**Instructions for Use**

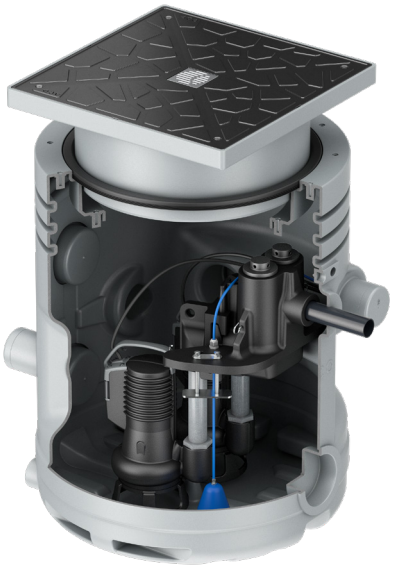
Issued: 2022-02-25

# Muli-Flex Wastewater lifting plant

## For non-faecal and faecal wastewater

### Type UF duo or mono

- UF = for underfloor installation (frost-free)
- duo = with two submerged pumps
- mono = with one submerged pump



### Type FR duo or mono

- FR = for freestanding installation (frost-free)
- duo = with two submerged pumps
- mono = with one submerged pump

For safe and proper use, read carefully through the instructions for use and all other documents enclosed with the product, pass them on to the end user and keep them until the end of the product's life.

# Introduction

ACO Passavant GmbH (hereinafter referred to as ACO) thanks you for your trust and provides you with a product that represents state-of-the-art technology and which has been checked for proper condition during quality controls prior to delivery.

Figures in these instructions are provided for basic understanding and may differ, depending on the product version and the installation situation.

## ACO Service

For additional information regarding wastewater lifting plants, ordering spare parts and after-sales services e.g. maintenance contracts, ACO Service will be pleased to be of assistance.

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## Target group

The target group for these operating instructions is technically trained personnel.

The personnel must have the appropriate qualifications, 🕮 Chapter 1.3 "Personnel qualifications". Areas of responsibility, competence and monitoring of the personnel must be closely regulated by the operator. Any lack of knowledge in the personnel must be rectified through training and instruction by adequately trained skilled personnel. Training on the system shall be carried out only under the supervision of technical skilled personnel.

## Guarantee

For information regarding the guarantee, refer to General Terms and Conditions of Business ("Allgemeine Geschäftsbedingungen"), 🕮 http://www.aco-haustechnik.de/agb

## Symbols used

Certain information in these instructions for use is marked as follows:

Tips and additional information, which make the work easier

- Bullet points

➔ Actions to be carried out in the specified order

🕮 References to other information in these instructions for use and other documents

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# 1 For your safety

Read the safety instructions before installing and launch of the wastewater lifting plant, in order to prevent personal injuries and damage to property.

## 1.1 Intended use

The wastewater lifting plant is intended for use for collecting and automatic lifting of non-faecal and faecal wastewater above the backflow level. The wastewater is channelled into the sewer without any risk to people or damage to buildings.

Depending on the model, the unit is suitable for frost-free installation in the floor slab (type: -UF / underfloor) or for free-standing installation in frost-protected rooms (type: -FR / outdoor installation).

**IMPORTANT**

- Only drainage objects that are installed below the backflow level and where there is no slope towards a sewer may be connected.
- The maximum installation depth (distance between the upper edge of the top section and the tank base) is 1.20 m.
- The maximum wastewater temperature should not exceed 40 °C (65 °C for short periods).

The wastewater lifting plant is intended for installation in the ground below the backflow level in the following types of projects:

- Drainage of multi- and single-family homes
- Office building drainage
- Industrial building drainage
- Drainage for laundry rooms
- Drainage of technical rooms

Conditions for use of the different pump types:

| Pump type | Type of wastewater | Operating mode |
|---|---|---|
| SAT-V 75/2/50/D<br>SAT-V 150/2/50/D | Wastewater free of faeces (grey water) | S1 operation = continuous operation/ continuous running |
| SITA 200 N-ex-G | Waste water containing faeces (black water) and non-faecal water (grey water) with short-fibre components | ■ S1 operation = continuous operation/ continuous running<br>■ ATEX certification |

Harmful substances must not be discharged into the pump station:

- Heavy metals, e.g. zinc, lead, cadmium, nickel, chromium
- Aggressive substances, e.g. acids (pipe cleaning agent with pH value below 6)
- Alkaline solutions, salts and condensates
- Cleaning products and disinfectants, washing-up agents and detergents in overdosed quantities or quantities that result in disproportionate foaming
- Flammable or explosive substances, e.g. petrol, benzene, oil, phenols, solvent-based paints, white spirits
- Solids, e.g. kitchen waste, glass, sand, ashes, fibrous material, synthetic resins, tar, cardboard, textiles, greases (oils), leftover paint
- Liquid substances, which can harden, e.g. gypsum, cement, lime
- Ecocides, e.g. plant treatment and pest control products
- Wastewater from manure pits and keeping of livestock, e.g. liquid manure, slurry, dung

Other possible uses and changes are not allowed. Installation of unapproved parts impairs safety and excludes any guarantee from ACO. In the event of replacement, only use original ACO parts or spare parts approved by ACO.

## 1.2 Normative specifications

The listed norms must be supplemented and checked for currency.

- EN 12050-1 'Wastewater lifting plants for building and land drainage – Part 1: Faeces lifting plants"
- EN 12050-2 "Wastewater lifting plants for building and land drainage – Part 2: Wastewater lifting plants for faecal-free wastewater"
- EN 12050-4 "Wastewater lifting plants for building and land drainage – Part 4: Back flow preventer for faecal-free and faecal-containing wastewater"
- EN 752 "Drain and sewer systems outside buildings"
- EN 12056-1 "Gravity drainage systems inside buildings – Part 1: General points and design requirements"
- EN 12056-4 "Gravity drainage systems inside buildings – Part 4: General points and design requirements"

## 1.3 Personnel qualifications

| Activities | Person | Knowledge |
|---|---|---|
| Layout, operational changes | Planners | Knowledge of building systems and services and applicable standards and directives<br>Evaluation of wastewater technology application cases<br>Proper layout of drainage systems |
| Below ground installation | Skilled people | Specific knowledge of carrying out civil engineering works |
| Sanitary installation | Skilled people | Installation, fixing and connection of pipes |
| Electrical installation | Electrician | Work on electrical connections to power supply must be carried out by qualified electricians only |
| Operation monitoring | Owner, operating company | No specific requirements |
| Launch, maintenance | Qualified persons | “Qualified persons” according to DIN 1986-100* |
| Disposal | Skilled people | Appropriate and environmentally friendly disposal of materials and substances, knowledge of recycling |

*Definition of “competent persons” in accordance with German Standard DIN 1986-100:

"Competent persons" are employees of companies independent of operators, experts or other institutions who can prove that they have the necessary specialist knowledge for the operation, maintenance and inspection of separator systems to the extent specified here and have the technical equipment required for the inspection of separator systems. In individual cases, in larger operational units, these tests and inspections can also be carried out by internal personnel of the operating company who are qualified people, independent with regard to their area of responsibility and who are not bound by instructions, and who have the same qualification and technical equipment.”

## 1.4 Personal protective equipment

Personal protective equipment must be made available to the personnel and supervisors must check that it is used or worn.

| Manda-tory sign | Meaning |
|---|---|
|  | Safety footwear provides good slip resistance, especially in wet conditions, as well as a high degree of penetration resistance (e.g. in case of nails) and protects the feet from falling objects (e.g. during transport). |
|  | Protective gloves protect the hands from infection (moisture proof protective gloves) and from minor bruising and cut injuries. |
|  | Protective clothing protects the skin from minor mechanical effects and infections. |
|  | A protective helmet protects the head in case of low ceilings and from falling objects (e.g. during transport). |
|  | Safety glasses and goggles protect eyes from infections, especially during launch, maintenance and repair. |

## 1.5 Warnings

In the instructions for use, warnings are identified by the following warning symbols and signal words.

| Warning symbols and signal words | | Meaning | |
|---|---|---|---|
|  | **DANGER** | Personal injuries | Hazard with a high degree of risk which, if not prevented, results in death or severe injuries. |
|  | **WARNING** | | Hazard with a moderate degree of risk which, if not prevented, can result in death or severe injuries. |
|  | **CAUTION** | | Hazard with a low degree of risk which, if not prevented, can result in minor or moderate injuries. |
| | **IMPORTANT** | Damage to property | Hazard which, if not prevented, can result in the damage of products and their functions or an item/property in the surrounding area. |

## 1.6 Responsibility of the Owner

Due diligence in the owner's, or the operator's, area of responsibility:

ACO recommends that an operating log be kept and that inspections, servicing, maintenance work, repairs, etc. be documented, so that proof exists in case of an insurance claim:

### Planning and installation

Specifications in accordance with DIN EN 12056-4 as well as regional provisions and directives must be complied with, these include, among other things:

- Layout and dimensioning
- Protection against backflow
- Installation of pipes

### Operation monitoring

- Monitoring normal operation, 🕮 Chapter 1.1 "Intended use".
- Monthly performance of at least 2 trial runs, 🕮 Chap. 4.4 "Execute trial run".
- Controlling of the wastewater lifting plant, e.g. for leakages, unusual running noises.
- Check the operational readiness of the wastewater lifting plant on the control unit.

### Maintenance

Wastewater lifting plants must be operated and maintained in such as way as to ensure proper functioning and operating safety. We recommend that plant operators conclude a maintenance contract for the maintenance and servicing work to be carried out on a regular basis.

ACO Service would be pleased to undertake the servicing and maintenance work professionally. Maintenance contract request 🕮 service@aco.com.

Required maintenance intervals for the wastewater lifting plant:

- Commercial operation = every 3 months
- Operation in multi-dwelling buildings = every 6 months
- Operation in single-family houses = every 12 months

Additional (extraordinary) maintenance of the wastewater lifting plant:

- After the wastewater lifting plant has flooded
- Before restarting the wastewater lifting plant

## 1.7 Transport and storage

**IMPORTANT** Note during storage and transport:

- Store the plant parts in frost-protected premises.
- If intermediate storage is required, then the collection tank must be protected against water ingress.
- Never drive the forks of a fork-lift truck or lift truck directly under the plant parts.
- Where possible, do not remove the packaging and transport restraints until the components are at their installation site.
- If transporting the unit parts using a crane or crane hook:
  - Comply with the accident prevention regulations
  - Check the working load limit of the crane and the slings
  - Never stand under the suspended load
  - Prevent other persons from entering the entire danger zone
  - Avoid oscillating motion (swinging) during transport

## 1.8 Decommissioning and disposal

**IMPORTANT** Improper disposal is a hazard for the environment. Comply with the regional disposal regulations.

- Completely drain and clean the plant when decommissioning.
- Separate the unit parts according to their material and hand them over for recovery or recycling.
- Electrical equipment must never be disposed of in household waste.

# 2 Product Description

The wastewater lifting plant is made of polyethylene. Polyethylene is characterised, for example, by lightweight construction and long life.

## 2.1 Product features

| | Product features | -UF | | -FR | |
|---|---|---|---|---|---|
| | | duo | mono | duo | mono |
| Product advantages | ■ Tested according to EN 12050-1 and 12050-2 | ● | ● | ● | ● |
| | ■ Potential separation of trades or partial delivery according to construction progress | ● | ● | ● | ● |
| | ■ can be used for non-faecal and faecal-containing waste water depending on the pump | ● | ● | ● | ● |
| | ■ Above-water automatic coupling for tool-free assembly and disassembly | ● | ● | ● | ● |
| | ■ Automatic operation | ● | ● | ● | ● |
| | ■ Control (including Bluetooth or Modbus, optional) | ● | ● | ● | ● |
| General | ■ For installation in the floor slab | ● | ● | | |
| | ■ For freestanding installation in rooms protected from frost | | | ● | ● |
| | ■ Maintenance opening Ø 480 mm | ● | ● | ● | ● |
| | ■ Maximum installation depth approx. 1.20 m (distance from upper edge of floor structure to lower edge of collection tank) | ● | ● | | |
| | ■ Collection tank height 1 m | | | ● | ● |
| | ■ Collection tank<br>□ Polyethylene material<br>□ mounted support frame with backflow preventer and above-water coupling, to accommodate two ACO submerged pumps<br>□ Pressure line to the outside designed as a spigot DN 50 / OD 50 mm<br>□ Collection tank height 1 m<br>□ Total volume approx. 380 l | ● | ● | ● | ● |
| | ■ Fixing set for buoyancy-proof anchorage | | | ● | ● |
| | ■ Sleeve seal DN 100 for connection of the on-site inlet pipe OD 110 mm | | | ● | ● |
| | ■ Compression fitting DN 50 / 1½" (internal thread) for connecting the on-site pressure line 1½" (external thread) | ● | ● | ● | ● |

| | Product features | -UF duo | -UF mono | -FR duo | -FR mono |
|---|---|---|---|---|---|
| Connections | ■ Pipe connections:<br>□ 3 x connection sleeve (closed) DN 100 / OD 110 mm for connection of an on-site inlet pipe<br>□ 3 x connection port (closed) DN 100 / OD 110 mm for connection of an on-site inlet pipe<br>□ 1x connection port (closed) DN 150 / OD 160 mm for connection of an on-site inlet pipe<br>□ 1x connection port (closed) DN 100 / OD 110 mm for connection of an on-site cable duct or utility pipe<br>□ 1x connection port (closed) DN 70 / OD 75 mm for connection of an on-site ventilation pipe<br>□ 1x connection thread (closed) 1½" (internal thread) for connecting an on-site drain line (e.g. with diaphragm hand pump)<br>□ 1x connection thread (closed) 1" (internal thread) for connection of an on-site base drain line<br>□ 1x connection port DN 50 / OD 50 mm for connection of an on-site pressure line | ● | ● | ● | ● |
| Electrical connections | ■ Muli-Flex duo electrical connection:<br>□ 400 V / 50 Hz / 1.2 kW (submerged pumps type SAT-V 75 / 2 / 50 / D)<br>□ 400 V / 50 Hz / 2.2 kW (submerged pumps type SAT-V 150 / 2 / 50 / D)<br>□ 400 V / 50 Hz / 3.0 kW (submerged pumps type SITA 200 N-ex-G)<br>□ General fuse protection: 3 x 16 A (time lag) or according to local conditions. | ● | | ● | |
| | ■ Muli-Flex mono electrical connection:<br>□ 400 V / 50 Hz / 0.6 kW (submerged pumps type SAT-V 75 / 2 / 50 / D)<br>□ 400 V / 50 Hz / 1.1 kW (submerged pumps type SAT-V 150 / 2 / 50 / D)<br>□ 400 V / 50 Hz / 1.5 kW (submerged pumps type SITA 200 N-ex-G)<br>□ General fuse protection: 3 x 16 A (time lag) or according to local conditions. | | ● | | ● |

| | Product features | | -UF | | -FR | |
|---|---|---|---|---|---|---|
| | | | duo | mono | duo | mono |
| Necessary top section (polyethylene material) | ■ Top section without drain system for use with non-faecal wastewater:<br>□ Cover (closed)<br>□ Bolts<br>□ Flat seal<br>□ Top section body 270 mm high<br>Dimensions, 📖 Chap. 6.2 "Top section body"<br>□ Lip seal |  | ○ | ○ | | |
| | ■ Top section with drain system for use with non-faecal wastewater:<br>□ Gratings<br>□ Cover<br>□ Drainage system<br>□ Bolts<br>□ Flat seal<br>□ Top section body 270 mm high<br>Dimensions, 📖 Chap. 6.2 "Top section body"<br>□ Lip seal |  | ○ | ○ | | |
| | ■ Top section without drain system for use with faecal waste-water:<br>□ Cover (closed)<br>□ Bolts<br>□ Flat seal<br>□ Top section body 270 mm high<br>Dimensions, 📖 Chap. 6.2 "Top section body"<br>□ Lip seal<br>□ Bolt cover<br>□ O-ring<br>□ Intermediate cover<br>□ Attachment set (stud bolts and cap nuts)<br>□ O-ring |  | ○ | ○ | | |

| Required top section ( made of polyethylene with top section body made of stainless steel) | Product features | | -UF | | -FR | |
|---|---|---|---|---|---|---|
| | | | duo | mono | duo | mono |
| | ■ Top section <u>without</u> drain system for use with non-faecal wastewater:<br>□ Cover (closed)<br>□ Bolts<br>□ Flat seal<br>□ Top section body (270 mm high) with special profile for bonded waterproofing or for connecting synthetic resin floors with cavity filling<br>Dimensions, 📖 chap. 6.2 "Top section body"<br>□ Lip seal |  | ○ | ○ | | |
| | ■ Top section <u>with</u> drain system for use with non-faecal wastewater:<br>□ Gratings<br>□ Cover<br>□ Drainage system<br>□ Bolts<br>□ Flat seal<br>□ Top section body (270 mm high) with special profile for bonded waterproofing or for connecting synthetic resin floors with cavity filling<br>Dimensions, 📖 chap. 6.2 "Top section body"<br>□ Lip seal |  | ○ | ○ | | |
| | ■ Top section <u>without</u> drain system for use with faecal waste-water:<br>□ Cover (closed)<br>□ Bolts<br>□ Flat seal<br>□ Top section body (270 mm high) with special profile for bonded waterproofing or for connecting synthetic resin floors with cavity filling<br>Dimensions, 📖 chap. 6.2 "Top section body"<br>□ Lip seal<br>□ Bolt cover<br>□ O-ring<br>□ Intermediate cover<br>□ Attachment set (stud bolts and cap nuts)<br>□ O-ring |  | ○ | ○ | | |

| | Product features | | -UF | | -FR | |
|---|---|---|---|---|---|---|
| | | | duo | mono | duo | mono |
| Necessary submerged pump | ■ Submerged pump SAT-V 75/2/50/D:<br>□ Version with vortex impeller<br>□ three-phase motor with 10 m connection cable<br>□ Degree of protection IP 68<br>□ Mounted pressure line with connection unit (guide hook) for trouble-free incorporation and sealing into the above-water coupling in the collection tank<br>□ Dimensions, technical data, application limits and performance diagrams, 📖 Chap. 6.3 "Submerged pumps" |  | ○ (2) | ○ (1) | ○ (2) | ○ (1) |
| | ■ Submerged pump SAT-V 150/2/50/D:<br>□ Version with open multi-channel impeller<br>□ three-phase motor with 10 m connection cable<br>□ Degree of protection IP 68<br>□ Mounted pressure line with connection unit (guide hook) for trouble-free incorporation and sealing into the above-water coupling in the collection tank<br>□ Dimensions, technical data, application limits and performance diagrams, 📖 Chap. 6.3 "Submerged pumps" |  | ○ (2) | ○ (1) | ○ (2) | ○ (1) |
| | ■ Submerged pump SITA 200 N-ex-G:<br>□ Version with grinder (stainless steel 60 HRC)<br>□ ATEX - certification<br>□ three-phase motor with 10 m connection cable<br>□ Degree of protection IP 68<br>□ Mounted pressure line with connection unit (guide hook) for trouble-free incorporation and sealing into the above-water coupling in the collection tank<br>□ Dimensions, technical data, application limits and performance diagrams, 📖 Chap. 6.3 "Submerged pumps" |  | ○ (2) | ○ (1) | ○ (2) | ○ (1) |
| Required level sensor | ■ Pressure transducer<br>□ Degree of protection IP68<br>□ 20 m or 40 m connecting cable, bending radius max. 120 mm<br>□ Cable gland<br>□ When used in faecal containing wastewater and in potentially explosive areas, the safety barrier must also be used.<br>□ Technical data, 📖 Chap 6.4.1 "Pressure transducer" |  | ○ (1) | ○ (1) | ○ (1) | ○ (1) |
| | ■ Open pressure bell (only available together with control unit):<br>□ Housing made of grey cast iron GG<br>□ 20 m pneumatic control line<br>□ Cable gland<br>□ Technical data, 📖 Chap. 6.4.2 "Open pressure bell" |  | ○ (1) | ○ (1) | ○ (1) | ○ (1) |

| | Product features | -UF duo | -UF mono | -FR duo | -FR mono |
|---|---|---|---|---|---|
| Required control unit | ■ MultiControl Mono control unit with or without open pressure bell:<br>□ For controlling one pump (P2 maximum 5.5 kW)<br>□ Ready to plug in: 1.5 m connection cable and CEE plug (16 A) with integrated phase inverter<br>□ Level measurement optionally available via pneumatic pressure, air bubble injection, external sensor (4 - 20 mA)<br>□ Potential-free group alarm and high water signal<br>□ Mains-independent alarm (85 dBA) in accumulator mode for 5 to 6 hours<br>□ Numeric display with state display and digital potentiometer for setting:<br>□ Pump ON and OFF<br>□ High water alarm<br>□ Motor current limitation<br>□ Filling level measuring<br>□ Rotary field control<br>□ H-0-A button<br>□ Display service intervals<br>□ Operating hours counting device and display of the activation impulses<br>□ Ampere meter<br>□ Error memory (last defect)<br>□ Control pre-set and multilingual<br>□ 230 V connection for the optional mini compressor<br>□ Technical data, 📖 Chap 6.6.1 "Duo control unit"  | | ○ (1) | | ○ (1) |

| | Product features | -UF duo | -UF mono | -FR duo | -FR mono |
|---|---|---|---|---|---|
| Required control unit | ■ MultiControl Duo control system with or without open pressure bell.<br>□ For controlling two pumps (P2 maximum 5.5 kW)<br>□ Ready to plug in: 1.5 m connection cable and CEE plug (16 A) with integrated phase inverter<br>□ For level regulating for liquid filling levels: The level can be optionally determined via pneumatic pressure (with/without air bubble injection), an external sensor (4 – 20 mA). The motor contactor directly activates two pumps up to max. 5.5 kW power. Furthermore, 5 relay contacts are available for the output of fault signals and messages. The operation and setting is very simple. All values can be queried at the LC display.<br>□ LCD plain text display<br>□ Hand – 0 – Auto functions<br>□ Acknowledge button<br>□ Forced switching on of the pumps (24 h)<br>□ Internal acoustic alarm<br>□ High water alarm, isolated<br>□ Operating hours counter<br>□ Pump change<br>□ High reliability<br>□ Level registered by an internal pressure transducer<br>□ All settings and fault messages are retained after a power failure<br>□ Rotating field and phase failure control<br>□ In manual mode the pumps switch off automatically after 2 min. running time<br>□ Switching off of pump via switch-off point and stop delay<br>□ Electronic monitoring of the motor current<br>□ Group alarm isolated and non-isolated<br>□ “Number of pump cycles” memory<br>□ Ampere meter<br>□ Automatic pump changeover<br>□ Easy operation<br>□ Service-Mode<br>□ Mains-independent alarm with battery back-up (approx. 7 h) through integrated 9 V rechargeable battery, horn volume maximum. approx. 85 dB (optional)<br>□ Technical data, 📖 Chap. 6.6.2 "Mono control unit"  | ○ (1) | | ○ (1) | |

| | Product features | -UF duo | -UF mono | -FR duo | -FR mono |
|---|---|---|---|---|---|
| Accessory (optional) | ■ Bonding flange:<br>□ Seal ring<br>□ Bolts<br>□ Washers<br>□ Sealing cord<br>□ Weight: 3 kg<br>□ Article No: 620520  | ● (1) | ● (1) | | |
| | ■ Sealing flange:<br>□ Weight: 5.6 kg<br>□ Article No: 620521  | ● (1) | ● (1) | | |
| | ■ Pressure line hose:<br>□ 7.5 m long<br>□ Outer diameter OD 63 mm / ID 55 mm<br>□ with 1 ½“ thread (External thread)<br>□ Weight: 8 kg<br>□ Article No: 620522  | ● (1) | ● (1) | | |
| | ■ Air bubble injection for open pressure bell.<br>□ Miniature compressor ready to plug in, connection 230 V<br>□ Control line<br>□ T - Screw-in connection<br>□ Spring check valve<br>□ Weight: 0.6 kg<br>□ Article No.: 0154.81.27<br>□ Technical data, Chap. 6.5 "Air bubble injection"  | ● (1) | ● (1) | ● (1) | ● (1) |
| | ■ Safety barrier for pressure transducer:<br>□ When using the pressure transducer with wastewater containing faecal matter and in hazardous areas<br>□ For separating potentially explosive and safe area.<br>□ Maximum permissible ambient temperature: -20 °C to +50 °C<br>□ Weight: 0.5 kg<br>□ Article No.: 0178.63.89  | ● (1) | ● (1) | ● (1) | ● (1) |
| | ● = applicable ○ = necessary for the functionality of the wastewater lifting plant ( ) = number of pieces | | | | |

## 2.2 Design

### 2.2.1 Muli-Flex-UF duo and mono

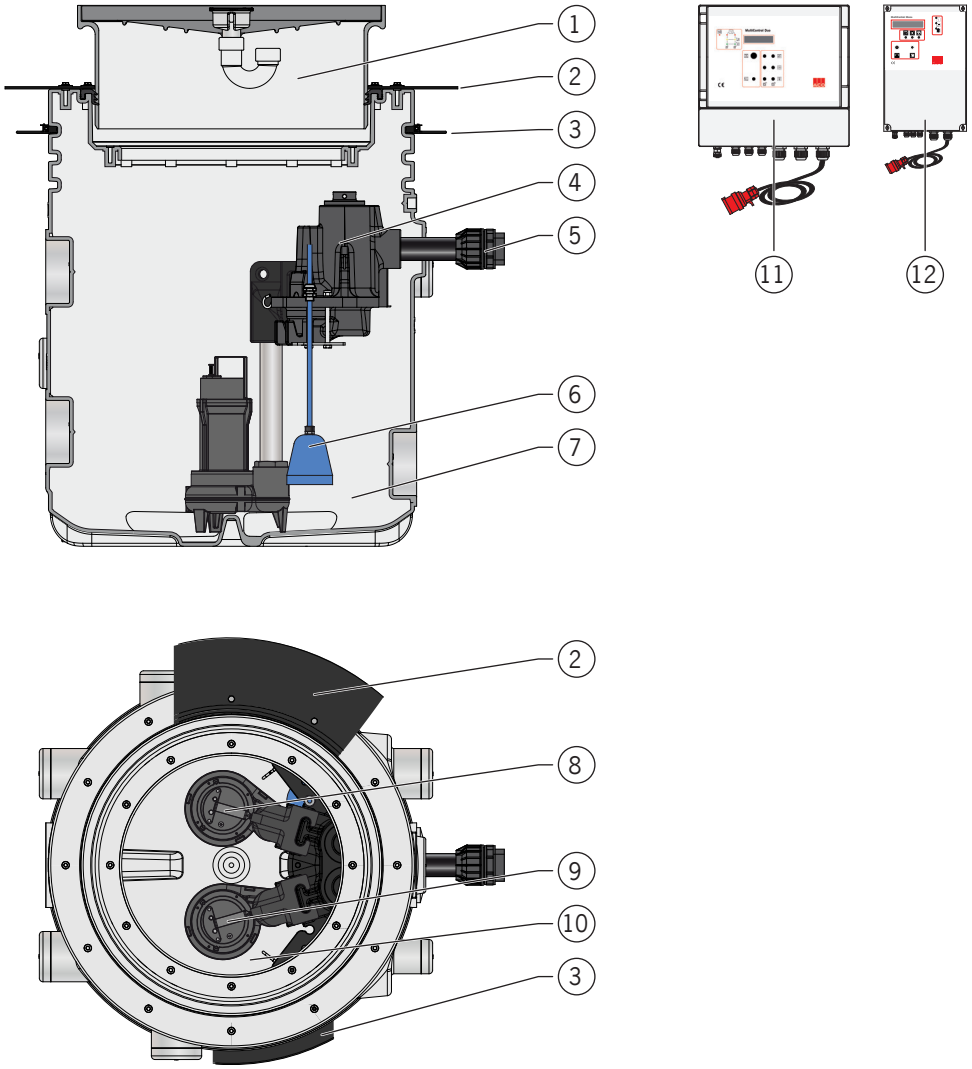



**Figure: Muli-Flex-UF duo**

1 = Complete top section (required accessories), depicted variant Material polyethylene _ "Non-faecal with drainage system".

2 = Bonded flange (optional accessory)

3 = Sealing flange (optional accessory)

4 = Support frame with backflow preventer and above-water coupling

5 = Compression fitting DN 50/ 1“(Internal thread.)

6 = Level sensor for level measurement (required accessories, shown: open pressure bell)

7 = Collection tank

8 = Submerged pump 1 (necessary accessory) with mounted pressure line and connection unit (guide hook)

9 = Submerged pump 2 (necessary accessory for duo version) with mounted pressure line and connection unit (guide hook)

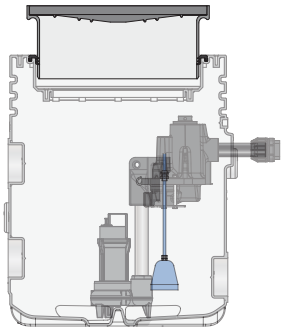
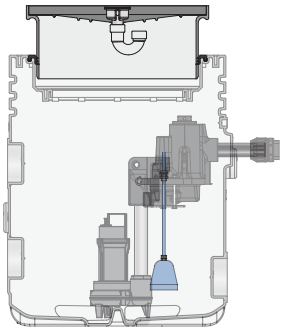
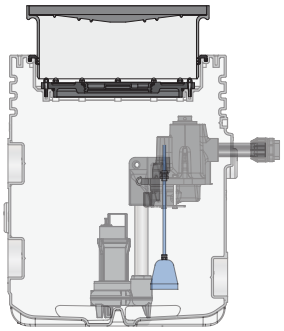
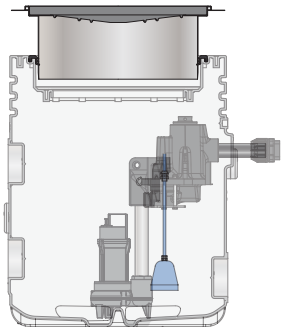
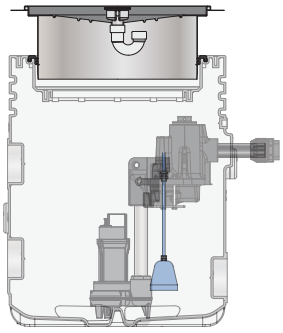
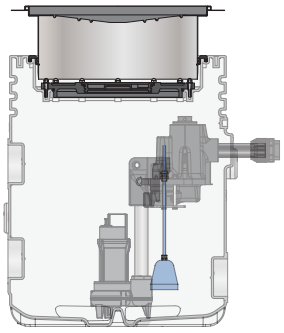
10 = Maintenance opening

11 = MultiControl duo control unit (necessary accessories for duo version)

12 = MultiControl mono control unit (necessary accessories for mono version)

## 2.2.2 Top section variants for Muli-Flex -UF

Top versions for faecal-free or faecal-containing wastewater, with or without drain system.

| | Non-faecal without drain system | Non-faecal with drain system | Faecal-containing without drain system |
|---|---|---|---|
| **Top section body (made of polyethylene)** |  <br>■ Cover (closed)<br>■ Flat seal<br>■ Top section body 270 mm high<br>■ Lip seal |  <br>■ Cover with grating and drain system<br>■ Flat seal<br>■ Top section body 270 mm high<br>■ Lip seal |  <br>■ Cover<br>■ Flat seal<br>■ Top section body 270 mm high<br>■ Lip seal<br>■ Intermediate cover<br>■ O-ring<br>■ Bolt cover<br>■ O-ring<br>■ Fastening parts |
| **Top section body (material stainless steel)** |  <br>■ Cover (closed)<br>■ Flat seal<br>■ Top section body* (270 mm high)<br>■ Lip seal |  <br>■ Cover with grating and drain system<br>■ Flat seal<br>■ Top section body* (270 mm high)<br>■ Lip seal |  <br>■ Cover<br>■ Flat seal<br>■ Top section body* (270 mm high)<br>■ Lip seal<br>■ Intermediate cover<br>■ O-ring<br>■ Bolt cover<br>■ O-ring<br>■ Fastening parts |

* Top section body with special profile for composite waterproofing or for connecting synthetic resin floors with cavity filling

### 2.2.3 Muli-Flex -FR duo and mono

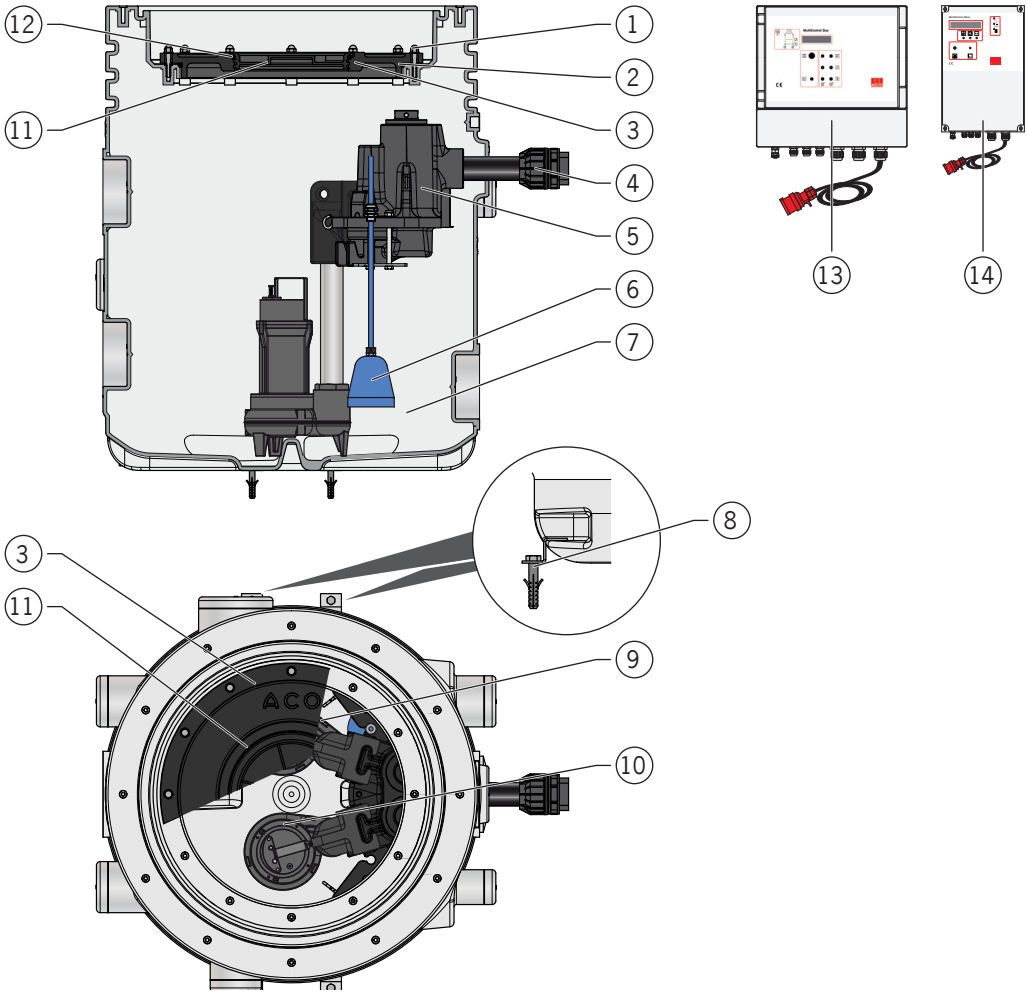



**Figure: Muli-Flex -FR duo**

1 = Attachment parts (stud bolts, washers and cap nuts)
2 = O-ring (sealing for the intermediate cover)
3 = Intermediate cover (Maintenance opening)
4 = Compression fitting DN 50/ 1“(Internal thread.)
5 = Support frame with backflow preventer and above-water coupling
6 = Level sensor for level measurement (required accessories, shown: open pressure bell)
7 = Collection tank
8 = Attachment set for buoyancy-proof anchoring (4 x mounting brackets, wood bolts and dowels)
9 = Submerged pump 1 (necessary accessories)
10 = Submerged pump 2 (necessary accessory for duo version)
11 = Bolt cover
12 = O-ring (bolt cover sealing)
13 = MultiControl duo control unit (necessary accessories for duo version)
14 = MultiControl mono control unit (necessary accessories for mono version)

## 2.3 Operating principle

Based on the example of Muli-Flex -UF duo and mono.

### 2.3.1 Muli-Flex duo

Accumulating waste water from the connected drainage and sanitary appliances flows through the inlet pipe(s) into the collection tank.

A level sensor mounted in the collection tank is connected to the control system. At a defined pressure, the submerged pumps are switched on and off and/or a high water alarm is triggered.

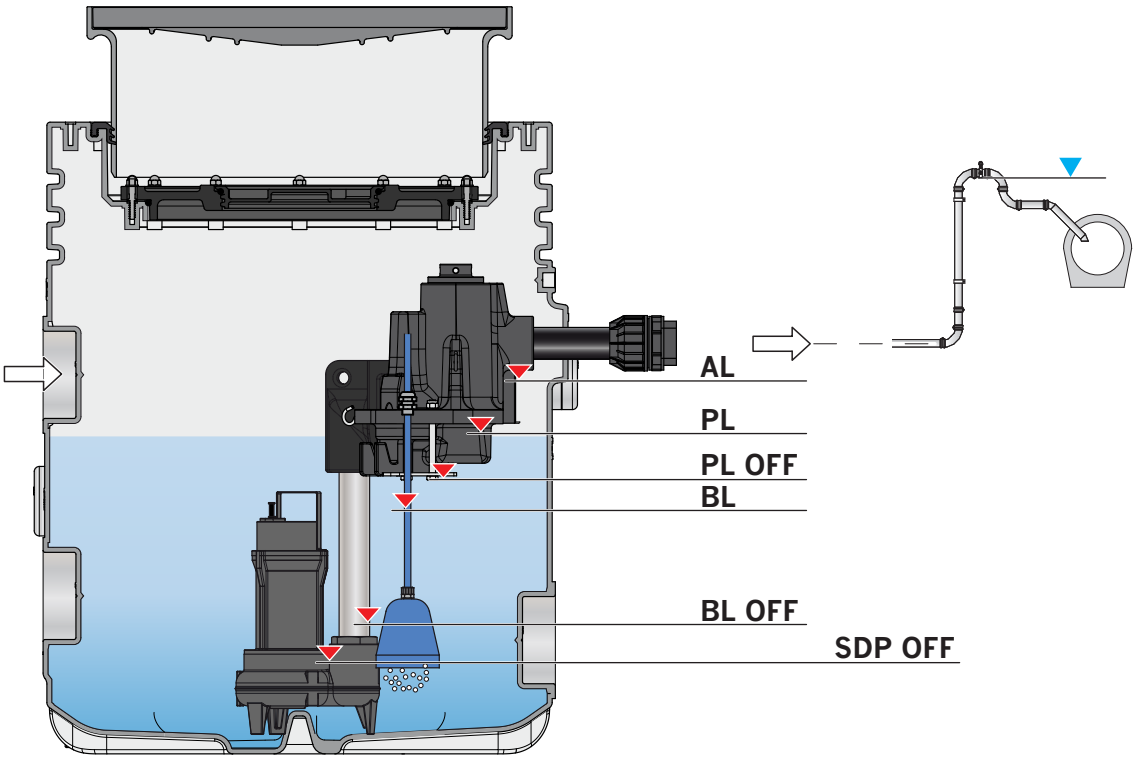


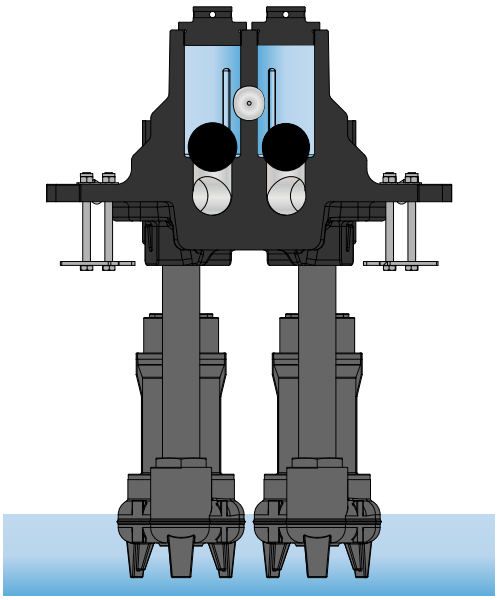

**Figure: Muli-Flex -UF duo with water level levels**

| | | | | | |
|---|---|---|---|---|---|
| AL | = | High water alarm | BL | = | Base load |
| PL | = | Peak load | BL OFF | = | Base load OFF |
| PL OFF | = | Peak load OFF | SDP OFF | = | Stop delay period OFF |

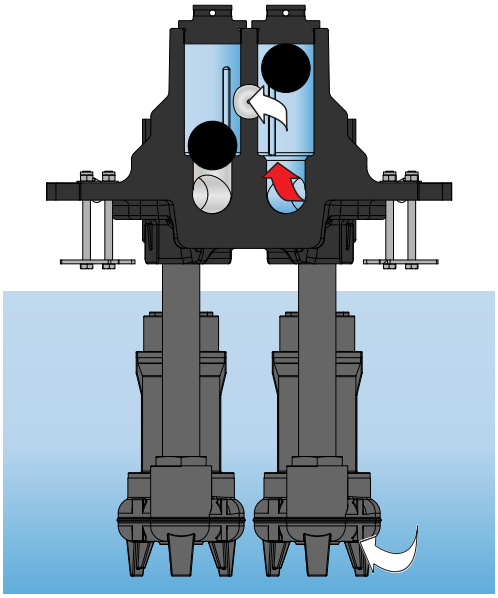
If the water level reaches the base load (BL), then a submerged pump switches on and pumps the wastewater into the pressure pipe and continues above the ▼ "Pipe base, backflow loop" level. From there the wastewater flows via gravity to the drainage sewer.

If the water level drops to the base load OFF level (BL OFF), the pre-set stop delay period (SDP) of the submerged pump is activated and the water level continues to drop to the 'SDP OFF' level.

A backflow preventer (double ball backflow preventer) upstream of the pipe junction prevents backflow from the discharge pipe (balls sit on the valve seat) into the collection tank after the submerged pump(s) has (have) been switched off.



If a submersible pump is in operation, a ball is pressed against the inspection plug and releases the discharge into the pressure line.



The wastewater lifting plant is equipped with two submerged pumps:

- With each new start, alternating operation is executed.
- If one submerged pump fails, then the second submerged pump switches on.
- If the wastewater inflow is higher than the delivery performance of one submerged pump and the water level rises to the peak load (PL) level, then the second submersible pump also switches on.
- If the water level falls to the peak load OFF (PL OFF) level the second submerged pump.

### 2.3.2 Muli-Flex mono

Accumulating waste water from the connected drainage and sanitary appliances flows through the inlet pipe(s) into the collection tank.

A level sensor mounted in the collection tank is connected to the control system. At a defined pressure, the submerged pump is switched on and off and/or a high water alarm is triggered.

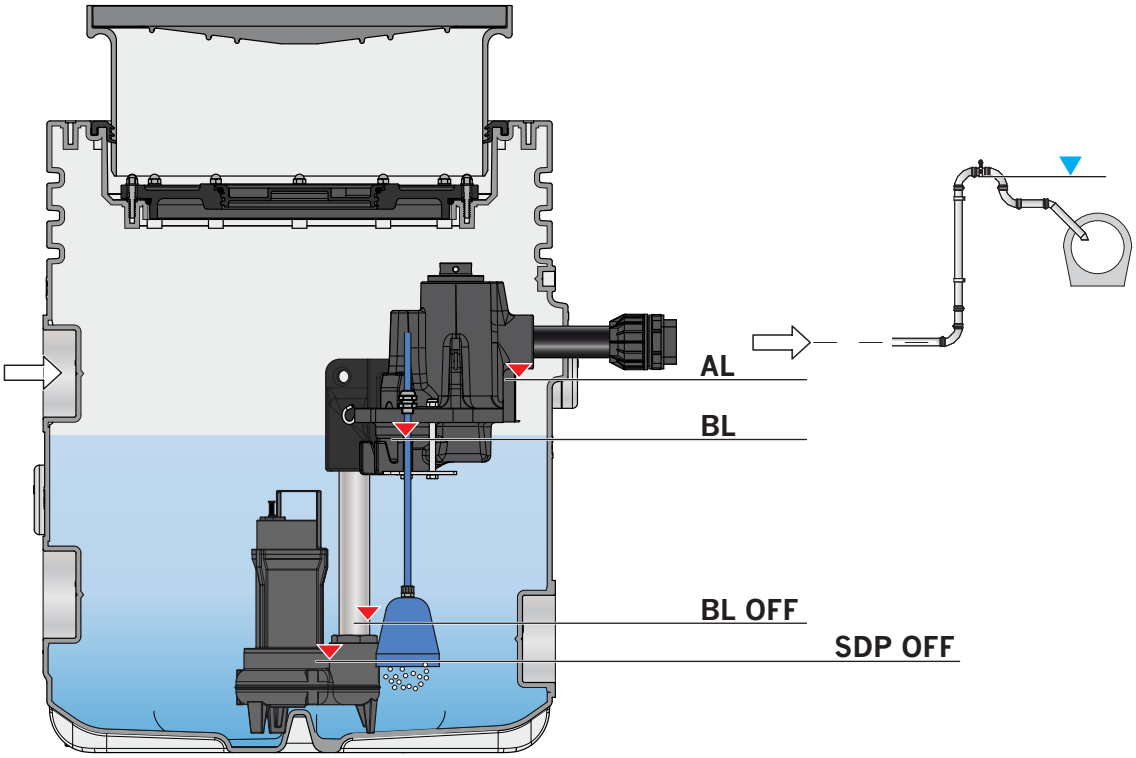


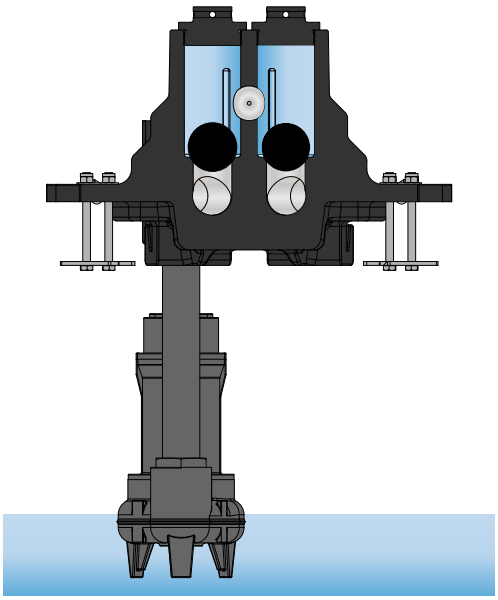

**Figure: Muli-Flex -UF mono water level levels**

| | | | | | |
|---|---|---|---|---|---|
| AL | = | High water alarm | BL OFF | = | Base load OFF |
| BL | = | Base load | SDP OFF | = | Stop delay period OFF |

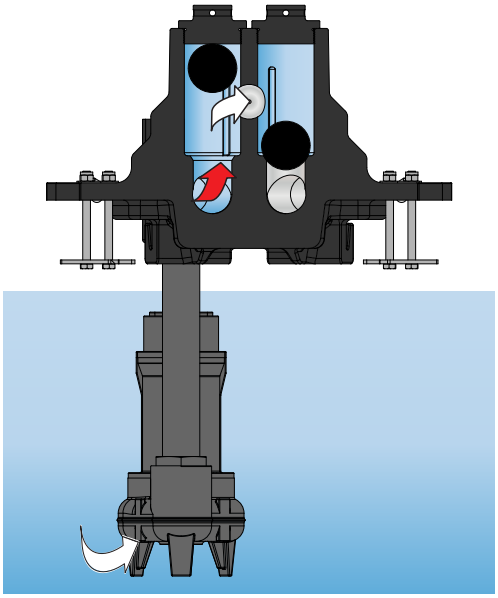
If the water level reaches the base load (BL), then the submerged pump switches on and pumps the wastewater into the pressure pipe and continues above the ▼ "Pipe base, backflow loop" level. From there the wastewater flows by gravity to the drainage sewer.

If the water level drops to the base load OFF level (BL OFF), the pre-set stop delay period (SDP) of the submerged pump is activated and the water level continues to drop to the 'SDP OFF' level.

A backflow preventer (double ball backflow preventer) upstream of the pipe junction prevents backflow from the discharge pipe (balls sit on the valve seat) into the collection tank after the submerged pump has been switched off.

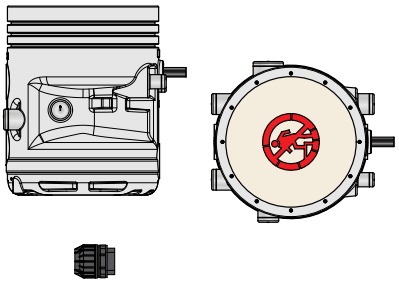
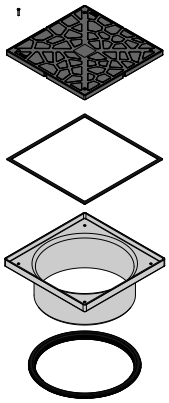
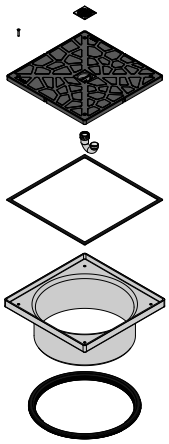


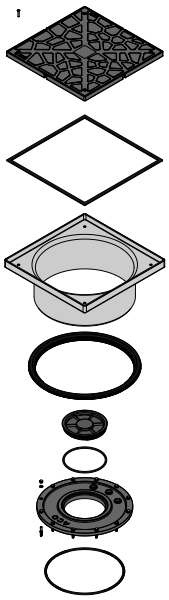
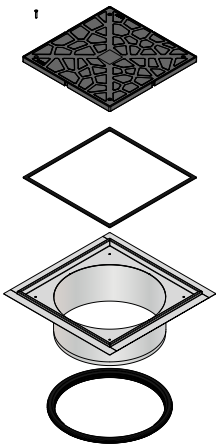
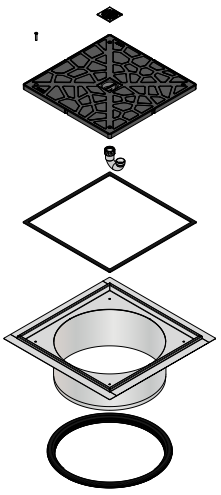
When the submerged pump is in operation, a ball is pressed against the inspection plug and releases the discharge into the pressure line.

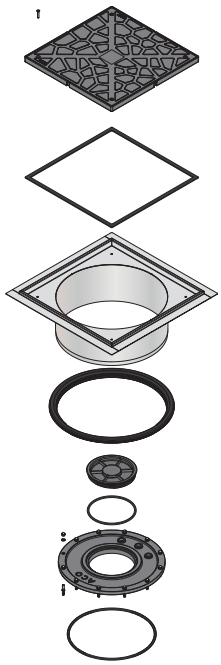
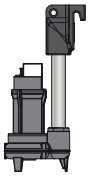
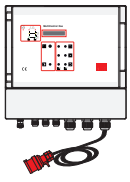
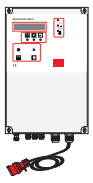


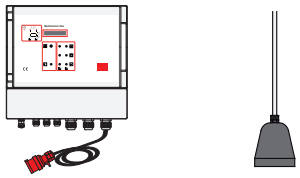
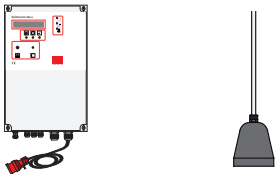
## 2.4 Muli-Flex-UF scope of supply

The following components are necessary for the functionality of the wastewater lifting unit (exception: type plate and operating instructions).

| Components | Weight | Image | duo | mono |
|---|---|---|---|---|
| ■ Complete collection tank:<br>□ Collection tank<br>□ Support frame with backflow preventer and above-water coupling<br>□ Pressure line to the outside designed as a spigot OD 50 mm<br>□ Compression fitting DN 50/R 1½“<br>□ Protective cover used during construction | 50.7 kg |  | (1) | (1) |
| ■ Complete top section (polyethylene material): | | | | |
| □ Top section <u>without</u> drain system for use with non-faecal wastewater<br>**or** | 17.8 kg |  | (1) | (1) |
| □ Top section <u>with</u> drain system for use with non-faecal wastewater<br>**or** | 18.1 kg |  | | |

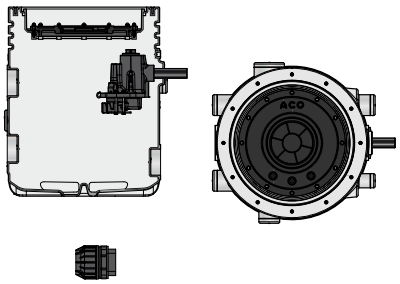
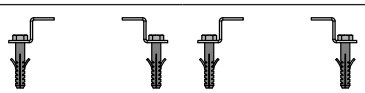
| Components | Weight | Image | duo | mono |
|---|---|---|---|---|
| □ Top section without drain system for use with faecal wastewater | 24.8 kg |  | (1) | (1) |
| ■ Complete top section (polyethylene material with stainless steel top section body): | | | | |
| □ Top section without drain system for use with non-faecal wastewater<br>**or** | 22.8 kg |  | (1) | (1) |
| □ Top section with drain system for use with non-faecal wastewater<br>**or** | 23.1 kg |  | | |

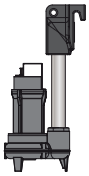
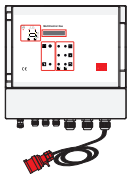
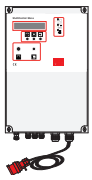
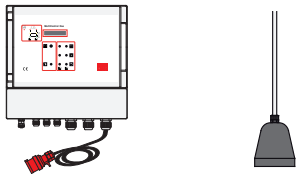
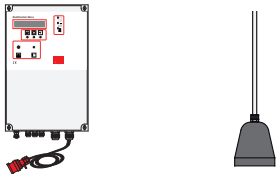
| | Components | Weight | Image | duo | mono |
|---|---|---|---|---|---|
| | □ Top section without drain system for use with faecal wastewater | 29.8 kg |  | (1) | (1) |
| | ■ Submerged pump(s) with mounted pressure line and connection unit (guide hook):<br>□ SAT-V 75/2/50/D **or**<br>□ SAT-V 150/2/50/D **or**<br>□ SITA 200 N-ex-G | <br>17.9 kg<br>22.4 kg<br>37.7 kg |  | (2) | (1) |
| **Components for version "pressure transducer"** | ■ Pressure transducer for level measurement<br>□ with 20 m connection cable<br>□ with 40 m connection cable | <br>2.0 kg<br>3.4 kg |  | (1) | (1) |
| | ■ Control unit for MultiControl Duo (for pressure transducer) | 5.4 kg |  | (1) | |
| | ■ MultiControl mono control unit (for pressure transducer) | 4 kg |  | | (1) |

| | Components | Weight | Image | duo | mono |
|---|---|---|---|---|---|
| Components for the version with a "pressure bell" | ■ Complete duo control unit:<br>□ MultiControl Duo control unit<br>□ Open pressure bell (for level measurement) with 20 m control line | 5.4 kg<br>1 kg |  | (1) | |
| | ■ Complete mono control unit:<br>□ MultiControl mono control unit<br>□ Open pressure bell (for level measurement) with 20 m control line | 4 kg<br>1 kg |  | | (1) |
| | ■ Type plate (adhesive label) | – | | (1) | (1) |
| | ■ Instructions for Use | 0.5 kg | | (1) | (1) |
| | ( ) = Amount | | | | |

## 2.5 Muli-Flex-FR scope of supply

The following components are necessary for the functionality of the wastewater lifting unit (exception: type plate and operating instructions).

| Components | Weight | Image | duo | mono |
|---|---|---|---|---|
| ■ Complete collection tank:<br>□ Collection tank<br>□ Support frame with backflow preventer and above-water coupling<br>□ Pressure line to the outside designed as a spigot OD 50 mm<br>□ O-ring (sealing for intermediate cover)<br>□ Intermediate cover<br>□ Fastening parts (bolts and washers)<br>□ O-ring (bolt cover sealing)<br>□ Bolt cover<br>□ Compression fitting DN 50/R 1½“ | 53.1 kg |  | (1) | (1) |
| ■ Fixing set | 0.5 kg |  | (1) | (1) |
| ■ Sleeve seal DN 100 | 0.4 kg |  | (1) | (1) |

| | Components | Weight | Image | duo | mono |
|---|---|---|---|---|---|
| | ■ Submerged pump(s) with mounted pressure line and connection unit (guide hook):<br>□ SAT-V 75/2/50/D **or**<br>□ SAT-V 150/2/50/D **or**<br>□ SITA 200 N-ex-G | <br>17.9 kg<br>22.4 kg<br>37.7 kg |  | (2) | (1) |
| **Components for version "pressure transducer"** | ■ Pressure transducer for level measurement<br>□ with 20 m connection cable<br>□ with 40 m connection cable | <br>2.0 kg<br>3.4 kg |  | (1) | (1) |
| | ■ MultiControl Duo control unit (for pressure transducer) | 5.4 kg |  | (1) | |
| | ■ MultiControl mono control unit (for pressure transducer) | 4 kg |  | | (1) |
| **Components for the version with a "pressure bell"** | ■ Complete duo control unit:<br>□ MultiControl Duo control unit<br>□ Open pressure bell (for level measurement) with 20 m control line | <br>5.4 kg<br>1 kg |  | (1) | |
| | ■ Complete mono control unit:<br>□ MultiControl mono control unit<br>□ Open pressure bell (for level measurement) with 20 m control line | <br>4 kg<br>1 kg |  | | (1) |
| | ■ Type plate (adhesive label) | – | | (1) | (1) |
| | ■ Instructions for Use | 0.5 kg | | (1) | (1) |
| | ( ) = Amount | | | | |

## 2.6 Type plate

The type plate (adhesive label) is attached to the top section (Muli-Flex -UF) or on the collection tank (Muli-Flex -FR). The following data must be copied from there for information and made available in the event of any enquiries:

- Product type designation
- Year of construction
- Article number
- Manufacturer's address
- Serial number

# 2.7 Suggested installations

## 2.7.1 Muli-Flex -UF

### 2.7.1.1 Suggestion 1:


**Figure: Muli-Flex -UF duo**

1 = Lip seal
2 = Support frame with backflow preventer and above-water coupling
3 = Inlet pipe
4 = Pressure pipe
5 = Submerged pump 1
6 = Level sensor (here open pressure bell)
7 = Collection tank
8 = Submerged pump 2
9 = Inlet pipe
10 = Concrete sealing ring
11 = Bonding flange
12 = Top section

### 2.7.1.2 Suggestion 2:

**Version:**

- Top section polyethylene material
- Bonding the vapour barrier with an adhesive flange

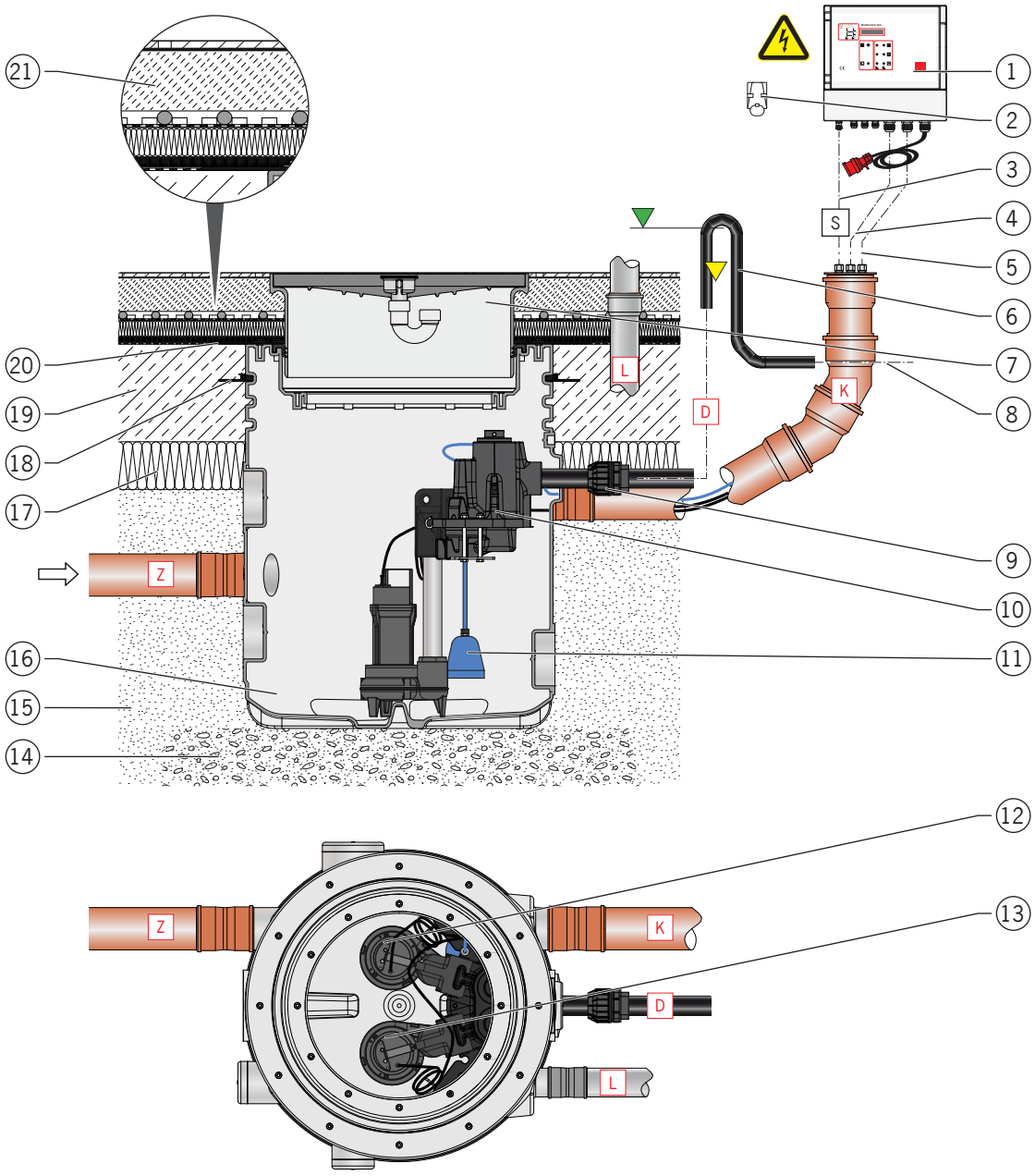



Figure: Muli-Flex -UF duo

| Item | Component/performance | ACO scope of supply | Accessories from ACO | On-site performance |
|---|---|---|---|---|
| 1 | Control unit (MultiControl duo) | X | | |
| 2 | CEE-plug socket 16 A | | | X |
| 3 | Control line (open pressure bell) | X | | |
| 4 | Submerged pump 1 connection cable | X | | |
| 5 | Submerged pump 2 connection cable | X | | |
| 6 | Backflow loop | | | X |
| 7 | Top section ( polyethylene material), here: with drainage system for use with non-faecal wastewater) | X | | |
| 8 | Outlet pipe to sewer | | | X |
| 9 | Compression fitting DN 50 | X | | |
| 10 | Support frame with backflow preventer and above-water coupling | X | | |
| 11 | Open pressure bell or pressure transducer | X | | |
| 12 | Submerged pump 1 with mounted pressure line and connection unit (guide hook) | X | | |
| 13 | Submerged pump 2 with mounted pressure line and connection unit (guide hook) | X | | |
| 14 | Foundation | | | X |
| 15 | Embedding layer | | | X |
| 16 | Collection tank | X | | |
| 17 | Thermal insulation | | | X |
| 18 | Concrete sealing ring | | X | |
| 19 | Floor slab | | | X |
| 20 | Bonding flange | | X | |
| 21 | Possible floor structure above the floor slab (from top to bottom):<br>Tile covering, tile adhesive, screed, underfloor heating, thermal insulation, impact sound insulation and sealing membrane | | | X |
| | ■ Construction phase 1:<br>☐ 1 x suitable pull wire (control unit installation location to collection tank) | | | X |
| S | ■ Construction phase 3:<br>☐ Connection cable 20 m or control line 20 m for level sensor<br>☐ 2 x connection cable 10 m submerged pump (duo version)<br>or<br>☐ 1 x connection cable 10 m submerged pump (mono version) | X<br><br>X | | |
| D | Pressure line at least DN 50 mm up to above backflow level | | | X [1)] |
| K | Cable conduit DN 100 / OD 110 mm (connection between control unit installation location and collection tank) | | | X [2)] |
| L | Vent stack DN 70 / OD 75 mm (vent stack via roof and collection tank) | | | X [3)] |
| Z | Inlet pipe DN 100 / OD 110 mm or. DN 150 / OD 160 mm | | | X [4)] |

| Item | Component/performance | ACO scope of supply | Accessories from ACO | On-site performance |
|---|---|---|---|---|
|  | ■ Muli-Flex duo electrical connection:<br>□ 400 V / 50 Hz / 1.2 kW (submerged pumps type SAT-V 75/2/50/D)<br>□ 400 V / 50 Hz / 2.2 kW (submerged pumps type SAT-V 150/2/50/D)<br>□ 400 V / 50 Hz / 3.0 kW (submerged pumps type SITA 200 N-ex-G)<br>□ General fuse protection: 3 x 16 A (time lag) or according to local conditions. | | | X |
| | ■ Muli-Flex mono electrical connection:<br>□ 400 V / 50 Hz / 0.6 kW (submerged pumps type SAT-V 75/2/50/D)<br>□ 400 V / 50 Hz / 1.1 kW (submerged pumps type SAT-V 150/2/50/D)<br>□ 400 V / 50 Hz / 1.5 kW (submerged pumps type SITA 200 N-ex-G)<br>□ General fuse protection: 3 x 16 A (time lag) or according to local conditions. | | | X |
|  | Back flow level: The highest level to which water can rise within a drainage system. | | | X |
|  | Pipe bottom of backflow loop, part of the pressure line above the backflow level | | | X |

1) Specifications:
- The pressure pipe must be designed for at least 1.5 times the pump pressure.
- Lay the pressure pipe so that it rises continuously and is frost-resistant
- The flow velocity in the pressure pipe must not fall below 0.7 m/s and must not exceed 2.3 m/s
- Never connect other pipes to the pressure pipe
- Air admittance valves are not allowed in the pressure pipe
- Connect the pressure pipe without any tension
- Install pressure line in at least DN 50

2) Specifications:
- Install with a slope of at least 1.5 - 2 % from the outdoor cabinet or plant room to the tank. Do not reduce the cross-section
- Do not use pipe bends with angles larger than 30°
- Use materials* with high resistance

3) Specifications:
- Run up to the roof, do not reduce the cross-section.
- Ventilation valves are not permitted
- Use materials* with high resistance

4) Specifications:
- Wastewater must be fed to the wastewater lifting plant with slope of at least 1.5 – 2 %.
- Use materials* with high resistance

* Materials that are resistant to animal and vegetable fats, cleaning agents and high temperatures. The permissible materials are cast iron (KML, TML), plastic (PP, PE), glass (borosilicate, float glass) and stainless steel (e.g. 1.4404). In addition, seals that are resistant to the substances contained in the wastewater must be used for all pipe connections.

### 2.7.1.3 Suggestion 3:

**Version:**

- Top section made of polyethylene material with top section body made of stainless steel material
- Bonding the vapour barrier with an adhesive flange

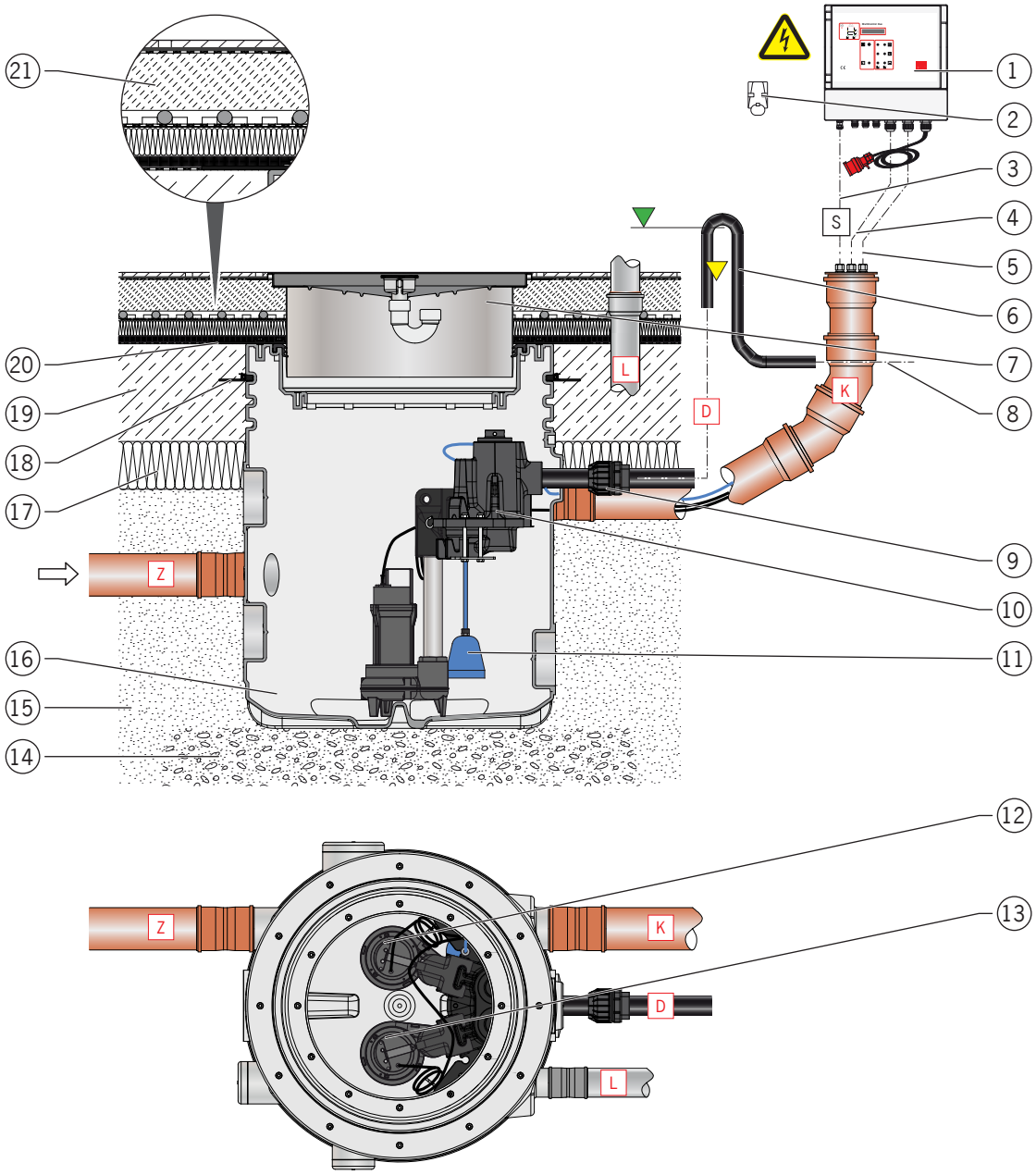



Figure: Muli-Flex -UF duo

| Item | Component/performance | ACO scope of supply | Accessories from ACO | On-site performance |
|---|---|---|---|---|
| 1 | Control unit (MultiControl duo) | X | | |
| 2 | CEE-plug socket 16 A | | | X |
| 3 | Control line (open pressure bell) | X | | |
| 4 | Submerged pump 1 connection cable | X | | |
| 5 | Submerged pump 2 connection cable | X | | |
| 6 | Backflow loop | | | X |
| 7 | Top section (polyethylene material with top section body made of stainless steel), here: with drain system for use with non-faecal wastewater) | X | | |
| 8 | Outlet pipe to sewer | | | X |
| 9 | Compression fitting DN 50 | X | | |
| 10 | Support frame with backflow preventer and above-water coupling | X | | |
| 11 | Open pressure bell or pressure transducer | X | | |
| 12 | Submerged pump 1 with mounted pressure line and connection unit (guide hook) | X | | |
| 13 | Submerged pump 2 with mounted pressure line and connection unit (guide hook) | X | | |
| 14 | Foundation | | | X |
| 15 | Embedding layer | | | X |
| 16 | Collection tank | X | | |
| 17 | Thermal insulation | | | X |
| 18 | Concrete sealing ring | | X | |
| 19 | Floor slab | | | X |
| 20 | Bonding flange | | X | |
| 21 | Possible floor structure above the floor slab (from top to bottom):<br>Tile covering, tile adhesive, bonded waterproofing, screed, underfloor heating, thermal insulation, impact sound insulation and waterproofing membrane | | | X |
| | ■ Construction phase 1:<br>☐ 1 x suitable pull wire (control unit installation location to collection tank) | | | X |
| S | ■ Construction phase 3:<br>☐ Connection cable 20 m or control line 20 m for level sensor<br>☐ 2 x connection cable 10 m submerged pump (duo version)<br>or<br>☐ 1 x connection cable 10 m submerged pump (mono version) | X<br><br><br>X | | |
| D | Pressure line at least DN 50 mm up to above backflow level | | | X [1] |
| K | Cable conduit DN 100 / OD 110 mm (connection between control unit installation location and collection tank) | | | X [2] |
| L | Vent stack DN 70 / OD 75 mm (vent stack via roof and collection tank) | | | X [3] |
| Z | Inlet pipe DN 100 / OD 110 mm or. DN 150 / OD 160 mm | | | X [4] |

| Item | Component/performance | ACO scope of supply | Accessories from ACO | On-site performance |
|---|---|---|---|---|
|  | ■ Muli-Flex duo electrical connection:<br>□ 400 V / 50 Hz / 1.2 kW (submerged pumps type SAT-V 75/2/50/D)<br>□ 400 V / 50 Hz / 2.2 kW (submerged pumps type SAT-V 150/2/50/D)<br>□ 400 V / 50 Hz / 3.0 kW (submerged pumps type SITA 200 N-ex-G)<br>□ General fuse protection: 3 x 16 A (time lag) or according to local conditions. | | | X |
| | ■ Muli-Flex mono electrical connection:<br>□ 400 V / 50 Hz / 0.6 kW (submerged pumps type SAT-V 75/2/50/D)<br>□ 400 V / 50 Hz / 1.1 kW (submerged pumps type SAT-V 150/2/50/D)<br>□ 400 V / 50 Hz / 1.5 kW (submerged pumps type SITA 200 N-ex-G)<br>□ General fuse protection: 3 x 16 A (time lag) or according to local conditions. | | | X |
| ▽ | Back flow level: The highest level to which water can rise within a drainage system. | | | X |
| ▼ | Pipe bottom of backflow loop, part of the pressure line above the backflow level | | | X |

1) Specifications:
- The pressure pipe must be designed for at least 1.5 times the pump pressure.
- Lay the pressure pipe so that it rises continuously and is frost-resistant
- The flow velocity in the pressure pipe must not fall below 0.7 m/s and must not exceed 2.3 m/s
- Never connect other pipes to the pressure pipe
- Air admittance valves are not allowed in the pressure pipe
- Connect the pressure pipe without any tension
- Install pressure line in at least DN 50

2) Specifications:
- Install with a slope of at least 1.5 - 2 % from the outdoor cabinet or plant room to the tank. Do not reduce the cross-section
- Do not use pipe bends with angles larger than 30°
- Use materials* with high resistance

3) Specifications:
- Run up to the roof, do not reduce the cross-section.
- Ventilation valves are not permitted
- Use materials* with high resistance

4) Specifications:
- Wastewater must be fed to the wastewater lifting plant with slope of at least 1.5 – 2 %.
- Use materials* with high resistance

* Materials that are resistant to animal and vegetable fats, cleaning agents and high temperatures. The permissible materials are cast iron (KML, TML), plastic (PP, PE), glass (borosilicate, float glass) and stainless steel (e.g. 1.4404). In addition, seals that are resistant to the substances contained in the wastewater must be used for all pipe connections.

### 2.7.2 Muli-Flex -FR

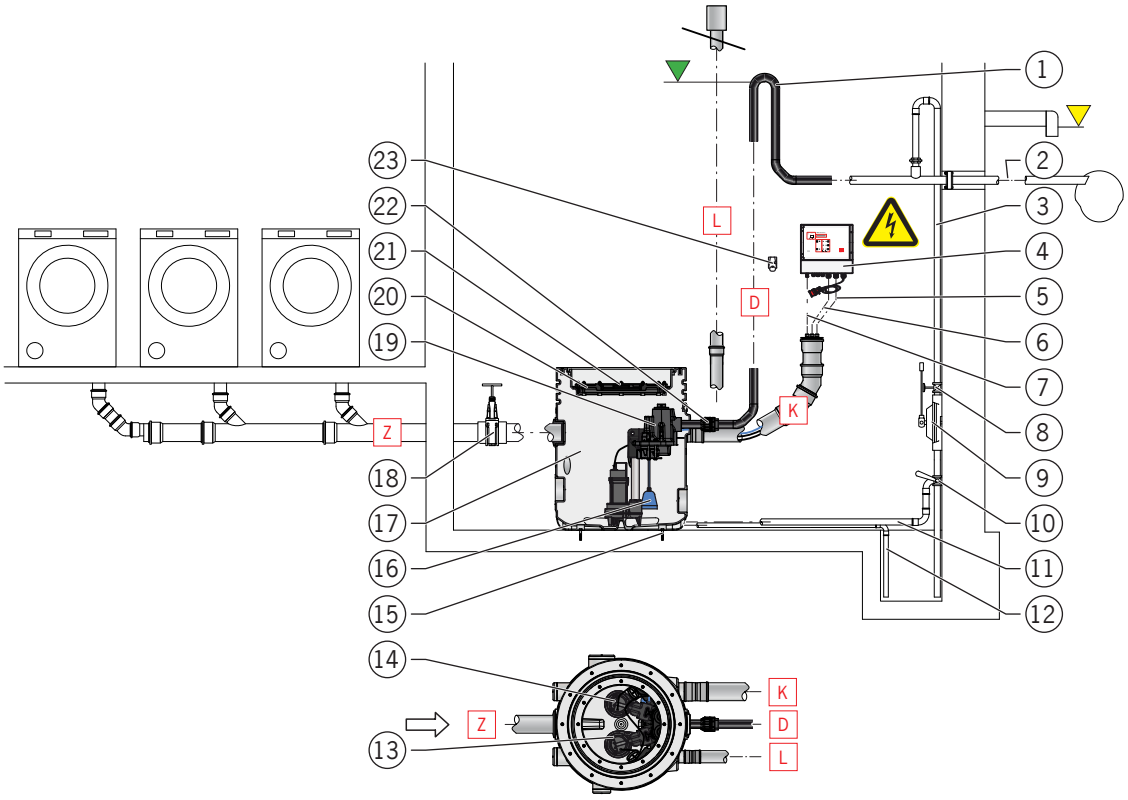



**Figure: Muli-Flex -FR duo**

| Item | Component/performance | ACO scope of supply | Accessories from ACO | On-site performance |
|---|---|---|---|---|
| 1 | Backflow loop | | | X |
| 2 | Outlet pipe to sewer | | | X |
| 3 | Pressure line for emptying pump sump or collection tank | | | X |
| 4 | Control unit (MultiControl duo) | X | | |
| 5 | Submerged pump 1 connection cable | X | | |
| 6 | Submerged pump 2 connection cable | X | | |
| 7 | Control line (open pressure bell) | X | | |
| 8 | Shut-off valve (optional) | | X | |
| 9 | Manual diaphragm pump (optional) | | X | |
| 10 | Three-way valve (optional) | | X | |
| 11 | Collection tank drainage pipe (optional) | | | X |
| 12 | Collection tank bottom outlet (optional, in pump sump) | | | X |
| 13 | Submerged pump 2 with mounted pressure line and connection unit (guide hook) | X | | |
| 14 | Submerged pump 1 with mounted pressure line and connection unit (guide hook) | X | | |
| 15 | Fixing set | X | | |
| 16 | Open pressure bell or pressure transducer | X | | |
| 17 | Collection tank | X | | |

| Item | Component/performance | ACO scope of supply | Accessories from ACO | On-site performance |
|---|---|---|---|---|
| 18 | Gate valve (optional) | | X | |
| 19 | Support frame with backflow preventer and above-water coupling | X | | |
| 20 | Intermediate cover (Maintenance opening) | X | | |
| 21 | Bolt cover | X | | |
| 22 | Compression fitting DN 50 | X | | |
| 23 | CEE-plug socket 16 A | | | X |
| D | Pressure line at least DN 50 mm up to above backflow level | | | X [1)] |
| K | Cable conduit DN 100 / OD 110 mm (connection between control unit installation location and collection tank) | | | X [2)] |
| L | Vent stack DN 70 / OD 75 mm (vent stack via roof and collection tank) | | | X [3)] |
| Z | Inlet pipe DN 100 / OD 110 mm or. DN 150 / OD 160 mm | | | X [4)] |
| ⚠ | ■ Muli-Flex duo electrical connection:<br>□ 400 V / 50 Hz / 1.2 kW (submerged pumps type SAT-V 75/2/50/D)<br>□ 400 V / 50 Hz / 2.2 kW (submerged pumps type SAT-V 150/2/50/D)<br>□ 400 V / 50 Hz / 3.0 kW (submerged pumps type SITA 200 N-ex-G)<br>□ General fuse protection: 3 x 16 A (time lag) or according to local conditions. | | | X |
| ⚠ | ■ Muli-Flex mono electrical connection:<br>□ 400 V / 50 Hz / 0.6 kW (submerged pumps type SAT-V 75/2/50/D)<br>□ 400 V / 50 Hz / 1.1 kW (submerged pumps type SAT-V 150/2/50/D)<br>□ 400 V / 50 Hz / 1.5 kW (submerged pumps type SITA 200 N-ex-G)<br>□ General fuse protection: 3 x 16 A (time lag) or according to local conditions. | | | X |
| ▽ | Back flow level: The highest level to which water can rise within a drainage system. | | | X |
| ▼ | Pipe bottom of backflow loop, part of the pressure line above the backflow level | | | X |

1) Specifications:

- The pressure pipe must be designed for at least 1.5 times the pump pressure.
- Lay the pressure pipe so that it rises continuously and is frost-resistant
- The flow velocity in the pressure pipe must not fall below 0.7 m/s and must not exceed 2.3 m/s
- Never connect other pipes to the pressure pipe
- Air admittance valves are not allowed in the pressure pipe
- Connect the pressure pipe without any tension
- Install pressure line in at least DN 50

2) Specifications:

- Install with a slope of at least 1.5 - 2 % from the installation location of the control unit to the tank. Do not reduce the cross-section
- Do not use pipe bends with angles larger than 30°
- Use materials* with high resistance

| Item | Component/performance | ACO scope of supply | Accessories from ACO | On-site performance |
|---|---|---|---|---|
| | 3) Specifications:<br>■ Run up to the roof, do not reduce the cross-section.<br>■ Ventilation valves are not permitted<br>■ Use materials* with high resistance<br>4) Specifications:<br>■ Wastewater must be fed to the wastewater lifting plant with a gradient of at least 1.5 – 2 %.<br>■ Use materials* with high resistance<br>* Materials that are resistant to animal and vegetable fats, cleaning agents and high temperatures. The permissible materials are cast iron (KML, TML), plastic (PP, PE), glass (borosilicate, float glass) and stainless steel (e.g. 1.4404). In addition, seals that are resistant to the substances contained in the wastewater must be used for all pipe connections. | | | |

# 2.8 Connections on the collecting tank

## 2.8.1 Muli-Flex -UF

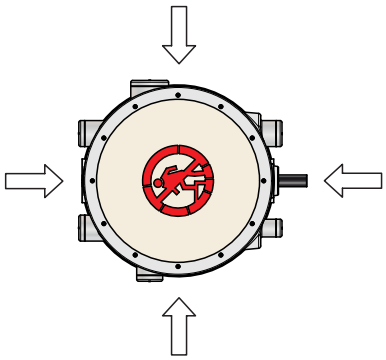
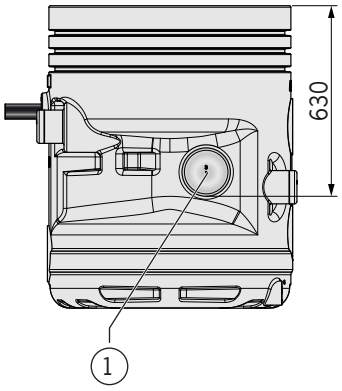
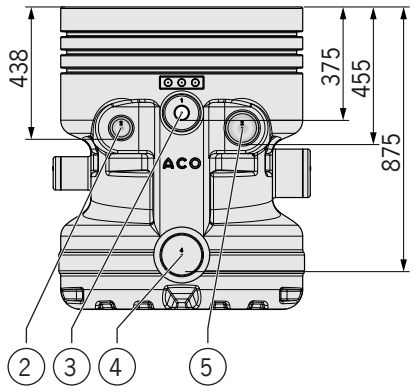
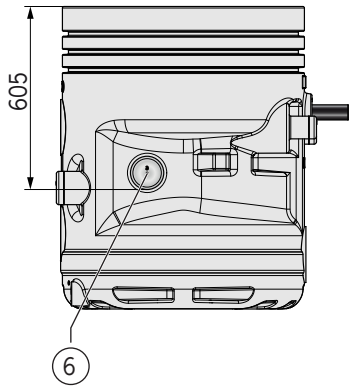
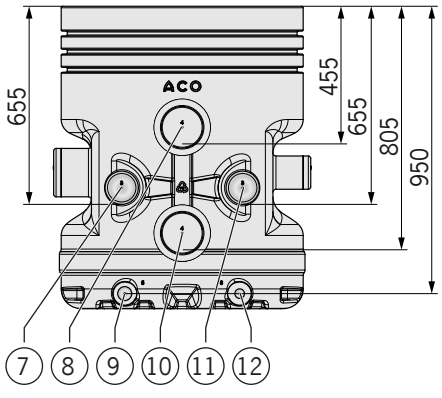


Figure: Muli-Flex -UF top view

**IMPORTANT**

- All connections are closed and must be opened if necessary (exception: item. 3_pressure connection).
- Dimensions refer to the pipe bottom of the possible connection pipe.

| Side view | Connections | | | | | Image with dimension |
|---|---|---|---|---|---|---|
| | Item | Shape / possible connection | DN | OD [mm] | R | |
| ⇩ | 1 | Socket/ Inlet pipe | 150 | 160 | |  |

| Side view | Connections | | | | | Image with dimension |
|---|---|---|---|---|---|---|
| | Item | Shape / possible connection | DN | OD [mm] | R | |
| ⇨ | 2 | Socket/ Vent stack | 70 | 75 | |   |
| | 3 | Socket/ Pressure line | 40 | 50 | | |
| | 4 | Sleeve/ Inlet pipe | 100 | 110 | | |
| | 5 | Socket/ Cable conduit | 100 | 110 | | |
| ⇧ | 6 | Socket/ Inlet pipe | 100 | 110 | |   |
| ⇨ | 7 | Socket/ Inlet pipe | 100 | 110 | |   |
| | 8 | Sleeve/ Inlet pipe | 100 | 110 | | |
| | 9 | Internal thread/ Drain line | | | 1½ | |
| | 10 | Sleeve/ Inlet pipe | 100 | 110 | | |
| | 11 | Socket/ Inlet pipe | 100 | 110 | | |
| | 12 | Internal thread/ bottom drain pipe | | | 1 | |

## 2.8.2 Muli-Flex -FR

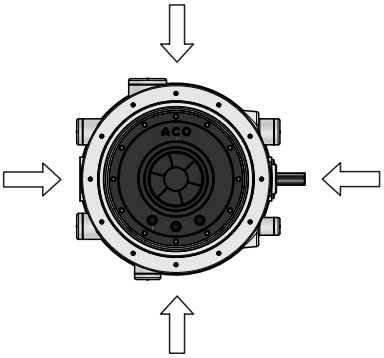
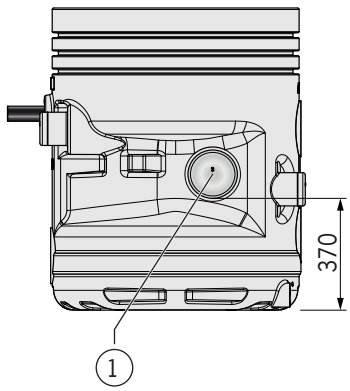
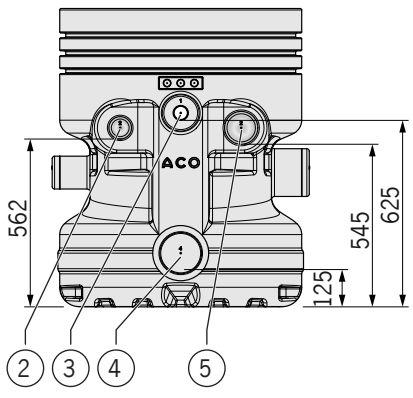
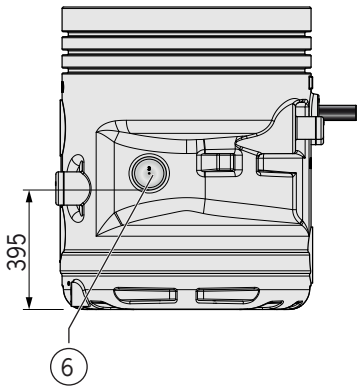
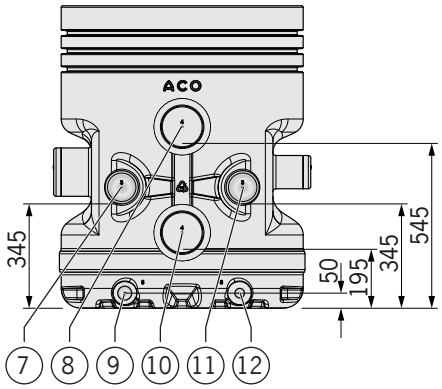


Figure: Muli-Flex -FR top view

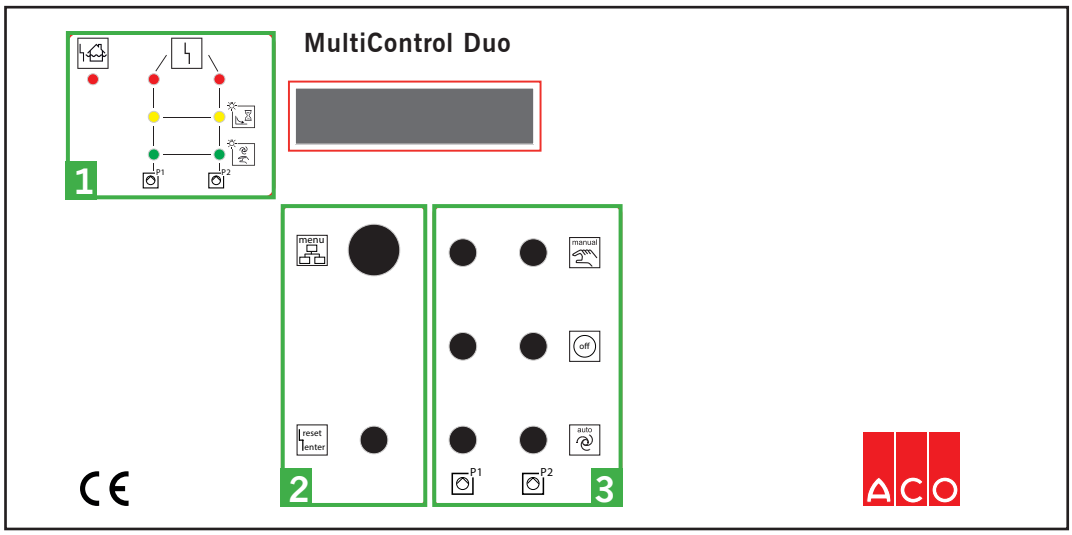
**IMPORTANT**

- All connections are closed and must be opened if necessary (exception: item. 3_pressure connection).
- Dimensions refer to the pipe bottom of the possible connection pipe.

| Side view | Connections | | | | | Image with dimension |
|---|---|---|---|---|---|---|
| | Item | Shape / possible connection | DN | OD [mm] | R | |
| ⇩ | 1 | Socket/ Inlet pipe | 150 | 160 | |   |
| ⇨ | 2 | Socket/ Vent stack | 70 | 75 | |   |
| | 3 | Socket/ Pressure line | 40 | 50 | | |
| | 4 | Sleeve/ Inlet pipe | 100 | 110 | | |
| | 5 | Socket/ Cable conduit | 100 | 110 | | |

| Side view | Connections | | | | | Image with dimension |
|---|---|---|---|---|---|---|
| | Item | Shape / possible connection | DN | OD [mm] | R | |
| ⇧ | 6 | Socket/ Inlet pipe | 100 | 110 | |   |
| ⇨ | 7 | Socket/ Inlet pipe | 100 | 110 | |   |
| | 8 | Sleeve/ Inlet pipe | 100 | 110 | | |
| | 9 | Internal thread/ Drain line | | | 1½ | |
| | 10 | Sleeve/ Inlet pipe | 100 | 110 | | |
| | 11 | Socket/ Inlet pipe | 100 | 110 | | |
| | 12 | Internal thread/ bottom drain pipe | | | 1 | |

## 2.9 MultiControl Duo control unit




### 2.9.1 Operating elements and displays

| Field | LED displays / symbols and meanings | | |
|---|---|---|---|
| 1 | | LED lights up: | High water alarm in the collection tank |
| | | LED lights up: | Group alarm, e.g. when the power consumption is too high, ... |
| | | LED lights up:<br>LED flashes: | Pump(s) in operation<br>Pump(s) in operation via the stop delay function |
| | | LED lights up:<br>LED flashes regularly:<br>LED flashes irregularly: | Automatic mode is active<br>Manual operation is active<br>Manual operation was deactivated after 2 minutes |
| 2 | menu | Activates the rotary switch “Menu” to select menu items | |
| | reset enter | Confirms setting (Menu): Briefly press the "reset/enter" key<br>Acknowledge malfunction: Press and hold the "reset/enter" key for approx. 2 seconds. | |
| 3 | manual | Switches on manual operation for pump P1 and P2 regardless of the level measurement: Press button briefly<br>Manual operation is switched off automatically after 2 minutes | |
| | off | Switches off manual or automatic operation for pump P1 and P2 regardless of the level measurement: Press the button briefly | |
| | auto | Switches on automatic mode for pump P1 and P2: Press key briefly | |

## 2.9.2 Settings in the menu

Settings in several menu items can only be made in Service mode and should be agreed with ACO Service.

If no entry is made within 20 seconds the display automatically switches back to the basic setting.

Operating hours and pump cycles can be displayed but not changed.

### Amending the settings

➔ Select menu items (upper line): Press the rotary switch "Display".

➔ Amend settings (bottom line):

- Press the reset/enter "reset/enter" button briefly. The most recently saved setting begins to flash.
- Turn the menu "Menu" rotary switch (turn fast for a general setting, turn slowly for fine setting).

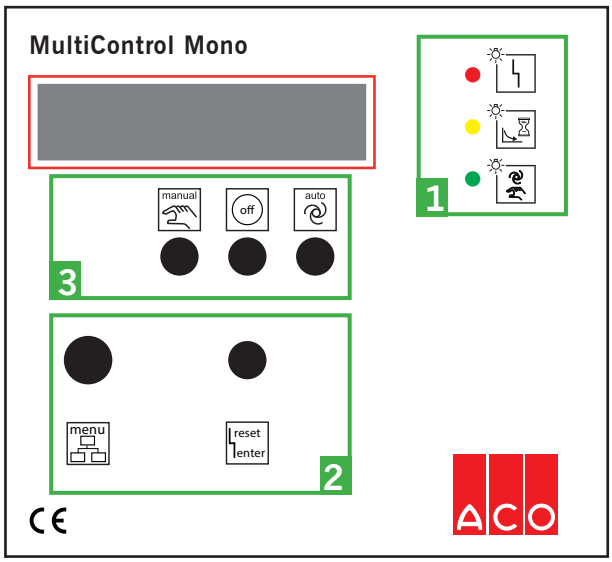
➔ Confirm setting: Briefly press the reset/enter "reset/enter" button

### Explanation of the menu items

| Menu items (top line) | Settings (bottom line) | Explanation |
|---|---|---|
| Base load ON | 0 – 200 cm | Activation point for first pump 1 |
| Base load OFF | 0 – 200 cm | Switch-off point for first pump 1 |
| Peak load ON | 0 – 200 cm | Activation point for additional pump |
| Peak load OFF | 0 – 200 cm | Deactivation point for additional pump |
| High water level | 0 – 200 cm | High water level alarm in the event of exceedance |
| Running time max | 0 – 60 minutes | Value '0' deactivates the function. if the pump is operated without interruption, it is automatically shut down after the set running period.<br>The pump does not start up again until the defect has been acknowledged. |
| Run time altern. | deactivated<br>1 – 60 minutes | After the set time in base load operation a pump change takes place. After three changes without interruption the "High water level alarm" is also triggered and the "Running time change" message appears in the display. |
| Start delay | 0 – 900 s | After a mains failure (staggered start) the pumps do not start until the set time has expired. The remaining time is shown in the display. |
| Stop delay | 0 – 180 s | Stop delay period of the pump after the switch-off point has been reached. |

| Menu items (top line) | Settings (bottom line) | Explanation |
|---|---|---|
| Max. current – 1 | 0.3 – 12.0 A | Pump P1 is deactivated automatically if the power consumption is exceeded. The message 'excess current' appears in the display field. The pump is not released again until the 'Acknowledge' button is pressed. |
| Max. current – 2 | 0.3 – 12.0 A | Pump P1 is deactivated automatically if the power consumption is exceeded. The message 'excess current' appears in the display field. The pump is not released again until the 'Acknowledge' button is pressed. |
| force activation | deactivated<br>1 – 10 s | Duration of the automatic activation of the pumps of the pumps have not been operated for more than 24 hours. |
| Acoustic alarm | deactivated<br>activated | Activated: An alarm sounds in the event of a malfunction. |
| Interm. alarm | deactivated<br>activated | Activated: Malfunction message relay will be cycled. |
| Pump alternation | deactivated<br>activated | Activated: Pump change with every restart. |
| P1: therm fault 1 | deactivated,<br>activated | Deactivated: No bimetallic contact (warning contact) is connected to terminals 31,32 (pump 1). |
| P2: therm fault 1 | deactivated,<br>activated | Deactivated: No bimetallic contact (warning contact) is connected to terminals 38,39 (pump 2). |
| rot. field fault | deactivated<br>activated | Activated: If the phase sequence is incorrect or L2 or L3 are missing, the group alarm message is triggered and the pumps cannot be put into operation. |
| ATEX mode | deactivated<br>activated | Activated: If the level sensing does not determine any liquid, the pumps cannot be started. This applies to the manual function, and to the Test Pump run 24h and the telecontrol systems. |
| Service-Mode | activated<br>deactivated | Activated: all settings can be amended.<br>Deactivated: Settings are shown, but cannot be amended. |
| Level control | Internal converter<br>Float switch<br>4 – 20 mA interface | Internal transducer: level detection via pneumatic pressure and air bubble injection<br>Float switch: Level detection via float switch<br>4 - 20 mA interface: Level detection via external sensor (4 - 20 mA) |
| 20mA => level | 0 – 1,000 cm | The measurement range of the external level probe can be set. |
| Language | German<br>English<br>... | Selection of the language for the menu. |

# 2.10 MultiControl Mono control




## 2.10.1 Operating elements and displays

| Field | LED displays / symbols and meanings | | |
|---|---|---|---|
| 1 | ϟ | LED lights up: | Collective malfunction, e.g. high water alarm in the collection tank, excessive power consumption |
| | | LED lights up: | Pump in operation |
| | | LED flashes: | Pump in operation via the stop delay function |
| | | LED lights up: | Automatic mode is active |
| | | LED flashes regularly: | Manual operation is active |
| | | LED flashes irregularly: | Manual operation was deactivated after 2 minutes |
| 2 | menu | Activates the rotary switch “Menu” to select menu items | |
| | reset enter | Confirms setting (Menu): Briefly press the "reset/enter" key<br>Acknowledge malfunction: Press and hold the "reset/enter" key for approx. 2 seconds. | |
| 3 | manual | Switches on manual operation for pump regardless of the level measurement:<br>Press button briefly<br>Manual operation is switched off automatically after 2 minutes | |
| | off | Switches off manual or automatic operation for pump regardless of the level measurement:<br>Press the button briefly | |
| | auto | Switches on automatic mode for pump: Press button briefly | |

## 2.10.2 Settings in the menu

Settings in several menu items can only be made in Service mode and should be agreed with ACO Service.

If no entry is made within 20 seconds the display automatically switches back to the basic setting.

Operating hours and pump cycles can be displayed but not changed.

### Amending the settings

➔ Select menu items (upper line): Press the rotary switch "Display".

➔ Amend settings (bottom line):

- Press the reset/enter "reset/enter" button briefly. The most recently saved setting begins to flash.
- Turn the menu "Menu" rotary switch (turn fast for a general setting, turn slowly for fine setting).

➔ Confirm setting: Briefly press the reset/enter "reset/enter" button

### Explanation of the menu items

| Menu items (top line) | Settings (bottom line) | Explanation |
|---|---|---|
| Last faults | Delete value | The last error remains saved with non-resetting on voltage failure and can be deleted using the acknowledge button. |
| Base load ON | 0 – 200 cm | The value determines the switching on point of the pump. |
| Base load OFF | 0 – 200 cm | The value determines the switching off point of the pump. |
| High water level | 0 – 200 cm | If the set value is exceeded, then the group alarm relay switches on and the high water level relay switches on. |
| Run time max | 0 – 60 minutes | The value zero deactivates this function. If a value of 1 – 60 min. is set, the pump is switched off if it runs for longer than the set value without interruption. |
| Stop delay | 0 – 180 s | After falling below the switching off point, the level switching pump continues operating until the set time has expired. |
| max. current | 0.3 – 16.0 A | If the pump exceeds the set current consumption for a certain time it is switched off. “Excess current” message appears. The pump is not re-released until the Acknowledge button is pressed. |
| force activation | deactivated<br>1 – 10 s | Is activated = when the pump is not requested for a duration of 24 hours, then it operates automatically for the duration of the set time. |
| Acoustic alarm | deactivated<br>activated | Is activated = In the event of a fault, the internal piezo buzzer sounds. |
| Interm. alarm | deactivated<br>activated | Is activated = The alarm relay is clocked. A more cost-effective continuous light can be used instead of a flashing light. |

| Menu items (top line) | Settings (bottom line) | Explanation |
|---|---|---|
| therm. fault 1 | deactivated<br>activated | Is switched off = no bimetal contact (alarm contact) is connected to terminal 20.21. |
| rot. field fault | deactivated<br>activated | Is activated = In the event of incorrect phase sequence or the lack of L2 or L3, an alarm is triggered and the pumps cannot be started up. |
| Light automatic OFF | deactivated<br>activated | If no more settings are made on the device, then the background illumination switches off automatically after 2 minutes. |
| ATEX mode | deactivated<br>activated | Is activated = If the level sensing does not determine any liquid, the pump cannot be started. This applies to the manual function, as well as for 24h switch on and the telecontrol systems. |
| Service-Mode | deactivated<br>activated | Is activated = all settings can be amended<br>Is switched off = settings are shown, but cannot be amended. |
| Level control | Internal converter<br>Float switch<br>4 – 20 mA interface | Level sensing via pneumatic pressure or air bubble injection<br>Level sensing via float switch<br>Level sensing via external sensor (4 – 20 mA) |
| 20mA => level | 0 – 1,000 cm | The measurement range of the external level probe can be set. |
| Language | German<br>English<br>... | Selection of the language for the menu. |

# 3 Installation

The specifications of EN 12056-4 and the regional directives must be complied with during installation. Following installation, start-up must be carried out by a qualified person, according to the requirements in these instructions for use, Chapter 4.1 “Commissioning”.

## 3.1 Muli-Flex -UF

### 3.1.1 Specifications for foundations / installation / structural analysis

**IMPORTANT** Explicit reference is made to compliance with any additional applicable standards and regulations. The following information does not claim to be complete and must be checked by the customer for each individual project.

#### 3.1.1.1 Foundation

- Excavation according to local Standards
- 2 m (in diameter) Excavation pit / shoring in accordance with local Standards
- the existing soil:
  - Soil group G1 to G4 according to ATV-DVWK-A 127
  - Degree of compaction $D_{Pr} \geq 95\,\%$
- Foundation:
  - Soil group G1 according to ATV-DVWK-A 127 or soil group GE, GW, Gi, SE, SW or SI according to DIN 18196
  - Degree of compaction $D_{Pr} \geq 97\,\%$
  - Layer thickness ≥ 30 cm
  - Dimension: ≥ 1.0 m around the collection tank, if necessary replace / improve the soil.
  - For foundation components, do not under any circumstances install in the area of the 45 ° load spread angle

#### 3.1.1.2 Installation

- Filling the working area / embedding:
  - Soil group G1 according to ATV-DVWK-A 127 or soil group GE, GW, Gi, SE, SW or SI according to DIN 18196
  - Degree of compaction $D_{Pr} \geq 97\,\%$
  - Installation in layers with ≤ 30 cm layers
  - Maximum grain size 16 mm

- Care must be taken to ensure that the recessed parts of the installation (floor, ribs, corrugations, etc.) are carefully underfilled.
- If on-site requirements, applicable standards or guidelines result in greater requirements for the production of the embedment then these must be complied with.
- When using the top sections for bonded waterproofing (Applies to Germany. Beyond that, the specifications of the respective country must be checked):
  - Observe specifications according to local Standards.
  - Observe German ZDB Code of Practice "Bonded Waterproofing".
- The building materials used for the installation or in contact with the system must not have any negative impact on the material or cause any deformation or damage; the same applies to the installation methods selected.
- The frame or lid of the top section should never be higher than the final covering of the floor structure, instead the covering should be slightly higher and tightened to the edge of the frame.
- When creating the floor construction above the floor slab, the top section must no longer be moved.
- The top system must not be subjected to loads until the floor has been completely built up and the materials being used have set sufficiently.

#### 3.1.1.3 Structural analysis

- The introduction of additional loads (other structures, additional buildings or similar) is not permitted, the load transfer is to be carried out below the foundation level of the installation, minimum clearances are to be maintained or suitable measures are to be taken on site.
- Depending on the requirements, the plant can be combined with an attachment section including a cover. The combination with other systems is not permitted.
- The maximum groundwater level of 2 m above the lower edge of the collection tank must not be exceeded.
- The maximum installation depth of 1,200 mm (distance from the top edge of the top section to the bottom edge of the collection tank) must not be exceeded.

## 3.1.2 Preliminary work

### 3.1.2.1 Preparing connections

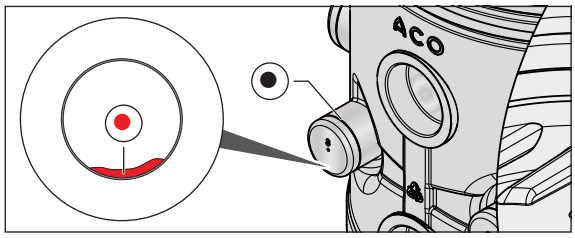
Possible connections on the collection tank, Chap. 2.8.1 "Muli-Flex -UF".
Numbers in brackets "( )", see item numbers of the connections, Chap. 2.8.1 "Muli-Flex -UF".

**IMPORTANT**

- Do not open connections that are not required.
- It is essential to open connection port DN 70 (2) for the vent stack and connection socket DN 100 (5) for the cable conduit.

**Open sockets**

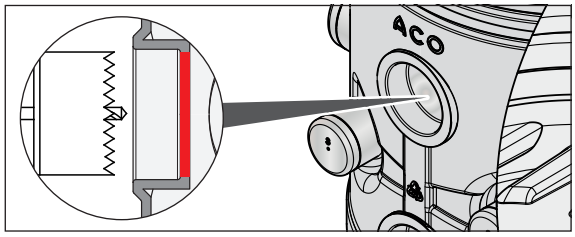
→ Cut open the closed connection port along the notch (●) and deburr the cut edge.
→ Remove possible material deposits (●) in base area of the connection ports.




**Open sleeve**

→ Drill out closed sleeve base ▬ with a hole saw, diameter:

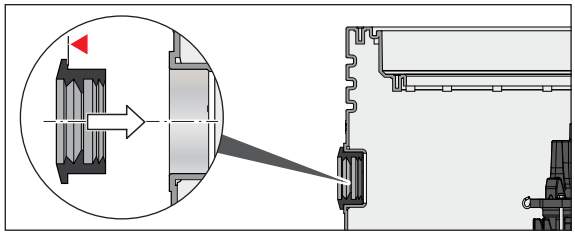
| Sleeve | | Diameter hole saw [mm] | |
|---|---|---|---|
| Item ( ) | DN or R | Mini-mum | max |
| (4) | 100 | 105 | 130 |
| (8) | 100 | 105 | 130 |
| (10) | 100 | 105 | 130 |
| (9) | 1½ | 30 | 40 |
| (12) | 1 | 20 | 30 |




**Insert the sleeve seal**

A sleeve seal DN 100 is supplied as a loose item on delivery.

→ Insert the sleeve seal ◀ into the sleeve as far as it will go.



### 3.1.2.2 Fitting the sealing flange (optional)

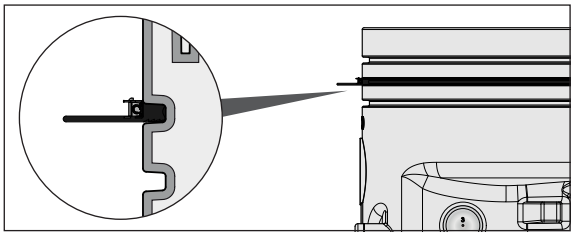
Sealing flange can be obtained from ACO as an optional extra. Figure, weight and order number, Chap. 2.1 "Product features".

The sealing flange is intended for sealing the collection tank in water-impermeable concrete (floor slab) and protects against pressing groundwater up to 0.2 bar (≈ 2.0 m water gauge).

**IMPORTANT** Improper installation can cause water damage:

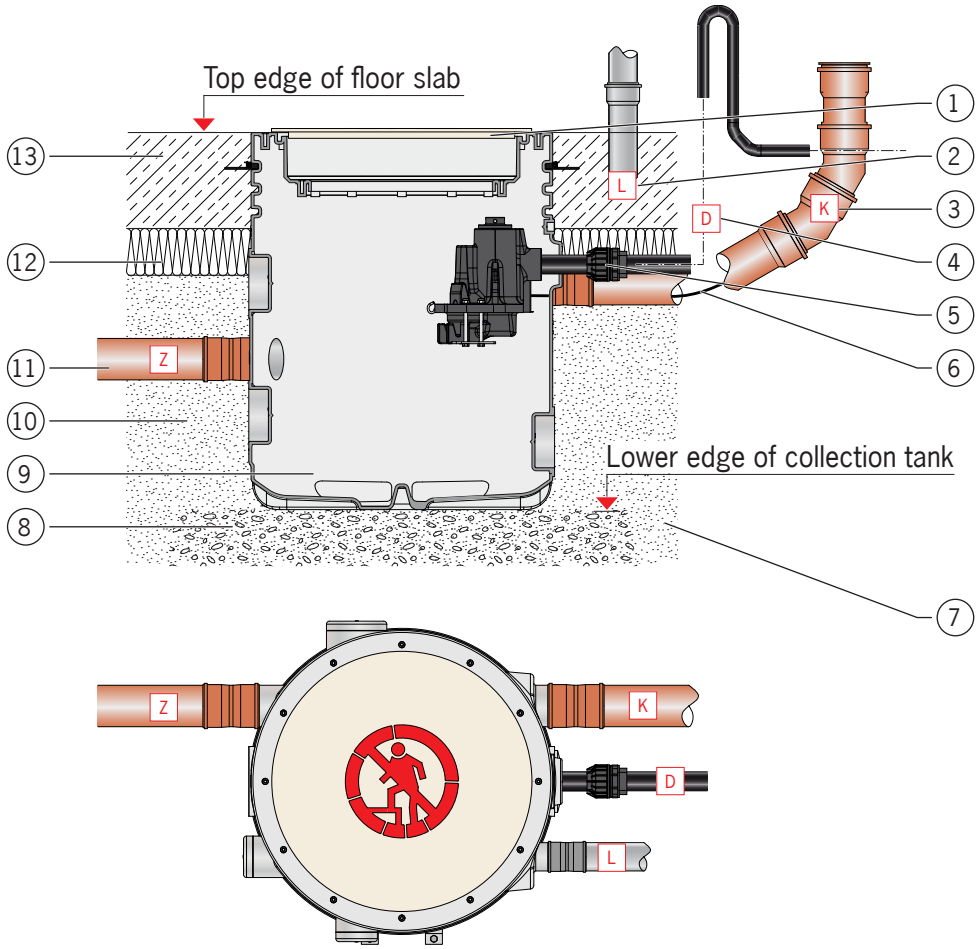
- Concrete layer above and below the sealing flange must be at least 50 mm. According to this requirement, the corresponding groove on the collection tank must be selected.

➔ Mount the sealing flange, assembly instructions "Sealing flange" (enclosed with the sealing flange as delivered).



## 3.1.3 Construction phase 1

### Overview of the work




**IMPORTANT**

- The collection is 1,000 mm high.
- Top edge of floor slab = top edge of collection tank

| Item | Work | Chapter |
|---|---|---|
| 1 | Insert the protective cover used during construction | 3.1.3.3 |
| 2 | Laying and connecting the on-site L vent stack | 3.1.3.5 |
| 3 | Laying and connecting the K cable conduit on site | 3.1.3.6 |
| 4 | Laying and connecting the D on-site pressure line | 3.1.3.7 |
| 5 | Mount compression fitting | 3.1.3.7 |
| 6 | Insert suitable on-site pull wire | 3.1.3.6 |
| 7 | Digging the excavation | 3.1.3.1 |
| 8 | Create foundation | 3.1.3.1 |
| 9 | Insert collection tank | 3.1.3.2 |

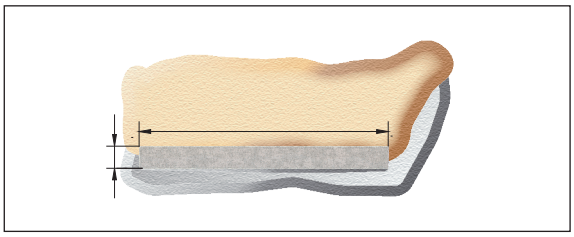
| Item | Work | Chapter |
|---|---|---|
| 10 | Create embedding layer | 3.1.1.2 |
| 11 | Laying and connecting the Z on-site inlet pipe | 3.1.3.4 |
| 12 | Install customer's thermal insulation (optional) | – |
| 13 | Construct on-site floor slab | 3.1.1.2 |
| 14 | Leak test | 3.1.3.8 |

The work should be carried out in the following order.

### 3.1.3.1 Digging the excavation

Requirements, Chap. 3.1.1.1 "Foundation".

➔ Excavate the pit and secure.
➔ Create foundation

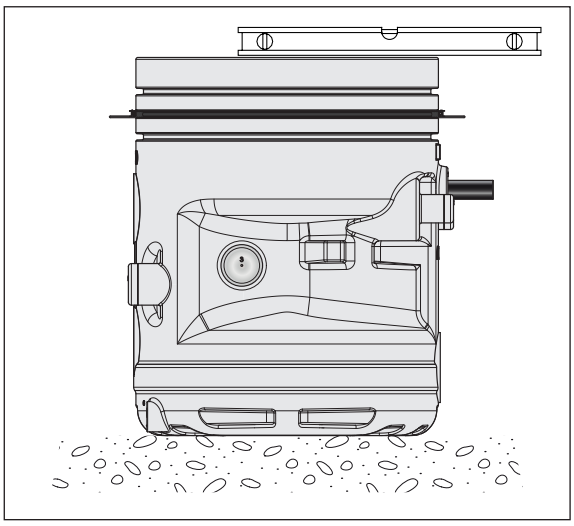


### 3.1.3.2 Insert collection tank

**IMPORTANT**

- The collection tank must be placed in the excavation and aligned in accordance with the desired layout of the inlet (marked at the factory) and the pressure pipe. A marking on the bottom of the excavation pit and on the collection tank makes the work easier.
- During the construction phase (up to installation in the floor slab), the collection tank must be secured against floating if there is a risk of it floating up (e.g. weigh down the collection tank).

➔ Insert the collection tank (weight approx. 50 kg) and align it horizontally.

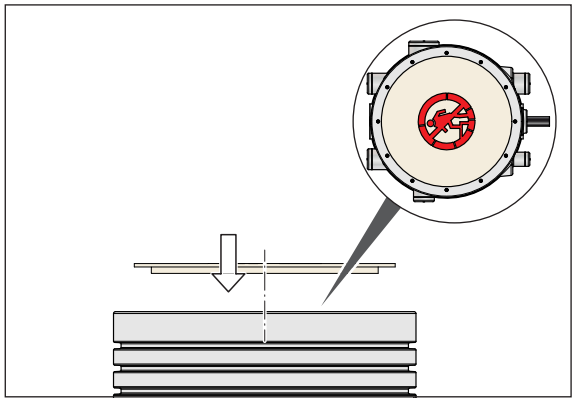


### 3.1.3.3 Insert the protective cover for use during construction

To prevent unnecessary contamination in the collection tank, the collection tank should be covered with the protective cover used during construction.

**IMPORTANT** The protective cover should remain on the collection tank at least until the floor slab has completely set.

➔ Cover the collection tank with a protective cover (if not already done).



### 3.1.3.4 Laying and connecting the inlet pipe(s)

**IMPORTANT** Before the on-site inlet pipe(s) are connected, the excavations must be filled up to this level, Chapter 3.1.1 "Specifications foundation / installation / structural analysis".

Inlet pipe(s) [Z] connects the drainage object to the collection tank.

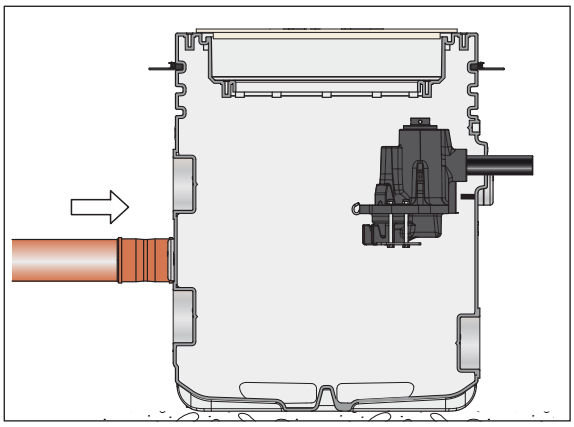
Connections have already been prepared for connecting the supply line(s), chap. 3.1.2.1 "Preparing connections".

Specifications:

- Lay pipes to be frost resistant.
- The cross-section of the inlet pipe must not be reduced in the direction of flow.
- Wastewater is to be routed to the collection tank with a gravity drainage pipe at a gradient of at least 1.5 – 2 %.
- Reverse gradients, and the formation of siphons or pockets are not allowed.
- A gate valve can be installed in the inlet pipe.
- Make flexible pipe joints.
- Choose material that is resistant to the wastewater (e.g. KML, PP, PE, PVC).
- When using a hose connector or a sliding sleeve, the inlet pipe and the connection port in the connector must be at least 10 mm apart.

➔ Connect the on-site inlet pipe(s) to the connection provided on the collection tank, e.g. with a sliding sleeve:

- ☐ Grease the spigot ends of the inlet pipe, the connection port and the lips of the sliding sleeve with an acid-free lubricant.
- ☐ Push the sliding sleeve over the connection port.
- ☐ Push the inlet pipe into the sliding sleeve.



### 3.1.3.5 Laying and connecting the vent stack

**IMPORTANT**

- Any penetration of the floor slab must be made impermeable to water, e.g. using wall collars.

- Before the on-site vent stack is connected, the excavation pit must be backfilled to this height, 📖 Chap. 3.1.1.2 "Installation".

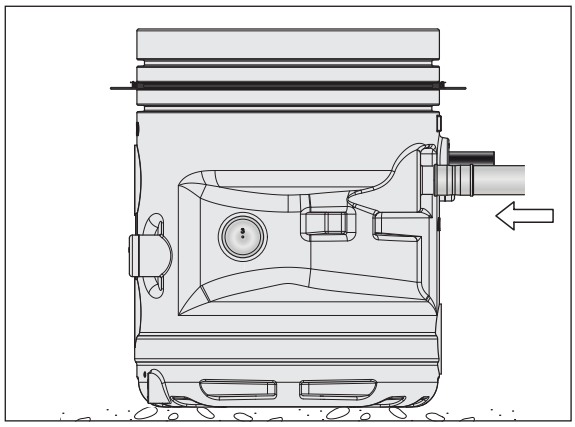
The ventilation duct [L] connects the collection tank with the air exchange via the roof.

The socket has already been prepared for the connection of the vent stack, 📖 Chap. 3.1.2.1 "Preparing the connections".

Specifications:

- Lay the vent stack so that it rises continuously. Do not reduce the cross-section.
- The end of the vent stack must be routed above the roof.
- The vent stack pipe must not be merged with the vent stack of a grease separator.
- Choose resistant material (e.g. KML, PP, PE, PVC).
- When using a hose connector, the vent stack and the connection port in the hose connector must have a distance of at least 10 mm.

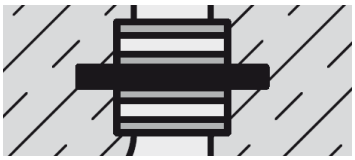
➔ Connect the on-site vent stack to the provided connection.



### 3.1.3.6 Laying and connecting the cable conduit

**IMPORTANT**

- Any penetration of the floor slab must be made impermeable to water, e.g. using wall collars.



- Before the on-site cable conduit is connected, the excavation pit must be backfilled to this height, 📖 chap 3.1.1.2 "Installation".

Cable conduit [K] connects the collection tank to the technical room.

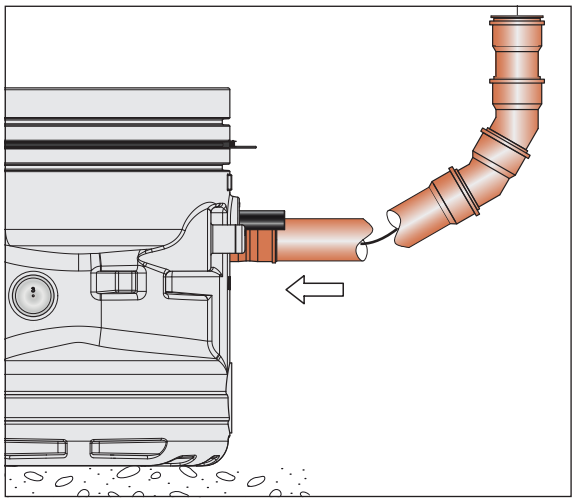
The socket has already been prepared for connecting the cable conduit, 📖 Chap. 3.1.2.1 "Preparing the connections".

Specifications:

- Install with a slope of at least 1.5 - 2 % from the technical room to the collection tank. Do not reduce the cross-section.
- Do not use pipe bends with angles larger than 30°.
- Choose resistant material (e.g. KML, PP, PE, PVC).
- When using a hose connector, the cable conduit and the connection port in the hose connector must have a distance of at least 10 mm.

➔ Connect the on-site cable conduit to the prepared connection.

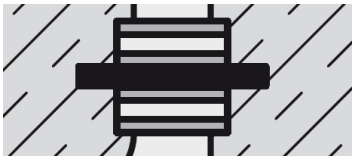
➔ Insert a suitable pull wire with excess length directly into the cable conduit in the technical room or the installation location of the control unit and in the collection tank.



### 3.1.3.7 Laying and connecting the pressure line on site

**IMPORTANT**

- Any penetration of the floor slab must be made impermeable to water, e.g. using wall collars.



- Before the on-site pressure line is connected, the excavation pit must be backfilled to this height, Chap. 3.1.1.2 "Installation".
- Only implement step 2 a or 2 b.

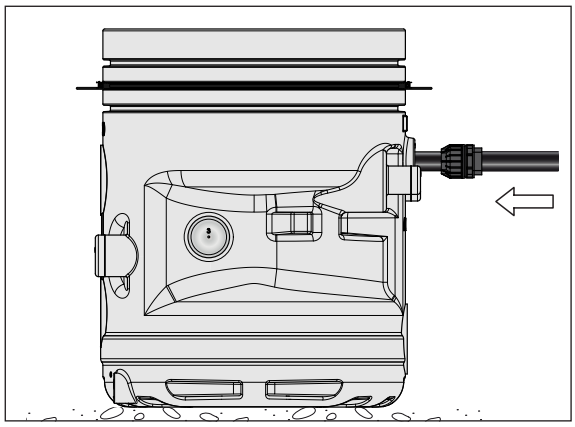
The pressure line [D] connects the collection tank to the on-site backflow loop.

Specifications:

- The pressure pipe must be designed for at least 1.5 times the pump pressure.
- Lay the pressure pipe so that it rises continuously and is frost-resistant.
- The flow velocity in the pressure pipe must not fall below 0.7 m/s and must not exceed 2.3 m/s.
- Never connect other pipes to the pressure pipe.
- Air admittance valves are not allowed in the pressure pipe.
- Connect the pressure pipe without any tension.
- Install pressure line in at least DN 50.

A compression fitting DN 50 is supplied as a loose item on delivery.

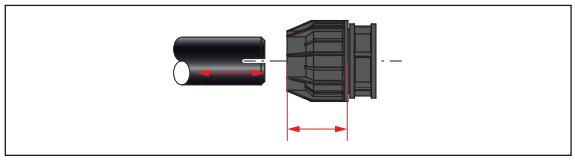
➔ Connect the on-site pressure line to the DN 50 / OD 50 mm pipe socket.



### Step 1: Fit the compression fitting

➔ Chamfer the spigot of the connection pipe and lubricate with acid-free lubricant.

➔ Determine the insertion depth ◄► and mark it on the pipe.

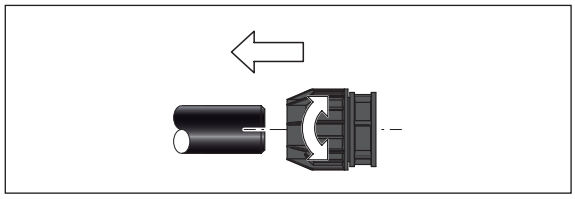


➔ Loosen the conical nuts on the compression fitting by a 3 – 4 turn (do not loosen off completely).

➔ Push the compression fitting onto the connection pipe as far as it will go or as far as the marking.

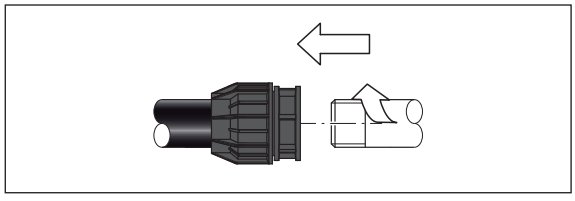
➔ Hand tighten the conical nut.

➔ Tighten for an optimal strength with tools suitable for plastic compression fittings.



### Step 2 a: Connect on-site pressure line

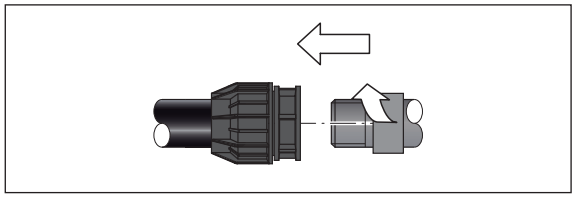
➔ Seal the on-site pressure line with a 1 ½" threaded connection (external thread) into the threaded sleeve of the compression fitting.



### Step 2 b: Connect pressure line

A 7.5 m long pressure line hose with a 1 ½" (male) threaded connection on one side can be obtained from ACO as an optional extra. Product features, illustration, weight and order number, Chap. 2.1 "Product features".

➔ Seal the pressure line hose with threaded connection 1 ½" into the threaded sleeve of the compression fitting.



### Step 3: Create a backflow loop in the pressure line

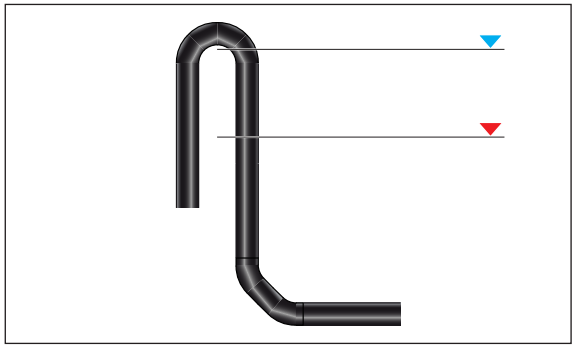
The wastewater must be drained via a backflow loop to be provided by the customer in order to operate the system in compliance with the standards. The backflow loop must be established above the backflow level. Installation examples demonstrate the base version, Chap. 2.7.1.2 " Suggestion 2" or Chap. 2.7.1.3 "Suggestion 3"

Definition of terms in accordance with EN 12056-4:

- “Back flow”: Wastewater return pressure from the sewer into the connected pipes.
- “Back flow level“: The highest level to which water can rise within a drainage system.
- “Back flow loop“: Part of the pressure pipe of a wastewater lifting plant above backflow level.

➔ Install the backflow loop at the bottom of the pipe ▼ above the level of the "backflow level”▼.

➔ Afterwards, feed the pipe to the sewer with a free gradient.



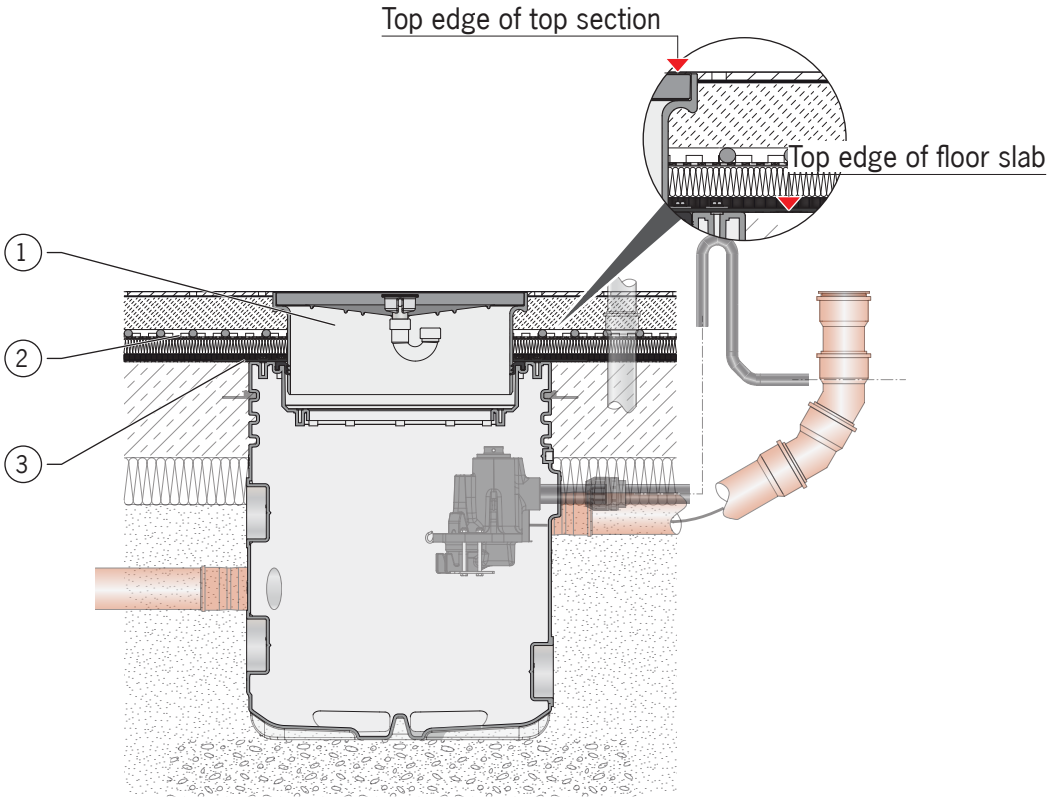
#### 3.1.3.8 Leak test

All drainage systems on private ground must be leak-proof (only applies to Germany. Provisions in other countries can vary).

The requirements and provisions for the leak test sequence must be enquired about for each individual country.

## 3.1.4 Construction phase 2

### Overview of the work




**IMPORTANT** By adjusting the height of the top section body, the distance from the top edge of the floor slab to the top edge of the top section can be adjusted from 70 - 205 mm.

| Item | Work | Chapter |
|---|---|---|
| 1 | Remove the protective cover used during construction | 3.1.4.1 |
| 2 | Installing the top section | 3.1.4.3 |
| 3 | Create a floor structure on site | 3.1.4.4 |
| 4 | Mount bonding flange (optional) | 3.1.4.2 |

The work should be carried out in the following order.

#### 3.1.4.1 Remove the protective cover used during construction

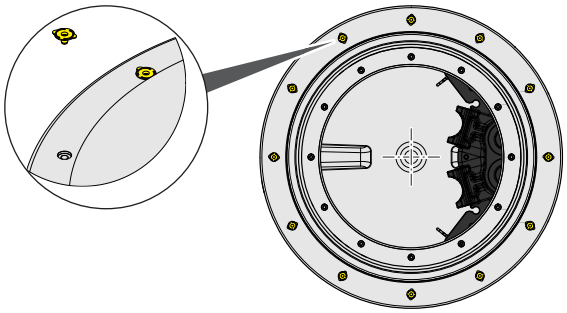
➔ Remove the protective cover used during construction.

### 3.1.4.2 Mount bonding flange (optional)

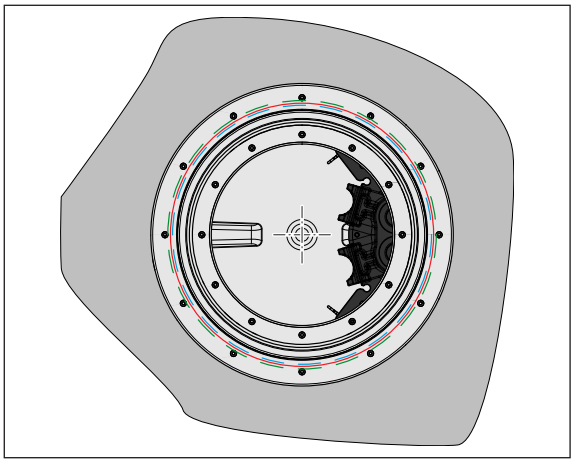
- A bonding flange can be obtained from ACO as an optional extra. Product features, weight, illustration and order number, Chap. 2.1 "Product features".
- Sealing ring, bolts, washers and sealing cord are supplied loose.

**IMPORTANT**

- Before mounting, remove the protective plugs from the holes.



- Any sealing (if required) between the bonding flange (sealing ring) and the floor slab must be made on site using appropriate means.

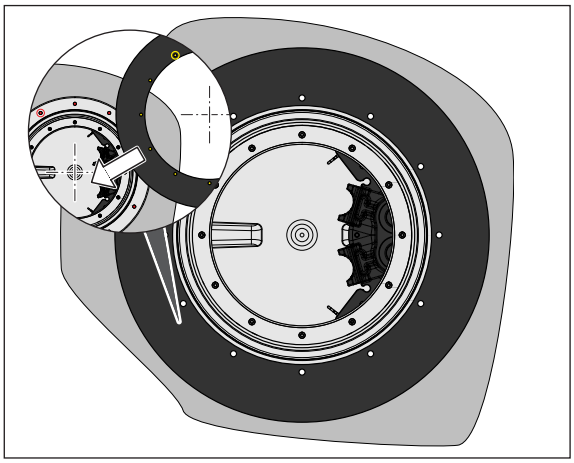


➔ Place the bonding flange on the collection tank and arrange it so that it is centred ┼ in the middle of the collection tank.

➔ Trace the inner diameter ▬ ▬ ▬ of the bonding flange to the top of the collecting tank, e.g. with a soft pencil.

➔ Remove the bonding flange again and store it sideways.

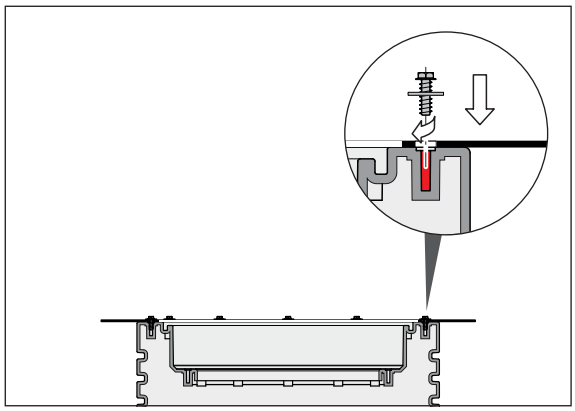
➔ Place the sealing cord between the marking diameter and the ▬ ▬ ▬ inner diameter of the blind holes ▬ ▬ ▬ distributed around the circumference ▬ and apply pressure.



➔ Place the bonding flange on the collection tank and arrange it so that it is centred ┼ in the middle of the collection tank.

➔ Position the holes of the ○ sealing ring flush with the holes ○ in the collection tank.

➔ Screw all bolts with the corresponding washers into the blind holes of the collection tank while applying pressure and tighten them crosswise by hand.

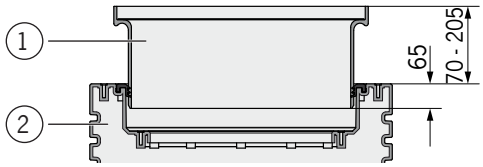


### 3.1.4.3 Installing the top section

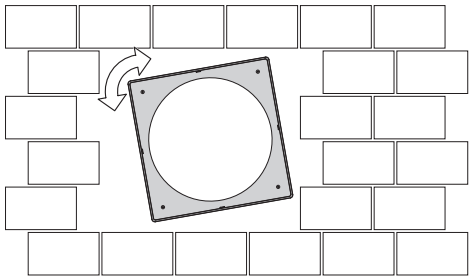
- Components for the required top section are supplied as loose parts on delivery. Product features and illustrations Chap. 2.1 "Product features", weights Chap. 2.4 "Scope of delivery Muli-Flex -UF".
  - Description applies to version:
    - Top section (material polyethylene) and
    - Top section (material stainless steel)
  - Illustration with top section (material polyethylene)

**IMPORTANT**

- The protrusion of the top section body (overall height 270 mm) above the upper edge of the collection tank can be continuously adjusted by adjusting the overall height from 70 - 205 mm.
- Top section body stands at least 65 mm in the receptacle of the collection tank
- Top section can be rotated freely for exact alignment with the floor covering (e.g. tiles).



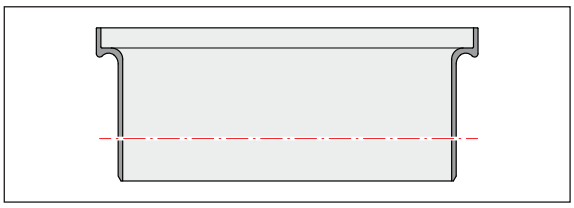

1 = Top section body
2 = Collection tank



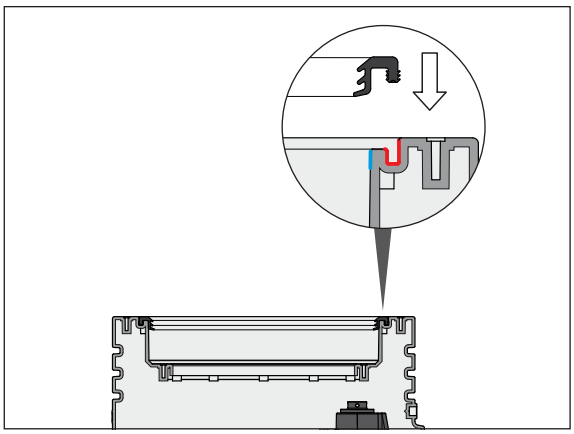
The work should be carried out in the following order.

**Top section for non-faecal use <u>without</u> drain system**

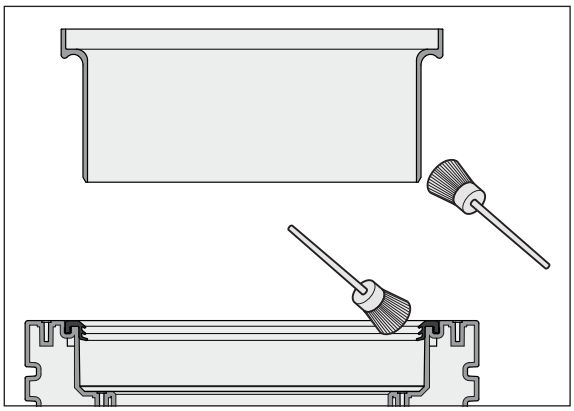
- ➔ Adjust the height of the top section body (if necessary).
- ➔ After adjusting, chamfer all around the outer edge of the cut.



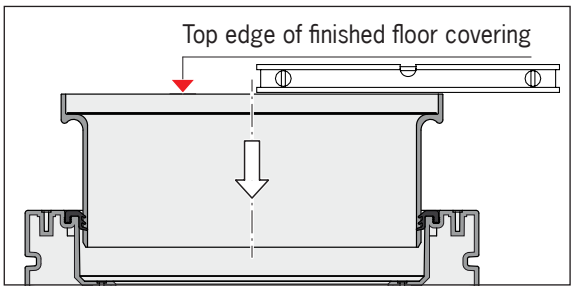
- ➔ Press the lip seal into the groove ▮ in the collection tank and distribute it evenly around the circumference.
  **IMPORTANT** Lips of the lip seal in the receptacle protrude inwards ▮ towards the centre of the collection tank.



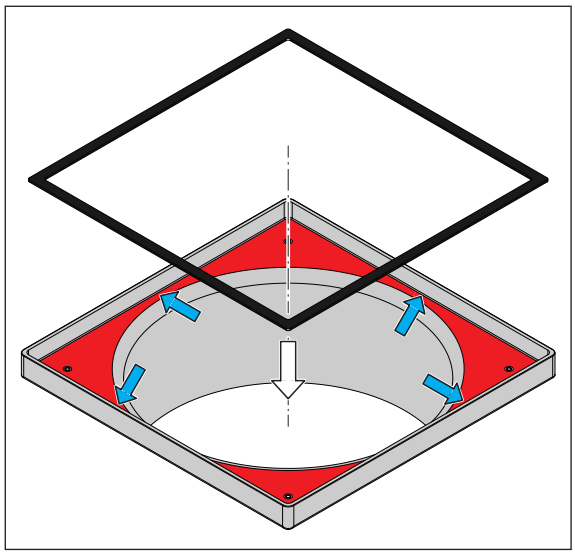
- ➔ Lubricate the lower outer area of the top section body and the lips of the lip seal with acid-free grease.



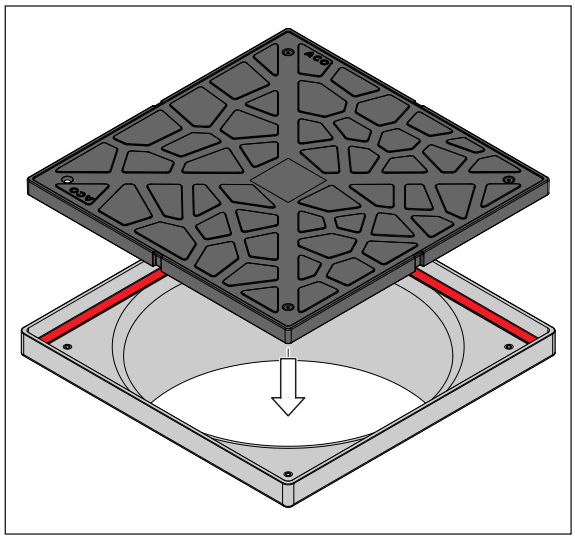
- ➔ Push the top section body into the centre of the receptacle of the collection tank.
- ➔ Set the upper edge of the top section body to the intended level "upper edge of the finished floor" and align it horizontally.



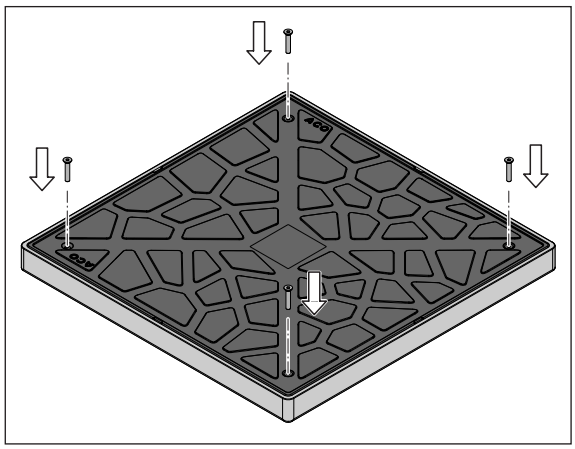
➔ Place the flat gasket on the surface in the top section body and align it all around the ⇨ sides.



➔ Place the cover on the surface of the flat seal in the top section body and align with the centre.

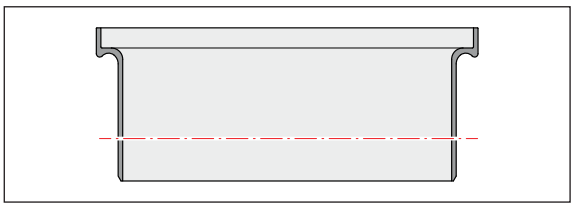


➔ Insert the bolts into the holes, screw them in under pressure and tighten them crosswise by hand.

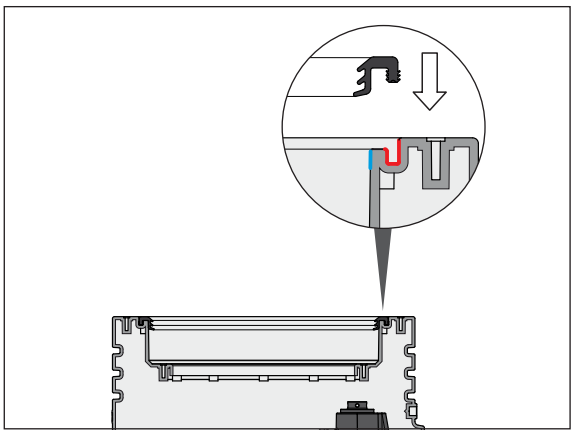


**Top section for non-faecal use <u>with</u> drain system**

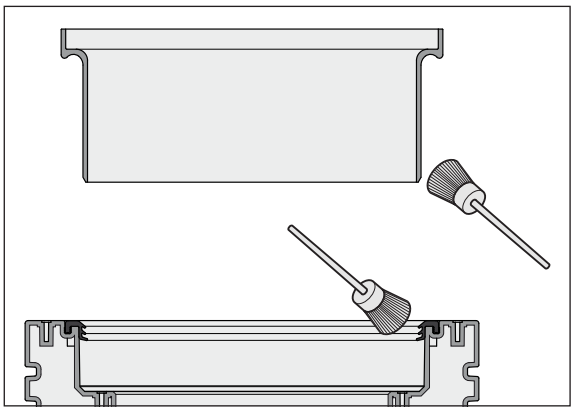
- ➔ Adjust the height of the top section body (if necessary).
- ➔ After adjusting, chamfer all around the outer edge of the cut.



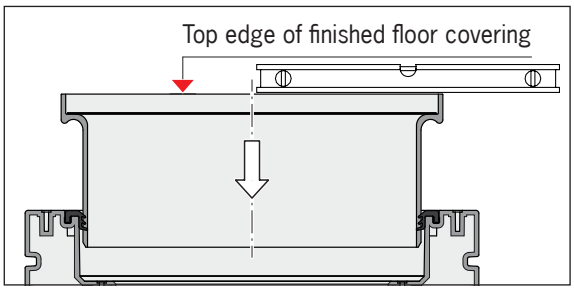
- ➔ Press the lip seal into the groove ▮ in the collection tank and distribute it evenly around the circumference.
  **IMPORTANT** Lips of the lip seal in the receptacle protrude inwards ▮ towards the centre of the collection tank.



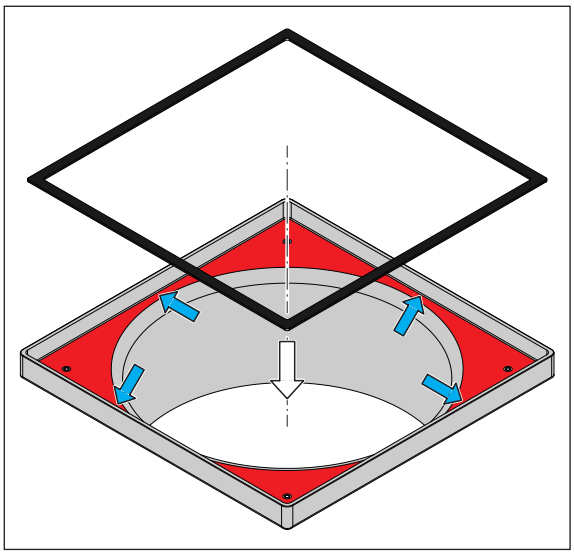
- ➔ Lubricate the lower outer area of the top section body and the lips of the lip seal with acid-free grease.



- ➔ Push the top section body into the centre of the receptacle of the collection tank.
- ➔ Set the upper edge of the top section body to the intended level "upper edge of the finished floor" and align it horizontally.

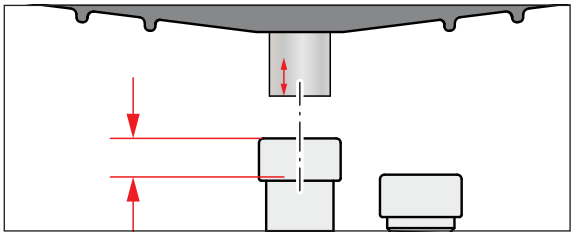


➔ Place the flat gasket on the surface ▮ in the top section body and align it all around the ⇨ sides.

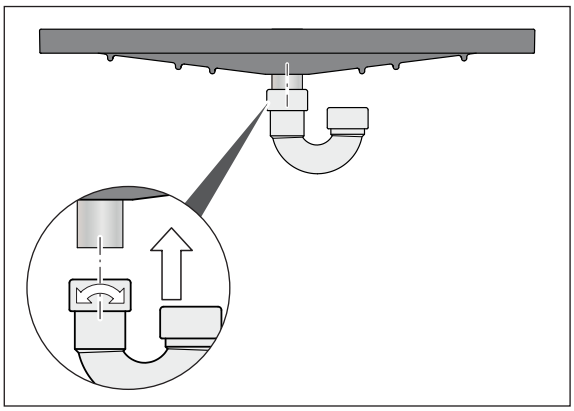


➔ Fit the drain system to the connection pipe of the cover:

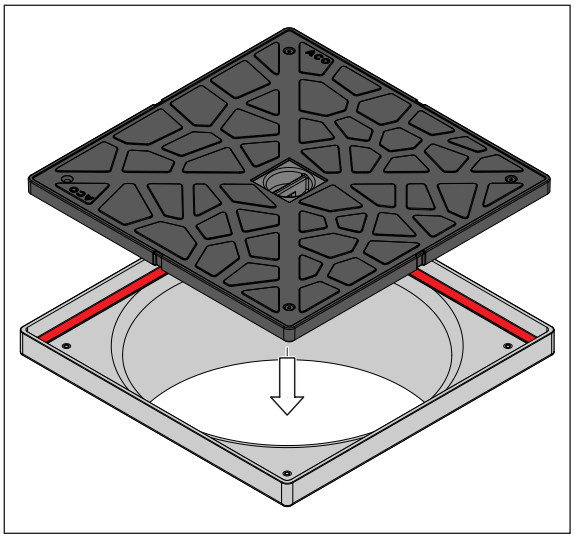
- ☐ Determine the insertion depth ↔ and mark it on the pipe.



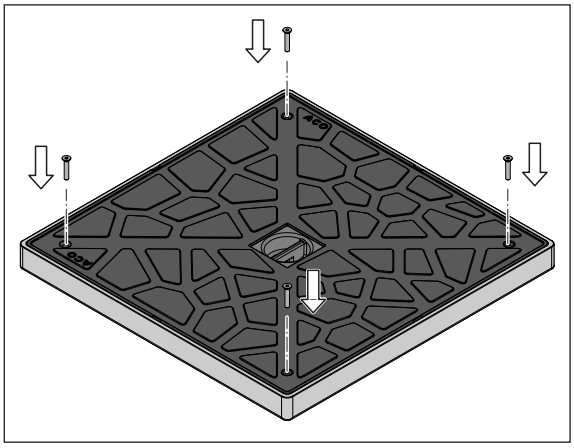
- ☐ Loosen the conical nuts on the compression fitting by a 3 – 4 turn (do not unscrew completely).
- ☐ Push the compression fitting onto the connection pipe as far as it will go or as far as the marking.
- ☐ Hand tighten the conical nut.
- ☐ Tighten for an optimal strength with tools suitable for plastic compression fittings.



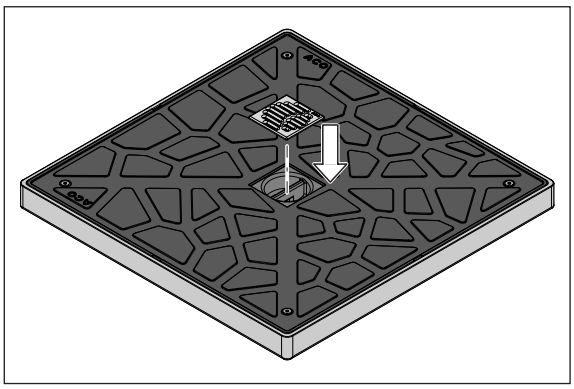
➔ Place the cover on the surface of the flat seal in the top section body and align with the centre.



➔ Insert the bolts into the holes, screw them in under pressure and tighten them crosswise by hand.

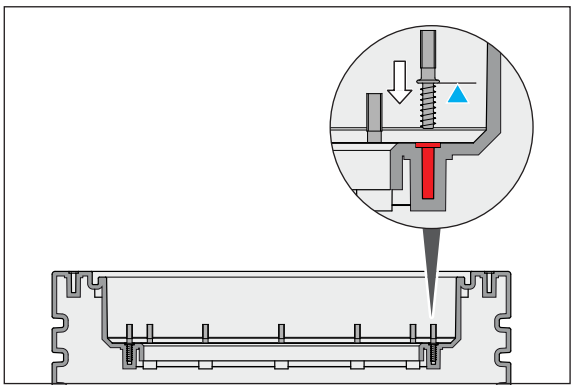


➔ Place the grating in the drainage recess of the lid.

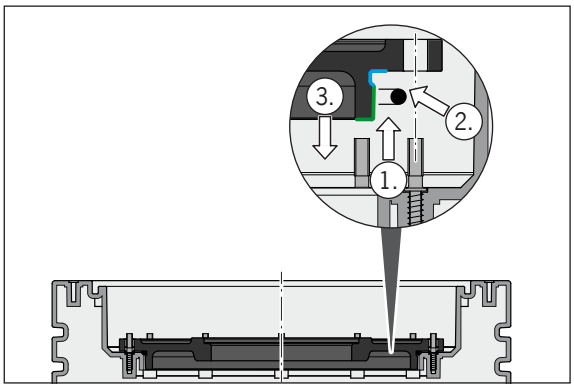


### Top section for faecal-containing use without drain system

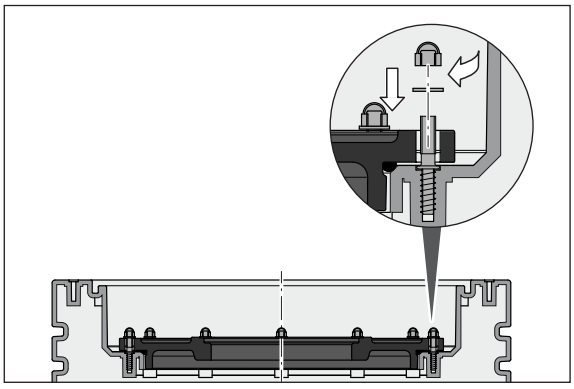
- Screw all stud bolts into the blind holes of the collection tank up to the stop (collar of the stud bolt) and tighten by hand.



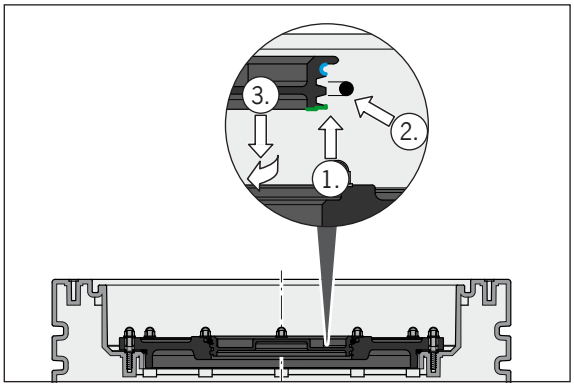
- Fit the O-ring over the spigot of the intermediate cover (1).
- Press the O-ring into the groove of the intermediate cover and distribute it evenly around the circumference (2).
- Position the holes of the intermediate cover over the stud bolts and place the intermediate cover in the receptacle of the collection tank (3).



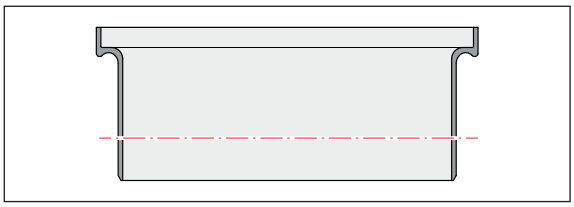

- Slide all the washers over the set bolts.
- Turn all of the cap nuts onto stud bolts and tighten them crosswise by hand.



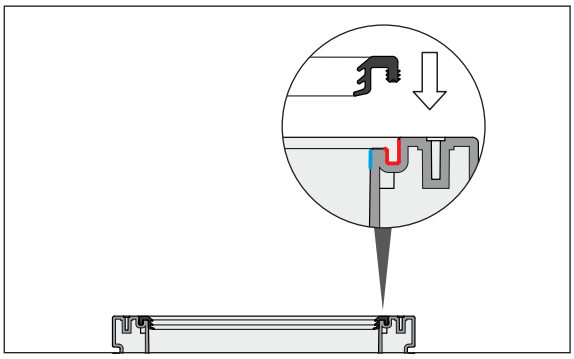
- Fit the O-ring over the spigot of the bolt cover (1).
- Press the O-ring into the groove of the bolt cover and press it evenly around the circumference (2).
- Place the bolt cover on the threaded receptacle of the intermediate cover, screw it in and tighten by hand (3).



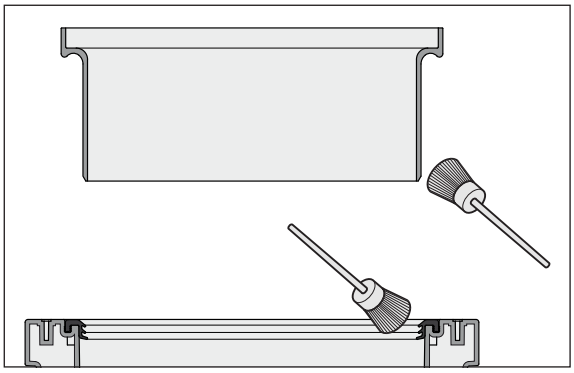
- Adjust the height of the top section body (if necessary).
- After adjusting, chamfer all around the outer edge of the cut.



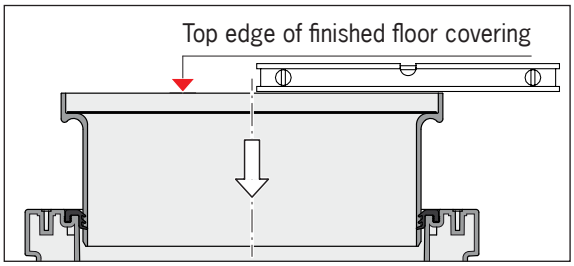
- Press the lip seal into the groove in the collection tank and distribute it evenly around the circumference.
  **IMPORTANT** Lips of the lip seal in the receptacle protrude inwards towards the centre of the collection tank.



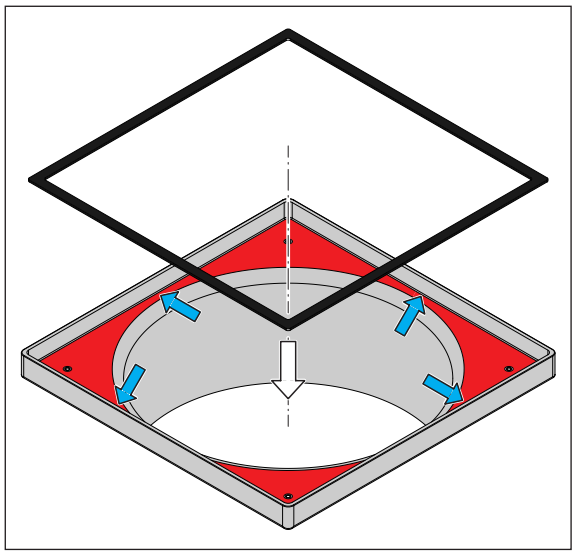
- Lubricate the lower outer area of the top section body and the lips of the lip seal with acid-free grease.



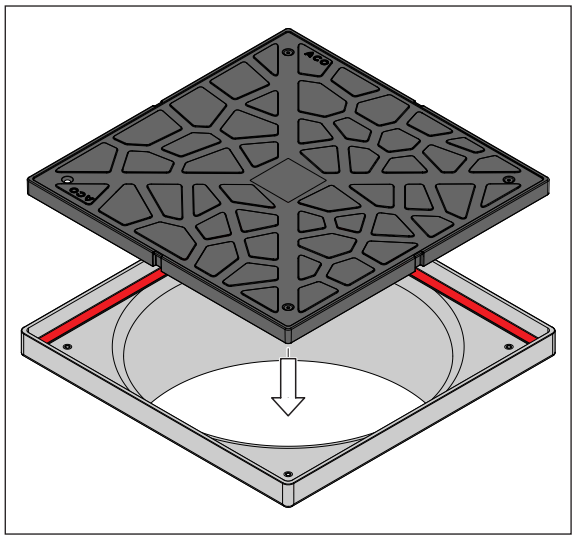
- Push the top section body into the centre of the receptacle of the collection tank.
- Set the upper edge of the top section body to the intended level "upper edge of the finished floor" and align it horizontally.



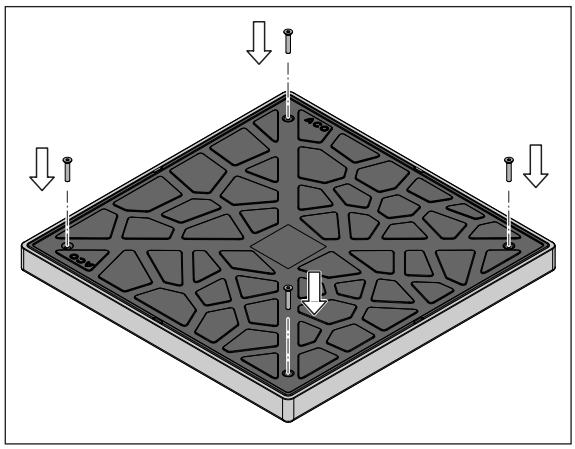
➔ Place the flat gasket on the surface in the top section body and align it all around the ⇨ sides.



➔ Place the cover on the surface of the flat seal in the top section body and align with the centre.



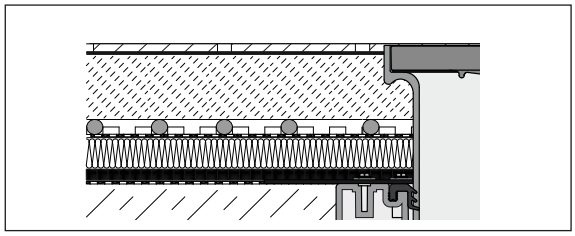
➔ Insert the bolts into the holes, screw them in under pressure and tighten them crosswise by hand.



### 3.1.4.4 Create a floor structure on site

**Sealing with bonding flange:**

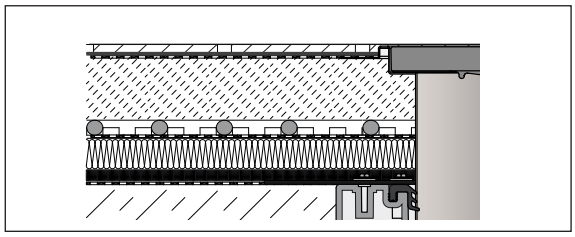
➔ Create floor structure, e.g. (from top to bottom)::
Tile covering, tile adhesive, screed, underfloor heating, thermal insulation, impact sound insulation and sealing membrane



**Sealing with thin-bed process and bonding flange:**

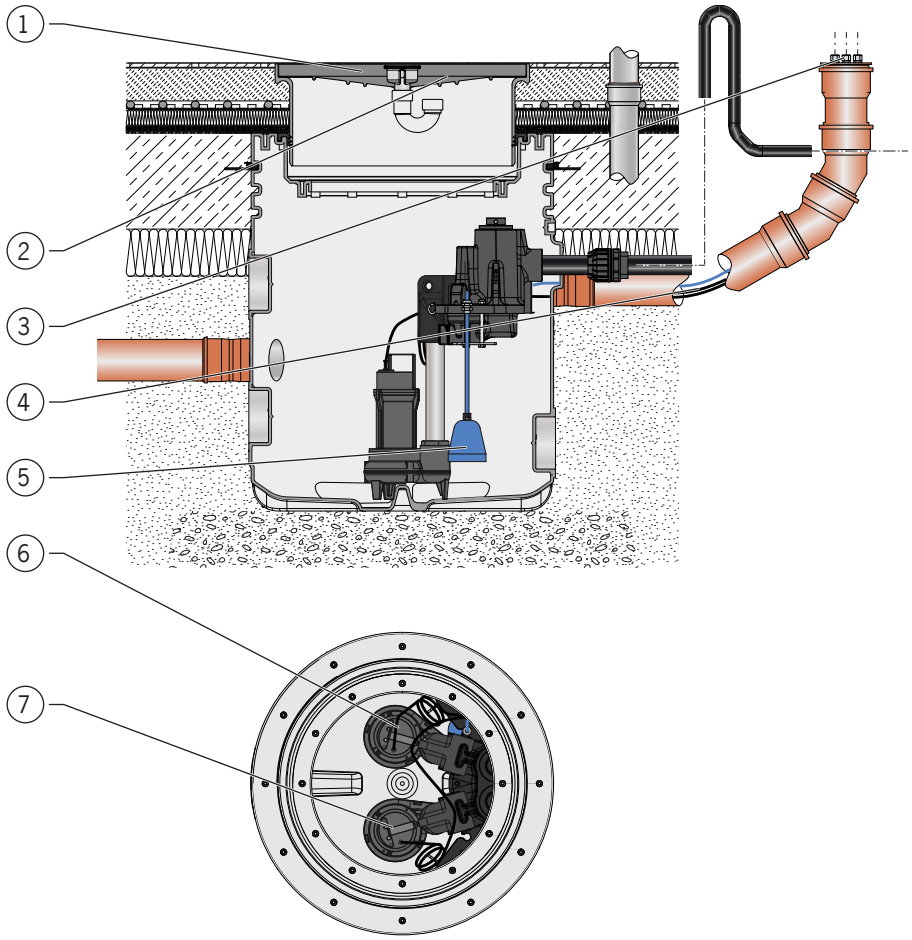
Top section body with special profile for composite waterproofing or for connecting synthetic resin floors with cavity filling.

➔ Create floor structure, e.g. (from top to bottom)::
Tile covering, tile adhesive, sealing membrane, screed, underfloor heating, thermal insulation, impact sound insulation and sealing membrane



## 3.1.5 Construction phase 3

### Overview of the work




| Item | Work | Chapter |
|---|---|---|
| 1 | Removing the cover | 3.1.5.1 |
| 2 | Installing the cover | 3.1.5.8 |
| 3 | Sealing penetrations | 3.1.5.6 |
| 4 | Pull the connection cable or control line into the cable conduit. | 3.1.5.5 |
| 4 | Install the required level sensor | 3.1.5.3 |
| 5 | Insert necessary submerged pump 1 | 3.1.5.4 |
| 6 | Insert necessary submerged pump 2 | 3.1.5.4 |
| 7 | Empty the collection tank (if necessary) | 3.1.5.2 |

The work should be carried out in the following order.

### 3.1.5.1 Removing the cover

➔ Remove the cover of the top section and store it on its side. **Carry out the work in reverse order,** 🕮 Chap 3.1.4.3 "Installing the top section".

### 3.1.5.2 Empty the collection tank (if necessary)

**IMPORTANT** If water is still present from a leak test that may have been carried out, the water must now be extracted or the collection tank must be emptied.

### 3.1.5.3 Mount necessary level sensor

- The necessary level sensor (accessory) for level measurement can be obtained from ACO.
- Product features and illustrations 🕮 Chap. 2.1 "Product features", weights 🕮 Chap. 2.4 "Scope of delivery Muli-Flex -UF".
- The level sensor (pressure transducer or open pressure bell) and cable glands are delivered as separate parts.

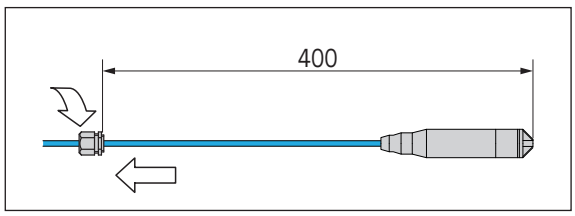
**IMPORTANT**

- Protect the ends of the connecting cable or control line against penetrating moisture and dirt.
- Ensure free movement (level sensor hangs freely downwards without obstruction) after installation.

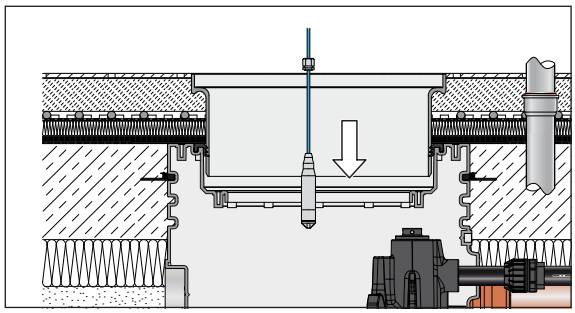
**Pressure transducer**

The pressure transducer has a 20 m or 40 m long connection cable (already clamped and sealed to the pressure transducer) and is suspended from the support frame.

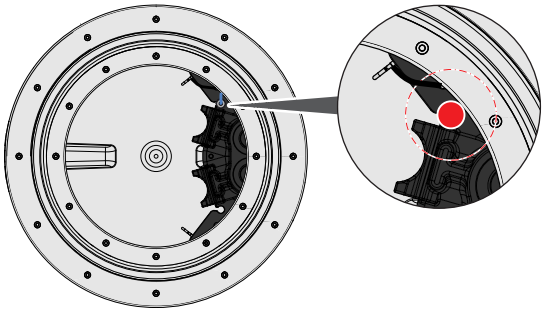
➔ Push the connection cable through the cable gland, adjust to a **length of 400 mm** and hand-tighten the union nut of the cable gland.



➔ Drain the pressure transducer on the connection cable into the collection tank.



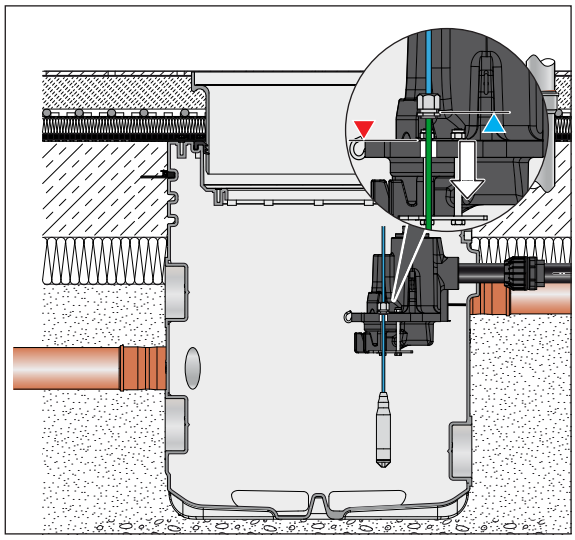
Position of the recess ● on the support frame to receive the pressure transducer:



➔ Guide the connection cable ▌ below the cable gland into the recess in ● the support frame.

➔ Continue to lower the pressure transducer until the ▲ cable gland is seated on the upper edge ▼ of the support frame.

➔ Protect the end of the connection cable against dirt and moisture ingress and pull it (together with the connection cables of the submerged pumps) with the pull wire through the cable conduit to the installation location of the control unit, 📖 chap 3.1.5.5 "Pulling the connection cable or control cable into the cable conduit".

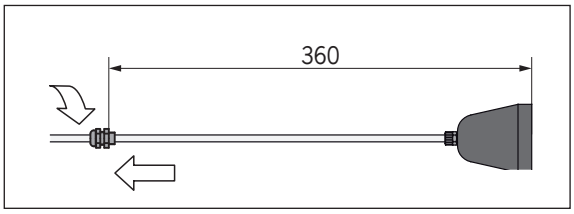


### Open pressure bell

Open pressure bell has a 20 m long pneumatic control line (hose connected to the bell) and is suspended from the support frame.

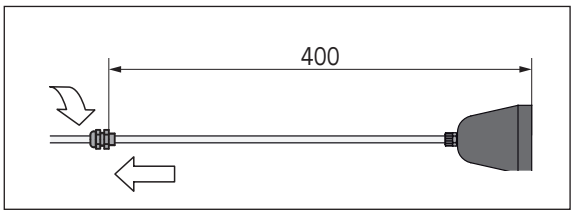
Version **without** air bubble injection:

➔ Push the control line through the cable gland, set it to the **longitudinal measurement 360 mm** and tighten the union nut of the cable gland as hand-tight.

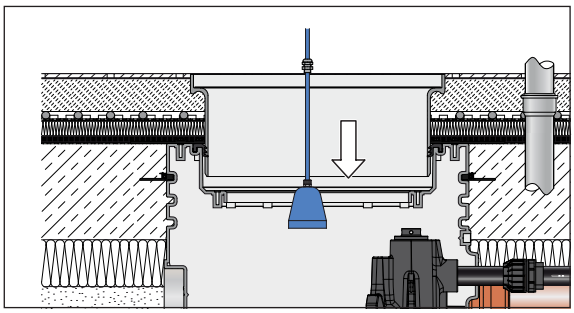



Version **with** air bubble injection:

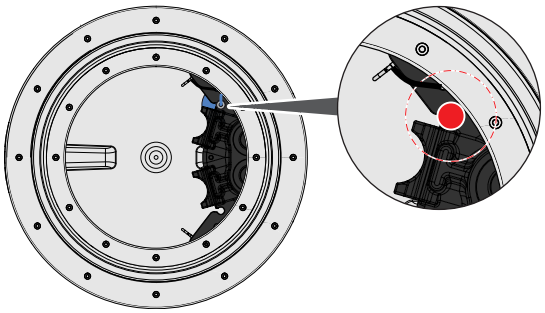
➔ Push the control line through the cable gland, set it to the **longitudinal measurement 400 mm** and tighten the union nut of the cable gland as hand-tight.



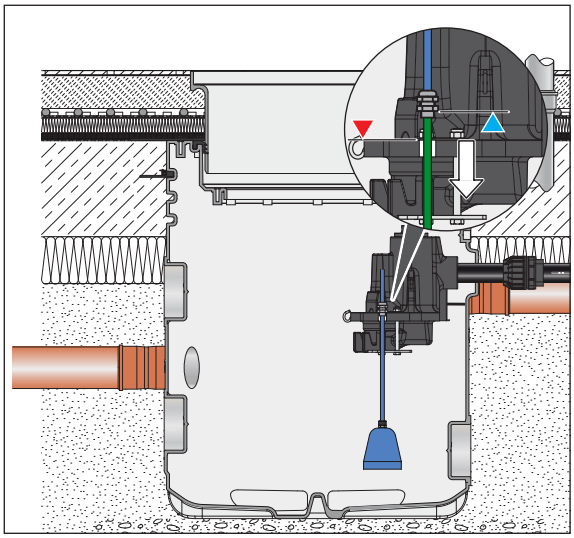

➔ Drain the pressure bell on the control line (hose) into the collecting tank.



Position of the recess ● on the support frame to receive the back pressure bell



- ➔ Guide the control line ▮ below the cable gland into the recess ● of the retaining bracket.
- ➔ Lower the pressure bell until the base of the ▲ cable gland rests on the upper edge ▼ of the support frame.
- ➔ Protect the end of the control line against dirt and moisture ingress and pull it (together with the connection cables of the submerged pumps) with the pull wire through the cable conduit to the installation location of the control unit, 🕮 chap 3.1.5.5 "Pulling the connection cable or control cable into the cable conduit".

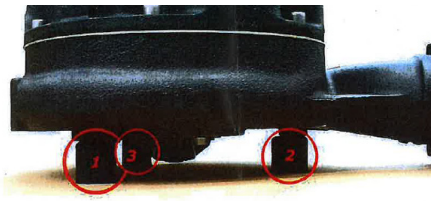


### 3.1.5.4 Insert submerged pump(s)

Applies to Muli-Flex -UF duo and mono.

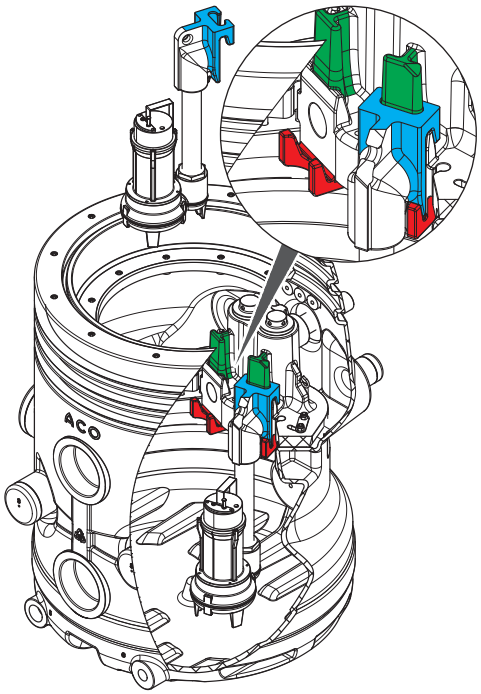
- The required submerged pump is supplied as a unit with mounted pressure line and connection unit (guide hook).
- Product features and illustrations 🕮 Chap. 2.1 "Product features", weights 🕮 Chap. 2.4 "Scope of delivery Muli-Flex -UF".

**IMPORTANT Applies to version with SITA 200 N-ex-G submerged pump**
Before inserting, all 3 support feet on the submerged pump must be removed.

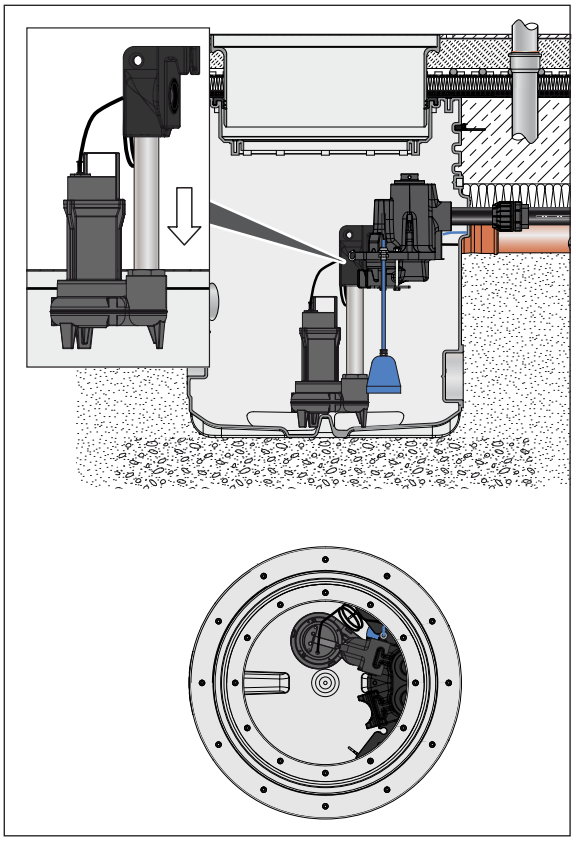


**IMPORTANT**

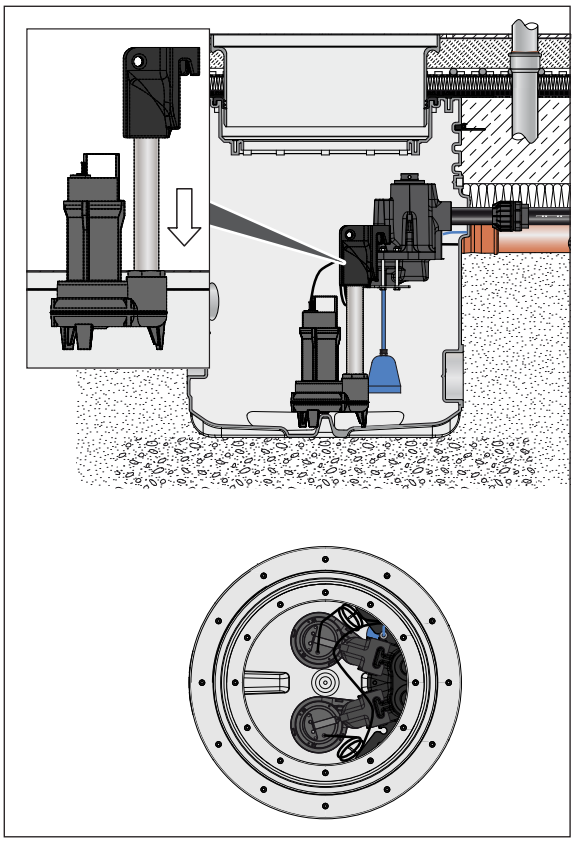
- When draining ■ the submerged pump, thread the guide hook into the guide ■ of the above-water coupling.
- After lowering, the guide hook ■ sits in the receptacle of the ■ above-water coupling.
- Two submerged pumps are used in the Muli-Flex -UF duo version.
- One submerged pump is used for the Muli-Flex -UF mono version. It does not matter which receptacle of the above-water coupling is used (front or rear).




➔ Drain submerged pump 1 into the collection tank and insert it into the receptacle ■ of the above-water coupling.



➔ Drain submerged pump 2 into the collection tank and insert it into the receptacle ■ of the above-water coupling.

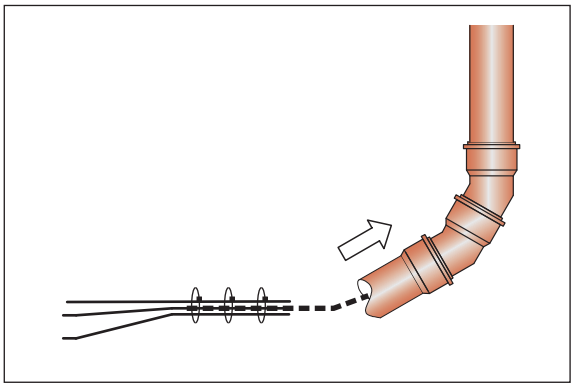


### 3.1.5.5 Pull the connection cable or control line into the cable conduit.

Specifications:

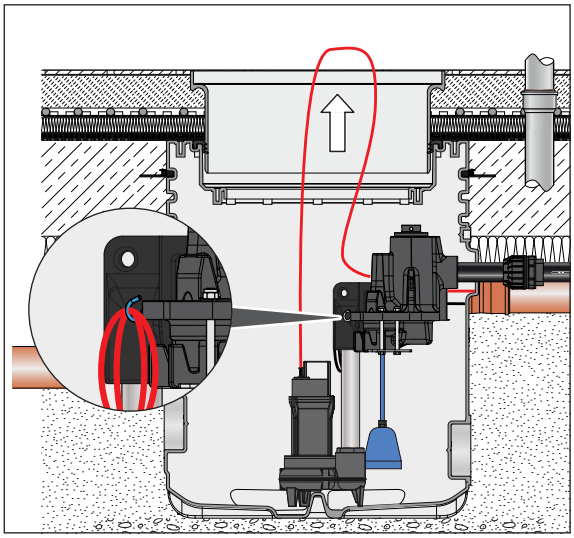
- Install the control line to the control system upwards, kink-free and frost-resistant manner.
- Ensure that the connecting cable or the control line protrudes sufficiently from the control unit (approx. 1 m) in order to guarantee adequate cabling in the terminal compartment or the connection to the control unit.

➔ Fasten the connection cable of the submerged pump(s), the connection cable of the pressure transducer or the control cable of the pressure bell with cable ties to the pull wire provided by the customer ▪▪▪▪ and pull it through the cable conduit to the control unit or into the equipment compartment.



➔ **IMPORTANT** Pull the connection cable back until it is possible to lay a loop on the upper ▬ edge of the foot. This is the only way to remove the submerged pump(s) and the pressure transducer from the plant during operation.

➔ Hook the loops of ▬ the connection cables onto a fastening point ▬ (hook) on the support frame.



**IMPORTANT** Exception for control line:

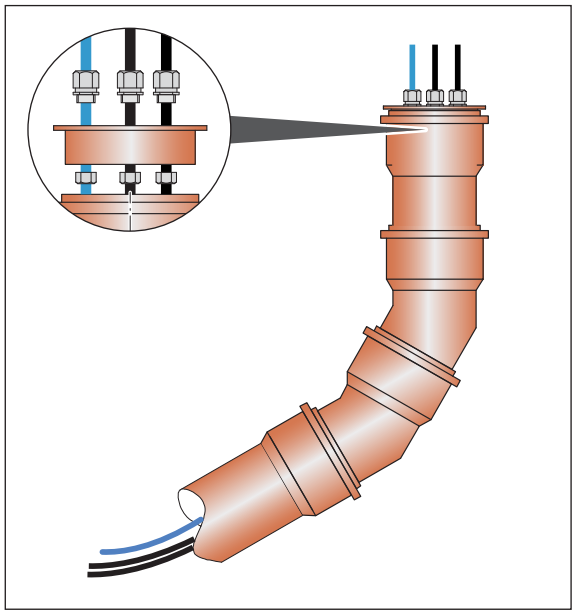
➔ Arrange these in an almost horizontal course from the cable gland to the beginning of the cable conduit.

### 3.1.5.6 Sealing penetrations

Necessary components, e.g. end covers and cable glands (alternatively annular space seal), must be provided by the customer.

➔ Seal the connection cable of the submerged pump(s), the connection cable of the pressure transducer or the control line of the pressure bell at the end of the cable conduit.

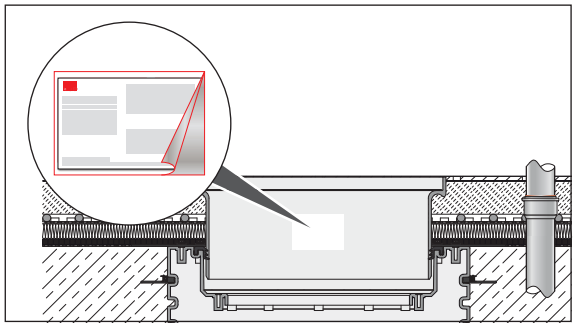
**IMPORTANT** Do not squeeze the control cable (the clear cross-section must be kept intact).



### 3.1.5.7 Attach type plate

Type plate (adhesive label) is supplied as a loose item.

➔ Stick the type plate onto the top section.



### 3.1.5.8 Installing the cover

➔ Install the cover of the top section, 📖 Chap. 3.1.4.3 "Installing the top section".

# 3.2 Muli-Flex -FR

## 3.2.1 Preparing connections

Available connections on the collection tank, Chap. 2.8.2 "Muli-Flex -FR".

Numbers in brackets "( )", see position numbers of the connections, Chap. 2.8.2 "Muli-Flex -FR".

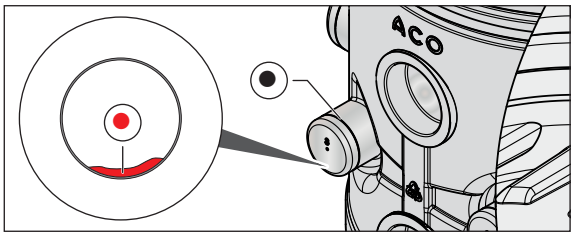
**IMPORTANT**

- Do not open connections that are not required.
- It is essential to open connection port DN 70 (2) for the vent stack and connection socket DN 100 (5) for the cable conduit.

### Open sockets

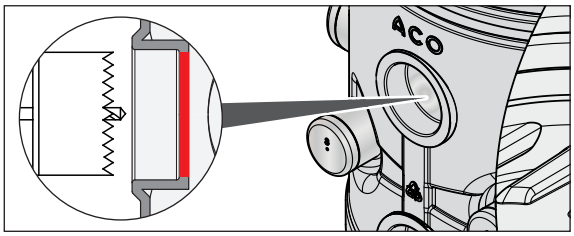
➔ Cut open the closed connection port along the notch (●) and deburr the cut edge.

➔ Remove possible material deposits (●) in base area of the connection ports.




### Open sleeve

➔ Drill out closed sleeve base ▬ with a hole saw, diameter:

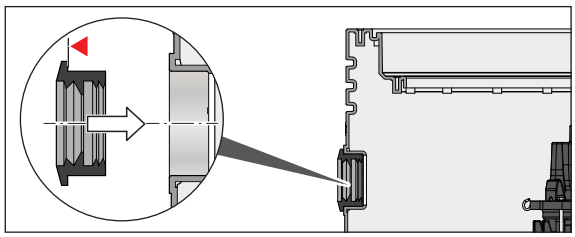



| Sleeve | | Diameter hole saw [mm] | |
|---|---|---|---|
| Item ( ) | DN or R | Mini-mum | max |
| (4) | 100 | 105 | 130 |
| (8) | 100 | 105 | 130 |
| (10) | 100 | 105 | 130 |
| (9) | 1½ | 30 | 40 |
| (12) | 1 | 20 | 30 |

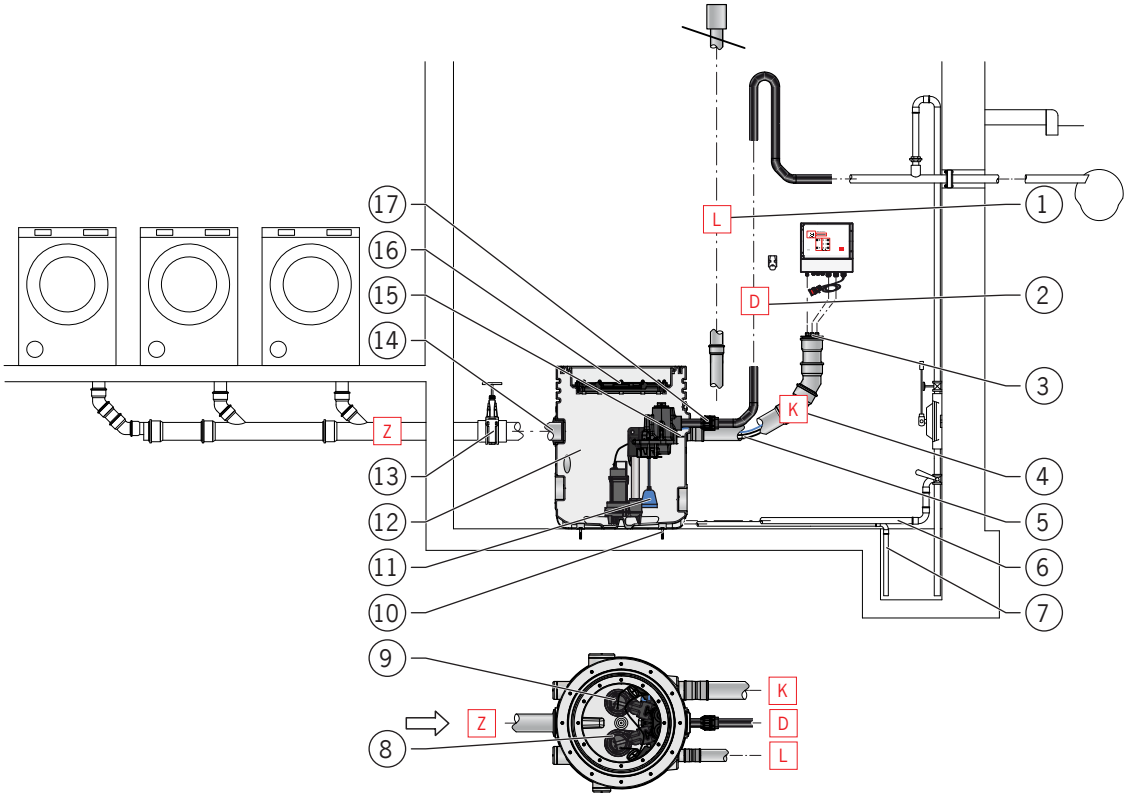
### Insert the sleeve seal

A sleeve seal DN 100 is supplied as a loose item on delivery.

➔ Insert the sleeve seal ◀ into the sleeve as far as it will go.



## 3.2.2 Overview of the work




| Item | Work | Chapter |
|---|---|---|
| 1 | Laying and connecting the on-site [L] vent stack | 3.2.7 |
| 2 | Laying and connecting the [D] on-site pressure line | 3.2.9 |
| 3 | Sealing penetrations | 3.2.15 |
| 4 | Laying and connecting the [K] cable conduit on site | 3.2.8 |
| 5 | Insert suitable on-site pull wire | 3.2.8 |
| 6 | Lay and connect on-site drain line (optional) | 3.2.11 |
| 7 | Lay and connect on-site bottom drain pipe (optional) | 3.2.10 |
| 8 | Insert necessary submerged pump 2 | 3.2.13 |
| 9 | Insert necessary submerged pump 1 | 3.2.13 |
| 10 | Secure collection tank | 3.2.4 |

| Item | Work | Chapter |
|---|---|---|
| 11 | Install the required level sensor | 3.2.12 |
| 12 | Assemble the tank | 3.2.3 |
| 13 | Installing the inlet shut-off valve (optional) | 3.2.6 |
| 14 | Laying and connecting the Z on-site inlet line(s) | 3.2.5 |
| 15 | Pull the connection cable or control line into the cable conduit. | 3.2.14 |
| 16 | Installing the intermediate and bolt cover | 3.2.16 |
| 17 | Mount compression fitting | 3.2.9 |
| 18 | Carry out a leak test (if required) | 3.2.17 |
| 19 | Attach type plate | 3.2.18 |

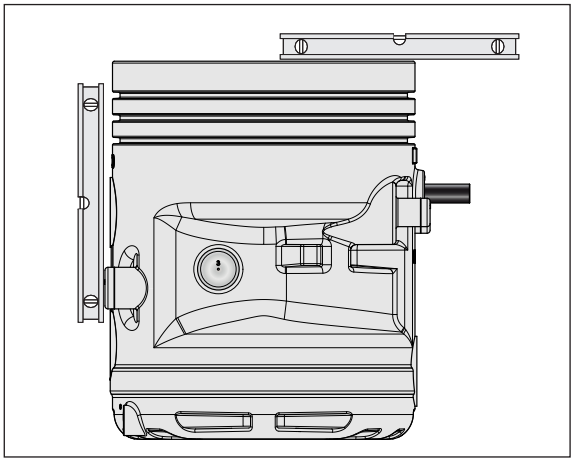
The work should be carried out in the following order.

## 3.2.3 Assemble the tank

Specifications:

- Frost proof installation premises
- Level installation surface with corresponding bearing load. It is not permitted to install the wastewater lifting plant in a lower position.
- Easily accessible for operation, cleaning and maintenance. There must be at least 600 mm of working space around all parts to be serviced.

➔ Align the tank at the installation site using a spirit level.



### 3.2.4 Secure collection tank

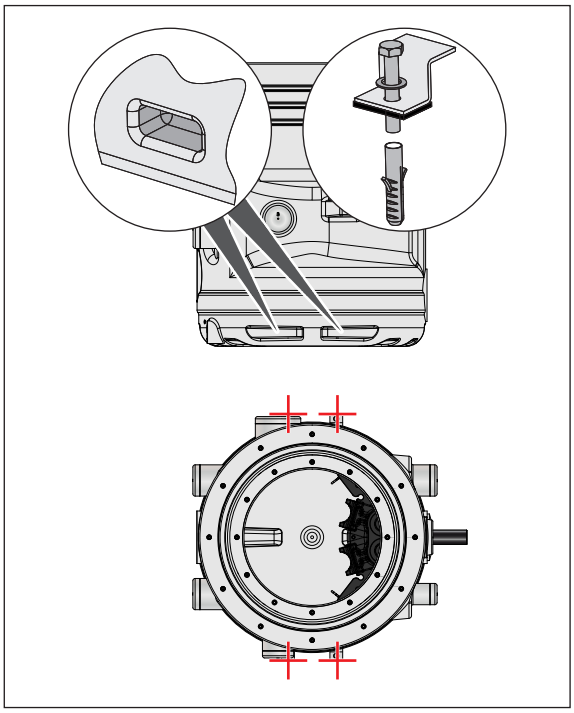
Specifications:

- Wastewater lifting plants must be installed in a way that ensures no twisting or tension.
- Wastewater lifting plants must be attached to prevent buoyancy.

- The fixing set is supplied loose on delivery.
- Figure and weight, Chap. 2.5 " Muli-Flex -FR Scope of delivery".

Anchor the aligned tank at 4 points in the soil + using the supplied attachment set:

➔ Place the bracket in the designated groove and mark the borehole in the soil.
➔ Remove the angle from the groove.
➔ Drill a hole Ø 12 mm, 60 mm deep.
➔ Suction out the borehole.
➔ Insert wall plug 12 W into the borehole.
➔ Place a rubber mat between the angle and the soil for noise insulation.
➔ Place the angle in the groove.
➔ Push the washers over the wooden bolts and through the hole in the angle and then twist in the wall plug.
➔ Tighten bolts by hand.



### 3.2.5 Laying and connecting the inlet pipe(s)

Inlet pipe(s) [Z] connects the drainage object to the collection tank.

Connections have already been prepared for connecting the inlet pipe(s), chap. 3.2.1 "Preparing connections".

Specifications:

- Lay pipes to be frost resistant.
- The cross-section of the inlet pipe must not be reduced in the direction of flow.
- Wastewater is to be routed to the collection tank with a gravity drainage pipe with gradient at least 1.5 – 2 %.
- Reverse gradients, and the formation of siphons or pockets are not allowed.
- A gate valve can be installed in the inlet pipe.
- Connect the inlet pipe without any tension.
- Make flexible pipe joints.
- Choose material that is resistant to the wastewater (e.g. KML, PP, PE, PVC).
- When using a hose connector, the inlet line and the connection port in the hose connector must have a distance of at least 10 mm.

➔ Connect the on-site supply pipe(s) to the prepared connection.

**With sleeve seal:**

☐ Grease the spigot of the inlet pipe and the lips of the sleeve seal with an acid-free lubricant.

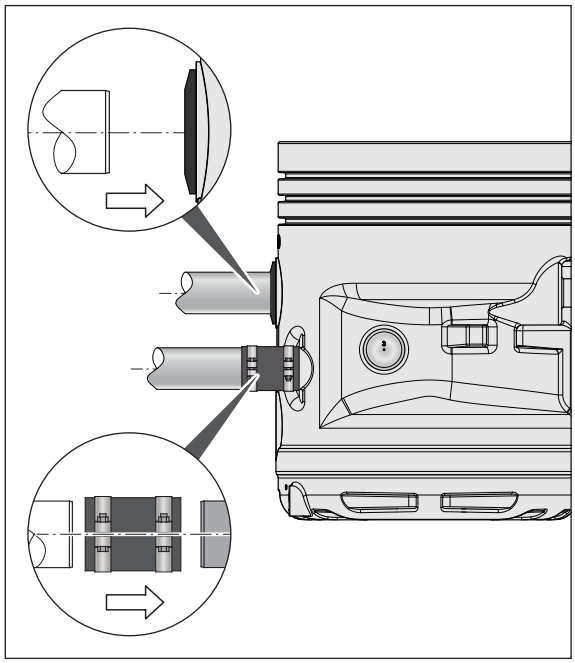
☐ Push the inlet pipe into the sleeve up as far as it will go into the sleeve seal.

**With hose connector:**

☐ Slightly loosen the clamping connector of the hose connector and slide it over the pipe spigot on the collection tank.

☐ Push the inlet pipe into the coupling.

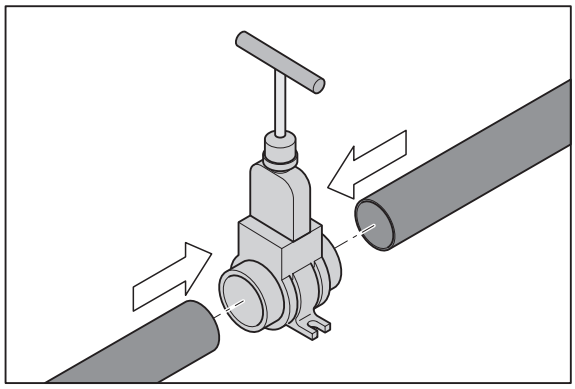
☐ Hand-tighten the fasteners of the coupling.



### 3.2.6 Installing the inlet shut-off valve (optional)

The inlet valve can be purchased from ACO optionally.

- ➔ Grease the spigots of the inlet pipe with an acid-free lubricant.
- ➔ Push the insert socket of the inlet valve onto the inlet line.
- ➔ Push the other end of the inlet pipe into the inlet socket of the inlet shut-off valve.



### 3.2.7 Laying and connecting the vent stack

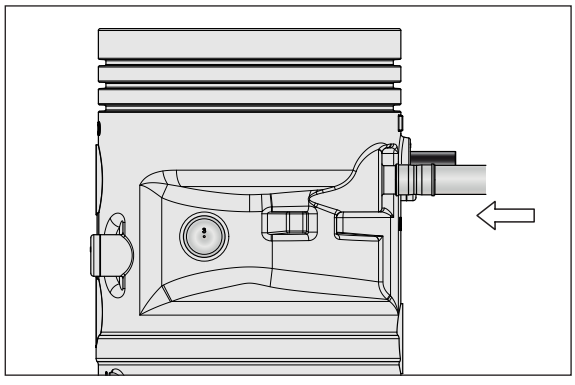
The ventilation duct [L] connects the collection tank with the air exchange via the roof.

The connection piece has already been prepared for connecting the vent stack, Chap. 3.2.1 "Preparing the connections".

Specifications:

- Lay the vent stack so that it rises continuously. Do not reduce the cross-section.
- The end of the vent stack must be routed above the roof.
- The vent stack pipe must not be merged with the vent stack of a grease separator.
- Choose resistant material (e.g. KML, PP, PE, PVC).
- When using a hose connector, the vent stack and the connection port in the hose connector must have a distance of at least 10 mm.

- ➔ Connect the on-site vent stack to the provided connection.



## 3.2.8 Laying and connecting the cable conduit

The cable conduit [K] connects the collection tank with the installation location of the control unit or technical room.

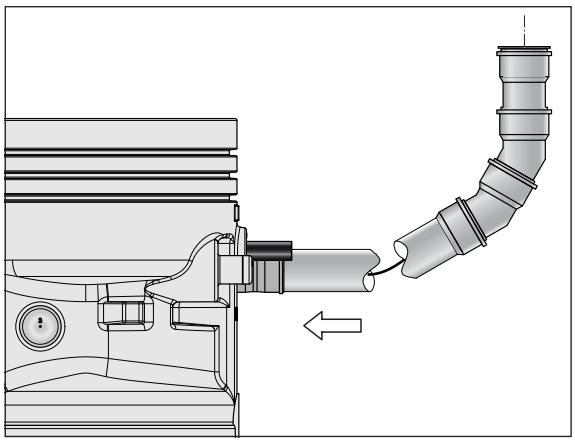
The socket has already been prepared for connecting the cable conduit, chap 3.2.1 "Preparing the connections".

Specifications:

- Install with a gradient of at least 1.5 - 2 % from the installation location of the control unit or equipment compartment to the collection tank. Do not reduce the stack cross-section.
- Do not use pipe bends with angles larger than 30°.
- Choose resistant material (e.g. KML, PP, PE, PVC).
- When using a hose connector, the cable conduit and the connection port in the hose connector must have a distance of at least 10 mm.

➔ Connect the on-site cable conduit to the prepared connection.

➔ Insert a suitable pull wire with excess length directly into the cable conduit at the installation site of the control unit or in the technical room and in the collection tank.



## 3.2.9 Laying and connecting the pressure line on site

**IMPORTANT** Only implement step 2 a or 2 b.

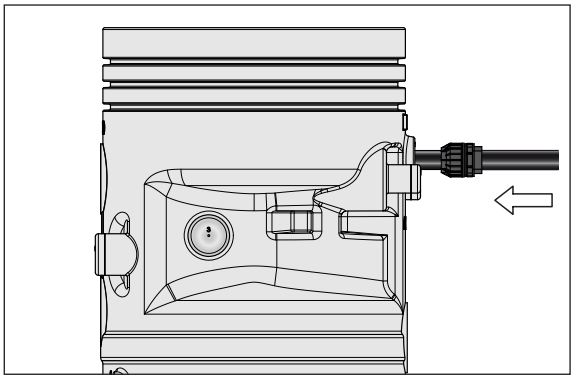
The pressure line [D] connects the collection tank to the on-site backflow loop.

Specifications:

- The pressure pipe must be designed for at least 1.5 times the pump pressure.
- Lay the pressure pipe so that it rises continuously and is frost-resistant.
- The flow velocity in the pressure pipe must not fall below 0.7 m/s and must not exceed 2.3 m/s.
- Never connect other pipes to the pressure pipe.
- Air admittance valves are not allowed in the pressure pipe.
- Connect the pressure pipe without any tension.
- Install pressure line in at least DN 50.

A compression fitting DN 50 is supplied as a loose item on delivery.

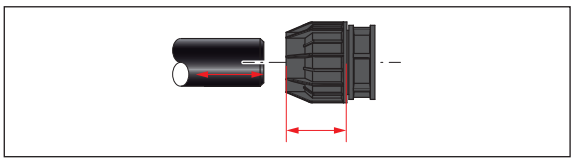
➔ Connect the on-site pressure line to the DN 50 / OD 50 mm pipe socket.



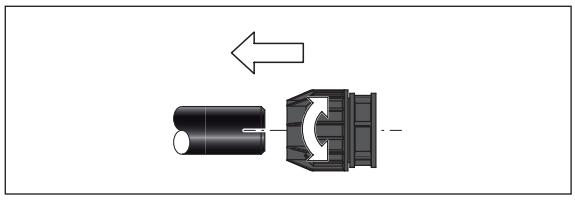
**Step 1: Fit the compression fitting**

➔ Chamfer the spigot of the connection pipe and lubricate with acid-free lubricant.

➔ Determine the insertion depth ↔ and mark it on the pipe.

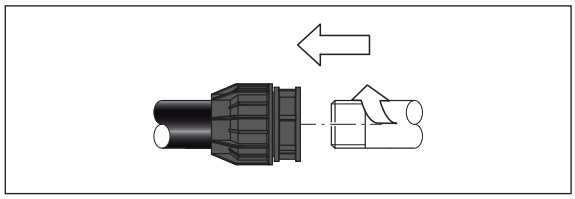


- ➔ Loosen the conical nuts on the compression fitting by a 3 – 4 turn (do not loosen off completely).
- ➔ Push the compression fitting onto the connection pipe as far as it will go or as far as the marking.
- ➔ Hand tighten the conical nut.
- ➔ Tighten for an optimal strength with tools suitable for plastic compression fittings.



### Step 2 a: Connect on-site pressure line

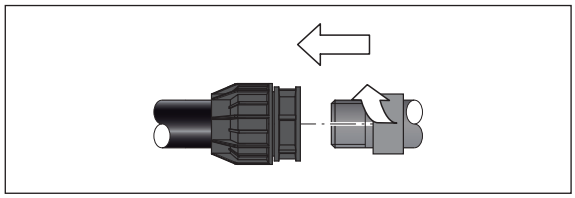
- ➔ Seal the on-site pressure line with a 1 ½" threaded connection (external thread) into the threaded sleeve of the compression fitting.



### Step 2 b: Connect pressure line

A 7.5 m long pressure line hose with a 1 ½" (male) threaded connection on one side can be obtained from ACO as an optional extra. Product features, illustration, weight and order number, Chap. 2.1 "Product features".

- ➔ Seal the pressure line hose with threaded connection 1 ½" into the threaded sleeve of the compression fitting.



**Step 3: Create a backflow loop in the pressure line**

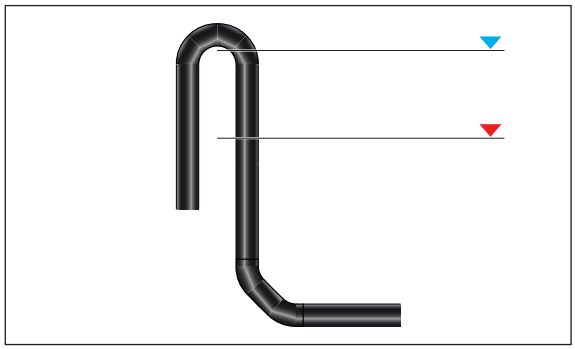
The wastewater must be drained via a backflow loop to be provided by the customer in order to operate the system in compliance with the standards. The backflow loop must be established above the backflow level. The installation example shows the base version, Chap. 2.7.2 "Muli-Flex -FR".

Definition of terms in accordance with EN 12056-4:

- “Back flow”: Wastewater return pressure from the sewer into the connected pipes.
- “Back flow level“: The highest level to which water can rise within a drainage system.
- “Back flow loop“: Part of the pressure pipe of a wastewater lifting plant above backflow level.

➔ Install the backflow loop at the bottom of the pipe ▼ above the level of the "backflow level”▼.

➔ Afterwards, feed the pipe to the sewer with a free gradient.



## 3.2.10 Laying and connecting the bottom drain line (optional)

Bottom drain line connects the collection tank to the on-site pump sump.

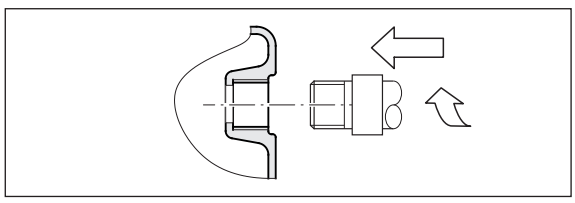
Threaded socket 1" (internal thread) on the collection tank has already been prepared for connecting the bottom drain line, Chap. 3.2.1 "Preparing connections".

**IMPORTANT** A shut-off valve must be installed in the bottom drain line.

Specifications:

- Install with a slope of at least 1.5 - 2 % from the collection tank to the pump sump. Do not reduce the cross-section.
- Choose resistant material (e.g. KML, PP, PE, PVC).

➔ Seal the on-site bottom drain line with a threaded connection 1 " (external thread) into the threaded socket.



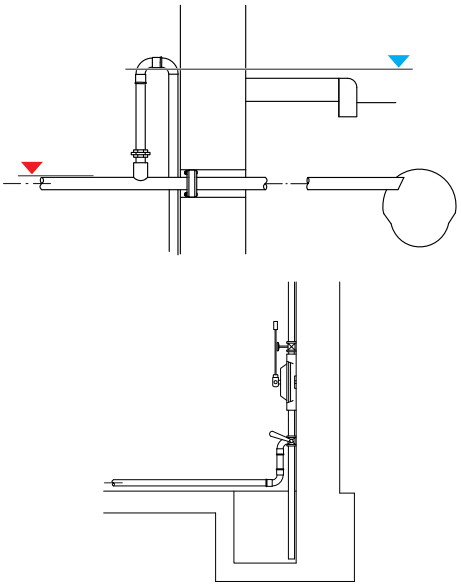
## 3.2.11 Laying and connecting the drain line (optional)

Drainage pipe connects the collection tank with the on-site connection pipe leading to the sewer.

Threaded socket 1½" (internal thread) on the collection tank has already been prepared for connecting the drain line, Chap. 3.2.1 "Preparing connections".

**IMPORTANT**

- Drain line must be connected to the connection line to the sewer after the backflow loop.
- In this case, the bottom ▼ of the discharge pipe is above the level ▼ of the connection pipe to the sewer.
- The drain line should be fitted with:
  - Three-way valve
  - Manual diaphragm pump
  - Shut-off valve
  - Branch pipe into the on-site pump sump

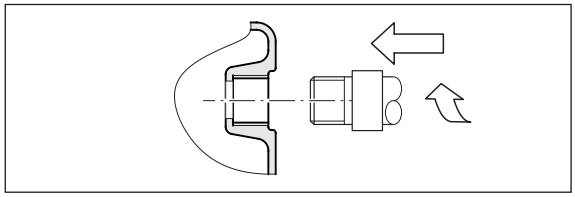


Three-way valve, manual diaphragm pump and shut-off valve can be obtained from ACO as an optional extra, chap. introduction "ACO Service".

Specifications:

- Install the pipe from the pipe loop of the connection pipe to the collection tank or the on-site pump sump with a gradient of at least 1.5 - 2 %. Do not reduce the stack cross-section.
- Choose resistant material (e.g. KML, PP, PE, PVC).

➔ Seal the on-site drain line with a 1½" threaded connection (external thread) into the threaded socket.



## 3.2.12 Mount necessary level sensor

- The necessary level sensor (accessory) for level measurement can be obtained from ACO.
- Product features and illustrations Chap. 2.1 "Product features", weights Chap. 2.5 "Scope of delivery Muli-Flex -FR".
- The level sensor (pressure transducer or open pressure bell) and cable glands are delivered as separate parts.

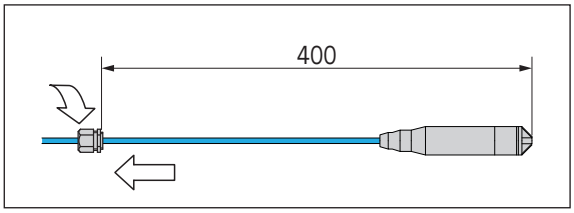
**IMPORTANT**

- Protect the ends of the connecting cable or control line against penetrating moisture and dirt.
- Ensure free movement (level sensor hangs freely downwards without obstruction) after installation.

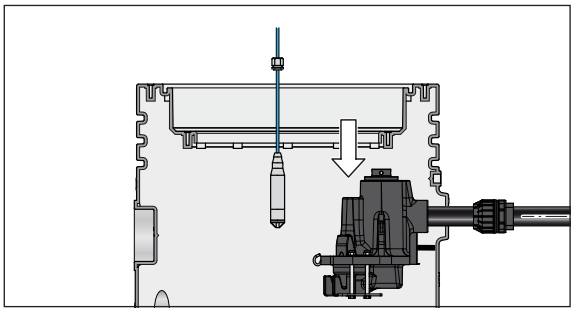
### Pressure transducer

The pressure transducer has a 20 m or 40 m long connection cable (already clamped and sealed to the pressure transducer) and is suspended from the support frame.

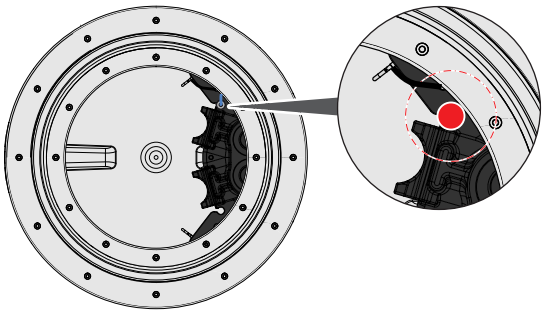
➔ Push the connection cable through the cable gland, adjust to a **length of 400 mm** and hand-tighten the union nut of the cable gland.



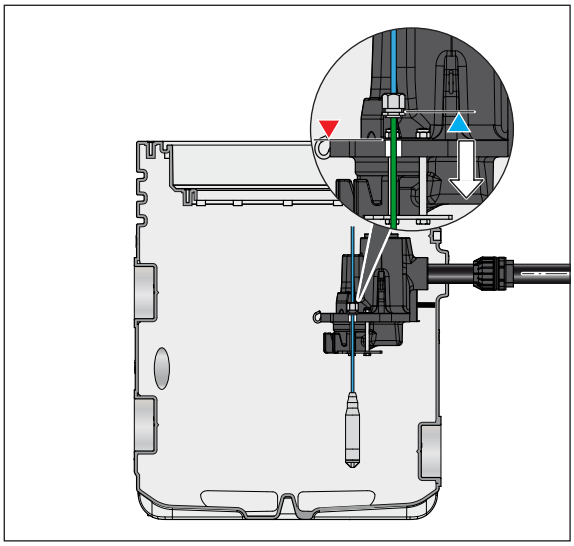

➔ Drain the pressure transducer on the connection cable into the collection tank.



Position of the recess ● on the support frame to receive the pressure transducer:



- ➔ Guide the connection cable ▮ below the cable gland into the recess in ● the support frame.
- ➔ Continue to lower the pressure transducer until the ▲ cable gland is seated on the upper edge ▼ of the support frame.
- ➔ Protect the end of the connection cable against dirt and moisture ingress and pull it (together with the connection cables of the submerged pumps) with the pull wire through the cable conduit to the installation location of the control unit, 📖 Chap 3.2.14 "Pulling the connection cable or control cable into the cable conduit".

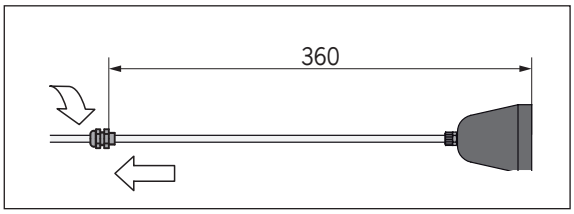


### Open pressure bell

Open pressure bell has a 20 m long pneumatic control line (hose connected to the bell) and is suspended from the support frame.

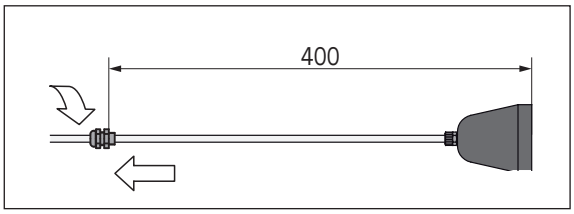
Version **without** air bubble injection:

- ➔ Push the control line through the cable gland, set it to the **longitudinal measurement 360 mm** and tighten the union nut of the cable gland as hand-tight.

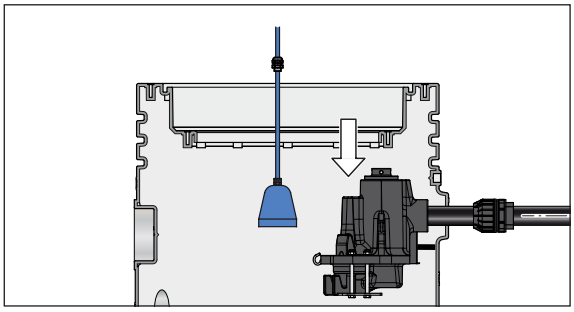



Version **with** air bubble injection:

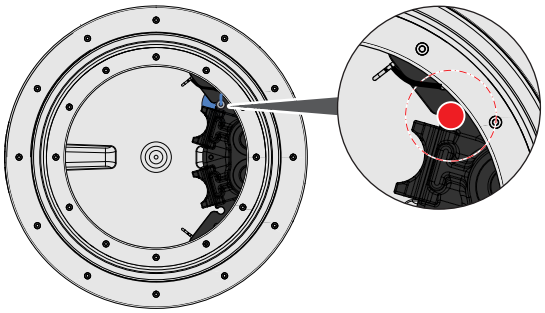
- ➔ Push the control line through the cable gland, set it to the **longitudinal measurement 400 mm** and tighten the union nut of the cable gland as hand-tight.



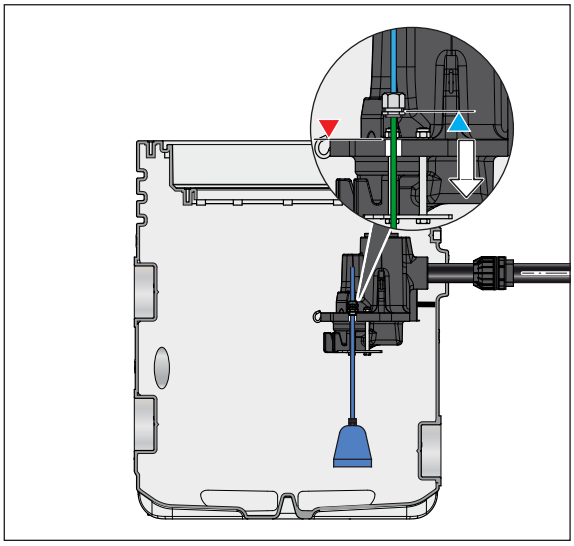

- ➔ Drain the pressure bell on the control line into the collecting tank.



Position of the recess ● on the support frame to receive the back pressure bell



- ➔ Guide the control line ▮ below the cable gland into the recess ● of the retaining bracket.
- ➔ Lower the pressure bell until the base of the ▲ cable gland rests on the upper edge ▼ of the support frame.
- ➔ Protect the end of the connection cable against dirt and moisture ingress and pull it (together with the connection cables of the submerged pumps) with the pull wire through the cable conduit to the installation location of the control unit, Chap 3.2.4 "Pulling the connection cable or control cable into the cable conduit".

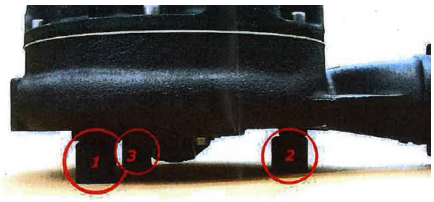


## 3.2.13 Insert submerged pump(s)

Applies to Muli-Flex -FR duo and mono.

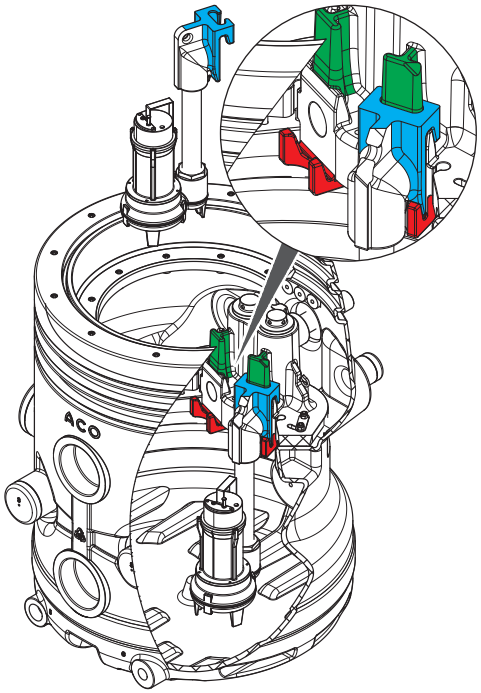
- The required submerged pump is supplied as a unit with mounted pressure line and connection.
- Product features and illustrations Chap. 2.1 "Product features", weights Chap. 2.5 "Scope of delivery Muli-Flex -FR".

**IMPORTANT** Before inserting, all 3 support feet on the submerged pump must be removed.

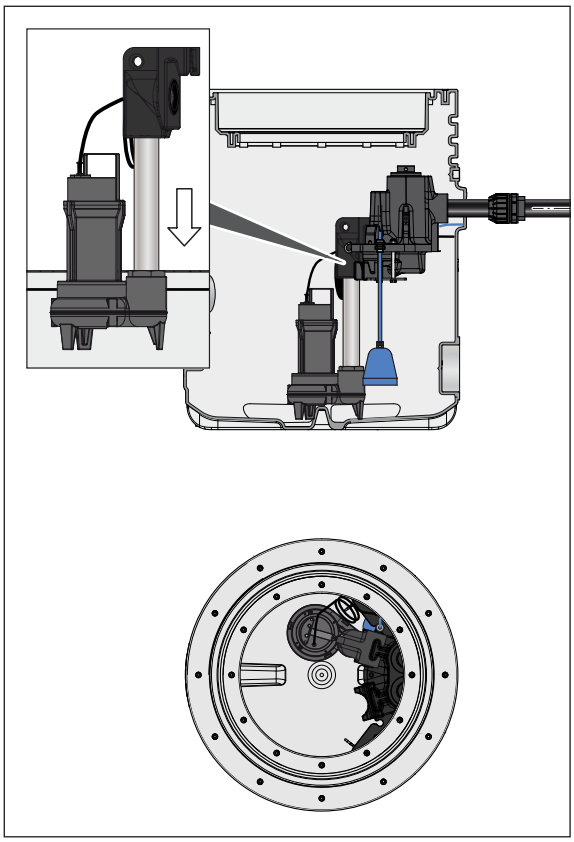



**IMPORTANT**

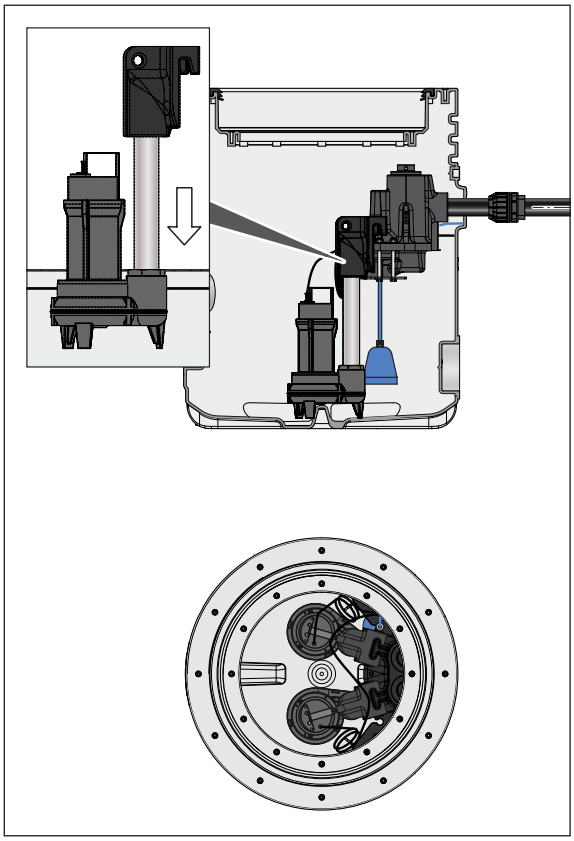
- When draining ■ the submerged pump, thread the into the guide ■ of the above-water coupling.
- After lowering, the guide hook ■ sits in the receptacle of the ■ above-water coupling.
- Two submerged pumps are used in the Muli-Flex -FR duo version.
- One submerged pump is used for the Muli-Flex -FR mono version. It does not matter which receptacle of the above-water coupling is used (front or rear).



➔ Drain submerged pump 1 into the collection tank and insert it into the receptacle ■ of the above-water coupling.



➔ Drain submerged pump 2 into the collection tank and insert it into the receptacle ■ of the above-water coupling.

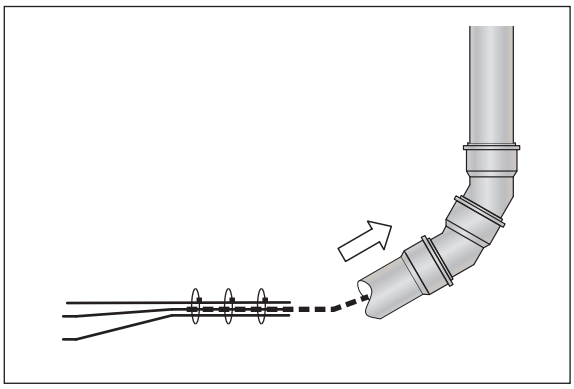


## 3.2.14 Pull the connection cable or control line into the cable conduit.

Specifications:

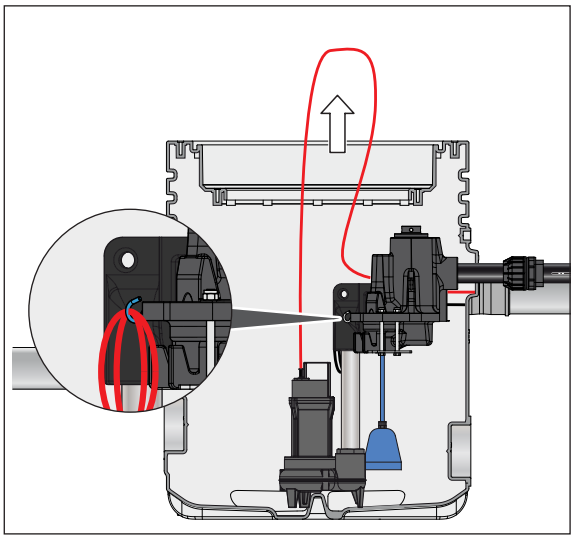
- Install the control line to the control system upwards, kink-free and frost-resistant manner.
- Ensure that the connecting cable or the control line protrudes sufficiently from the control unit (approx. 1 m) in order to guarantee adequate cabling in the terminal compartment or the connection to the control unit.

➔ Fasten the connection cable of the submerged pump(s), the connection cable of the pressure transducer or the control cable of the pressure bell with cable ties to the pull wire provided by the customer ▪▪▪▪ and pull it through the utility pipe (empty conduit) to the control unit or into the equipment compartment.



➔ **IMPORTANT** Pull the connecting cable back until a loop can be ▬ made at the top edge of the ground. This is the only way to remove the submerged pump(s) and the pressure transducer from the plant during operation.

➔ Hook the loops of ▬ the connection cables onto a fastening point ▬ (hook) on the support frame.



**IMPORTANT** Exception for control line:

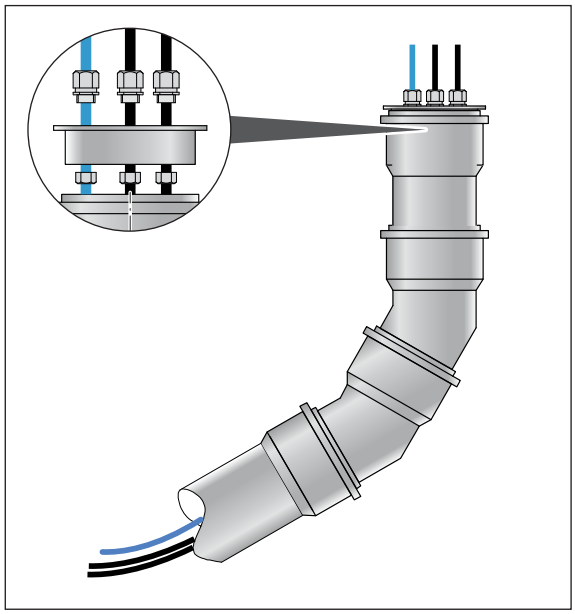
➔ Arrange these in an almost horizontal course from the cable gland to the beginning of the cable conduit.

## 3.2.15 Sealing penetrations

Necessary components, e.g. end covers, cable glands, are to be provided by the customer.

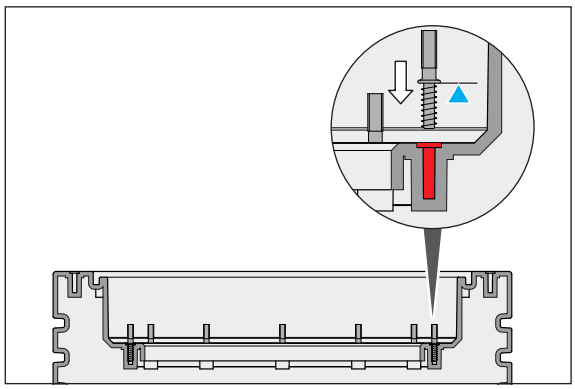
➔ Seal the connection cable of the submerged pump(s), the connection cable of the pressure transducer or the control line of the pressure bell at the end of the cable conduit.

**IMPORTANT** Do not squeeze the control cable (the clear cross-section must be kept intact).

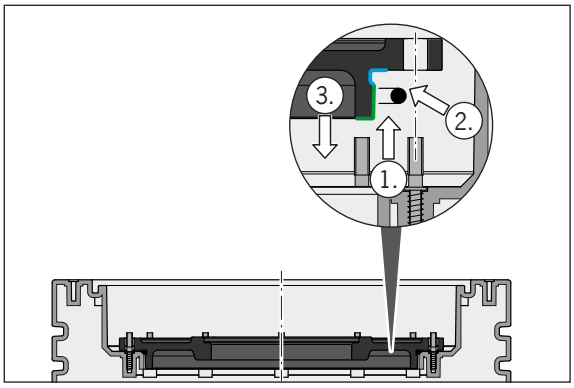


## 3.2.16 Installing the intermediate and bolt cover

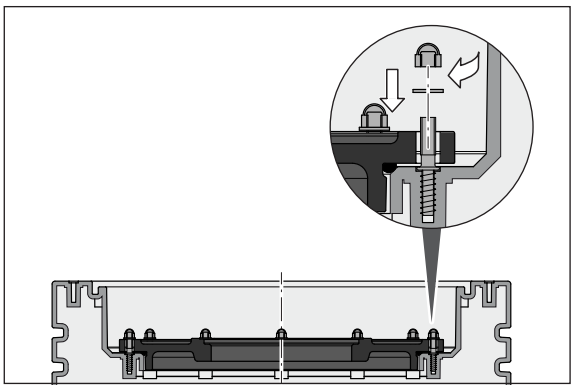
➔ Screw all stud bolts into blind holes of the collection tank up to the stop (collar of the stud bolt) and tighten by hand.



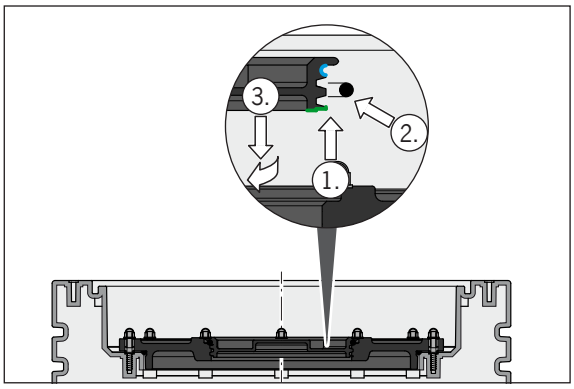
- Fit the O-ring over the spigot of the intermediate cover (1).
- Press the O-ring into the groove of the intermediate cover and distribute it evenly around the circumference (2).
- Position the holes of the intermediate cover over the stud bolts and place the intermediate cover in the receptacle of the collection tank (3).




- Slide all the washers over the set bolts.
- Turn all of the cap nuts onto stud bolts and tighten them crosswise by hand.



- Fit the O-ring over the spigot of the bolt cover (1).
- Press the O-ring into the groove of the bolt cover and press it evenly around the circumference (2).
- Place the bolt cover on the threaded receptacle of the intermediate cover, bolt it in and tighten by hand (3).




## 3.2.17 Leak test

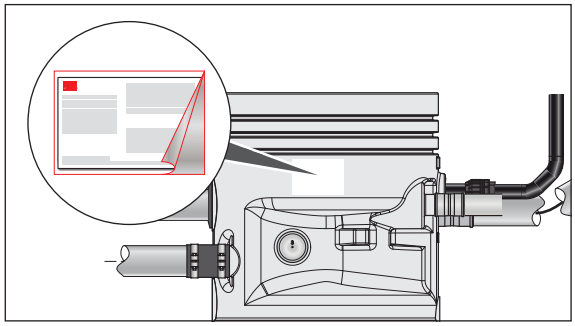
All drainage systems on private ground must be leak proof (only applies to Germany. Provisions in other countries can vary).

The requirements and provisions for the leak test sequence must be enquired about for each individual country.

## 3.2.18 Attach type plate

Type plate (adhesive label) is supplied as a loose item.

➔ Stick the type plate onto the collection tank.



## 3.3 Electrical installation

Applies to Muli-Flex -UF and Muli-Flex -FR.

**WARNING**

**Electric shock risk as a result of improper electrical installation**

- The control unit must not be connected to the power supply until after the sanitary installation and electrical installation have been completed.
- Electrical connections may only be executed by qualified electricians.
- The power supply must comply with the directives of the local power supplier. In particular, attention should be paid to the specific protection measures and the cable cross-sections and potential compensation.
- Electrical connections must be executed in accordance with the circuit diagram, Chapter 6.2.4 “Circuit diagram”.

### Overview of the work

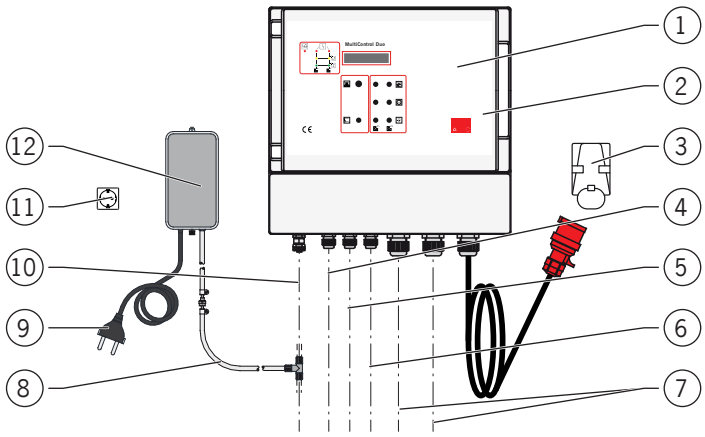



Figure: Version with duo control unit

| Item | Work | Chapter |
|---|---|---|
| 1 | Installing the control unit | 3.3.2 |
| 2 | Insert battery (only with mono control unit) | 3.3.3 |
| 3 | Connecting the control unit to the power supply | 3.3.10 |
| 4 | Connect the connection cable for the mini compressor (only for the version with air bubble injection). | 3.3.9 |
| 5 | Connect pressure sensor connection cable (only for version with pressure transducer) | 3.3.5 |
| 6 | Connecting fault message device (optional) | 3.3.6 |
| 7 | Connecting the submerged pump(s) | 3.3.4 |
| 8 | Connect air bubble injection (optional) | 3.3.9 |
| 9 | Prepare the connection cable of the mini compressor for connection to the control unit. | 3.3.9 |
| 10 | Connect control line (only for version with open pressure bell) | 3.3.9 |
| 11 | Install the socket with earth contact | 3.3.9 |
| 12 | Installing the mini compressor | 3.3.9 |
| – | Install safety barrier (optional) | 3.3.7 |

The work should be carried out in the following order.

### 3.3.1 Connections for the control unit

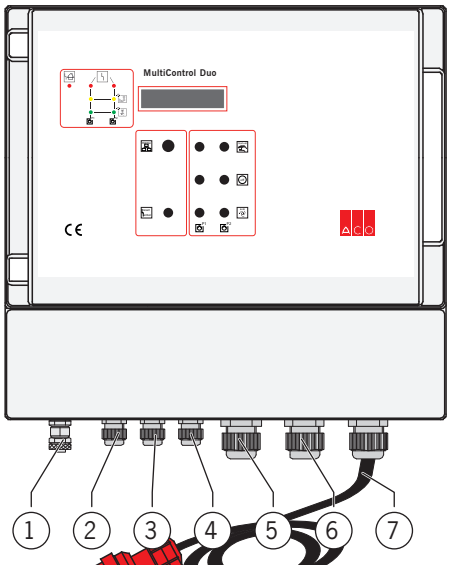



**Figure: Connections for MultiControl Duo**

1 = Connection, control line for pneumatic level measurement
2 = Connection, mini compressor power supply (optional)
3 = Pressure transducer connection
4 = Fault signal device connection (optional)
5 = Submerged pump 1 connection
6 = Submerged pump 2 connection
7 = 1.5 m connecting cable with CEE plug 16A

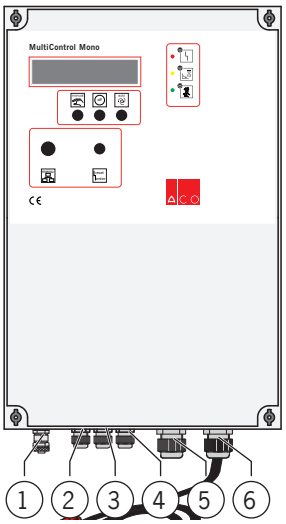



**Figure: Connections for MultiControl Mono**

1 = Connection, control line for pneumatic level measurement
2 = Connection, mini compressor power supply (optional)
3 = Pressure transducer connection
4 = Fault signal device connection (optional)
5 = Submerged pump connection
6 = 1.5 m connecting cable with CEE plug 16A

### 3.3.2 Installing the control unit

The control unit is supplied loose.

Specifications:

- Flood-proof and free wall area (width x height) of at least 400 mm x 400 mm
- Select the maximum distance according to the lengths of the connection cables of the submerged pumps and pressure transducer or the control line of the open pressure bell. If necessary, versions with longer connection cable or a control line can be purchased from ACO as optional components.

➔ Attach the control unit to the wall.

### 3.3.3 Insert the battery into the control unit

- Applies to MultiControl Mono
- The battery is supplied as a loose part.

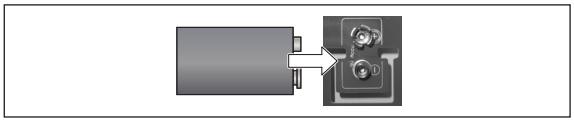
If the power supply is interrupted, the accumulator guarantees a mains-independent alarm. Once the accumulator is inserted, the alarm is automatically activated.

**IMPORTANT**

- De-energize the control unit before inserting it.
- Damage to the control unit: Only use original ACO batteries.

➔ Unscrew the cover of the control.

➔ Insert the accumulator at the position on the circuit board.

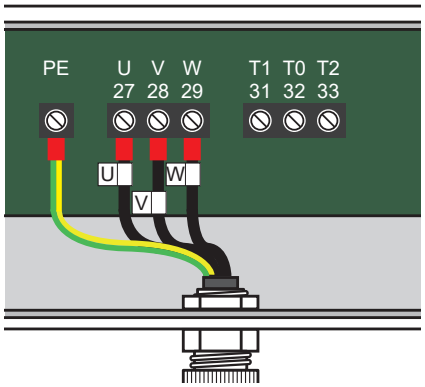
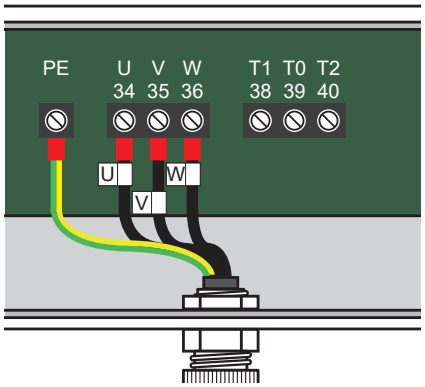
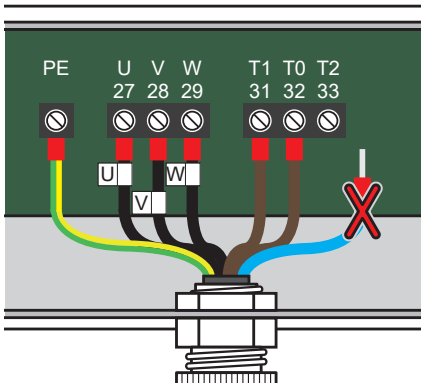
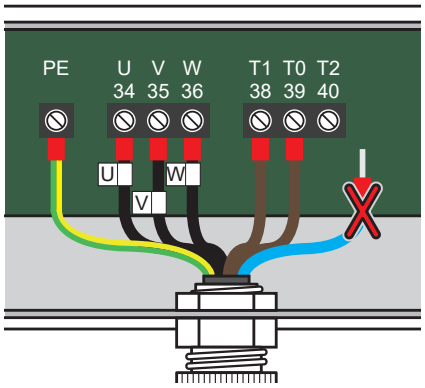
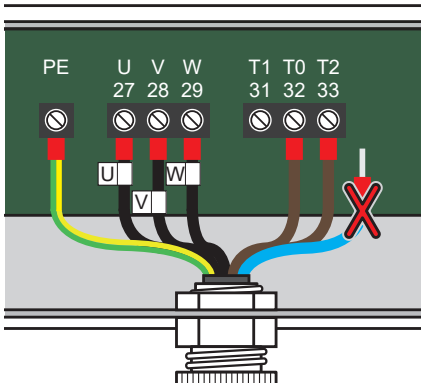
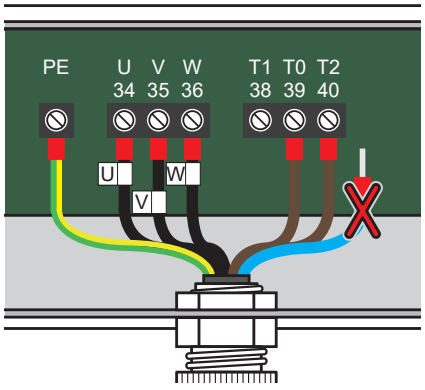


### 3.3.4 Connect the connection cable of the submerged pump(s)

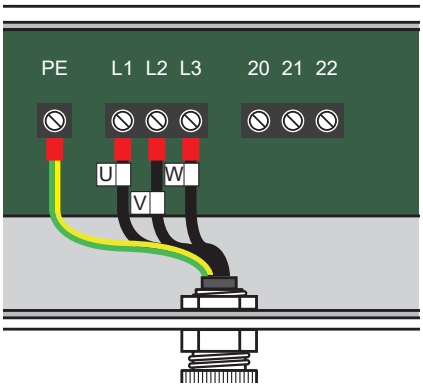
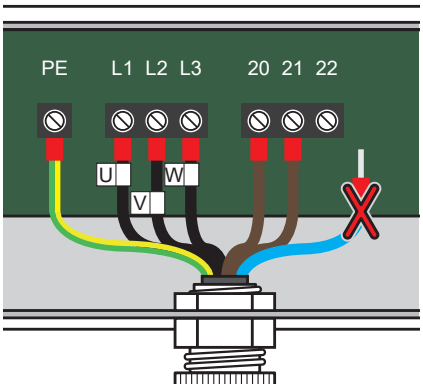
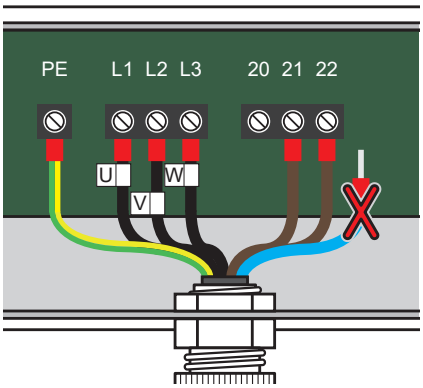
**IMPORTANT**

- When connecting Temp 1: Submerged pump too hot, submerged pump is switched off. Release after cooling down by acknowledging the fault.
- When connecting Temp 2: Submerged pump too hot, submerged pump is switched off or another submerged pump starts. Automatic release after cooling.
- The connection of the connecting cables on the circuit board must be made as follows

**Duo control unit**

| | Submerged pump 1 | Submerged pump 2 |
|---|---|---|
| 2 x SAT-V 75/2/50/D or. 2 x SAT-V 150/2/50/D |  |  |
| 2 x SITA 200 N-ex-G Temp 1 |  |  |
| 2 x SITA 200 N-ex-G Temp 2 |  |  |

## Mono control unit

| | Submerged pump |
|---|---|
| 2 x SAT-V 75/2/50/D or. 2 x SAT-V 150/2/50/D |  |
| 2 x SITA 200 N-ex-G Temp 1 |  |
| 2 x SITA 200 N-ex-G Temp 2 |  |

➔ Connect the connection cable of the submerged pump(s) to the control unit.

➔ Adjust the length of the connecting cable or hang in sufficiently large loops and attach.

**IMPORTANT** There is a rotating arrow on the submerged pump (fixed or as a sticker).

➔ Check the direction of turn

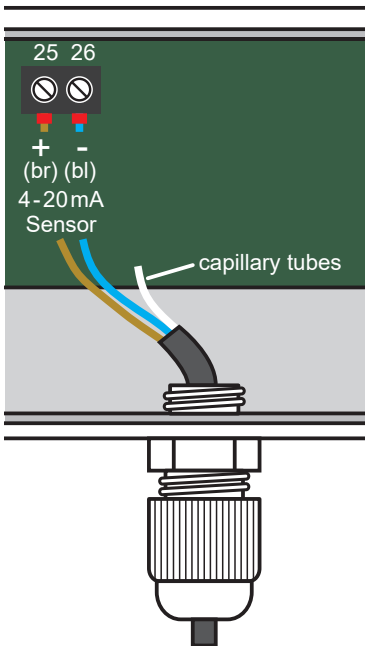
- ☐ Clean the impeller / cutting unit and then switch the submerged pump on and off briefly.
- ☐ Compare the direction of rotation with the rotation arrow and, if necessary, reverse the phases on the circuit board.

### 3.3.5 Connect the connection cable of the pressure transducer

Applies to version with pressure transducer

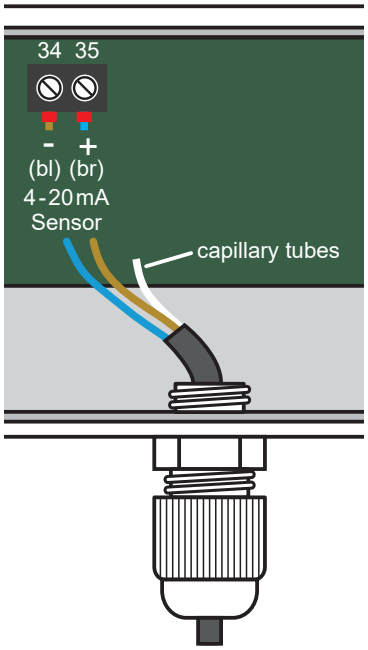
**IMPORTANT** The connection cable must be connected to the circuit board as follows (+ and - must not be reversed):

**Duo control unit**




The wire with brown insulation must be connected to terminal 25 and the wire with blue insulation to terminal 26.

**Mono control unit**




Wire with blue insulation is to be connected to terminal 34 and wire with brown insulation to terminal 35.

- ➔ Connect the pressure transducer connection cable to the control unit.
- ➔ Adjust the length of the connecting cable or hang in loops and attach.
  **IMPORTANT** Do not crush the white capillary tube (routed with the wires in the connection cable) when shortening (clear cross-section must remain free). Capillary tube is not to be connected, but remains hanging freely.

### 3.3.6 Connecting the fault signalling equipment

**IMPORTANT** If fault signalling equipment is specified, then this should be installed in such a way that a system malfunction is signalled to every connected accommodation unit.

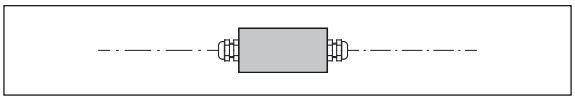
A cable (2-wire/at least 0.75 mm²) must be connected in the control unit to forward the potential-free contact to the building management system (BMS) as a group alarm.

### 3.3.7 Install safety barrier (optional)

**IMPORTANT** If the pressure transducer is used in an explosion-proof area and with waste water containing faecal matter, a safety barrier must be installed.

- A safety barrier can be obtained from ACO as an optional extra. Product features, illustration, weight and order number Chap. 2.1 "Product features".
- The safety barrier is supplied as a loose part.

➔ Install or connect the safety barrier into the connection line of the pressure transducer.



### 3.3.8 Connecting the control line

Applies to version with pressure bell.

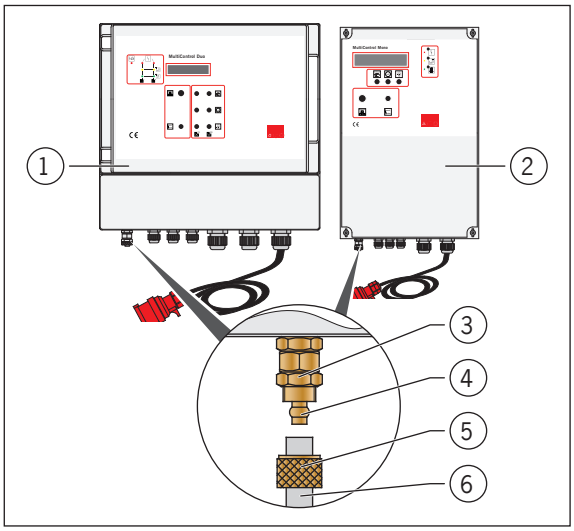
**IMPORTANT** To prevent malfunctions:

- Always lay the control line for the control system as rising, kink-free and frost-resistant (lay, e.g. in a reserve cable conduit of at least DN 50).
- Use a cutter to adjust the control cable length at right angles.
- Only connect the control cable to the MultiControl Duo Control when the open pressure bell is not hanging in the water.

➔ On the duo control unit (1) or mono control unit (2), unscrew the union nut (5) from the compression fitting (3) and push it over the control line (6).

➔ Push the control cable (6) onto the bush (4).

➔ Twist the union nut (5) onto the compression fitting (3) and tighten hand-tight.



## 3.3.9 Connecting the air bubble injection (optional)

- Air bubble injection system can be obtained from ACO as an optional extra. Product features, illustration, weight and order number Chap. 2.1 "Product features".
- Components for the air bubble injection are supplied as loose parts.

### Assembling the mini compressor onto a wall

The mini compressor has a 1.5 m long connection cable with Schuko earthed safety plug.

Requirement: Flood-proof and free wall surface 100 mm x 200 mm (width x height) near the control unit

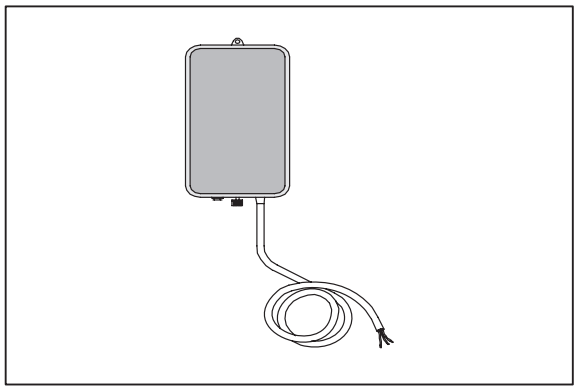
### Connecting the mini compressor to the power supply

➔ Note the connection value 230 V/50 Hz.

➔ Install the Schuko earthed safety socket or connect to the control:

➔ Strip the ends of the cables and fit on wire-end ferrules.

➔ Unscrew the cover of the control unit and connect the cable ends.

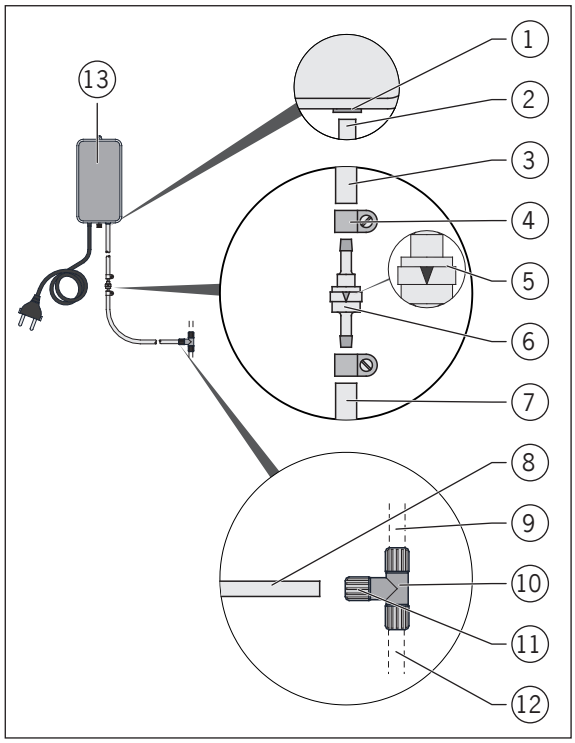


### Connecting the control line

In the as-delivered condition, the connection parts are enclosed with the mini compressor as loose items.

**IMPORTANT**In order to prevent malfunctions:
Use a cutting knife to adjust the control pipe length at right angles.

- ➔ Cut the control pipe (12).
- ➔ Push the hose ends (8, 9 + 12) into the retainers of the screw-in T-fitting (10) and clamp (tighten hand-tight) using the respective union nuts (11).
- ➔ Push hose clamp (4) over the end (7) of the 0.5 m long hose.
- ➔ Push the hose end (7) onto the hose bush of the spring check valve (6), in accordance with the installation direction (5), and fix using a hose clamp (4).
- ➔ Push hose clamp (4) over the end (3) of the 0.5 m long hose.
- ➔ Push the hose end (3) onto the other hose bush of the spring check valve (6) and fix using a hose clamp (4).
- ➔ Push the other end of the hose (2) over the retainer (1) of the mini compressor (13).




## 3.3.10 Connecting the control unit to the power supply

**IMPORTANT** Connection data, chap. 6.6.1 "Duo control unit" or chap. 6.6.2 "Mono control unit".

- ➔ Install a CEE socket 16 A near the control unit according to the manufacturer's specifications (control unit connection cable 1.5 m long).
- ➔ Insert the CEE plug (16 A) into the CEE socket.

# 4 Operation

**CAUTION**

**Risk of infection in the event of contact with wastewater**

- Wear protective equipment, 🕮 Chap. 1.4 "Personal protective equipment".

## 4.1 Commissioning

Based on the normative requirements (EN 12056-4), the start-up must be carried out by an appropriately competent person.

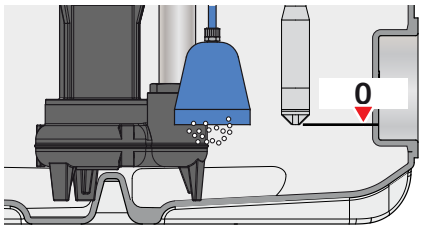
The commissioning must be documented, 🕮 Appendix: “Commissioning record”.

- ➔ Empty and clean the collection tank.
- ➔ Connect the control unit to the electric power supply.
- ➔ Set the adjustment values in the menu items of the control unit, 🕮 Chap. 4.2 "Setting the control unit".
- ➔ Open the gate valve (if present) in the inlet pipe(s).
- ➔ Start up the submerged pump(s), 🕮 Chap. 4.3 "Putting submerged pump(s) into operation".
- ➔ Execute a test run, 🕮 Chapter 4.4 “Executing a test run”.
- ➔ Set the automatic mode on the control unit.
- ➔ Close maintenance opening.

## 4.2 Setting the control unit

**IMPORTANT**

- There must not be any water in the collection tank when the setting is made.
- If more than one supply line is connected, the setting values for the water level levels must be set for the **lowest supply.**
- The reference point for the switching pressure or the setting values for the water level is the lower edge of the level sensor (pressure transducer or open pressure bell).




The possible connections ( chap. 2.8.1 "Muli-Flex -UF" or chap. 2.8.2 "Muli-Flex -FR" ) for supply lines are abbreviated or shown in the following tables as follows:

- Connection according to item 1 = (1)
- Connection according to item 4 = (4)
- Connection according to item 6 = (6)
- Connection according to item 7 = (7)
- Connection according to item 8 = (8)
- Connection according to item 10 = (10)
- Connection according to item 11 = (11)

## 4.2.1 Muli-Flex duo

The setting values from the following table are to be set in the menu items. Later adjustments are to be entered in the table by hand.

### 4.2.1.1 Level sensor _ Bell with air bubble injection and pressure transducer

| Menu items | Unit | Setting values Commissioning Connections | | | | | | | Adjustments Connection |
|---|---|---|---|---|---|---|---|---|---|
| | | 4 | 10 | 7 | 11 | 1 | 6 | 8 | ○ |
| Base load ON | cm | 8 | 5 | 20 | 20 | 22 | 25 | 40 | |
| Base load OFF | cm | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| Peak load ON | cm | 11 | 12 | 27 | 27 | 29 | 32 | 47 | |
| Peak load OFF | cm | 9 | 7 | 22 | 22 | 24 | 27 | 42 | |
| High water level | cm | 12 | 14 | 29 | 29 | 31 | 34 | 49 | |
| Run time altern. | Minimum | 5 | | | | | | | |
| Run time max | Minimum | 0 | | | | | | | |
| Start Delay | s | 0 | | | | | | | |
| Stop delay | s | 2 | | | | | | | |
| max. current | A | ■ 1.3 A (Submerged pump SAT-V 75/2/50/D)<br>■ 2,6 A (Submerged pump SAT-V 150/2/50/D)<br>■ 3.3 A (Submerged pump SITA 200 N-ex-G) | | | | | | | |
| Force Activation | s | 5 | | | | | | | |
| Acoustic alarm | – | activated | | | | | | | |
| Interm. alarm | – | deactivated | | | | | | | |
| Pump alternation | – | activated | | | | | | | |
| P1:therm. fault 1 | – | deactivated | | | | | | | |
| P1:therm. fault 2 | – | deactivated | | | | | | | |
| rot. field fault | – | activated | | | | | | | |
| ATEX mode | – | deactivated * | | | | | | | |
| Service-Mode | – | deactivated | | | | | | | |
| Level control | – | ■ Internal transducer (only for versions with open pressure bell and air bubble injection)<br>■ 4 - 20 mA interface (only for versions with pressure transducer) | | | | | | | |
| 20 mA => level | 0 – 1,000 cm | 200 (only for versions with pressure transducer) | | | | | | | |
| Language | German, English... | German | | | | | | | |
| * Setting = "activated" when using SITA 200 N-ex-G | | | | | | | | | |

### 4.2.1.2 Level sensor _ Bell without air bubble injection

| Menu items | Unit | Setting values Commissioning Connections | | | | | | | Adjustments Connection |
|---|---|---|---|---|---|---|---|---|---|
| | | 4 | 10 | 7 | 11 | 1 | 6 | 8 | ○ |
| Base load ON | 0 – 200 cm | 4 | 5 | 16 | 16 | 18 | 21 | 36 | |
| Base load OFF | 0 – 200 cm | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| Peak load ON | 0 – 200 cm | 7 | 12 | 23 | 23 | 25 | 28 | 43 | |
| Peak load OFF | 0 – 200 cm | 5 | 7 | 18 | 18 | 20 | 23 | 38 | |
| High water level | 0 – 200 cm | 8 | 14 | 29 | 29 | 31 | 34 | 49 | |
| Run time altern. | Minimum | 5 | | | | | | | |
| Run time max | Minimum | 0 | | | | | | | |
| Start Delay | s | 0 | | | | | | | |
| Stop delay | 0 – 180 s | 6 | | | | | | | |
| max. current | 0.3 – 14.0 A | ■ 1.3 A (Submerged pump SAT-V 75/2/50/D)<br>■ 2.6 A (Submerged pump SAT-V 150/2/50/D)<br>■ 3.3 A (Submerged pump SITA 200 N-ex-G) | | | | | | | |
| Force Activation | s | 5 | | | | | | | |
| Acoustic alarm | – | activated | | | | | | | |
| Interm. alarm | – | deactivated | | | | | | | |
| Pump alternation | – | activated | | | | | | | |
| P1:therm. fault 1 | – | deactivated | | | | | | | |
| P1:therm. fault 2 | – | deactivated | | | | | | | |
| rot. field fault | – | activated | | | | | | | |
| ATEX mode | – | deactivated * | | | | | | | |
| Service-Mode | – | deactivated | | | | | | | |
| Level control | – | Internal converter | | | | | | | |
| 20 mA => level | 0 – 1,000 cm | 0 | | | | | | | |
| Language | German, English... | German | | | | | | | |

*Setting = "activated" when using SITA 200 N-ex-G

## 4.2.2 Muli-Flex mono

The setting values from the following table are to be set in the menu items. Later adjustments are to be entered in the table by hand.

### 4.2.2.1 Level sensor _ Bell with air bubble injection and pressure transducer

| Menu items | Unit | Setting values Commissioning Connections | | | | | | | Adjustments Connection |
|---|---|---|---|---|---|---|---|---|---|
| | | 4 | 10 | 7 | 11 | 1 | 6 | 8 | ○ |
| Base load ON | cm | 8 | 5 | 20 | 20 | 22 | 25 | 40 | |
| Base load OFF | cm | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| High water level | cm | 12 | 14 | 29 | 29 | 31 | 34 | 49 | |
| Run time max | Minimum | 0 | | | | | | | |
| Start Delay | s | 0 | | | | | | | |
| Stop delay | s | 2 | | | | | | | |
| max. current | A | ■ 1.3 A (Submerged pump SAT-V 75/2/50/D)<br>■ 2.6 A (Submerged pump SAT-V 150/2/50/D)<br>■ 3.3 A (Submerged pump SITA 200 N-ex-G) | | | | | | | |
| Force Activation | s | 5 | | | | | | | |
| Acoustic alarm | – | activated | | | | | | | |
| Interm. alarm | – | deactivated | | | | | | | |
| therm. fault 1 | – | deactivated | | | | | | | |
| rot. field fault | – | activated | | | | | | | |
| ATEX mode | – | deactivated * | | | | | | | |
| Service-Mode | – | deactivated | | | | | | | |
| Level control | – | ■ Internal transducer (only for versions with open pressure bell and air bubble injection)<br>■ 4 - 20 mA interface (only for versions with pressure transducer) | | | | | | | |
| 20 mA => level | 0 – 1,000 cm | 400 (only for versions with pressure transducer) | | | | | | | |
| Language | German, English... | German | | | | | | | |
| * Setting = "activated" when using SITA 200 N-ex-G | | | | | | | | | |

### 4.2.2.2 Level sensor _ Bell without air bubble injection

| Menu items | Unit | Setting values Commissioning Connections | | | | | | | Adjustments Connection |
|---|---|---|---|---|---|---|---|---|---|
| | | 4 | 10 | 7 | 11 | 1 | 6 | 8 | ○ |
| Base load ON | cm | 4 | 5 | 20 | 20 | 22 | 25 | 40 | |
| Base load OFF | cm | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| High water level | cm | 8 | 14 | 29 | 29 | 31 | 34 | 49 | |
| Run time max | Minimum | 0 | | | | | | | |
| Start Delay | s | 0 | | | | | | | |
| Stop delay | s | 6 | | | | | | | |
| max. current | A | ■ 1.3 A (Submerged pump SAT-V 75/2/50/D)<br>■ 2.6 A (Submerged pump SAT-V 150/2/50/D)<br>■ 3.3 A (Submerged pump SITA 200 N-ex-G) | | | | | | | |
| Force Activation | s | 5 | | | | | | | |
| Acoustic alarm | – | activated | | | | | | | |
| Interm. alarm | – | deactivated | | | | | | | |
| therm. fault 1 | – | deactivated | | | | | | | |
| rot. field fault | – | activated | | | | | | | |
| ATEX mode | – | deactivated * | | | | | | | |
| Service-Mode | – | deactivated | | | | | | | |
| Level control | – | Internal converter | | | | | | | |
| 20 mA => level | 0 – 1,000 cm | 0 | | | | | | | |
| Language | German, English... | German | | | | | | | |

*Setting = "activated" when using SITA 200 N-ex-G

## 4.3 Starting up the submerged pump(s)

Description applies to both submerged pumps, using the Muli-Flex -UF as an example.

**IMPORTANT**

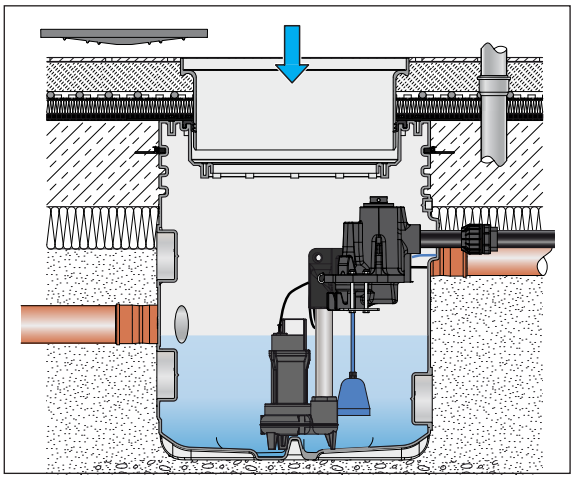
- To ensure dry-running protection, the pump chamber must be vented during the initial start-up.
- For Muli-Flex -FR version, dismantle intermediate cover beforehand, chap. 3.2.15 "Installing intermediate and bolt cover" (in reverse order).

Filling should be done with drinking water.

Requirements:

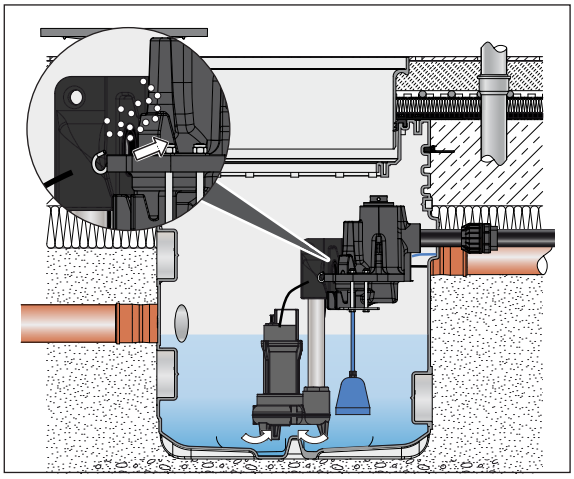
- All installation work is now completed.
- Gate valves (if any) in inlet pipe(s) have been opened.
- The control unit is connected to the power supply.

➔ Fill the collection tank with water via the inlet pipe(s) or the maintenance opening up to approx. the upper edge of the submerged pump(s).



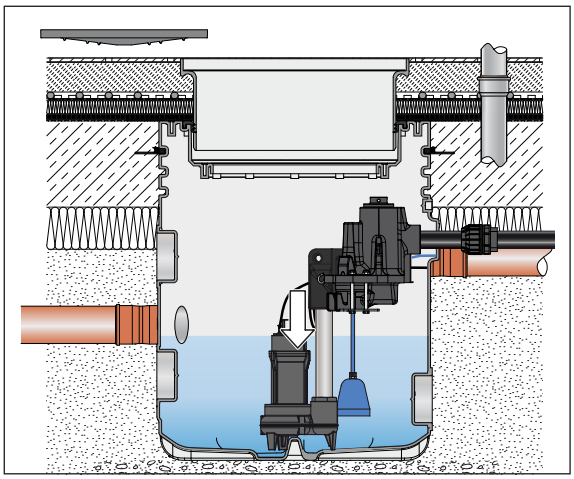
➔ Switch on the submerged pump at the control unit and lift the "submerged pump" unit a small distance.
**IMPORTANT** Guide hook must still remain in the guide of the above-water coupling.

Water flows into the submerged pump from below, air is displaced upwards into the pressure line and escapes via the opening of the connection unit.



➔ Lower the "submerged pump" unit again until the guide hook is completely seated in the guide of the above-water coupling.

➔ Switch off the submerged pump.



## 4.4 Execute trial run

Requirements:

- Gate valve in the inlet pipe (if there is one) is open.
- The control unit is connected to the power supply.

During the trial run, pay attention to the following:

- Perform the trial run at least twice during commissioning.
- Carry out a test run with drinking water.
- Avoid dry running during the trial run.
- Observe the signals/messages in the display panel of the control unit.

**IMPORTANT**

- If no stop delay period is set (value = 0), the submerged pumps are switched off when the "base load OFF" level is reached.
- If knocking noises/vibrations occur in the pressure pipe when the pump is switched off, set a stop delay period or increase the set stop delay period.
- If the level sensing does not determine any liquid, the pumps cannot be started. This applies to the manual function, and to 24h operation and the telecontrol systems.
- Requirement for the version with an open pressure bell with air bubble injection and for pressure transducer:
  The water level at the "stop delay OFF" level is approx. 20 mm above the lower edge of the level sensor.
- Requirement for version with open pressure bell without air bubble injection:
  The water level at the "stop delay period OFF" level is approx. 20 mm below the lower edge of the pressure bell.

Fill the collection tank via the inlet pipe(s) or via the maintenance opening.

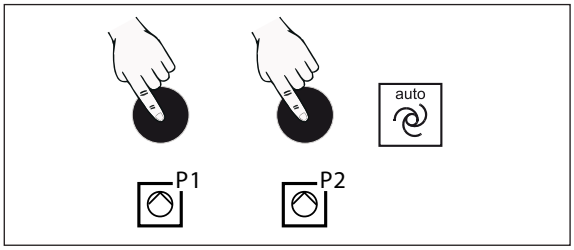
## 4.4.1 Muli-Flex duo

### 4.4.1.1 Version with pressure transducer or open pressure bell with air bubble injection

Shown: open pressure bell with air bubble injection

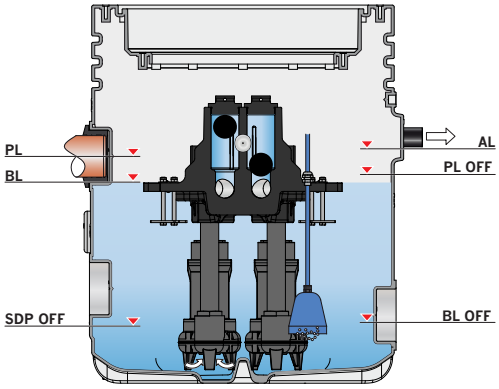
**Starting automatic mode:**

➔ Press both "auto" buttons to start automatic operation of submerged pump 1 and 2.



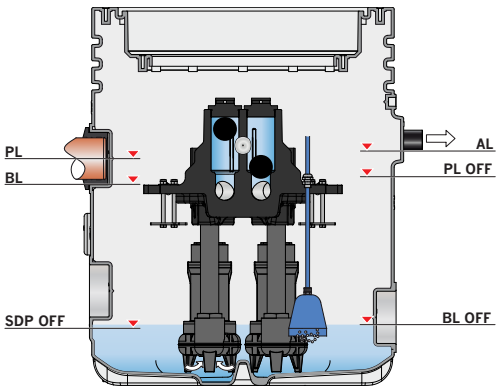

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump 1 switches on.



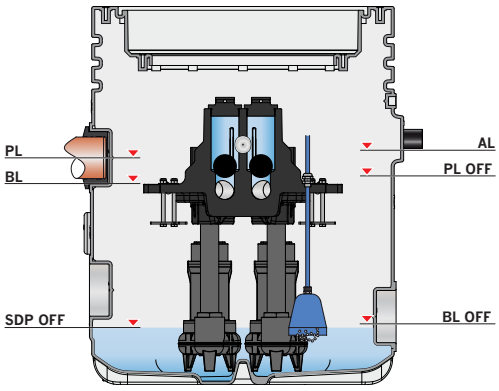

➔ Interrupt the inlet.

If the water level reaches the "Base load OFF" level (BL OFF), the set stop delay period of submerged pump 1 is activated.



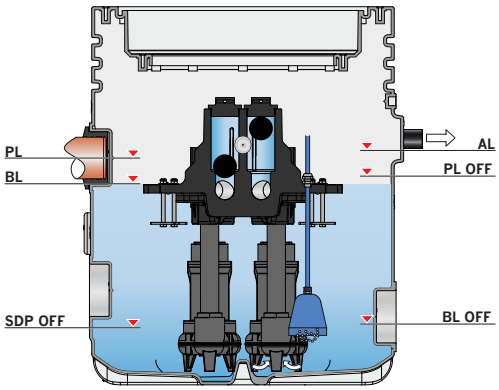
After the stop delay period has expired, submerged pump 1 is switched off. Level "Stop delay period OFF" (SDP OFF) is reached.

**IMPORTANT** If the level is not approx. 1 - 2 cm above the lower edge of the level sensor (check via the maintenance opening), the stop delay period should be adjusted.



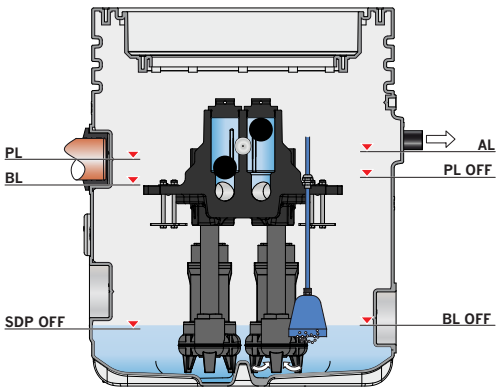

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump 2 switches on.



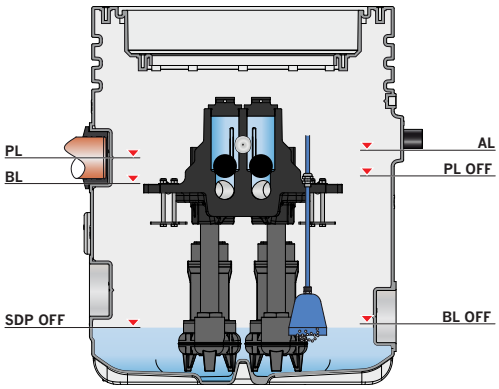

➔ Interrupt the inlet.

If the water level reaches the "Base load OFF" level (BL OFF), the set stop delay period of submerged pump 2 is activated.



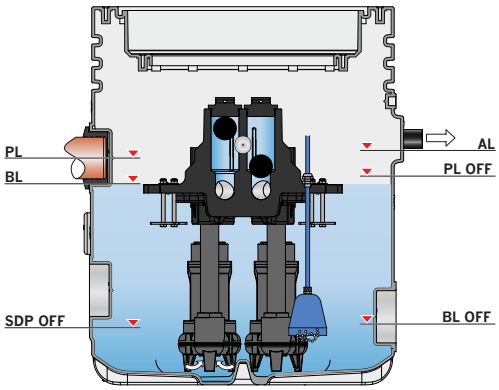
After the stop delay period has expired, submerged pump 2 is switched off. Level "Stop delay period OFF" (SDP OFF) is reached.

**IMPORTANT** If the level is not approx. 1 - 2 cm above the lower edge of the level sensor (check via the maintenance opening), the stop delay period should be adjusted.



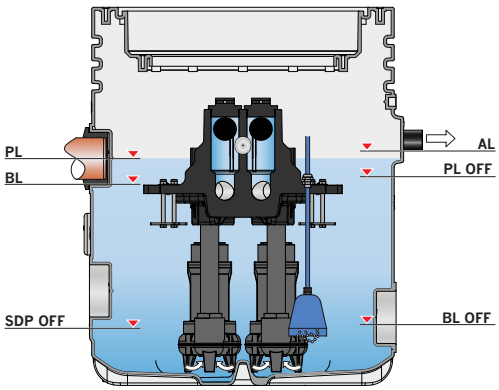

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump 1 switches on.



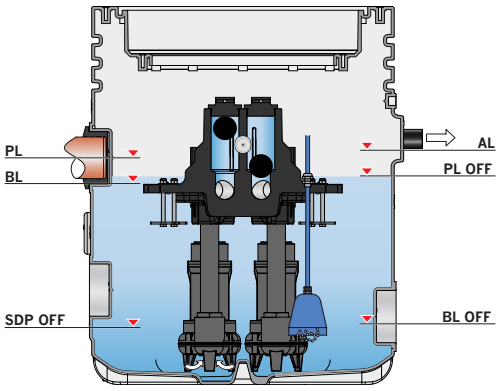

➔ Increase the inlet flow so that the water level continues to rise.

When the water reaches the “Peak load” (PL) level submerged pump 2 also switches on.

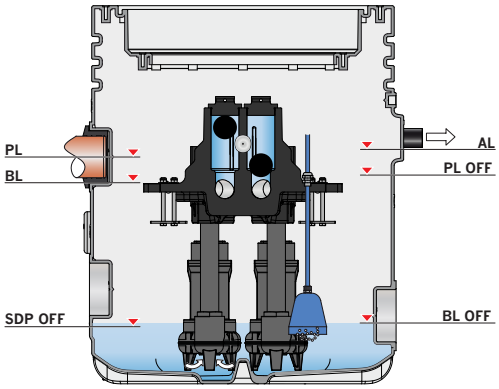



➔ Interrupt the inlet.

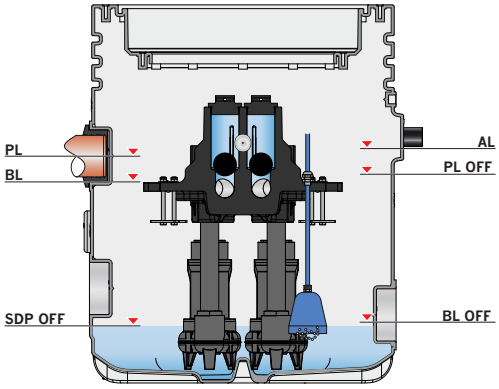
When the water level reaches the “Peak load OFF” (PL OFF) level, submerged pump 2 switches off.




If the water level reaches the "Base load OFF" level (BL OFF), the stop delay period of submerged pump 1 is activated.

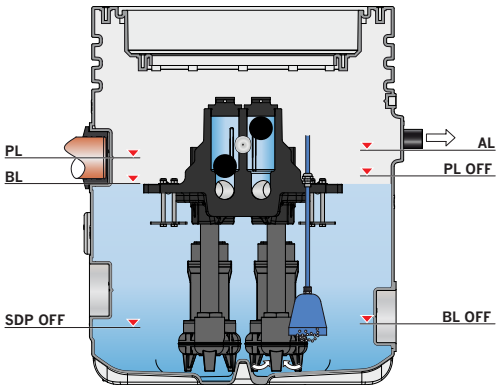



After the stop delay period has expired, submerged pump 1 is switched off. Level "Stop delay period OFF" (SDP OFF) is reached.



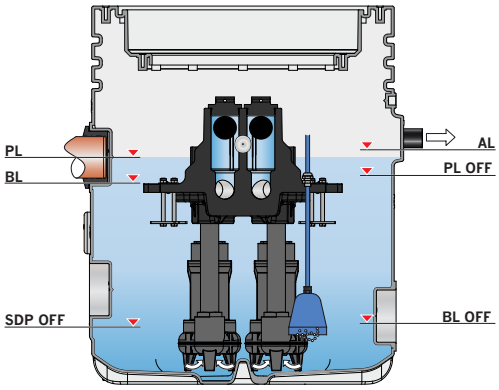

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump 2 switches on.



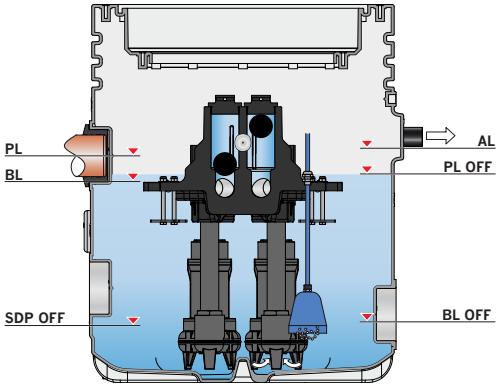

➔ Increase the inlet flow so that the water level continues to rise.

When the water reaches the “Peak load” (PL) level submerged pump 1 also switches on.



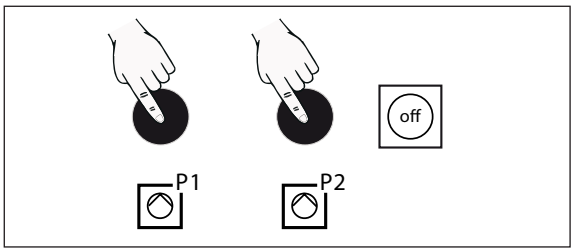

➔ Interrupt the inlet.

When the water level reaches the “Peak load OFF” (PL OFF) level, submerged pump 1 switches off.



**Ending automatic mode:**

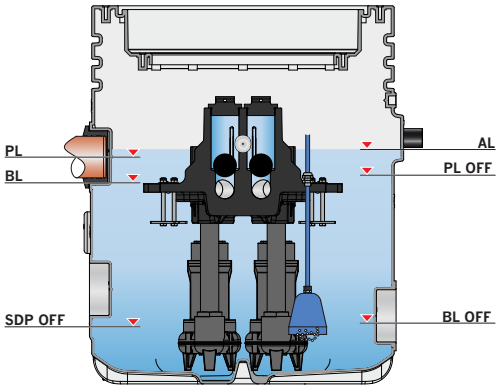
➔ Press both "off" buttons to end the automatic mode of pumps 1 and 2.




➔ Fill the collection tank.

If the water level reaches the "high water alarm" (AL):

- Alarm sounds
- LED lights up
- "High water alarm" appears in the display field




➔ End inflow.

**Acknowledging a malfunction:**

➔ Press the "reset enter" button to acknowledge the fault:

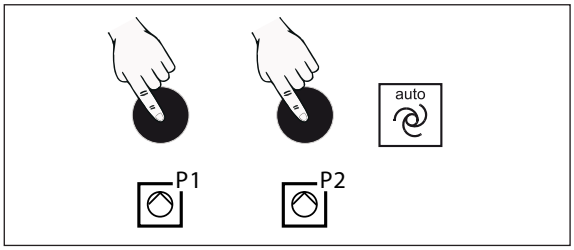
- ☐ Alarm goes off
- ☐ LED goes out
- ☐ the message "High water alarm" in the display panel goes out


**The test run is finished, repeat the test run a second time.**

### 4.4.1.2 Version with open pressure bell without air bubble injection

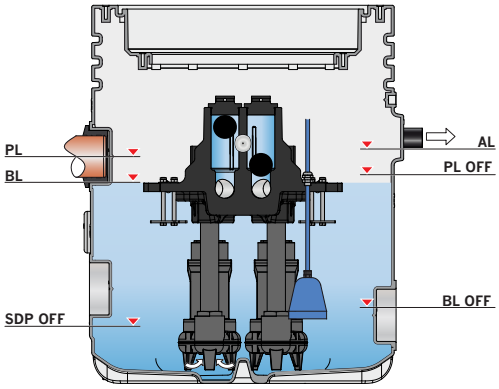
**Starting automatic mode:**

➔ Press both "auto" buttons to start automatic operation of submerged pump 1 and 2.



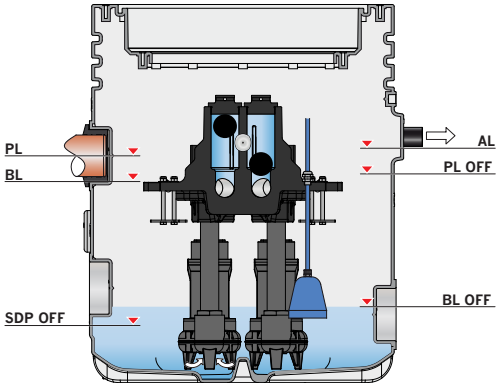

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump 1 switches on.



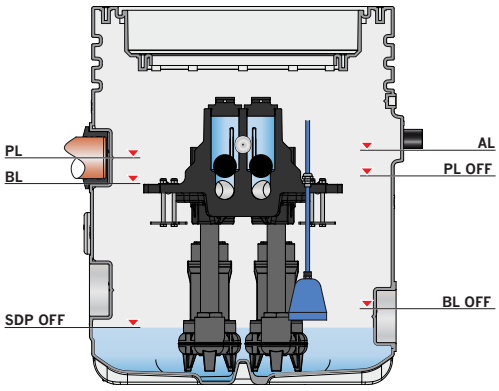

➔ Interrupt the inlet.

If the water level reaches the "Base load OFF" level (BL OFF), the set stop delay period of submerged pump 1 is activated.



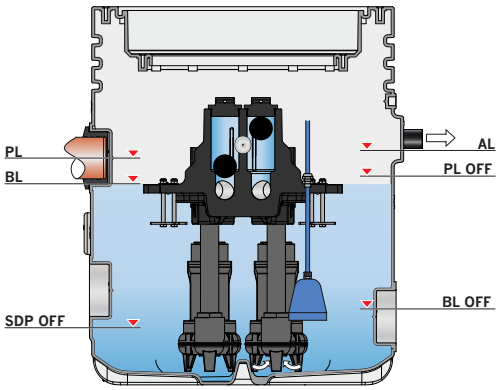
After the stop delay period has expired, submerged pump 1 is switched off. Level "Stop delay period OFF" (SDP OFF) is reached.

**IMPORTANT** If the level is not approx. 1 - 2 cm below the lower edge of the level sensor (check via the maintenance opening), the stop delay period should be adjusted.



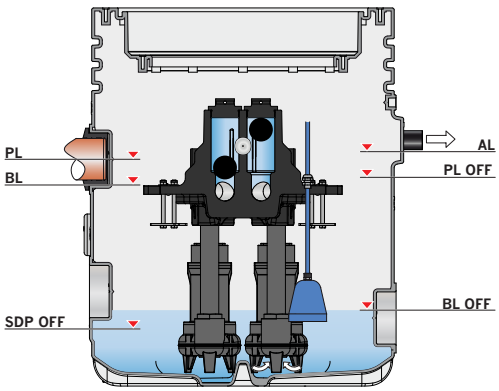

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump 2 switches on.



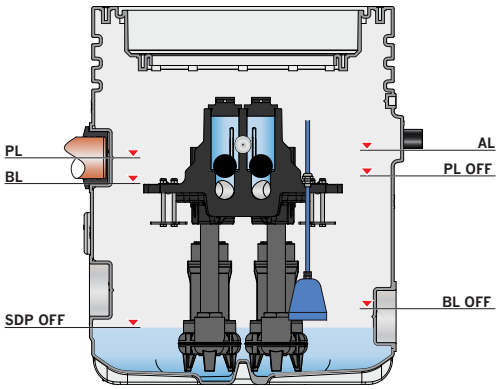

➔ Interrupt the inlet.

If the water level reaches the "Base load OFF" level (BL OFF), the set stop delay period of submerged pump 2 is activated.



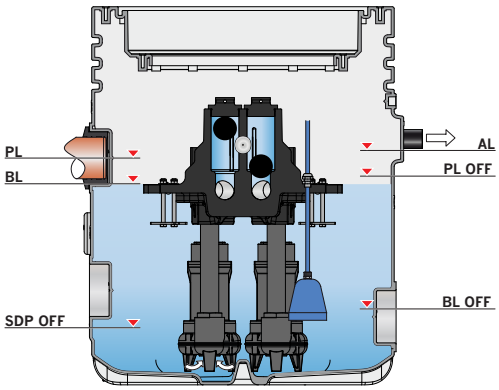
After the stop delay period has expired, submerged pump 2 is switched off. Level "Stop delay period OFF" (SDP OFF) is reached.

**IMPORTANT** If the level is not approx. 1 - 2 cm below the lower edge of the level sensor (check via the maintenance opening), the stop delay period should be adjusted.



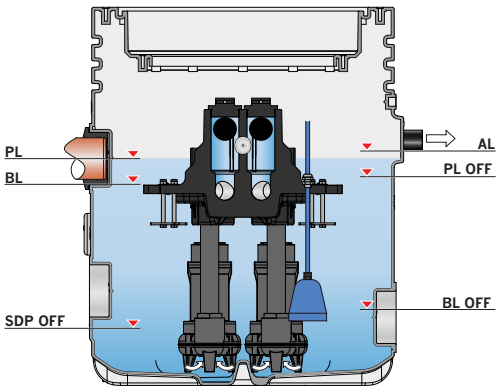

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump 1 switches on.



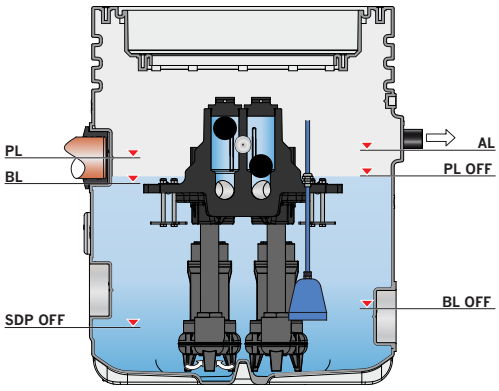

➔ Increase the inlet flow so that the water level continues to rise.

When the water reaches the “Peak load” (PL) level submerged pump 2 also switches on.

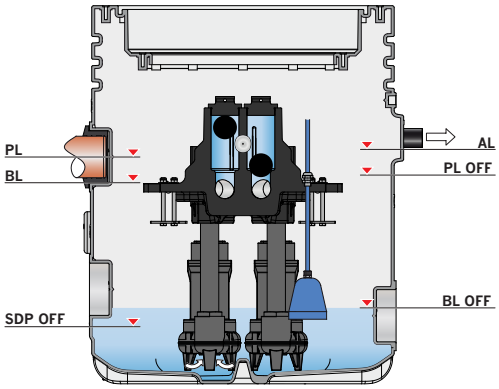



➔ Interrupt the inlet.

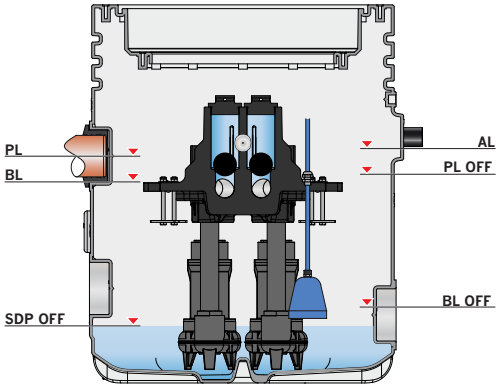
When the water level reaches the “Peak load OFF” (PL OFF) level, submerged pump 2 switches off.




If the water level reaches the "Base load OFF" level (BL OFF), the stop delay period of submerged pump 1 is activated.

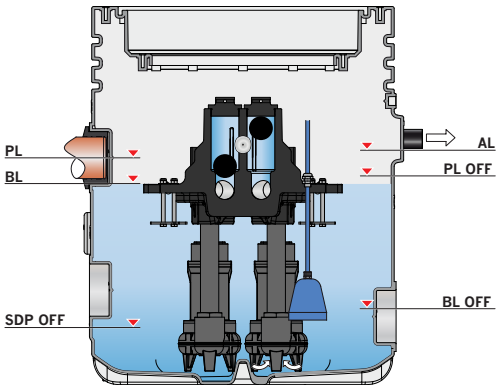



After the stop delay period has expired, submerged pump 1 is switched off. Level "Stop delay period OFF" (SDP OFF) is reached.



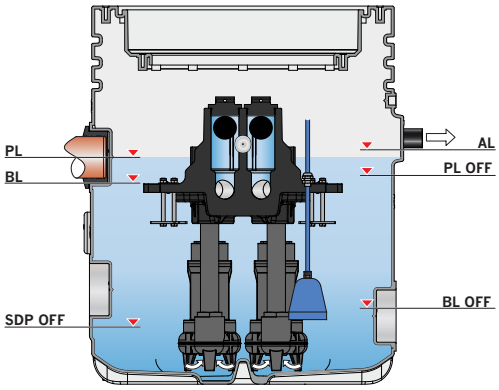

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump 2 switches on.



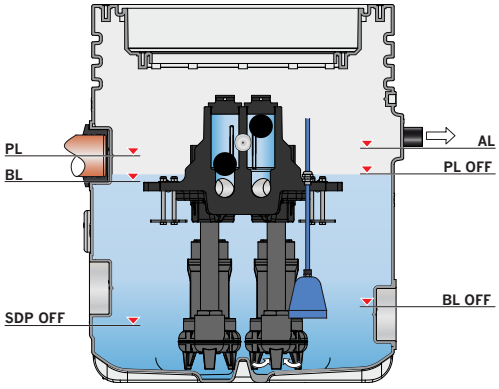

➔ Increase the inlet flow so that the water level continues to rise.

When the water reaches the “Peak load” (PL) level submerged pump 1 also switches on.



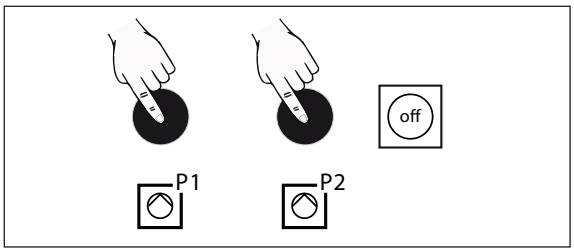

➔ Interrupt the inlet.

When the water level reaches the “Peak load OFF” (PL OFF) level, submerged pump 1 switches off.



**Ending automatic mode:**

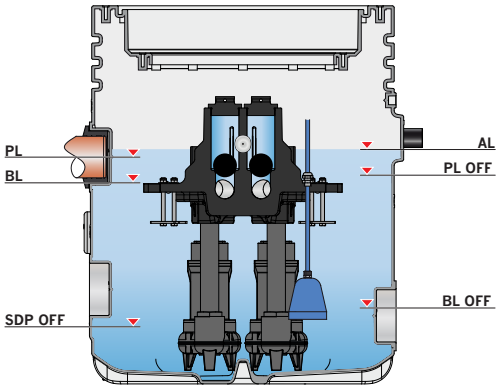
➔ Press both "off" buttons to end the automatic mode of pumps 1 and 2.




➔ Fill the collection tank.

If the water level reaches the "high water alarm" (AL):

- Alarm sounds
- LED lights up
- "High water alarm" appears in the display field




➔ End inflow.

**Acknowledging a malfunction:**

➔ Press the "reset enter" button to acknowledge the fault:

- ☐ Alarm goes off
- ☐ LED goes out
- ☐ the message "High water alarm" in the display panel goes out


**The test run is finished, repeat the test run a second time.**

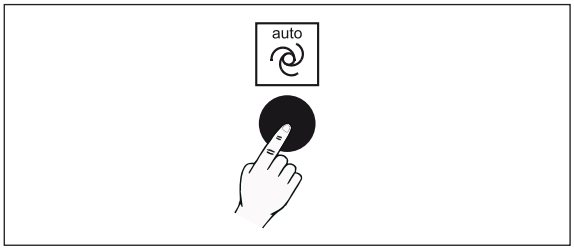
## 4.4.2 Muli-Flex mono

### 4.4.2.1 Version with pressure transducer or open pressure bell with air bubble injection

Shown: open pressure bell with air bubble injection

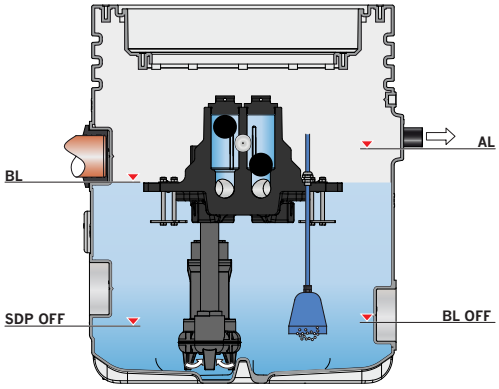
**Starting automatic mode:**

➔ Press the "auto" button to switch the submerged pump to automatic mode.



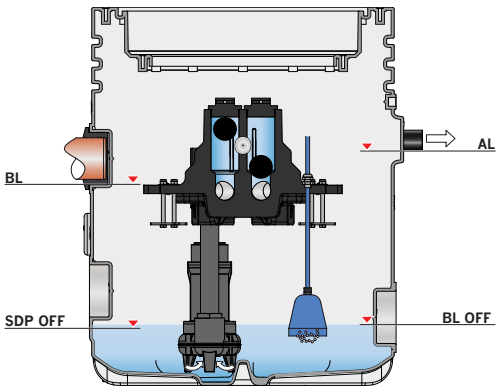

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump switches on.

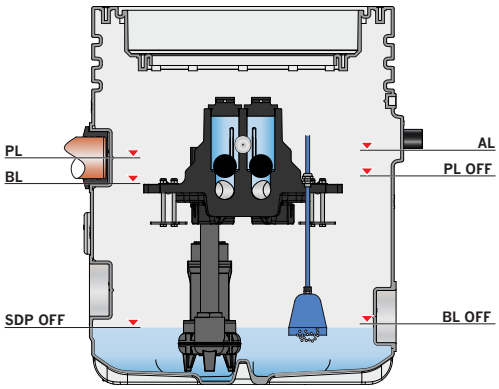



➔ Interrupt the inlet.

If the water level reaches the "Base load OFF" level (BL OFF), the set stop delay period of the submerged pump is activated.



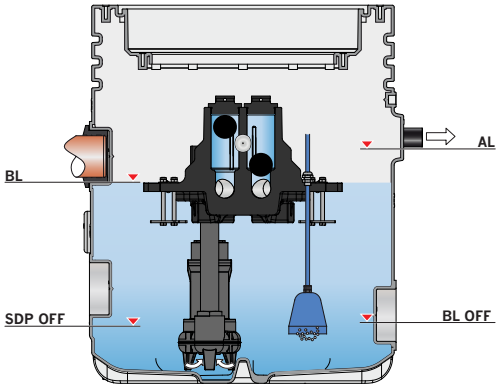
After the stop delay period has elapsed, the submerged pump is switched off. Level "Stop delay period OFF" (SDP OFF) is reached.




**IMPORTANT** If the level is not approx. 1 - 2 cm above the lower edge of the level sensor (check via the maintenance opening), the stop delay period should be adjusted.

➔ Fill the collection tank.

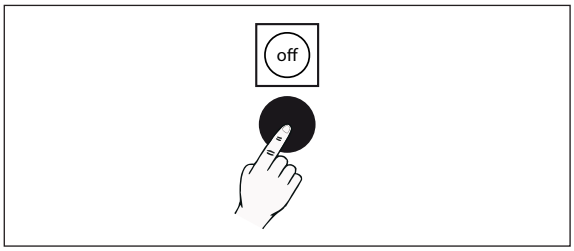
When the water level reaches the “Base load” (BL) level, submerged pump switches on.




➔ End inflow.

**Ending automatic mode:**

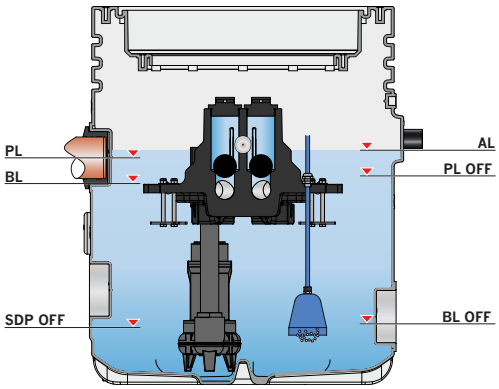
➔ Press the "off" button to switch off the automatic mode of the submerged pump.




➔ Fill the collection tank.

If the water level reaches the "high water alarm" (AL):

- Alarm sounds
- LED ● lights up
- "High water alarm" appears in the display field

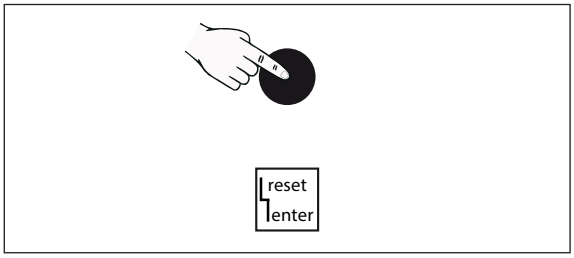



➔ End inflow.

**Acknowledging a malfunction:**

➔ Press the button to acknowledge the malfunction:

- ☐ Alarm goes off
- ☐ LED ● lights up
- ☐ the message "High water alarm" in the display panel goes out

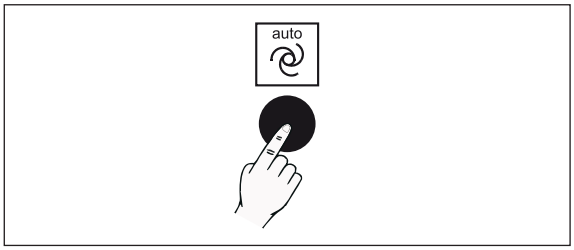



**The test run is finished, repeat the test run a second time.**

### 4.4.2.2 Version with open pressure bell without air bubble injection

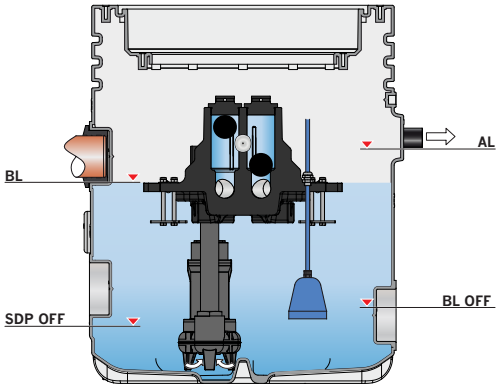
**Starting automatic mode:**

➔ Press the "auto" button to switch the submerged pump to automatic mode.



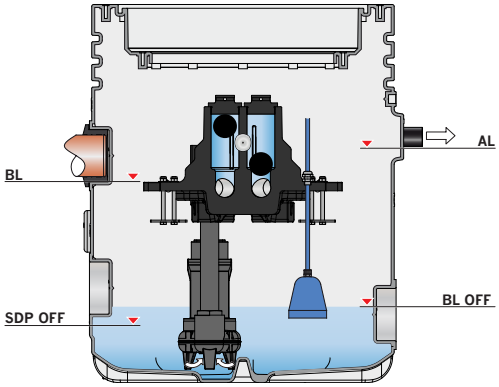

➔ Fill the collection tank.

When the water level reaches the “Base load” (BL) level, submerged pump switches on.



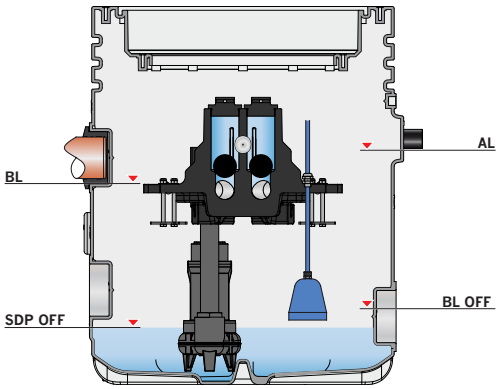

➔ Interrupt the inlet.

If the water level reaches the "Base load OFF" level (BL OFF), the set stop delay period of the submerged pump is activated.



After the stop delay period has elapsed, the submerged pump is switched off. Level "Stop delay period OFF" (SDP OFF) is reached.

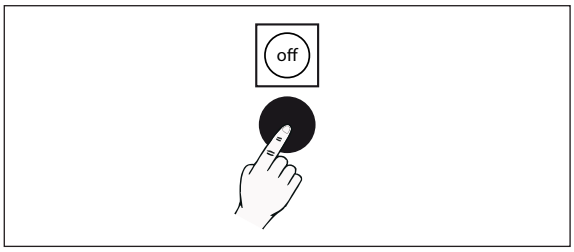
**IMPORTANT** If the level is not approx. 1 - 2 cm below the lower edge of the level sensor (check via the maintenance opening), the stop delay period should be adjusted.




➔ End inflow.

**Ending automatic mode:**

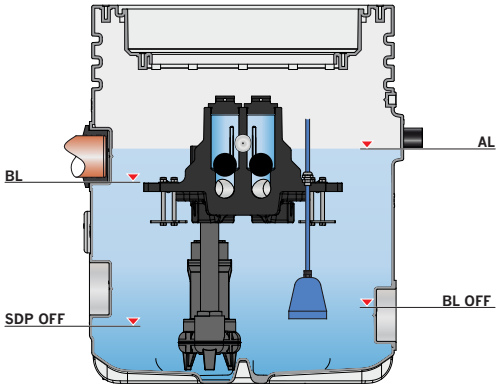
➔ Press the "off" button to switch off the automatic mode of the submerged pump.




➔ Fill the collection tank.

If the water level reaches the "high water alarm" (AL):

- Alarm sounds
- LED ● lights up
- "High water alarm" appears in the display field

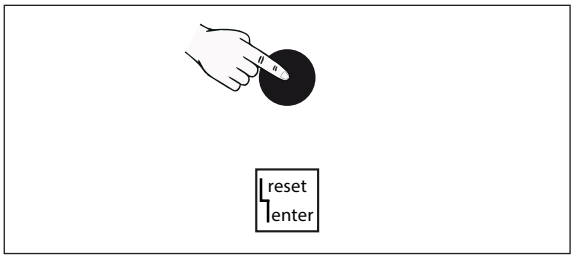


➔ End inflow.

**Acknowledging a malfunction:**

➔ Press the button to acknowledge the malfunction:

- ☐ Alarm goes off
- ☐ LED ● lights up
- ☐ the message "High water alarm" in the display panel goes out




**The test run is finished, repeat the test run a second time.**

### 4.4.3 Final work

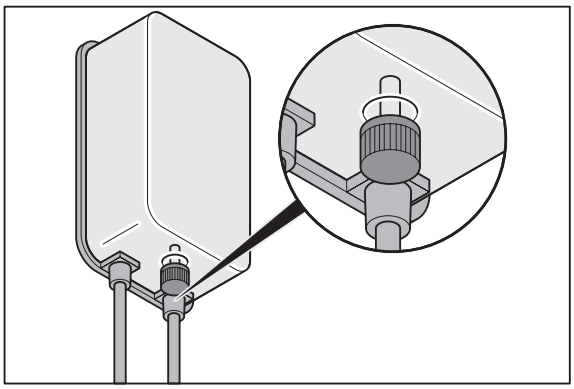
- For version with mini compressor (optional): Set air bubble injection Chapter 4.5 “Setting air bubble injection (optional)”
- Document settings, Chapter 4.2 "Setting the control unit
- Document the commissioning, Appendix: “Commissioning report”
- Set the automatic mode on the control unit
- Close maintenance opening.

**The wastewater lifting plant is ready for operation.**

## 4.5 Setting the air bubble injection (optional)

The air outlet of the mini compressor must be adjusted to reduce the volume and power consumption.

➔ Use the bolt on the mini compressor to set the air bubble injection so that only a few air bubbles escape at the end of the pressure bell (check via inspection opening).



## 4.6 Operation

The system operates automatically, and the work required of the operator during operation is limited to:

- Cleaning the drain system if required (applies to "Top section for non-faecal use with drainage system"):
  - ➔ Remove the grating.
  - ➔ Remove the cover.
  - ➔ Dismantle the drain system.
  - ➔ Clean the components, reassemble and insert them.
  - ➔ Fill the drain system trap with fresh water.
- Operation monitoring and maintenance, 📖 Chap 1.6 "Responsibility of the owner".

# 5 Troubleshooting

**WARNING**

**Electric shock**

- Work on electrical connections must only be executed by qualified electricians.
- Disconnect the control unit from the power supply before troubleshooting.

**CAUTION**

**Flooding due to improper sanitary installation**

- Work on the sanitary equipment must be carried out by qualified personnel only, 🕮 Chapter 1.3 "Personnel qualifications".
- Only use original spare parts.
- Have wastewater lifting plant repairs carried out by ACO or an ACO Service partner, 🕮 page 2 “ACO Service”.
- Prevent contact with wastewater and wear protective equipment, 🕮 Chapter 1.4 "Personal protective equipment".
- Do not carry out work on the connections and pipes unless they are depressurised.

**Burns due to hot surfaces**

- Allow the pump motors to cool.

**IMPORTANT**

**Acoustic alarm with power failure and high water level alarm**

- Always interrupt the wastewater feed and remedy the causes.

For safe and fault-free operation, only original spare parts from ACO are permitted, 🕮 Introduction "Service".

For repairs and spare part orders: Specify serial and article number, 🕮 Chapter 2.6 "Type plate".

The list does not claim to be complete.

## 5.1 Muli-Flex duo and mono malfunctions

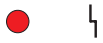
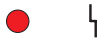
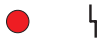
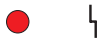
| Malfunction | Cause(s) | Remedy |
|---|---|---|
| Pump without function | Power consumption too high (automatic shut-off) | Keep "Acknowledge selection" button on the control unit pressed for approx. 2 seconds<br>If the malfunction remains: Contact ACO Service |
| | Control unit without power supply | Restore power supply (electrician) |
| | Automatic mode not switched on | Switch on automatic mode |
| | Pump motor is defective | Pump replacement required (ACO Service) |
| | Pump blocked by foreign bodies | Pump maintenance required (ACO Service) |
| Pump does not deliver or pumps too little<br>or the tank is full | Incorrect rotational direction<br>Phases L1, L2, L3 interchanged | Inspect and test rotational direction, if necessary turn<br>2 phases via phase changer in the plug (electrician) |
| | Pressure pipe obstructed | Clean the pressure pipe |
| | Impeller (submerged pump) obstructed | Submerged pump maintenance required (ACO Service) |
| | Pump parts are worn | Submerged pump repair required (ACO Service) |
| Pump only runs in manual operation | Level sensor set incorrectly or is defective | Check the settings in the menu, 🕮 Chap 4.2 "Setting the control unit" |
| | Mini compressor of the air bubble injection is defective when using an open pressure bell. | Replace the mini compressor |
| High water level alarm (water level above the 'High water' level) | Pressure pipe obstructed | Clean the pressure pipe |
| | High water level incorrectly set | Check the "High water" settings in the menu, 🕮 Chap 4.2 "Setting the control unit" |
| | Pump(s) damaged | Check pump(s) and replace if necessary (ACO Service). |
| Knocking noises/ vibrations in the pressure pipe on switching off the submerged pump(s) | Stop delay period of the pump(s) is too low | Increase or adjust the stop delay period of the pump(s). |

## 5.2 Fault messages on the duo control unit

| Display panel | LED display | Cause(s) | Remedy |
|---|---|---|---|
| P1: without load<br>P2: without load |  | Pump does not draw current:<br>■ Terminal not tightened properly<br>■ Pump defective<br>■ Current consumption is incorrect | ■ Correctly attach the terminal<br>■ Replace pump<br>■ Correct setting |
| Excess current |  | Motor current of the corresponding pump is higher than the set value of the current limitation | Acknowledge malfunction *<br>Check mains supply, pump cable and pump |
| Dry run protection activated |  | Contact for dry-running protection has opened | Acknowledge malfunction *<br>Check pump or level sensor for function, check level |
| Runtime - Alarm |  | Tripping after three changes | Acknowledge malfunction *<br>Check the function of the pumps and the run time altern. settings. |
| Runtime of small pump change |  | Max run time is smaller than the set value of the run time change | Acknowledge malfunction *<br>Check run time altern., run. time max. - settings |
| Switch-on below switch-off point |  | Settings for switch-on and switch-off point overlap | Acknowledge malfunction *<br>Check level settings |
| High water level below switch-on point |  | Settings for high water level alarm and switch-on point overlap | Acknowledge malfunction *<br>Check level settings |
| Switch-on point above peak load |  | Switch-on point for the base load pump is above the switch-on point of the peak load pump | Acknowledge malfunction *<br>Check level settings |
| Rotating field - error |  | One or two phases are missing or the rotating field is not correct. | Check whether all 3 phases are present and whether the rotating field (right) is correct. |

| Display panel | LED display | Cause(s) | Remedy |
|---|---|---|---|
| High water alarm |  | Level has exceeded the high water setting | Acknowledge malfunction *<br>Check the function of the pumps and the high water level setting |
| | | High water level incorrectly set | Set "High water" in the menu, Chap 4.2 "Setting the control unit"<br>Acknowledge malfunction * |
| | | Automatic mode is switched off | Switch on automatic mode<br>Acknowledge malfunction * |
| | | Pump motor is defective | Pump replacement required (ACO Service) |
| | | Impeller obstructed | Pump maintenance required (ACO Service) |
| | | Pressure bell blocked | Clean the pressure bell |
| | | Pressure transducer is defective | Replacing the pressure transducer |
| | | Pressure pipe obstructed | Clean the pressure pipe |
| | | Pump(s) damaged | Check pump(s) and replace if necessary (ACO Service). |
| ATEX: Level below switch-off point |  | Atex Mode is activated and the level is below the switch-off point of the selected pump. | In the explosion-risk area, the level must first rise above the switch-off point of the pumps before they can be switched on.<br>If the pumps are not in the explosion-risk area, the Atex mode can be deactivated in the menu. |
| *Keep "Acknowledge selection" button on the control unit pressed for approx. 2 seconds If the malfunction persists: carry out the work described, if necessary consult ACO Service. | | | |

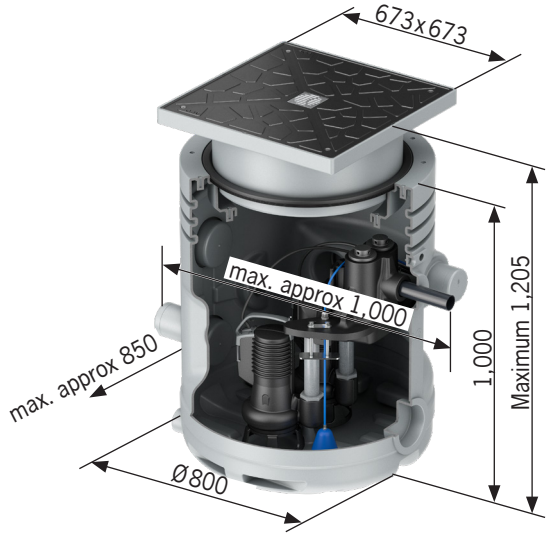
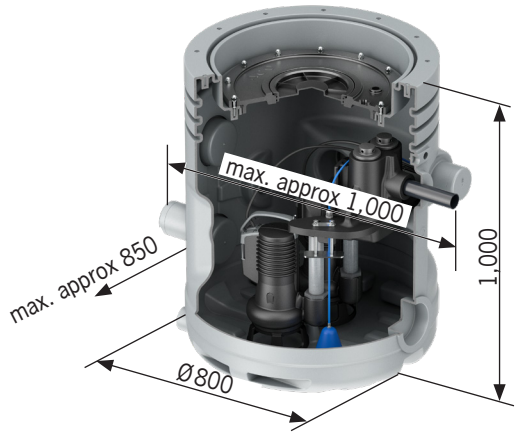
## 5.3 Fault messages on the mono control unit

| Display panel | LED display | Cause(s) | Remedy |
|---|---|---|---|
| No load |  | Pump does not draw current:<br>■ Terminal not tightened properly<br>■ Pump defective<br>■ Current consumption is incorrect | ■ Correctly attach the terminal<br>■ Replace pump<br>■ Correct setting |
| Excess current |  | Motor current of the pump is higher than the set value of the current limitation | Acknowledge malfunction *<br>Check mains supply, pump cable and pump |
| Switch-on below switch-off point |  | Settings for switch-on and switch-off point overlap | Acknowledge malfunction *<br>Check level settings |
| High water level below switch-on point |  | Settings for high water level alarm and switch-on point overlap | Acknowledge malfunction *<br>Check level settings |
| Run time - error |  | Tripping after three changes | Acknowledge malfunction *<br>Check the function of the pumps and the run time altern. settings. |
| Dry run protection activated |  | Contact for dry-running protection has opened | Acknowledge malfunction *<br>Check pump or level sensor for function, check level |
| Interface < mA |  | Signal of the external level probe less than 3 mA | Acknowledge malfunction *<br>Check level probe, Ex barrier and electrical connections |
| Check switching points |  | Measuring range of the external level probe changed. Switching points are outside the measuring range | Acknowledge malfunction *<br>Check level settings |
| Rotating field - error |  | One or two phases are missing or the rotating field is not correct. | Check whether all 3 phases are present and whether the rotating field (right) is correct. |

| Display panel | LED display | Cause(s) | Remedy |
|---|---|---|---|
| High water alarm |  | Level has exceeded the high water setting | Acknowledge malfunction *<br>Check the function of the pumps and the high water level setting |
| | | High water level incorrectly set | Set "High water" in the menu, 🕮 Chap 4.2 "Setting the control unit"<br>Acknowledge malfunction * |
| | | Automatic mode is switched off | Switch on automatic mode<br>Acknowledge malfunction * |
| | | Pump motor is defective | Pump replacement required (ACO Service) |
| | | Impeller obstructed | Pump maintenance required (ACO Service) |
| | | Pressure bell blocked | Clean the pressure bell |
| | | Pressure transducer is defective | Replacing the pressure transducer |
| | | Pressure pipe obstructed | Clean the pressure pipe |
| | | Pump(s) damaged | Check pump(s) and replace if necessary (ACO Service). |
| ATEX: Level below switch-off point |  | Atex mode is activated and the level is below the switch-off point of the pump | In the explosion-risk area, the level must first rise above the switch-off point of the pump before it can be switched on.<br>If the pump is not in the explosion-risk area, the Atex mode can be deactivated in the menu. |
| *Keep "Acknowledge selection" button on the control unit pressed for approx. 2 seconds If the malfunction persists: carry out the work described, if necessary consult ACO Service. | | | |

# 6 Technical data

## 6.1 Wastewater lifting plant

| Type | Dimensions** | Content | | Total weights* | |
|---|---|---|---|---|---|
| | | Usable volumes [l] | Total [l] | Empty [kg] | maximum [kg] |
| Muli-Flex -UF |  | 15 until 180 | 380 | 165 (duo)<br>125 (mono) | 545 (duo)<br>505 (mono) |
| Muli-Flex -FR |  | 15 until 180 | 380 | 170 (duo)<br>130 (mono) | 550 (duo)<br>510 (mono) |

* Values with heaviest submerged pump and heaviest top section, but without accessories.
Combinations with other submerged pumps and top sections are lighter, see 🕮 chap 2.4 "Scope of delivery Muli-Flex -UF" or 2.5 "Scope of delivery Muli-Flex -FR".

** Connection dimensions, 🕮 Chap. 2.8.1 "Muli-Flex -UF" or 2.8.2 "Muli-Flex -FR".

## 6.2 Top section body

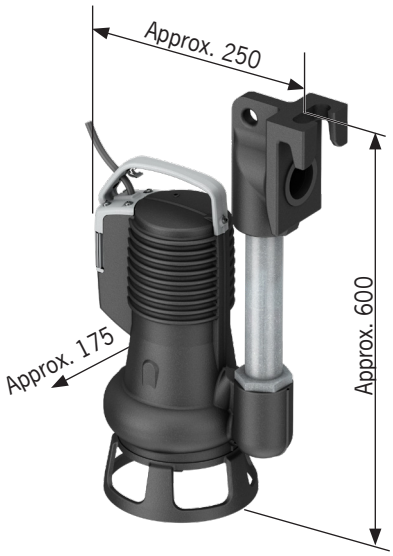
### 6.2.1 Polyethylene material


### 6.2.2 Material Stainless steel

## 6.3 Submerged pumps

Data applies to one pump unit.

### 6.3.1 Dimensions

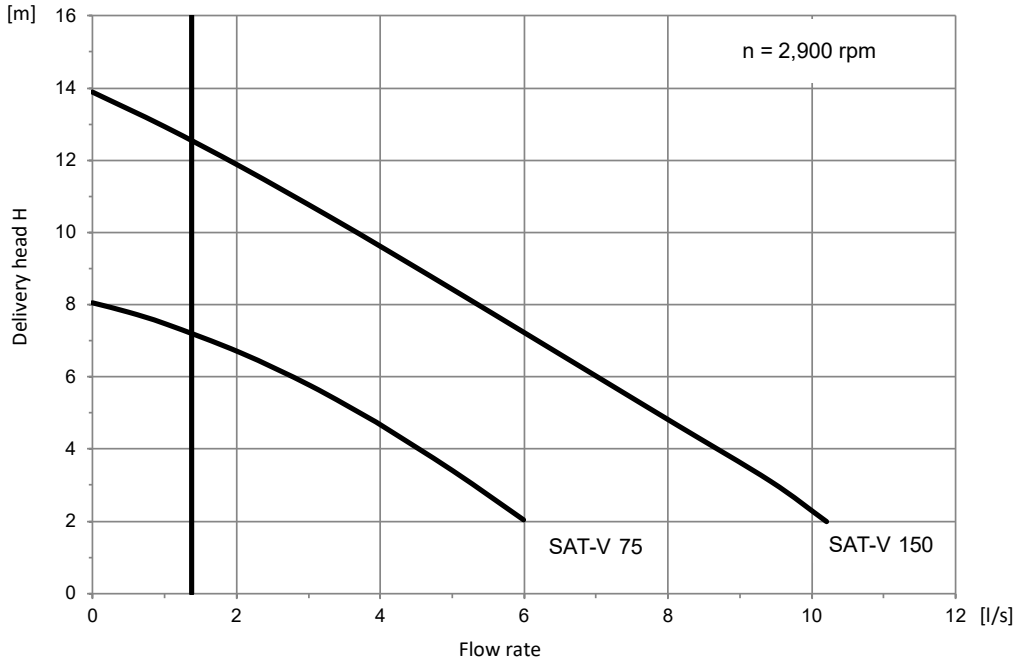



### 6.3.2 Technical data and application limits

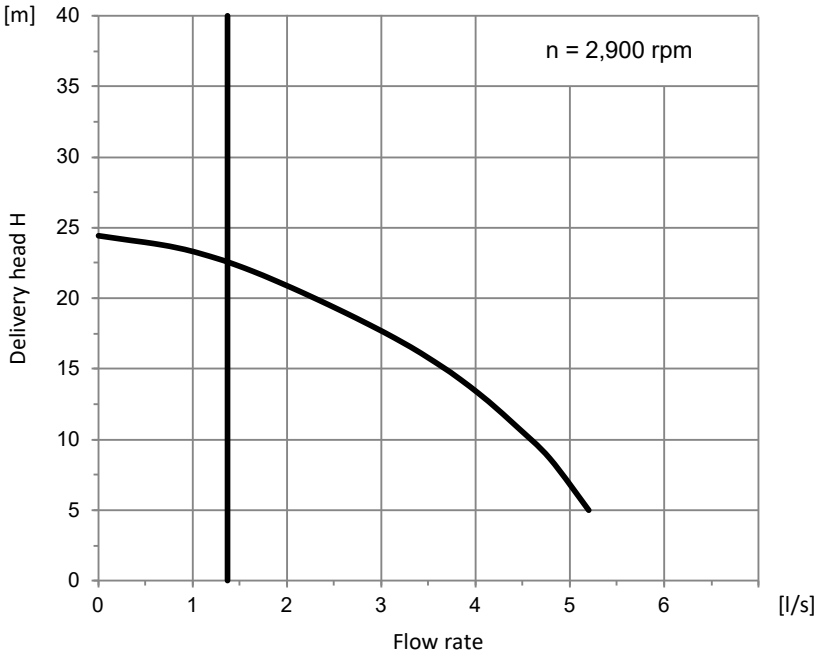
| Data | Values | | |
|---|---|---|---|
| | SAT-V 75/2/50/D | SAT-V 150/2/50/D | SITA 200 N-ex-G |
| Type of cable for connection cable: | 4G1 | 4G1 | 4G1,5 + 3x1 |
| Pump motor operating voltage [V]: | 400 | 400 | 400 |
| Frequency [Hz]: | 50 | 50 | 50 |
| Pump motor speed [1/min.]: | 2,900 | 2,900 | 2,824 |
| Pump motor power input P1 [kW]: | 0.7 | 1.5 | 1.78 |
| Pump motor output P2 [kW]: | 0.6 | 1.1 | 1.50 |
| Pump motor nominal current [A]: | 1.3 | 2.6 | 3.3 |
| Maximum ball through-flow [mm]: | 40 | 50 | – |
| Fluid pH-value: | 6 – 14 | 6 – 14 | 6 – 14 |
| Weight [kg]: | 17.9 | 22.4 | 37.7 |

## 6.3.3 Output diagram SAT-V

### SAT-V 75/2/50/D and SAT-V 150/2/50/D




## 6.3.4 Output diagram SITA 200 N-ex-G



# 6.4 Required level sensor

## 6.4.1 Pressure transducer

| Technical data | Values | |
|---|---|---|
| Length of the connection cable: | 20 m | 40 m (60 or 80 m on request) |
| Output signal: | 4 – 20 mA | |
| Use for ambient temperature: | minus 10 – plus 70 °C | |
| Measurement range: | 0 – 200 mbar | |
| Bending radius of connection cable: | maximum 120 mm | |
| Weight: | 2 kg | 3.4 kg |
| Dimensions of the pressure transducer: | Ø 30 x 160 mm | |

## 6.4.2 Open pressure bell

| Technical data | Values |
|---|---|
| Length of the connection hose: | 20 m |
| Measurement principle: | Pneumatic dynamic pressure measurement |
| Area of use: | In highly contaminated and viscous liquids and Zone 1 + 2 potentially explosive atmospheres. |
| Restriction: | Not suitable for aggressive liquids and temperatures higher than 40 |
| Material: | Grey cast iron |
| Weight: | 1 kg |
| Dimensions: | Ø 110 x 100 mm |

# 6.5 Air bubble injection (accessory)

For use with the open pressure bell.

| Technical data | Values |
|---|---|
| Mini compressor connection: | 230 V |
| Ready to plug in, length of connection cable: | 1.5 m |
| Area of use: | Pneumatic dynamic pressure measurement |
| Length of the hose lines: | 0.1 and 0.5 m |
| Maximum pressure: | 300 mbar |
| Volume flow: | 250 l/h |
| Operating noise: | < 38 dBA |
| Power consumption: | 5 W |
| Version: | T-screw fitting and non-return valve |
| Weight: | 0.6 kg |
| Dimensions (W x H x D): | 135 x 75 x 60 mm |

# 6.6 Control unit

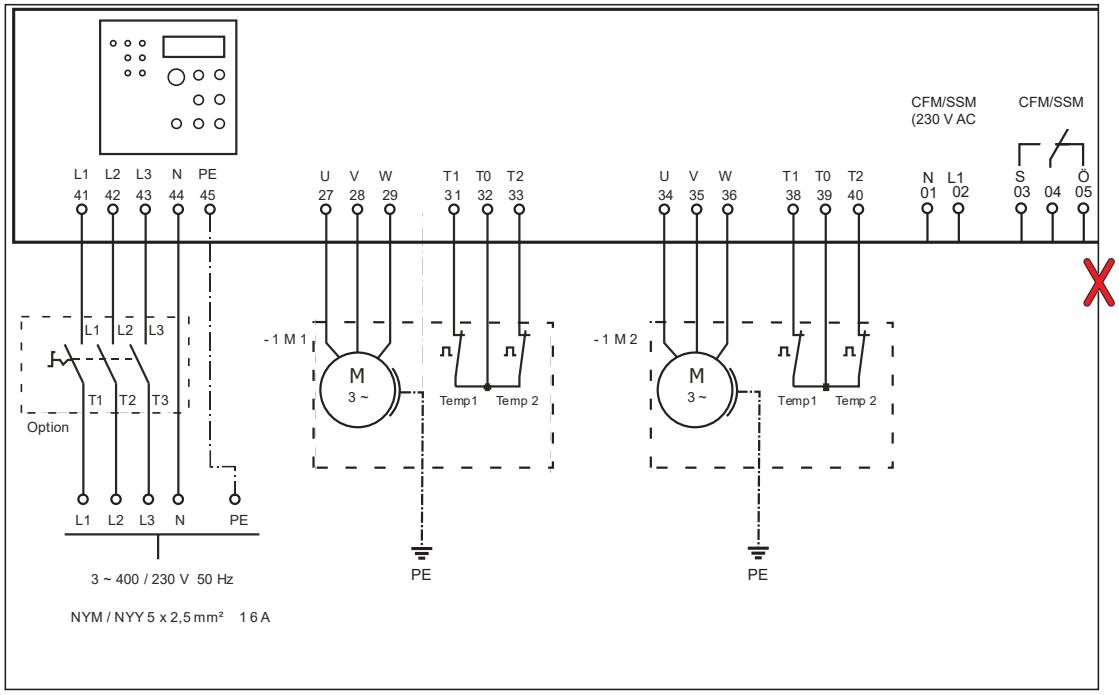
## 6.6.1 Duo control unit

| Technical data | Versions |
|---|---|
| Power consumption: | 1.4 kW (2 x SAT-V 75/2/50/D) |
| | 3.0 kW (2 x SAT-V 150/2/50/D) |
| | 3,6 kW (2 x SITA 200 N-ex-G) |
| Power supply: | 3~ 400V (L1, L2, L3, N, PE) |
| Frequency: | 50/60 Hz |
| Control voltage: | 230 V / AC / 50 Hz |
| CEE plug socket: | 16 A |
| Fuse (local): | 3 x 16 A (time lag) or according to the conditions on site |
| Power intake (contactors operated): | < 20 VA |
| Power consumption in idle mode: | < 10 VA |
| Range of electrical motor current limitation: | 0.3 – 14 A |
| Alarm contact 230 V: | 1 A |
| Isolated alarm contact: | 3A |
| Pressure range (internal sensor): | 0 – 2 mWs (0 – 5 mWs optional) |
| Power supply for 4-20 mA probe: | Approx. 24 V/DC |
| Fuse: | 5 x 20 1AT (alarm output) |
| Back-up fuse | 5 x 20 100 mA |
| Temperature range: | –20 to +60 °C |
| Housing: | Polycarbonate |
| Protection type: | IP 54 |
| Cable glands: | 2 x M25 x 1,5 and 1 x M16 x 1,5 |
| Hose connection: | 10/8 mm |
| Dimensions: | 320 x 300 x 120 mm (W x H x D, including cable glands) |
| Weight: | 5.4 kg |
| Dimensions (W x H x D): | 320 x 300 x 120 mm |

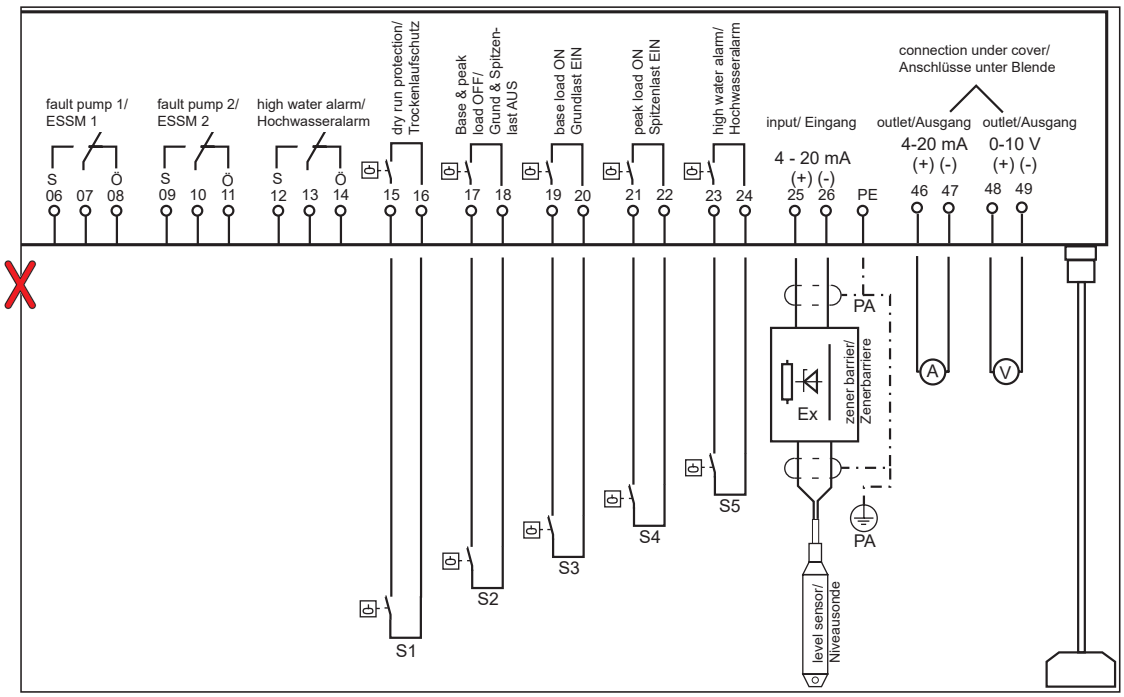
## 6.6.2 Circuit diagram of the control unit

Interface X between part 1 and part 2.

### Part 1:




### Part 2:



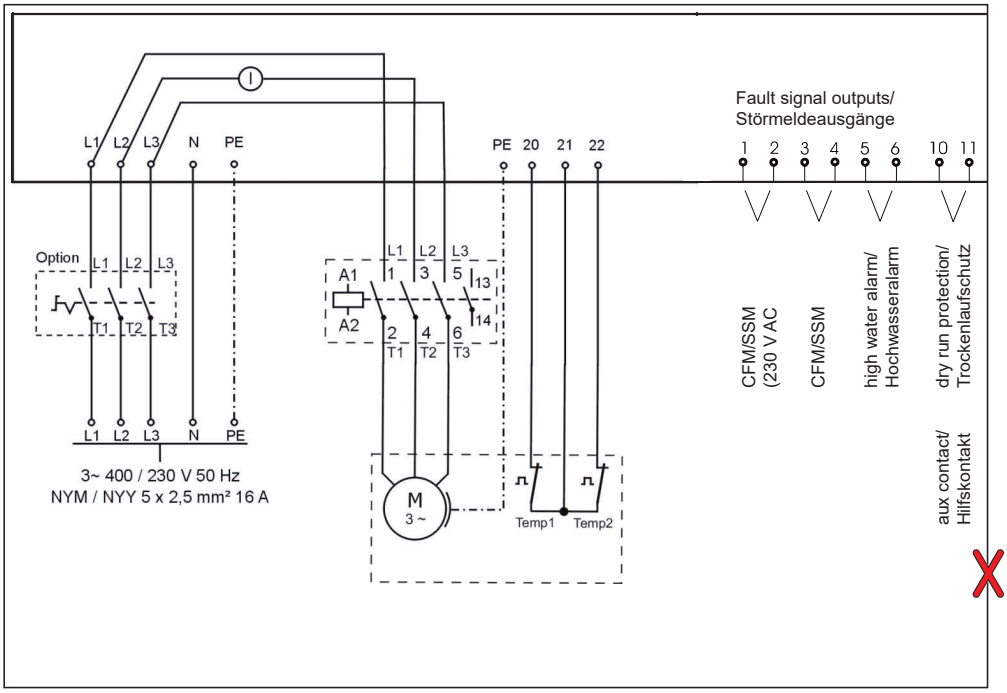
### 6.6.3 Mono control unit

| Technical data | Versions |
|---|---|
| Power consumption: | 0.7 kW (2 x SAT-V 75/2/50/D) |
| | 1.5 kW (2 x SAT-V 150/2/50/D) |
| | 1,8 kW (2 x SITA 200 N-ex-G) |
| Power supply: | 3~ 400V (L1, L2, L3, N, PE) |
| Frequency: | 50/60 Hz |
| Control voltage: | 230 V / AC / 50 Hz |
| CEE plug socket: | 16 A |
| Fuse (local): | 3 x 16 A (time lag) or according to the conditions on site |
| Power intake (contactors operated): | < 10 VA |
| Power consumption in idle mode: | < 8 VA |
| Range of electrical motor current limitation: | 0.3 – 16 A |
| Alarm contact 230 V: | 1 A |
| Isolated alarm contact: | 3A |
| Pressure range (internal sensor): | 0 – 1 mWs (0 – 2 mWs optional) |
| Power supply for 4-20 mA probe: | Approx. 20 V/DC |
| Fuse: | 5 x 20 1AT (alarm output) |
| Back-up fuse | 5 x 20 100 mA |
| Temperature range: | –20 to +60 °C |
| Housing: | Polycarbonate |
| Protection type: | IP 54 |
| Cable glands: | 2 x M25 x 1,5 and 1 x M16 x 1,5 |
| Hose connection: | 10/8 mm |
| Dimensions: | 180 x 290 x 130 mm (W x H x D, including cable glands) |
| Weight: | 4.0 kg |
| Dimensions (W x H x D): | 320 x 300 x 120 mm |

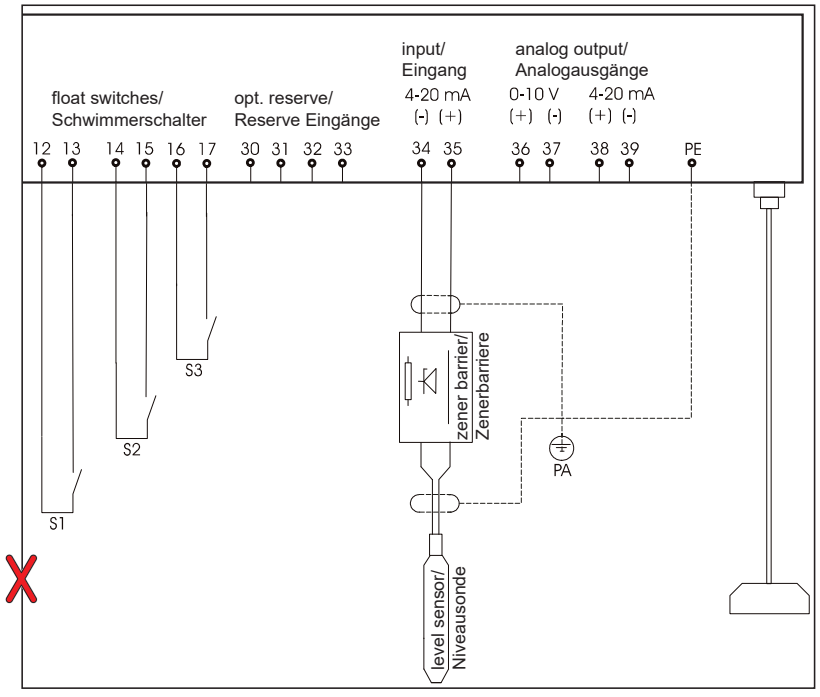
## 6.6.4 Circuit diagram of the control unit

Interface X between part 1 and part 2.

**Part 1:**




**Part 2:**



# Appendix: Commissioning report

Commissioning and instruction of a qualified person takes place in the presence of the authorised acceptance inspection representative and the plant operating company.

Commissioning date: _____

Handover date: _____

## Wastewater lifting plant

| Type | Art. no. | Serial no. | Year of construction |
|---|---|---|---|
| | | | |

## Use location

Building/room: _____

Use: Commercial company ○ ○ ○

Street: _____

Town/city: _____

## Responsible persons

| | Qualified person | Authorised acceptance representative | Plant operating company |
|---|---|---|---|
| Name: | | | |
| Phone no.: | | | |
| Fax no.: | | | |
| Email: | | | |
| Address: | | | |
| | | | |
| | | | |

## Check list for commissioning (Qualified person)

| **Tests & Inspections** (no claim is made that the list is complete) | **OK** | **Not OK** |
|---|---|---|
| Installation | ○ | ○ |
| Electrical fusing of the plant in accordance with the IEC regulations or national and local regulations | ○ | ○ |
| Control unit: Operating voltage and frequency | ○ | ○ |
| Control unit: Setting values | ○ | ○ |
| Control unit: Function test | ○ | ○ |
| Rotational direction of pump motor(s) | ○ | ○ |
| Test run | ○ | ○ |
| Malfunction and fault signalling equipment: LED malfunction indicators, telecommunications device (group alarm) | ○ | ○ |

## Instruction (by the installer company)

| **Instruction** | **Remarks** | **Yes** | **No** |
|---|---|---|---|
| Instruction: | Functions, control, operating information, troubleshooting, maintenance obligations | ○ | ○ |
| Handover: | Instructions for Use | ○ | ○ |

## Remarks:

Signature of qualified person: _____

Signature of authorised acceptance inspection representative: _____

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