



**Bypass level indicator, model BNA with option level sensor and magnetic switch**

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**WARNING!**

Instructions on correct installation and proper operation. Non-observance of these instructions can lead to malfunction or damage.



**DANGER!**

Instructions which must be complied with to avoid injury or property damage.



**Information**

Facts and information concerning proper operation.

# 1. Safety instructions

## 1. Safety instructions

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Please read these instructions carefully before installing and commissioning the model BNA bypass level indicator. These instructions are directed to trained personnel implementing the assembly, installation and set-up of the system. The bypass level indicator serves for continuously measuring the level of liquids in vessels. Use it for no purpose other than this. No liability will be assumed by the manufacturer for damage resulting from use other than specified! The bypass level indicator has been designed, manufactured and tested in accordance with the state of art and the accepted safety regulations. Notwithstanding this, certain risks might be involved.

### **The following safety instructions should, therefore, be observed:**

Do not modify, supplement or change the bypass level indicator unless with manufacturer's express approval. Unauthorised changes or non-permitted use will result in immediate loss of warranty or liability claims.

The installation, operation and maintenance must be performed by expert and authorised personnel only. The required expertise must be obtained by regular training.

It is imperative for operators, installers and servicers to comply with all applicable safety regulations. This provision shall extend to all local safety and accident preventing regulations not expressly referred to herein.

Prior to starting operation please check all devices for their proper connection, operability and power supply. This shall also apply to assemblies coupled thereto.

# 1. Safety instructions

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The general operating instructions of all devices as used must be abided by.

Measures must be taken preventing personal injuries and damage to property from occurring in case of a defective condition of the bypass level indicators.

The bypass level indicator must not be operated in the direct vicinity of ferromagnetic environments (min. distance 50 mm) or strong electromagnetic fields (min. distance 1 m).

The bypass level indicator must not be exposed to heavy mechanical strain.

The maximum power and voltage values for the intrinsically safe operation as specified in the assembling and operating instructions should be adhered to.



**The safe operation of the system with a view to pressure and temperature of the materials as employed shall be the operator's responsibility.**

The medium to be monitored must not be heavily soiled or contain coarse particles. It must not tend to stick or crystallise, as otherwise the perfect function cannot be guaranteed.

The bypass level indicators may only be used in accordance with the maximum values for pressure and temperature as stated on the product label. Exceeding these parameters can lead to malfunctions or to the destruction of the bypass level indicator and may cause personal injury or damage to property. All materials of the bypass tube and the float must be resistant to the medium to be monitored.

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The maximum values specified on the product label must be observed to guarantee trouble-free operation. At temperatures over 60 °C, a warning sign has to be attached to flanges, tubes, case etc., warning explicitly of the danger of burning and suitable protective measures must also be taken.



The float has been designed for the medium density specified on the product label. When the float is used in liquids with another specific weight, deviations can occur during measurement.



### **DANGER!**

Work in containers involves the danger of intoxication and suffocation. No work is allowed to be carried out unless by taking suitable personal protective measures (e.g. respiratory protection apparatus, protective outfit etc.).

### **Danger of explosion**

Inside the container, there is danger of an explosive atmosphere. Corresponding measures for preventing sparking should be taken. No work is allowed in this area unless by technically skilled staff in accordance with applicable safety regulations.

## 2. Functional description and design

KSR KUEBLER bypass level indicators work according to the principle of communicating vessels. The bypass vessel contains a float with a built-in permanent magnet. This rises and falls with the level of the medium. Optical and electrical level indicators or limit switches are mounted to the outside of the bypass tube and actuated by the magnetic field. Evaluation of the filling level by guided radar is also possible.

The fitting of these options is carried out according to specific customer wishes in the factory.

The principle structure is shown in figure 1. Customer-specific versions are executed to order.

### **Transport and storage**

Transport and storage for bypass level indicators are only allowed in designed packaging.

### **Removal of transport packaging and transportation safety devices**

Remove the bypass level indicator carefully from the transport packaging.

Please observe the instructions given on the shipment packaging and remove all transportation safety devices before taking out the bypass level indicator.

Never use force to remove the bypass level indicator from the packaging!

Before fitting, loosen the float attached on the outside of the bypass level indicator from the bypass vessel. Make sure that all parts of the packaging have been removed and the float can move freely in the bypass reference vessel.

## **3. Installation and commissioning**



Remove the protective caps on the process connections before fitting. Check the connection dimensions (centre to centre distance) and the alignment of the process connections on the vessel. There must not be any mechanical damage on the sealing faces of the vessel or the bypass level indicator.

The magnetic roller display and any installed magnetic switches must be aligned. To do this, slowly move the enclosed float from bottom to top on the magnetic roller display and then back down again. Magnetic switches must be aligned on the basis of the same principle. In the case of bypass level indicators with insulation and magnetic roller displays

### 3. Installation and commissioning

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with Plexiglass attachments, the float must be moved up and down inside the tube. For magnetic roller displays with flushing connections, these connections must have an airtight seal. Please refer in this case to the mounting and operating instructions for KSR KUEBLER magnetic roller displays with flushing connections as well.

The bypass level indicator is mounted in a vertical position on the vessel to be monitored using the **process connections (1)** provided. **Seals (2), screws (3), washers (4) and nuts (5)** suitable for the process connection must be used. Choose a seal with a suitable corrosion resistance. If necessary, shut-off valves must be mounted between the vessel and the bypass.



Please heed the usual torque values of screws used in pipefitting work. The bypass level indicator must be installed without tension. Suitable seals must be used. Care must be taken that the seal material is resistant to the medium and its vapours as well as to the temperature and pressure loads to be expected.

#### Installing the float

- Clean the float of anything stuck on it in the area of the float magnet system
- Remove the **base flange (7)** and insert the **float (6)** into the tube from the bottom (the marking "top" or a legible model code marks the top side of the float)
- Place the **seal (9)** onto the base flange. Replace the base flange and fix it in place using the **screws (8)**

#### Commissioning

If the bypass level indicator is fitted with shut-off valves between process connections and tank, proceed as follows.

- **Close** draining and bleeding fittings on the bypass level indicator

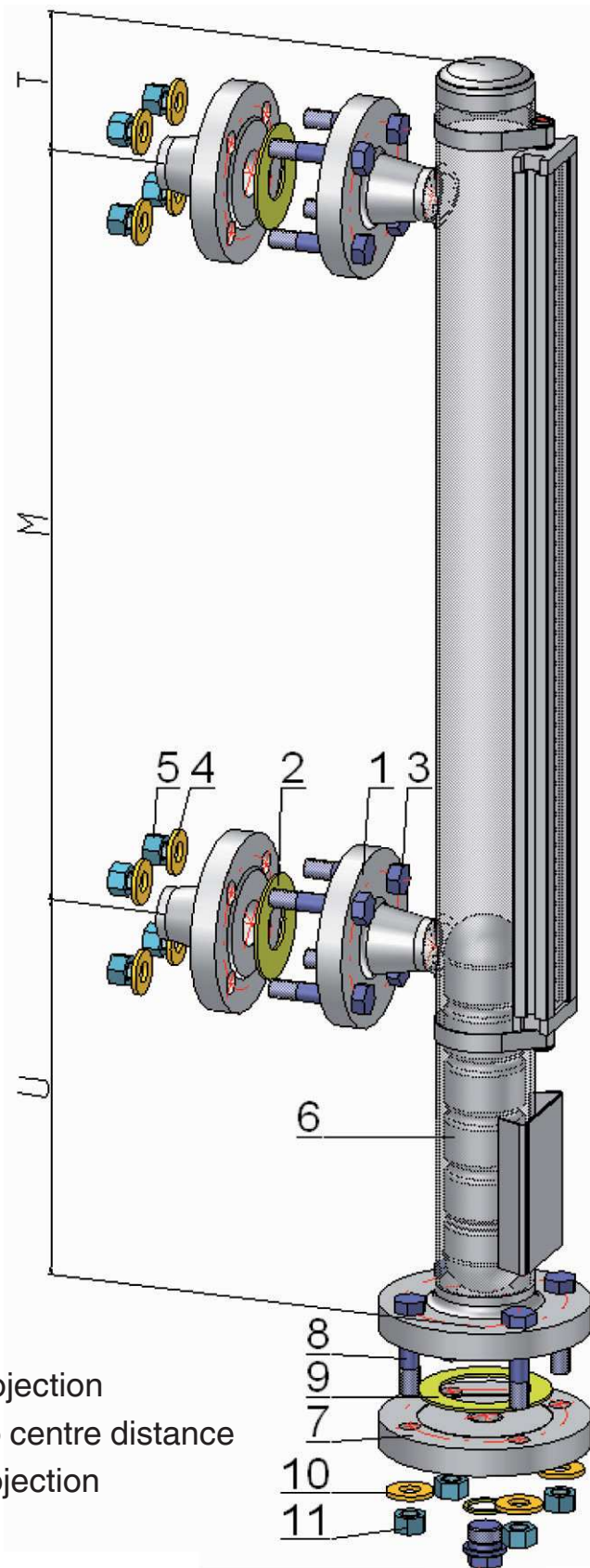


### 3. Installation and commissioning

- **Slowly open the shut-off valve** at the upper process connection
- **Slowly open the shut-off valve** at the lower process connection. As liquid flows into the bypass vessel, the float floats to the top. The magnetic system turns the magnetic rollers of the optical indicator from „light“ to „dark“. The current filling level is shown after liquid equalisation between the vessel and the bypass level indicator
- **Always heed the mounting and operating instructions of attachment devices before putting them into operation**

Fig. 1: Bypass level indicator, model BNA

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T = upper projection  
M = centre to centre distance  
U = lower projection



### Installation and commissioning of the bypass level indicator in a heated double-walled version

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The bypass tube can also be delivered in a heated double-walled version. In this case, the bypass tube is surrounded by a second tube. Heated liquid or steam (heat carrier) can flow through this double-sheathed space via two connections. The materials for higher temperatures must be designed according to AD information sheets in non-corroding qualities.



The heating sheath of the bypass level indicators may only be used according to the specified maximum values for pressure and temperature.

### Attachment of the evaluation devices to the bypass level indicator

When attaching the evaluation devices (e.g.: KSR KUEBLER sensors MG ..., KSR KUEBLER magnetic switches) to the BNA ..., the respective maximum values of the field instrument must be heeded. The applicable laws or directives for the use or the planned purpose of application must also be observed.

### Attachment example (sensor MG... to the bypass tube)



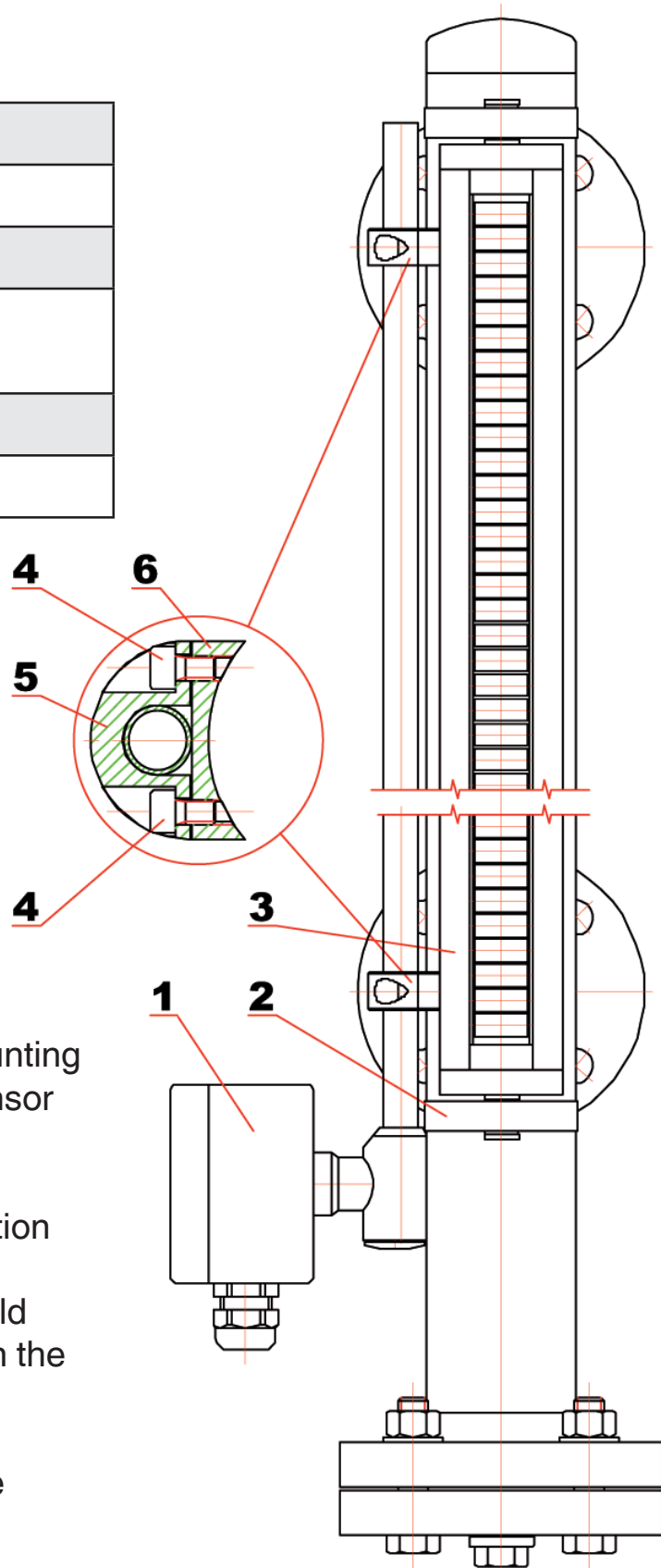
This description is only intended as an orientation aid for the local installation situation. Please refer to the mounting and operating instructions of the attachment devices as well.

### 3. Installation and commissioning

Fig. 2: Sensor to the bypass tube

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1	Sensor MG ...
2	Tightening strap
3	Magnetic roller display
4	Cheese-head screw or comparable
5	Mounting clamp
6	Mounting lug



Use the tightening strap or mounting clamp (pos. 5) to attach the sensor MG ... to the bypass tube.

The distance between the position sensor (magnetic system in the float) and the sensor tube should not exceed 8 mm depending on the magnetic system.

The bypass tube must never be scored or drilled into or welded directly.

### 3. Installation and commissioning

#### Attachment example (magnetic switch to magnetic roller display)

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The magnetic switch is attached to the magnetic roller level display (4) of the bypass level indicator (6) by means of sliding blocks (fig. 3).

- Loosen the mounting screws (1) on the magnetic switch by about one turn using an Allen key size 3 mm
- Push the sliding block(s) (2) into the guide groove (3) of the magnetic roller display (4) from the top or the bottom. (Please note the position of the cable connection or the plug as shown in the illustration)
- Push the magnetic switch to the height of the required switching point and fix in place by tightening the screws (the switch point is marked on the product label).

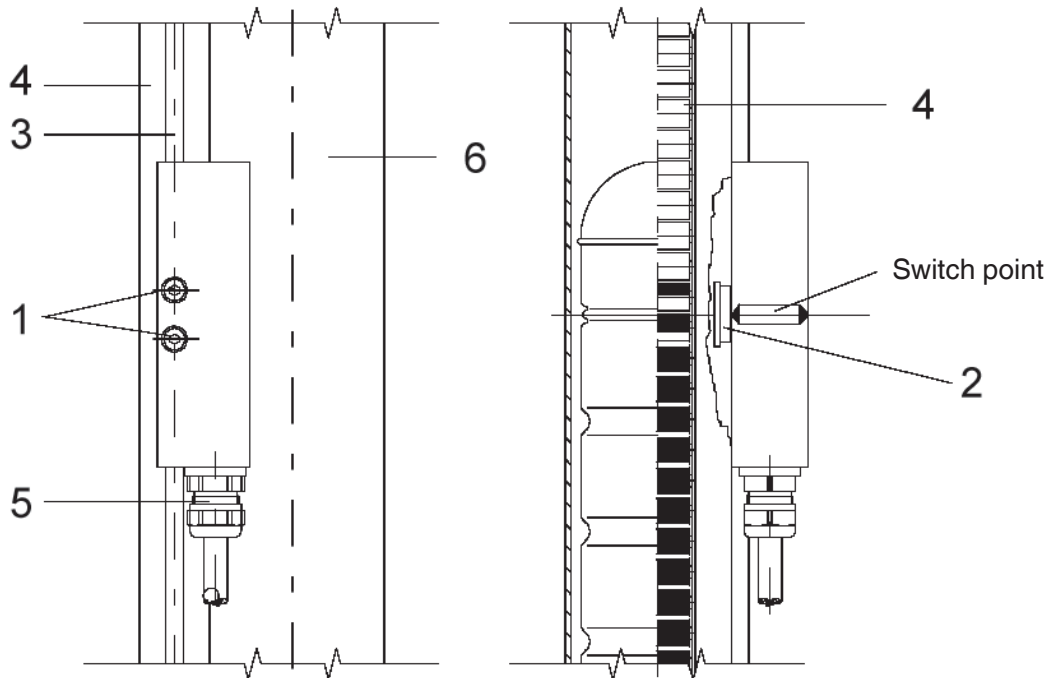


The magnetic switch MA has been designed for attachment on the right-hand side of the magnetic roller display (4). If it is mounted on the left-hand side, the switching function is reversed. The switch has to be mounted the other way round (product label is upside down).

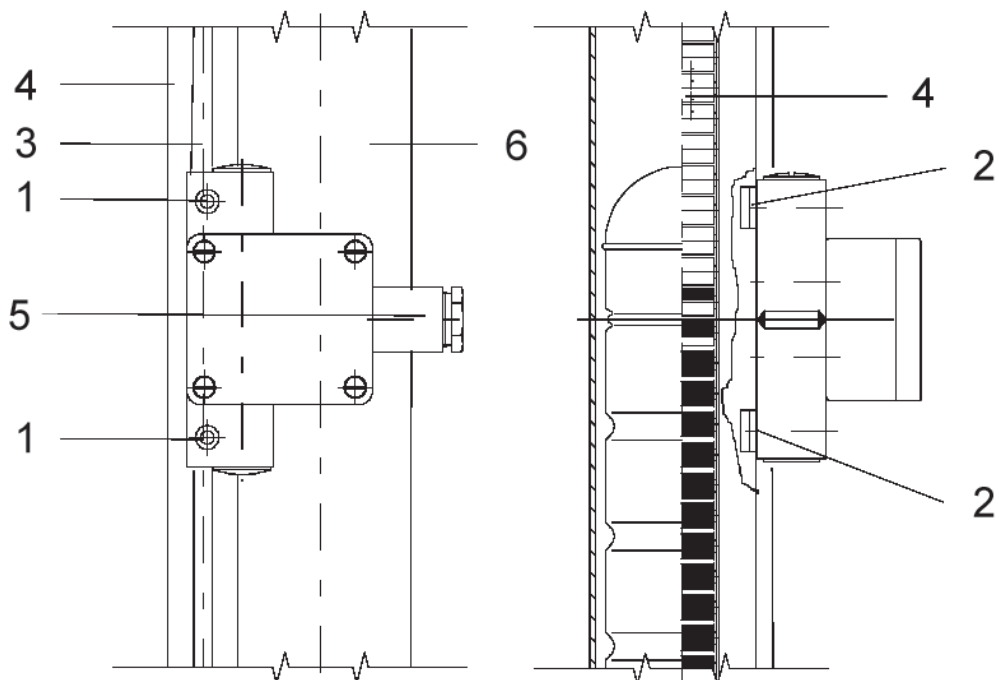
### 3. Installation and commissioning

Fig. 3:  
Mounting the magnetic switch (model M, ME, MST, MT)

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Mounting the magnetic switch (model MA)



### 3. Installation and commissioning

#### Attachment example (magnetic switch to support bar)

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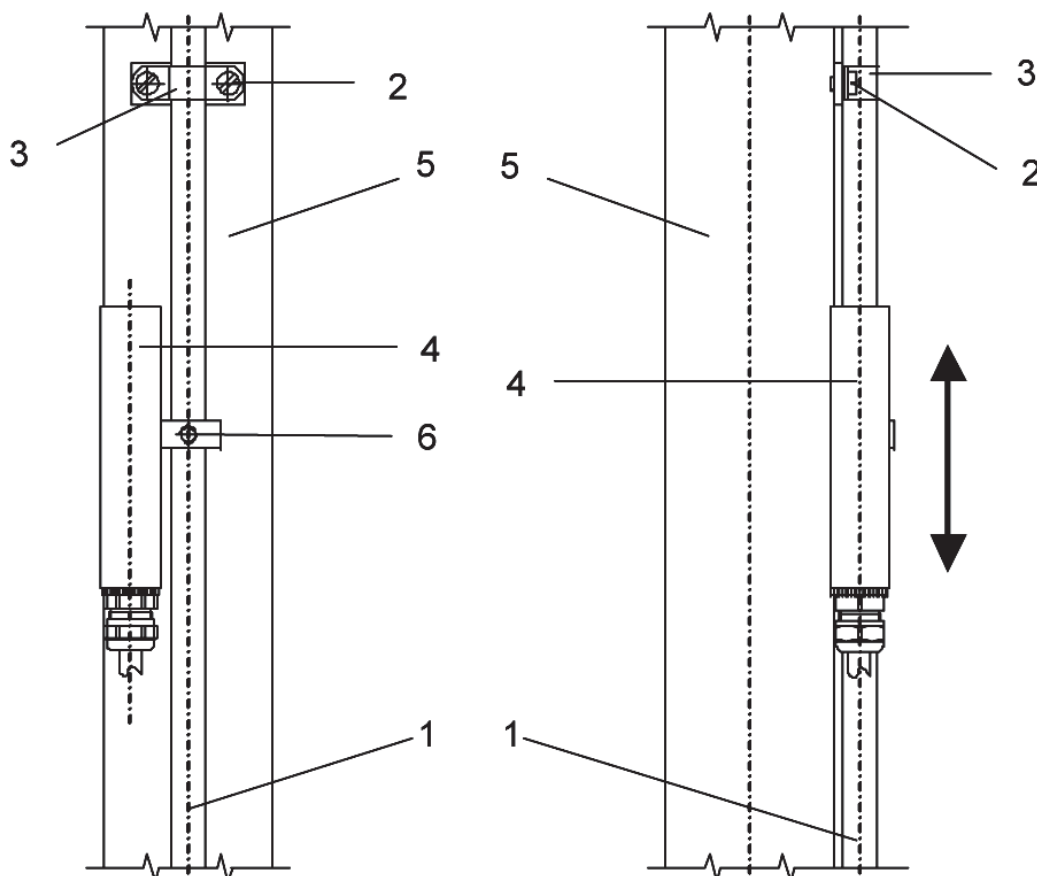
These magnetic switches are fixed to a separately attached support bar (fig. 4).

- Remove the support bar (1) by loosening the mounting screws (2) and removing the retaining plates (3) from the bypass stand seat
- Push the magnetic switch (4) onto the support bar (1)
- Attach the support bar (1) to the bypass tube (5) again using the retaining plates (3) and mounting screws (2)
- Push the magnetic switch to the height of the required switch point and fix in place by tightening the screws (6) (the switch point is marked on the product label)



Please make sure during mounting that the cable entry and/or the plug are pointing downwards. To guarantee a safe switching function, the magnetic switch housing must rest against the bypass tube.

Fig. 4: Mounting the magnetic switch (model MS, MV, MVT, MEx)



### 4. Maintenance

When used properly, bypass level indicators work maintenance-free.

They must be subjected to visual inspection within the context of regular servicing, however, and included in the tank pressure test. (The test pressure must not exceed the value specified on the product label!)

If the liquid to be measured contains dirt particles that could be deposited in the bypass level indicator, the operator should clean the bypass chamber at regular intervals.



#### **DANGER!**

Work on containers involves the danger of intoxication and suffocation. No work is allowed to be carried out unless by taking suitable personal protective measures (e.g. respiratory protection apparatus, protective outfit etc.). The bypass vessel can be under pressure. There might be a hot, poisonous, caustic or explosive medium inside the bypass vessel. Potential injury hazard due to splashing liquid, burns to hands, arms, feet and face are possible, as well as chemical burns, poisoning or explosions. Vessel pressure has to be released before opening.



Perfect functioning of the bypass level indicator can only be guaranteed when original accessories and spare parts are used.

## 5. Trouble shooting

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**GB** The following table contains the most frequent causes of faults and the necessary countermeasures.

Fault	Cause	Measure
Bypass level indicator cannot be fitted at the planned place on the vessel	Thread size or flange size of the bypass level indicator do not correlate	Modification of the vessel Return to the factory
	Thread on the fastening sleeve on the vessel is faulty	Rework the thread or replace the fastening sleeve
	Mounting thread on the bypass level indicator is faulty	Return to the factory
	Centre to centre distance of the vessel does not correlate with the bypass level indicator	Modification of the vessel Return to the factory
	Process connections are not attached parallel to one another	Modification of the vessel

Please contact us if you have any difficulties. We will be happy to help any way we can.





**KSR KUEBLER**  
Niveau-Messtechnik AG  
Heinrich-Kuebler-Platz 1  
69439 Zwingenberg  
Tel. (+49) 6263 87-0  
Fax (+49) 6263 8799  
E-Mail [info@ksr-kuebler.com](mailto:info@ksr-kuebler.com)  
Internet [www.ksr-kuebler.com](http://www.ksr-kuebler.com)