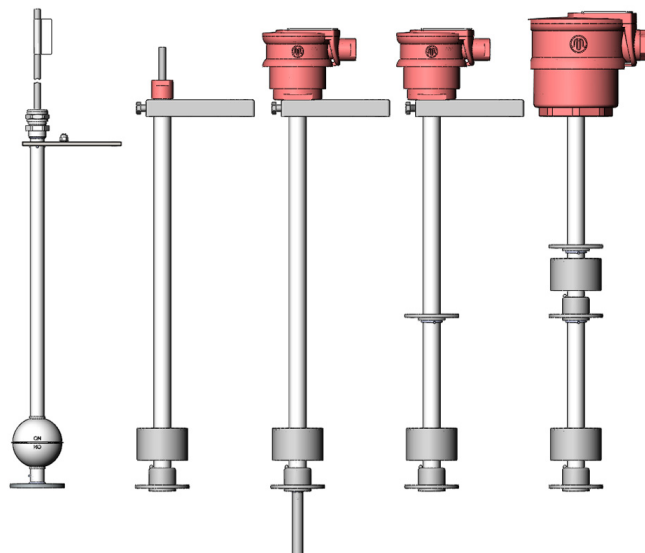


MTS float switches made of PP, PVDF and stainless steel

Installation instructions

E-MA 44

05.12/1



Please copy the following information from the model plate:

For the float switch MTS

MTS



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General information

1. General information

Please read these installation instructions carefully and comply with relevant country-specific standards, safety regulations and accident prevention guidelines. The installation instructions form an integral part of the device and must be kept available throughout the service life of the device.

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Supporting documents:

Document	Content
Information/data sheet for the float switch MTS	Product description and technical data
Resistance list (http://www.rotkappe.de or inquire manufacturer)	Recommended uses for materials in process media

1.1 Warnings

Warnings in this document are marked as follows:

 DANGER	Warning of immediate danger. Death, serious injury or serious damage will be the result of a failure to observe these warnings.
 WARNING	Warning of possible danger. Death, serious injury or serious damage is possible.
 CAUTION	Warning of possible dangerous situations. Minor injury or damage is possible.

General information

1.2 Symbols in the instructions

✓ Requirements that must be satisfied.

⇒ Work to be carried out (one step).

1. The first step in work to be carried out.

Consecutive steps are numbered in ascending order.

1.3 Warranty and repairs

If you wish to make a claim under the warranty or require repairs, return the float switch MTS to the manufacturer, postage paid, with details of the defect.

General safety instructions

2. General safety instructions

2.1 Proper usage

The float switch is only intended for industrial use.

These devices are used for the following purposes:

- The float switch enables the evaluation and monitoring of the level of liquids in the tanks.

Proper use also comprises the following:

- The instructions in this manual must be adhered to.
- The float switch should not be exposed to strong mechanical loads.
- The technical limit values (see chapter 5 "Technical data") must be respected.
- The float switch may not be used in hazardous areas.
- The material of the float switch (Polypropylene PP / Polyvinylidene fluoride PVDF / stainless steel 1.4571) must be chemically resistant to the liquid being monitored.
- The manufacturer does not accept any liability for damages resulting from incorrect use, unauthorised modifications, failure to comply with these instructions or the device being operated by unqualified staff. The manufacturer's warranty will also be invalidated.

Strong magnetic fields (induction) can impair the function. Encrustment or deposits on the float switch probe, the float switch body and/or the stop discs are to be removed. The freedom of movement of the floating element(s) must be guaranteed at all times.

General safety instructions



2.2 Standards and directives

The device complies with the following regulations:

- EN 60335-1:2002 (Safety of household and similar electrical appliances)
- EN 60519/1-2 (devices are categorised in protection class 1)
- DIN VDE 0100 (Construction of low-voltage power systems)

2.3 Safety instructions

⇒ Have the fitting, electrical installation, commissioning and maintenance of the float switch carried out by a qualified electrical technician.

The electrical technician is responsible for ensuring that the device is correctly connected in accordance with the electrical wiring diagrams.

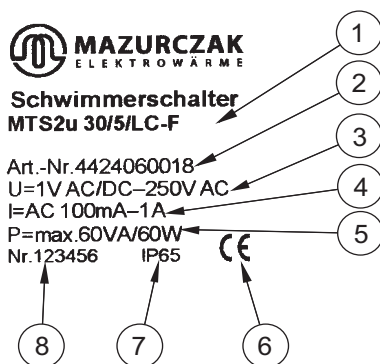
- ⇒ Carefully read and observe these instructions.
- ⇒ Ensure that an additional ETS or ENR signalling device is only operated by staff authorised and instructed to perform such work by the plant operator.
- ⇒ Observe all applicable standards and directives of the respective country.
- ⇒ Comply with the EMC directives for the entire system.

Product description

3. Product description

3.1 Model plate

The model plate is located on the cover of the BC/LC terminal casing or on the holder/flange for the PG version.



- | | |
|----------------------|---------------------------------|
| 1. Device type | 5. Switching capacity |
| 2. Article number | 6. CE mark as per EC conformity |
| 3. Switching voltage | 7. Degree of protection |
| 4. Switching current | 8. Production number |

3.2 Principle of operation

Float switches open/close the circuit by means of magnetically energised reed contacts. They consist of a guide tube with changeover (reed) contacts and a float body with magnet. The position of the float body changes with the position of the liquid level.

If the float body reaches a predefined switching point (or one of several), a changeover contact is opened and/or closed.

Adjustment of the switching points, the switching distance or the reed contacts is not possible.

Product description

3.2.1 MTSt float switches

In addition to the functions of a MTSu float switch, the MTSt has an integrated Pt100 temperature sensor which enables the temperature to be measured.

This version is not available in stainless steel.

Mounting and electrical installation

4. Mounting and electrical installation

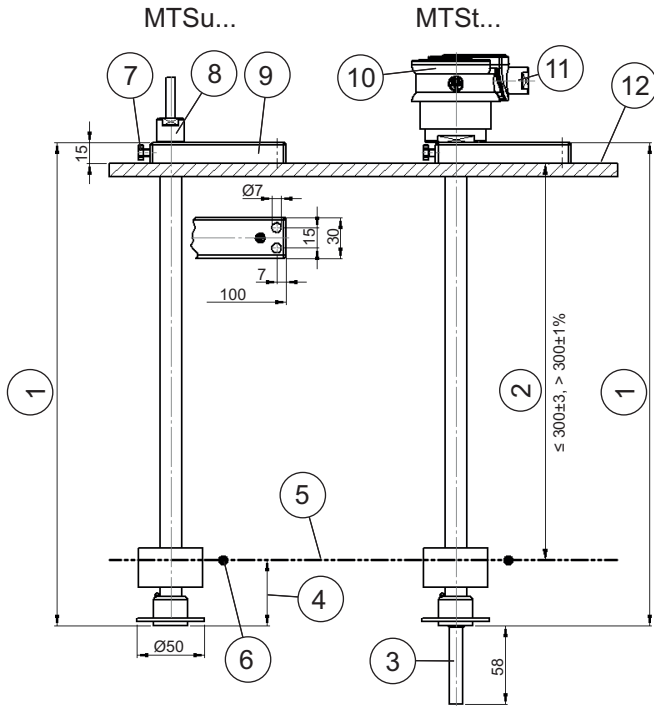
- ✓ Inspect the float switch carefully for possible damage caused by impact or moisture during transport or storage.
- ✓ Check that limit values and ambient temperature limits match the values specified in the technical data and are not exceeded.

4.1 Mounting the float switch

1. The MTS float switch is mounted either by means of an adjustable support or a bolted or welded flange.
In the BC version, the installation by means of the HB support (accessory) is also possible.
2. The guide tube of the float must be installed vertically (maximum angle $\pm 15^\circ$ from vertical).
3. The opening through which the floats or the end-plugs are to be guided should have a minimum diameter of 53 mm (PP /PVDF) or 57 mm (stainless steel).
4. For the support and screw-flange version, appropriate nuts and bolts are to be used for attaching it to the container or cover.
5. Depending on the required degree of protection (for versions with screw flange) an appropriate seal or gasket must be used when screwing on the flange.
6. The float switch cable must not be subjected to excessive tension.

Mounting and electrical installation

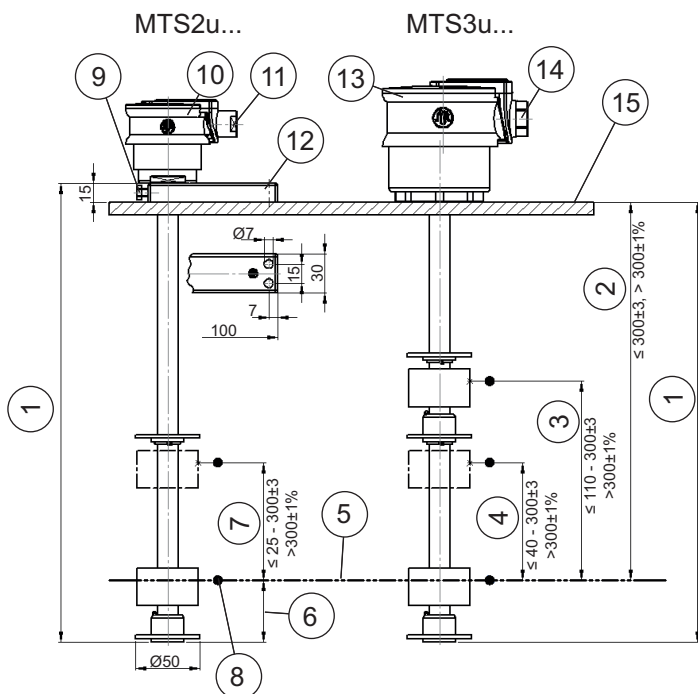
Plastic



- | | |
|--|---------------------------------------|
| 1. Nominal length | 7. SW 10 |
| 2. Switching height | 8. PG screw connection |
| 3. Temperature sensor | 9. Support SH10 |
| 4. Measurement X for PVDF ~ 45, for PP ~ 40 | 10. LC terminal casing |
| 5. Level | 11. SW 16 |
| 6. Switching point for fluid density 1 g/cm ³ | 12. Reference edge = rim of container |

Mounting and electrical installation

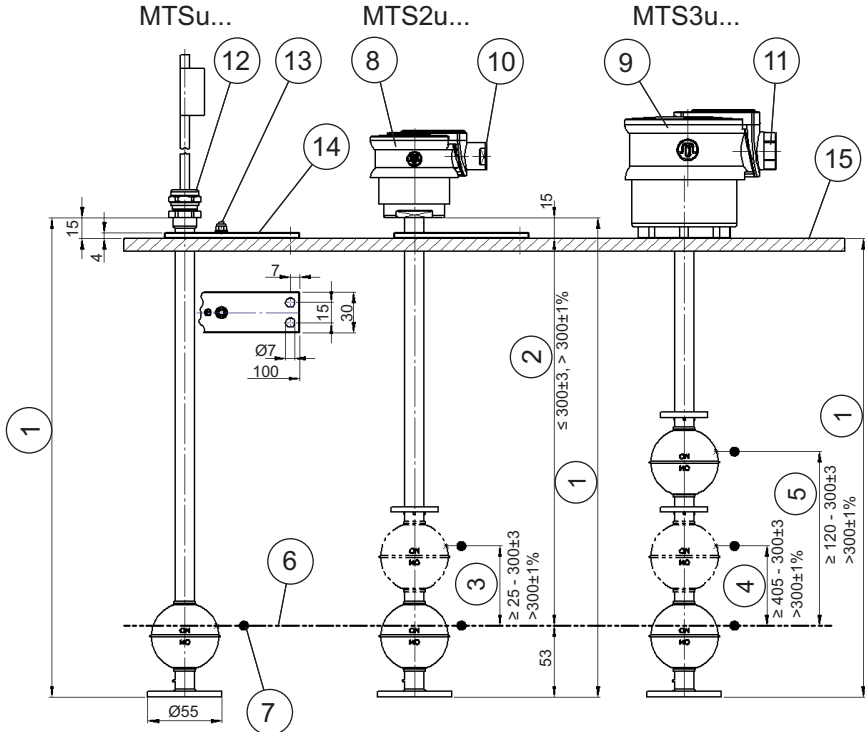
Plastic



- | | |
|--|---------------------------------------|
| 1. Nominal length | 9. SW 10 |
| 2. Switching height | 10. LC terminal casing |
| 3. Operating distance 1 | 11. SW 16 |
| 4. Operating distance 2 | 12. Support SH10 |
| 5. Level | 13. BC terminal casing |
| 6. Measurement X for PVDF ~ 45, for PP ~ 40 | 14. SW 24 |
| 7. Operating distance | 15. Reference edge = rim of container |
| 8. Switching point for fluid density 1 g/cm ³ | |

Mounting and electrical installation

Stainless steel




- | | |
|--|---------------------------------------|
| 1. Nominal length | 9. BC terminal casing |
| 2. Switching height | 10. SW 16 |
| 3. Operating distance | 11. SW 24 |
| 4. Operating distance 1 | 12. PG screw connection |
| 5. Operating distance 2 | 13. Protective earth connection |
| 6. Level | 14. Support SH10 |
| 7. Switching point for fluid density 1 g/cm ³ | 15. Reference edge = rim of container |
| 8. LC terminal casing | |

Mounting and electrical installation

4.2 BC/LC terminalasing c and PG version

- The mounting key SL (accessory) is used for opening and closing the LC terminal casing. When closing, ensure that the strain relief, clamping bolt and screw-fit cover are tightly done up. Tighten the terminal casing cover until the cover makes a positive connection with the cable gland. Only then is an optimum seal guaranteed.
- On the models MTS3u and MTS3x, it is recommended that the protective earth wire (green/yellow) is laid in the LC casing first and afterwards the terminal strips for the switching contacts. This should avoid any problems in closing the LC terminal casing.
- The mounting key SB (accessory) is used for opening and closing the BC terminal casing. In the case of the BC terminal casing, make sure that the strain relief, clamping bolt for the cable entry and the screw-fit cover are tightened again. Tighten the terminal casing cover until the cover makes a positive connection with the cable gland. Only then an optimum seal is guaranteed.
- The screw-joint of the PG version must not be opened.


4.3 Electrical connection

 <p>WARNING</p>	<p>Danger of electric shock! If the cables are incorrectly connected to the terminals the float switch MTS can be under current.</p> <p>⇒ All work on electrical systems should only be carried out by a qualified electrician.</p> <p>⇒ All work on the float switch must be performed in the power - off state.</p>
---	---

- ⇒ Protect the cables against temperatures $> +60\text{ }^{\circ}\text{C}$.
- ⇒ Do not lay cables where they may come into contact with hot steam or liquids.
- ⇒ Operate the float switch only with a resistive load.
- ⇒ Ensure that the bending radius of the cable is not less than 25 mm.

Mounting and electrical installation

4.4 Protective earth

 <p>WARNING</p>	<p>Danger of electric shock! If the cables are incorrectly connected to the terminals the float switch MTS can be under current.</p> <p>⇒ All work on electrical systems should only be carried out by a qualified electrician.</p>
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- ⇒ Have the protective earth connected by a qualified electrician.
- In the case of the BC/LC terminal casings, the protective earthing is via the green/yellow flexible lead inside the terminal casing.
 - In the case of the PG version of the stainless steel float switch, the protective earthing is via the bolts on the support or on the (bolted or welded) flange with the protective earth symbol. In this case, the protective earth must be achieved by means of a wire with a cable lug and must be secured with the washer and nut included.
 - On the PG version of the float switch made of PP or PVDF, the protective earthing is by means of the green/yellow flexible lead.
- ⇒ Do not subject the earth cables to any tension load.
- In the case of metallic containers and float switches made of stainless steel, protective earthing is possible via the container. This requires that the container has a protective ground and that the metallic casing of the stainless steel float switch is "conductively" connected to the container.
 - In the case of containers with electrochemical precipitation and conductive process solutions, a direct current can flow via the protective earth in connection with stainless steel float switches. This is to be taken into consideration when installing the stainless steel float switch and, if necessary, measures must be taken to avoid perturbation (e.g. anodic corrosion protection).
 - If the MTS float switch is operated without a protective earth, an electrical sparkover could occur in the event of a fault.
 - For low voltages < 24 V no protective earth is required for the float switch.

Mounting and electrical installation

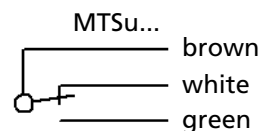
4.5 Connection diagram

The position of the connection diagram on the float switch varies according to the terminal casing (or PG version) and the corresponding fixing (support or flange).

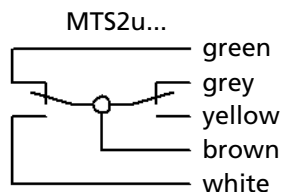
They can be obtained from the table below:

Position of connection diagram	BC	LC	PG
Support	in casing	on support	outgoing cable
Flange	in casing	in casing	outgoing cable

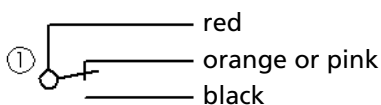
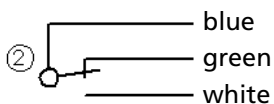
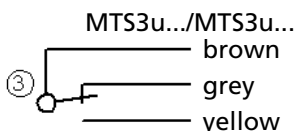
In addition, the connection diagrams are shown once more in this section:



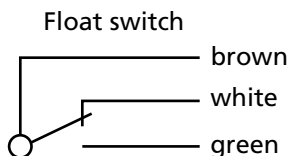
Switching status not energised magnetically



Switching status not energised magnetically



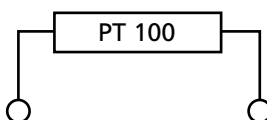
Switching status not energised magnetically



Switching status not magnetically excited

MTSt...

Temperature sensor



Mounting and electrical installation

4.5.1 Cable installation

When installing the cables, you need to remove the white plastic insert below the strain-relief clamp if the cable has a diameter of between 8 and 9.5 mm (for BC/LC terminal casings only).

The seal on the cable screw joint is to be applied according to the table below and is available if necessary as an accessory.

Cable entry	Cable Ø [mm]	Seal colour code	Article number [Accessory]
BC terminal casing	4 - 6.5	yellow	1702200001
	6.5 - 9.5	black	1702500001
LC terminal casing	4 - 6.5	yellow	4921000053
	6.5 - 9.5	black	4921000050

4.5.1.1 MTSt... cable installation

From the double terminal of the Pt100 the cable can continue as a 3- or 4-core conductor until the controller. In order to avoid electro-magnetic interference, we recommend the use of a shielded cable.

4.5.2 Operation and maintenance

Float switches are safety devices and therefore their function has to be checked by the user before they are put into service and at regular intervals once in service. The intended effect (e.g. protecting the heating against running dry) must also be checked at this time.

Strong magnetic fields (induction) can impair the function.

Any encrustment or deposits on the float switch must be removed.

The freedom of movement of the floating element must be guaranteed at all times.

4.5.3 Function test

Before the float switch is installed, it should be subjected to a function test. In order to check the function of the float switch, it must be connected to a corresponding control unit (e.g. ETS 410). Then, with the aid of the control unit and by moving the float element(s), the switching points of the float switch can be checked.

This function check can also be performed after installation (or during operation), provided this does not affect the process or the operation of the system.

Mounting and electrical installation

4.5.4 Operating conditions

- ✓ Field of application: Only in aqueous solutions with a density of at least 0.7 g/cm³ (PP and PVDF) or 0.9 g/cm³ (stainless steel 1.4571).
- ✓ The terminal casing, the cable screw connection and the cable do not come into direct contact with the fluid or with hot steam.
- ✓ The maximum temperature of the float switch of 90 °C (PP), 100 °C (PVDF) or 105 °C (stainless steel 1.4571) is not exceeded (does not apply to the terminal casing or the cable).
- ✓ The material of the float switch (PP, PVDF or stainless steel 1.4571) is chemically and thermally resistant to the fluid to be monitored.
- ✓ The temperature of 60 °C (PP) or 80 °C (PVDF) at the BC/LC terminal casing is not exceeded.
- ✓ The temperature of 60 °C at the cable gland (MTS.../PG-...) or at the cable is not exceeded.
- ✓ Cables must not be kinked. The bending radius of the cables is not less than 25 mm.

The float switch is not suitable for fluids that have a strong tendency towards encrustation or crystallization. Likewise, it is not suitable for fluids that could inhibit the mobility of the float element.

Technical data

5. Technical data

Type	MTSt....	MTSu	MTS2u...	MTS3u... MTS3x...
Rated voltage	1 V AC/DC - 250 V AC			
Switching current	max. 1 A *			
Switching capacity	max. 60 W / 60 VA			
Switching delay	None			
Switching hysteresis	5 mm			
Type of contact	1 changeover		2 changeovers	3 changeovers
Ingress protection	BC or LC design: Hose-proof IP 65 PG design: Splash-proof IP 64			
Built-in temperature sensor:	Pt100 (DIN EN 60751) 2- conductor technol- ogy	None	None	None
Measurement range of tem- perature sensor	-20 to +100 °C	-	-	-
max. operating temperature for material: PP (grey)	90 °C			
max. operating temperature for material: PVDF (white)	100 °C			
max. operating temperature for material: stainless steel	-	105 °C		
max. ambient temperature at terminal casing and at PG screw connection made of PP (red)	60 °C			
max. ambient temperature at terminal casing and at PG screw connection made of PVDF (white)	80 °C			
max. ambient temperature at PG screw connection made of stainless steel	-	60 °C		
max. ambient temperature at the cable	60 °C			

*) Maximum number of operating cycles at 1 A = 30,000
Maximum number of operating cycles at 0.5 A = 1.0×10^6

6. Transport / storage / disposal

6.1 Transporting and storing the device


When transporting the device, make sure that the packing of the casing guarantees full protection, free of tension. The device must be stored in accordance with the ambient conditions specified in the technical data.

6.2 Return

The following measures must be implemented before returning the float switch:

- ⇒ Clean and neutralise the device.
- ⇒ Remove any adhering residues.
- ⇒ Enclose a description of the application.
- ⇒ Enclose a description of the error that occurred.
- ⇒ Specify how long the device has been in operation.
- ⇒ Please provide your contact address and a contact person.

6.3 Disposal

 <p>DANGER</p>	<p>Danger of injury. Contact with residue from hazardous substances may cause injury.</p> <ul style="list-style-type: none">⇒ Neutralise the float switch and remove any parts of the device that hold residue of hazardous substances. Refer to the safety directives for handling hazardous substances.⇒ Clean any dirt or process medium residue off the float switch MTS using an appropriate method.⇒ Observe the locally applicable regulations for disposal.
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Dispose of the device and residues so that they do not harm the environment and in compliance with local regulations.





Original installation instructions

WG 44.1/05.12/1

Subject to change!

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