Sistemas de Controlo e Medida

Hidrostatic Level
DATASHEET

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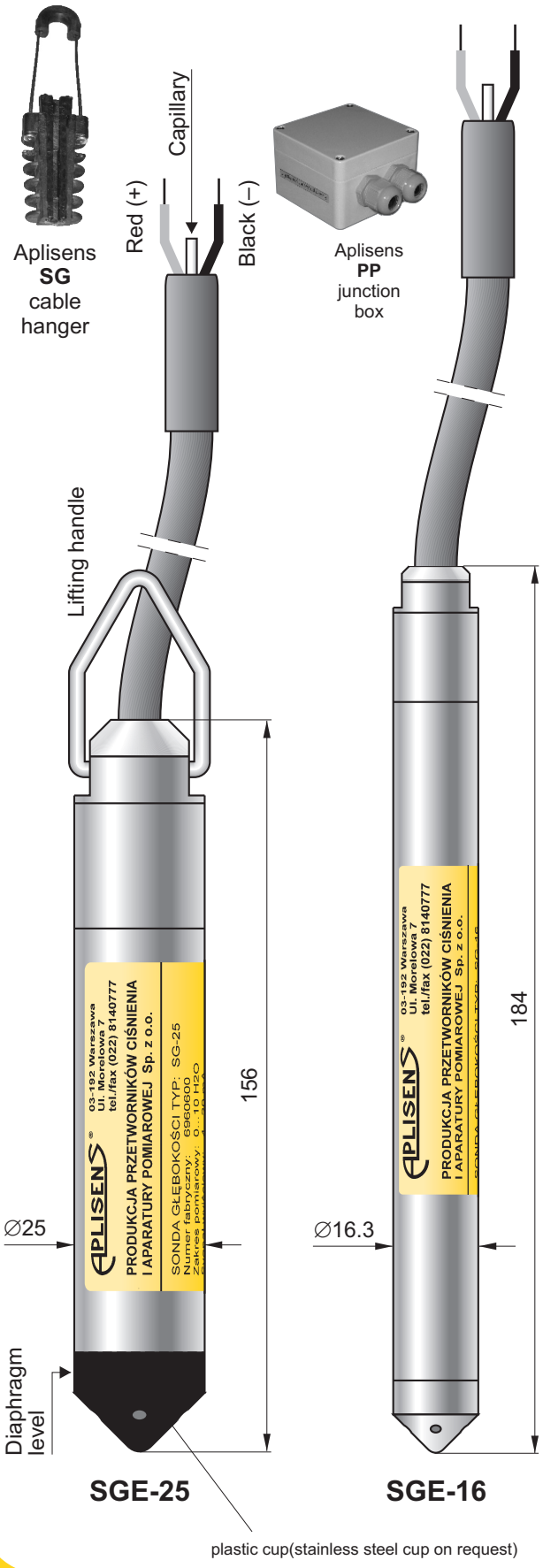
Hydrostatic level probes SGE-25 and SGE-16



- ✓ **Any measurement range from 1 up to 500 m H_2O**
- ✓ **Integrated internal overvoltage protection circuit**
- ✓ **ATEX Intrinsic safety** Ex II 1G Ex ia IIC T4/T5/T6 Ga I M1 Ex ia I Ma
- ✓ **Marine certificate DNV**

Application

The SGE-25 hydrostatic level probe is applicable to measure liquid levels in tanks, deep wells or piezometers.

The SGE-16 probe is a specialized device designed to measure water levels in narrow diameter piezometers or wells.

Principles of operation, construction

The probe measures liquid levels, basing on a simple relationship between the height of the liquid column and the resulting hydrostatic pressure. The pressure measurement is carried out on the level of the separating diaphragm of the immersed probe and is related to atmospheric pressure through a capillary in the cable.

The active sensing element is a piezoresistant silicon sensor separated from the medium by an isolating diaphragm. The electronic amplifier, which works in combination with the sensor, and is meant to standardize the signal, is additionally equipped with an overvoltage protection circuit, which protects the probe from damage caused by induced interference from atmospheric discharges or from associated heavy current engineering appliances.

Installation, method of use

When lowered to the reference level, the probe may either hang freely on the cable or lie on the bottom of the tank. The cable with the capillary can be extended using a standard signal cable. For the cable connection a special Aplisens **SG** cable hanger is recommended. The cable connection should be situated in a non-hermetically sealed box (the internal pressure inside the box should be equal to the atmospheric pressure), preventing water or other contaminants from getting into the capillary. The Aplisens **PP** junction box is recommended For systems with long signal transmission lines, it is recommended the using of an additional Aplisens UZ-2 overvoltage protection circuit in the form of a wall-mounted box which allows the cables connection. When the probe cable is being wound up, the minimum winding diameter should be 30cm and the cable should be protected from mechanical damage.

If there is a possibility of turbulence in the tank (for example, because of the mixer operating mixers or a turbulent inflow), the probe should be installed inside a screening tube (e.g. made of PVC). If the probe is to be lowered deeper than 100m, the cable should be hanged at steel lifting rope. Cleaning the probe diaphragm by mechanical means is strictly prohibited.

Technical data for the SGE-25 level probe

Measuring range
Any measuring range 1 ÷ 500 m H_2O (the standard ranges: 4, 10, 20, 50, 100 m H_2O are recommended)

	Measuring Range		
	1 m H_2O	**4 m H_2O**	**0...10 m H_2O ÷ 500 m H_2O**
Overpressure Limit (repeatable – without hysteresis)	40 × range	25 × range	10× range (max. 700 m H_2O)
Accuracy % FSO acc. to IEC 60770	0.6%	0.3%	0.2%
Accuracy % FSO acc. to BFSL	0.3%	0.15%	0.1%
Thermal error	Typical 0.3% / 10°C max 0.4% / 10°C		Typical 0.2% / 10°C max 0.3% / 10°C

Long term stability 0.1% or 1 cm H_2O for 1 year
Hysteresis, repeatability 0.05%
Thermal compensation range 0 ÷ 25°C – standard,
-10 ÷ 70°C – special version
Medium temperature range -25 ÷ 50°C – for range > 20 m H_2O,
-25 ÷ 75°C – for range ≤ 20 m H_2O,
-25 ÷ 50°C – for EEx version
CAUTION: The medium must not be allowed to freeze in the immediate vicinity of the probe

Technical data for the SGE-16 level probe

Measurement ranges 10, 20, 50, 100 m H_2O
Overpressure limit 10 × range
(repeatable – without hysteresis)
Accuracy 0.5%
Hysteresis, repeatability 0.05%
Thermal compensation range 0 ÷ 25°C
Process temperature limit 0 ÷ 50°C

Electrical parameters (applicable to both probes)

Output signal, power supply:

no	Signal type	Power supply	Available in models
1	4 - 20mA	10,5 – 36VDC	SGE-25/… SGE-16/…
2	4- 20mA	10,5 – 28V	SGE-25/Exia
3	0 - 10V	15 – 30 VDC	SGE-25/….
4	0 – 3,3V	4,1 – 14,1VDC	SGE-25/….
5	0 – 5V 0,5 – 4,5 V	8 – 14,1 VDC	SGE-25/….
6	0 – 3,3 V	3,6 – 4,5 V DC	SGE-16/….

Load resistance (for current output) $R[\Omega] \leq \frac{U_{sup}[V] - 10.5\,V}{0.02\,A}$

Load resistance (for voltage output) $R \geq 5\,k\Omega$

Error due to supply voltage changes 0.005% / V

Degree of protection IP-68
Material of casing (applicable to both probes) 00H17N14M2 (316Lss)
Material of diaphragm
SGE-25 Hastelloy C276
SGE-16 316Lss
Cable shield (applicable to both probes) POLYURETHANE

Special versions, certificates (not applicable to SGE-16)
◊ **Teflon –** Teflon cable shielding
◊ **EEx** – Atex Intrinsic safety
◊ **-10 ÷ 70°C** – extended thermal compensation range
◊ **MR –** Marine certificate DNV

Ordering procedure

SGE-25 /___/___/___/ L = ... m

Special versions:
Teflon, EEx, -10 ÷ 70°C, MR
Measuring range
Output signal: (1-5)
Cable length

SGE-16 /___/___/ L = ... m

Measuring range
(standard only)
Output signal: (1 or 6)
Cable length

Fitting accessories if required: **SG** cable hanger, **PP** junction box

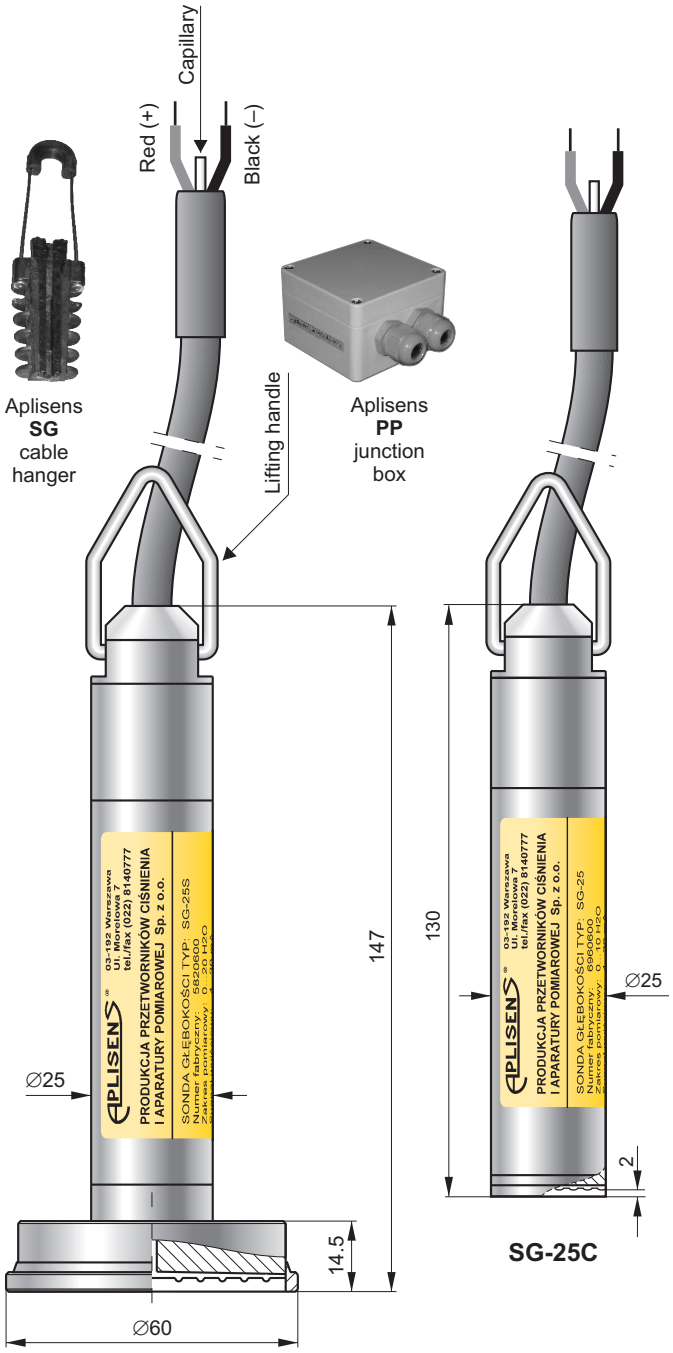
Example 1: SGE-25 level probe / EEx version, extended temperature compensation range / measuring range 0 ÷ 2.5 m of fuel oil with density ρ = 0.83 g/cm^3 / cable length 6 m

SGE-25 / EEx, -10 ÷ 70°C / 0 ÷ 2.5 m (ρ = 0,83) / L = 6 m

Hydrostatic level probes SGE-25S and SGE-25C

for measurement of waste liquid levels

- ✓ **Any measurement range from 2 up to 20 m H_2O**
- ✓ **Integrated internal overvoltage protection circuit**
- ✓ **ATEX Intrinsic safety** Ex II 1G Ex ia IIC T4/T5/T6 Ga
  I M1 Ex ia I Ma
- ✓ **Marine certificate DNV**



Application

The SGE-25S and SGE-25C probes are applicable to measure levels of liquids containing contaminants or suspensions. A typical use for this probe is the measurement of levels of liquid waste in intermediate pumping stations, fermentation chambers, settling tanks etc.

Principles of operation, design

The probe measures liquid levels, basing on a simple relationship between the height of the liquid column and the resulting hydrostatic pressure. The pressure measurement is carried out on the level of the separating diaphragm of the immersed probe and is related to atmospheric pressure through a capillary in the cable.

The use of a special separator with a large uncovered diaphragm minimizes the metrological effect of sediment deposit on the diaphragm surface. This enables the probe long lifetime and proper work in contaminated media (even in the presence of abrasives, such as sand) and facilitates cleaning with a delicate stream of running water (washing with water under pressure may damage the probe).

The active sensing element is a piezoresistant silicon sensor separated from the medium by an isolating diaphragm. The electronic amplifier, which works in combination with the sensor, and is meant to standardize the signal, is additionally equipped with an overvoltage protection circuit, which protects the probe from damage caused by induced interference from atmospheric discharges or from associated heavy current engineering appliances.

Installation, method of use

When lowered to the reference level, the probe may either hang freely on the cable or lie on the bottom of the tank. The cable with the capillary can be extended using a standard signal cable. For the cable connection a special Aplisens **SG** cable hanger is recommended. The cable connection should be situated in a non-hermetically sealed box (the internal pressure inside the box should be equal to the atmospheric pressure), preventing water or other contaminants from getting into the capillary. The Aplisens **PP** junction box is recommended For systems with long signal transmission lines, it is recommended the using of an additional Aplisens UZ-2 overvoltage protection circuit in the form of a wall-mounted box which allows the cables connection. When the probe cable is being wound up, the minimum winding diameter should be 30cm and the cable should be protected from mechanical damage.

If there is a possibility of turbulence in the tank (for example, because of the mixer operating mixers or a turbulent inflow), the probe should be installed inside a screening tube (e.g. made of PVC). The line hooked on the lifting handle can simplify the operation of the probe pulling out. Cleaning the probe diaphragm by mechanical means is strictly prohibited.

Technical data

Any measurement range 2 ÷ 20 m H_2O (we recommend the standard ranges: 2, 4, 10 m H_2O)

	Measuring Range		
	2 m H_2O	**4 m H_2O**	**0...10 m H_2O ÷ 20 m H_2O**
Overpressure Limit (repeatable – without hysteresis)	20 × range	20 × range	10 × range
Accuracy % FSO acc. to IEC 60770	1.5%	1%	0.5%
Accuracy % FSO acc. to BFSL	0.75%	0.5%	0.25%
Thermal error of zero	Typical 0.4% / 10°C max 0.6% / 10°C		Typical 0.2% / 10°C max 0.3% / 10°C
Thermal error of span	Typical 0.3% / 10°C max 0.4% / 10°C		Typical 0.2% / 10°C max 0.3% / 10°C

Hysteresis, repeatability 0.05%

Thermal compensation range 0 ÷ 25°C

Medium temperature range -25 ÷ 75°C
-25 ÷ 50°C – for EEx version
CAUTION: The medium must not be allowed to freeze in the immediate vicinity of the probe

Electrical parameters

Output signal 4 ÷ 20 mA, two wire transmission
Special version: 0 ÷ 10 V three wire transmission (not applicable to EEx)

Load resistance (for current output) $R[\Omega] \leq \frac{U_{sup}[V] - 10.5\,V}{0.02\,A}$

Load resistance (for voltage output) $R \geq 5\,k\Omega$

Power supply 10.5 ÷ 36 V DC (EEx: max 28 V)
15 ÷ 30 V DC (for 0 ÷ 10 V output)

Error due to supply voltage changes variation 0.005% / V

Degree of protection IP-68
Material of casing and diaphragm
SG-25S (casing 316Lss, diaphragm 316Lss /option Hastelloy C/)
SG-25C (casing 316Lss, diaphragm 316Lss)
Cable shielding POLYURETHANE

Special versions, certificates
◊ **Teflon –** Teflon cable shielding
◊ **EEx** – ATEX Intrinsic safety
◊ **MR** – Marine certificate DNV
◊ **0 ÷ 10 V** – voltage output (not applicable to EEx; without overvoltage protection circuit)
◊ **Others**

Ordering procedure

SGE-25S /___/___/ L = ... m

Special versions: Teflon, Ex ia, MR
0 ÷ 10 V, others (description)

Measurement range

Cable length

Ordering procedure

SGE-25C /___/___/ L = ... m

Special versions: Teflon, MR, Ex ia
0 ÷ 10 V, others (description)

Measurement range

Cable length

Fitting accessories if required: **SG** cable hanger, **PP** junction box

Example: SGE-25S level probe / EEx version / measuring range 0 ÷ 4 m H_2O / cable length 8 m
SGE-25S / EEx / 0 ÷ 4 m H_2O / L = 8 m

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