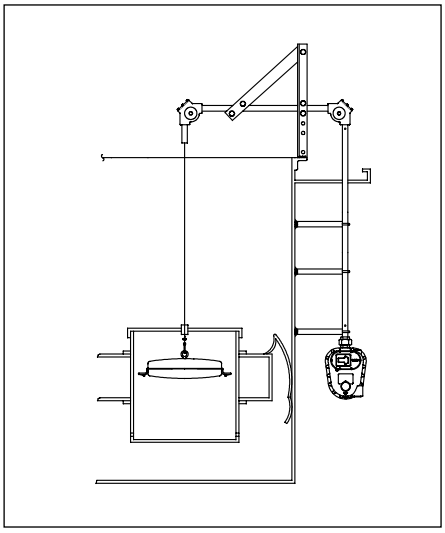
Standard and Optional Features
Endress+Hauser provides either Imperial fractional, decimal or Metric configurations with counter displays in feet/inches/16ths, feet/inches/10ths or meters/10ths/100ths. Imperial reading gauges are manufactured with a reversible fractional/decimal dial. If the customer desires a decimal level display, the dial can be removed, reversed and reinstalled to show decimal units. All dial/counters reflect product innage. For outage reading requirements, Endress+Hauser offers a modification kit (P/N 13-08774) for Imperial units of measure only.

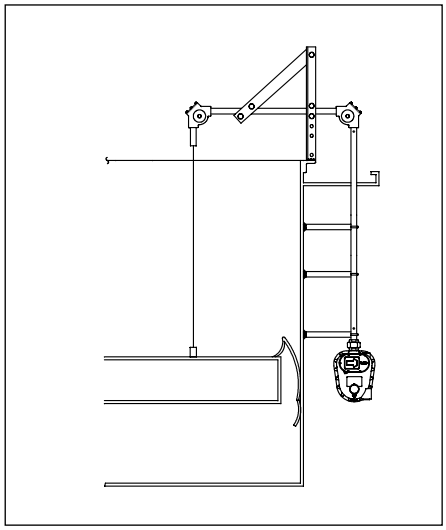
Endress+Hauser recommends the use of the Model 275 Rubber Plug Gate Valve when installing the 2520 on high pressure vessels. This permits the user to seal off tank working pressure from the gaugehead and tape piping system for routine inspection and maintenance. The plug valves have 38 mm (1-½") ANSI RF flanges, Viton-A plug and are rated for either 1136 or 2170 kPa (11.4 or 21.7 bar) service.

When directly mounting a transmitter or SPDT cam-operated limit switch to the 2520, Endress+Hauser recommends the use of a 2581 (Oil Tight) Transmitter Adapter.

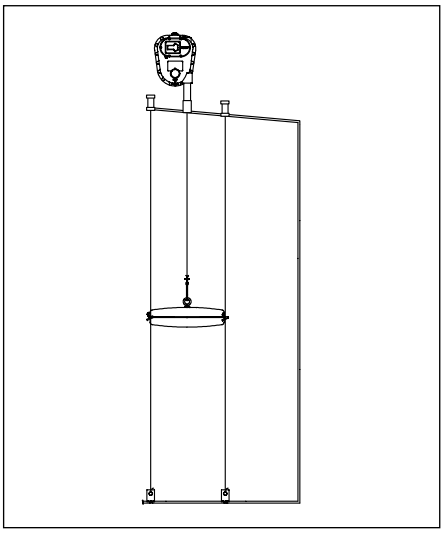
An operation checker is provided as a standard feature on both the 2520 and 2500 ATG, which permits your technician to check the instrument for proper operation. Other design considerations, such as the self adjusting tape keeper, ensure the highest reliability and performance available.

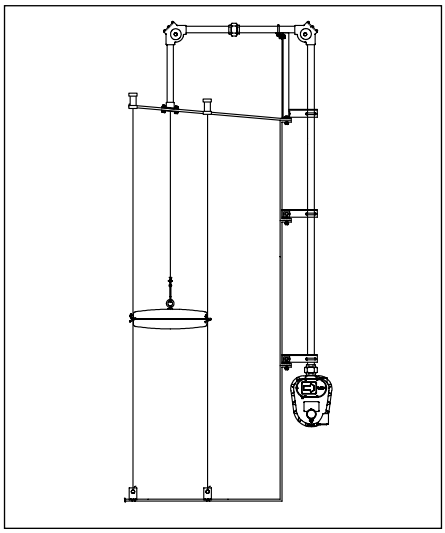


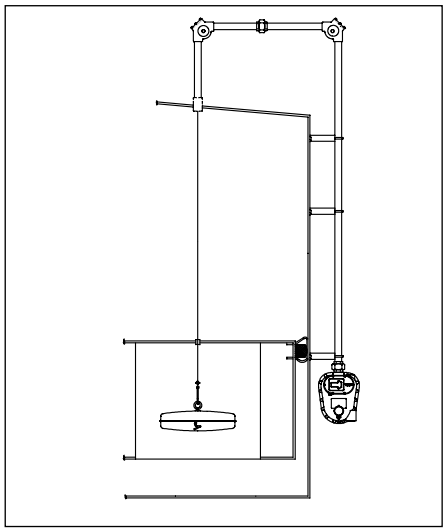




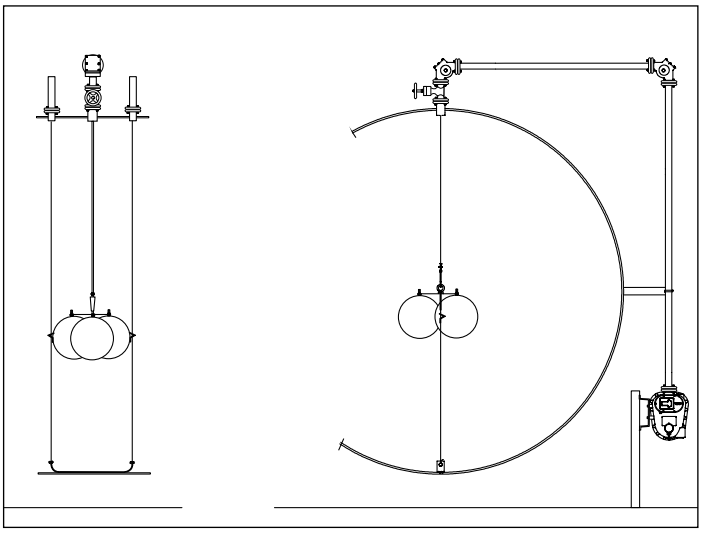
Left: Cone roof tank, *Center:* Floating roof tank, floatwell type, *Right:* Floating roof tank without floatwell

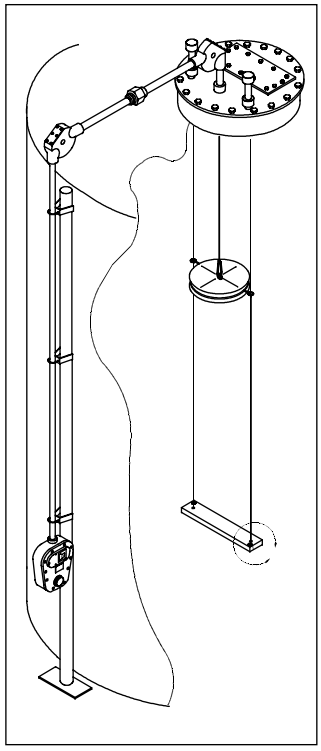


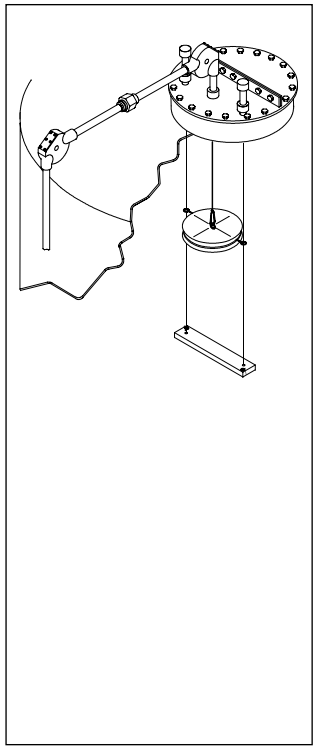




Left: Top mounting for cone roof tank, *Center*: Bolted cone roof tank, *Right*: Cone roof tank with internal floating roof and pan







Left:
Typical 2520 installation on sphere tank with 275 Rubber Plug Gate Valve

Center:
Installation with 228 Inspection Cover

Right:
Installation with 226 Manhole Cover

Accessories

2546 Teflon Tape Wipe
Part #BA13924
Generally used with the conduit vent, the tape wipe can also be used alone. The wipe mounts in the conduit between the top of the tank and the first elbow and removes excess residue from the tape. It minimises vapour loss from the tank into the conduit and helps prevent vapours and liquids from contaminating the gaugehead.

Dual Calibrator Assembly
Part #13-08948
The dual calibrator allows level transmitters with absolute encoders to be calibrated without disassembling the transmitter from the gaugehead. The calibrator is accessed by removing the counter assembly cover. By simply turning the calibrator, the counter and the transmitter can both be set to the proper level. The dual calibrator can be retrofitted to existing 2500 ATG installations.

Extended Range Kit
Part #13-08772 (Imperial) #13-08773 (Metric)
The extended range kit provides an extra long gauge tape and negator motor to extend the range to 29 m (96 ft). It is not available for cartridge equipped gauges.

Outage Conversion Kit
Part #13-08774
This kit allows the conversion of standard innage reading gauges to outage. It is only available for Imperial gauges.

Imperial to Metric Conversion Kit
Part #BM16541
This kit provides necessary parts and instructions for converting Imperial gauges to Metric gauges. Metric tape must be purchased separately.

2545 Condensate Reservoir
Part #BM4O51
The condensate reservoir is designed to collect condensate that would otherwise accumulate in the gaugehead. Its use is recommended where an excessive amount of condensate could develop.

Shock Absorber
Part #DA6138
The Shock Absorber reduces wear and maintenance on a 2500 ATG by minimising the transfer of wave energy from the float to the perforated tape and gaugehead components. It prevents the float from becoming detached from the tape by wave action and should always be used in tanks with turbulent conditions near inlet or outlet piping and near a mixer.

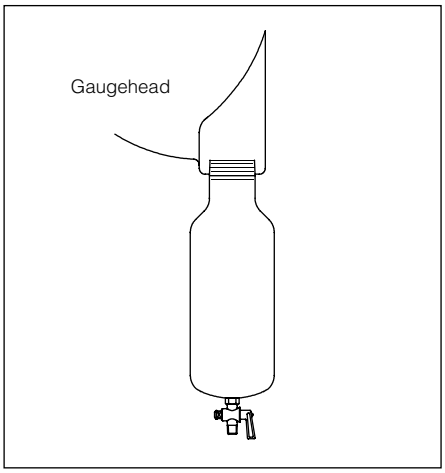
2542 Tape Conduit Vent
Part #1M4084
This vent is designed for use on liquid level gauging installations on storage tanks where corrosive vapours are involved. The unit vents gauge piping to the atmosphere, thereby preventing vapours from entering the gaugehead. Special construction is designed to prevent damage to the vent due to pipe alignment.

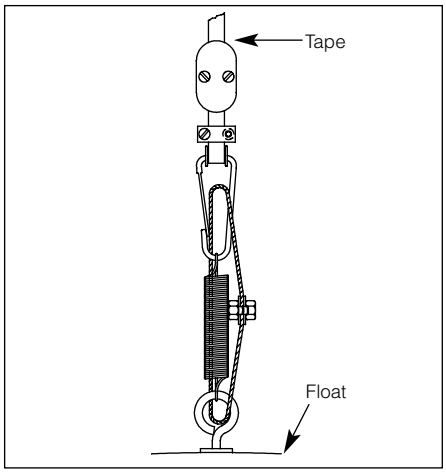
226 Manhole Cover
Part #BM3443 (20") #BM3607 (24")
This cover allows for in-service installation of the 2500 ATG through a tank's existing manway.

228 Inspection Cover
Part #BM6746
This cover functions the same as the 226 Manhole Cover, but features an easily removable inspection plate.

Communication Options

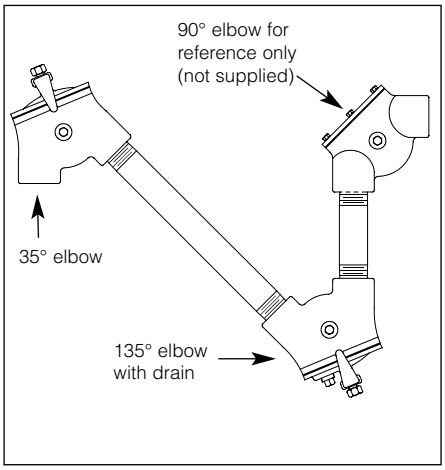
Transmitter	Model 4000 ATT
	Model 8200
Limit Switch	Model 2557

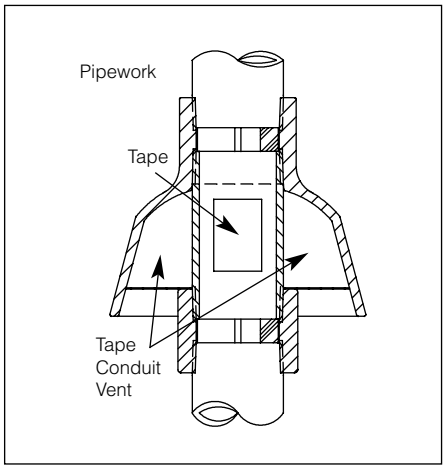




Left:
2545 Condensate Reservoir

Right:
Shock Absorber





Left:
Oil Seal Assembly

Right:
Tape Conduit Vent

Technical Data

Model 2500 ATG

Service Type

Description	Standard	Moderate	Severe	Extreme (NaOH)	Extreme (H2SO4)
Gaugehead	Aluminium	Aluminium	Cast Iron	Cast Iron	Cast Iron
Sheave Elbows	Aluminium	316 S.S.	Cast Iron	Cast Iron	Cast Iron
Top Anchors	Steel	316 S.S.	Steel	Steel	Stl/Carp. 20
Bottom Anchor	Steel	316 S.S.	316 S.S.	Monel	Carp. 20
Guide Cables	316 S.S.	316 S.S.	316 S.S.	Monel	Carp. 20
Perforated Tape	316 S.S.	316 S.S.	316 S.S.	Monel	Carp. 20
Hollow Shell Float	316 S.S.	316 S.S.	316 S.S.	Monel	Carp. 20

Float Specifications

Part Number	Material	Net Weight	Size
BM9074-000	316 S.S.	4 kg (8.8 lb)	368 mm (14.5”)
BM12339-000	Carp. 20	4.9 kg (10.7 lb)	432 mm (17”)
BM12338-000	Monel	4.8 kg (10.5 lb)	432 mm (17”)

Oil Seals

	Max Working Pressure	Part Number	Service
Aluminium Sheaves, Steel Pipe	216 mm (8.5”) W.C.	10-01994-AAA	Standard
Cast Iron Sheaves, Steel Pipe	216 mm (8.5”) W.C.	10-01994-BAA	Severe
Aluminium Sheaves, Steel Pipe	686 mm (27”) W.C.	10-02861-AAA	Standard

Technical Specifications

Product Gravity Range	0.7 to 1.9 (specific gravity)	
Service Rating	Atmospheric to 119 kPa (1.19 bar)	
Gauging Range	18 m (0 – 60 ft)	
Extended Range	29 m (0 – 96 ft) Fixed Roof Tanks Requires Kit 13-08772 (Imperial) or 13-08773 (Metric)	
Shipping Weight	Varies with model – 32 kg (70 lb) to 50 kg (110 lb)	
Sheave Elbows	90° Aluminium Sheave 90° Cast Iron Sheave 90° 316 Cast Iron Sheave 135° Aluminium Sheave 180° Aluminium Sheave Aluminium Tape Carrier	06-0856 BM4675 BM5074 BM3480 BM3481 BM3621

Model 2520

Technical Specifications

Gauge Body & Cover	Cast Carbon Steel ASTM A 216, WCB
Counter Housing & Cover	Aluminium 356-T6
Sprocket Sheave	Cast Aluminium
Motor Storage Sheave	Cast Aluminium
Tape Storage Sheave	Cast Aluminium
Negator Spring	Type 301 Stainless Steel
Perforated Tape	Type 316 Stainless Steel
Sprocket Pins	Type 303 Stainless Steel
Bearings	Stainless Steel
Gauge Float	Type 316 S.S.
Service and Flange Ratings	Feature Options No. 252001XX & 252002XX: 1136 kPa (11.4 bar) Feature Options No. 252003XX & 252004XX: 2170 kPa (21.7 bar)
Operating Temperature Ranges	-34 °C (-30 °F) to ++71 °C (+160 °F)
Gauging Range	0 – 18 m (60 ft)

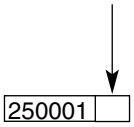
Mounting Kits

Sheave Housing & Cover	Cast Carbon Steel ASTM A216, WCB
Sheave Wheel	Type 316 S.S.
Sheave Wheel Bearing	Teflon®
Top Anchor	Carbon Steel
Top Anchor Spring	Carbon Steel ASTM A229 CL
Bottom Anchor	Carbon Steel ASTM 575 Grade M-1020
Mounting Brackets	Carbon Steel ASTM 575 Grade M-1020
Guide Cable	3/32”, Type 316 S.S.

Product Structure

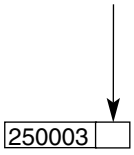
Aluminium Gaugehead – Imperial Configuration – Negator Motor

Tank Type	
T01	Standard service cone roof tank
T02	Standard service cone roof tank with pan & floatwell
T03	Standard service floating roof tank & floatwell
T04	Standard service tank top mounting
T05	Standard service bolted tank
T06	Standard service floating roof tank; no floatwell
T07	Standard service cone roof tank & pan; no floatwell
T41	Moderate service cone roof tank
T51	Interface service cone roof tank; 15 min s.g. differential
T52	Interface service cone roof tank; 25 min s.g. differential
T55	Stilling well service cone roof tank 6" dia. float



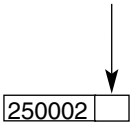
Aluminium Gaugehead – Metric Configuration – Negator Motor

Tank Type	
T11	Standard service cone roof tank
T12	Standard service cone roof tank with pan & floatwell
T13	Standard service floating roof tank & floatwell
T14	Standard service tank top mounting
T15	Standard service bolted tank
T16	Standard service floating roof tank; no floatwell
T17	Standard service cone roof tank & pan; no floatwell
T42	Moderate service cone roof tank
T53	Interface service cone roof tank; 15 min s.g. differential
T54	Interface service cone roof tank; 25 min s.g. differential



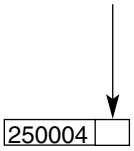
Aluminium Gaugehead – Imperial Configuration – Float Crank

Tank Type	
T01	Standard service cone roof tank
T05	Standard service bolted tank



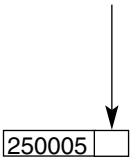
Aluminium Gaugehead – Metric Configuration – Float Crank

Tank Type	
T11	Standard service cone roof tank



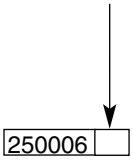
Iron Gaugehead – Imperial Configuration

Tank Type	
T21	Severe service cone roof tank
T22	Extreme service cone roof tank; monel
T23	Extreme service cone roof tank; carp.20



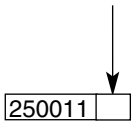
Iron Gaugehead – Metric Configuration

Tank Type	
T31	Severe service cone roof tank
T33	Extreme service cone roof tank; monel
T34	Extreme service cone roof tank; carp.20



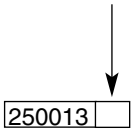
Aluminium Gaugehead – Imperial Configuration – Cartridge Motor

Tank Type	
T01	Standard service cone roof tank
T02	Standard service cone roof tank with pan & floatwell
T03	Standard service floating roof tank & floatwell
T04	Standard service tank top mounting
T05	Standard service bolted tank
T06	Standard service floating roof tank; no floatwell
T07	Standard service cone roof tank & pan; no floatwell
T41	Moderate service cone roof tank



Aluminium Gaugehead – Metric Configuration – Cartridge Motor

Tank Type	
T11	Standard service cone roof tank
T12	Standard service cone roof tank with pan & floatwell
T13	Standard service floating roof tank & floatwell
T14	Standard service tank top mounting
T15	Standard service bolted tank
T16	Standard service floating roof tank; no floatwell
T17	Standard service cone roof tank & pan; no floatwell
T42	Moderate service cone roof tank



Steel Gaugehead – Imperial Configuration – 1136 kPa (11.4 bar)

Tank Type
- T01 Spheres to 4.9 m (16 ft) diam. or horizontal cylinder tanks
- T02 Spheres to 14.6 m (48 ft) diameter
- T03 Top mounting on spheres or horizontal cylinder tanks
- T04 Spheres to 18.3 m (60 ft) diam. or horizontal cylinder tanks

Plug Valve
- T0 Plug Valve not used
- T1 38 mm (1-½") Plug Valve (Viton -A plug)

Transmitter Adapter
- T0 Transmitter Adapter not used
- T1 2581 Transmitter Adapter

252001 [ ][ ][ ]

Steel Gaugehead – Metric Configuration – 1136 kPa (11.4 bar)

Tank Type
- T01 Spheres to 4.9 m (16 ft) diam. or horizontal cylinder tanks
- T02 Spheres to 14.6 m (48 ft) diameter
- T03 Top mounting on spheres or horizontal cylinder tanks
- T04 Spheres to 18.3 m (60 ft) diam. or horizontal cylinder tanks

Plug Valve
- T0 Plug Valve not used
- T1 38 mm (1-½") Plug Valve (Viton -A plug)

Transmitter Adapter
- T0 Transmitter Adapter not used
- T1 2581 Transmitter Adapter

252002 [ ][ ][ ]

Steel Gaugehead – Imperial Configuration – 2170 kPa (21.7 bar)

Tank Type
- T05 Spheres to 4.9 m (16 ft) diam. or horizontal cylinder tanks
- T06 Spheres to 14.6 m (48 ft) diameter
- T07 Top mounting on spheres or horizontal cylinder tanks
- T08 Spheres to 18.3 m (60 ft) diam. or horizontal cylinder tanks

Plug Valve
- T0 Plug Valve not used
- T1 38 mm (1-½") Plug Valve (Viton -A plug)

Transmitter Adapter
- T0 Transmitter Adapter not used
- T1 2581 Transmitter Adapter

252003 [ ][ ][ ]

Steel Gaugehead – Metric Configuration – 2170 kPa (21.7 bar)

Tank Type
- T05 Spheres to 4.9 m (16 ft) diam. or horizontal cylinder tanks
- T06 Spheres to 14.6 m (48 ft) diameter
- T07 Top mounting on spheres or horizontal cylinder tanks
- T08 Spheres to 18.3 m (60 ft) diam. or horizontal cylinder tanks

Plug Valve
- T0 Plug Valve not used
- T1 38 mm (1-½") Plug Valve (Viton -A plug)

Transmitter Adapter
- T0 Transmitter Adapter not used
- T1 2581 Transmitter Adapter

252004 [ ][ ][ ]

Supplementary Documentation

- ❏ 2500 Automatic Tank Gauge System information Si 016G/03/en
- ❏ 2557 Limit Switch Technical information Ti 023G/03/en
- ❏ 4000 Advanced Technology Transmitter Technical information Ti 009G/03/en
- ❏ 8200 Current Output Transmitter Technical information Ti 021G/03/en

Locations

Endress+Hauser
Systems & Gauging Ltd.
Heighington Lane
Newton Aycliffe
Co Durham DL5 6XZ
United Kingdom
Tel: +44 (0)1325 321111
Fax: +44 (0)1325 300840

Endress+Hauser
Systems & Gauging S.A.
Rue de Bitche
62100 Calais
France
Tel: +33 - (0)321-96-49-93
Fax: +33 - (0)321-34-36-12

Sakura Endress Co., Ltd.
862-1 Mitsukunugi
Sakaigawa-mura
Higashi-Yatsushiro-Gun
Yamanashi Prefecture
406-0846 Japan
Tel: +81 (0)552-66-4964
Fax: +81 (0)552-66-4969

Systems & Gauging Headquarters

Endress+Hauser
Systems & Gauging, Inc.
5834 Peachtree Corners East
Norcross (Atlanta), GA 30092
USA
Tel: +1 (770) 447-9202
Fax: +1 (770) 662-8939
http://www.systems.endress.com

Endress+Hauser
Systems & Gauging, Inc.
2901 W. Sam Houston
Parkway North
Houston, TX 77043
USA
Tel: +1 (832) 590-6200
Fax: +1 (832) 590-6201

Endress+Hauser
Systems & Gauging, Inc.
1800 Diagonal Road
Suite 300
Alexandria, VA 22314
USA
Tel: +1 (703) 837-9202
Fax: +1 (703) 837-9209

Endress+Hauser
Systems & Gauging

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