

2046 ADVANCED TANK GAUGE

The next generation in gauging, the 2046 Automatic Tank Gauge provides a degree of level detection that was previously only considered possible using servo gauge technology.



The 2046 Advanced Tank Gauge (ATG) provides precise level measurement ($\pm 1\text{mm}$) of oil, petroleum, petroleum-based products, chemicals, pharmaceuticals and food substances contained in storage tanks. The 2046 ATG owes its superior accuracy to its refined yet simple design which has addressed the factors which affect accuracy, namely friction.

When supplied with a HART local bus option the 2046 ATG can connect with up to 4 HART devices, to provide secondary process measurements of:

- Spot temperature
- Multi-spot temperature
- Average temperature
- Pressure
- Interface level
- Density
- Alarms

Full configuration of the 2046 ATG is via a user friendly push button interface which allows all the necessary configuration parameters to be entered into the gauge software.



AT A GLANCE

➤ High accuracy

Refined and simple design minimises friction and hysteresis, providing improved inventory management.

➤ Push button configuration

Enables the transmitter to easily configured on-site via the unit's programming matrix without the need for separate configuration tools.

➤ HART local bus option

Allows multiple measurement devices to be locally integrated and communicate remotely via a common field bus.

➤ All electronics isolated from tank atmosphere

Maximising safety, and enabling operation in hazardous areas.

➤ Removable cartridge assembly

A single mechanical cartridge assembly simplifies installation and maintenance procedures while allowing safe handling of a spring tensioned device.

➤ Can re-utilise existing float gauge fittings

Ensures ease of retrofits, minimising installation costs.

2046 ADVANCED TANK GAUGE

OPERATING PRINCIPLE

The model 2046 ATG is float actuated and employs a "tensator spring" as a counterbalancing mechanism which maintains a constant tape tension at the float so that float immersion is not affected by the length/weight of the tape. The accurately perforated tape transmits float movement to a sprocket wheel. This is magnetically coupled to an encoder wheel that registers the rotation of the sprocket, with one revolution taking place every 300mm. This coder wheel incorporates holes from which the level is optically encoded in millimetres and centimetres.

RETROFIT INSTALLATIONS

Over a number of years, Whessoe Varec has developed the largest installed base of float gauges in the world, and the 2046 ATG provides a cost effective upgrade to these and other manufacturers' float gauge installations. On Custody Transfer type applications which require a precise means of level measurement, the 2046 ATG offers a cost effective alternative to using more expensive servo operated gauges.

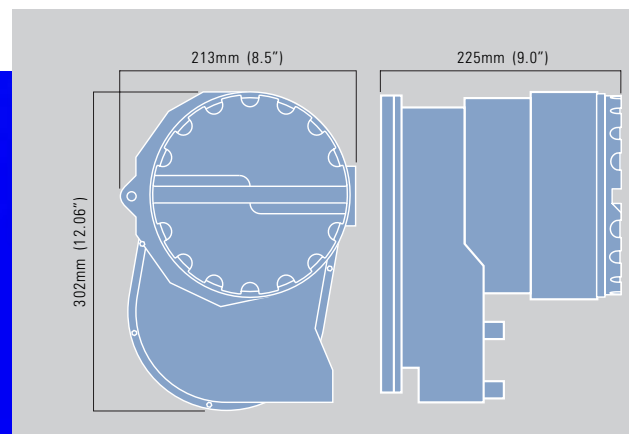
INSTALLATION

Because of its small size the ATG can easily be retrofitted to existing float gauge installations and fittings such as guidewires and elbows can be re-utilised. When the gauge is tank roof mounted, a local display is available to provide tankside readout.

The 2046 ATG can be supplied with four versions of installation kits which are:

1. SIM-approved installation kit - this method has been approved by the French (SIM) Weights and Measures authority and relies essentially on the tank having previously been fitted with a stillwell to provide a stable platform for the gauge.
2. High accuracy installation kit - this method minimises the potential measurement errors caused by the movement of the tank walls. This is achieved primarily by providing a flexible bellows arrangement which is fitted between the tank roof and the gauge tape pipework.
3. Standard installation kit - the kit provides all the basic equipment required to install the ATG and is ideally suited for low value product measurement applications or where precise level monitoring is not required.
4. In-service installation kit - allows the AGT to be installed, without taking the tank out of service, and without the for your service engineers to gain a 'Hot Working' permits.

Contact our sales offices for further information on the available installation kits and 2046 ATG ancillaries.



CONFIGURATION

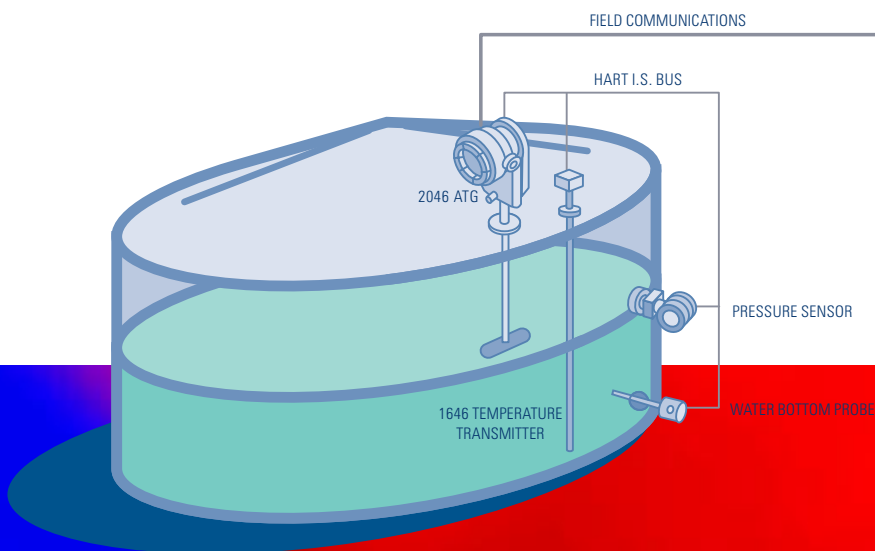
Once the 2046 ATG is installed, all calibration and operating functions can be configured using the user friendly 'Matrix Program'. The operator can easily access the matrix via 3 push buttons. This solution minimises installation time and eliminates the need for costly handheld configuration units.

MAINTENANCE

At the heart of the 2046 ATG is an optical level encoder that accurately registers the movement of the float gauge. No potentiometers, brushes or wires are used, therefore the possibility of wear is virtually eliminated. The 2046 ATG remains unaffected by power failure and requires no battery backup, as the unit utilises an 'absolute' encoder and nonvolatile memory. The 2046 ATG is also fitted with a mechanical cartridge unit as standard, enabling safe, time efficient installation and maintenance without need for specialist service engineers.

SYSTEMS COMPATIBILITY

The 2046 ATG has been specifically designed to ensure total compatibility across field communications, by providing dual field communication ports that support existing Whessoe Varec protocols. The unit also incorporates an industry standard MODBUS option to allow communication to other manufacturers equipment.



OTHER RELATED DOCUMENTS

Corporate overview:

Instrumenting Solutions

Gauging Market overview:

Gauging & Instrumentation Systems

Liquid Gas Market overview:

Liquid Gas Instrumentation & Safety Systems

Advanced SCADA System for Fuels Management:

FuelsManager

High Pressure Applications Advanced Tank Gauge:

2047L ATG



TOTAL CAPABILITY

Our total capability is demonstrated through the use of appropriate, field-proven techniques and advanced applications technology and services to maximise your profitability and performance.

2046 ADVANCED TANK GAUGE

TECHNICAL SPECIFICATION

PERFORMANCE

Accuracy	± 1.0mm (0.04")*	* Float dependent
Sensitivity	± 1.0mm (0.04")	
Repeatability	± 1.0mm (0.04")	
Measuring Range	0 - 25M (0 - 82ft)*	
Ambient Operating Temp.	-40°C to +85°C (-40°F to 185°F)	

Cable Entries	4 x M20 or 4 x 3/4" NPT
Enclosure Protection	IP65, NEMA 4X

TEMPERATURE MEASUREMENT

Input	1 Spot RTD, 100 Ohms@ 0°C, 3 or 4 wire
Sensitivity	± 0.1°C (± 0.18°F)
Accuracy	± 0.2°C (± 0.36°F)
Optional Average Temperature Sensor via the 1646 element selector on I.S local bus	

LOCAL I.S. Hart Bus (2 WIRE)

I.S HART interface devices	4 (max)
Typical HART devices	1646 HART Temperature Transmitter E + H Cerabar Pressure Transmitters E + H Multicap Capacitance Water Bottom Probe

LOCAL I.S. RS-485 Bus (4 WIRE)

No of I.S RS-485 devices	5 (max)
Typical I.S RS-485 devices	1608 Tank Side Display 1645 Av. Temperature/Pressure Transmitter 1646 RS-485 Temperature Transmitter

DATA TRANSMISSION

No. of Communication Loops	2 (2nd loop optional)
Protocols	Whessoe Bus (WM550) Mark/Space Matrix (1600/1700) Mark/Space 4-wire (1800/1900) MODBUS RTU slave Sakura V1 4-20mA (Passive)
Analogue Output	Comprehensive surge protection
Optional Lightning Protection	2 external Exd alarms (N/C contacts)
Alarm Input	4 alarm output relays
Optional Alarm Output	(N/O or N/C contacts, 100 VDC, 0.2A)
Power Supply	15 - 50 VDC (17mA @ 15V) 110/220/240VAC 50/60 Hz

GAUGE MOUNTING

Tank Connection	1 1/2" NPT (Other options available)
Pressure Rating	Up to 0.3 bar (4.4 PSI)

MATERIALS

Housing	Aluminium
Float/Tape	Stainless steel (optional float materials available)
Anchor Bar	Steel (optional – stainless steel)
Pulley Housings	Aluminium (optional – stainless steel)
Weight	20kg (44 lbs) exclusive of installation kit

APPROVALS

Safety Approvals	CENELEC EExd IIB T5 EExd (ia) IIB T5 FM & CSA (Pending)
Accuracy Approvals	NMI, SIM
Other Approvals	CE Mark

LCD DISPLAY

8 Alphanumeric digits
Metric or imperial (English) units

CATALOGUE ORDER CODES

2046 ADVANCED TANK GAUGE

CODE	TYPE OF MOUNTING POSITION & BASIC GAUGE OPTIONS
A	
1	Roof Reading with 3/4" NPT Cable Entries
2	Roof Reading with M20 Cable Entries
3	Ground Reading with 3/4" NPT Cable Entries
4	Ground Reading with M20 Cable Entries
5	Roof Reading with 3/4" NPT Cable Entries With Operation Check Knob
6	Roof Reading with M20 Cable Entries With Operation Check Knob
7	Ground Reading with 3/4" NPT Cable Entries With Operation Check Knob
8	Ground Reading with M20 Cable Entries With Operation Check Knob
Y	Special version contact factory
CODE	PRIMARY COMMUNICATIONS OPTIONS
B	
0	No primary communications
1	20 mA current loop (WM550 protocol)
2	20 mA current loop (MODBUS protocol)
3	EIA-485 Bus (WM550 protocol)
4	EIA-485 Bus (MODBUS protocol)
Y	Special version contact factory
CODE	SECONDARY COMMUNICATIONS OPTIONS
C	
0	No Secondary Communications
1	20mA Current Loop (WM550 Protocol)
2	20mA Current Loop (MODBUS)
3	EIA-485 Bus (WM550 Protocol)
4	EIA-485 Bus (MODBUS)
5	Mark Space (1800/1900 Protocol)
6	Mark Space Matrix (1600/1700)
7	Sakura V1 Protocol + 4-20mA Analogue output
8	4/20mA Analogue With External Power Supply
Y	Special version contact factory
CODE	POWER SUPPLY OPTIONS
D	
0	15/50 VDC
1	115 VAC
2	240 VAC
3	15/50 VDC With Lightning Suppression
4	115 VAC With Lightning Suppression
5	240 VAC With Lightning Suppression
Y	Special version contact factory
CODE	INPUT/OUTPUT OPTIONS
E	
0	No Local Bus / No Alarm Outputs
1	No Local Bus / With 4 Alarm Outputs
2	EIA-485 I.S. Local Bus / No Alarm Outputs
3	EIA-485 I.S. Local Bus / With 4 Alarm Outputs
4	HART I.S. Local Bus / No Alarms
5	HART I.S. Local Bus / With 4 Alarm Outputs
Y	Special version contact factory
CODE	INSTALLATION KIT OPTIONS
F	
0	None
1	1 x FLP RTD Input
2	1 x I.S. RTD Input
Y	Special version contact factory
CODE	INSTALLATION KIT OPTIONS
G	
1	None – Retrofit to Existing Installation
2	Ground Reading/Fixed Roof Tank/Standard Accuracy
3	Ground Reading/Fixed Roof Tank/High Accuracy
4	Ground Reading/Fixed Roof Tank/SIM Approved
5	Ground Reading/Internal Floating Blanket/Standard Accuracy
6	Ground Reading/Internal Floating Blanket/High Accuracy
7	Ground Reading/Internal Floating Blanket/SIM Approved
8	Ground Reading/Floating Roof Tank/Standard Accuracy
9	Ground Reading/Floating Roof Tank/High Accuracy
A	Ground Reading/Floating Roof Tank/SIM Approved
B	Roof Reading/Fixed Roof Tank/Standard Accuracy
C	Roof Reading/Fixed Roof Tank/High Accuracy
D	Roof Reading/Fixed Roof Tank/SIM Approved
E	Roof Reading/Internal Floating Blanket/Standard Accuracy
F	Roof Reading/Internal Floating Blanket/High Accuracy
G	Roof Reading/Internal Floating Blanket/SIM Approved
H	Ground Reading/Fixed Roof Tank/In-service Installation/Standard Accuracy
J	Ground Reading/Fixed Roof Tank/In-service Installation/High Accuracy
K	Roof Reading/Fixed Roof Tank/In-service Installation/Standard Accuracy
L	Roof Reading/Fixed Roof Tank/In-service Installation/High Accuracy
Y	Special version contact factory
CODE	CUSTODY TRANSFER APPROVAL
H	TRANSFERABLE ONLY ON INSTALLATION KIT OPTIONS 3, 4, 6, 7, 8, A, C, D, E, 9, G
1	None
2	SIM (French Weights & Measures Approval)
3	NMI (Dutch Weights & Measures Approval)
4	Other options contact factory
CODE	SAFETY APPROVAL
J	
1	CENELEC
2	F.M./C.S.A.
3	Other approvals contact factory
CODE	OTHER OPTIONS
K	
0	Contact factory

2046	A	B	C	D	E	F	G	H	J	K
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Choose options from suffixes to complete the catalogue order code

2046-DS2.P65 3/99

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