A. P. I.
industry

Universal Sensor Technology

for industrial use

ISO 9001 QUALITY ASSURANCE

ATEX

API Industry
Sensor Technology

API Industry specializes in development and production of unique sensors and level switches for liquid control in tank and pipe installations for industrial production and process automation.

The API Industry patented technology is developed and constantly improved by a team of highly skilled scientists and engineers, ensuring high accuracy, steady performance and reliability in harshest environments, where conventional solutions fall short.

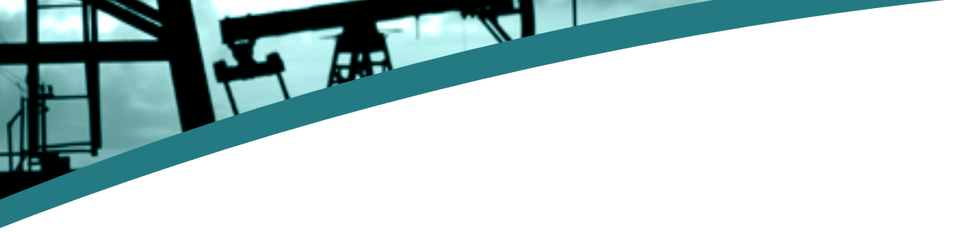
For extreme high/low temperature environments and applications API Industry has developed an extensive range of instruments for level measurement and liquid detection based on unique acoustic principle.

With international headquarters and factory facilities, situated in Aalborg, Denmark, branch facilities in St. Petersburg, Russia and a wide network of agents and distributors worldwide we offer our customers:

- Advanced technology expertise
- Efficient, flexible in-house production and logistics
- Strict quality management and control
- Worldwide service support
- Customized solutions

ENERGY PRODUCTION | OIL & GAS | PHARMACEUTICAL | FOOD | WATER / WASTEWATER | PAPER | MARINE & OFFSHORE

Contents



UTS™

Ultrasonic Tank Switch

Designed for the harsh environment in tank and pipeline installations UTS™ provides correct data for constant liquid level control including indication of the top and bottom levels as well as monitoring of pumps. Protection of pumps and prevention of spillage is obtained with a high level of efficiency. UTS™ can operate and provide accurate measurements in any liquid, in extreme temperatures and in any shape of tank.

The operating principle of UTS™ is based on a breakthrough patented acoustic wave technology, providing outstanding results in extreme operating temperatures ranging from –200°C to +450°C. Accuracy of measurement is ensured regardless of shape of tank, type of liquid or liquid temperature.

UTS™ is installed outside the tank/pipe with only a metal rod inside the tank/pipe. Acoustic waves in the metal rod created by piezo-electric transducer ensure transmission of signals. When liquid in the tank reaches the probe on the rod, the emission of sound waves is muffled. This change is picked up by the piezo-electric transducer and a signal is transmitted to the corresponding alarm. Having only the metal rod inside the tank and no mechanical or moving parts means no maintenance is required.

UTS™ can be easily installed in vertical, horizontal or any inclined position and is tested for operation in a wide range of media, such as water, oil, petroleum, petrochemicals, acids, wastewater as well as many others. Made of high-grade stainless steel, UTS™ can also be used in tanks and reservoirs with food products.

UTS™ can be installed indoors as well as outdoors, including explosive environments and harsh arctic conditions.

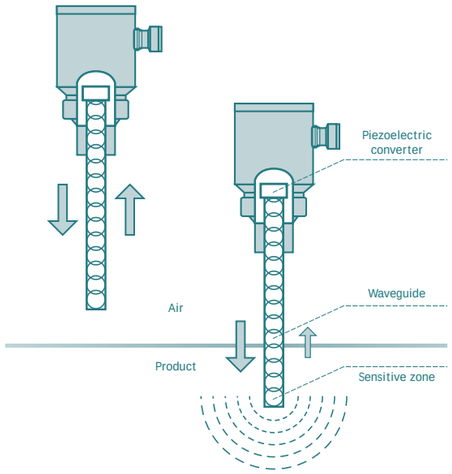
Universal liquid level switch UTS™ is characterized by high resistance to sticky products, reliability under dynamic load and vibrations due to reinforced rod.

API UTS™ Features:

- Easy installation
- Extended temperature range
- No moving parts
- No maintenance
- Automatic self test
- No calibration needed
- Explosion proof
- Pre-adjustable alarm points
- No sensitivity to foam
- Only steel rod inside the tank (electronics and connections outside)
- More than 300 possible variations

UTS Technical Characteristics

Length	65mm/115mm/or any on request
Material	Stainless steel AISI 316L or on request
Input	18 to 30 VDC
Output	4-20 mA current loop or relay
Explosion protection	EEx ia IIC T6
Operating temperatures	ambient: -55°C... +85°C product: -200°C... +450°C
Pressure	up to 200 bar



UTS™

Coding sheet

UTS - □□ - □□□□ - □□□ - □□ - □□□ - □ - □

Housing type

Protection level IP67	6	7
Protection level IP68	6	8
Compact IP68	M	8

Length of the switch

Minimum length 65 mm	0	0	6	5
Standard length 115 mm	0	1	1	5
Length on request (specify lenght in mm)	X	X	X	X

Type and size of connection

Metric cylindrical thread M27x1.5	M	2	7
Pipe cylindrical thread 1 inch	0	1	G
Flange DN 25 PN10-40	F	2	5
On request	X	X	X

Output signal

Current 14 mA (“dry”)/7 mA (“wet”)	C	1
Current 7 mA (“dry”)/14 mA (“wet”)	C	2
Namur*	N	A
Dry contact: open (“dry”)/closed (”wet”)	R	1
Dry contact: open (“wet”)/closed (”dry”)	R	2

Cable input

PG 13	P	1	3
M24x1.5 internal	M	2	4
M20x1.5 internal	M	2	0
Special for IP68, specify cable length in meters	X	X	X

Temperature range of controlled liquid

Standard (–55°C ... +100°C)	L
High temperature 1 (-55°C... +200°C)	M
High temperature 2 (-55°C... +325°C)	N
High temperature 3 (-55°C... +450°C)	H
Low temperature (–200°C... +100°C)	C

Explosion protection

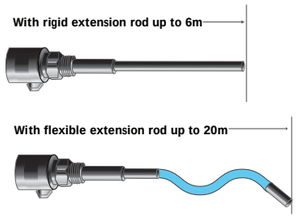
Standard type	N
Ex type	I

UTS codes ver.08.12.08

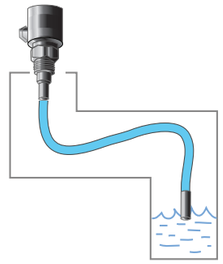
** Currently unavailable*

UTS™

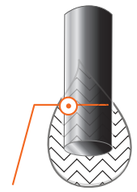
Mission critical solutions in harsh environments



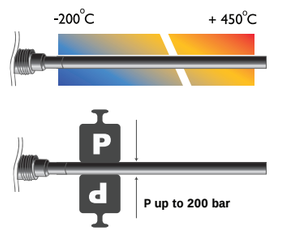
Wide length range



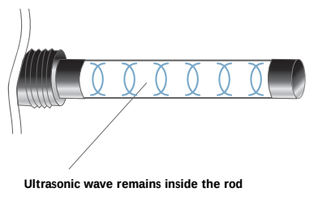
Possibility to bend



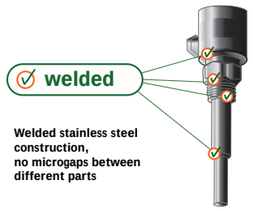
Resistance to sticking



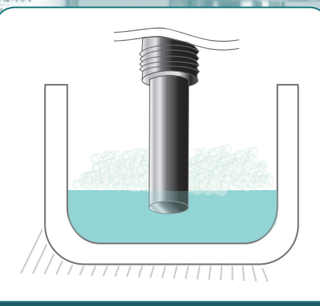
Wide temperature and pressure range



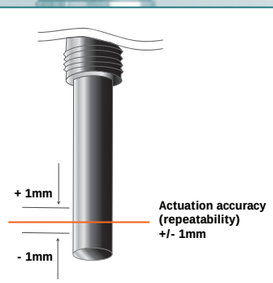
High reliability - no moving parts



Reliable construction ensures safe application in harsh environments



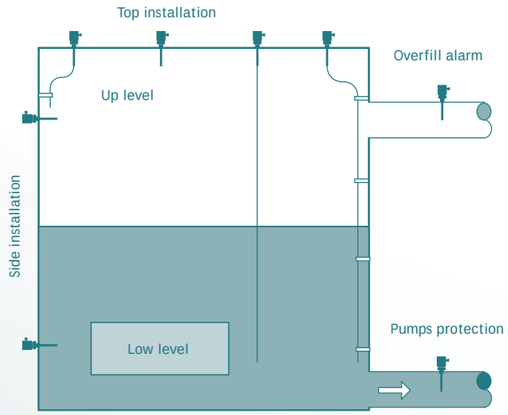
No sensitivity to foam

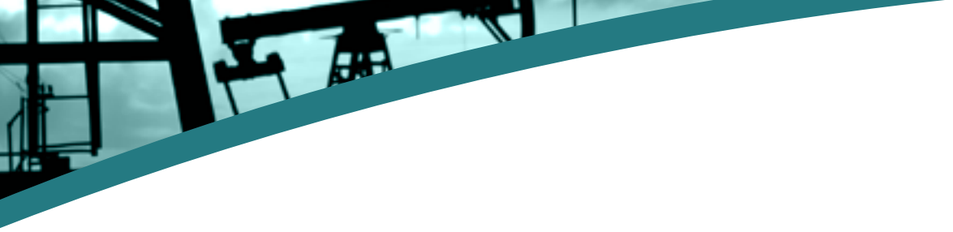


High accuracy (repeatability)

UTS™

Solid design - robust construction





TLA™

Tank Level Alarm

TLA™ – Tank Level Alarm is used for detection of high (95%) and high-high (98%) level of liquid and liquefied gas. Built on the same patented acoustic wave technology as UTS™, TLA™ features high level of accuracy, reliability and customizability.

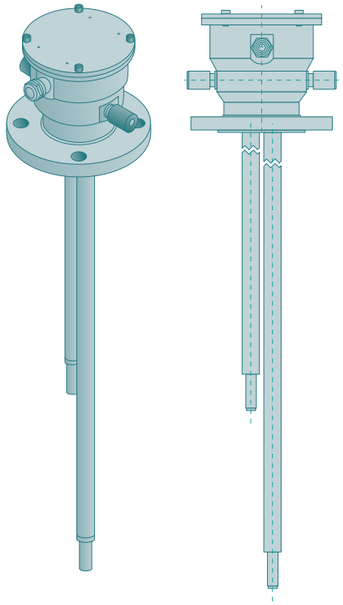
TLA™ represents a two-point level switch with alarm levels defined by length of rods, which are produced on request. Built-in test buttons are used for performing functionality test before filling in the liquid. Being highly adjustable to customer's requirements, TLA™ can also be supplied as a three-point version.

API TLA™ Features:

- Works with any type of liquid and liquefied gas
- Easy installation
- No maintenance
- No moving parts
- No electronics inside the tank
- No sensitivity to vapor, moisture and foam
- Automatic self test
- Lengths on request
- Only steel rod inside the tank (electronics and connections outside)

TLA™ Technical Characteristics

Length	on request
Material	Stainless steel AISI 316L
Input	18 to 30 VDC
Output	4-20 mA current loop or relay
Explosion protection	EEx ia IIC T6
Protection level	IP67
Operating temperatures	ambient: -55°C... +85°C
Number of alarm points	2 (optional 3)
Built-in test buttons	2 (optional 3)



TLA™

Coding sheet

TLA - □□□-□-□□□□-□□□□-□□

Connection

Flange DN50 PN10-16	F	5	0
Other	X	X	X

Product pressure

Standard (not more than 0.1 MPa)	0
Pressure more than 0.1 MPa	1

1st switch point

Length of 1st rod in mm L2 (not less than 150 mm)	X	X	X	X

2nd switch point

Length of 2nd rod in mm L2 (not less than 150 mm)	X	X	X	X

Output signal

Current 14 mA ("dry")/7 mA ("wet")	C	1
Current 7 mA ("dry")/14 mA ("wet")	C	2
Current: upper C1, lower C2 (upper – the shorter rod)	C	3
Current: upper C2, lower C1	C	4

TLA codes ver.08.02.08

TGD™

Liquid Level, Temperature, Pressure and Density Measurement Device

Tank Gauging Device - TGD™ is designed for simultaneous measurement of level, temperature (up to 15 points), pressure and density. It is used for measurement of bottom water in tanks and storage terminals of oil, oil products and liquefied gases, on offshore drilling platforms, FSO and FPSO, as well as for estimation of product volume, stored in reservoirs and bullet tanks, using volume-weight method.

Depending on the application type, TGD™ can be supplied as a 1-channel (level or temperature measurement), 2-channel (level + temperature; temperature + density), 3-channel (level, temperature and pressure/ density) or 4-channel version (level, temperature, pressure and density).

Operation principle of TGD™ is based on the patented principle of Guided Low Frequency (GLF™) wave propagation, which allows equally precise measurements along tank height with any shape of tank and type of liquid.

Principle and Advantages of GLF™ Technology:

- GLF technology measures difference in density between air and liquid.
- Tank geometry and objects inside the tank, such as ladders, heating pipes, etc. do not affect the signal.
- GLF technology secures equal measurement accuracy of the whole tank – from top to bottom.
- Automatic calibration with accuracy of 1mm every 2 seconds.
- GLF technology is not affected by foam.
- GLF technology allows a reduced number of sensors to be installed in tank.
- Flexible solution with possibility for waveguide to be bent/curved.

TDG™ Features:

- Automatic calibration
- High level of accuracy
- Less cabling – only 2 wires
- No moving parts – longer lifetime
- Flexible and easy installation
- Explosion proof

TGD™ Technical Characteristics

Housing material	Stainless steel AISI 316L
Electrical connection	2-wire line (HART®) RS-485Ex (with PI-485)
Explosion protection	EEx ia IIC T6/T5
Output	7-14 mA current loop or relay
Protection level	EEx ia IIC T6
Operating temperatures	-55°C… +85°C

TGD™ Measurement Channels

L- level measurement	
Measurement range	0...30 m
Measurement accuracy	+/-2 mm
Product temperature range	-200°C...+150°C

T- temperature measurement	
Measurement points	up to 15 points
Measurement accuracy	0.15°C
Product temperature range	-200°C...+150°C

S- density measurement	
Measurement range	500-1200 kg/m3
Measurement accuracy	0.1% of measured range

Pressure measurement in the tank	
Measurement range	on request
Measurement accuracy	0.15%

TGD™

Coding sheet

TGD - □-□□,□-□-L □-□-□ -T □□-□ -S -W

Model type

Industrial application	P
Marine application	M

Nominal length of probe, waveguide

Length in meters	X X, X

Cable input

PG 13.5	A
M24x1.5 internal	B
M25x1.5 internal	C
On request	X

Section: L - level sensor. Excess pressure above product

Below 0.1 MPa	0
Above 0.1 MPa	1

Flange connection: nominal diameter DN

DN 50	A
DN 65	B
DN 80	C
DN 100	D
DN 200	E
Thread M28x1	F

Flange connection: type

Type 1	1
Type 2	2
Type 5	5
Thread connection	0

Section: T - temperature sensor

Number of measurement points (from 2 to 15, with "W" - from 2 to 14)	X X

Flange connection

DN 125 PN 40 ver.2	A
DN 80 PN 40 ver.2, if code S is left out	B
DN 80 PN 6 ver.1, if code S is left out	C
DN 100 PN 16 ver.1, if code S is left out	D
DN 80 PN 16 ver.1, if code S is left out	E
DN 125 PN 6 ver.1	F
Straight pipe thread G2-A, if codes S and W are left out	G
DN 100 PN 1-6 ver.1, if code S is left out	C

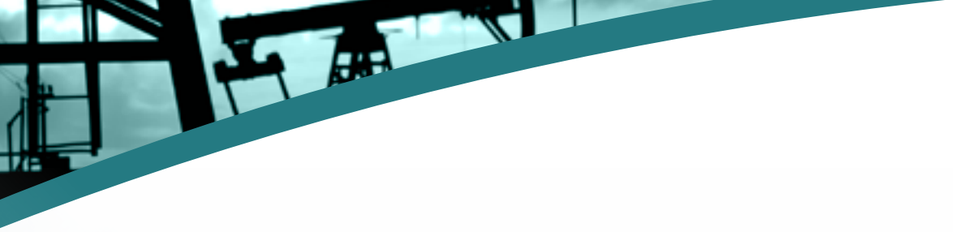
TGD codes ver.04.07.10

Coding principles:

TGD code consists of the following sections:

- General section – general characteristics of the sensor
- Section L – level sensor specification
- Section T – multilevel temperature sensor specification
- Section S – differential pressure sensor for measurement of density
- Section W - level sensor for bottom water

If any of the sensors is not required, the corresponding section is left out.
Section W is required only in presence of section T.
If length is less than 10 meters, the first length position to be indicated as zero.



TGD-L™

Tank Gauging Device (Level)

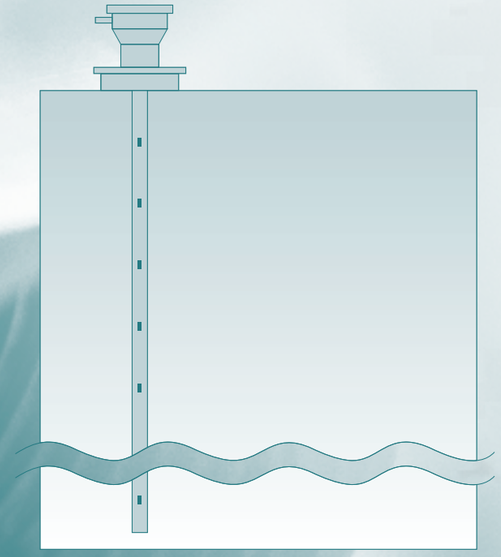
TGD-L™ level sensor is a non-contact level gauge, that has been developed for measuring level of liquids, slurries and sludge including solvents, acids and caustics, waste chemicals, oils, liquefied natural gas, liquefied petroleum gas, food products and most water-based solutions.

TGD-L™ uses patented principle of Guided Low Frequency GLF™ wave propagation, which allows equally precise accuracy of measurement along tank height in any shape of tank and at nearly any conditions in the tank. The principle of operation of TGD-L™ is based on emission of impulse acoustic signal to the liquid surface and receiving the signal reflected from the surface. The level in the tank is calculated based on measured signal transit time to the surface of the liquid and back. The level in the tank is measured by using a number of reference reflectors, located along the height of the tank.

To avoid negative influence of other acoustic signal reflectors in the tank, the acoustic signal is guided in a “channel” - often a pipe going all the way down to the tank bottom. Reference points are located along the pipe.

TDG-L™ Features and Advantages::

- Non-contact level gauge with accuracy of 2 mm
- Automatic self-calibration
- HART® 2-wire connection
- Less cabling – only 2 wires
- Compact unit
- Customized variations
- Easy maintenance



TGD-T™

Tank Gauging Device (Temperature)

TGD-T™ is a high-accuracy multipoint (up to 15 measurement points) temperature sensor, which can be used in almost any type of liquid.

TGD-T™ is as standard manufactured in stainless steel with an ingress protection of IP 67. It consists of housing with a built-in multiplexer and a flexible temperature probe with up to 15 PT-100 resistance thermometers. The PT-100 thermometers offer excellent accuracy over a wide temperature range and are located inside the probe.

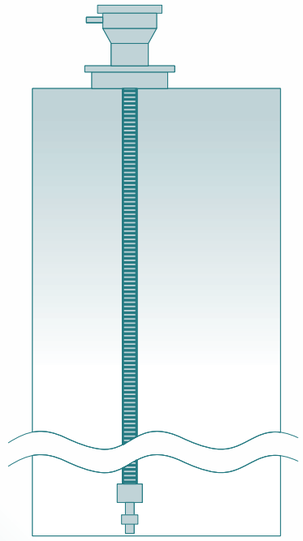
Operating principle of TGD-T™ is based on converting output signals of resistance thermometers into temperature equivalent, received through HART® interface.

Measurement accuracy of TGD-T™ is 0.15°C when using DIN A class resistance thermometers. TGD-T™ ensures accurate measurements of average product temperature even when there is vertical temperature gradient in the tank.

The TGD-T™ is ATEX approved and can be directly mounted in hazardous areas. The multipoint solution is easy to install with a minimum of cables. Length of the temperature probe and the layout of the thermometers are can be based on customer requirements and request.

TDG-T™ Features and Advantages:

- Precise and reliable measurement in any liquids including aggressive media
- HART® 2-wire connection
- Less cabling – only 2 wires
- Up to 15 measurement points
- Easy installation (flexible probe)
- Easy maintenance
- Compact unit
- Any length on request



TGD-S™

Tank Gauging Device (Density)

Density measurement device TGD-S™ is designed for precise and continuous submersible measurement of liquid density in various tanks and reservoirs.

TGD-S™ is manufactured in stainless steel with an ingress protection of IP 67. It consists of a housing with the electronic unit and a sensor element, comprising a differential pressure sensor and two membranes, placed at a fixed distance and connected through capillary tubes.

TGD-S™ measures density of the media by measuring the hydrostatic differential pressure between the two membranes, and provides resulting density value as a digital HART® protocol output.

The density sensor element is designed to be installed at the bottom of the tank with the housing and electronics outside of the tank, providing easy access to the electronic parts.

TGD-S™ Features and Advantages:

- Precise and reliable measurement in any liquids including aggressive media
- HART® 2-wire connection
- Less cabling – only 2 wires
- Easy installation in difficult-to-reach areas (flexible rod)
- Easy maintenance/calibration/reparation
- Compact unit
- Proven technology ensuring high measurement reliability

PI-485™

HART® Controller

PI-485™ HART® Controller is an intelligent microprocessor device that converts HART® digital signals to serial data (RS-485 MODBUS Protocol). This allows HART® devices to be interfaced directly with MODBUS based systems.

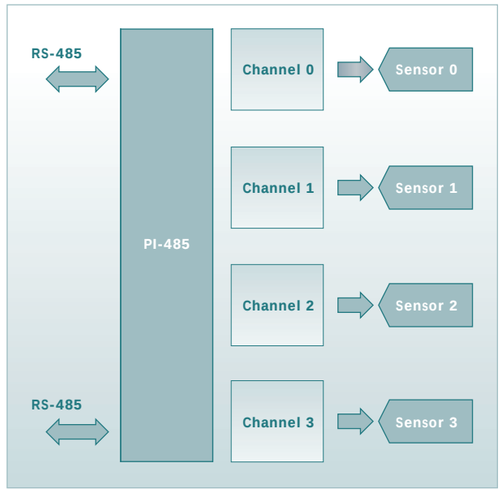
The PI-485 has 4 galvanic isolated HART® digital input ports and 2 galvanic isolated RS485 MODBUS ports, which makes it ideal in critical applications.

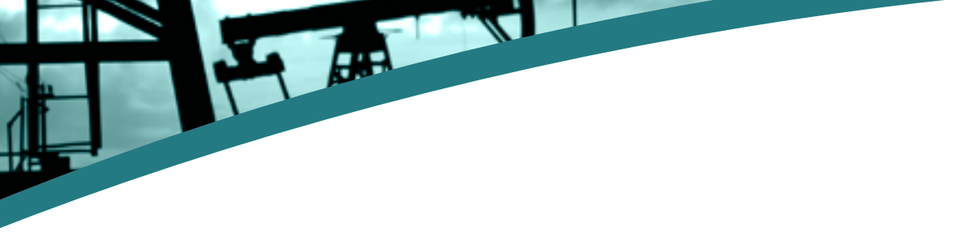
PI-485™ Features:

- Works with all HART® compatible HART® devices/sensors
- Designed with safety in mind for critical applications
- Input: 4 galvanic isolated HART® devices - Output: 2 galvanic isolated RS-485 MODBUS
- Easy programming through Windows based software
- Intrinsic safety of HART® interface devices in accordance with 0Ex ia IIC T5 (version PI-485 Ex)
- Buffering of data received from HART® interface devices for further “quick” processing through the main and backup port of RS-485 interface
- Mounting on universal DIN-rails (35mm)
- Available in a weatherproof external enclosure

PI-485™ Technical Characteristics

Electrical connection	4-20 mA, 2-wire, HART® RS-485, Modbus RTU
Explosion protection	0Ex ia IIC T5
Power supply	24VDC (-25%... +30%)
Power consumption	2 W max.
Ambient temperature range	-10°C... +70°C





UPT™

Universal Pressure Transmitter

Universal Pressure Transmitter UPT™ is designed for measurement and detection of pressure in tanks, reservoirs and pipelines as well as for level measurement (hydrostatic method) in tanks and holds.

Housing and membrane of UPT™ are made of stainless steel. UPT™ can be supplied with various types of flange and thread connections, including a special extension for installation on top of tanks and reservoirs.

Special attention has been given to meeting demands for a high level of enclosure, robust, compact construction and resistance to shock and vibration where conditions of high overload and temperature variation are common.

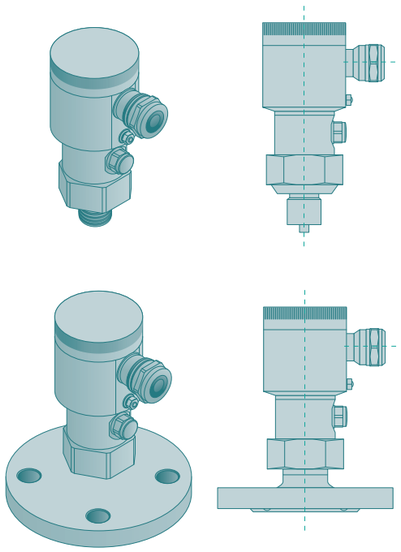
UPT™ can be specially designed for IP 68 applications and it meets the highest standards and extended requirements for arctic and cold climate operations within industrial equipment, marine and off-shore applications.

UPT™ Features:

- General purpose pressure transmitters
- Easy installation
- Customized solutions
- Superior performance
- Application versatility
- Plug-in electronic module

UPT™ Technical Characteristics

Housing material	Stainless steel AISI 316L
Input	18 to 30 VDC
Output	4-20 mA, 2-wire, HART®
Explosion protection	EEx ia IIC T4
Linearity	0.2 % of measured range
Hysteresis effect and repeatability	0.1 % of measured range
Calibration accuracy	0.25 % of measured range
Zero thermal drift	0.25 %/10°C (-10°C...+80°C)
Load resistance, maximum	600 Ω at 24 VDC
Operating temperature	-40°C…+80°C
Temperature limit	-55°C...+125°C



UPT™

Coding sheet

UPT - □□-□-□□□□-□□□-□-□□□-□

Housing type

IP67 Standard	6	7
IP68 Submersible	6	8
IP65 Low pressure of air, gases	6	5
IP68 Submersible, diameter 27 mm	M	8

Type of transmitter

Absolute	A
Relative	R
Differential	D
Barometric	B

Measurement range

Range	Code	Range	Code
0 ... 0.10 bar	0 B 1 0	0... 1.0 wcm	0 1 W 0
0 ... 0.16 bar	0 B 1 6	0... 1.6 wcm	0 1 W 6
0 ... 0.25 bar	0 B 2 5	0... 2.5 wcm	0 2 W 5
0 ... 0.40 bar	0 B 4 0	0... 4.0 wcm	0 4 W 0
0 ... 0.60 bar	0 B 6 0	0... 6.0 wcm	0 6 W 0
0 ... 1.0 bar	0 1 B 0	0... 10 wcm	0 1 0 W
0 ... 1.6 bar	0 1 B 6	0... 16 wcm	0 1 6 W
0 ... 2.5 bar	0 2 B 5	0... 25 wcm	0 2 5 W
0 ... 4.0 bar	0 4 B 0	0... 40 wcm	0 4 0 W
0 ... 6.0 bar	0 6 B 0	0... 60 wcm	0 6 0 W
0 ... 10 bar	0 1 0 B		
0 ... 16 bar	0 1 6 B	B – bar	
0 ... 25 bar	0 2 5 B	K – KPa	
0 ... 40 bar	0 4 0 B	M – MPa	
0 ... 60 bar	0 6 0 B	W – wcm	
0 ... 100 bar	1 0 0 B	G - kgf/cm2	
0 ... 160 bar	1 6 0 B	Z - +/- (in the first position)	
0 ... 250 bar	2 5 0 B		
0 ... 400 bar	4 0 0 B		
On request	X X X X		

Connection type

Thread BSP 1/2"-M	G	1	2
Thread BSP 1/2"-M	0	1	G
Flange DN 25 PN10-40	F	2	5
On request	X	X	X

Type of membrane

Normal	N
Chemical resistant	C

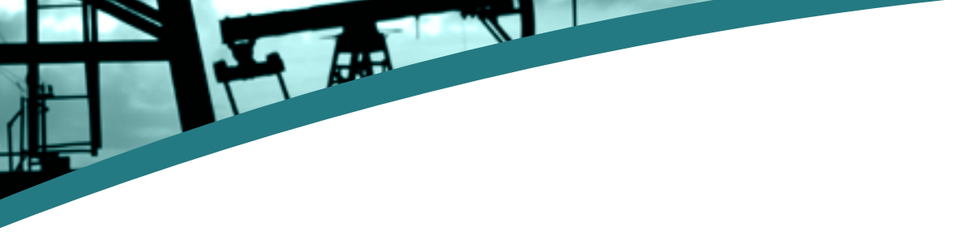
Cable input or cable length

PG 13	P	1	3
M24x1.5	M	2	4
Cable lenght, m (only for IP68)	X	X	X

Explosion protection

Standard type	0
Ex type	1

UPT codes ver.08.02.08



UTT™

Universal Temperature Transmitter

Universal Temperature Transmitter UTT™ is used for temperature measurement of various media – water, oil, petrochemicals, acids, alkalies, gases and steam. UTT™ is characterized by a reinforced housing manufactured in stainless steel and a possibility of open-air installation.

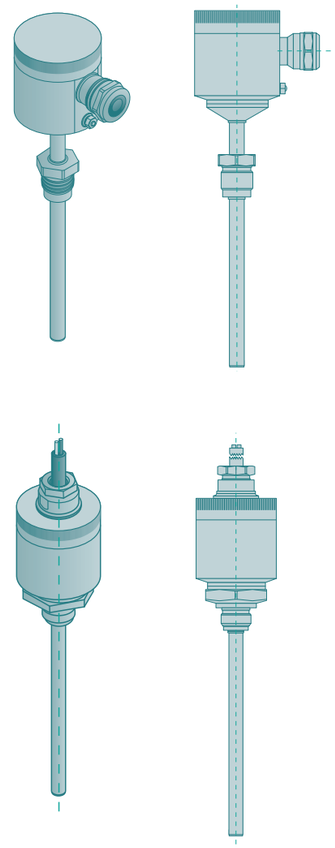
Possibility of ordering the sensor with required probe length, with or without a thermowell, in explosion-proof or standard construction - makes UTT™ the most convenient solution for any industrial application.

UTT™ Features:

- General purpose temperature transmitter
- Easy installation
- Customized solutions
- Resistant to aggressive media
- Resistant to temperature drop
- Easy connection to most interfaces

UTT™ Technical Characteristics

Housing material	Stainless steel AISI 316L
Input	18 to 30 VDC
Output	4-20 mA, 2-wire, HART®
Explosion protection	Ex ia IIC T4-T6
Measurement range	-200°C...+400°C
Measurement accuracy	< ± 0.15%°C
Ambient temperature	-55°C...+85°C



UTT™

Coding sheet

UTT - □□-L□□□-□□□□-□□□□-IS□-□□□-TW□-□□□-□-□□□

Housing type

Protection level IP67	6	7
Protection level IP68	6	8

Length of rod (thermowell)

Length of rod (thermowell), mm	X	X	X

Measurement range

Lower limit, +/- °C	±	X	X	X
Upper limit, +/- °C	±	X	X	X

Output signal

Thermo resistance Pt100, 3-wire connection	A
Current 4-20 mA, 2-wire connection	B
Current 4-20 mA and HART, 2-wire connection	C

Type and size of connection

External straight pipe thread 1/2 inch, fixed socket	G	1	2
External straight pipe thread 1/2 inch, cap socket (only for versions with remote insertion)	1	2	G
On request	X	X	X

Explosion protection

Standard type	0
Ex type	1

Cable input

PG 13	P	1	3
M24x1.5 (internal thread)	M	2	4
Cable length for IP68 version, m	X	X	X

Thermowell

Not included	0
Included, thermowell G 1/2 – G 1/2	1
Included, thermowell G 1/2 – flange DN25 PN40	3
On request	X

Availability and length of remote insertion (extension)

No insertion	0	0	0
Length of insertion, mm	X	X	X

UTT codes ver.08.02.08

With state-of-the-art sensor technology we bring efficiency to our customers

API Industry is a house of competence, where development, design and production processes are united in unique products for tank and pipeline installations integrated in automation systems for industrial applications. Our International Headquarters and factory facilities are situated in Aalborg, Denmark, with branch facilities in St. Petersburg, Russia.

API Industry develops and produces a range of products for surveillance of any type of liquid.

API Industry supplies complete range of sensors for accurate measurement within oil & gas, energy production, food & beverages, pharmaceuticals, water & wastewater, pulp & paper, marine & offshore industries.

We want to contribute to our customer's profitability supplying high quality products, excellent service and state-of-the-art high tech solutions, where reliability and durability are key-words!

A. P. I.
industry

17.04.2012

API Industry ApS | Troensevej 12 | DK-9220 Aalborg Oest | Denmark | Tel.: +45 9634 5070 | info@api-industry.com | www.api-industry.com