

Instruction manual

Version: 1.0

No.: 9010057A01

Immersion float switches

2ES0..., 2ES1..., 20991102, 20901009



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1. User information

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Validity This Instruction manual generally applies to the product Immersion float switches listed on the title page and must be appended to the product documents of the downstream machine. Other variants are possible and are also listed in case of deviating specifications. Depending on the customer's wishes or special versions, individual components may be missing or deviate from the standard. Some drawings and figures in this Instruction manual are for illustrative purposes only. Deviations from the original part are therefore possible and desired for reasons of a better representation.

The publisher has tried to make this Instruction manual as accurate and up-to-date as possible. We are constantly working on developing our products further. We reserve the right to make changes to the scope of delivery in terms of shape, equipment and technology. No claims can be derived from the information, figures and descriptions in this documentation.

This Instruction manual is a translation of the original Instruction manual. For more information, we are at your disposal.

1.1 General

This document makes it possible to safely work and handle to the product properly Immersion float switches. Read through this Instruction manual carefully before commissioning and observe the relevant health and safety and accident prevention regulations. Also observe all warnings to avoid hazards for personnel, the environment or the product.

Make this Instruction manual as well as other information about the product (e. g. data sheets) available to the person who installs, maintains or repairs the product. When passing on or selling the product, this Instruction manual must be enclosed with the product because it is part of the product. Therefore, keep this Instruction manual safe for the entire service life of the product and readily accessible in a legible condition.

If you do not understand this Instruction manual or parts of it, please ask us.

1.2 Representation conventions



Information!

Refers to effective and practical use of the product.

Text/image reference (1) Item number: Refers to an item number in a figure

Lists Numbered and non-numbered lists are represented as follows:

1. Numbered list
2. Numbered list
 - List, level 1
 - List, level 2
 - List, level 2

1. User information

Handling instructions Handling instructions in chronological order for operating the machine are represented as follows:

Action task

1. Action step: Prompts an action.
Interim result: To check an action step.
2. Action step: Prompts an action.
Interim result: To check an action step.
3. Action step: Prompts an action.

✓ **Result of action**

Individual handling instructions, without a chronological order, are represented as follows:

- ▶ Unordered action step

1.3 Variants and type code

Elobau Immersion float switches are defined and specified by an 7-character code. The key can be broken down as follows:

- 1: Product area (here, fill level measurement)
- 2 - 3: Series (e. g. Immersion float switches)
- 4: Material for riser tube and float ("0" for PVC/PVC; "1" for VA/VA)
- 5 - 7: Sequence number

Example: Item no.: 2ES0001

1	2	3	4	5	6	7	Description
2							Fill level measurement
	Series						
	E	S					Immersion float switches
			Housing material (riser tube / float)				
			0				Plastic (PVC)
			1				Stainless steel (VA)
			Sequence number				
				X	X	X	

Table 1

1.4 Manufacturer



sustainable solutions

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2. Safety instructions

2.1 General labelling of hazards and information

The severity of the hazard and its consequences are classified in this Instruction manual with the following signal words and colours.

WARNUNG!

Here is a brief description of the type and source of danger.

If the safety instruction "WARNING" appears, there is a medium risk of danger. The occurrence of the mentioned hazard may result in irreversible personal injury or death.

► Listing of all measures which must be taken to prevent the consequences.

VORSICHT!

Here is a brief description of the type and source of danger.

If the safety instruction "CAUTION" appears, there is a low risk of danger. The occurrence of the mentioned hazard may result in reversible minor personal injuries.

► Listing of all measures which must be taken to prevent the consequences.

ACHTUNG!

Here is a brief description of the type and source of danger.

If the following safety instruction "ATTENTION" appears, there is a situation which may potentially result in property damage.

► Listing of all measures which must be taken to prevent the consequences.

2. Safety instructions

Hinweis



Warning of dangerous electrical voltage

- ▶ This warning sign warns where there is a risk of electric shock, possibly with fatal consequences prior to activities.
-

2.2 Definition of personnel groups

Operator/contractor

The operator of the downstream machine is responsible for training personnel to work in a safety-conscious manner at regular intervals and to ensure the personnel are appropriately qualified for the necessary work.

The operator is obligated to only allow personnel to work on the machine, system, assembly or with the software who:

- Have been trained in the procedures and operation.
- Are familiar with the regulations on health and safety and accident prevention.
- Have read and understood the content of the Instruction manual in order to prevent hazards for personnel or the product.

User / operating and maintenance personnel

This includes all persons who are responsible for the installation, operation, set-up times, maintenance work (including cleaning) and troubleshooting on behalf of the operator/contractor. Personnel tasked with operation and maintenance must be appropriately qualified for this work. The area of responsibility, competence and supervision of personnel must be precisely regulated by the operator. If personnel do not possess the requisite knowledge, the operator must provide training and instruction.

2.3 Conformity

The product Immersion float switches conforms to the state of the art plus the applicable safety conditions at the time of bringing into circulation within the scope of its intended use. From a design point of view, foreseeable misuse cannot be avoided without limiting the intended functionality.

Ensure that all applicable European directives and national laws/directives are observed.

2.4 Intended use

Immersion float switches are suitable for monitoring the fill level of liquid media. They are used, e. g. as a full or empty message, as a sensor for the controllers or to control the valves and pumps or for alarm messages. The Immersion float switches are intended exclusively for the approved use in the industrial sector and for applications in low-flow media within the electrical values according to the data sheet.

- The Immersion float switches may only be used in liquid where safe functioning is ensured.
- The Immersion float switches must be sufficiently resistant to the materials used.
- Do not use the Immersion float switches close to ferromagnetic surroundings.
- Do not operate the Immersion float switches close to strong electromagnetic fields or in the vicinity of equipment that can be affected by magnetic fields.
- Avoid heavy mechanical loads (impacts, bending, vibration).
- Do not use in media containing magnetic particles (e. g. iron particles, chips).



Information

Observe the specified range of use according to the data sheet.

- ▶ Check whether the variant is suitable for the application.

Any improper use of the Immersion float switches as well as any activities not described in this manual are unauthorised use outside the legal liability limits of the manufacturer.

Only use the Immersion float switches if they are not damaged. Observe all applicable safety conditions, laws and guidelines.

2.4.1 Reasonably foreseeable misuse (improper use)

In the event of improper use, hazards can arise for persons or property. The following operating conditions are classified as misuse:

- Use in potentially explosive areas,
- unauthorised modifications,
- personnel that are insufficiently qualified,
- deviations from the intended use.

Operation contrary to the intended use will void the warranty.

2. Safety instructions

WARNING!



Warning against misuse!

In case of incorrect or unintended use or manipulation, the use of this product does not exclude risks to persons or damage to machine and/or system components.

- ▶ Make sure that no current or voltage peaks that are higher than the electrical specifications of this product are caused by any external components. Current or voltage peaks are produced, for example, by capacitive or inductive loads.

2.4.2 Warranty and liability



Information

This product has a warranty of 24 months beginning at the time of transfer of risk. The general terms and conditions of the manufacturer apply to the warranty and liability.

Defects in the form of material or manufacturing defects that occur during this warranty period shall be rectified free of charge either by repair or replacement. The General Terms and Conditions of Delivery of elobau GmbH & Co. KG apply.

If a warranty is provided, the warranty period is not extended.

We reserve the right to charge for costs resulting from unjustified claims, e. g. installation or operating errors.

2.4.3 Liability exclusion

The manufacturer excludes warranty and liability claims for personal injury and property damage if they are caused by one or more of the following causes:

- Non-compliance with this manual,
- Improper use,
- Unauthorised repairs, conversions and modifications that are not described in this Instruction manual,
- Deliberate damage or improper handling,
- Use of spare parts or accessories that have not been approved by the manufacturer.

The warranty does not apply in the event of third-party interference or dismantling by a third party without our prior consent. To the extent permitted by law, other claims for compensation are excluded.

3. Product-specific information

3.1 Scope of delivery

The scope of delivery includes all parts listed in assembled condition.

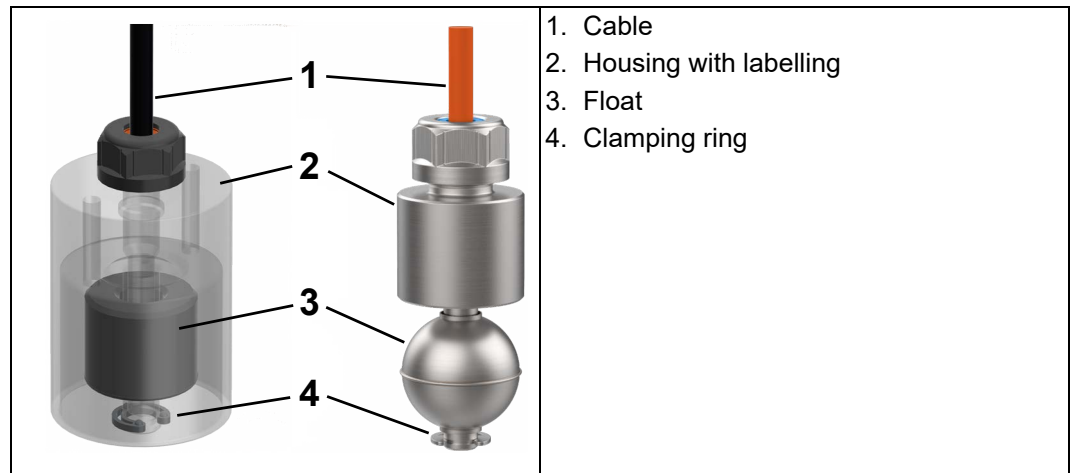


Figure 1: Plastic housing (left), stainless steel housing (right)

3.2 Functional description

The Immersion float switches is designed for use in liquid media. Immersion float switches operate according to the float principle with magnetic actuation. A reed contact incorporated in the sliding tube is switched in a contact-free manner by a magnetic field upon reaching a pre-specified switching point. The magnetic field is created by a magnet that is located inside the float.

The float is guided along the sliding tube dependent on the height of the medium being monitored. Either an NO contact or an NC contact is achieved depending on the assembly direction of the float.



Information

Deviations in function are possible depending on the version. If you have any questions, please contact elobau.

Before using the product, read the following technical data and observe this during installation, repair and maintenance.

3. Product-specific information

3.3 Technical data

3.3.1 Series 2ES0001

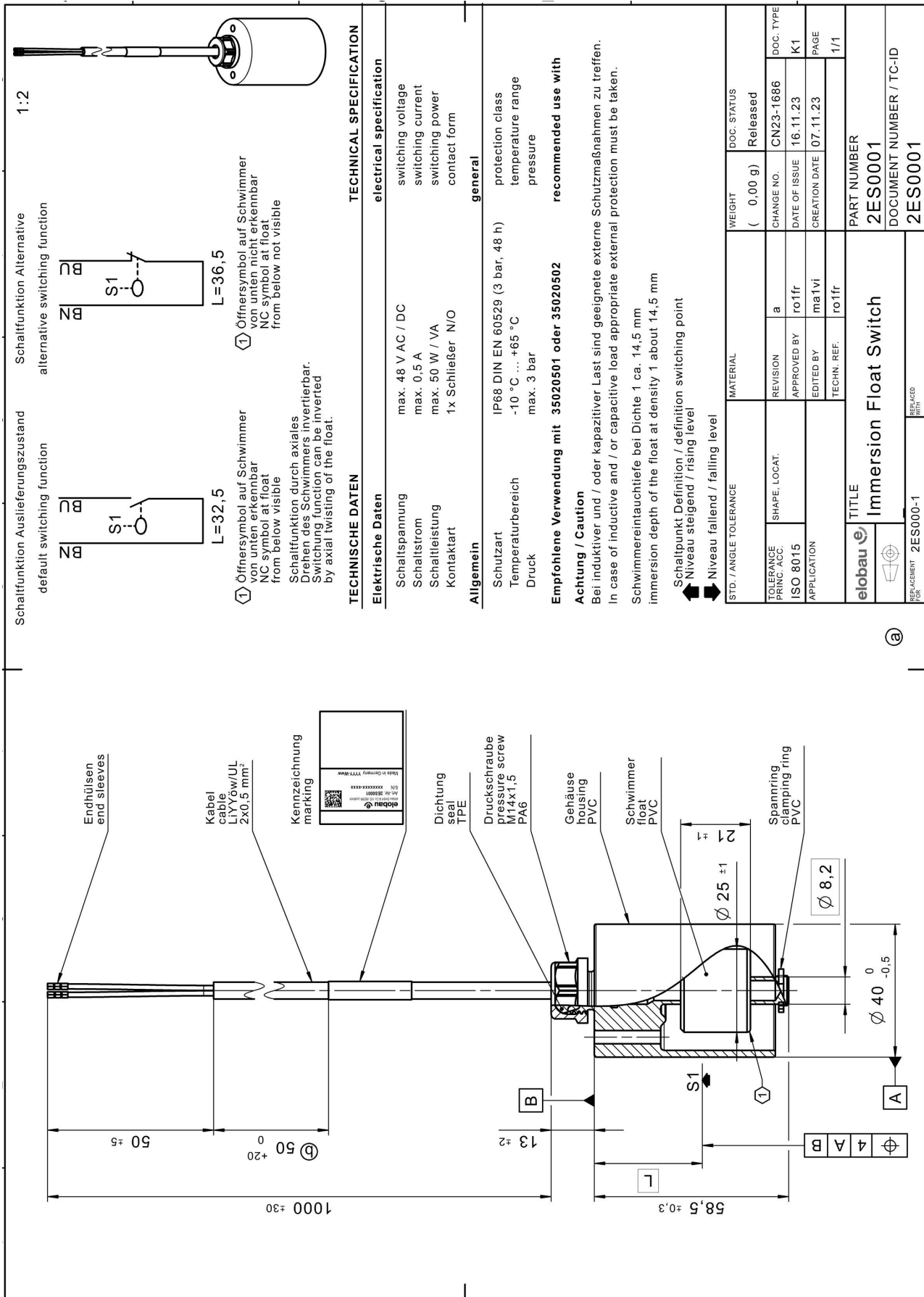


Figure 2

3.3.2 Series 2ES1001

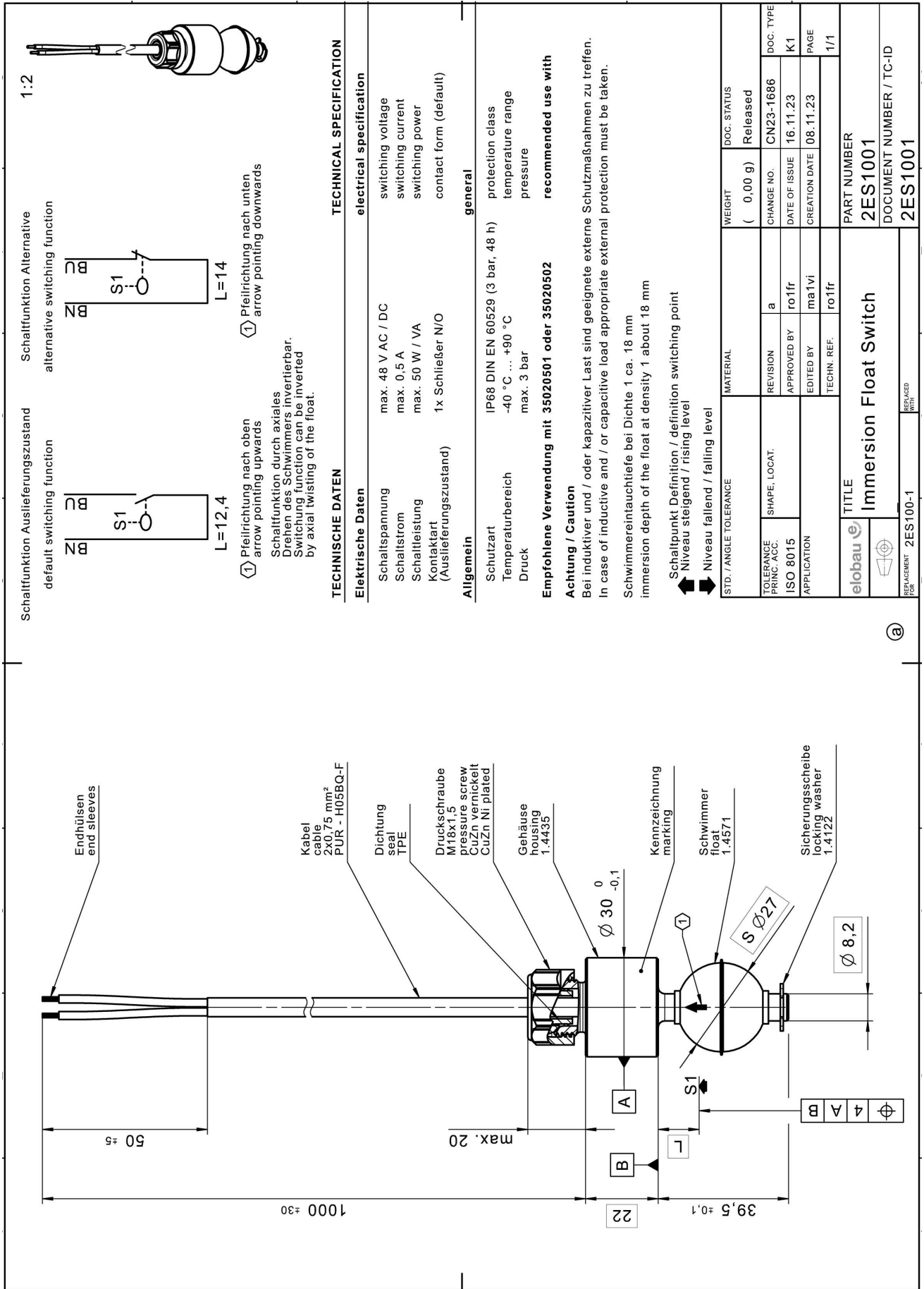


Figure 3

3. Product-specific information

3.3.3 Series 20901009

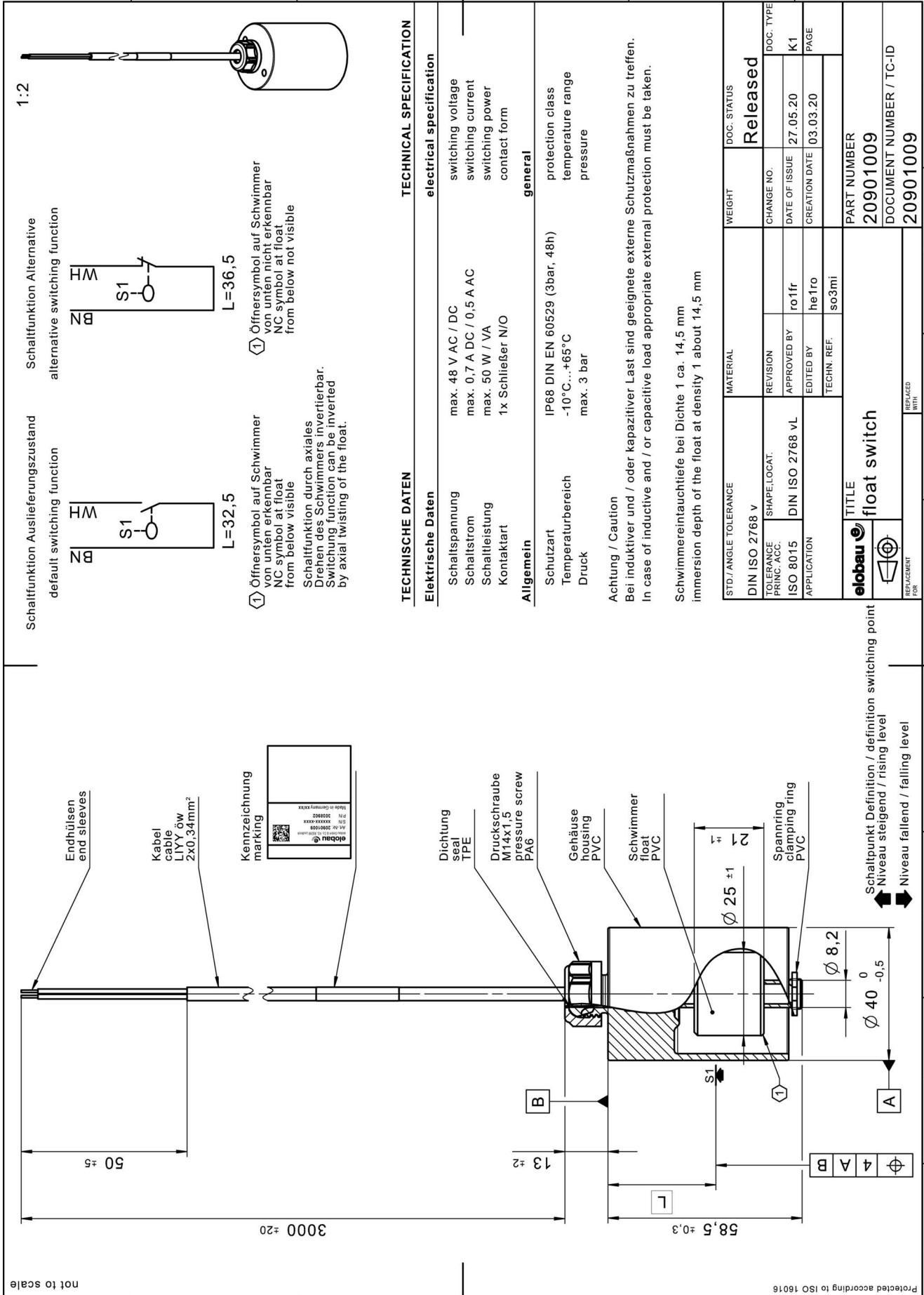


Figure 4

3.3.4 Series 20991102

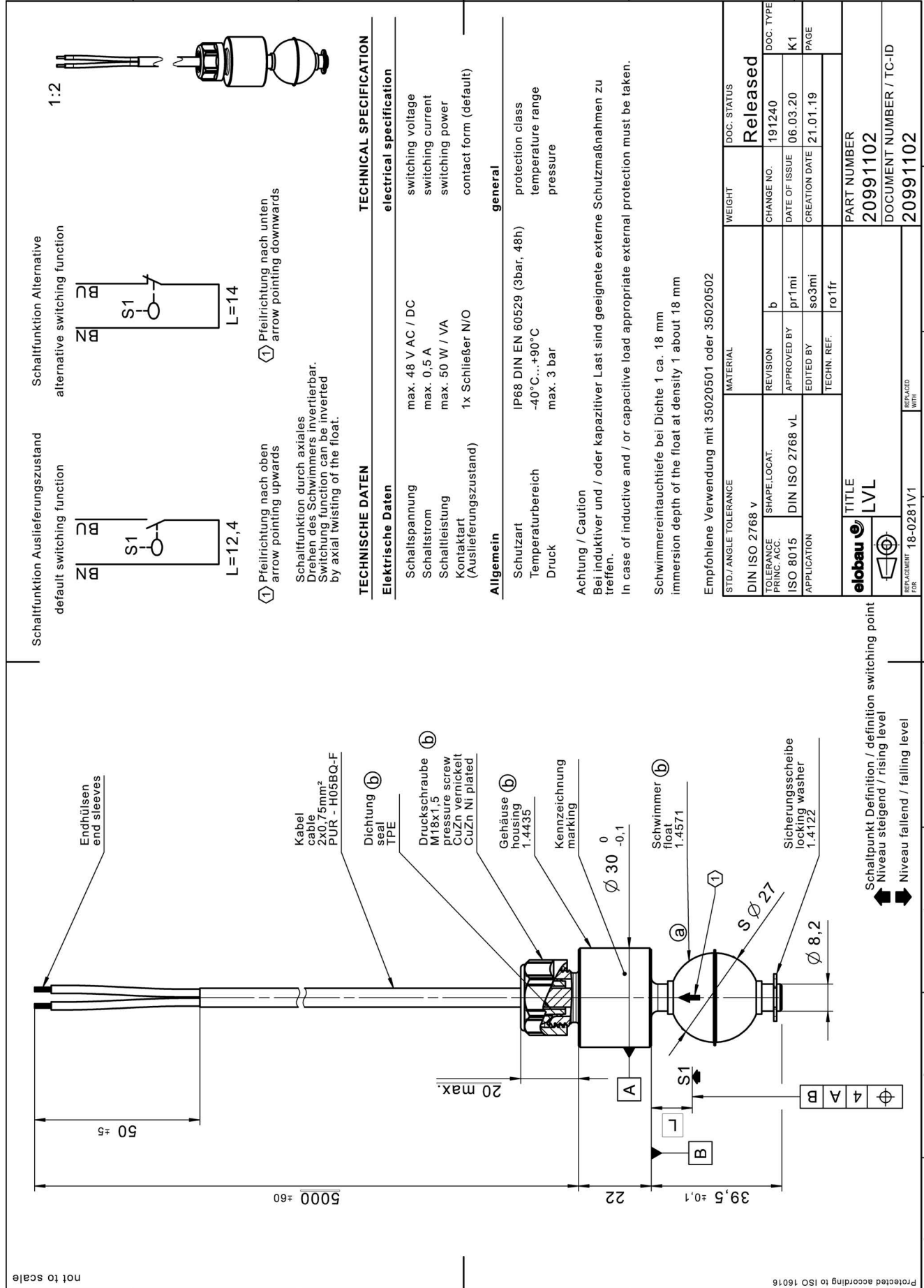


Figure 5

4. Transport and storage

4. Transport and storage



ACHTUNG!

Damage/injury from adhering chemical residues is possible.

Chemical residues may leak out during transport and cause damage.

- ▶ Empty and clean the Immersion float switches before transport.
 - ▶ Only store and transport the Immersion float switches when clean.
-

4.1 General transport information

During transport and storage, protect the product against heat, moisture, chemicals and impacts.

Only transport and store the Immersion float switches in the designated transport material. During transport, protect against impacts and severe shocks. The owner is responsible for damage and personal injuries.

4.2 Storage, ambient conditions

The storage temperature corresponds to the respective operating temperature. More information about storage and the ambient conditions can be found in the data sheets in chapter 3.3 Technical data, page 10.

5. Installation and putting into service

Immersion float switches are only suitable for suspended vertical installation from above in a container. They are attached to the container or a corresponding device via the cable. Installation in the container is performed from the outside or the inside, depending on the version and type of fastening.



Information

Observe the additional data sheet (separate document) regarding the shape, material and process connection. Deviations in functionality are possible depending on the version. If you have any questions, please contact elobau.

5.1 Installation

Immersion float switches are attached to the cable. The desired switching point height can be variably adjusted via the cable length. The Immersion float switches can be completely immersed in the medium. For the implementation of several switching points, a corresponding number of Immersion float switches are necessary.

Before use, it must be checked whether there are external magnetic fields or ferritic parts in the vicinity as they can result in malfunctions.

Before installation, proceed as follows:

1. Carefully remove the Immersion float switches from the packaging.
2. Check all parts for damage.

Immersion float switches are supplied ready for use.

Fastening modules are available separately. See chapter 5.2.1 Fastening modules (optionally available), page 17.

**Information**

We recommend connecting the product manually before installation and checking that the switching function is correct. (See chapter 5.3 Electrical connection, page 18). The electrical values must not be exceeded.

The sealing surfaces of the container and the cable of the Immersion float switches must be free of soiling and there must be no mechanical damage. The user is responsible for leak-tightness.

VORSICHT!**Danger to people, environment and machines due to chemicals!**

Chemicals may escape during assembly.

- ▶ Observe the safety data sheet of the medium.
- ▶ Protect against possible emissions (vapours, liquids)!

5.2 Mechanical connection

Before installation, ensure that the installation opening provided in the container and the mounting device of the Immersion float switches match in size and dimension.

WARNUNG!**Danger due to pressurised media!**

Escaping media can result in severe injuries.

- ▶ Obtain information about the container contents, e. g. safety data sheet of the medium.
- ▶ Depending on the container contents, wear personal protective equipment (safety gloves, safety glasses).
- ▶ Ensure that the system is depressurised before the Immersion float switches is installed/removed.
- ▶ Capture any escaping media in a suitable vessel.

ACHTUNG!**Danger due to incorrect installation!**

Improper installation can damage the Immersion float switches due to impacts and vibrations.

- ▶ Adhere to the installation tolerances and installation location.

5. Installation and putting into service

Assembling the Immersion float switches

1. Determine the fastening corresponding to the respective application and installation situation.

With regard to assembly and maintenance, attach the Immersion float switches in a readily accessible location.

2. Observe the process conditions when selecting the fitting accessories (seal, screws, nuts, etc.).

Cable glands are recommended. It must be ensured that the cable gland selected is suitable for the cable diameter.

3. Adjust the switching point height via the cable length.

During assembly, make sure that the Immersion float switches does not fall unsecured into the tank or container.

During alignment, make sure that the float can move freely at all times.

4. Ensure there is sufficient cable strain relief in the area of the electrical connection.

5. After installing the cable gland and the optional fastening module, regularly check them for firm seating.

When using several Immersion float switches, make sure that the Immersion float switches do not block each other mechanically.

✓ **Immersion float switches mounted.**

Installation of the Immersion float switches in the container.

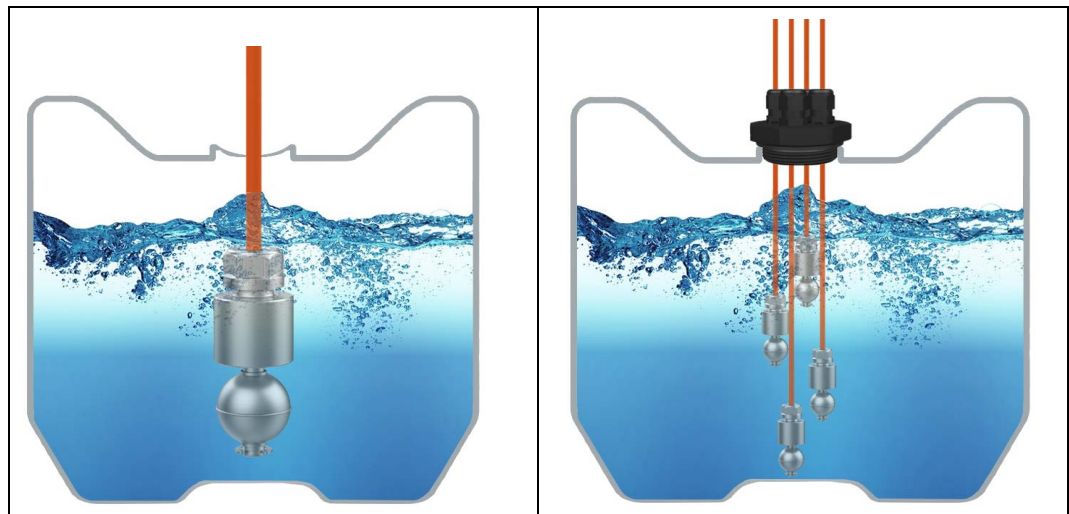


Figure 6: Vertical installation from above without fastening module

Figure 7: Installation with optional fastening module G2"

5.2.1 Fastening modules (optionally available)

Fastening modules are available in different versions. See the respective Immersion float switches data sheet.



	35020501	Fastening module with process connection G1" with a cable gland for an Immersion float switches.
	35020502	Fastening module with process connection G2" with up to four cable glands for up to four Immersion float switches.

Figure 8: Fastening module

5.2.2 Assembly with the fastening module

The following figure shows an example of a fastening module G2" with process connection.

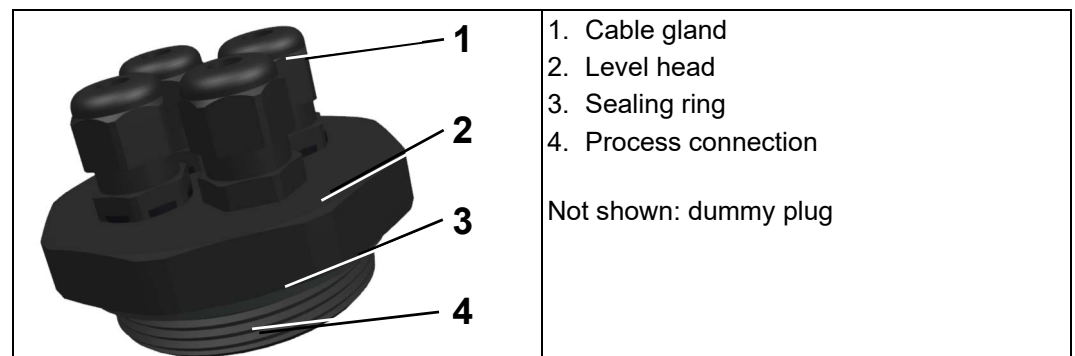


Figure 9: Fastening module G2"

Procedure for assembly with the fastening module

1. Undo the cable gland nut.
2. Thread the Immersion float switches cable through.
3. Determine the correct cable length.
Provide sufficient cable outside of the container so that a correct electrical connection is ensured.
4. Tighten the cable gland nut.
Observe the tightening torque 3 Nm \pm 0.3 Nm.
5. Remove unused cable gland and screw in the dummy plug.
6. Insert the Immersion float switches carefully and completely into the tank / container.
7. Ensure that the sealing surfaces of the container and the Immersion float switches are free of soiling and there is no mechanical damage.
The user is responsible for leak-tightness.
8. Screw the fastening module to the container carefully and slowly.
Screwing in too quick can result in "knotting".
The max. tightening torque of the process connection of the level head can be found on

5. Installation and putting into service

the data sheet. (G1 = 75 Nm, G2 = 125 Nm)

✓ **Immersion float switches mounted with fastening module.**

5.3 Electrical connection

WARNING!



Danger due to faulty connection!

Incorrect or faulty connection can destroy the reed contacts. This can cause a malfunction of the system. A faulty connection may result in irreversible personal injury or death.

- ▶ Immersion float switches may only be put into operation by qualified specialist personnel.
 - ▶ Direct operation in circuits with an inductive load without protective equipment is prohibited. Suitable protective equipment with RC element or free-wheeling diode is permissible.
 - ▶ Direct operation in circuits with a capacitive load without protective equipment is prohibited. Suitable protective equipment with series resistance is permissible.
 - ▶ Only use the Immersion float switches if they are not damaged.
-



Information

We recommend connecting the product manually before installation and checking that the switching function is correct.

The electrical connection may only be carried out by qualified specialist personnel. Also observe the following points:

- In case of a cable extension, observe the electrical rated data (see data sheet in chapter 3.3 Technical data, page 10).
- Provide suitable short-circuit protection.
- When installing the cable, ensure a suitable strain relief device for the Immersion float switches is used.

Connecting the Immersion float switches

(See data sheet in chapter 3.3 Technical data, page 10).

1. Check and ensure the connections are in a voltage-free condition.
2. Connect the Immersion float switches in accordance with the wire colours.
The assignment of the wires as well as the circuit diagram can be found in the data sheet (see chapter 3.3 Technical data, page 10).
3. Route the cables so that no damage can occur.
Route cables so that they are rigidly fixed if they will be exposed to temperatures less than -5°C.
4. After installation, give this Instruction manual to the end user.

✓ **Immersion float switches connected.**

5.4 Putting into service

Putting the Immersion float switches into operation

1. Ensure that the electrical specifications are adhered to. The values must never be exceeded.
2. Apply the operating voltage and check the function of the Immersion float switches by filling the container.
3. Check for and ensure leak-tightness after installing the Immersion float switches.

✓ **Immersion float switches is ready for operation.**

WARNING!



Danger due to lack of complete validation!

During installation, e. g. the normally-closed and normally-open connections could be mixed up. Commissioning the system without a legally prescribed complete validation may result in personal injury, property damage or environmental damage.

- ▶ Before commissioning the system, always carry out a comprehensive complete validation of the system.

5.5 Changes, modification

Any unauthorised change or modification is expressly forbidden. The activities described in this Instruction manual are excluded from this.

5.5.1 Rotating the float

The Immersion float switches is delivered in version "A" as standard, with rising level (A = normally open contact). The contact type can be reversed to version "B" (B = normally closed contact) by rotating the float. Rotating of the float is possible, if it is noted on the respective data sheet.

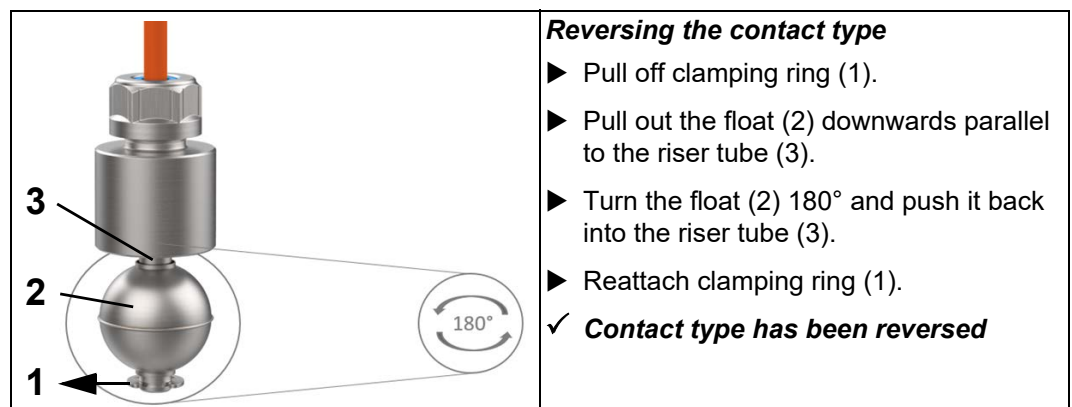


Figure 10: Rotating the float on example Immersion float switches with stainless steel housing.

6. Operation / control

6. Operation / control

There are no further settings to be observed during operation. In the event of an incorrect or missing signal, read the following information about troubleshooting. Contact us in the event of further problems which are not listed in Table 2.

6.1 Troubleshooting

Problem	Cause	Remedy
No or incorrect signal	Float sticks	<ul style="list-style-type: none"> ▶ Clean the Immersion float switches. ▶ Check the suitability of the Immersion float switches to the viscosity of the medium.
	Immersion float switches connected incorrectly in the application.	▶ Check connection cable in accordance with the data sheet and application.
	Density of the medium too low	▶ If nec. contact elobau.
	Float does not have enough buoyancy.	▶ Operate the Immersion float switches in a suitable medium.
	External magnetic field	<ul style="list-style-type: none"> ▶ Shield the Immersion float switches. ▶ Remove/suppress the external magnetic field.
	Float is blocked by another Immersion float switches.	▶ Ensure freedom of movement of all used Immersion float switches.
Contact type unsuitable for application.	▶ Change contact type (See "Rotating the float" page 19).	

Table 2

7. Maintenance

If used correctly, the Immersion float switches is maintenance-free.

In extreme operating conditions, it is advisable to check the Immersion float switches as part of regular inspections. In doing so, the following points should be observed:

- ▶ Visually inspect and check the function of the Immersion float switches.
- ▶ Check the Immersion float switches for firm seating and leaks.
- ▶ Check the connection cables for damage.
- ▶ If heavily soiled, clean the float and sliding tube.

VORSICHT!

Bodily injuries, damage to property and the environment!

Incorrect cleaning will lead to injuries, damage to property and the environment. Measuring residues contained in the uninstalled device can cause bodily injury and damage to the environment and equipment.

- ▶ Observe the safety data sheet of the medium.
- ▶ Flush and clean the removed product.



**ACHTUNG!****Danger due to property damage!**

Incorrect cleaning will cause damage to the product!

- ▶ Do not use aggressive cleaning agents.
- ▶ Do not use any hard or pointed objects for cleaning.

7.1 Dismantling

**WARNUNG!****Danger due to pressurised media!**

Escaping media can result in severe injuries!

- ▶ Ensure that the system is depressurised before the Immersion float switches is removed.
- ▶ Observe the safety data sheet of the medium.
- ▶ If necessary, wear personal protective equipment (safety gloves, safety glasses).
- ▶ Capture any escaping media in a suitable vessel.

**WARNUNG!****Danger to humans and the environment from chemicals!**

The shipper is responsible for damage!

- ▶ Observe the safety data sheet of the medium.
- ▶ If necessary, wear personal protective equipment (safety gloves, safety glasses).
- ▶ Protect against possible emissions (vapours, liquids).

Dismantling the Immersion float switches

- ▶ Check and ensure a voltage-free condition.
- ▶ Pull out the power plug.
- ▶ If necessary, empty the container.
- ▶ Dismantle the float switch by unscrewing it from the container threaded hole.
- ▶ Flush and clean the removed float switch to prevent danger due to adhering media.
- ✓ ***Immersion float switches dismantled.***

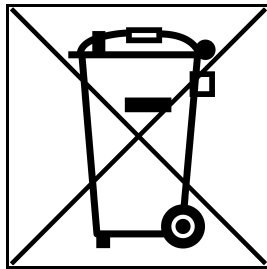
VORSICHT!

**Damage due to chemical residues!**

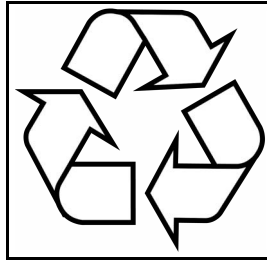
When dismantling, residues of the chemical materials may adhere to the product.

- ▶ Empty and clean the Immersion float switches before transport.
 - ▶ Only store and transport the Immersion float switches when clean.
-

7.2 Disposal



The symbol means that a product must be collected separately from other waste when it reaches the end of its service life in accordance with directive 2012/19/EU. For more information, please contact elobau or your dealer on site.



Dispose of packaging and used parts in accordance with the relevant national regulations. Do not dispose of Immersion float switches with domestic waste; e. g. dispose of at the collection centre of a waste management utility.

Figure 11

Disposing of the Immersion float switches

- ▶ Disassemble the Immersion float switches as described above.
- ▶ Clean the Immersion float switches.
- ▶ Capture any dripping media according to health and safety regulations.
- ▶ Dispose of packaging and used parts in accordance with the relevant national regulations.
- ▶ Do not dispose of Immersion float switches with domestic waste; e. g. dispose of at the collection centre of a waste management utility.

✓ **Immersion float switches disposed of.**

WARNING!

**Danger due to incorrect disposal!**

Hazards to personnel and the environment may result from incorrect disposal!

- ▶ Capture any dripping media according to health and safety regulations.
 - ▶ Dispose of packaging and used parts in accordance with the relevant national regulations.
-