

# 6005 Servo Tank Gauge

Intelligent tank gauge with high accuracy liquid level, interface level, density & density profile measurements for bulk liquid storage applications

Software Version 4.27f



SIL2

FuelsManager<sup>®</sup>  
Compatibility



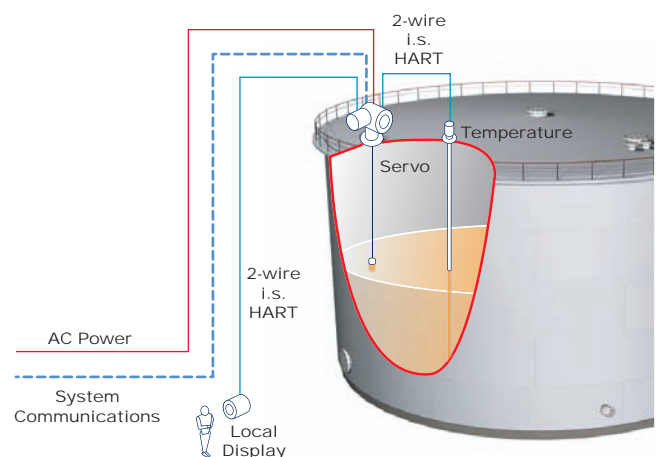
## Benefits

- Measures liquid to an accuracy of +/- 0.7 mm
- Measures two clear interface levels and specific gravity of up to three liquid phases
- Profiling of liquid density throughout the tank (tank profile) and upper layer (I/F profile)
- Wetted parts are completely separated from the electronic circuit
- Tank top mounting with 3" flange weighing only 12 kg (aluminum version)
- Wide range of output signals, including Sakura V1 RS-485 (MODBUS), Mark Space, Enraf BPM protocol
- Material and pressure rating of the wetted parts can be selected according to the application
- Suitable for atmospheric and high pressure applications up to 355 psi (24.5 bar)
- Maintenance prediction of the instrument
- Direct connection of spot or average temperature probes
- Built-in calibration window capabilities
- FM & CSA approved for use in hazardous areas
- NMI Approved for custody transfer applications
- Proactive safety diagnostics output to display and system operators
- SIL2 Certified

## Application

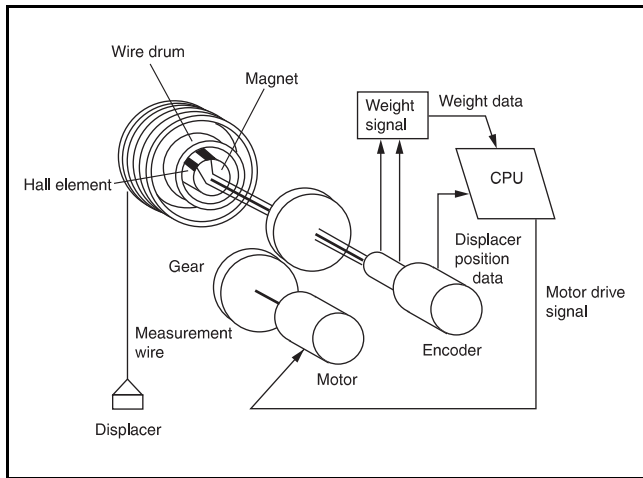
The 6005 Servo Tank Gauge (STG) is designed for high accuracy measurement in bulk liquid storage applications. Typical areas of application include:

- Oil (fuels)
- LPG/LNG
- Chemicals
- Water / chemical interface measurement
- Foods, liquid food.



## Function and System Design

The 6005 STG is an intelligent tank gauge for high accuracy liquid level measurement employing the latest microprocessor technology. In addition to level measurement, the 6005 STG can determine the interfaces between three liquids, specific gravity of these liquids and tank bottom. To enable accurate volume calculation the 6005 STG will accept an input from either an average temperature probe 453x ATC series of temperature devices (via twisted pair cables, HART protocol) or via spot temperature element (via 3-wire Pt. 100 RTD signal). Once installed, all calibration and operating functions can be made via the user friendly Matrix program and touch sensitive keypad. Tank side monitoring and operation can be performed by the 4560 SGM.



Direct Torque Detection

### Measuring Principle

The 6005 STG tank gauging system is based on the principle of displacement measurement. A small displacer is accurately positioned in the liquid medium using a servo motor. The displacer is suspended on a measuring wire that is wound onto a finely grooved drum housing within the instrument.

The drum is driven via coupling magnets, which are completely separated by the drum housing. Outer magnets are connected to the wire drum whilst the inner magnets are connected to the drive motor. As the magnets turn, the magnetic attraction causes the outer magnets to turn as well, resulting in turning the entire drum assembly. The weight of the displacer on the wire creates a torque on the outer magnets generating the change of magnetic flux. These changes generated between the drum assembly are detected by a unique electromagnetic transducer on the inner magnet. The drive motor is actuated to balance the voltage generated by the variations of magnetic flux to equal the reference voltage defined by the operating command.

When the displacer is lowered and touches the liquid, the weight of the displacer is reduced because of the buoyant force of the liquid. As a result, the torque in the magnetic coupling is changed and this change is measured by 5 sets of Hall sensor chips (patented) which are temperature compensated. The signal, an indication of the position of the displacer, is sent to the

motor control circuit. As the liquid level rises and falls, the position of the displacer is adjusted by the drive motor. The rotation of the wire drum is precisely evaluated to determine the level value, which is accurate to an outstanding  $\pm 0.7$  mm.

### Maintenance Prediction

6005 STG will provide advance warning of required maintenance, such as replacement of worn wire, etc. The operating life span of electrical and mechanical parts of the 6005 STG are factory set within the instruments memory. This information is checked with the built-in clock and then compared, and registered in the instrument.

### Automatic Displacer Weight Compensation

The displacer can be checked for buildup or corrosion by comparing the measured weight of the displacer in the air with the pre-programmed displacer weight. The 6005 STG can be set to perform periodical checks for the displacer weight; any deviations in the weight will then be corrected and an alarm or memo initiated.

### Automatic Compensation of Wire Length

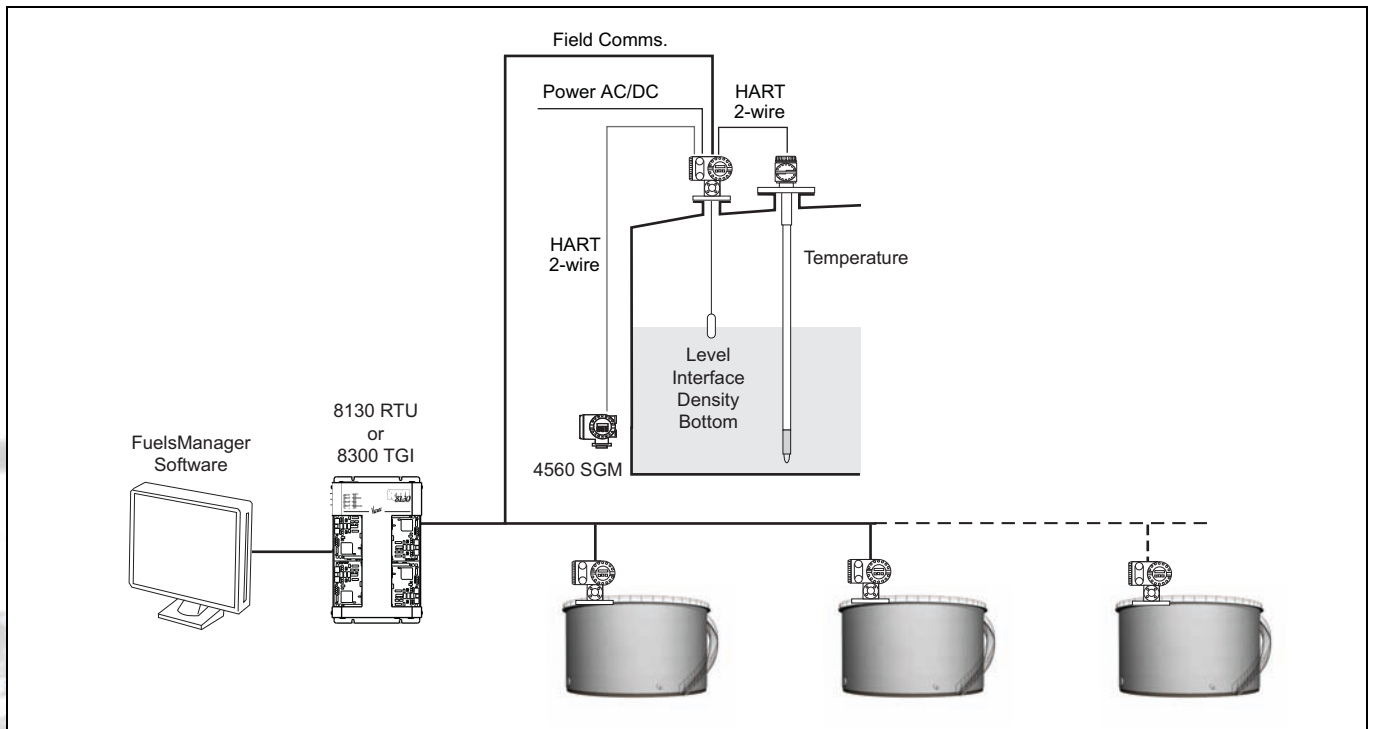
When the displacer is moved from the level position to the reference point (mechanical stop within the instrument), the calibration can be checked. If there is any deviation outside the tolerance, the instrument will emit an alarm. If the deviation is within the tolerance (set by the customer), an automatic recalibration will be done. This function can be working manually or automatically in pre-set time intervals.

### Field Communications

The 6005 STG has a variety of communication protocols that enables compatibility and connectability in the following tank gauging systems:

- EIA-485 MODBUS®
- Serial Pulse (V1)
- Enraf BPM
- Whessoe matic 550 + OVP = Overvoltage protection
- Mark Space

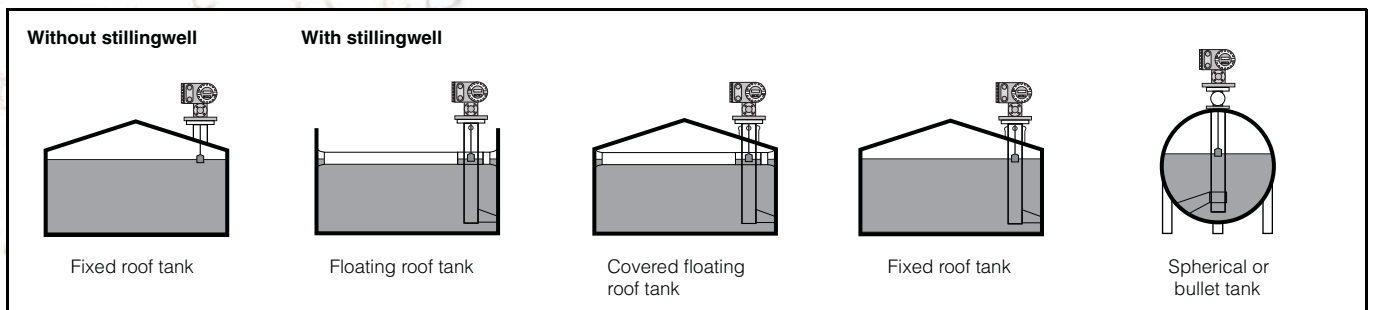
Control room interrogation and operation are facilitated by protocol conversion to various output by the 8130 Remote Terminal Unit (RTU). The 8130 RTU is ideal for large volume tank farms, integrating data from up to 160 tank sensors, transmitting to a FuelsManager host system via 4 separate protocol converter modules.



Example system diagram for Mark/Space and MODBUS communications

## Installation Guidelines

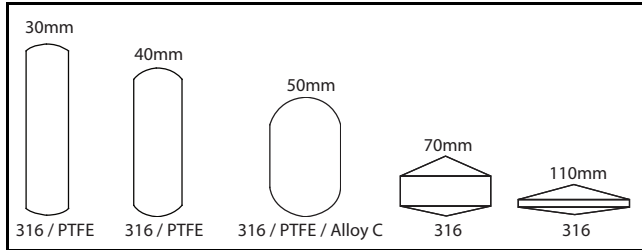
The following information should be used as a guide only; please refer to the Operation and Maintenance Manual for complete installation instructions.



Example Installations

## Displacer Selection

A wide variety of displacers are available to meet your applications. Proper displacer selection ensures optimal performance and longevity. The following guidelines will assist you to select the best displacer for your application.



Displacer Dimensions and Materials

Application	Surface	Interface	Density
Viscous	50mm PTFE	Not recommended	
Crude	50mm 316 50mm PTFE		
Black Oil	50mm 316		
White Oil			
LPG/LNG	70mm 316	50mm 316	
Aggressives	50mm Alloy C 50mm PTFE		
Custody Transfer	70mm 316 110mm 316	N/A	

Recommended Displacer by Application for 3" mounting flanges or larger.

### Application

Most applications can be generalized into three requirement cases: Level data, Density data, or Level and Density data. 6005 STG is primarily a Hi-accuracy Level measurement instrument, with the additional ability to measure density. Level measurement includes finding the liquid surface level, the interface level(s) between different liquids, and as well finding the tank floor or datum plate. Density measurement includes single-point (called "spot" measurements), as well as profile measurements of the entire liquid(s) in a tank.

### Surface Level

In general, larger diameter displacers give higher accuracy under similar conditions.

### Interface Level(s)

Cylindrical shape displacers, with rounded top and bottom, reduce the resistance while moving through the liquid(s). Therefore, a cylindrical shape usually provides smoother movement and faster interface measurements compared to flat-bottom displacers, especially for density profile measurements that span the full tank height. Note that, in order for a displacer to travel down through the liquid(s), the density of a displacer (its weight divided by its volume) must be higher than the density of the liquid(s). These

conditions are equally true for *tank-bottom and datum plate level* applications.

### Density:

Since the density measurement is the calculated result of two or more measurements, a displacer with higher volume will usually yield the most accurate density measurement. In most cases we recommend our 50mm diameter displacer for density measurement. Note that, in order for a displacer to travel down through the liquid(s), the density of a displacer (its weight divided by its volume) must be higher than the density of the liquid(s).

### Level and Density:

When an application calls for equal importance placed on both Level and Density measurements, the 50mm diameter, cylindrical displacer gives the best all-around performance.

### Custody Transfer

The 70mm, conical, 316 displacer is the choice for requirements per NMI.

### Material Compatibility:

Material compatibility should be confirmed to ensure safe operation and optimal 6005 STG performance.

- 316: Stainless steel is a highly versatile industrial material and provides good compatibility with a wide range of chemicals, including most white and black oils.
- AlloyC: This high-performance material is harder than 316, and provides excellent resistance to the many of the most severe corrosive chemical applications.
- PTFE: One of the most well-known and versatile polymer materials, this high-performance material has one of the lowest coefficients of friction. It provides excellent performance in viscous/sticky liquids, and also has excellent chemical resistance to a wide range of corrosives

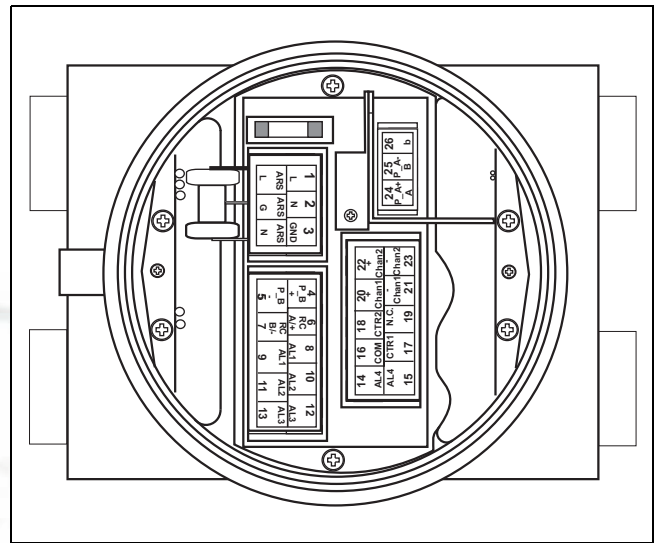
### Process Connection Size

The standard 6005 STG process connections start at 3"/DN80 and fit most tank gauging applications. Accordingly, most applications can be covered with one of the 50mm and 70mm displacer choices. Smaller diameter displacers are available when the process connection is smaller. Note that, when the 110mm diameter custody transfer approval (PTB) displacer is selected, a separate calibration and maintenance chamber is recommended between the 6005 STG and the tank process connection.

# Input and Output

## Terminal Connections

#	Function	EIA-485 Modbus Enraf BPM	Mark/Space				
1	L	Power Supply AC 85 to 264 V 50/60 Hz or DC 20 to 62 V AC 20 to 55 V					
ARS	L						
2	N						
ARS	N						
3	G						
ARS	G						
4	+	Port B+ & B- Non IS HART (Exd) to the 4560 SGM and other devices	Local HART				
5	-						
6	+	Digital Output Rackbus RS- 485 or Remote HART					
7	-						
8	+	Alarm contact					
9	-						
10	+	Alarm contact					
11	-						
12	+	Alarm contact					
13	-						
14	+	Alarm contact					
15	-						
16	Com	Operation contact input					
17	Hoist						
18	Stop						
19							
20	+	4-20 mA Channel 1	Mark/Space	WM550 Channel 1			
21	-						
22	+	4-20 mA Channel 2	Mark	WM550 Channel 2			
23	-		Space				
24	A+	Local (slave) HART (Exd or Ex ia) to 453x ATC or Pt100 3-wire temperature devices)					
25	A-						
26	b						



6005 STG Terminal Enclosure

### Input Power

High voltage type: 85 ... 264 VAC 50/60 Hz

Low voltage type: 20 ... 60 VDC / 20 ... 55 VAC 50/60Hz

**Note!** Allowable voltage supply is specifically stated depending on each Ex approval. Refer to the designated certification.

### HART Input for Local Devices

Multi drop local HART® protocol max. 4 devices

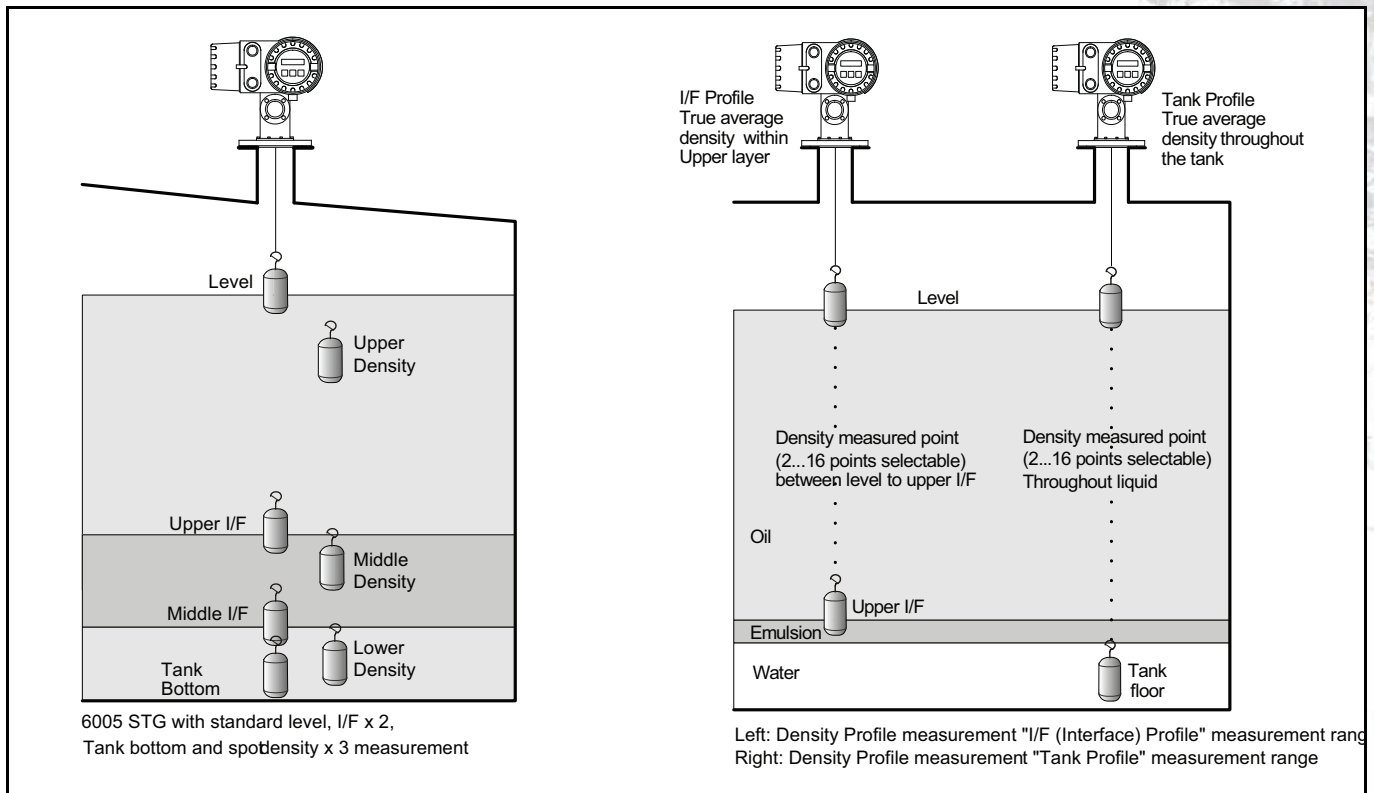
### Output Parameters

**Note!** The following are output parameters remarks!

1. Upper I/F output value can be either selected from the 6005 STG's own displacer measurement or Water Bottom measured value via the 4539 ATC.
2. A single point density measurement within the upper layer liquid in the tank. The measurement position is configured to 150mm below the liquid surface at default.
3. A single point density measurement within the middle layer liquid in the tank. The measurement position is configured to 150mm below the upper interface level at default.
4. A single point density measurement within the lower layer liquid in the tank. The measurement position is configured to 150mm below the middle interface at default.
5. The value of this "Average Density" is based on the calculation after performing the Density Profile operation at the 6005 STG.
6. All of the selected number of density measured values from 1 - 16 points can be transmitted.

Parameter	MODBUS	HART	WM550	ENRAF	M/S
Level	Yes	Yes	Yes	Yes	Yes
Temperature (product)	Yes	Yes	Yes	Yes	Yes
Vapor temperature	Yes	Yes	Yes	-	-
Upper I/F (water level)	Yes	Yes	Yes	Yes	-
Middle I/F	Yes	Yes	-	-	-
Upper density *2	Yes	Yes	Yes	-	-
Middle density *3	Yes	Yes	-	-	-
Lower density*4	Yes	Yes	-	-	-
Average density*5	Yes	-	Yes	-	-
1-16 Points individual density *6	Yes	-	-	-	-
Multi-element temperature	Yes	Yes	Yes	-	-
HART device input (device1)	Yes	Yes	Yes	-	-
HART device input (device2)	Yes	Yes	Yes	-	-
Alarm/ discrete value	Yes	Yes	Yes	Yes	-

Output Parameters Based on Communications Protocol



Output Parameters Measurement Terminology

## Configuration

The 6005 STG's illuminated liquid crystal display provides all configuration and operation capabilities. Using only three keys, all parameters can be selected and modified. For example, (but not limited to):

- Operation – level; interface; spot and profile density, water dip and tank bottom
- Current output
- Relay output
- Custody transfer
- Maintenance prediction
- Calibration
- Measurement unit and decimal point

### Operational Security

A software access code or hardware switch can be enabled to prevent programming changes from the 6005 STG's touch control keypad or a remote system.

### Maintenance Record

The maintenance record can be accessed via the instrument and will provide information of alarm data (e.g. date, time, alarm type). A memo function also allows the user/service engineer to enter maintenance data manually.

### Proactive Safety Diagnostics

To meet the oil and gas industry's demands for overfill protection the 6005 STG contains a proactive safety diagnostics function. In the event of an abnormal measurement condition the 6005 STG warns of mechanical failure, and outputs a maximum level value, (e.g. 99999.0mm) to the local display and system software, thereby causing an alarm to trigger.

Abnormal conditions include:

- Undertension
- Overtension
- Sensor error
- Input error

This feature is set to ON before delivery, but can be disabled by the user during configuration.

## Accessories

### Spare Parts and Maintenance Kits

The 6005 STG is designed and manufactured to provide accurate and reliable operation without an intensive maintenance schedule.

Varec can provide spare parts, maintenance kits, preventive maintenance advice, training and warranties. Please consult your Installation and Maintenance Manual or a representative for more details.

All 6000 STG spare parts originate in Japan

### Electronics Upgrade Kits

Part #	Description
52013661	V1 Upgrade Kit
52013662	WM550 Upgrade Kit
52013649	Enraf BPM Upgrade Kit
52013651	Hart Upgrade Kit
52013654	I/O 3 Upgrade Kit
52013656	I/O 5 Upgrade Kit
52013658	MarkSpace Upgrade Kit
56004490	Spot Temp. Input T-Amp Upgrade Kit
70106032	Operation Input/Contact Output Upgrade Kit
70106035	Operation Input/Contact Output Ex d Temperature Upgrade Kit
70106039	Hart Active Output Upgrade Kit
70106270	MODBUS RS485 Upgrade Kit

### Mounting Plates and Flange Adaptors

Part #	Description
F6501-26	Mounting Plate 2" to 6"
F6501-26S	Stainless Steel Flange adapter mounting plate 2" to 6"
F6501-36	Mounting Plate 3" to 6"
F6501-36S	Stainless Steel Flange adapter mounting plate 3" to 6"
F6501-38	Mounting Plate 3" to 8"
F6501-38S	Stainless Steel Flange adapter mounting plate 3" to 8"
F6501-46	Mounting Plate 4" to 6"
F6501-46S	Stainless Steel Flange adapter mounting plate 4" to 6"
F6501-48	Mounting Plate 4" to 8"
F6501-48S	Stainless Steel Flange adapter mounting plate 4" to 8"

### Calibration Chambers and Sample Hatches

Part #	Description
CS6501-10	10" Calibration Chamber, Aluminum
CS6501-10S	10" Calibration Chamber, SS
CS6501-4	4" Calibration Chamber, Aluminum
CS6501-4S	4" Calibration Chamber, SS
CS6501-6	6" Calibration Chamber, Aluminum
CS6501-6S	6" Calibration Chamber, SS
CS6501-8	8" Calibration Chamber, Aluminum
CS6501-8S	8" Calibration Chamber, SS



## 4560 Servo Gauge Monitor

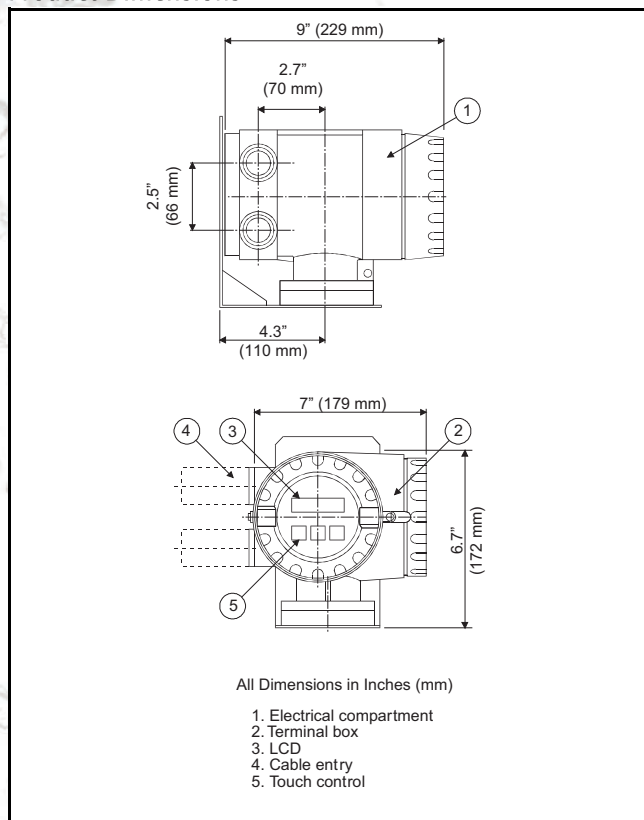
The 4560 Servo Gauge Monitor is a simple, low cost tank side monitor for displaying primary tank gauging data and operating the 6005 STG. Mounted at the tank side or up to 3600 feet (1200 meters) away (local HART connection), it provides indication of measured level, temperature data and operating status, and can send operating commands to the 6005 STG from a convenient location.

A four line, illuminated Liquid Crystal Display (LCD) with touch control is used to operate and select data. Mounted within a flameproof enclosure, touch control ensures safe operation even in hazardous areas.

Two display modes are available for indication of level and temperature\*. Operating commands to the 6005 STG include:

- Level measurement
- Displacer host
- Interface level measurement (two interfaces can be measured)
- Specific gravity measurement of each product layer
- Tank Bottom location

### Product Dimensions



**Note!** \* The 4560 SGM displays only level and temperature data.

### Technical Specifications

<b>Input characteristics</b>	Signal: Local HART protocol
<b>Display</b>	Four line, illuminated display, language selectable English and Japanese
<b>Programming</b>	3 optical keys for selection of matrix functions (touch control)
<b>Power supply</b>	85 – 264 VAC, 50/60 Hz, 25 VA 20 – 62 VDC, 25 W: 20 – 55 VAC, 50/60 Hz, 25 VA
<b>Power consumption</b>	For AC power supply: 40 VA For DC power supply: 40 W
<b>Ambient temperature protection</b>	-20...+60°C IP67 with closed housing and cable glands of same protection class
<b>Housing: material &amp; weight</b>	aluminum, coated with rust inhibitor paint – Approx. 6.5 kg
<b>Electromagnetic compatibility</b>	Immunity and emission to EN 50082-1,2

### Order Codes

Protection Class	
0	Protection: Weather proof; IP67,NEMA 4X
4	Flame proof, XP Cl.I, Div.1, Groups ABCD FM
5	Flame proof, Cl.I, Div.1, Groups ABCD CSA
6	ATEX - Flameproof - Ex d IIC T4
8	ATEX & NMI - Flameproof - Ex d IIC T4*
Cable Entry	
A	Two NPT 1/2" thread
B	Two NPT 1/2" thread
C	Two thread Pg16
D	Two thread M20
Power Supply	
3	85 - 264 VAC, 50/60 Hz, 25 VA
4	20 - 62 VDC, 25 W: 20 - 55 VAC, 50/60 Hz, 25 VA
Mounting	
0	None
1	With mounting bracket
Color	
9	Silver
<b>N4560 -</b>	Complete product code

# Technical Specifications

The following specifications apply to the 6005 STG over the normal (ambient) operating temperature range.

## Physical

<b>Net weight</b>	6531/4 : 12 kg 6532/5/6/7 : 27 kg
<b>Shipping weight</b>	16 lbs (7.25 kg)
<b>Enclosure materials</b>	Electrical compartment :aluminium Drum chamber: aluminium or stainless steel 316 (depending on model) Rated IP67 with closed housing and cable glands of equal protection type
<b>Flange type</b>	ANSI, JIS, DIN 3" (standard) or equivalent. Refer to order code for full selection

## Power

<b>Power requirements</b>	High voltage type: 85 ... 264 VAC 50/60 Hz Low voltage type: 20 ... 60 VDC / 20 ... 55 VAC 50/60Hz
<b>Power consumption</b>	Maximum 50 VA, 50W (cos j=0.5)
<b>Safe electrical isolation</b>	Between power supply and signal output, CPU, RS 485, relay and other electronics

## Input Characteristics

<b>Signal</b>	Multi drop local HART® protocol max. 4 devices
<b>Power supply additional units</b>	DC 24V 453x average temperature sensor
	4560 Servo Monitor Others – compatible HART® devices Spot temperature Pt 100 Ohm ISO standard 3-wire connection

## Displacer

<b>Diameter</b>	30...50mm (dependent on application), optional 70...110mm
<b>Material (standard)</b>	Stainless steel 316
<b>Material (optional)</b>	Hastelloy C; PTFE
<b>Horizontal movement</b>	1.23 mm /m with standard wire
<b>Speed of movement</b>	0...2500 mm/min.

## Environmental

<b>Operating (Liquid) temperature</b>	-200... +200°C
<b>Ambient temperature</b>	-20... +60°C -40... +60°C ( ATEX approval)

## Measuring Wire

<b>Range</b>	28m (optional 36m)
<b>Material (standard)</b>	Stainless steel 316, 0.15mm (standard)
<b>Material (optional)</b>	Hastelloy C. f0.2 mm (max. 16m range)
<b>Wire protection</b>	PTFE coated St/St 316L, 0.4mm (max 16m range) Any turbulent conditions: stilling well or guidewire

## Compensation

<b>Wire</b>	Compensation of wire expansion due to temperature and wire weight
<b>Displacer</b>	Automatic compensation of displacer weight
<b>Tank roof</b>	Compensation of depression and distortion

## Performance

<b>Level accuracy</b>	+/-0.7 mm for L=10 m, D=1 g/cm3 with 50 mm displacer
<b>Interface level</b>	+/-2.7 mm for L=10m, *D=0.2 g/cm3 with 50 mm displacer *D: difference between densities of 2 liquids
<b>Spot &amp; profile density</b>	+/-5kg/m3 or better, (at reference condition)
<b>Tank bottom</b>	+/-2.1 mm (independent from liquid condition)

## Display/Programming

<b>Display (LCD)</b>	Two line, 16 digit, illuminated display English, Japanese selectable
<b>Programming</b>	Three optical keys (touch control) for selection of matrix functions
<b>Memo function</b>	Memo of maintenance information

Field Communications

**EIA-485 MODBUS**

Baud rate	600 / 1,200 / 2,400 / 4,800 / 9,600 / 19,200 bits selectable
Parity	Odd, Even, None, selectable
Cable	Two (2) wire twisted cable with screening (DGND is connected to the ground cable)
Topology	Serial bus, electrically isolated, tree structure
Distance	Maximum 3,600 ft (1,200 m) including limbs or branches (negligible with branches under 3 m)
Instrument address	Accessed via touch control
Isolation	Bus inputs are electrically isolated from the other electronics

**Mark/Space**

Baud rate	1,200 / 2,400 / 4,800 / 9,600 / 19,200 bits
Cable	Four (4) wire
Distance	Depending on specifications
Topology	Serial bus, tree structure
Instrument address	Setting by DIP switches on communication board
Isolation	Serial communication isolated from other circuits

**Enraf Bi Phase Mark**

No. of units	Maximum 10 instruments per loop
Baud rate	1,200 / 2,400 bits, selectable
Cable	Two wire, twisted cable with screening
Distance	Maximum 10 km
Topology	Serial bus, electrically isolated, tree structure
Instrument address	Accessed via touch control
Isolation	Serial communication circuit isolated from other circuits

**WM550**

No. of units	Maximum 15 instruments per loop (to RTU)
Baud rate	1,200 / 2,400 bits, selectable
Cable	Two wire, twisted cable with screening
Distance	Depending on specifications
Topology	Serial bus, tree structure
Instrument address	Setting by DIP switches on communication board
Isolation	Serial communication circuit isolated from other circuits

**Analog Output**

Output	4...20 mA, two channels freely assignable value
On alarm	Switchable +110%, -10% or hold last measured value

Electrical isolation	Analog output isolated from other circuits
Adjustable damping	0 to 99 s
Maximum load	500 Ohm
Load effect	Negligible

Relay

**I/O-3**

Version	4 relays with potential free change-over contacts, freely assignable to measured value
Hysteresis	Switch points and switching hysteresis freely adjustable, residual current fail-safe mode: minimum or maximum selectable
Switching capacity	AC max. 250V, 2A / 62.5VA DC max. 220V, 2A / 60 W * FM and CSA approvals :AC 30V, 2A/DC 42V, 2A, 60W

**Alarm Output- Overspill Protection**

Version	2 relays with potential- free changeover contacts, assignable to Level
Hysteresis	Switch points and switching hysteresis freely adjustable, residual current fail-safe mode: minimum or maximum, selectable
Switching capacity	Umax. DC200V/AC200Vpp, 0.5A Imax. 0.5AC or peak AC Pmax. 15W/VA

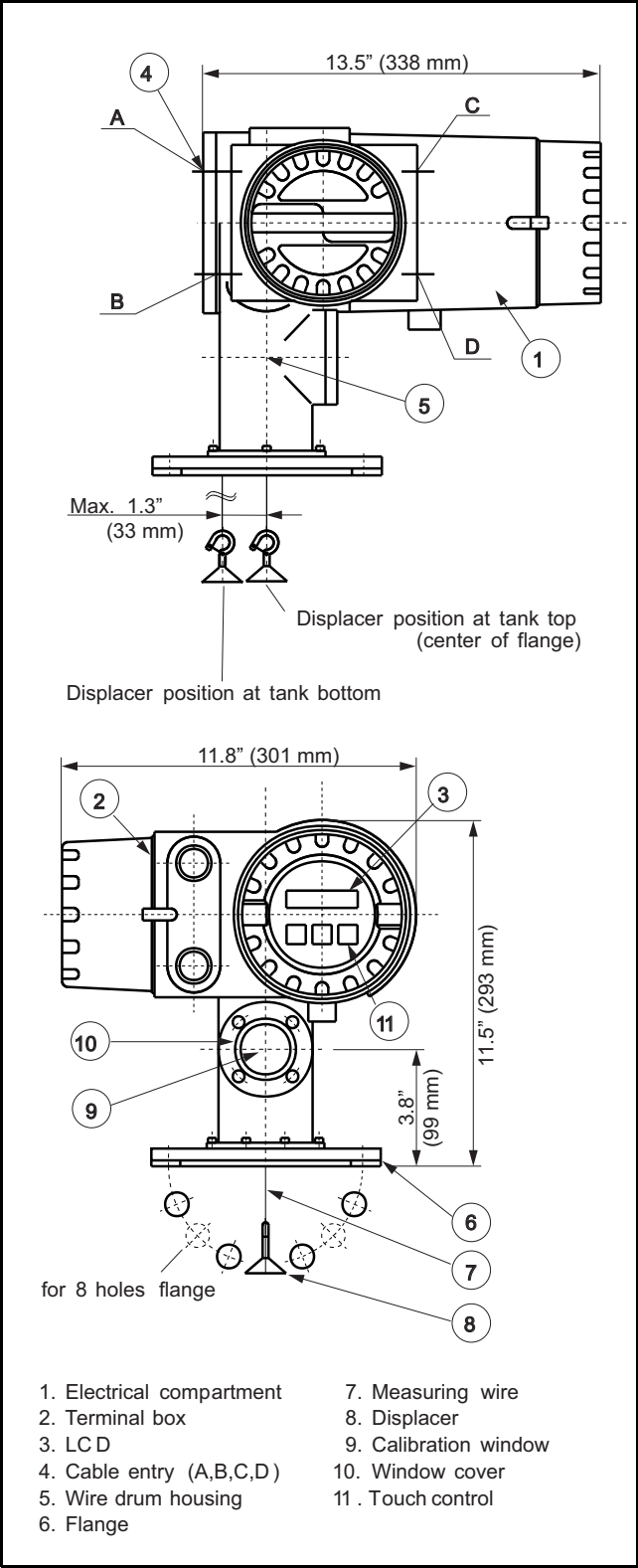
**Operation Input**

Version	2 photocouplers, for external input from controller (tumbler switch, DCS, etc.)
Hysteresis	Switch points and switching hysteresis freely adjustable, residual current fail-safe mode: minimum or maximum selectable
Input voltage	15VDC, active circuit (supplied by 6005 STG)
Input current	Approximately 5mA

Certifications & Approvals

Product Dimensions

Please reference order codes on pg. 13 :Protection Class



## Order Codes

				<b>Pressure Rating, Drum Chamber Material</b>			
				1	Drum housing: 0.2bar g; aluminum casting		
				2	Drum housing: 0.2bar g; stainless steel		
				4	Drum housing: 6bar g; aluminum casting		
				5	Drum housing: 6bar g; stainless steel		
				6	Drum housing: 25bar g; stainless steel		
				<b>Protection Class</b>			
				0	Weather proof, IP67/ NEMA 4X (only for the stainless steel Drum chamber)		
				5	FM - Explosion Proof - Class 1, Division 1, Groups C & D		
				6	CSA - Explosion Proof - Class I, Division 1, Groups C & D		
				G	ATEX II 1/2G Ex d IIB T4, T3 (only for the stainless steel Drum chamber)		
				J	ATEX II 1/2G Ex d[ia] IIB T4, T3		
				N	FM - Explosion Proof - AIS Class I, Division 1, Groups C & D		
				O	CSA - Class I, Division 1, Groups C & D (Eex d[ia])		
				Q	ATEX II 1/2G Ex d IIC T4, T3 (only for the stainless steel Drum chamber)		
				S	ATEX II 1/2G Ex d IIB T4, T3, -40°C		
				U	ATEX II 1/2G Ex d[ia] IIB T4,T3, -40°C		
				Note! IS Safety Barrier required for all available options when a 4532/4539 Temperature Device is used. ATEX Pending			
				Note! NMI W&M approval only with 70 mm displacer (R).			
				Note! Option 'N' provides intrinsically safe power to a connected I.S. classified device and is recommended for use in the U.S. Option 5 does not provide I.S. power to connected devices.			
				<b>Application</b>			
				A	Level		
				C	*Tax + Weight NMI, Level		
				D	Multi measurement, Level, I/F Level, Bottom, Density		
				F	*Tax + Weight NMI, Level + I/F Level, Bottom, Density		
				G	*Tax + Weight NMI, Density Profile, Level, I/F Level, Bottom, Density		
				J	Density profile multi measurement, Level, I/F Level, Bottom, Density		
				9	Special Version		
				<b>Primary (Digital) Output</b>			
				N	Enraf BPM		
				A	Serial Pulse V1		
				P	RS 485 Modbus		
				F	Not selected		
				L	Whessoe matic 550 + OVP = Overvoltage protection		
				M	Mark / Space		
				9	Special Version		
				<b>Secondary Output</b>			
				0	Not selected		
				1	Alarm contact, 4x SPST		
				2	4 - 20 mA, 2 channels selectable		
				3	4 x SPST + 4 - 20 mA, 2 channels		
				4	2 x SPST, overspill protection TÜV		
				5	4 x SPST, 4 - 20 mA, 1 channel		
				9	Special Version		
				<b>Signal Input from Field Units</b>			
				0	HART protocol (e.g. NMT, NRF)		
				1	HART + Pt100 spot temp.		
				2	HART + operation contact, 3digits		
				3	HART + Pt100 Spot temp.+ operation contact		
				4	HART + 1 x status (discrete input)		
				5	HART + Pt100 spot temp. + 1 x status (discrete input)		
				6	HART + Pt100 + operation contact +1 x status (discrete input)		
				9	Special Version		
				<b>Measuring Range, Wire Material</b>			
				C	0...28m, AISI316 wire		
				L	0 -36m, AISI316 wire		
				H	0 -16m, AISI316 wire PTFE covered wire		
				K	0 -16m, Alloy C		
				M	0...22m; Alloy C, 0.2mm		
				N	0...47m; SUS316, 0.15mm		
				Y	Special version		
				<b>Cable entry</b>			
				F	Cable entry: four G(PF) 3/4" thread		
				H	Cable entry: four NPT 3/4" thread		
				L	Cable entry: four M20 thread		
				M	Cable entry: four M25 thread		
				Y	Special version		
				<b>Process Connection</b>			
				G	Flange ANSI 3" 150 lbs RF		
				J	Flange ANSI 3" 300 lbs RF (only for 25bar drum chamber)		



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If no official representative is listed here, please visit [www.varec.com](http://www.varec.com) to find your local representative.  
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Document Code  
TEC022GVEN2312