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Technical Documentation



## 83 UV/84 UVT

Overfill Prevention Sensors



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## 1 Characteristic features of the overflow prevention sensors 83 UV and 84 UVT

In connection with a certified filling sensor (repeater and actuator) installed in a tank truck, the two overflow prevention sensors 83 UV and 84 UVT monitor the filling operation and the storage of heating oil, diesel and gasoline.

The PTC (= positive temperature coefficient) at the bottom end of the probe of both overflow prevention sensors transmits any resistance changes caused by different temperatures to the repeater in the tank truck. Depending on the resistance value (liquid level in the tank) in each case, the actuator in the tank truck is opened so that fuel is filled into the receiving system or it is closed so that the supply of fuel is interrupted.

The overflow prevention sensors are installed in the tank by means of a screw-in unit. They can be moved and fixed within the adjustment range. The 83 UV is available with a probe length of 200 to 5,000 mm and the 84 UVT with a probe length of 600 and 900 mm.

Both overflow prevention sensors are suitable for direct filling operations and are equipped with a plug on sensor for direct connection to the tank truck. Instead of being equipped with the plug on the top, the overflow prevention sensor 83 UV can also be equipped with a junction box which is connected via a connecting line to a wall plug whenever the filling connection is installed at a distance away from the tank.

## 2 Safety instructions

In connection with a certified filling sensor (repeater and actuator) installed in tank trucks, the two overfill prevention sensors 83 UV and 84 UVT serve the purpose of monitoring the filling operations (heating oil, diesel, and gasoline). Use the overfill prevention sensors for this purpose only. The manufacturer shall not be liable for any form of damage resulting from improper use!

The overfill prevention sensors were developed, manufactured and inspected in accordance with state-of-the-art technology and with recognised technical safety rules and regulations. Nevertheless, hazards may arise from the use of these devices. Therefore, please observe the following safety instructions:

- Never perform any modifications, attachments or conversions on the overfill prevention sensors or on the total system without obtaining prior consent from the manufacturer.
- Use original spare parts only. These comply with the technical requirements specified by the manufacturer.
- The installation, operation and maintenance of the overfill prevention sensors is only allowed to be carried out by expert, authorised personnel. Specialised knowledge must be obtained by undergoing regular training.
- Operators, installers and service personnel must observe all applicable safety regulations. This also applies to the local safety regulations and accident prevention regulations not mentioned in this manual of operating instructions.
- Proper operation of the overfill prevention sensors is only guaranteed when used in connection with a certified filling sensor (amplifier and actuator) in the tank truck.
- Whenever the overfill prevention sensors are installed in tanks used to store other liquids than heating oil, diesel or gasoline, the tank truck must be equipped with a filling sensor certified for the liquid to be discharged.
- The overfill prevention sensors are designed according to the EN standard 13616.

The safety instructions in this manual are labelled in the following manner:



*If you do not observe these safety instructions, risk of an accident exists or the overflow prevention sensors 83 UV/84 UVT could be damaged.*



*Useful information that will guarantee proper function of the overflow prevention sensors or facilitate your work.*

## 3 Structure

The main difference between the two overfill prevention sensors has to do with the available probe lengths and connection equipment to the tank truck.

### Overfill prevention sensor 83 UV

The overfill prevention sensor 83 UV is designed according to the EN standard 13616 and consists of

- a probe (1), which reaches into the tank in height-adjustable form, and carries a protected sensor (2) (steel-encapsulated PTC-resistor) at its bottom end,
- a screw-in unit (3) as a probe carrier and
- a connection unit (4) to the tank truck.

(see Fig. 1a and 1b)

#### Probe

The overfill prevention sensor 83 UV is available in special lengths from 200 to 5,000 mm – in 100-mm increments. The respective probe length has been permanently imprinted (5) at the top end of the probe tube, above the marking groove, and refers to the spacing dimension between the marking groove (6) at the top end of the probe tube and the marking groove (7) on the protective sleeve at the height of the sensor (threshold point). The probe (1) is made of brass.

#### Screw-in unit

The probe (Ø 24 x 2) is locked and sealed in the screw-in unit (thread 1) (3), which is also made of brass, with a gland screw connection (8) and also with a fixing screw and can be moved and fixed in place within the height adjustment range. The screw-in unit is designed to be used for a pressure range from 0.67–2 bar.

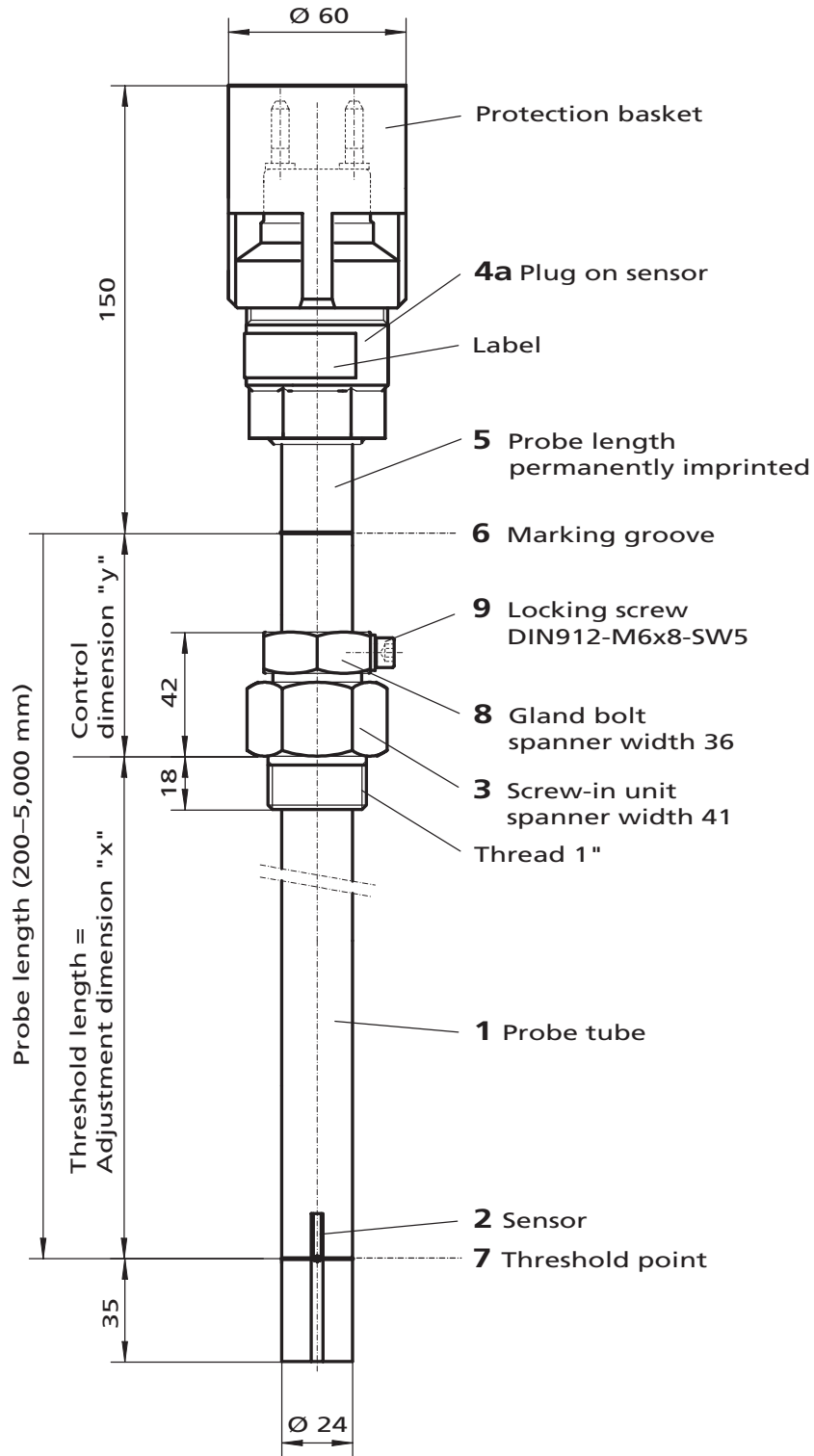


Fig. 1a: Overfill prevention sensor 83 UV with plug on sensor

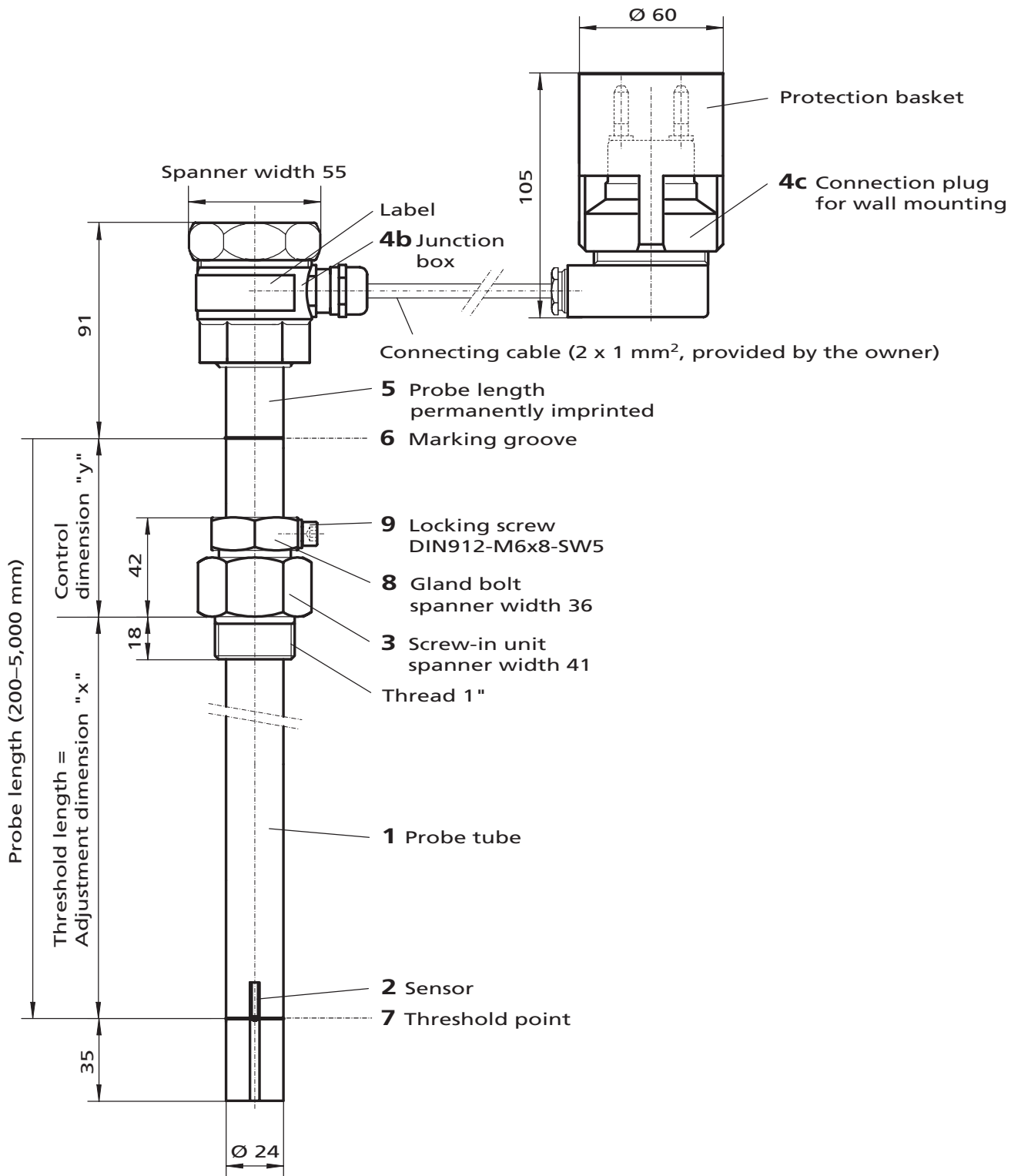


Fig. 1b: Overfill prevention sensor 83 UV with wall plug

### Connection plugs

The connection plug is the interface between the overflow prevention sensor and the tank truck. The overflow prevention sensor can be equipped with various connection plugs. The connection plug must be located in the vicinity of the filling connection (also see section „Connect overflow prevention sensor to filling sensor“ in Chap. 5).

### Plug on sensor

If the filling connection is located directly on the tank in which the overflow prevention sensor has been installed, the connection equipment of the overflow prevention sensor is then designed as a plug on sensor (Fig. 1a).

### Wall plug

If the filling connection has been installed at a distance away from the tank (e.g. in central filling shaft), a junction box (4b), instead of the plug on sensor, is then screwed onto the end of the probe tube. Starting from the junction box, a two-core connecting cable is then laid over to the wall plug (Fig. 1b) (see Chap. 5 „Installation“).

## Overflow prevention sensor 84 UVT

The overflow prevention sensor 84 UVT is designed according to the EN standard 13616 and consists of

- a probe (1), which reaches into the tank in height-adjustable form, and carries a protected sensor (2) (steel-encapsulated PTC-resistor) at its bottom end,
- a screw-in unit (3) as a probe carrier and
- a plug on sensor (4) for the connection to the tank truck.

(see Fig. 2)

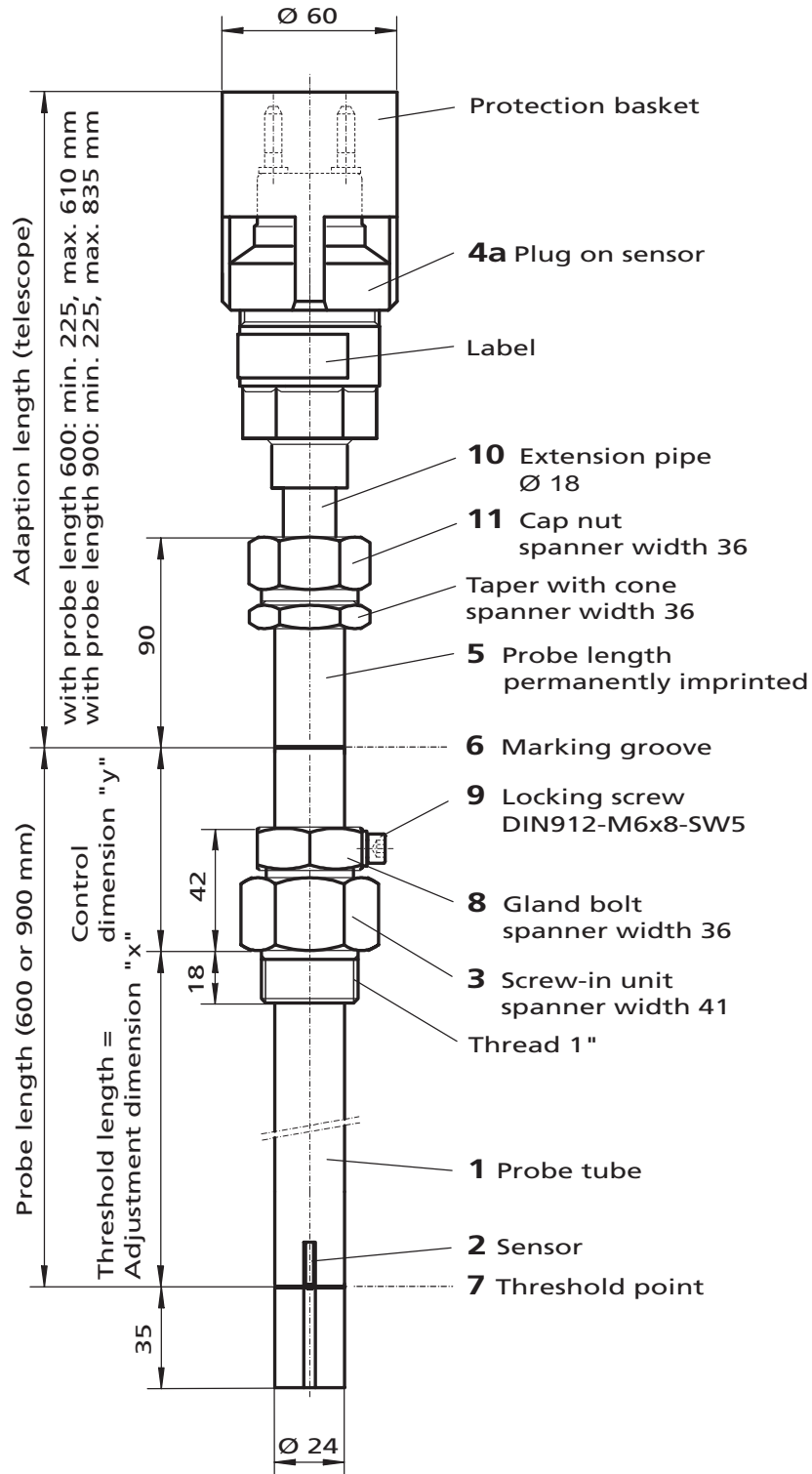


Fig. 2: Overfill prevention sensor 84 UVT

## Probe

The overfill prevention sensor 84 UVT is available in special lengths of 600 and 900 mm. The respective probe length has been permanently imprinted (5) at the top end of the probe tube, above the marking groove, and refers to the spacing dimension between the marking groove (6) at the top end of the probe tube and the marking groove (7) on the protective sleeve at the height of the sensor (threshold point). The probe (1) is made of brass.

## Screw-in unit

The probe ( $\varnothing$  24 x 2) is locked and sealed in the screw-in unit (thread 1) (3), which is also made of brass, with a gland screw connection (8) and also with a fixing screw and can be moved and fixed in place within the height adjustment range. The screw-in unit is designed to be used for a pressure range from 0.67–2 bar.

## Plug on sensor

The plug on sensor (4) is the interface between the overfill prevention sensor and the tank truck. This plug must be located in the vicinity of the filling connection (also see section „Connect overfill prevention sensor to filling sensor“ in Chap. 5).

Since the distance between the bottom edge of the shaft cover and the top edge of the connection plug is not supposed to be less than 20 mm and not more than 300 mm, the overfill prevention sensor 84 UVT has therefore been equipped with a submersible extension pipe ( $\varnothing$  18 x 2) (10) inside the probe tube. The extension pipe is fixed in place with a cap nut (11) and a clamping ring. An O-ring serves the purpose of a sealing element.

Depending on the respective height of the connection plug in each case, the following adaptation lengths can be reached for the two probe lengths (see Fig. 2):

600-mm probe length: 225–610 mm

900-mm probe length: 225–835 mm

## Security systems

The connection plugs of both overfill prevention sensors can be encoded so that they compare the liquid to be filled with the stored liquid and then guarantee an intact hose connection (also see Section „Connect overfill prevention sensor to filling sensor“ in Chap. 5).

## Product monitoring QSS

Both overfill prevention sensors can be equipped with an encoded connection plug QSS. Accordingly, a specific code is assigned to each liquid (product) to be filled; this code is then read via the FAFNIR-FP 903/ASS/K junction by the repeater in the tank truck. The repeater does not release the liquid discharge signal until the product to be discharged corresponds to the storage product. The encoding process is carried out via the FAFNIR-FP 901 flange plug insert:

- Code 1 = Super Unleaded
- Code 2 = Diesel
- Code 3 = Regular Unleaded
- Code 4 = Super Plus Unleaded
- Code 5 = not yet assigned
- Code 6 = not yet assigned

## Hose monitoring ASS

In addition to the QSS code, the connecting plugs can be used for hose monitoring. A signal is transmitted via the connecting cable from the repeater in the tank truck to the overfill prevention sensor and then conducted via the hoses back to the amplifier. A discharge operation can only be carried out if the filling hose (or, in the case of gasoline, the gas displacement hose) has been properly connected. The encoding process is carried out via the FAFNIR-FP 901-ASS flange plug insert.

## 4 Mode of operation

As soon as the connecting line has been made between the overflow prevention sensor and the amplifier of the filling sensor on the tank truck, the PTC-resistor of the probe is heated up. After a specific temperature has been reached, the resulting resistance change activates a „Filling sensor ready for operation“ signal in the repeater. The liquid can then be discharged.

As soon as the liquid reaches the sensor of the overflow prevention sensor, the cooling process of the heated-up PTC-resistor results in a resistance change that leads to the „Close actuator“ signal in the repeater. The actuator (valve) is closed automatically and the discharge operation is then terminated.



*The response time of the sensor starting from the submergence in the storage liquid until the activation of the switching operation amounts to a maximum period of 2 seconds.*

*The actuator blocks off the flow of liquid after a period of no more than 3 seconds, measured from the time of signal transmission by the repeater.*

## 5 Installation



*For all work performed on the overflow prevention sensor, observe the national safety regulations and accident prevention regulations as well as all the safety instructions in this manual of operating instructions.*



*For the installation of the overflow prevention sensor, make sure that the threshold point is not located in areas of intensive vapor flow. Installation in safety pipes or sounding pipes is impermissible.*

The installation position of the overflow prevention sensor in the tank must be selected so that neither splashes of liquid nor excessive vapor flow can result in premature response of the sensor. The overflow prevention sensor must be installed in perpendicular position so that residual liquid can drop down from the sensor.

### Calculate threshold length of overflow prevention sensor

With the permissible filling degree of the respective tank, you define the threshold height (h) of the overflow prevention sensor (see Fig. 3).

Each probe length (Z) is permanently imprinted at the top end of the probe. The probe length is provided as a distance dimension between this mark (M) and the threshold point (A) of the overflow prevention sensor. (See Fig. 3)

Before the overflow prevention sensor can be installed, the threshold length (x) must be determined. Depending on the probe length (S), the overflow prevention sensors can be used for the following threshold lengths:

$$x_{\min} = 50 \text{ mm}$$

$$x_{\max} = \text{special length (S)} - 45 \text{ mm}$$

If your overflow prevention sensor has a probe length of, e.g., 700 mm, the threshold length for this overflow prevention sensor can then range from 50 to 655 mm.

In order to adjust the threshold length ( $x$ ) as the distance between the hexagon support of the screw-in unit and the threshold point at the bottom end of the sensor (see Fig. 3 and Fig. 4):

1. Determine the threshold height ( $h$ ) depending on the permissible filling degree.
2. Calculate the threshold length ( $x$ ) depending on the tank dimensions and on the threshold height ( $h$ ).

$$x = b - h,$$

whereby  $b$  = distance between tank bottom and hexagon support

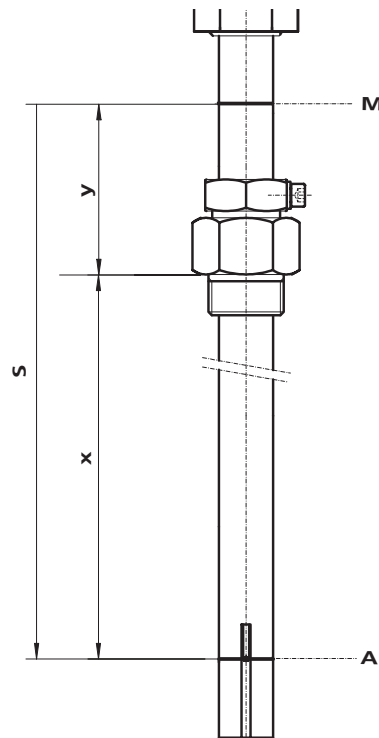


Fig. 3: Adjustment dimensions for overfill prevention sensors 83 UV and 84 UVT



***When calculating the threshold length ( $x$ ) and installing the overfill prevention sensor, make sure that the country-specific regulations for the maximum filling degree are observed.***

***(Example: For Germany, 95 % are stipulated for above-ground tanks and 97 % for underground tanks (min. earth cover = 300 mm).)***

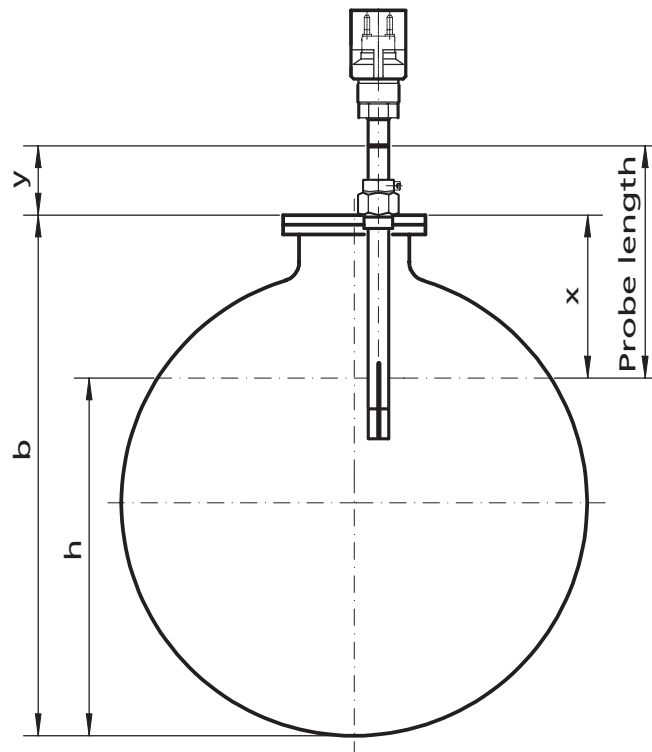


Fig. 4: Adjustment dimensions for a standard tank

$$x = b - h$$

x = threshold length

b = distance between tank bottom and hexagon support

h = threshold height

## Install overflow prevention sensor



*In the case of underground tanks, the distance between the top edge of the plug on sensor and the bottom edge of the shaft cover is not allowed to be less than 20 mm and not more than 300 mm.*



*In the case of the overflow prevention sensor 84 UVT, the extension pipe can be used to adjust the plug on sensor to the correct distance to the shaft cover regardless of the threshold length of the overflow prevention sensor (see Section „Plug on sensor“ in Chap. 3 „Structure“).*

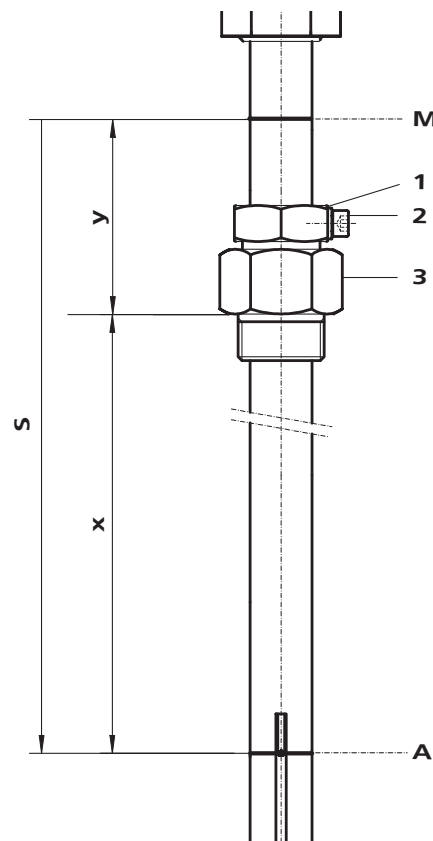


Fig. 5: Installation of overflow prevention sensors 83 UV and 84 UVT

1. Undo locking screw (2) and gland bolt (1).
2. Adjust the calculated threshold length (x) between the bottom edge of the hexagon piece of the screw-in unit (3) and the threshold point (A).



When the overflow prevention sensor has been installed, the correct adjustment of the threshold length ( $x$ ) can be checked without removing the sensor by referring to the control dimension ( $y$ ) and the imprinted probe length ( $S$ ) (whereby  $y$  = distance between the marking groove ( $M$ ) at the top end of the probe tube and the hexagon support of the screw-in unit).

$$x = S - y$$

3. Tighten the gland bolt (1) of the screw-in unit firmly.
4. Secure the gland bolt by tightening the locking screw (2).
5. Apply suitable, resistant sealing material to the screw-in threads.
6. Screw the overflow prevention sensor into the screw-in threads in the tank sleeve.
7. Check the threshold length ( $x$ ) by referring to the control dimension ( $y$ ) and the probe length ( $S$ ) ( $x = S - y$ ).

### Connect overflow prevention sensor to filling sensor

The overflow prevention sensor 83 UV can be connected by means of a plug on the sensor but also by means of a wall plug (see next section).

For the wall installation, the connection between the junction box and the wall plug must be made via a two-core cable with the following dimensions:

- 2 x 1 mm<sup>2</sup> for a max. length of 150 m
- 2 x 1.5 mm<sup>2</sup> for a max. length of 250 m

The overflow prevention sensor 84 UVT is connected by means of the plug on sensor to the filling sensor in the tank truck (see next section). The height of the plug can be adjusted using the extension pipe regardless of the probe length.



**Both overflow prevention sensors are only allowed to be connected to a repeater with a certified electric circuit and the following maximum values:**

**No-load voltage: 24 V**

**Short-circuit current: 150 mA**

**Power: 600 mW (in the entire range)**

### Plugs on sensor

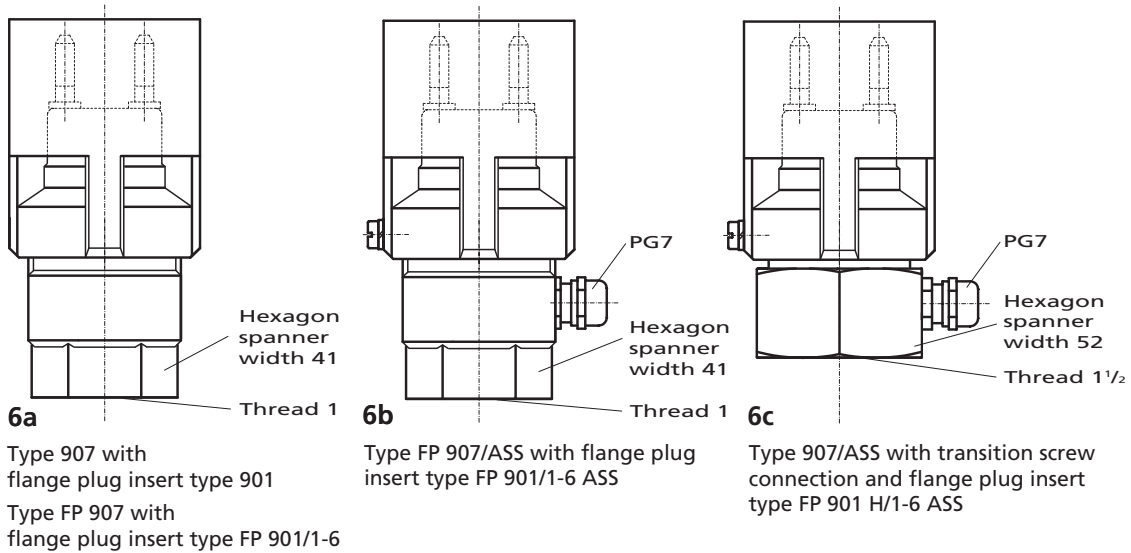


Fig. 6a–6c: Plugs on sensor for overfill prevention sensors 83 UV and 84 UVT

### Plugs for wall mounting

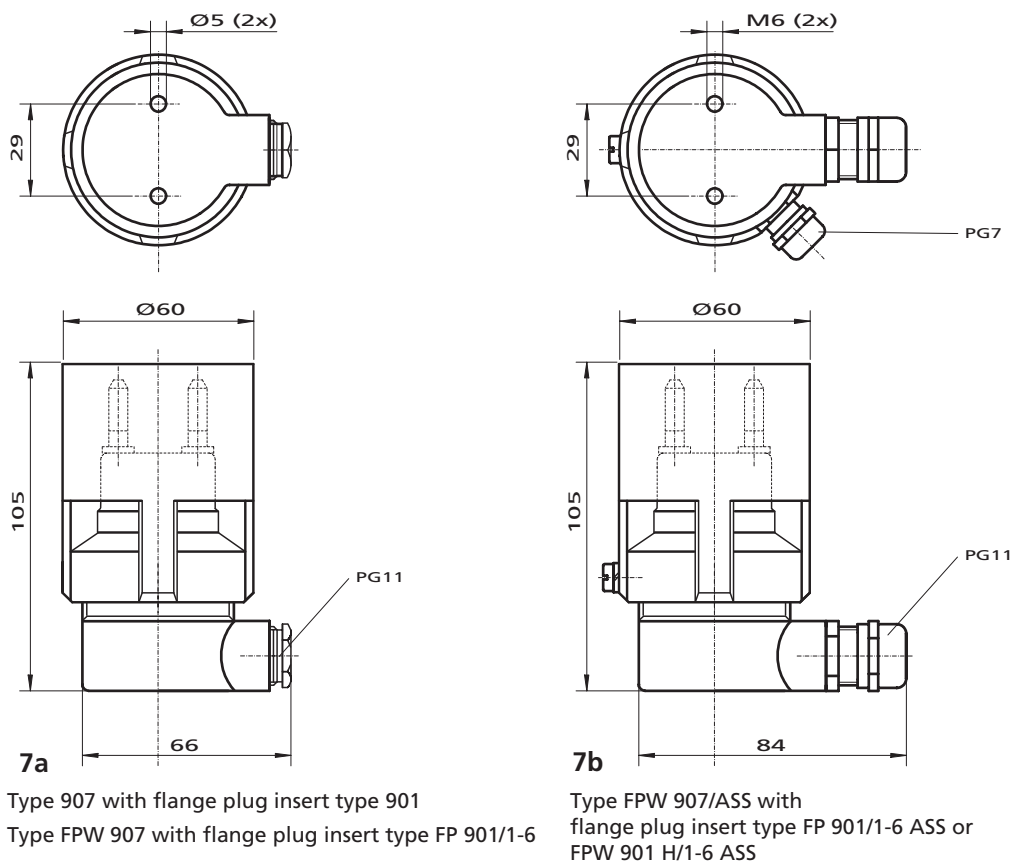


Fig. 7a–7b: Wall plugs for overfill prevention sensor 83 UV

## 6 Technical data

Explosion protection:	II 1G EEx ia IIB T3
Certification:	TÜV 03 ATEX 2033
Ambient temp.:	-25 °C bis +60 °C
Media temperature:	-25 °C bis +50 °C
Pressure range, Screw-in unit:	0.67 to 2 bar
Immersion switching delay:	< 2 seconds
Inductance:	Outward acting, negligibly little
Capacitance:	Outward acting, negligibly little
Connection data:	No-load voltage: 24 V Short-circuit current: 150 mA Power: 600 mW (in the entire range)