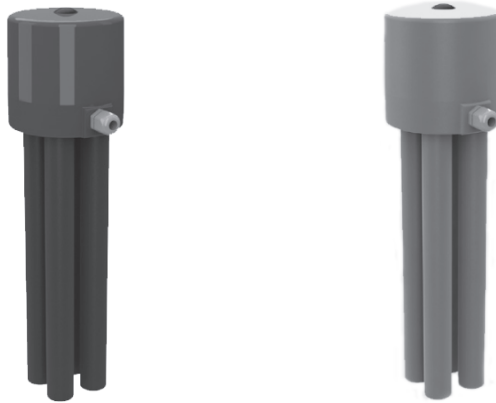


Level switch

Original operating manual

Series
NIS



Version BA-2022.10.26 EN
Print-No. 302 499
TR MA DE Rev001

STÜBBE GmbH & Co. KG
Hollwieser Straße 5
32602 Vlotho
Germany
Phone: +49 (0) 5733-799-0
Fax: +49 (0) 5733-799-5000
E-mail: contact@stuebbe.com
Internet: www.stuebbe.com

Subject to technical modifications.
Read carefully before use.
Save for future use.



Table of contents

1	About this document	3
1.1	Target groups	3
1.2	Other applicable documents	3
1.3	Warnings and symbols	3
2	General safety instructions	4
2.1	Intended use	4
2.2	General safety instructions	4
2.2.1	Obligations of the operating company	4
2.2.2	Obligations of personnel	4
2.3	Hazardous media	4
3	Layout and Function	5
3.1	Type plate	5
3.2	Description	5
3.3	Assembly	5
4	Transport, Storage and Disposal	5
4.1	Unpacking and inspection on delivery	5
4.2	Transportation	5
4.3	Storage	5
4.4	Disposal	6
5	Installation and connection	6
5.1	Preparations for installation	6
5.1.1	Check operating conditions	6
5.1.2	Preparation of the vessel	6
5.2	Preparation of the device	6
5.2.1	Connecting the immersion tubes	6
5.2.2	Setting the switching points	7
5.2.3	Application examples for the variants NIS 1 to NIS 4	7
5.3	Install device	8
5.4	Electrical connection of device	8
6	Commissioning	8
7	Maintenance	9
7.1	Servicing	9
7.2	Maintenance	9
7.2.1	Removing the device	9
7.2.2	Replacement parts and return	9
8	Troubleshooting	10
9	Appendix	10
9.1	Technical data, operating limits and weights	10
9.2	Connection diagram	10
9.3	Dimensions	11
9.4	Accessories	11
9.4.1	Mounting flange	11
9.4.2	mounting plate	11

List of figures

Fig. 1	Type plate	5
Fig. 2	Assembly (example: NIS 4)	5
Fig. 3	Connecting the immersion tubes	6
Fig. 4	Setting the switching points	7
Fig. 5	Switching point for NIS 1	7
Fig. 6	Switching points for NIS 2	7
Fig. 7	Switching points for NIS 3	8
Fig. 8	Switching points for NIS 4	8
Fig. 9	Electrical connection of device	8
Fig. 10	Connection diagram	10
Fig. 11	Dimensions	11
Fig. 12	Mounting flange	11
Fig. 13	mounting plate	11

List of tables

Tab. 1	Other application documents, purpose and where found	3
Tab. 2	Warnings and symbols	3
Tab. 3	Servicing activities	9
Tab. 4	Troubleshooting	10

1 About this document

This manual:

- is part of the equipment
- applies to all series referred to
- describes safe and proper operation during all operating phases

1.1 Target groups




Operating company

- Responsibilities:
 - Always keep this manual accessible where the device is used on the system.
 - Ensure that employees read and observe this document, particularly the safety instructions and warnings, and the documents which also apply.
 - Observe any additional country-specific rules and regulations that relate to the system.

Qualified personnel, fitter








- Mechanics qualification:
 - Qualified employees with additional training for fitting the respective pipework
- Electrical qualification:
 - Qualified electrician
- Transport qualification:
 - Qualified transport specialist
- Responsibility:
 - Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.

1.2 Other applicable documents

To download: Resistance Guide Chemical resistance of the materials used www.stuebbe.com/pdf/300051.pdf	
To download: NIS data sheet Technical specifications, conditions of operation www.stuebbe.com/pdf/302505.pdf	
To download: CE declaration of conformity Conformity with standards www.stuebbe.com/pdf/300773.pdf	


Tab. 1 Other application documents, purpose and where found

1.3 Warnings and symbols

Symbol	Meaning
	<ul style="list-style-type: none"> • Immediate acute risk • Death, serious bodily harm
	<ul style="list-style-type: none"> • Potentially acute risk • Death, serious bodily harm
	<ul style="list-style-type: none"> • Potentially hazardous situation • Minor injury
	<ul style="list-style-type: none"> • Potentially hazardous situation • Material damage
	Safety warning sign ► Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
	Instruction
1., 2., ...	Multiple-step instructions
✓	Precondition
→	Cross reference
	Information, notes

Tab. 2 Warnings and symbols

2 General safety instructions

 The manufacturer accepts no liability for damages caused by disregarding any of the documentation.

2.1 Intended use


The device is used to monitor liquid levels in unpressurized vessels and open pits. The device is also used as a signal transmitter when the level rises above or falls below a specified level.

- Only use the device with suitable media (→ resistance lists).
- Adhere to the operating limits (→ Data sheet).
- Not for use as an overflow protection device for WHG §19 purposes. The device is not a safety system.

Avoidance of obvious misuse (examples)

- Do not use the device in a position inverted from the correct installation orientation (correct installation orientation: perpendicular, from top to bottom).
- Vent the immersion tubes regularly. If the immersion tubes are not vented, shifts in the switching points may occur due to the propensity of the pumped media to absorb air.
- Do not adjust the pressure adjustment screws on the diaphragm pressure switches. The pressure setting screws are correctly preset by the manufacturer. Adjusting the pressure setting screws may cause in the switching points to be shifted.

2.2 General safety instructions

 Observe the following regulations before carrying out any work.

2.2.1 Obligations of the operating company

Safety-conscious operation

- Only operate the device if it is in perfect technical condition and only use it as intended, staying aware of safety and risks, and in adherence to the instructions in this manual.
- Ensure that the following safety aspects are observed and monitored:
 - Intended use
 - Statutory or other safety and accident-prevention regulations
 - Safety regulations governing the handling of hazardous substances
 - Applicable standards and guidelines in the country where the pump is operated
- Make personal protective equipment available.

Qualified personnel

- Make sure all personnel tasked with work on the device have read and understood this manual and all other applicable documents, especially the safety, maintenance and repair information, before they start any work.
- Organize responsibilities, areas of competence and the supervision of personnel.
- The following work should be carried out by specialist technicians only:
 - Installation, repair and maintenance work
 - Work on the electrical system
- Make sure that trainee personnel only work on the device under supervision of specialist technicians.

2.2.2 Obligations of personnel

Only complete work on the device if the following requirements are met:

- System is empty
- System has been flushed
- System is depressurized
- System has cooled down
- System is secured against being switched back on again
- Do not make any modifications to the device

2.3 Hazardous media

- When handling hazardous media, observe the safety regulations for the handling of hazardous substances.
- Use personal protective equipment when carrying out any work on the device.
- Collect leaking pumped liquid and residues in a safe manner and dispose of in accordance with environmental regulations.

3 Layout and Function

3.1 Type plate

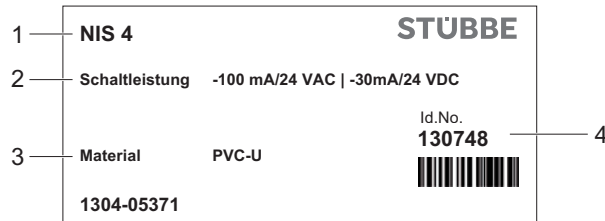


Fig. 1 Type plate

- 1 Device type
- 2 Switching capacity
- 3 Material
- 4 ID number

3.2 Description

The device monitors liquid levels in unpressurized vessels and open pits. The sensor does not require an additional power supply and actuates a potential-free switching contact when the level rises above or falls below the specified level.

- Depending on the variant, the device carries 1 to 4 diaphragm pressure switches/immersion tubes
- The switching behavior depends on the air pressure/fluid level in the immersion tube:
 - The switch is set to „On“ when the air pressure rises by max. 10 mbar / level difference rises by more than 100 mm H₂O
 - The switch is set to „Off“ when the air pressure falls by max. 5 mbar / level difference falls by more than 50 mm H₂O

3.3 Assembly

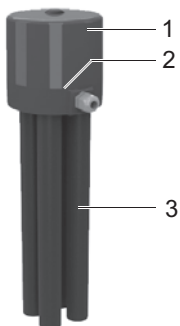


Fig. 2 Assembly (example: NIS 4)

- 1 Housing
- 2 Diaphragm pressure switch (concealed)
- 3 Immersion tube

4 Transport, Storage and Disposal

4.1 Unpacking and inspection on delivery

1. Unpack the device when received and inspect it for transport damage and completeness.
2. Check that the information on the type plate agrees with the order/design data.
3. Report any transport damage to the manufacturer immediately.
4. If fitted immediately: Dispose of packaging material according to local regulations.
 - If fitted at a later point: leave device in its original packaging.

4.2 Transportation

- ▶ Device should preferably be transported in the original packaging.


4.3 Storage

NOTE

Material damage due to inappropriate storage!

- ▶ Store the device properly.
1. Make sure the storage room meets the following conditions:
 - Dry
 - Frost-free
 - Vibration-free
 - Not in direct sunlight
 - Storage temperature +10 °C to +60 °C
 2. Device should preferably be stored in the original packaging.

4.4 Disposal

 Plastic parts can be contaminated by poisonous or radioactive media to such an extent that cleaning will not be sufficient.

WARNING

Risk of poisoning and environmental damage from medium!

- ▶ Use personal protective equipment when carrying out any work on the device.
- ▶ Prior to the disposal of the device: Neutralize residues of medium in the device.

1. Remove electronic parts and dispose of in accordance with local regulations.
2. Dispose of plastic parts in accordance with local regulations.


5 Installation and connection

5.1 Preparations for installation

5.1.1 Check operating conditions

1. Ensure the required operating conditions are met:
 - Resistance of body and seal material to the medium (→ resistance lists).
 - Media temperature (→ Data sheet).
 - Operating pressure (→ Data sheet).
2. Consult with the manufacturer regarding any other use of the device.

5.1.2 Preparation of the vessel


 The device can be installed in closed, pressureless and open containers.

The device can be installed by means of a threaded insert on the lower part of the housing or by means of a suitable mounting device, e.g. mounting flange or mounting plate (→ 9.4 Accessories, Page 11).

1. Check that the vessel provides sufficient immersion depth.
2. Align the vessel correctly, ensuring the following points are satisfied:
 - Vertical mounting position of the device
 - Sufficient space for installation, electrical connection and maintenance (→ 9.3 Dimensions, Page 11).

5.2 Preparation of the device

5.2.1 Connecting the immersion tubes

 Connection types:

- PVC socket end for solvent welding
- PP fusion socket end

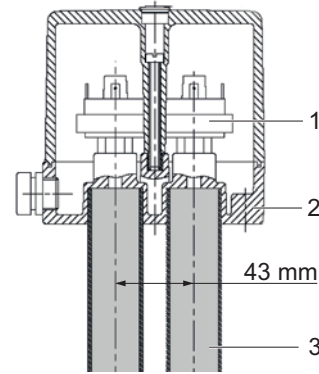



Fig. 3 Connecting the immersion tubes

- 1 diaphragm pressure switch
- 2 Bottom section of casing
- 3 Immersion tube

✓ The device installation is complete.

- ▶ Depending on the type of connection, glue or weld the immersion tube (3) to the lower part of the housing (2).

 Only the manufacturer may perform welding of the variants NIS 2 to NIS 4 in PP, because a special tool is required for welding the tubes at the pitch of 43 mm.

5.2.2 Setting the switching points

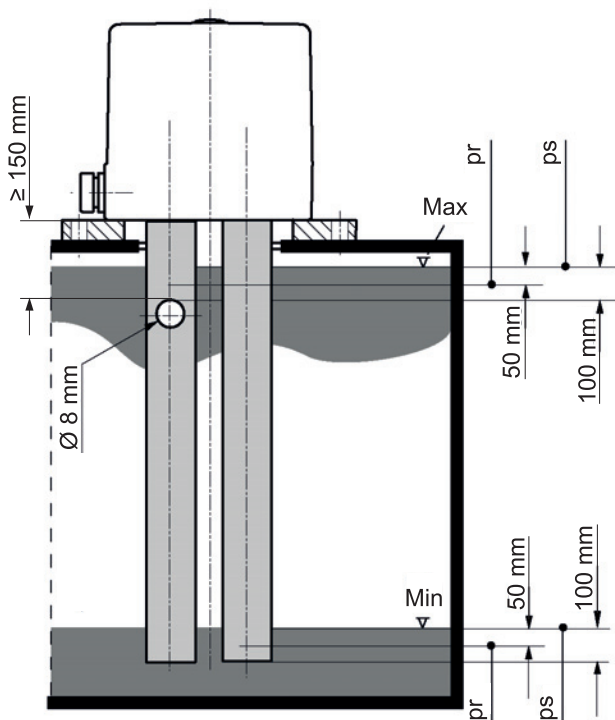


Fig. 4 Setting the switching points

Max	Max. filling level
Min	Min. filling level
pr	Switching point for discharging
ps	Switching point for filling

- ✓ The device installation is complete.
 - ✓ The immersion tubes are connected.
 - ✓ Tool: Power drill, 8 mm drill bit
1. Check the fill levels of the vessel and select the switching point accordingly.
 2. Cut the immersion tubes to length as required.
 3. Drill an 8 mm hole into the immersion tube 100 mm below the selected switching point. Ensure the necessary spacing of ≥ 150 mm from the drilled hole to the lower part of the housing.

5.2.3 Application examples for the variants NIS 1 to NIS 4

NIS 1

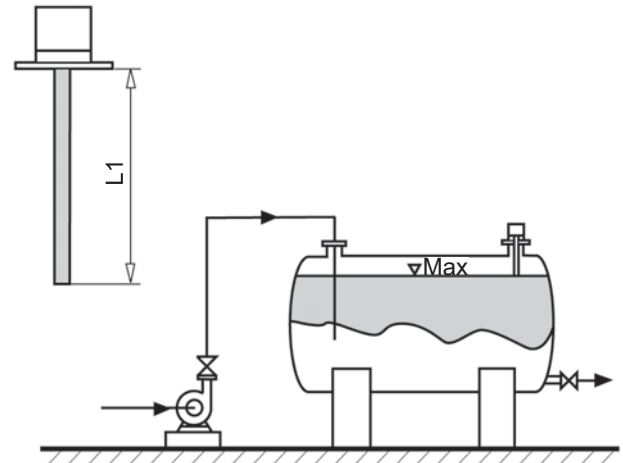


Fig. 5 Switching point for NIS 1

L1 switches the pump off when the maximum fill level (Max) is reached.

NIS 2

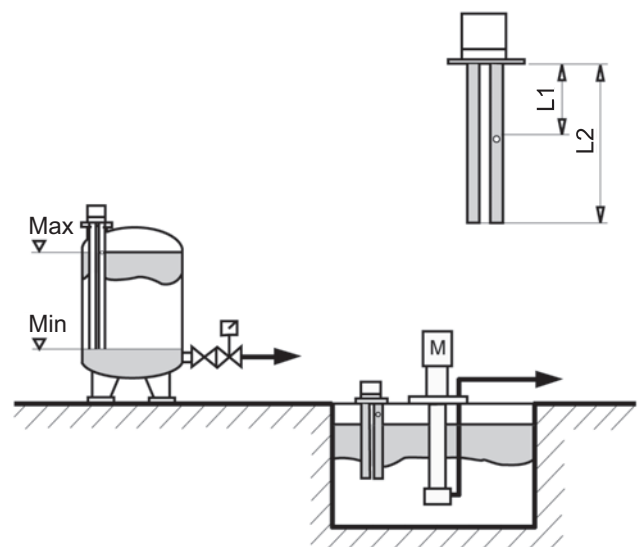


Fig. 6 Switching points for NIS 2

L1 switches the submersible pump on when the maximum fill level is reached. **L2** switches the submersible pump off when the minimum fill level is reached.

On the vessel, the shut-off valve is opened at (Max) fill level and closed at (Min) fill level.

NIS 3

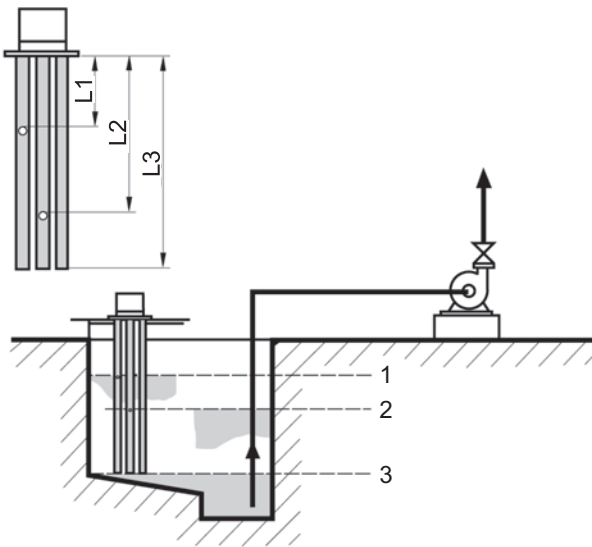


Fig. 7 Switching points for NIS 3

L1 outputs a warning signal when the fill level **1** is reached.
L2 switches the pump on when the fill level **2** is reached.
L3 switches the pump off when the fill level **3** is reached.

NIS 4

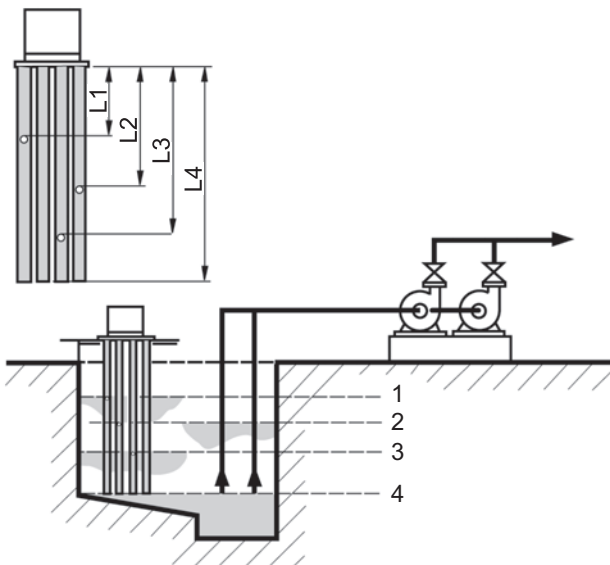


Fig. 8 Switching points for NIS 4

L1 outputs a warning signal when the fill level **1** is reached.
L2 switches both pumps on when the fill level **2** is reached.
L3 switches one pump on when the fill level **3** is reached.
L4 switches both pumps off when the fill level **4** is reached.

5.3 Install device

⚠ WARNING

Risk of injury and poisoning due to medium spraying out!

► Use personal protective equipment when carrying out any work on the fitting.

- ✓ The device installation is complete.
- ✓ The device is prepared.
- Screw in the threaded inserts so that the device when mounted in the container is perpendicular to the surface of the media.

5.4 Electrical connection of device

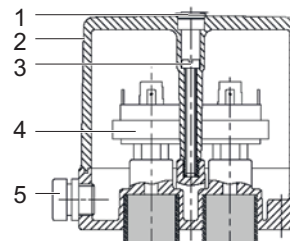


Fig. 9 Electrical connection of device

- | | |
|---------------------------|-----------------------------|
| 1 Plug | 4 diaphragm pressure switch |
| 2 Top part of the housing | 5 Cable gland |
| 3 Screw | |

- ✓ The unit must be installed properly.
 - ✓ Power supply must be switched off and secured against being switched back on again.
1. Remove the plug (1).
 2. Undo screw (3).
 3. Remove the top part of the housing (2).
 4. Guide connection cable through the cable gland (5) and connect it to the diaphragm pressure switch (4):
 - Electrical data (→ Data sheet).
 - Connection diagram (→ [9.2 Connection diagram, Page 10](#)).
 5. Tighten the cable gland securely.
 6. Tighten the top part of the housing.

6 Commissioning

- ✓ The device is installed and connected.
 - Switch on power supply.
- Depending on the actual filling level, the device will now trigger a switching operation.

7 Maintenance

⚠ WARNING

Risk of injury and poisoning due to hazardous media and improper operating procedure!

- ▶ Use personal protective equipment when carrying out any work on the device.
- ▶ Disconnect the power supply and secure it against being switched back on again.
- ▶ Block the infeed of media to the vessel / the device.
- ▶ Safely collect the media and dispose of it in accordance with environmental regulations.

7.1 Servicing

Interval	Action
The interval is defined by the operating company	<ul style="list-style-type: none"> ▶ Check the switching function. If the switching points have shifted <ul style="list-style-type: none"> – Take the device out of the vessel and vent the immersion tubes. – Install device.
As necessary	<ul style="list-style-type: none"> ▶ Clean device with a damp cloth.
Six-monthly	<ul style="list-style-type: none"> ▶ Perform a visual and functional check: <ul style="list-style-type: none"> – Normal operating conditions unchanged – No leaks

Tab. 3 Servicing activities

- ▶ Perform maintenance tasks according to the table.

7.2 Maintenance

7.2.1 Removing the device

- ✓ System is empty.
 - ✓ System has been flushed.
 - ✓ System is depressurized.
 - ✓ System has cooled down.
 - ✓ System must be secured against being switched back on again.
1. Unplug connection cable.
 2. Take the device out of the vessel.
 3. Decontaminate device if required.

7.2.2 Replacement parts and return

1. Have the following information ready to hand when ordering spare parts (→ 3.1 Type plate, Page 5).
 - Device type
 - ID number
 - Nominal pressure and diameter
 - Connection and gasket material
2. Please complete and enclose the document of compliance for returns (→ www.stuebbe.com/en/service/download).



3. Use only spare parts from STÜBBE.

8 Troubleshooting

WARNING

Risk of injury and poisoning due to hazardous media liquids!


- ▶ Use personal protective equipment when carrying out any work on the device.

Error	Possible cause	Corrective action
Device does not trip	The hole for communication between the housing and the diaphragm pressure switch is clogged or is missing	▶ Clean the hole or drill it.
	Switching pressure in the immersion tube too low (< 10 mbar or < 100 mm)	▶ Ensure that the hole giving access to the switching point bore is at least 100 mm below the switching point level.
	Air in the immersion tube has been absorbed by the medium	▶ Vent the immersion tubes.
	No pressure build-up can be achieved in the immersion tube	▶ Replace the defective diaphragm pressure switch.
The device fails to switch any consumer	Electrical connection faulty	▶ Check the power supply and if necessary change the terminal assignment.

Tab. 4 Troubleshooting

9 Appendix

9.1 Technical data, operating limits and weights

 The particulars are described on the data sheet (→ Data sheet).

9.2 Connection diagram

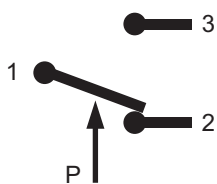


Fig. 10 Connection diagram

- 1 COM
- 2 NC
- 3 NO
- P Pressure in the immersion tube

9.3 Dimensions

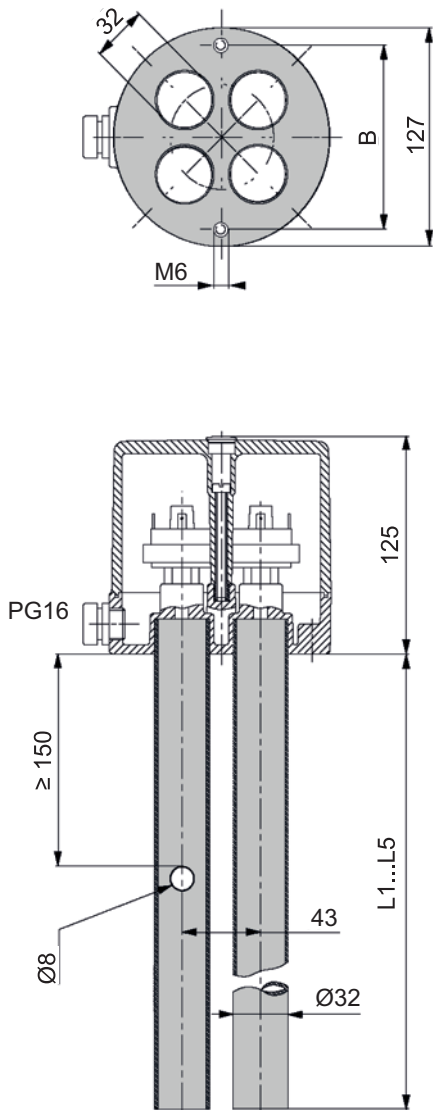


Fig. 11 Dimensions

B PVC-U = 105
PP = 103.5

9.4 Accessories

9.4.1 Mounting flange

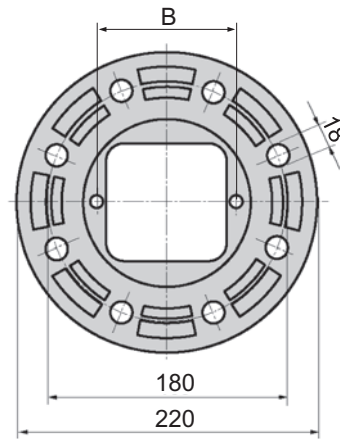


Fig. 12 Mounting flange

B PVC-U = 105
PP = 103.5

9.4.2 mounting plate

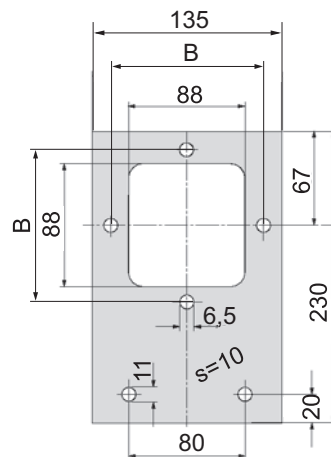


Fig. 13 mounting plate

B PVC-U = 105
PP = 103.5