Instructions for Use

Issued: 2019-09-26

Powerlift prefabricated pumping station

For non-faecal and faecal wastewater, for installation in the ground

Powerlift Pro

Type PSD-P: Pumpstation Duo (2 Pumps)-Polymerbeton

Powerlift Concrete

Type PSD-B: Pumpstation Duo (2 Pumps)-Concrete

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 Tiefbau Vertrieb GmbH (referred to as ACO in the following) thanks you for your trust and hands over to you a product which is state-of-the-art and has been tested for proper condition as part of quality controls carried out before delivery.

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

ACO Service

Accessories, refer to "Product catalogue": 🕮http://katalog.aco-tiefbau.de
For additional information regarding the prefabricated pumping station, ordering spare parts and services e.g. maintenance contracts, general inspections, please contact ACO Service.

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Target group

The target group for these operating instructions is technically trained skilled 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-tiefbau.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 operating the prefabricated pumping station, in order to prevent personal injuries and damage to property.

1.1 Intended use

The prefabricated pumping station is used for collecting and automatic lifting of non-faecal and faecal wastewater above the backflow level. The wastewater is drained into the drainage sewer safely for people and without damaging structures or contaminating the ground.

IMPORTANT

- The maximum wastewater temperature must not exceed 40 °C.
- The installation fittings and components (e.g. inlet immersion pipe, pressure pipe parts) are designed for operation as a prefabricated pumping station. They are not designed to be a step or foot board for people and storage e.g. heavy cleaning devices. The bearing force is not designed for such purposes.
- The use of an access aid for accessing or entering the prefabricated pumping station is anchored in the requirements of the employers' liability insurance association.

The prefabricated pumping station is intended for installation in the ground below the backflow level in the following types of projects:

- Drainage for sanitary rooms
- Drainage for rainwater surface areas
- Protection for separator plants, which are built into the ground, against backflow from public sewers

Harmful substances must not be discharged into the prefabricated pumping station:

- Heavy metals, e.g. zinc, lead, cadmium, nickel, chromium
- Aggressive substances, e.g. acids (pipe cleaning agent with pH value below 4)
- 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

Requirements based on the listed or currently relevant standards:

- EN 12056-1
  Gravity drainage systems inside buildings"
- EN 752 "Drain and sewer systems outside buildings"
- DIN 1986-100: Drainage systems for buildings and property
  – Part 100: Provisions in connection with DIN EN 752 and DIN EN 12056"

1.3 Personnel qualifications

Activities	Person	Knowledge
Layout, operational changes	Planners	Knowledge of building systems and services and applicable standards and directives Evaluation of wastewater technology application cases 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" in according to DIN 1986-100*
Disposal	Skilled people	Appropriate and environmentally friendly disposal of materials and substances, knowledge of recycling

*Definition of "competent people" in accordance with DIN 1986-100:

"Competent people are employees of companies independent of the operating company/owner, experts or other institutions, who verifiable have the required technical knowledge to operate, maintain and check wastewater lifting plants to the scope named here and have the equipment required to test wastewater lifting plants. 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.

Mandatory 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 hands from infections (moisture-tight protective gloves) and minor bruises and cuts, especially during transport, installation, maintenance and dismantling.
	Protective clothing protects the skin from minor mechanical effects and infections.
	A safety helmet protects against head injuries, e.g. in case of falling objects or knocks in the event of low room heights.
	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 verification exists in case of an insurance claim.

Planning and installation

Requirements in accordance with the relevant standards and regional regulations 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.
- Controlling the prefabricated pumping station, e.g. unusual running noises of pumps.
- Controlling the readiness of the prefabricated pumping station for operation on the control system.

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 owners/operating companies conclude a maintenance contract for the regular servicing and maintenance work to be undertaken.

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

Maintenance intervals for the prefabricated pumping station:

- Commercial operation = every 3 months
- Operation in detached houses and multiple dwelling buildings = every 6 months

Additional (unscheduled) servicing:

- After flooding
- Before putting back into service

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 manhole base section 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

2.1 Product features

2.1.1 Basic equipment

	Powerlift PSD-P	Powerlift PSD-B
Design	■ Base shaft tank made of high-quality polymer concrete, optimised against biogenic corrosion ■ Maximum installation depth, Class D 400/SLW 60: 4.50 m ■ Easy accessibility for maintenance work ■ Use of different level sensors by means of universal probe holder ■ Selected material combinations for longer service life	■ Base shaft tank made of high-quality, quality-monitored concrete ■ Largely deposit-free collection area (partly with benching) ■ Maximum installation depth, Class D 400/SLW 60: 7.0 m ■ Easy accessibility for maintenance work ■ Use of different level sensors by means of universal probe holder ■ Selected material combinations for longer service life

	Powerlift PSD-P	Powerlift PSD-B
Manhole base section	■ Tank nominal size 1,000 mm (clear opening width) ■ Pipework made of PVC-U up to approx. 30 cm outside the shaft ■ Underwater coupling system with short guide pipe (slider pipe) made from plastic ■ Ball-type non-return valve made of cast iron EN-GJL ■ Ball valve made of PVC-U ■ Flushing pipe connection option ■ Universal special bracket made from stainless steel ■ Inlet DN/OD 160 ■ Connection discharge pipework: DN/OD 63 ■ Chain holder ■ Connection collars with collar seal for reserve cable conduit connection and ventilation connection DN/OD 110	■ Tank nominal size 1,000, 1,500 or 2,200 mm (clear opening width) with assembled mechanical seal ■ Internal pipework made from PVC-U up to approx. 30 – 40 cm outside the shaft ■ Underwater coupling system with short guide pipe (slider pipe) made from plastic ■ Ball-type non-return valve made of cast iron EN-GJL ■ Ball valve made of PVC-U and/or gate valve made from cast iron ■ Flushing pipe connection option ■ Universal special bracket made from stainless steel ■ Inlet DN/OD 160, 200, 315 and/or 400 ■ Connection pressure pipe DN/OD 63 (PSD-P-1000 and PSD-B-1000) and/or flange connection DN 100 (PSD-B-1500), DN 125 and/or DN 200 or 250 (PSD-B-2200) according to DIN 2501/PN 10 ■ Chain holder **PSD-B-1000 and -1500** ■ Separate shaft ring with nominal size 1,000 and/or 1,500, 500 mm high: □ Connection collars with collar seal for reserve cable conduit connection and ventilation connection DN/OD 110 □ Assembled mechanical seal **PSD-B--2200** ■ Connection collars with collar seal for reserve cable conduit connection and ventilation connection DN/OD 110 and/or 160 in tank
Cover plate complete	■ Cover plate made of polymer concrete: □ Nominal size 1,000 (clear opening width of tank and/or shaft rings) □ Maintenance opening Ø 800 □ 2-component adhesive ■ Manhole cover made of cast iron: □ Class D 400 □ Clear opening width Ø800 mm	■ Cover plate made of concrete: □ Nominal size 1,000 (PSD-B-1000), 1,500 (PSD-B-1500) and 2,200 (PSD-B-2200) □ Maintenance opening 1x Ø800 mm (PSD-B-1000), 2x 600 mm (PSD-B-1500) and 2x 800 mm (PSD-B-2200) ■ Manhole cover(s) Class D 400 made of cast iron: □ 1x clear opening width Ø 800 mm (PSD-B-1000) or 2x clear opening width Ø 800 mm (PSD-B-2200) □ 2x clear opening width Ø 600 mm (PSD-B-1500)

	Powerlift PSD-P	Powerlift PSD-B
Manhole rings	■ Shaft rings made of polymer concrete: □ Nominal size 1,000 mm with heights from 250 to 1,000 mm □ 2-component adhesive	■ Manhole rings made from concrete according to/similar to DIN 4034-1: □ Nominal size 1,000 with heights from 250 to 2,500 mm for Type PSD-B-1000 □ Nominal size 1,500 with heights from 250 to 2,500 mm for Type PSD-B-1500 □ Nominal size 2,200 with heights from 250 to 2,500 mm for Type PSD-B-1500 □ Assembled mechanical seal
Supporting rings	■ Supporting rings made of polymer concrete: □ Nominal size 800 with heights from 40 to 100 mm □ 2-component adhesive	■ Manhole rings made from concrete according to/similar to DIN 4034-2: □ Nominal size 800 with heights from 100 to 400 mm for Type PSD-B-1000 and PSD-B-1500 □ Nominal size 600 with heights from 60 to 400 mm for Type PSD-B-1500
Submersible pumps*	■ Submersible pumps (10 m connection cable) with assembled coupling piece, for **non-faecal** wastewater: □ Delivery head from 1.1 to 17.7 m □ Delivery performance from 1.8 to 47 m³/h ■ Submersible pumps (10 m connection cable) with assembled coupling piece, for **faecal containing** wastewater: □ Delivery head from 1.5 to 47 m □ Delivery performance from 2 to 23 m³/h	■ Submersible pumps (10 m connection cable) with assembled coupling piece, for **non-faecal** wastewater: □ Delivery head from 1.0 to 33 m □ Delivery performance from 1.8 to 420 m³/h ■ Submersible pumps (10 m connection cable) with assembled coupling piece, for **faecal containing** wastewater: □ Delivery head from 1.5 to 47 m □ Delivery performance from 2 to 158 m³/h
Safety ladders	■ Ladders made of reinforced plastic, 300 mm wide, 280 mm riser dimension including wall bracket and fixing material: □ One-piece with 7 to 16 rungs and/or 1,960 to 4,480 mm long □ Two parts including coupling piece with 17 to 21 rungs or 4,760 to 5,580 mm long	■ Ladders made of reinforced plastic, 300 mm wide, 280 mm riser dimension including wall bracket and fixing material: □ One-piece with 7 to 16 rungs and/or 1,960 to 4,480 mm long □ Two parts including coupling piece with 17 to 21 rungs or 4,760 to 5,580 mm long

* Performance data and application limits, 📖 Chapter 6.2 "Submersible pumps - non-faecal wastewater" and 6.3 "Submersible pumps - faecal containing wastewater.

2.1.2 Accessories

Product	Utilising the pumping station	Description
Pump pull chain	All	Stainless steel with a pull force of 500 kg (metre goods)
Shackle	All	For fastening the pump pull chain on the pump handle
Guide pipe	PSD-P-1000, PSD-B-1000	DN/OD 43 - GRP pipe for extending the short guide pipe up to the chain holder (per metre)
Guide pipe	PSD-B-1500 and 2200	DN/OD 60 - GRP pipe for extending the short guide pipe up to the chain holder (per metre)
Rechargeable battery	Control	12 V/1.2 aH, for retaining the alarm signal in case of power failure
Sealing plug	All	For sealing (vapour-proof) the connection of the cable pipe in the tank (base shaft) and/or in the shaft ring
Pressure pipe adapter	PSD-P-1000, PSD-B-1000	From DN/OD 50 to DN/OD 80
Entry aid	All	Used in the frame of the cover
Outdoor cabinet	All	■ As empty housing ■ Dimension: 806 x 2,000 x 338 mm (W x H x D) ■ with horizontal partition ■ Area above the partition wall:Spare space for a control unit ■ With 230 V and 400V plug socket ■ Area below the partition wall:Spare space for an on-site DN 50 - 200 backflow loop, ■ with 100 W heating with thermostat

Product	Utilising the pumping station	Description
Multi Control control system	With submersible pumps ■ SAT-100/D ■ SAT-150/D ■ SAT-200/D ■ SAT-50/2/32/D ■ SAT-75/2/32/D ■ SAT-V 75/2/50/D ■ SAT-V 150/2/50/D ■ SAT-Q 300/65/D ■ SAT-Q 300/80/D ■ SAT-Q 400/65/D ■ SAT-Q 400/80/D ■ SAT-Q 300/80/4/D ■ SAT-Q 550/80/4/D ■ KL-AT-M 200/4/80 D-Ex ■ KL-AT-M 300/4/80 D-Ex ■ KL-AT-M 400/4/80 D-Ex ■ KL-AT-V 400/2/80 D-Ex ■ KL-AT-V 400/4/100 D-Ex ■ KL-AT-V 550/2/80 D-Ex ■ SITA 150 N-ex ■ SITA 200 N-ex ■ SITA 300 N-ex ■ SITA 550 N-ex	■ 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) or a float switch. 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 on the LCD display. ■ LCD plain text display ■ Hand – 0 – Auto functions ■ Acknowledge button ■ Forced switching on of the pumps (24 h) ■ Internal acoustic alarm ■ Flood alarm, isolated ■ Operating hours counter ■ High reliability ■ Level registered by an internal pressure transducer ■ All settings and fault signals and messages are retained after a power failure ■ Rotating field and phase failure control ■ In manual mode the pumps switch off automatically after 2 min. running time ■ Switching off of pump via switch-off point and after-running period ■ Electronic monitoring of the motor current ■ Group alarm isolated and non-isolated ■ “Number of pump starts” memory ■ Ampere meter ■ Automatic pump change ■ Easy operation ■ Service mode ■ Off-mains alarm with battery back-up (approx. 7 h) through integrated 9 V rechargeable battery, horn volume maximum. approx. 85 dB (optional)

Product	Utilising the pumping station	Description
Level Control PS 2 Control System	With submersible pumps ■ SAT-Q 750/80/D ■ SAT-Q 1000/100/D ■ SAT-Q 1000/100/4/D ■ SAT-Q 1500/100/D ■ LW-KP 1325...421 ■ LW-KP 1325...422 ■ LW-KP 1325...423 ■ LW-KP 1325...424	■ LCD plain text display ■ Thermal monitoring for the pumps ■ Manual – 0 – Auto functions ■ Switching off the pump via switch-off point and after-running ■ Acknowledgement button - Runtime monitoring ■ Forced activation of the pump ■ Variable staged start (switch-on delay) ■ Internal acoustic alarm ■ Collective fault signal potential-free ■ Flood alarm potential-free ■ Number of pump starts memory ■ Operating hours counter ■ Input for high water float switch ■ Pump change ■ Forced switching ■ High interference immunity ■ Easy operation ■ Atex–Mode ■ Service–Mode ■ Peak load can be switched off ■ Interpump delay adjustable ■ Level detection optionally by internal pressure transducer, external 4 - 20 mA probe ■ Measuring range of the external probe adjustable in the menu ■ Malfunction alarm inputs for various monitoring - modules ■ Connection to telecontrol systems via digital inputs and outputs or serial interface possible ■ All settings and various fault or malfunction messages with zero voltage protection

Product		Utilising the pumping station	Description
Level sensor	Open back pressure bell	All	■ Measuring principle: pneumatic filling level recording. When the liquid reaches the bottom of the compression bell, the air within the bell is compressed. A rising liquid level activates the control. After pumping out it must be ensured that the compression bell is ventilated (not the version with air bubble injection). ■ Utilisation: in highly contaminated, polluted and viscous medium as well as Zone 1 + 2 potentially explosive atmospheres. ■ Restriction: not suitable for aggressive media and temperatures higher than 40 °C. ■ Housing: grey cast iron GG ■ 20 m pneumatic control pipe
	Closed back pressure bell	All	With 40 m control cable
	Float switch (4 Units required)	Not for wastewater containing faeces	■ Knife principle: Microswitch (position dependent) ■ Use up to 80 °C, not approved for use in explosive hazardous areas ■ Degree of protection: IP 68/2 bar ■ Switching capacity 5 A/250 V, switching angle 10° ■ Polypropylene housing ■ 10 m connecting cable
	Level probe	All	■ 4 - 20 mA output signal for hydrostatic filling level measurement in water and wastewater. ■ Very easy to clean and is ideally suited for wastewater with the front flush-installed membrane (ATEX II 2 G EEx ia IIC T6: XA131P/00/a3). ■ Degree of protection IP68 ■ Utilisation for ambient temperature: -10 °C to +70 °C ■ Measuring range: 0.1 – 0.4 bar ■ 20, 50 and/or 80 m connecting cable (bending radius maximum 120 mm)
Air bubble injection		In combination with open back pressure bell	A compressor is integrated into the control line of the open compression bell as a bypass via a T-piece. The compressor permanently blows in air via the control line. This therefore the back pressure bell from becoming clogged by substances that form a floating layer (e.g. fat).
Ex-barrier		In combination with level probe	■ For separating potentially explosive and safe area. The ex-barrier is an additional piece of equipment whose purpose is to achieve safe isolation of intrinsically safe electric circuits from non-intrinsically safe electric circuits. It contains limiting devices with voltage limitation for two circuits. ■ Maximum permissible ambient temperature: -20 °C to +50 °C
Protection pipe for level probe		All	■ Total length 1,700 mm

2.2 Components

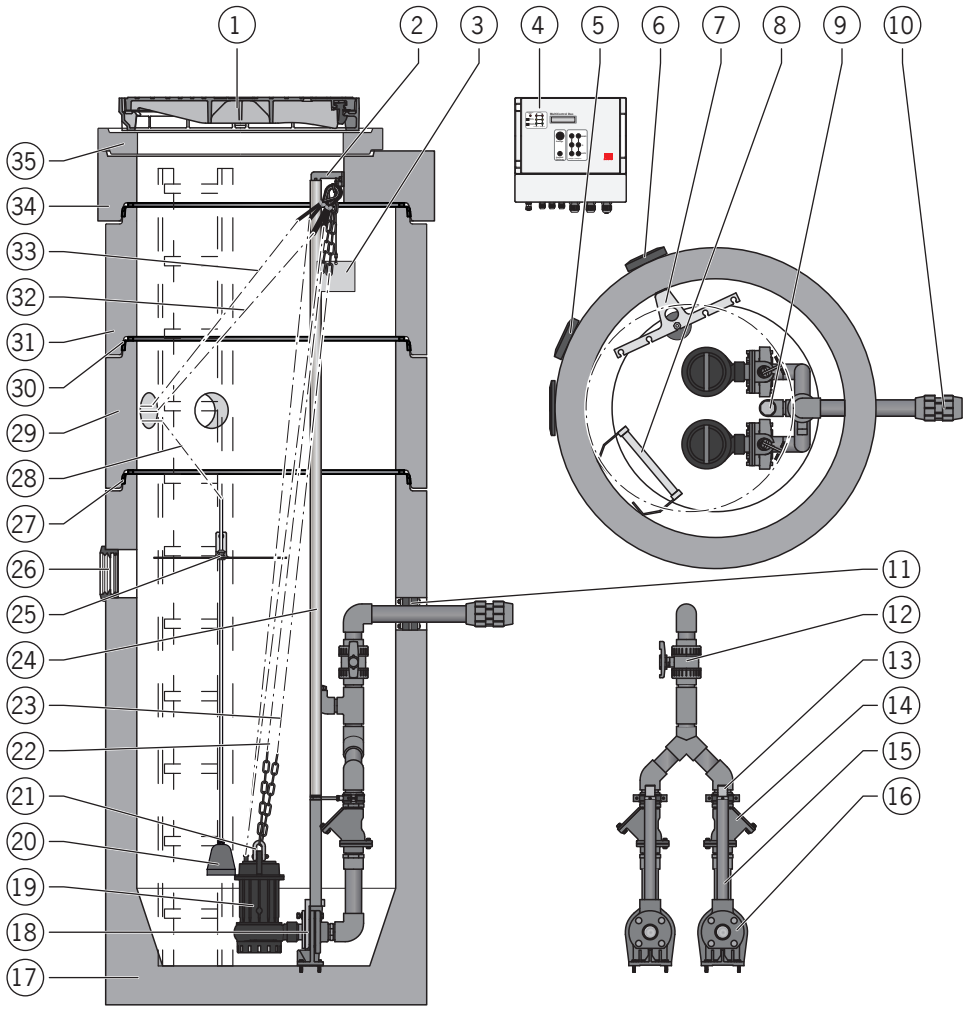


Figure: Type PSD-B 1000

1 = Cover
2 = Chain holder
3 = Type plate
4 = Control
5 = Collar seal (on-site reserve cable conduit connection)*
6 = Collar seal (connection provided by customer for ventilation pipe)*
7 = Probe holder
8 = Access ladder
9 = Flushing connection (optional)
10 = Compression fitting and/or flange connection (connection on-site to pressure pipe)
11 = Pipe feed-through
12 = Ball valve and/or gate valve
13 = Clip on nipple
14 = Ball retaining valve
15 = Slide pipe
16 = Underwater coupling system-automatic
17 = Tank (basin)
18 = Coupling piece*
19 = Submerged pump
20 = Level probe e.g. open back pressure bell
21 = Shackle
22 = Pump pull chain for Pump 1
23 = Pump pull chain for Pump 2
24 = Guide pipe (each Pump 1 + 2)
25 = Cable screw connection

26 = Socket seal (connection on-site to inlet pipe)
27 = Mechanical seal according to DIN 4034
28 = Control cable and/or connection cable for level sensor
29 = Shaft ring with connection for reserve cable conduit and ventilation**
30 = Mechanical seal according to DIN 4034
31 = Shaft ring (optional) for adapting the installation depth
32 = Connecting cable Pump 1
33 = Connecting cable Pump 2
34 = Cover plate
35 = Support ring (optional) for adapting the installation depth

* With PSD-P-1000, PSD-B-1500 and -2200 arranged in the tank

** Not applicable for PSD-P-1000, PSD-B-1500 and -2200

2.3 Operating principle

Wastewater from the connected sanitary appliances flows via the inlet pipe and into the tank. Level encoders assembled in the tank (sensors) are connected to the control. At a defined water level, the pumps are switched on and off or a flood alarm is triggered.

The water level in the tank is shown in the display panel of the control.

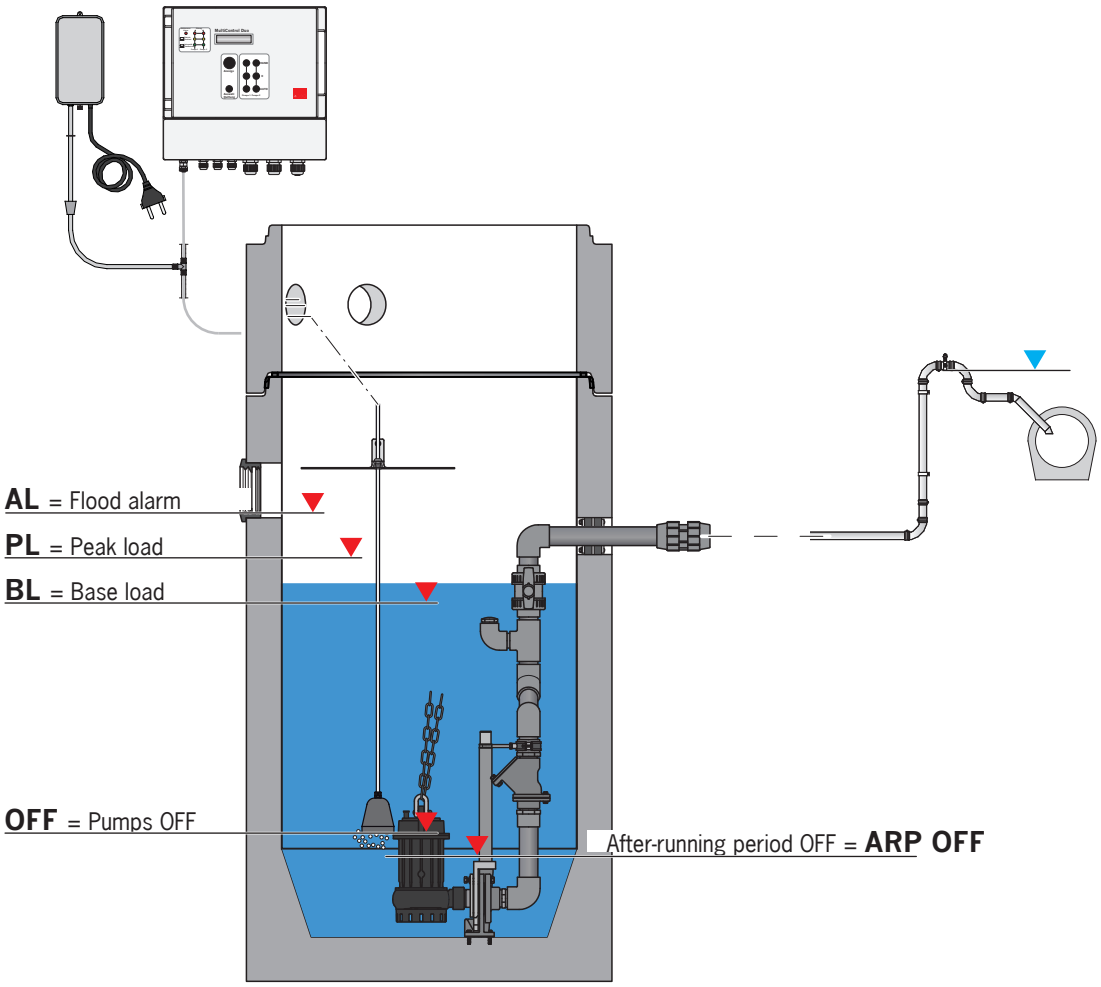


Figure: Water status level

If the water level reaches the baseload (BL), then a pump switches on and pumps the wastewater through the pressure pipe above the ▼ “Pipe invert, backflow loop” level. From there the wastewater flows by gravity to the drainage sewer.

Two ball retaining valves prevent backflow from the pressure pipe and into the tank.

If the water level falls to the pump OFF (OFF) level, then the pump switches off. With a set after-running period (ARP), the pump remains activated and the water level continues to be lowered to the after-running period OFF (ARP OFF) level.

The prefabricated pumping station is equipped with two pumps:

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

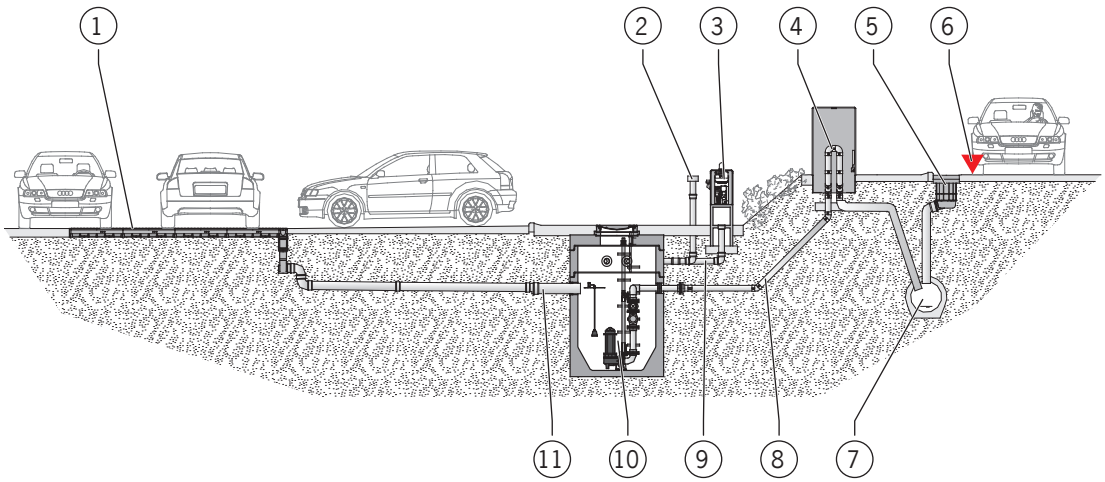
3 Installation

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

IMPORTANTAssure required qualifications of personnel, Chapter 1.3 "Personnel qualifications".

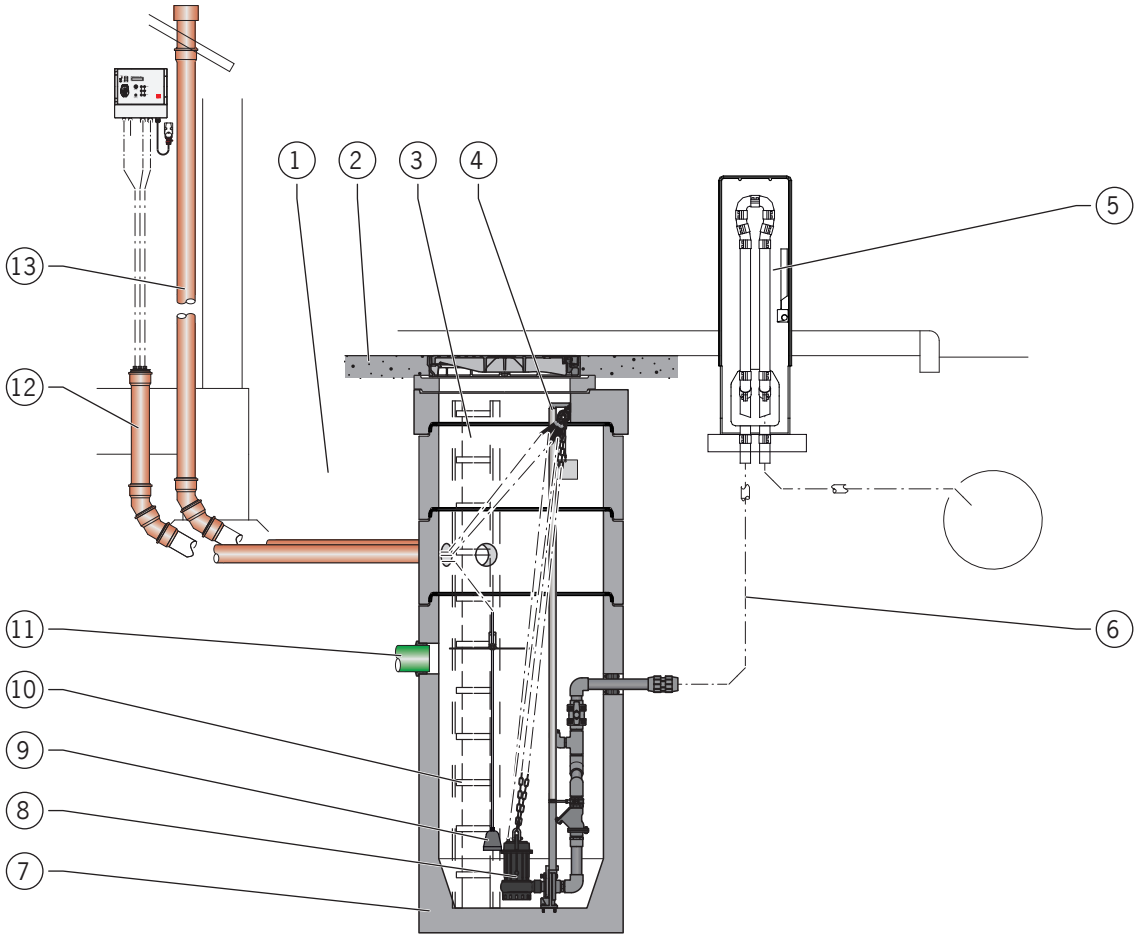
3.1 Installation example (schematic diagram)

The example shows the installation of a prefabricated pumping station for draining a car park. The components used can differ, depending on the installation situation.



1 = Channel (optional)
2 = On-site ventilation line
3 = Outdoor cabinet (optional)
4 = On-site backflow loop
5 = Road gully (optional)
6 = Backflow level
7 = On-site sewer
8 = On-site pressure pipe
9 = On-site cable duct
10 = Prefabricated pumping station (e.g. Powerlift-PSD-B-1500)
11 = On-site inlet pipe

3.2 Overview of earthwork and installation works



Item	Work	Description Chapter
1	Digging the excavation	3.3.2
2	Backfilling the excavation	3.3.11
3	Installing shaft components with PSD-P Installing shaft components with PSD-B	3.3.4 3.3.5
4	Assembling the chain holder and guide pipe	3.4.2
5	Installation in the outdoor cabinet (optional)	3.3.10
6	Laying and connecting the on-site pressure pipe	3.3.9
7	Installing the container in the basic shaft	3.3.3
8	Installing the submersible pumps	3.4.3
9	Assembling the level sensor (optional)	3.4.4
10	Assembling the access ladder	3.4.1
11	Laying and connecting the on-site inlet pipe	3.3.6
12	Laying and connecting the on-site blank cable pipe	3.3.8

Item	Work	Description Chapter
13	Laying and connecting the on-site ventilation pipe	3.3.7
–	Execute leak test	3.3.12

3.3 Earthworks

3.3.1 Specifications

Installation site

Load class D 400: truck trafficable – the safe solution for heavy goods vehicles and storage areas and side strips (hard shoulders) of carriageways

Installation depth

In Germany, the minimum depth for frost-free earthworks is regulated in DIN 1054. In this standard, the depth is cited as min. 80 cm, but can be stipulated even higher due to supplementary regional ordinances or empirical meteorological values.

Installation in groundwater

When the structural prerequisites make a buoyancy safeguard necessary, then the following proposal for buoyancy safeguard applies:

The tank will have drill holes drilled in the factory, including delivery of short structural steel pieces for connection to the on-site in-situ concrete structure to be erected by the customer. Please note that we do not provide a reinforcement plan and that the calculation as well as an associated reinforcement plan must be inspected and approved by a structural engineer (client's obligation). We would be pleased to execute this for you for a fee.

Excavated pit

- Excavation and back-filling per DIN 18300
- Embankment / work space / shoring per DIN 4124
- With normal ground conditions, a profile-following, compacted sand or gravel bed with levelling accuracy will suffice.
- Maximum ground pressure is 15.5 N/cm^2
- Works are to be carried out such that the system and the pipes are not damaged and that they remain in place. Subsequent settlement of system parts must be prevented by appropriate measures.
- If the levelling is created using concrete, a 5 cm thick sand layer must be established on top of this in order to guarantee uniform load distribution and to be able to compensate for any manufacturing tolerances that may arise.
- A foundation earthing electrode or earthing strip shall be provided for potential compensation during the construction phase.
- Always secure the excavation pit during the construction stage.

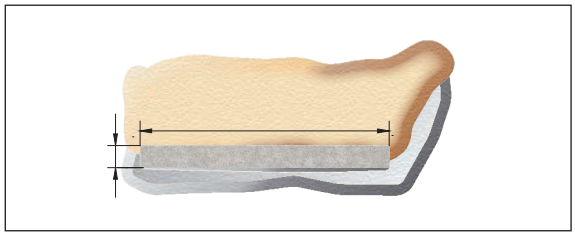
Slings for transport using lifting gear

- Tank and cover plate: Use 3-part harness with at least 5 m long strands made from chain or cables with load hooks and NG 5 shackles according to DIN 82101
- Cover and shaft components: Use 3-type part harness with at least 5 m long strands made from chain or cables with shaft jaws

3.3.2 Digging the excavation

Requirement: Excavation pits should have a diameter of at least 1,500 mm larger than the external diameter of the base shaft.

➔ Excavate the pit and secure.
➔ Make underfill/bedding.

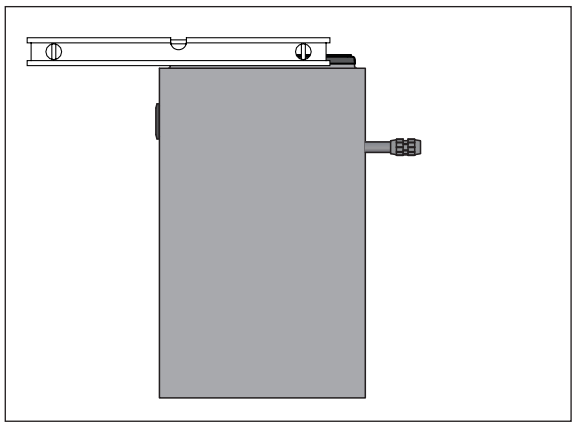


3.3.3 Installing the container in the basic shaft

IMPORTANT Transport eyebolts are designed for the load of the tank. Do not transport with shaft components placed on top.

➔ Bring in the tank and align horizontally.

Complete weight,
Chapter 6.1.2 “Characteristic Data”



3.3.4 Installing shaft components with PSD-P

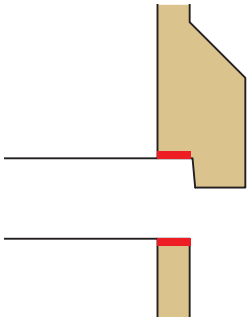
Shaft rings with connection collars, cover plate, support rings, cover and adhesive are supplied loose.

IMPORTANT

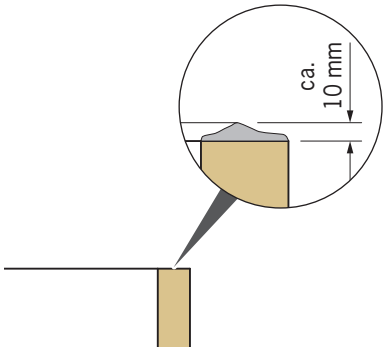
- All joints must be sealed with the supplied 2-component adhesive.
- Transport eyes on the shaft components are designed for their own weight load. Do not transport with other shaft components placed on top.

Specifications:

- Both adhesive surfaces ▬ (e.g. circumferential upper edge of the base shaft and circumferential collar base of the shaft ring) must be machined (e.g. with angle grinder and grinding disc) in order to obtain a release agent-free adhesive surface.



- Adhesive surfaces must be clean, dry and free of grease and oil before bonding.
- Mixing of the 2-component adhesive, 🕮 documentation accompanying the product.
- Apply the adhesive over the entire surface and conically (approx. 10 mm in the tip) all around on the upper adhesive surface area of every component.

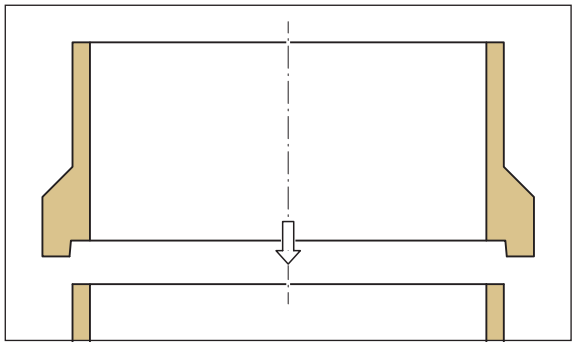


- The adhesive mass should squeeze out circumferentially to the inside after the components have been positioned. Smooth out any excess or protruding material and fill any gaps in the joint flush with the adhesive.

Manhole rings

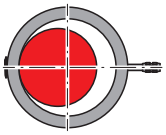
Manhole rings of nominal size 1,000 can be installed between the manhole ring and cover plate to adapt to the installation depth. Manhole rings with construction heights from 250 to 1,000 mm can be optionally purchased from ACO.

➔ Arrange the shaft ring centrally (e.g. above the tank), position and fit as plumb and allow to slide on. Press carefully if there is any canting.

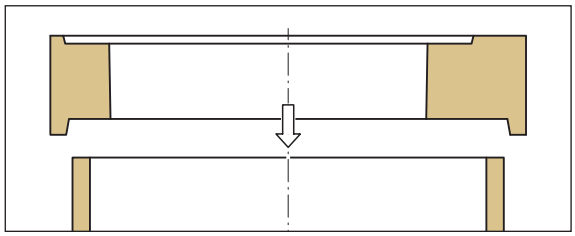


Cover plate

IMPORTANT Arrange the cover plate opening as illustrated next to this:



➔ Arrange the cover plate centrally above the manhole ring, position and fix as plumb and allow to slide on. Press carefully if there is any canting.

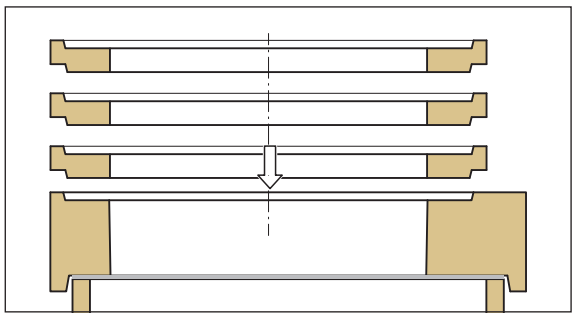


Supporting rings

Supporting rings can be installed between the cover and the cover plate to adjust to the upper level of the terrain on site. Supporting rings with construction heights from 40 to 100 mm can be optionally purchased from ACO.

IMPORTANT Compensate out maximum. 300 mm of height difference with supporting rings.

➔ Insert the supporting ring into the "retainer".



Cover

IMPORTANT

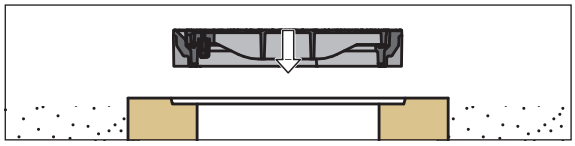
- Before the cover is installed the excavation fit must be backfilled up to this level, Chapter 3.3.11 "Backfill pit".
- Release and approval for traffic is only permitted after an adequate bonding time has passed, once the mortar has reached a compressive strength of at least 10 N/mm².
- When installing in asphalt surfaces, it is not permitted to tar over the cover.

Specifications:

- Installation, product-accompanying documentation: Instruction "Multitop manhole cover".

➔ Clean and moisten the sliding rebate of the cover plate and/or the supporting ring and the underside of the cover.

➔ Insert the cover in the "retainer" and align.



3.3.5 Installing shaft components with PSD-B

Shaft rings with connection collars, cover plate, supporting rings and cover are supplied loose.

- Shaft components delivered by ACO according to/similar to DIN 4034-1 have an ACO mechanical seal for joint sealing. The mechanical seal is a compression mechanical seal with a wedge-shaped cross section and a factory-made, closed, pre-lubricated slide sleeve. A load-distributing tube filled with fine quartz sand is permanently attached to the sealing ring.
- The mechanical seal is pre-fitted at the factory to the spigot end of the shaft component and/or the tank.

Should the mechanical seal slip out of place e.g. during transportation or on-site, then this should be tightened again as follows:

➔ On cold days, pre-heat the sealing, e.g. construction tank.

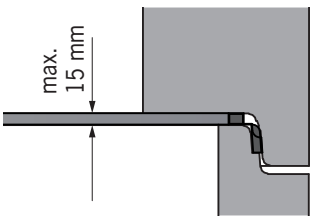
➔ Clean spigot.

➔ Fit the circular rotating mechanical seal to the spigot such that the slide sleeve of the circular rotating mechanical seal faces outwards and the load-distributing tube lies centrally on the spigot.

➔ Position the circular rotating mechanical seal on the shoulder and spread the pre-tensioning evenly.

IMPORTANT

- Transport eyes on the shaft components are designed for their own weight load. Do not transport with other shaft components placed on top.
- After placement, there must be a maximum gap of 15 mm present in the interior.

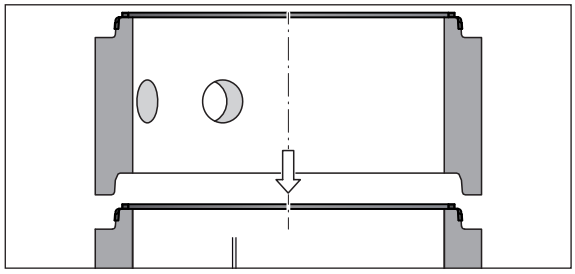


- Always observe the maximum installation depth of the prefabricated pumping station, Chapter 6.1.1 “Dimensions”.

Supporting ring with connection collar (PSD-P-1000, PSD-B-1000 and -1500)

IMPORTANT Always pay attention to the desired arrangement with regards to connection for reserve cable conduit and ventilation pipe.

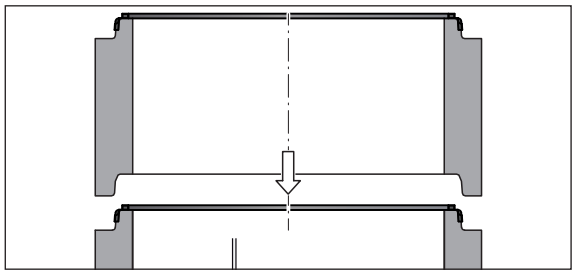
➔ Arrange the shaft ring centrally above the tank, fit plumb and allow to slide on. Press carefully if there is any canting.



Manhole rings

Manhole rings with nominal size 1,000, 1,500 and/or 2,200 according to DIN 4034-1 can be installed between the manhole ring and connection collars and/or tank and cover plate to adapt the installation depth. Shaft rings with construction heights from 265 to 2,515 mm can be optionally purchased from ACO.

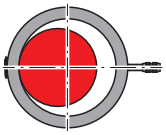
➔ Arrange the shaft ring centrally above the tank, fit plumb and allow to slide on. Press carefully if there is any canting.



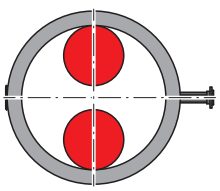
Cover plate similar to 4034-1

IMPORTANT Arrange the cover plate opening as illustrated next to this:

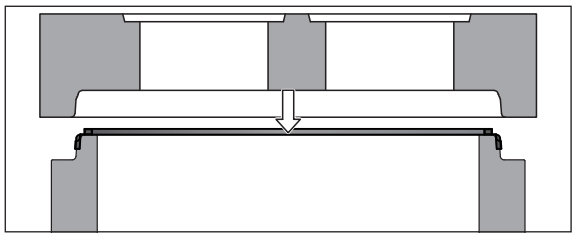
- Powerlift PSD-P-1000 and PSD-B-1000



- Powerlift PSD-B-1500 and -2200



➔ Arrange the cover plate centrally above the manhole ring, position and fix as plumb and allow to slide on. Press carefully if there is any canting.



Complete weight,
📖 Chapter 6.1.2 “Characteristic Data”.

Supporting rings

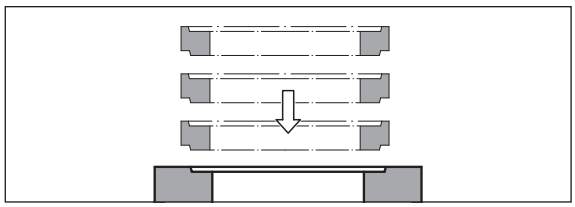
Standard supporting rings can be installed between the cover and the cover plate to adjust to the upper level of the terrain on site. Support rings with construction heights from 70, 90 to 110 mm can be optionally purchased from ACO. (Height details with 1 cm mortar joint).

IMPORTANT Compensate out maximum. 300 mm of height difference with supporting rings.

Specifications:

- The mortar joint shall not be less than 1 cm or more than 3 cm.
- Use MG III mortar per DIN 1053. Alternatively, use non-shrinking shaft-grouting mortar, e.g. Ebralit or equivalent. In doing so, the manufacturer's processing instructions must be complied with.

➔ Clean and moisten the sliding rebate and the underside of the supporting ring.
➔ Apply mortar bed on the surface of the rebate.
➔ Insert the supporting ring into the "retainer".



Cover

IMPORTANT

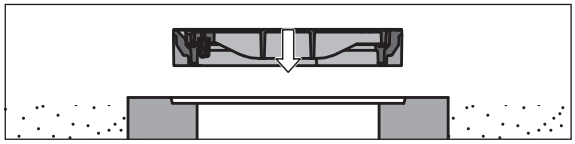
- Before the cover is installed the excavation fit must be backfilled up to this level,
📖 Chapter 3.3.11 "Backfill pit".
- Release for traffic is only permitted after an adequate bonding time has passed, once the mortar has reached a compressive strength of at least 10 N/mm².
- When installing in asphalt surfaces, it is not permitted to tar over the cover.

Specifications:

- The mortar joint shall not be less than 1 cm or more than 3 cm.
- Use MG III mortar per DIN 1053. Alternatively, use non-shrinking shaft-grouting mortar, e.g. Ebralit or equivalent. In doing so, the manufacturer's processing instructions must be complied with.

- Installation, 🕮 product-accompanying documentation: Instruction "Multitop manhole cover".

➔ Clean and moisten the sliding rebate of the cover plate and/or the supporting ring and the underside of the cover.
➔ Apply mortar bed on the surface of the rebate.
➔ Insert the cover in the "retainer" and align.



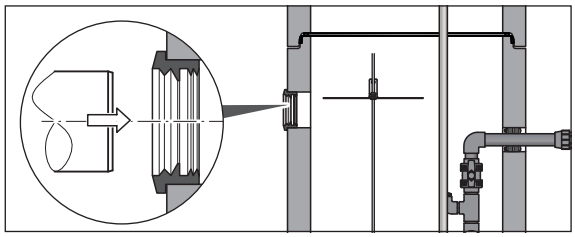
3.3.6 Laying and connecting the on-site inlet pipe

IMPORTANT Before the inlet pipe is connected, the excavations must be filled up to this level, 🕮 Chapter 3.3.11 “Backfill excavations”.

Specifications:

- Pipe nominal width, 🕮 Chapter 6.1.1 “Dimensions”.
- Lay pipes to be frost resistant.
- The pipe cross-section must not reduce in the direction of flow.
- Make flexible pipe joints.
- Lay up to the tank with a gradient of at least 1.5 – 2 %.
- Reverse gradients, and the formation of siphons or pockets are not allowed.
- Select material that is resistant to the wastewater (e.g. KML, PP, PE, PVC).

➔ Use acid-free lubricant to grease the spigot of the inlet pipe and the sealing lips of the socket seal.
➔ Push the spigot into the socket seal.



3.3.7 Laying and connecting the on-site ventilation pipe

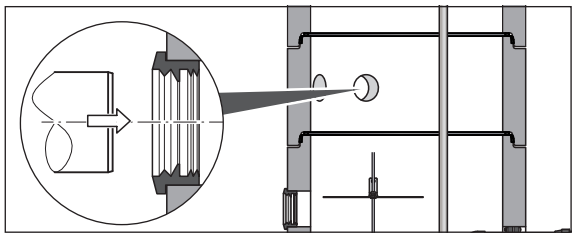
IMPORTANT Before the on-site ventilation pipe is connected, the excavations must be backfilled up to this level, 🕮 Chapter 3.3.11 “Backfill excavations”.

Specifications:

- Pipe nominal widths DN/OD = 110 mm and/or DN/OD = 160 mm with PSD-B-2200/ T_{Basin} 585
- Lay the vent stack so that it rises continuously. Do not reduce the stack cross-section.
- The vent stack pipe must not be merged with the vent stack of a grease separator.
- The end of the vent stack must be routed to above the roof or, for example, in the ground, where it does not cause any odour nuisance.

- Choose resistant material (e.g. KML, PP, PE, PVC).

➔ Use acid-free lubricant to grease the spigot of the vent stack and the sealing lips of the socket seal.
➔ Push the spigot into the socket seal.



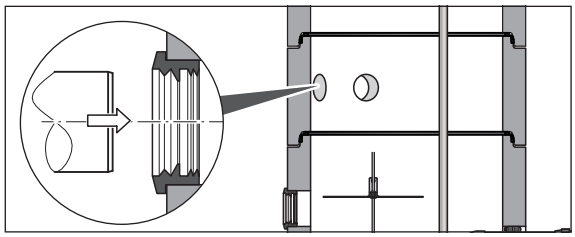
3.3.8 Laying and connecting the on-site blank cable pipe

IMPORTANT Before the on-site reserve cable conduit is connected, the excavations must be backfilled up to this level, Chapter 3.3.11 “Backfill excavations”.

Specifications:

- Pipe nominal widths DN/OD = 110 mm and/or DN/OD = 160 mm with PSD-B-2200/ T_{Basin} 585
- The reserve cable conduit must be laid as always rising from the tank to the assembly location of the control unit (technology room and/or outside cabinet). Do not reduce the stack cross-section.
- Do not use pipe bends with angles larger than 30°.
- Lay a high-quality pull wire in the reserve conduit directly at the same time.
- Choose resistant material (e.g. KML, PP, PE, PVC).

➔ Use acid-free lubricant to grease the spigot of the reserve cable conduit and the sealing lips of the socket seal.
➔ Push the spigot into the socket seal.



3.3.9 Laying and connecting the on-site pressure pipe

IMPORTANT Before the on-site pressure pipe is connected, the excavations must be backfilled up to this level, Chapter 3.3.11 “Backfill excavations”.

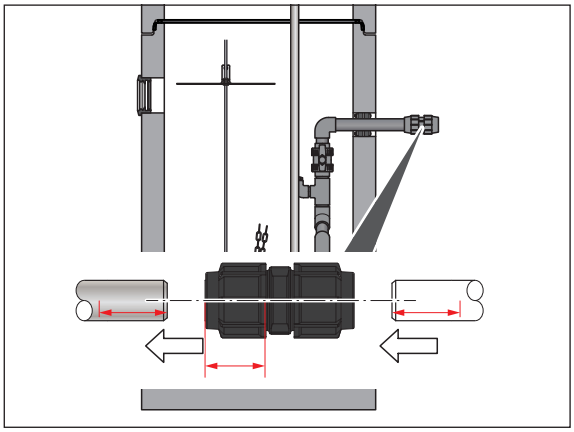
Based on normative requirements:

- 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 stress-free.

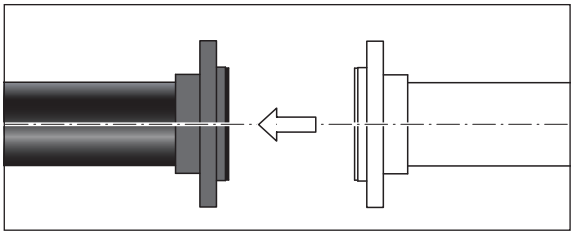
Pressure pipe DN 50, DN 70 or DN 80

Compression fitting ID 63 mm to ID 75 and 90 can be purchased from ACO as an optional item.



- Cut the on-site pressure pipe at aright-angles and grind the spigot end.
- Use acid-free lubricant to grease the spigot end of the on-site pressure pipe and the connection pipe to the pump station.
- 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).
- Insert the pipe to the end stop and/or marking in the compression fitting.
- Hand tighten the conical nuts.
- Tighten for an optimal strength with tools suitable for plastic compression fittings.

Pressure pipe DN 100, DN 125, DIN 200 and/or DN 250



- Flange connection dimension according to DIN 2501/PN 16.
- A seal is adhered on the flange in the as-delivered status.

- Connect the on-site pressure pipe with the on-site fastening material on the flange.

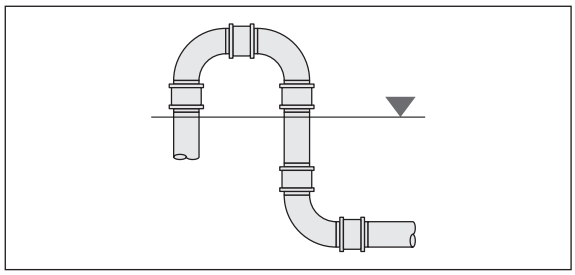
Creating the backflow loop in the pressure pipe

Based on the normative requirements, the unit should drain via a backflow loop. The backflow loop must be established above the backflow level. The installation example shows the basic layout, Chapter 3.1 “Installation example”.

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.

➔ Lay the backflow loop above the “backflow level” ▼ .



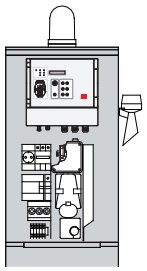
3.3.10 Installation in the outdoor cabinet (optional)

Outdoor cabinet for accommodation of accessories

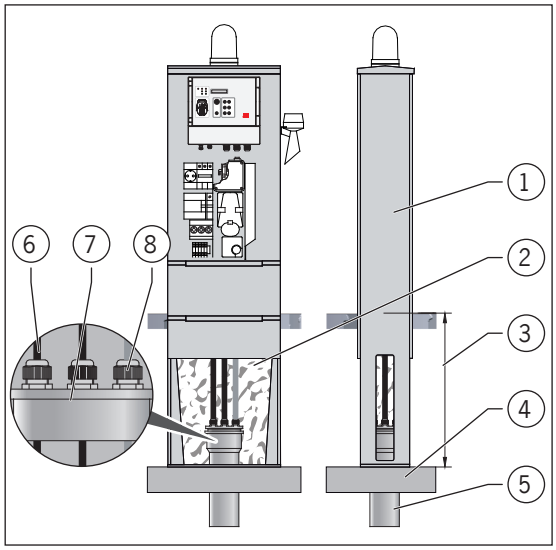
Specifications:

- The construction materials used and installation method must not cause any harmful deformations, damage or unfavourable load cases for the outdoor cabinet.
- Use base filler (fill material for reducing the formation of condensation).

An outdoor cabinet for accommodating the control, flashing light, horn, etc. can be purchased from ACO as an optional product. In general, components such as the control are already pre-installed in the outdoor cabinet.



➔ Make a hole in the ground for the outdoor cabinet (1), note the buried depth (3).
➔ Build the foundation (4) for the outdoor cabinet (1) and at the same time position the cable duct above the foundation.
➔ Install and fix the outdoor cabinet (1) onto a foundation (4).
➔ Use, for example, cable glands (8) and end covers (7) to pass through the cables and control pipe (6).
➔ Fill the void (2) with base filler.
➔ Backfill the excavated hole.

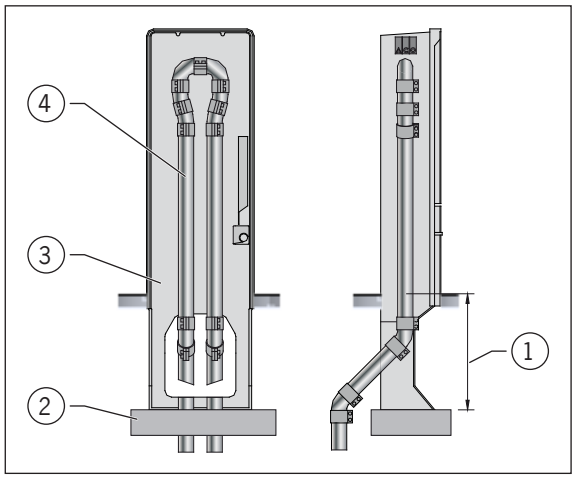


Outdoor cabinet for accommodation of a backflow loop

Specifications:

- The construction materials used and installation method must not cause any harmful deformations, damage or unfavourable load cases for the outdoor cabinet.
- Install the backflow loop not necessarily “filling the cabinet”. It is sufficient if the pipe bottom of the backflow loop is located above the backflow level on site.

An outdoor cabinet for accommodating the backflow loop can be purchased from ACO as an optional product.



➔ Make a hole in the ground for the outdoor cabinet (3), note the buried depth (1) (📖 outdoor cabinet data sheet).

➔ Make the foundation (2) for the outdoor cabinet (3).

➔ Install and fix the outdoor cabinet (3) onto a foundation (2).

➔ Install the on-site pressure pipe in the outdoor cabinet as a backflow loop (4).

➔ Backfill the excavated hole.

3.3.11 Backfilling the excavation

Specifications:

- The construction materials utilised and installation method must never cause any harmful deformations, damage or unfavourable load cases for the manhole base section and shaft components.
- Bed in the manhole base section all round (≥ 0.50 m) with a fine-grained sand-gravel or sand-crushed rock mixture of the soil groups GW or GI according to DIN 18196.
- The backfill material must be placed in layers (≤ 30 cm high) and compacted with lightweight compacting equipment to a Proctor density of Dpr ≥ 97%.
- The frame of the cover should never be higher than the surfacing, rather the surfacing should be slightly higher and drawn up at the edge of the frame.
- On laying the surfacing (e.g. asphalt surface) the cover must not be moved.
- The shaft structure may not be loaded until the excavated pit has been completely backfilled and the materials used have cured sufficiently.

➔ Backfill the excavation pit.

3.3.12 Leak test

WARNING

Danger of injury caused by incorrect execution

- Any resulting buoyancy forces acting on the cover plate due to the water filling must be compensated for by applying an additional load to the shaft structure.

All drainage systems on private ground must be leaktight (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.

IMPORTANT

- Leak tests must be executed on the whole plant by a specialist company before backfilling the excavation pit.
- Additional weights must be evenly positioned directly on the cover plate.
- Details for supplementary weights on request.

3.4 Installation work

3.4.1 Assembling the access ladder

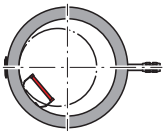
The access ladder is an integral part of the basic equipment and can be optionally purchased from ACO. Assembly, product accompanying instructions.

IMPORTANT

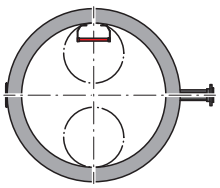
- Access ladders must not be assembled in the inlet pipe area.
- Access ladders must not impair the insertion, installation or lifting out of the submersible pumps.

Arrange the access ladders as follows:

- Powerlift PSD-P-1000 and PSD-B-1000



- Powerlift PSD-B-1500 and -2200

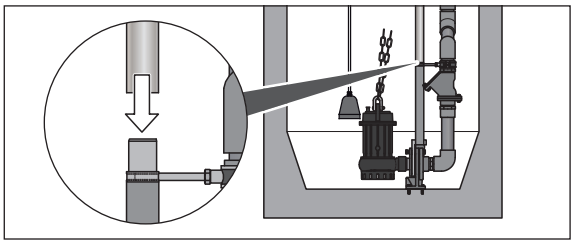


3.4.2 Assembling the chain holder and guide pipe

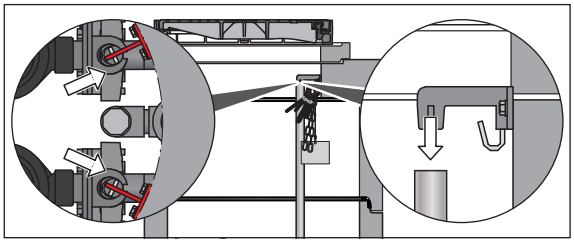
In the as-delivered condition, a chain holder with fixing material is enclosed as a loose part. The guide pipe (metre goods) can be optionally purchased from ACO.

Requirement: The chain holder should be assembled centrally in the cover plate according to the height.

➔ Attach the guide pipe on the glide pipe and align it as vertical.



➔ Insert the chain holder on the guide pipe and mark the drill holes on the cover plate.
➔ Fasten the chain holder on the marked position.



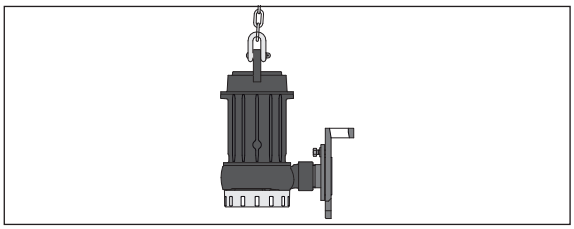
3.4.3 Installing the submersible pumps

Submersible pumps with assembled coupling pieces are integral parts of the basic equipment and must be selected according to the operating conditions and are supplied loose. 2 cable lugs are additionally included as loose.

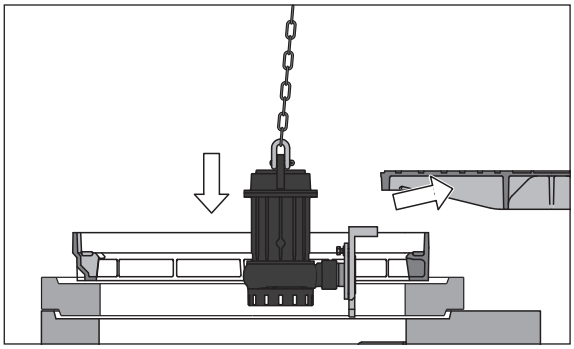
Pump pull chains (metre goods) and shackle can be optionally purchased from ACO.

The description applies to both submersible pumps:

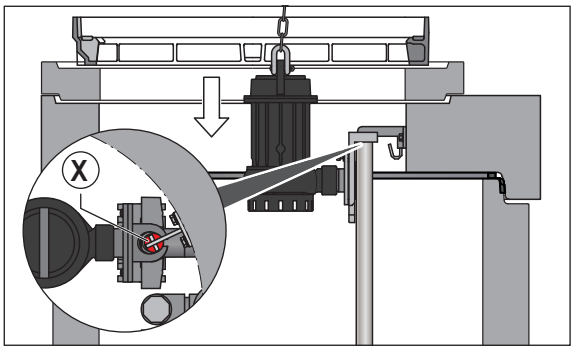
➔ Assemble the chain with shackle on the handle of the pump and/or
lay the chain around the pump handle and connect two chain links with the shackle.



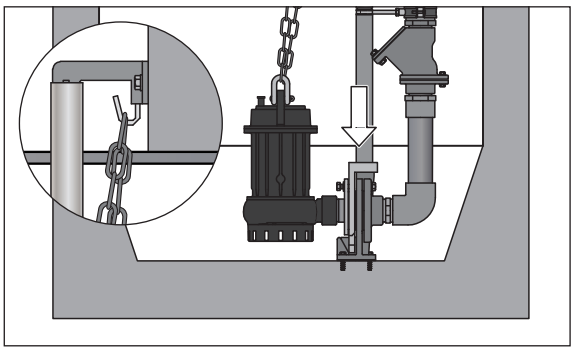
➔ Lift the cover out of the cover frame and store to the side.
➔ Use the chain to lower the pump into the tank.



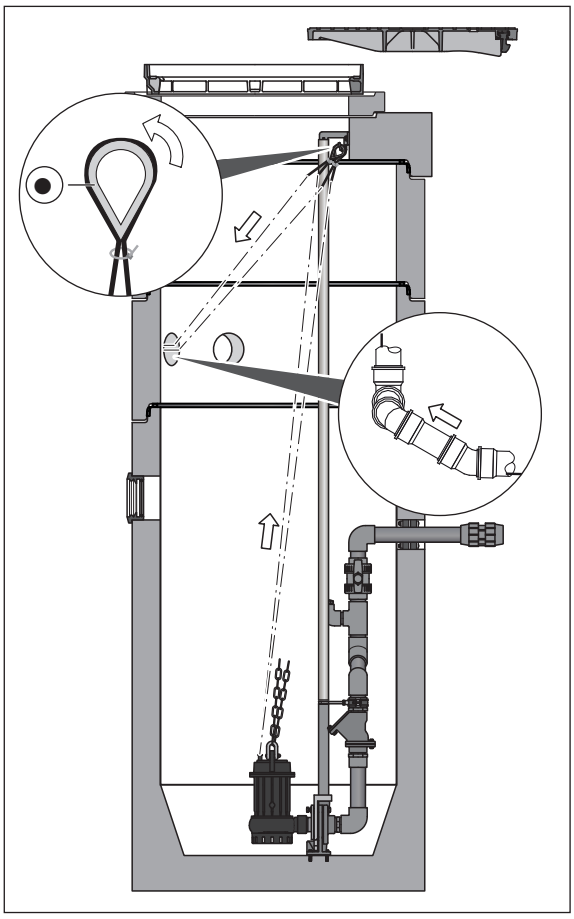
- Thread the coupling piece for the pump onto the guide pipe: Position **X**.



- Lower the pump further until the coupling sits in the underwater automatic coupling.
- Hook the chain onto the chain holder.



- Protect the end of the pump connecting cable against penetrating moisture.
- Pull the connecting cable upwards (not while energised) until it reaches the chain holder.
- Place the loop around the cable eye (●) and fasten with cable tie.
- Hang the cable eye on the chain holder.
- Use the pull wire in order to pull the connecting cable together with the level sensor connecting cable through the reserve cable duct up to the assembling location of the control.
- Keep sufficient excess cable length (approx. 1 m), to enable the wiring in the terminal compartment of the control.
- Replace the cover.



This is the only way that enables the submersible pumps to be removed and to be stored to the side next to the tank opening.

3.4.4 Assembling the level sensor (optional)

- Level sensors (open and/or closed back pressure bell, float switch or level probe) can be optionally purchased from ACO.
- The probe bracket is already assembled in the tank in the as-delivered condition.
- In the as-delivered condition, cable screws are enclosed as loose parts.

IMPORTANT

- Protect the ends of the connecting cable or control pipe against penetrating moisture.
- Never crimp or bend the control cable
- Ensure free movability of the level sensor after installation.

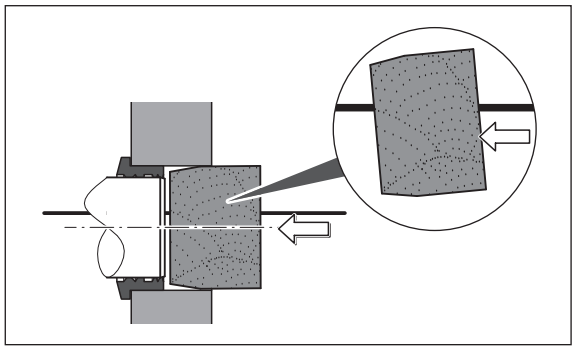
Installing the sealing plug

A sealing plug can be optionally purchased from ACO. Installing the sealing plug enables the cable entry position for all connecting cables and/or the control cable in the reserve cable conduit to be sealed (vapour-proof).

➔ Open the required drill holes in the sealing plug and insert the connection cable or control cable through them.

➔ Fill the entire length of unneeded drill holes with sealant (silicone).

➔ Push in the sealing plugs as deep as possible into the collar in the tank and/or manhole ring.



Open back pressure bell

The open back pressure bell has a 20 m long pneumatic control hose (hose fixed onto the bell) and is hung on the probe bracket.

Longitudinal measurement L with combination of the open back pressure bell with possible pump types in the various prefabricated pumping stations (overview of the prefabricated pumping stations Chapter 6.1 “Prefabricated pumping station”):

Powerlift PSD-P-1000 and PSD-B-1000

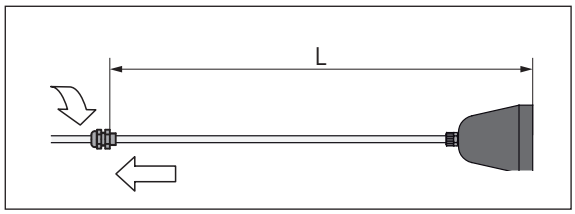
Pump type	Longitudinal measurement L [cm]		
	PSD-P-1000 T_{Basin} 685	PSD-B--1000 T_{Basin} 480	PSD-B--1000 T_{Basin} 1070
SAT-100/D	96	117	58
SAT-150/D	96	117	58
SAT-200/D	96	117	58

Pump type	Longitudinal measurement L [cm]		
	PSD-P-1000 T_{Basin} 685	PSD-B--1000 T_{Basin} 480	PSD-B--1000 T_{Basin} 1070
SAT-50/2/32/D	96	117	58
SAT-75/2/32/D	96	117	58
SAT-V 75/2/50/D	91	112	53
SAT-V 150/2/50/D	91	112	53
SITA 150 N-ex	94	115	56
SITA 200 N-ex	94	115	56
SITA 300 N-ex	85	106	47
SITA 550 N-ex	78	99	40

Powerlift PSB-P-1500 and PSD-B-2200

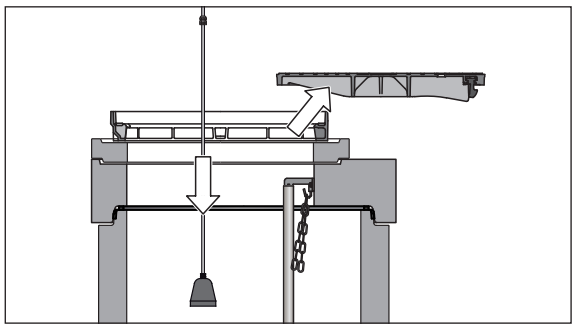
Pump type	Longitudinal measurement L [cm]				
	PSD-B--1500 T_{Basin} 395	PSD-B--1500 T_{Basin} 795	PSD-B--2200 T_{Basin} 515	PSD-B--2200 T_{Basin} 505	PSD-B--2200 T_{Basin} 585
SAT-Q 300/65/D	114	74	150	151	–
SAT-Q 300/80/D	114	74	150	151	–
SAT-Q 400/65/D	107	67	143	144	–
SAT-Q 400/80/D	107	67	143	144	–
SAT-Q 550/80/4/D	–	–	142	143	–
SAT-Q 750/80/D	–	–	141	142	–
SAT-Q 1000/100/D	–	–	137	138	–
SAT-Q 1000/100/4/D	–	–	137	138	–
SAT-Q 1500/100/D	–	–	137	138	–
SAT-Q 300/80/4/D	106	66	142	143	–
LW-KP 1325...421	–	–	–	–	170
LW-KP 1325...422	–	–	–	–	170
LW-KP 1325...423	–	–	–	–	170
LW-KP 1325...424	–	–	–	–	170
KL-AT-M 200/4/80/D-Ex	111	71	147	148	–
KL-AT-M 300/4/80/D-Ex	106	66	142	143	–
KL-AT-M 400/4/80/D-Ex	106	66	142	143	–
KL-AT-V 400/2/80/D-Ex	104	64	140	141	–
KL-AT-V 400/4/100/D-Ex	102	62	138	139	–
KL-AT-V 550/2/80/D-Ex	104	64	140	141	–

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



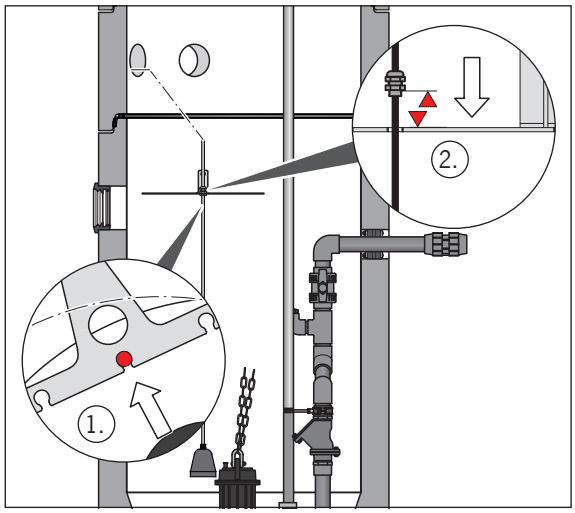
➔ Lift the cover out of the cover frame and store to the side.

➔ Lower the back pressure bell on the control cable into the tank.

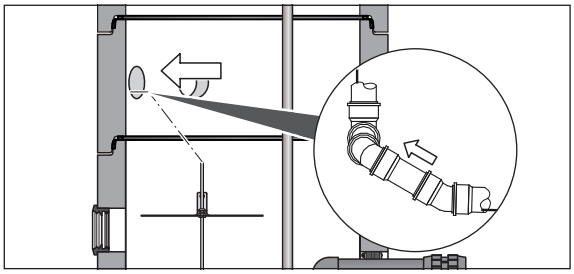


➔ Guide the control cable length below the cable gland into the recess (●) of the probe bracket (1).

➔ Lower the back pressure bell until the cable gland sits on the probe bracket (2).



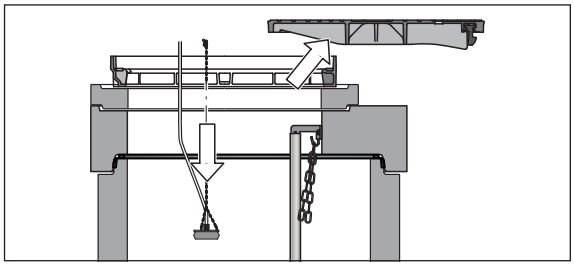
- ➔ Use the pull wire to pull the connection cable together with the pump connecting cable through the cable duct up to the mounting location of the control.
- ➔ Keep sufficient excess control cable (approx. 0.5 m), to enable the connection to the control.
- ➔ **IMPORTANT** Pull the control cable back out of the blank pipe by a small amount and arrange it so that it again so that it is kink-free and rising. This is the only way that the back pressure bell can be removed (e.g. for cleaning purposes).
- ➔ Replace the cover.



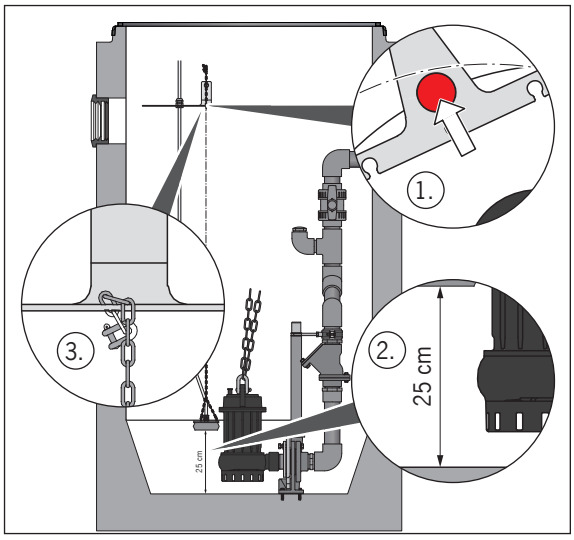
Closed back pressure bell

The closed back pressure bell with 40 m control cable will be assembled on the probe bracket.

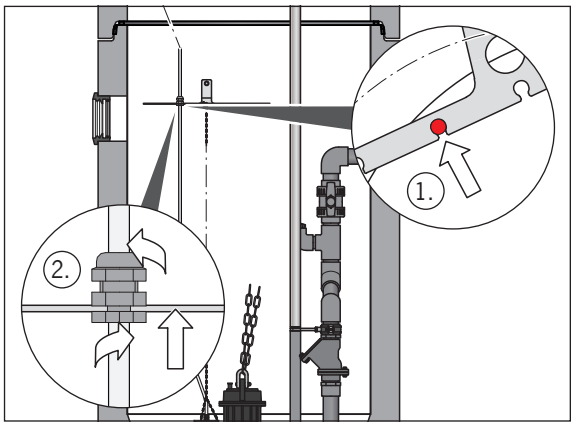
- ➔ Lift the cover out of the cover frame and store to the side.
- ➔ Lower the closed back pressure bell in the tank.



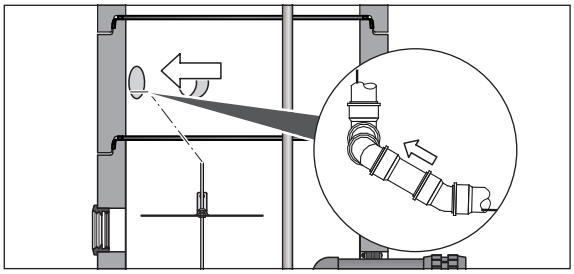
- ➔ Insert the chain through the drill hole (●) of the probe bracket (1).
- ➔ Adjust the back pressure bell to **distance measurement 25 cm** to the tank base (2).
- ➔ Fix the chain with the shackle on the probe bracket (3).



- ➔ Guide the control cable into the recess (●) of the probe bracket (1).
- ➔ Pull the control cable through by means of a PG screw and fix it with a PG screw on the probe bracket (2).



- ➔ Use the pull wire to pull the connection cable together with the pump connecting cable through the cable duct up to the mounting location of the control.
- ➔ Keep sufficient excess control cable (approx. 0.5 m), to enable the connection to the control.
- ➔ Replace the cover.



Float switch

A maximum of 5 float switches can be installed on the probe holder. The float switch has a 10 m connection cable (clamped and cast on the float switch).

The float switch will be hung on the probe holder. In the as-delivered condition, a float switch and cable eye are enclosed as loose parts.

IMPORTANT A float switch must be assembled for every L-AL, L-PL, L-BL and L-AUS switching point.

Longitudinal measurement L with combination of float switch with possible pump types in the various prefabricated pumping stations (overview of the prefabricated pumping stations Chapter 6.1 “Prefabricated pumping station”):

Powerlift PSD-P-1000 and PSD-B-1000

Pump type	Longitudinal measurement L [cm]											
	PSD-P-1000 T_{Basin} 685				PSD-P-1000 T_{Basin} 480				PSD-P-1000 T_{Basin} 1070			
	L-AL	L-PL	L-BL	L-AUS	L-AL	L-PL	L-BL	L-AUS	L-AL	L-PL	L-BL	L-AUS
SAT-100/D	31	41	51	96	32	42	52	117	32	37	42	58
SAT-150/D	31	41	51	96	32	42	52	117	32	37	42	58
SAT-200/D	31	41	51	96	32	42	52	117	32	37	42	58
SAT-50/2/32/D	31	41	51	96	32	42	52	117	32	37	42	58
SAT-75/2/32/D	31	41	51	96	32	42	52	117	32	37	42	58
SAT-V 75/2/50/D	31	41	51	91	32	42	52	112	32	37	42	53
SAT-V 150/2/50/D	31	41	51	91	32	42	52	112	32	37	42	53
SITA 150 N-ex	31	41	51	94	32	42	52	115	32	37	42	56
SITA 200 N-ex	31	41	51	94	32	42	52	115	32	37	42	56
SITA 300 N-ex	31	41	51	85	32	42	52	106	32	34	36	47
SITA 550 N-ex	31	41	51	78	32	42	52	99	32	34	36	40

Powerlift PSD-B-1500

Pump type	Longitudinal measurement L [cm]							
	PSD-B-1500 T_{Basin} 395				PSD-B-1500 T_{Basin} 795			
	L-AL	L-PL	L-BL	L-AUS	L-AL	L-PL	L-BL	L-AUS
SAT-Q 300/65/D	36	46	56	114	36	46	56	74
SAT-Q 300/80/D	36	46	56	114	36	46	56	74
SAT-Q 400/65/D	36	46	56	107	36	46	56	67
SAT-Q 400/80/D	36	46	56	107	36	46	56	67
SAT-Q 300/80/4/D	36	46	56	106	36	46	56	66
KL-AT-M 200/4/80/D-Ex	36	46	56	111	36	46	56	71
KL-AT-M 300/4/80/D-Ex	36	46	56	106	36	46	56	66
KL-AT-M 400/4/80/D-Ex	36	46	56	106	36	46	56	66
KL-AT-V 400/2/80/D-Ex	36	46	56	104	36	46	56	64
KL-AT-V 400/4/100/D-Ex	36	46	56	102	36	46	56	62
KL-AT-V 550/2/80/D-Ex	36	46	56	104	36	46	56	64

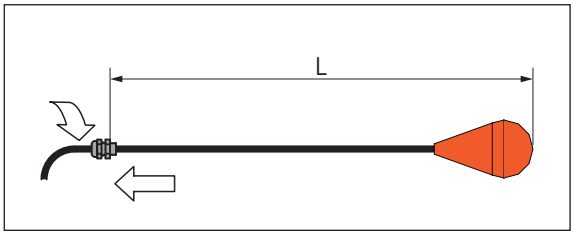
Powerlift PSD-B-2200

Pump type	Longitudinal measurement L [cm]											
	PSD-B-2200 T_{Basin} 515				PSD-B-2200 T_{Basin} 505				PSD-B-2200 T_{Basin} 585			
	L-AL	L-PL	L-BL	L-AUS	L-AL	L-PL	L-BL	L-AUS	L-AL	L-PL	L-BL	L-AUS
SAT-Q 300/65/D	48	58	68	150	48	58	68	151	–	–	–	–
SAT-Q 300/80/D	48	58	68	150	48	58	68	151	–	–	–	–
SAT-Q 400/65/D	48	58	68	143	48	58	68	144	–	–	–	–
SAT-Q 400/80/D	48	58	68	143	48	58	68	144	–	–	–	–
SAT-Q 550/80/4/D	48	58	68	142	48	58	68	143	–	–	–	–
SAT-Q 750/80/D	48	58	68	141	48	58	68	142	–	–	–	–
SAT-Q 1000/100/D	48	58	68	137	48	58	68	138	–	–	–	–
SAT-Q 1000/100/4/D	48	58	68	137	48	58	68	138	–	–	–	–
SAT-Q 1500/100/D	48	58	68	137	48	58	68	138	–	–	–	–
SAT-Q 300/80/4/D	48	58	68	142	48	58	68	143	–	–	–	–
LW-KP 1325...421	–	–	–	–	–	–	–	–	56	66	76	170
LW-KP 1325...422	–	–	–	–	–	–	–	–	56	66	76	170
LW-KP 1325...423	–	–	–	–	–	–	–	–	56	66	76	170
LW-KP 1325...424	–	–	–	–	–	–	–	–	56	66	76	170

Pump type	Longitudinal measurement L [cm]											
	PSD-B-2200 T_{Basin} 515				PSD-B-2200 T_{Basin} 505				PSD-B-2200 T_{Basin} 585			
	L-AL	L-PL	L-BL	L-AUS	L-AL	L-PL	L-BL	L-AUS	L-AL	L-PL	L-BL	L-AUS
KL-AT-M 200/4/80/D-Ex	48	58	68	147	48	58	68	148	–	–	–	–
KL-AT-M 300/4/80/D-Ex	48	58	68	142	48	58	68	143	–	–	–	–
KL-AT-M 400/4/80/D-Ex	48	58	68	142	48	58	68	143	–	–	–	–
KL-AT-V 400/2/80/D-Ex	48	58	68	140	48	58	68	141	–	–	–	–
KL-AT-V 400/4/100/D-Ex	48	58	68	138	48	58	68	139	–	–	–	–
KL-AT-V 550/2/80/D-Ex	48	58	68	140	48	58	68	141	–	–	–	–

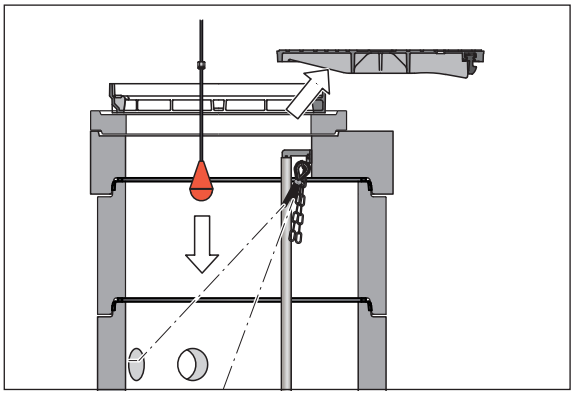
The description is valid for every float switch:

➔ Push the connection cable through the cable gland, set it to the **longitudinal measurement L** and tighten the union nut of the cable gland as hand-tight.

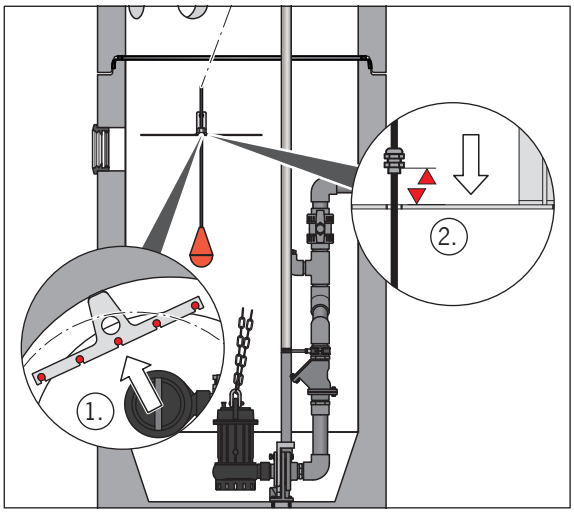


➔ Lift the cover out of the cover frame and store to the side.

➔ Lower the float switch on the connection cable into the tank.

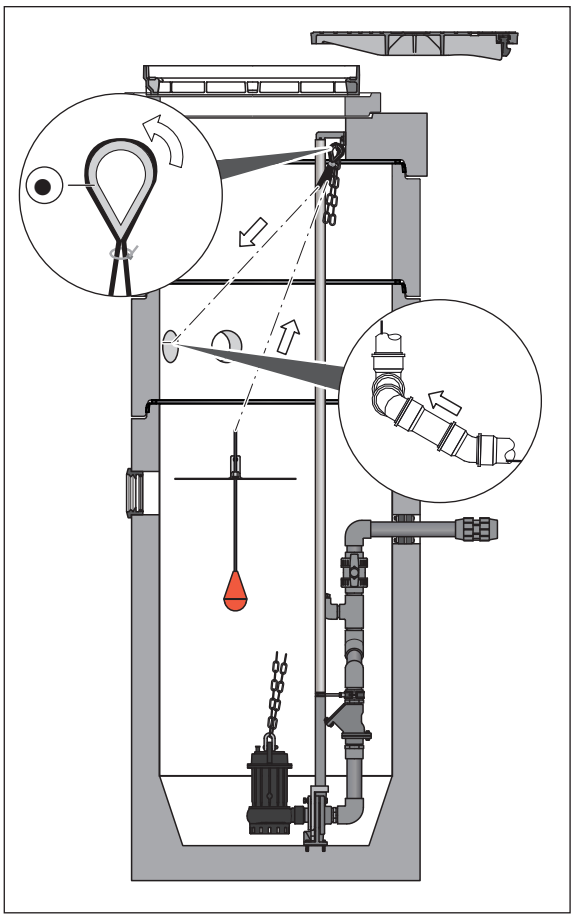


- Guide the control cable length below the cable gland into the recess (●) of the probe bracket (1).
- Lower the float switch until the cable gland sits on the probe bracket (2).



- Pull the connecting cable upwards (not while energised) until it reaches the chain holder.
- Place the loop around the cable eye (●) and fasten with cable tie.
- Hang the cable eye on the chain holder.
- Utilise the pull wire to pull the connecting cable together with the pump connecting cable through the cable duct up to the assembly location of the control.
- Keep sufficient excess cable length (approx. 1 m), to enable the wiring in the terminal compartment of the control.
- Replace the cover.

This is the only way that the float switch can be removed from the tank.



Level probe

The level probe has a 20 m, 50 m and/or 80 m long connecting cable (connected and sealed on the level probe). A protective pipe (total length 1,700 mm), a tensioning clamp and a cable eyelet are delivered as loose in the as-delivered condition.

The protective pipe must be adjusted to the **longitudinal measurement L** according to the combinations of the level probe with possible pump types in various prefabricated pumping stations (overview of the prefabricated pumping stations Chapter 6.1 “Prefabricated pumping station”):

Powerlift PSD-P-1000 and PSD-B-1000

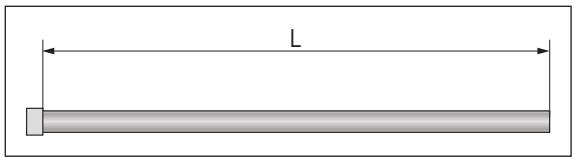
Pump type	Longitudinal measurement L [cm]		
	PSD-P-1000 T_{Basin} 685	PSD-B--1000 T_{Basin} 480	PSD-B--1000 T_{Basin} 1070
SAT-100/D	94	115	56
SAT-150/D	94	115	56
SAT-200/D	94	115	56
SAT-50/2/32/D	94	115	56
SAT-75/2/32/D	94	115	56
SAT-V 75/2/50/D	89	110	51
SAT-V 150/2/50/D	89	110	51
SITA 150 N-ex	92	113	54
SITA 200 N-ex	92	113	54
SITA 300 N-ex	83	104	45
SITA 550 N-ex	76	97	38

Powerlift PSB-P-1500 and PSD-B-2200

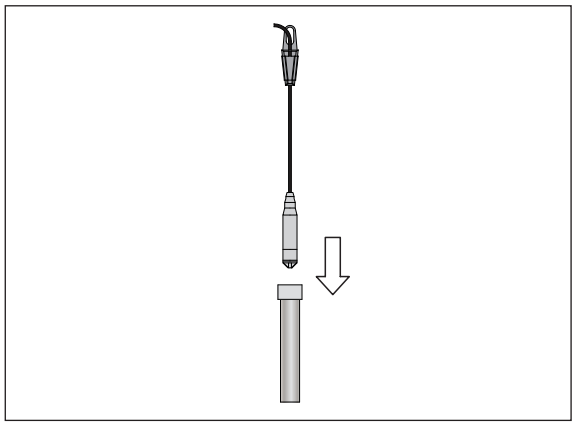
Pump type	Longitudinal measurement L [cm]				
	PSD-B--1500 T_{Basin} 395	PSD-B--1500 T_{Basin} 795	PSD-B--2200 T_{Basin} 515	PSD-B--2200 T_{Basin} 505	PSD-B--2200 T_{Basin} 585
SAT-Q 300/65/D	112	72	148	149	–
SAT-Q 300/80/D	112	72	148	149	–
SAT-Q 400/65/D	105	65	141	142	–
SAT-Q 400/80/D	105	65	141	142	–
SAT-Q 550/80/4/D	–	–	140	141	–
SAT-Q 750/80/D	–	–	139	140	–
SAT-Q 1000/100/D	–	–	135	136	–
SAT-Q 1000/100/4/D	–	–	135	136	–
SAT-Q 1500/100/D	–	–	135	136	–

Pump type	Longitudinal measurement L [cm]				
	PSD-B--1500 T_{Basin} 395	PSD-B--1500 T_{Basin} 795	PSD-B--2200 T_{Basin} 515	PSD-B--2200 T_{Basin} 505	PSD-B--2200 T_{Basin} 585
SAT-Q 300/80/4/D	104	64	140	141	–
LW-KP 1325...421	–	–	–	–	168
LW-KP 1325...422	–	–	–	–	168
LW-KP 1325...423	–	–	–	–	168
LW-KP 1325...424	–	–	–	–	168
KL-AT-M 200/4/80/D-Ex	109	69	145	146	–
KL-AT-M 300/4/80/D-Ex	104	64	140	141	–
KL-AT-M 400/4/80/D-Ex	104	64	140	141	–
KL-AT-V 400/2/80/D-Ex	102	62	138	139	–
KL-AT-V 400/4/100/D-Ex	100	60	136	137	–
KL-AT-V 550/2/80/D-Ex	102	62	138	139	–

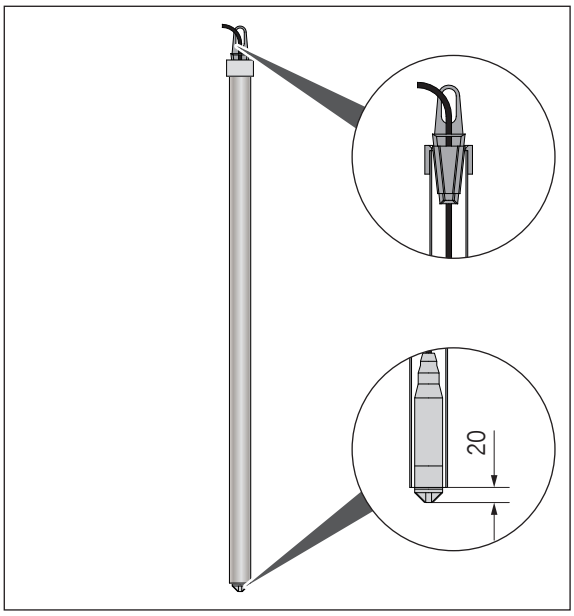
➔ Cut the protective pipe to the **longitudinal measurement L** length .



➔ Insert the level probe in the protective pipe.

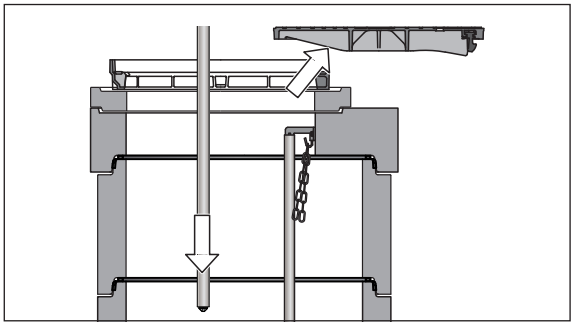


➔ Fix the length (projection of 20 mm) with the tensioning clamp and centre it in the protective pipe.



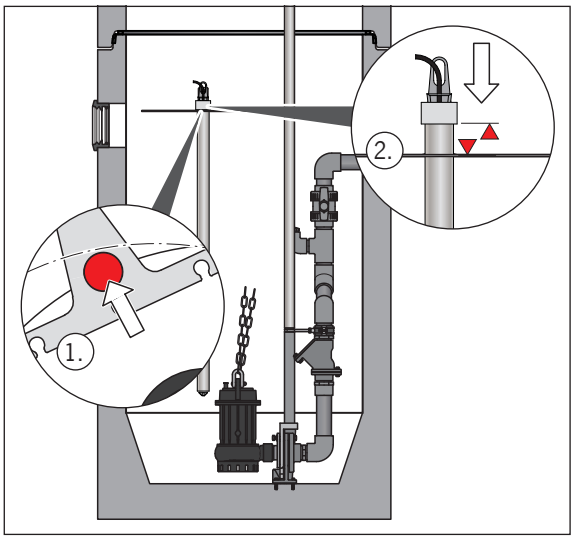
➔ Lift the cover out of the cover frame and store to the side.

➔ Lower the “protective pipe with level probe” unit on the protective pipe into the tank.



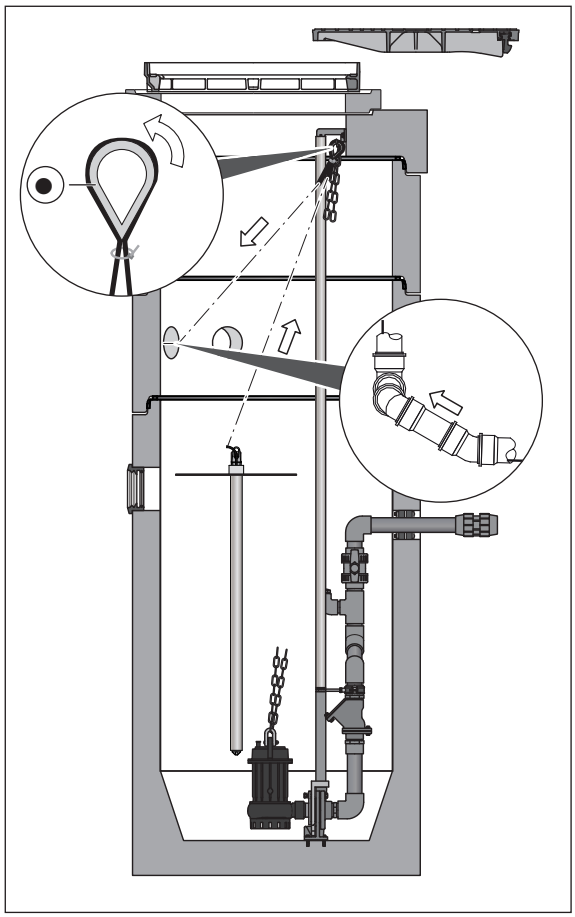
➔ Guide the protective pipe into the drill bore hole (●) of the probe bracket (1).

➔ Lower the protective pipe with level probe until the protective pipe sits on the probe bracket (2).



- Pull the connecting cable for the level probe upwards (not while energised) until it reaches the chain holder.
- Place the loop around the cable eye (●) and fasten with cable tie.
- Hang the cable eye on the chain holder.
- Utilise the pull wire to pull the connecting cable together with the pump connecting cable through the cable duct up to the assembly location of the control.
- Keep sufficient excess cable length (approx. 1 m), to enable the wiring in the terminal compartment of the control.

This is the only way that the level probe can be removed from the tank.



3.5 Electrical installation

WARNING

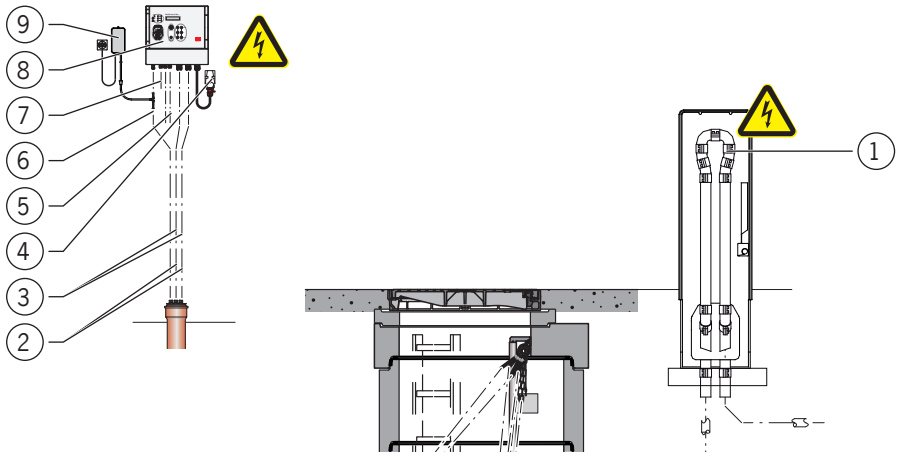
Electric shock risk in case of improper electrical installation

- The control must not be connected to the power supply until after all installation work has been completed.
- The voltage supply must be implemented in compliance with the directives of the local power supplier.
- Electrical connections may only be executed by qualified electricians.
- Electrical connections must be carried out in accordance with the circuit diagram, Chapter 6.4.2 and/or 6.5.2 “Circuit diagram”.

IMPORTANT Voltage failures caused by longer cable routes must be considered on site.

The MultiControl Duo control and/or LevelControl PS 2 ControlSystem, air bubble injection, outside cabinet and Ex-barrier can be optionally purchased from ACO.

3.5.1 Overview of the electrical installation work



Item	Work	Description Chapter
1	Supplying heating (optional) and work plug socket (optional) with current	3.5.2
2	Connecting the connecting cables of the pumps and level sensors	3.5.6
3	Check the rotational direction of the pumps	3.5.7
4	Connecting the control (optional) to the power supply	3.5.4
5	Connecting fault message device (optional)	3.5.10
6	Connecting the control cable (optional)	3.5.8
7	Clamping the connection cable for the level probe (optional)	3.5.6

Item	Work	Description Chapter
8	Installing the control	3.5.3
9	Connecting the air bubble injection (optional)	3.5.9
–	Installing ex-barrier (optional)	3.5.11

3.5.2 Supplying heating (optional) and work plug socket (optional) with current

➔ Observe the connection values with electrical installations: 400 V, 50 HZ, fuse 25 A

3.5.3 Installing the control

Mounting on a wall

Specifications:

- Flood-proof and free wall surface area of a minimum of:
  - MultiControl Duo Control: 400 mm x 400 mm (Width x Height)
  - Level Control PS 2 Control System: Dimensions as project-related on request
- Select the maximum spacing according to the lengths of the connection cables of the pumps and level sensor and/or control cable for level sensor. If necessary, versions with longer connection cables or control cable can be purchased from ACO as optional components.

Installation in the outdoor cabinet

Chapter 3.3.10 “Outdoor cabinet installation”

3.5.4 Connecting the control to the power supply

Note when executing the electrical installation:

➔ Always observe the connected value:

- Chapter 6.4. “MultiControl Duo Control”
- Chapter 6.5 “Level Control PS 2 Control System”

3.5.5 Connections for the control

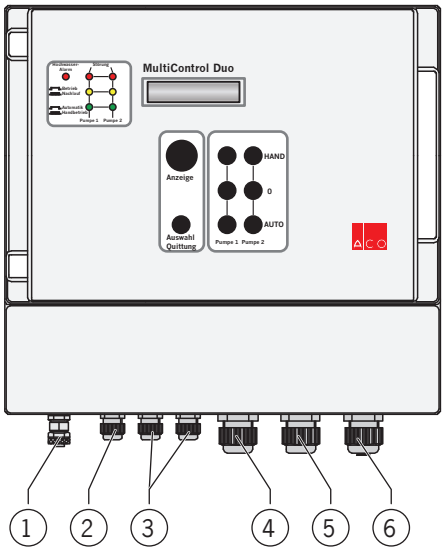


Figure: MultiControl Duo Control

1 = Connection, pneumatic level switching control cable and/or back pressure bell)
2 = Connection, mini compressor power supply (optional)
3 = Connection, level sensor connecting cable (optional)
4 = Pump 1 power supply connection
5 = Pump 2 power supply connection
6 = Power supply connection

3.5.6 Connecting and clamping the connecting cables of the pumps and level sensors

IMPORTANT

- Utilise a suitable material for the connection of cable extensions (e.g. cast resin or gel collars).
- Cable extension for pumps (standard length 10 m):
  - Always calculate the required cable cross-section based on the current consumption.
  - Current consumption and details regarding the number of wires, Chapter 6.2 “Submersible pumps - faecal-free wastewater” and/or Chapter 6.3 "Submersible pumps - faeces-containing wastewater”.
- Cable extension for the float switch:
  - Always calculate the required cable cross-section.
  - Utilise a cable with 3 wires for every float switch.
  - Connection cable for the supplied float switch: 3 x 0.75 mm², TPK/PVC quality with a switching capacity of 1 mA/4 V - 5 A/250 V
- Shortening the connection cable of the FMX 21 level probe: Always ensure to seal the air hose with the Teflon filter part again, otherwise condensation water can flow into the

electronics.

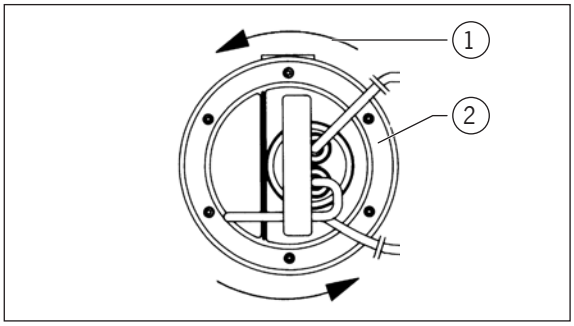
- Extending the cable of the FMX 21 level probe:
  - Always calculate the required cable cross-section.
  - Connection cable for the supplied level probe: 3 x 0.2 mm² (3 x 26 AWG) plus pressure compensation hose with Teflon filter. The pressure compensation hose must not be sealed in a gel collar or cast resin collar. A suitable cable connection box with membrane must be utilised e.g. ACO Article Number 711892.

➔ Insert the connection cable into the terminal compartment of the control and connect to the electrical system.

3.5.7 Check the rotational direction of the pumps

IMPORTANT The rotational direction is correct, i.e. clockwise, if the protective cover (2) moves as shown (1).

➔ Control the rotational direction: Switch on pump and switch off again immediately. Observe the starting recoil carefully from the motor side.



3.5.8 Connecting the control cable (optional)

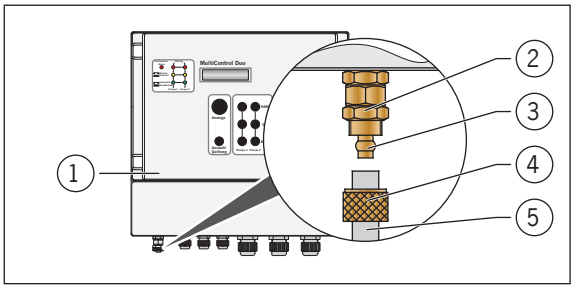
IMPORTANT To prevent malfunctions:

- Always lay the control cable 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 back pressure bell is not hanging in the water.

➔ At the control (1), unscrew the union nut (4) from the compression fitting (2) and push over the control cable (5).

➔ Push the control cable (5) onto the bush (3).

➔ Twist the union nut (4) onto the compression fitting (2) and tighten hand-tight.



3.5.9 Connecting the air bubble injection

Assembling the mini compressor onto a wall

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

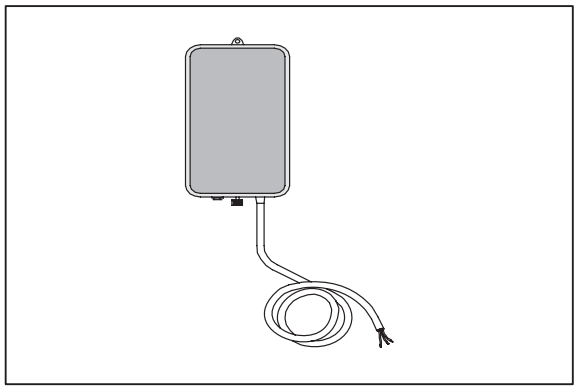
Requirement:

Flood-proof and free wall surface of 100 mm x 200 mm (Width x Height) near the control unit

Connecting the mini compressor to the power supply

Note when executing the electrical installation:

- ➔ 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 and connect the cable ends.

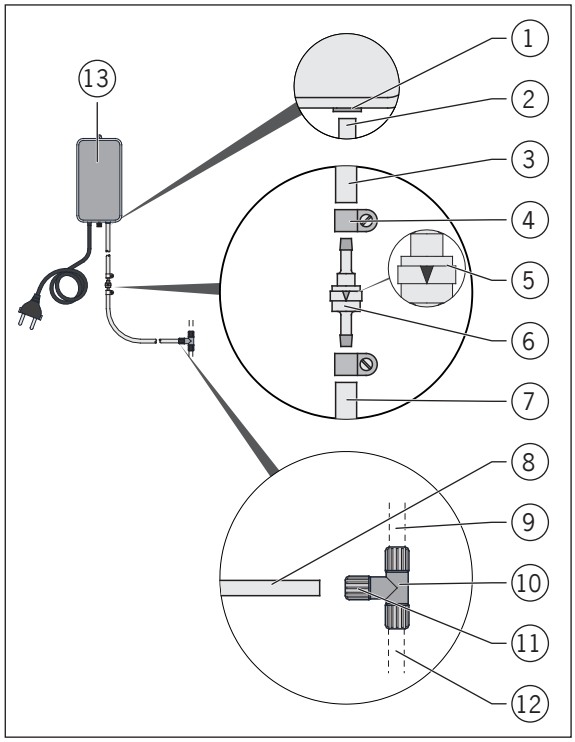


Connecting the control pipe

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

IMPORTANTIn order to prevent malfunctions:
Utilise 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).



3.5.10 Connecting the malfunction or fault signalling equipment (optional)

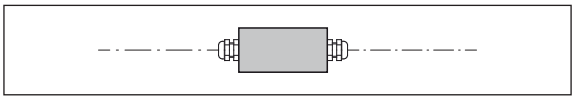
If malfunction or fault signalling equipment is specified, then this should be installed in such a way that a malfunction is signalled to each connected unit.

A suitable, on-site cable must be connected in the control to forward the potential-free contact as a group alarm. Optional for on-site GLT signal output cable as NYY-J or NYM-J 12x0.75mm² for potential-free, interchangeable contact / contact load 230V AC/3A.

3.5.11 Installing ex-barrier

IMPORTANT If the level probe is to be utilised in an explosion protected area, then an ex-barrier must be installed.

- ➔ Ex-barrier must be installed and/or connected in the connection cable for the level probe.



4 Commissioning

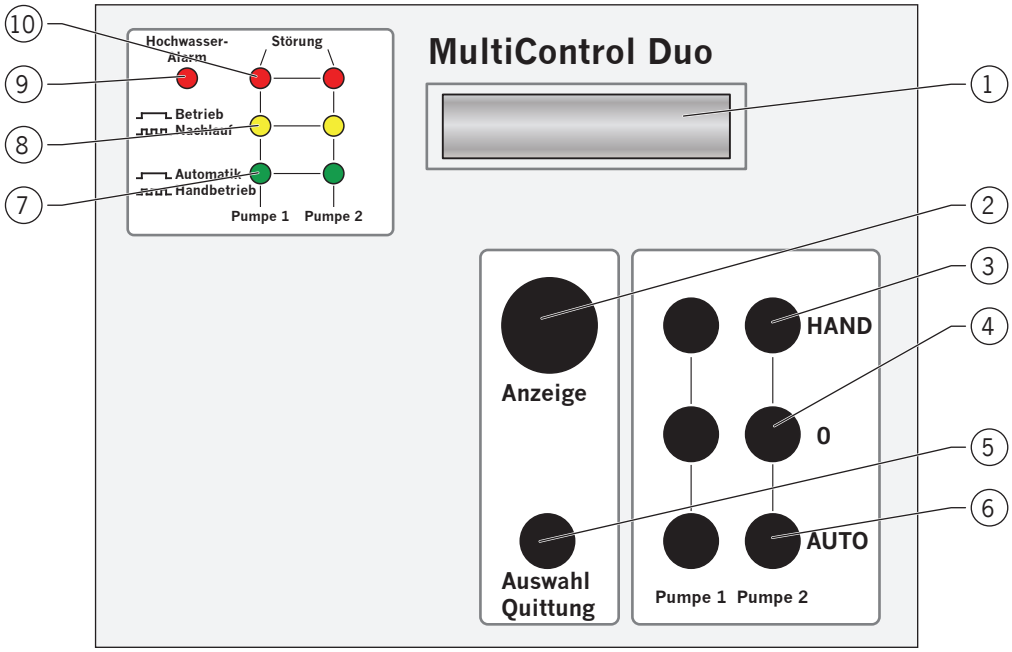
Based on the normative requirements (EN 12056-4), the start-up must be carried out by an appropriately competent person.

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

4.1 MultiControl Duo control

Will be utilised in combination with the following pumps, 🕮 Chapter 2.1.2 “Accessories”.

4.1.1 Controls and display elements



1 = Display panel
2 = Rotary knob: Select menu items
3 = Button: Manual mode AN P1 and/or P2
4 = Button: Operation OFF P1 and/or P2
5 = Button: Acknowledgement of the malfunction/value settings
6 = Button: Automatic mode AN P1 and/or P2
7 = LED illuminates: Automatic mode P1 and/or P2
LED flashes: Manual mode P1 and/or P2
LED flashes irregularly: Manual mode will be terminated automatically after approx. 2 minutes.
8 = LED illuminates: Mode P1 and/or P2
LED flashes: After run P1 and/or P2
9 = LED illuminates: Malfunction flooding alarm
10 = LED illuminates: Automatic malfunction P1 and/or P2

Function of the controls

Description	Function	Explanation
Display	Selection of the menu items	The rotary knob can be used to select the menu items in the display panel. The display automatically changes back to the basic setting after 20 seconds.
Selection Acknowledge	Acknowledge malfunction	The button is used to acknowledge malfunction signals and messages after removing the cause of the fault. If the malfunction is not corrected, only the group fault alarm relay and the alarm sound signal (e.g. flood alarm) are switched off.
	Confirm setting	The button is used to save the settings made in the menu items.
MANUAL	Switch on manual operation	The buttons for Pump P1 and P2 are used to switch on the pumps independently of the “level switching”. Manual operation is switched off automatically after 2 minutes.
0	Switch off operation	The buttons for Pump P1 and P2 are used to switch off automatic mode or manual operation of the pumps.
AUTO	Switch on automatic mode	The buttons for Pump P1 and P2 are used to switch on automatic operation of the pumps and to control them automatically via the “level switching”.

Explanation of the display elements

Description	Meaning	Explanation
Flood alarm 	Flood alarm group fault	Fault signal: The water level in the tank has reached the “Flood alarm” level
Malfunction 	Pump P1 or P2 malfunction	Malfunction Pump(s) not in operation
Operation after-running 	Operating display for Pump P1 or P2	LED illuminates: Pump(s) in operation LED flashes: Pump(s) in operation via the after-running function
Automatic 	Pump P1 or P2 operation mode	LED illuminates: Automatic mode LED flashes irregularly: Manual mode LED flashes irregularly: Manual operation was switched off automatically after approx. 2 minutes

4.1.2 Menu items and settings

Display panel

Messages in the display panel:

- Top line:
  - The water level in the tank (if no pump is in operation)
  - Setting option
- Bottom line:
  - Operating hours of the pumps (if pumps are not in operation)
  - Malfunctions that have occurred
  - Changeable settings (in service mode)
  - Motor current (if pump is in operation or changing display if both pumps are in operation)

Overview of the menu items and settings

Top row (menu item)	Bottom row (settings)	Explanation
Base load ON	0 – 200 (1,000) cm	The value determines the switching on point of the first pump.
Base load OFF	0 – 200 (1,000) cm	The value determines the switching off point of the first pump.
Peak load ON	0 – 200 (1,000) cm	The value determines the switching on point of the second pump.
Peak load OFF	0 – 200 (1,000) cm	The value determines the switching off point of the second pump.
Flood	0 – 200 (1,000) cm	If the set value is exceeded, the group alarm relay and the flood relay switch
Maximum running period	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. The pump does not start up again until the defect has been acknowledged.
Running period change	Is switched off 1 – 60 minutes	If the set time is exceeded in base load operation a pump change takes place. After three changes without interruption the alarm is also triggered and the “”Runtime alarm” message appears in the display.
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.
After-running period	0 – 180 s	After falling below the switching off point, the base load pump carries on running until the set time has expired.
Maximum current – 1	0.3 – 14.0 A	If Pump 1 exceeds the set current consumption for a certain time it is switched off. Message P1 appears: overcurrent. The pump is not re-released until the Acknowledge button is pressed.
Maximum current – 2	0.3 – 14.0 A	If Pump 2 exceeds the set current consumption for a certain time it is switched off. Message P2 appears: overcurrent. The pump is not re-released until the Acknowledge button is pressed.

Top row (menu item)	Bottom row (settings)	Explanation
24 h operation	Is switched off 1 – 10 s	Is activated = If the pumps are not requested for a duration of 24 hours, they run automatically for the duration of the set time.
Audible alarm	Is switched off Is activated	Is activated = In the event of a fault the internal Piezo buzzer sounds.
Interval alarm	Is switched off Is activated	Is activated = The alarm relay is clocked. A more cost-effective continuous light can be used instead of a flashing light.
Pump change	Is switched off Is activated	Is activated = After each operation of the base load pump the system switches to the other pump.
P1: th. malfunction 1	Is switched off, is activated	Is switched off = no bimetal contact (alarm contact) is connected to terminal 31,32 (Pump 1).
P2: th. malfunction 1	Is switched off, is activated	Is switched off = no bimetal contact (alarm contact) is connected to terminal 38,39 (pump 2).
Rotating field malfunction	Is switched off Is 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.
ATEX mode	Is switched off Is activated	Is activated = 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.
Service mode	Is activated Is switched off	Is activated = All settings can be changed Is switched off = Settings are displayed but cannot be changed.
Level control	Internal converter Float switch 4 – 20 mA interface	Level sensing via pneumatic pressure or air bubble injection Level sensing – recording via float switch 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 – English – French – Italian – Spanish – Dutch – Polish – Czech	The national language in the display can be changed.

4.1.3 Changing the settings

Notes:

- Settings can only be changed in service mode. If Service mode is not activated the settings are displayed, but cannot be changed or saved.
- If no entry is made within 20 seconds the display automatically switches back to the basic setting.
- Operating hours and pump starts can be displayed but not changed.

Procedure:

➔ Turn the “Display” rotary knob until the required menu item is displayed.

➔ Press the "Acknowledge selection” button. The most recently saved setting begins to flash.

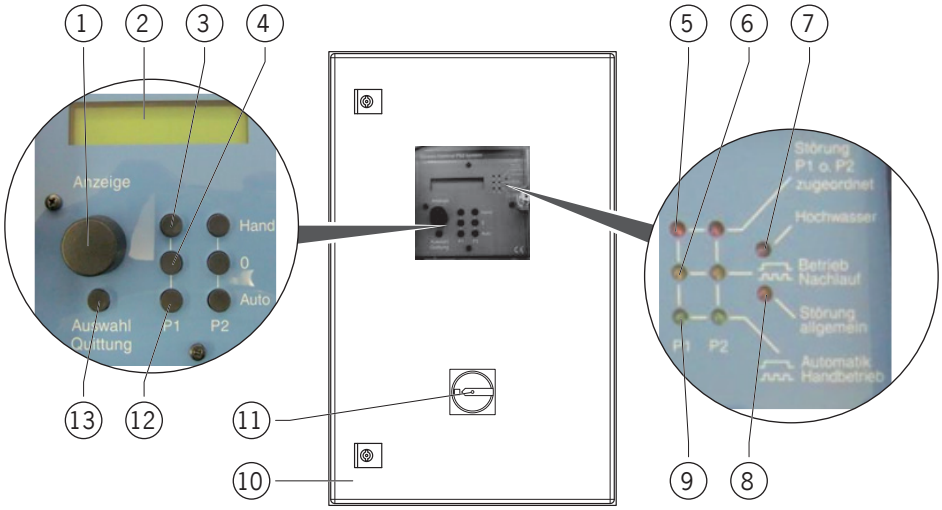
➔ Turn the rotary “Display” knob to change the setting (fast turning for a rough setting, slow turning for a fine setting).

➔ Press the “Acknowledge selection” button to save the setting.

4.2 Level Control PS 2 Control System

Will be utilised in combination with the following pumps, 📖 Chapter 2.1.2 “Accessories”.

4.2.1 Controls and display elements



1 = Rotaryknob for “Display”
2 = Display
3 = Button for “Manual” (P1 and/or P2)
4 = Button “0” (P1 and/or P2)
5 = LED red “Malfunction P1 and/or P2 arranged”
6 = LED yellow “Operation/After-running” (P1 and/or P2)
7 = LED red “Flood alarm”
8 = LED red “Malfunction, general”
9 = LED green “Automatic/Manual mode” (P1 and/or P2)
10 = Housing
11 = Main switch
12 = Button “Auto” (P1 and/or P2)
13 = Button “Acknowledge selection”

Function of the controls

Description	Function	Explanation
Display	Selection of the menu items	The rotary knob can be used to select the menu items in the display panel. The display automatically changes back to the basic setting after 20 seconds.
Selection Acknowledge	Acknowledge malfunction	The button is used to acknowledge malfunction signals and messages after removing the cause of the fault. If the malfunction is not corrected, only the group fault alarm relay and the alarm sound signal (e.g. flood alarm) are switched off.
	Confirm setting	The button is used to save the settings made in the menu items.
MANUAL	Switch on manual operation	The buttons for Pump P1 and P2 are used to switch on the pumps independently of the “level switching”. Manual operation is switched off automatically after 2 minutes.
0	Switch off operation	The buttons for Pump P1 and P2 are used to switch off automatic mode or manual operation of the pumps.
AUTO	Switch on automatic mode	The buttons for Pump P1 and P2 are used to switch on automatic operation of the pumps and to control them automatically via the “level switching”.
Main switch	Switch on power	Thee main switch enables the electrical equipment to be connected with all poles to the electrical supply .

Explanation of the display elements

Description	Meaning	Explanation
Malfunction 	Pump P1 or P2 malfunction	Malfunction Pump(s) not in operation
Flood alarm 	Flood alarm group fault	Fault signal: The water level in the tank has reached the “Flood alarm” level
Malfunction 	Malfunction, general	All malfunctions will be displayed
Operation after-running 	Operating display for Pump P1 or P2	LED illuminates: Pump(s) in operation LED flashes: Pump(s) in operation via the after-running function

Description	Meaning	Explanation
Automatic 	Pump P1 or P2 operation mode	LED illuminates: Automatic mode LED flashes irregularly: Manual mode LED flashes irregularly: Manual operation was switched off automatically after approx. 2 minutes

4.2.2 Menu items and settings

Display panel

Messages in the display panel:

- Top line:
  - The water level in the tank (if no pump is in operation)
  - Setting option
- Bottom line:
  - Operating hours of the pumps (if pumps are not in operation)
  - Malfunctions that have occurred
  - Changeable settings (in service mode)
  - Motor current (if pump is in operation or changing display if both pumps are in operation)

Overview of the menu items and settings

Top row (menu item)	Bottom row (settings)	Explanation
Base load ON	0 – 200 (500) cm	The value determines the switching on point of the first pump.
Base load OFF	0 – 200 (500) cm	The value determines the switching off point of the first pump.
Peak load ON	0 – 200 (500) cm	The value determines the switching on point of the second pump.
Peak load OFF	0 – 200 (500) cm	The value determines the switching off point of the second pump.
Flood	0 – 200 (500) cm	If the set value is exceeded, then the group alarm relay and the flood relay will be switched on
Running period change	Is switched off 1 – 60 min.	If the set time is exceeded in base load operation a pump change takes place.
Delay	0 – 900 sec.	After a power failure, the pumps do not start until the set time has expired. The remaining time is shown in the display.
After-running period	0 – 180 sec.	After undershooting the switching off point, the base load pump carries on running until the set time has expired.

Top row (menu item)	Bottom row (settings)	Explanation
Interpump delay	0 – 60 sec.	When both pumps are simultaneously requested, Pump 2 also initially switches on after the set time.
24 h operation	Is switched on, 1 – 10 seconds	Is activated = When the pumps are not requested for a duration of 24 hours, they run automatically for the duration of the set time.
Audible alarm	Is switched off, is activated	Is activated = In the event of a malfunction, the internal piezo buzzer sounds.
Interval alarm	Is switched off, is activated	Is activated = The malfunction relay will be tacted. A more cost-effective continuous light can be used instead of a flashing light.
Pump change	Is switched off, is activated	Is activated = After each operation of the base load pump, the system switches over to the other pump.
P2: Thermal malfunction 1	Is switched off, is activated	Is switched off = no bimetal contact (alarm contact) is connected to terminal 01,02 (Pump 1).
P2: Thermal malfunction 1	Is switched off, is activated	Is switched off = no bimetal contact (alarm contact) is connected to terminal 06,07 (Pump 2).
ATEX mode	Is switched off, is activated	Is activated = If the level sensing does not determine any liquid, the pumps cannot be started. This applies to the manual function, as well as for 24h switch on and the telecontrol systems.
Service mode	Is switched off, is activated	Is activated = all settings can be amended. Is switched off = settings are shown, but cannot be changed.
Level control	Internal converter (optional) float switch 4 – 20 mA interface	Level recording via pneumatic pressure or air bubble injection Level recording via float switch Level recording via external sensor (4 – 20 mA)
20mA => level	0 – 1000 cm	Adjusting the display to the connected probe
Language	German – English – French – ...	The national language in the display is selectable.
Level control	Internal converter Float switch 4 – 20 mA interface	Level sensing via pneumatic pressure or air bubble injection Level sensing – recording via float switch 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 – English – French – Italian – Spanish – Dutch – Polish – Czech	The national language in the display can be changed.

4.2.3 Changing the settings

Notes:

- Settings can only be changed in service mode. If Service mode is not activated the settings are displayed, but cannot be changed or saved.
- If no entry is made within 20 seconds the display automatically switches back to the basic setting.
- Operating hours and pump starts can be displayed but not changed.

Procedure:

➔ Turn the “Display” rotary knob until the required menu item is displayed.
➔ Press the "Acknowledge selection” button. The most recently saved setting begins to flash.
➔ Turn the rotary “Display” knob to change the setting (fast turning for a rough setting, slow turning for a fine setting).
➔ Press the “Acknowledge selection” button to save the setting.

4.3 Commissioning settings

If no settings have been made in the factory (default) for the entered menu items, then the recommended settings given in the table are to be utilised. Menu items not listed are already preset in the as-delivered condition and do not need to be changed.

The various level sensors are abbreviated and/or represented in the tables as follows:

- Open back pressure bell without air bubble injection = (A)
- Open back pressure bell with air bubble injection = (B)
- Closed back pressure bell = (C)
- Float switch = (D)
- Level probe = (E)

4.3.1 Powerlift PSD-P-1000 with T_{Basin} = 685

Menu point	Unit	Pump type	Settings with level sensor:												
			(A) + (B)				(C)				(D)	(E)			
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
Flood AL = **AL** Peak load ON = **SL** Base load ON = **BL** Base load OFF = **OFF**	cm	SAT-100/D	80	70	60	11	98	88	78	18	–	80	70	60	11
		SAT-150/D	80	70	60	11	98	88	78	18		80	70	60	11
		SAT-200/D	80	70	60	11	98	88	78	18		80	70	60	11
		SAT-50/2/32/D	80	70	60	11	98	88	78	18		80	70	60	11
		SAT-75/2/32/D	80	70	60	11	98	88	78	18		80	70	60	11
		SAT-V 75/2/50/D	75	65	55	11	98	88	78	23		75	65	55	11
		SAT-V 150/2/50/D	75	65	55	11	98	88	78	23		75	65	55	11
		SITA 150 N-ex	78	68	58	11	98	88	78	20		78	68	58	11
		SITA 200 N-ex	78	68	58	11	98	88	78	20		78	68	58	11
		SITA 300 N-ex	69	59	49	11	98	88	78	29		69	59	49	11
		SITA 550 N-ex	62	52	42	11	98	88	78	36		62	52	42	11
After-running period	s		0**				0				0	0			
Maximum current – 1 *** Maximum current – 2 ***	A	SAT-100/D	2.3												
		SAT-150/D	2.7												
		SAT-200/D	3.6												
		SAT-50/2/32/D	1.1												
		SAT-75/2/32/D	1.3												
		SAT-V 75/2/50/D	1.3												
		SAT-V 150/2/50/D	2.6												
		SITA 150 N-ex	2.9												
		SITA 200 N-ex	3.7												
		SITA 300 N-ex	5.1												
		SITA 550 N-ex	8.7												
Level control	–		Internal converter								Float switch	4-20mA interface			
20 mA => level	cm		–				–				–	400			
Language	–		German												

* Previously set under “level control” menu item = Set **4-20mA Interface** “and under”20 mA => Level = **400**.

** Value = 0 with version with air bubble injection. With version without air bubble injection, value assessment during trial run: Water level must remain approx. 5 cm under lower edge of back pressure hole.

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

4.3.2 Powerlift PSD-B-1000 with T_{Basin} = 480

Menu point	Unit	Pump type	Settings with level sensor:											
			(A) + (B)				(C)				(D)	(E)		
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
Flood AL = **AL** Peak load ON = **SL** Base load ON = **BL** Base load OFF = **OFF**	cm	SAT-100/D	101	91	81	11	119	109	99	18	–	101	91	81	11
		SAT-150/D	101	91	81	11	119	109	99	18		101	91	81	11
		SAT-200/D	101	91	81	11	119	109	99	18		101	91	81	11
		SAT-50/2/32/D	101	91	81	11	119	109	99	18		101	91	81	11
		SAT-75/2/32/D	101	91	81	11	119	109	99	18		101	91	81	11
		SAT-V 75/2/50/D	96	86	76	11	119	109	99	23		96	86	76	11
		SAT-V 150/2/50/D	96	86	76	11	119	109	99	23		96	86	76	11
		SITA 150 N-ex	99	89	79	11	119	109	99	20		99	89	79	11
		SITA 200 N-ex	99	89	79	11	119	109	99	20		99	89	79	11
		SITA 300 N-ex	90	80	70	11	119	109	99	29		90	80	70	11
		SITA 550 N-ex	83	73	63	11	119	109	99	36		83	73	63	11
After-running period	s		0**				0				0	0			
Maximum current – 1 *** Maximum current – 2 ***	A	SAT-100/D	2.3												
		SAT-150/D	2.7												
		SAT-200/D	3.6												
		SAT-50/2/32/D	1.1												
		SAT-75/2/32/D	1.3												
		SAT-V 75/2/50/D	1.3												
		SAT-V 150/2/50/D	2.6												
		SITA 150 N-ex	2.9												
		SITA 200 N-ex	3.7												
		SITA 300 N-ex	5.1												
		SITA 550 N-ex	8.7												
Level control	–		Internal converter								Float switch	4-20mA interface			
20 mA => level	cm		–				–				–	400			
Language	–		German												

* Previously set under “level control” menu item = Set **4-20mA Interface** “and under”20 mA => Level = **400**.

** Value = 0 with version with air bubble injection. With version without air bubble injection, value assessment during trial run: Water level must remain approx. 5 cm under lower edge of back pressure hole.

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

4.3.3 Powerlift PSD-B-1000 with T_{Basin} = 1070

Menu point	Unit	Pump type	Settings with level sensor:											
			(A) + (B)				(C)				(D)	(E)			
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
Flood AL = **AL** Peak load ON = **SL** Base load ON = **BL** Base load OFF = **OFF**	cm	SAT-100/D	42	32	22	11	60	50	40	18	–	42	32	22	11
		SAT-150/D	42	32	22	11	60	50	40	11		42	32	22	11
		SAT-200/D	42	32	22	11	60	50	40	11		42	32	22	11
		SAT-50/2/32/D	42	32	22	11	60	50	40	11		42	32	22	11
		SAT-75/2/32/D	42	32	22	11	60	50	40	11		42	32	22	11
		SAT-V 75/2/50/D	37	27	17	11	60	50	40	11		37	27	17	11
		SAT-V 150/2/50/D	37	27	17	11	60	50	40	11		37	27	17	11
		SITA 150 N-ex	40	30	20	11	60	50	40	11		40	30	20	11
		SITA 200 N-ex	40	30	20	11	60	50	40	11		40	30	20	11
		SITA 300 N-ex	31	29	27	5	60	50	40	11		31	29	27	5
		SITA 550 N-ex	24	22	20	5	60	50	40	11		24	22	20	5
After-running period	s		0**				0				0	0			
Maximum current – 1 *** Maximum current – 2 ***	A	SAT-100/D	2.3												
		SAT-150/D	2.7												
		SAT-200/D	3.6												
		SAT-50/2/32/D	1.1												
		SAT-75/2/32/D	1.3												
		SAT-V 75/2/50/D	1.3												
		SAT-V 150/2/50/D	2.6												
		SITA 150 N-ex	2.9												
		SITA 200 N-ex	3.7												
		SITA 300 N-ex	5.1												
		SITA 550 N-ex	8.7												
Level control	–		Internal converter								Float switch	4-20mA interface			
20 mA => level	cm		–				–				–	400			
Language	–		German												

* Previously set under “level control” menu item = Set **4-20mA Interface** “and under”20 mA => Level = **400**.

** Value = 0 with version with air bubble injection. With version without air bubble injection, value assessment during trial run: Water level must remain approx. 5 cm under lower edge of back pressure hole.

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

4.3.4 Powerlift PSD-B-1500 with T_{Basin} = 395

Menu point	Unit	Pump type	Settings with level sensor:											
			A + B				C				D	E			
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
Flood AL = **AL** Peak load ON = **SL** Base load ON = **BL** Base load OFF = **OFF**	cm	SAT-Q 300/65/D	94	84	74	11	125	115	105	31	–	94	84	74	11
		SAT-Q 300/80/D	94	84	74	11	125	115	105	31		94	84	74	11
		SAT-Q 400/65/D	87	77	67	11	125	115	105	38		87	77	67	11
		SAT-Q 400/80/D	87	77	67	11	125	115	105	38		87	77	67	11
		SAT-Q 300/80/4/D	86	76	66	11	125	115	105	39		86	76	66	11
		KL-AT-M 200/4/80/D-Ex	91	81	71	11	125	115	105	34		91	81	71	11
		KL-AT-M 300/4/80/D-Ex	86	76	66	11	125	115	105	39		86	76	66	11
		KL-AT-M 400/4/80/D-Ex	86	76	66	11	125	115	105	39		86	76	66	11
		KL-AT-V 400/2/80/D-Ex	84	74	64	11	125	115	105	41		84	74	64	11
		KL-AT-V 400/4/100/D-Ex	82	72	62	11	125	115	105	43		82	72	62	11
		KL-AT-V 550/2/80/D-Ex	84	74	64	11	125	115	105	41		84	74	64	11
After-running period	s		0**				0				0	0			
Maximum current – 1 *** Maximum current – 2 ***	A	SAT-Q 300/65/D	5.1												
		SAT-Q 300/80/D	5.1												
		SAT-Q 400/65/D	6.7												
		SAT-Q 400/80/D	6.7												
		SAT-Q 300/80/4/D	5.8												
		KL-AT-M 200/4/80/D-Ex	4.1												
		KL-AT-M 300/4/80/D-Ex	5.8												
		KL-AT-M 400/4/80/D-Ex	7.3												
		KL-AT-V 400/2/80/D-Ex	6.7												
		KL-AT-V 400/4/100/D-Ex	7.3												
		KL-AT-V 550/2/80/D-Ex	8.7												
Level control	–		Internal converter								Float switch	4-20mA interface			
20 mA => level	cm		–				–				–	400			
Language	–		German												

* Previously set under “level control” menu item = Set **4-20mA Interface** “and under”20 mA => Level = **400**.

** Value = 0 with version with air bubble injection. With version without air bubble injection, value assessment during trial run: Water level must remain approx. 5 cm under lower edge of back pressure hole.

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

4.3.5 Powerlift PSD-B-1500 with T_{Basin} = 795

Menu point	Unit	Pump type	Settings with level sensor:												
			A + B				C				D	E			
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
Flood AL = **AL** Peak load ON = **SL** Base load ON = **BL** Base load OFF = **OFF**	cm	SAT-Q 300/65/D	54	44	34	11	85	75	65	31	–	54	44	34	11
		SAT-Q 300/80/D	54	44	34	11	85	75	65	31		54	44	34	11
		SAT-Q 400/65/D	47	37	27	11	85	75	65	38		47	37	27	11
		SAT-Q 400/80/D	47	37	27	11	85	75	65	38		47	37	27	11
		SAT-Q 300/80/4/D	46	36	26	11	85	75	65	39		46	36	26	11
		KL-AT-M 200/4/80/D-Ex	51	41	31	11	85	75	65	34		51	41	31	11
		KL-AT-M 300/4/80/D-Ex	46	36	26	11	85	75	65	39		46	36	26	11
		KL-AT-M 400/4/80/D-Ex	46	36	26	11	85	75	65	39		46	36	26	11
		KL-AT-V 400/2/80/D-Ex	44	34	24	11	85	75	65	41		44	34	24	11
		KL-AT-V 400/4/100/D-Ex	42	32	22	11	85	75	65	43		42	32	22	11
		KL-AT-V 550/2/80/D-Ex	44	34	24	11	85	75	65	41		44	34	24	11
After-running period	s		0**				0				0	0			
Maximum current – 1 *** Maximum current – 2 ***	A	SAT-Q 300/65/D	5.1												
		SAT-Q 300/80/D	5.1												
		SAT-Q 400/65/D	6.7												
		SAT-Q 400/80/D	6.7												
		SAT-Q 300/80/4/D	5.8												
		KL-AT-M 200/4/80/D-Ex	4.1												
		KL-AT-M 300/4/80/D-Ex	5.8												
		KL-AT-M 400/4/80/D-Ex	7.3												
		KL-AT-V 400/2/80/D-Ex	6.7												
		KL-AT-V 400/4/100/D-Ex	7.3												
		KL-AT-V 550/2/80/D-Ex	8.7												
Level control	–		Internal converter								Float switch	4-20mA interface			
20 mA => level	cm		–				–				–	400			
Language	–		German												

* Previously set under “level control” menu item = Set **4-20mA Interface** “and under”20 mA => Level = **400**.

** Value = 0 with version with air bubble injection. With version without air bubble injection, value assessment during trial run: Water level must remain approx. 5 cm under lower edge of back pressure hole.

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

4.3.6 Powerlift PSD-B-2200 with T_{Basin} = 515

Menu point	Unit	Pump type	Settings with level sensor:											
			(A) + (B)				(C)				(D)	(E)			
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
Flood AL = **AL** Peak load ON = **SL** Base load ON = **BL** Base load OFF = **OFF**	cm	SAT-Q 300/65/D	118	108	98	11	149	139	129	31	–	118	108	98	11
		SAT-Q 300/80/D	118	108	98	11	149	139	129	31		118	108	98	11
		SAT-Q 400/65/D	111	101	91	11	149	139	129	38		111	101	91	11
		SAT-Q 400/80/D	111	101	91	11	149	139	129	38		111	101	91	11
		SAT-Q 550/80/4/D	110	100	90	11	149	139	129	39		110	100	90	11
		SAT-Q 750/80/D	109	99	89	11	149	139	129	40		109	99	89	11
		SAT-Q 1000/100/D	105	95	85	11	149	139	129	44		105	95	85	11
		SAT-Q 1000/100/4/D	105	95	85	11	149	139	129	44		105	95	85	11
		SAT-Q 1500/100/D	105	95	85	11	149	139	129	44		105	95	85	11
		SAT-Q 300/80/4/D	110	100	90	11	149	139	129	39		110	100	90	11
		KL-AT-M 200/4/80/D-Ex	115	105	95	11	149	139	129	34		115	105	95	11
		KL-AT-M 300/4/80/D-Ex	110	100	90	11	149	139	129	39		110	100	90	11
		KL-AT-M 400/4/80/D-Ex	110	100	90	11	149	139	129	39		110	100	90	11
		KL-AT-V 400/2/80/D-Ex	108	98	88	11	149	139	129	41		108	98	88	11
		KL-AT-V 400/4/100/D-Ex	106	96	86	11	149	139	129	43		106	96	86	11
		KL-AT-V 550/2/80/D-Ex	108	98	88	11	149	139	129	41		108	98	88	11
After-running period	s		0**				0				0	0			
Maximum current – 1 *** Maximum current – 2 ***	A	SAT-Q 300/65/D	5.1												
		SAT-Q 300/80/D	5.1												
		SAT-Q 400/65/D	6.7												
		SAT-Q 400/80/D	6.7												
		SAT-Q 550/80/4/D	9.0												
		SAT-Q 750/80/D	15.9												
		SAT-Q 1000/100/D	21.6												
		SAT-Q 1000/100/4/D	20.0												
		SAT-Q 1500/100/D	28.8												
		SAT-Q 300/80/4/D	5.8												
		KL-AT-M 200/4/80/D-Ex	4.1												
		KL-AT-M 300/4/80/D-Ex	5.8												
		KL-AT-M 400/4/80/D-Ex	7.3												
		KL-AT-V 400/2/80/D-Ex	6.7												
		KL-AT-V 400/4/100/D-Ex	7.3												
		KL-AT-V 550/2/80/D-Ex	8.7												
Level control	–		Internal converter								Float switch	4-20mA interface			

Menu point	Unit	Pump type	Settings with level sensor:												
			(A) + (B)				(C)				(D)	(E)			
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
20 mA => level	cm		–				–				–	400			
Language	–		German												

* Previously set under “level control” menu item = Set **4-20mA Interface** “and under”20 mA => Level = **400**.

** Value = 0 with version with air bubble injection. With version without air bubble injection, value assessment during trial run: Water level must remain approx. 5 cm under lower edge of back pressure hole.

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

4.3.7 Powerlift PSD-B-2200 with T_{Basin} = 505

Menu point	Unit	Pump type	Settings with level sensor:												
			(A) + (B)				(C)				(D)	(E)			
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
Flood AL = **AL** Peak load ON = **SL** Base load ON = **BL** Base load OFF = **OFF**	cm	SAT-Q 300/65/D	119	109	99	11	150	140	130	31	–	119	109	99	11
		SAT-Q 300/80/D	119	109	99	11	150	140	130	31		119	109	99	11
		SAT-Q 400/65/D	112	102	92	11	150	140	130	38		112	102	92	11
		SAT-Q 400/80/D	112	102	92	11	150	140	130	38		112	102	92	11
		SAT-Q 550/80/4/D	111	101	91	11	150	140	130	39		111	101	91	11
		SAT-Q 750/80/D	110	100	90	11	150	140	130	40		110	100	90	11
		SAT-Q 1000/100/D	106	96	86	11	150	140	130	44		106	96	86	11
		SAT-Q 1000/100/4/D	106	96	86	11	150	140	130	44		106	96	86	11
		SAT-Q 1500/100/D	106	96	86	11	150	140	130	44		106	96	86	11
		SAT-Q 300/80/4/D	111	101	91	11	150	140	130	39		111	101	91	11
		KL-AT-M 200/4/80/D-Ex	116	106	96	11	150	140	130	34		116	106	96	11
		KL-AT-M 300/4/80/D-Ex	111	101	91	11	150	140	130	39		111	101	91	11
		KL-AT-M 400/4/80/D-Ex	111	101	91	11	150	140	130	39		111	101	91	11
		KL-AT-V 400/2/80/D-Ex	109	99	89	11	150	140	130	41		109	99	89	11
		KL-AT-V 400/4/100/D-Ex	107	97	87	11	150	140	130	43		107	97	87	11
		KL-AT-V 550/2/80/D-Ex	109	99	89	11	150	140	130	41		109	99	89	11

Menu point	Unit	Pump type	Settings with level sensor:											
			(A) + (B)				(C)				(D)	(E)		
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
After-running period	s		0**				0				0	0			
Maximum current – 1 *** Maximum current – 2 ***	A	SAT-Q 300/65/D	5.1												
		SAT-Q 300/80/D	5.1												
		SAT-Q 400/65/D	6.7												
		SAT-Q 400/80/D	6.7												
		SAT-Q 550/80/4/D	9.0												
		SAT-Q 750/80/D	15.9												
		SAT-Q 1000/100/D	21.6												
		SAT-Q 1000/100/4/D	20.0												
		SAT-Q 1500/100/D	28.8												
		SAT-Q 300/80/4/D	5.8												
		KL-AT-M 200/4/80/D-Ex	4.1												
		KL-AT-M 300/4/80/D-Ex	5.8												
		KL-AT-M 400/4/80/D-Ex	7.3												
		KL-AT-V 400/2/80/D-Ex	6.7												
		KL-AT-V 400/4/100/D-Ex	7.3												
		KL-AT-V 550/2/80/D-Ex	8.7												
Level control	–		Internal converter								Float switch	4-20mA interface			
20 mA => level	cm		–				–				–	400			
Language	–		German												

* Previously set under “level control” menu item = Set **4-20mA Interface** “and under”20 mA => Level = **400**.

** Value = 0 with version with air bubble injection. With version without air bubble injection, value assessment during trial run: Water level must remain approx. 5 cm under lower edge of back pressure hole.

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

4.3.8 Powerlift PSD-B-2200 with T_{Basin} = 585

Menu point	Unit	Pump type	Settings with level sensor:											
			A + B				C				D	E		
			AL	PL	BL	OFF	AL	PL	BL	OFF		AL*	PL*	BL*	OFF*
Flood AL = **AL** Peak load ON = **SL** Base load ON = **BL** Base load OFF = **OFF**	cm	LW-KP 1325...421	130	120	110	11	180	170	160	49		130	120	110	11
		LW-KP 1325...422	130	120	110	11	180	170	160	49		130	120	110	11
		LW-KP 1325...423	130	120	110	11	180	170	160	49		130	120	110	11
		LW-KP 1325...424	130	120	110	11	180	170	160	49		130	120	110	11
After-running period	s		0**				0				0	0			
Maximum current – 1***		LW-KP 1325...421	27												
		LW-KP 1325...422	23												
Maximum current – 2***		LW-KP 1325...423	23												
		LW-KP 1325...424	20												
Level control	–		Internal converter								Float switch	4-20mA interface			
20 mA => level	cm		–				–				–	400			
Language	–		German												

* Previously set under “level control” menu item = Set **4-20mA Interface** “and under”20 mA => Level = **400**.

** Value = 0 with version with air bubble injection. With version without air bubble injection, value assessment during trial run: Water level must remain approx. 5 cm under lower edge of back pressure hole.

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

4.3.9 Settings for the installed prefabricated pump station

The settings made during the commissioning must be entered in the following table by hand.

Menu item	Unit	Pump type	Settings with level sensor:				
			(A)	(B)	(C)	(D)	(E)
Base load ON	cm						
Base load OFF	cm						
Peak load ON	cm						
Flood AL	cm						
After-running period	s			0	0	0	0
Maximum current – 1 *** Maximum current – 2 ***	A						
Level control	–		Internal converter			Float switch	4-20mA interface
20 mA => level	cm		–	–	–	–	400
Language	–		German				

*** With Level Control PS 2 Control System: Setting via separate motor protection switch.

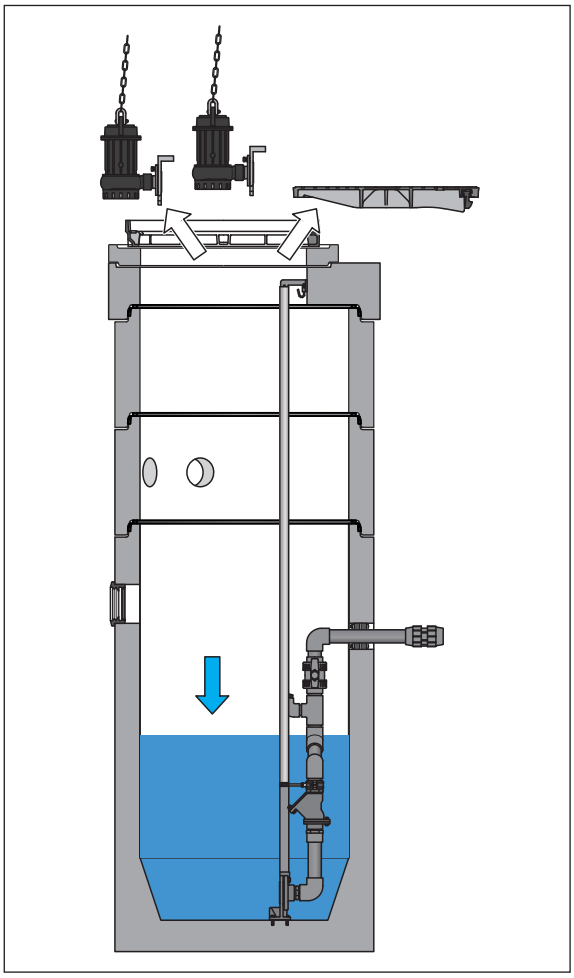
4.4 Starting up the submersible pumps

The description is valid for both submersible pumps.

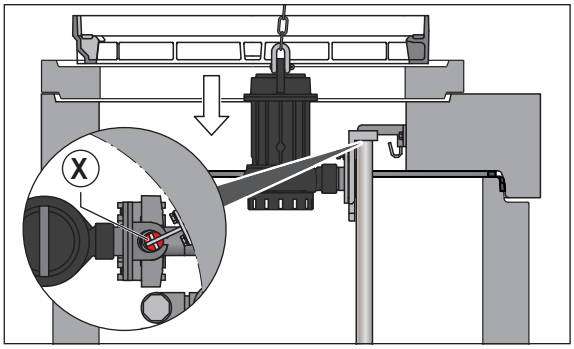
IMPORTANT To ensure dry-running protection, the pump chamber must be vented during the initial start-up.

It can be filled with drinking water, rainwater or process water (when this complies with the local discharge conditions for effluent).

- ➔ Lift the cover out of the cover frame and store to the side.
- ➔ Remove the pumps from the tank and store to the side.
- ➔ Fill the tank up to approx. half-full (relative to the inlet level).

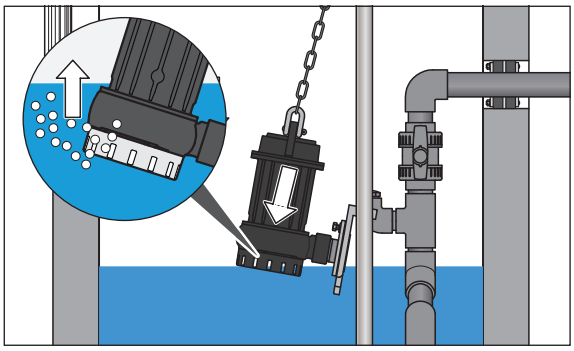


- ➔ Thread the coupling piece for the pump onto the guide pipe: Position **X**.



➔ Pull the pump at an angle and lower further.

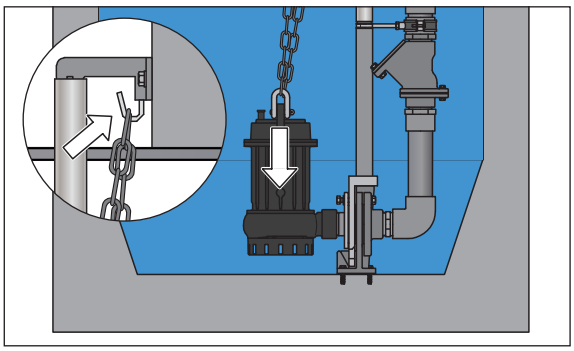
Air escapes from the pump chamber.



➔ Lower the pump further until the coupling sits in the underwater automatic coupling.

➔ Hook the chain onto the chain holder.

➔ Execute a test run, Chapter 4.5 “Executing a test run”.



4.5 Execute test run

Requirements:

- The ball valve and/or gate valve is opened in the pressure pipe.
- The control is connected to the power supply.

During the trial run, pay attention to the following:

- Perform the trial run at least twice during commissioning.
- Perform the trial run with drinking water, rainwater or process water (if it meets the local discharge conditions for effluent).
- Avoid dry running during the trial run.
- Observe the signals/messages in the display panel of the control.

IMPORTANT

- If knocking noises/vibrations occur in the pressure pipe when the pump is switched off, set an after-running period or increase the set after-running time.
- If SITA pumps are used, the ATEX mode must be activated in the control menu. 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.

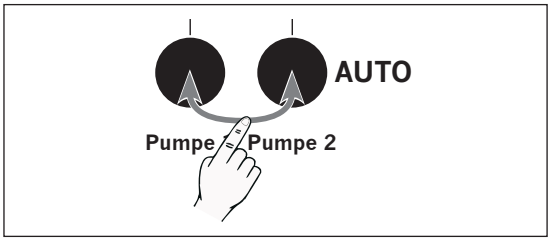
Requirement for design with open back pressure bell without air bubble injection:

The water level at the "after-running period OFF" is located at approx. 50 mm below the lower edge of the back pressure bell.

The tank can be filled via the inlet pipe or via the inspection opening.

Starting automatic mode:

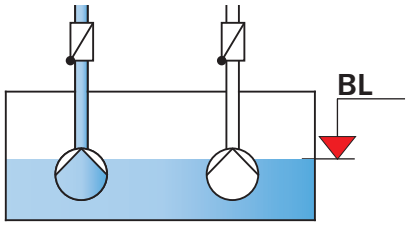
➔ Press both buttons to start automatic operation of Pumps 1 and 2.



➔ Fill the tank

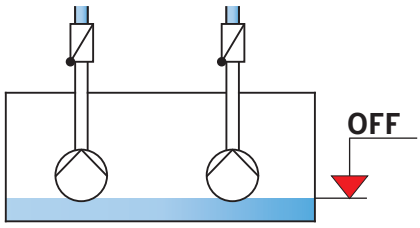
When the water level reaches the “Base load” (BL) level, Pump 1 switches on.

➔ Interrupt the inlet.



When the water reaches the “OFF” level, Pump 1 switches off.

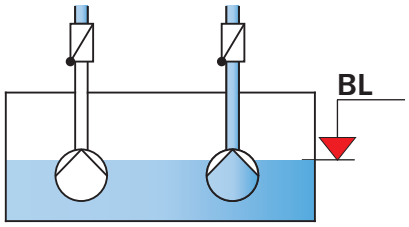
IMPORTANTWith a combination of open back pressure bell without air bubble injection: Switch on Pump 1 manually, measure the time until the water level is approx. 50 mm below the back pressure bell and set this time in the control as the after-running period for both pumps.



➔ Fill the tank

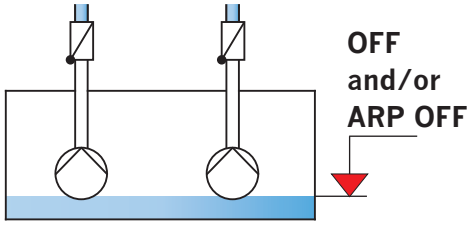
When the water level reaches the “Base load” (BL) level, Pump 2 switches on.

➔ Interrupt the inlet.



When the water reaches the “OFF” level, Pump 2 switches off.

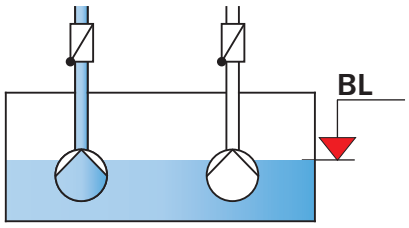
IMPORTANT With a combination of open back pressure without air bubble injection:The water level will be lowered by the after-running period to the “after-running level OFF” (ARP OFF) level. Then Pump 2 switches off.



➔ Fill the tank

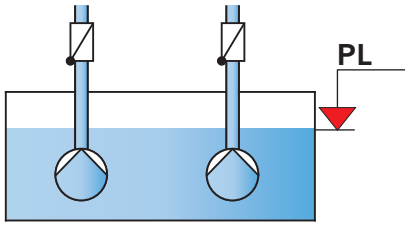
When the water level reaches the “Base load” (BL) level, Pump 1 switches on.

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



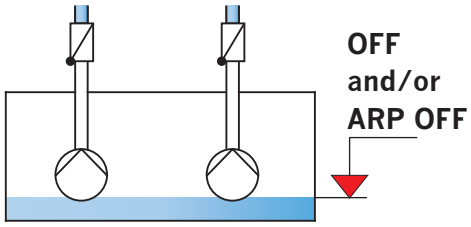
When the water reaches the “Peak load” (PL) level, Pump 2 also switches on.

➔ Interrupt the inlet.

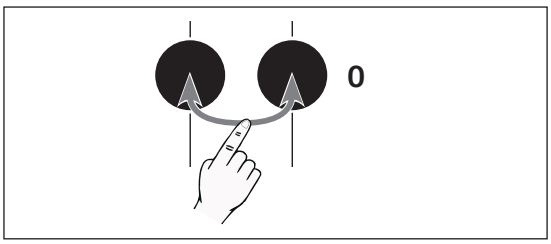


When the water level reaches the “OFF” level, the pumps switch off.

IMPORTANT In combination with open back pressure bell without air bubbling: The pumps switch off after the "after-running period".



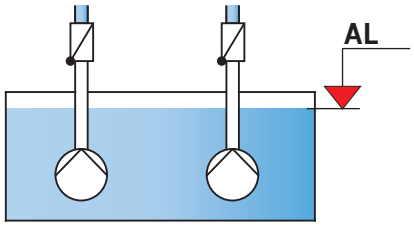
Terminating automatic mode:
Press both buttons in order to end automatic mode of Pump 1 and 2.



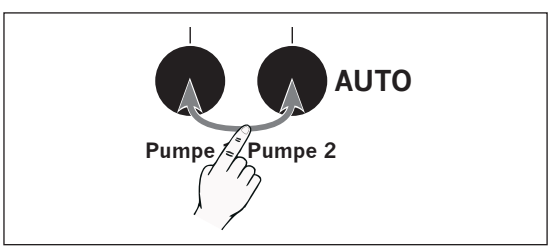
➔ Fill the tank

If the water reaches the “Flood alarm” (AL) level, an alarm sounds, a fault message appears in the display panel and the LED for “Flood alarm” ● lights up:

➔ Interrupt the inlet.



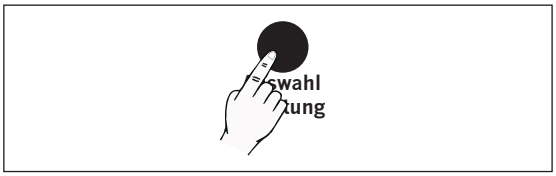
Starting automatic mode:
Press both buttons in order to start automatic mode of Pump 1 and 2.



Acknowledging a malfunction:

➔ Press the button to acknowledge the malfunction.

A fault message is no longer displayed and the LED for the “Flood alarm” ● goes out.



The trial run is finished.

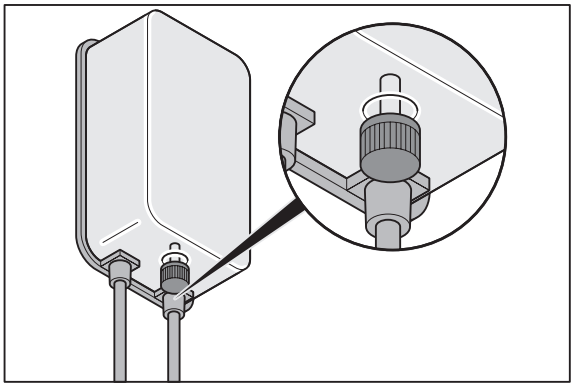
Final work:

- Position the cover again
- For version with air bubble injection (optional): Set air bubble injection on the mini compressor, Chapter 4.6 “Setting air bubble injection (optional)”
- Document the settings, Chapter 4.3 “Commissioning settings”
- Document the commissioning, Appendix: “Commissioning report”

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



5 Troubleshooting

WARNING

Electric shock

- According to EN 12056, work on electrical connections to power supply may only be carried out by qualified electricians.
- Disconnect the control from the power supply before troubleshooting.

CAUTION

Flooding and risk of infection in case of 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 prefabricated pumping station repairs carried out by ACO or an ACO Service partner, 🕮 Chapter Introduction, “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 flood alarm

- Always interrupt the wastewater feed and remedy the causes.

Malfunctions on the pump station

No claim is made that the list is complete.

Malfunction	Cause(s)	Actions
Pump without function	Power consumption too high (automatic shut-off)	Acknowledge malfunction If the malfunction remains: Contact ACO Service
	Control 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 (16) (ACO Service)

Malfunction	Cause(s)	Actions
Pump does not deliver and/or pumps too little or tank full	Ball valve and/or gate valve in the pressure pipe is not fully open or is closed	Fully open the ball valve or stop valve in the pressure pipe
	Pressure pipe obstructed	Clean the pressure pipe
	Impeller or grinder (pump) blocked	Pump maintenance required (ACO Service)
	Pump parts are worn	Pump repair required (ACO Service)
Pump only runs in manual operation	Control pipe of the level switching is leaking, incorrectly laid, kinked or obstructed	Check the control pipe
	Back pressure bell blocked	Clean the back pressure bell
	Closed back pressure bell defective	Replace the closed back pressure bell
	Level probe is defective	Exchange the level probe
	Float switch is defective	Exchange the float switch(es)
Knocking noises/ vibrations in the pressure pipe on switching off the pump(s)	After-running period of the pumps is too short	Increase pump after-running period

Fault messages at the control

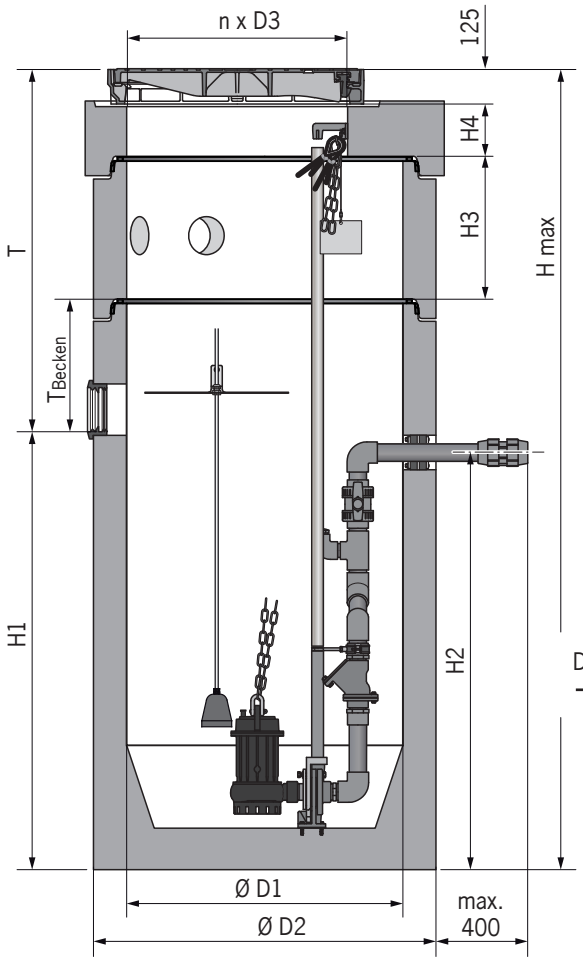
No claim is made that the list is complete.

Display panel	LED display(s)	Cause(s)	Actions
Maximum current		Power consumption too high (automatic shut-off)	Acknowledge malfunction If the malfunction remains: Contact ACO Service
Flood alarm		Ball valve and/or gate valve in the pressure pipe is not fully open and/or is closed	Fully open the ball valve or stop valve in the pressure pipe
		Automatic mode is switched off	Switch on automatic mode
		Pump motor is defective	Pump replacement required (ACO Service)
		Impeller or grinder (pump) blocked	Pump maintenance required (ACO Service)
		Pressure pipe obstructed	Clean the pressure pipe
		Pump parts are worn	Pump repair required (ACO Service)

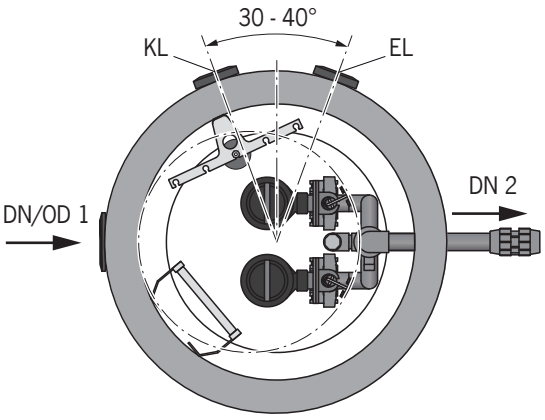
6 Technical Data

6.1 Prefabricated pumping station

6.1.1 Dimensions



Short caracters	Type of prefabricated pumping station
A	PSD-P-1000/T_{Basin} 685
B	PSD-B-1000/T_{Basin} 480
C	PSD-B-1000/T_{Basin} 1,070
D	PSD-B-1500/T_{Basin} 395
E	PSD-B-1500/T_{Basin} 795
F	PSD-B-2200/T_{Basin} 515
G	PSD-B-2200/T_{Basin} 505
I	PSD-B-2200/T_{Basin} 585



Model	Dimensions [mm]											
	D1	D2	nxD3	H1	H2	H3	H4	H_{Max}	T_{Basin}	T	OD1	DN2
A	1,000	1,240	1x800	1,345	1,480	0	190	4,500	685	1,000	160	50 [1]
B	1,000	1,240	1x800	1,585	1,510	515	190	7,000	480	1,310	160	50 [1]
C	1,000	1,240	1x800	995	1,510	515	190	7,000	1,070	1,870	160	50 [1]
D	1,500	1,820	2x600	1,615	1,695	515	190	7,000	395	1,225	200	100 [2]
E	1,500	1,820	2x600	1,215	1,695	515	190	7,000	795	1,625	200	100 [2]
F	2,200	2,450	2x800	1,940	2,150	0	240	7,000	515	880	315	125 [2]
G	2,200	2,450	2x800	1,950	2,145	0	240	7,000	505	870	315	200 [2]
I	2,200	2,450	2x800	2,250	2,500	0	240	7,000	585	950	400	250 [2]

H3, H4, T_{Basin} and T	= Construction height with joints for circular rotating mechanical seal (15 mm) or mortar (10 mm)
H maximum	= Maximum installation depth of the tank relative to the tank base
EL	= Ventilation pipe connection DN 100/OD = 110 mm: details for pipe bottom on request
KL	= Blank cable pipe connection DN 100/OD = 110 mm: details for pipe bottom on request
1)	For connecting pipe OD 63 mm
2)	Flange connection with flange connection dimension according to DIN 2501– PN 16

6.1.2 Key data

Prefabricated pumping station Model	Useful volume [l]	Weight Manhole base section Complete* [kg]	Weight Cover plate Complete [kg]
PSD-P-1000/T_{Basin} 685	210 – 510	1,040	425
PSD-B-1000/T_{Basin} 480	370 – 670	2,450	625
PSD-B-1000/T_{Basin} 1,070	45 – 240	2,450	625
PSD-B-1500/T_{Basin} 395	810 – 1,390	5,100	1,230
PSD-B-1500/T_{Basin} 795	105 – 690	5,100	1,230
PSD-B-2200/T_{Basin} 515	2,600 – 3,910	7,250	2,510
PSD-B-2200/T_{Basin} 505	2,650 – 3,950	7,500	2,510
PSD-B-2200/T_{Basin} 585	3,590 – 4,200	8,510	2,510
*without submersible pumps			

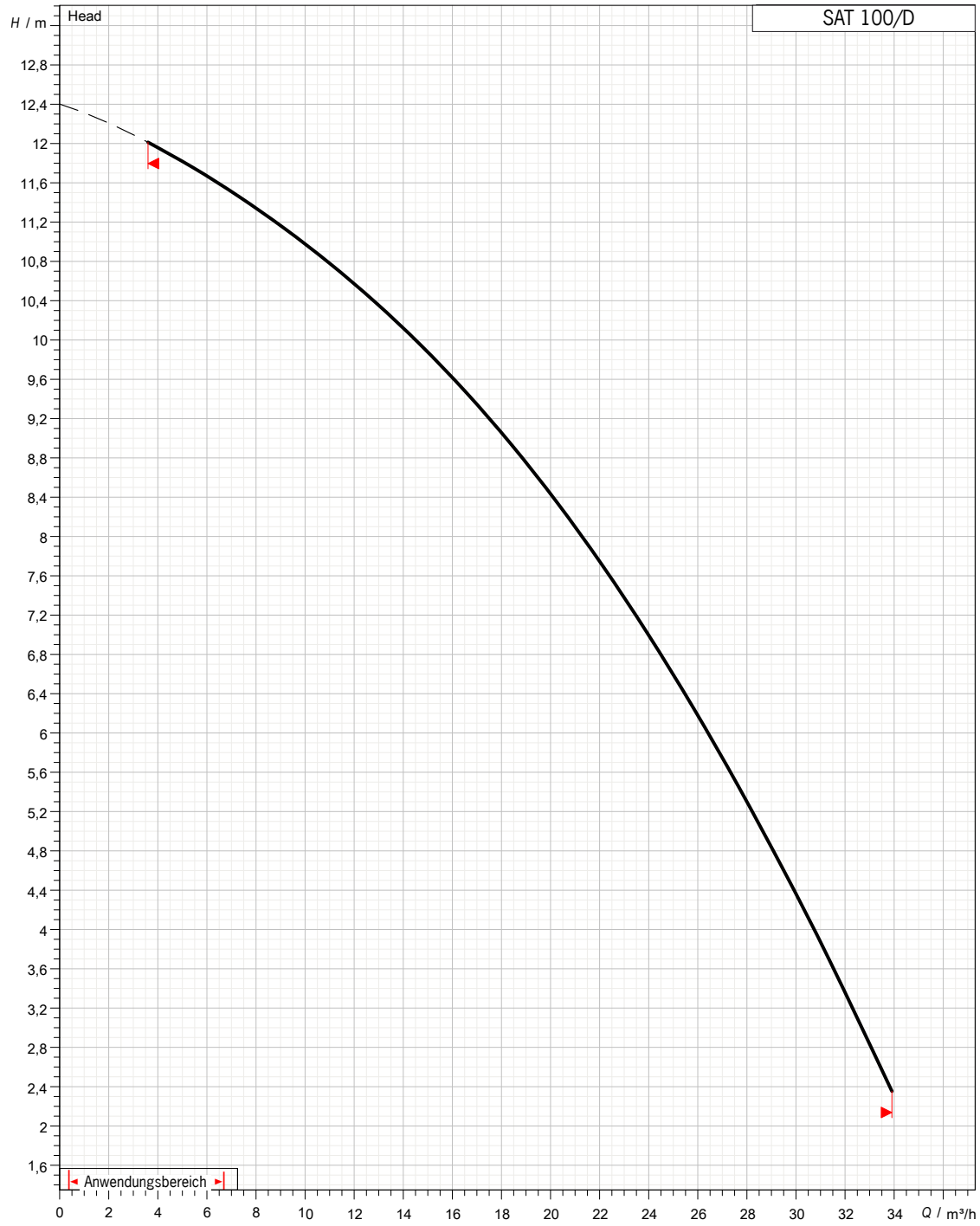
6.2 Submersible pumps – non-faecal wastewater

6.2.1 SAT-100/D, SAT-150/D and SAT-200/D

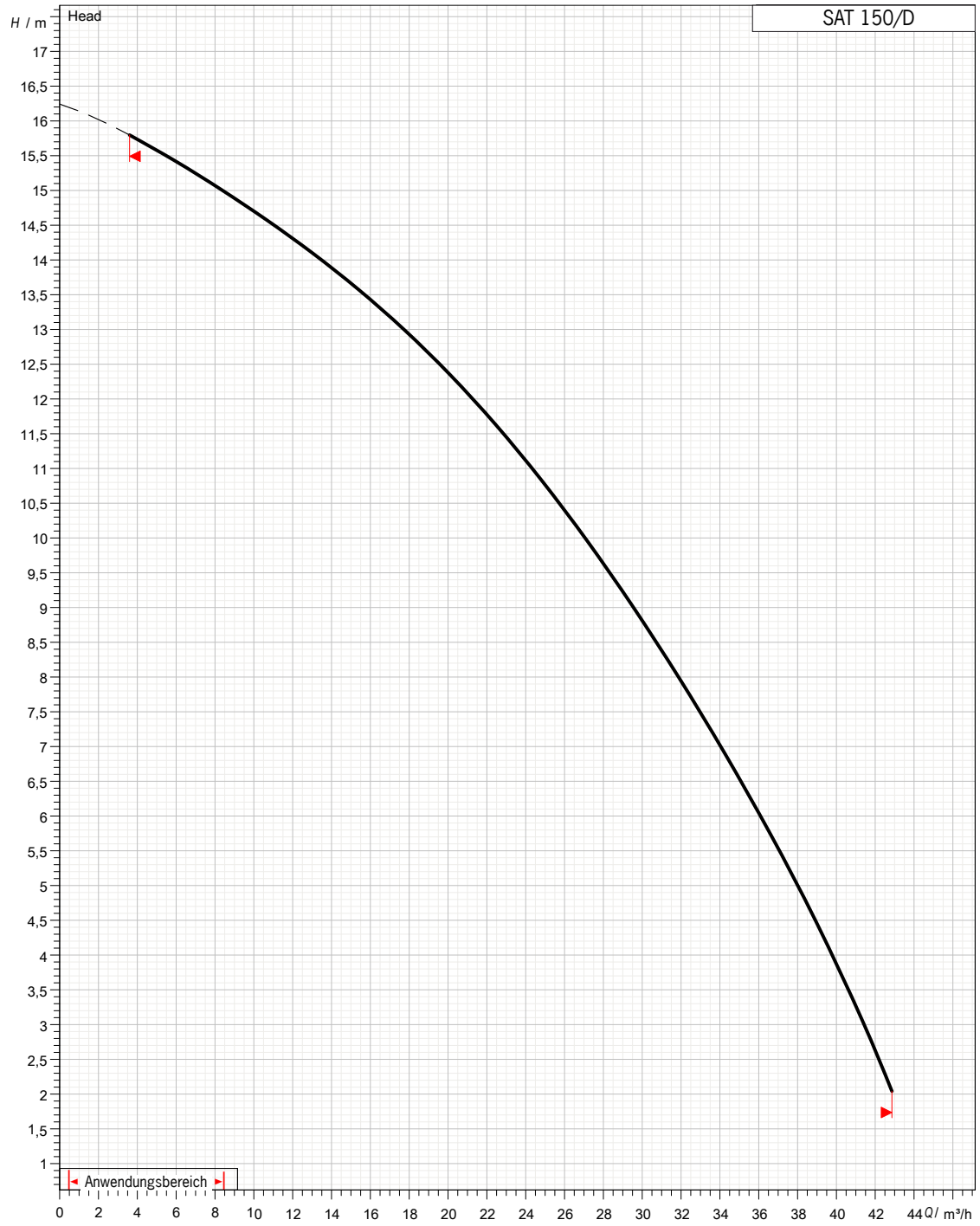
Characteristic data and use limits

Key data	SAT		
	100/D	150/D	200/D
Type of cable for connection cable:	4G1	4G1	4G1
Pump motor operating voltage [V]:	400	400	400
Frequency [Hz]:	50	50	50
Pump motor speed [1/min.]:	2,700	2,665	2,740
Pump motor power input P1 [kW]:	1.3	1.6	2.0
Pump motor output P2 [kW]:	0.9	1.1	1.5
Pump motor nominal current [A]:	2.3	2.7	3.6
Maximum starts per hour:	30	30	30
Maximum ball through-flow [mm]:	15	15	15
Medium temperature range [°C]:	40	40	40
Fluid pH-value:	6 – 14	6 – 14	6 – 14
Fluid viscosity [mm^2/s]:	1.005	1.005	1.005
Medium density [kg/ m^3]:	1,100	1,100	1,100
Weight [kg]:	19.5	20.5	21.5

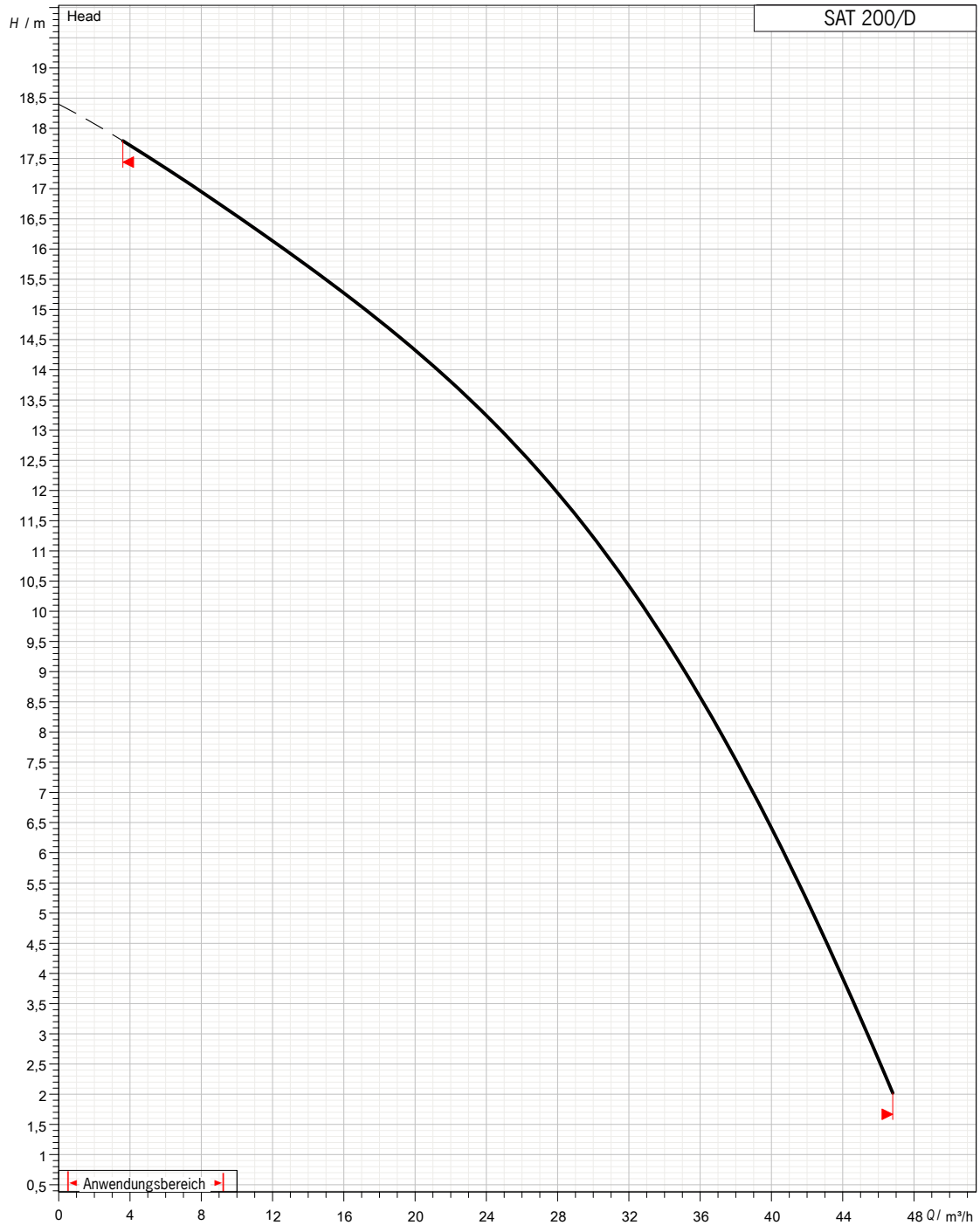
Performance diagram SAT-100/D



Performance diagram SAT-150/D



Performance diagram SAT-200/D

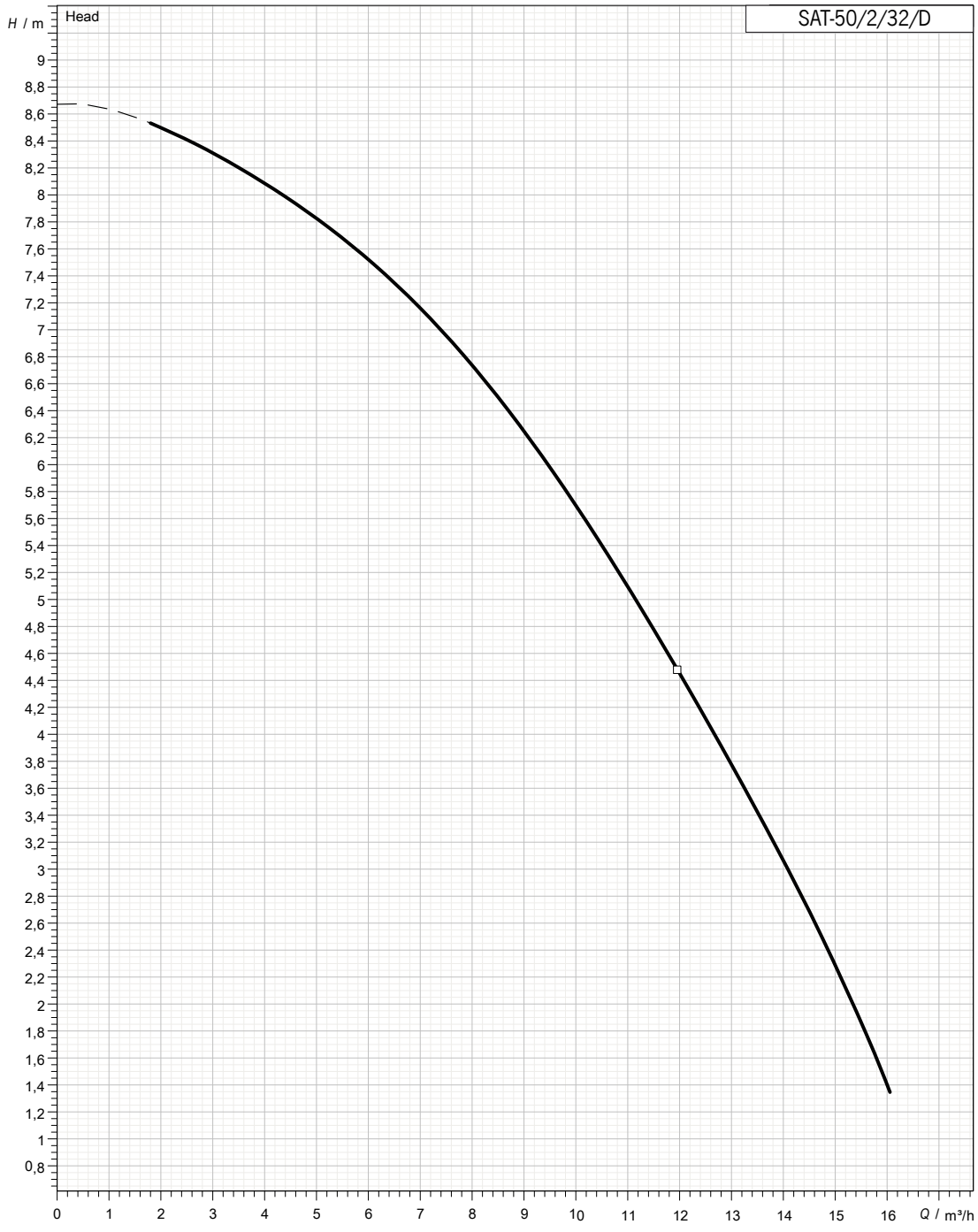


6.2.2 SAT-50/2/32/D and SAT-75/2/32/D

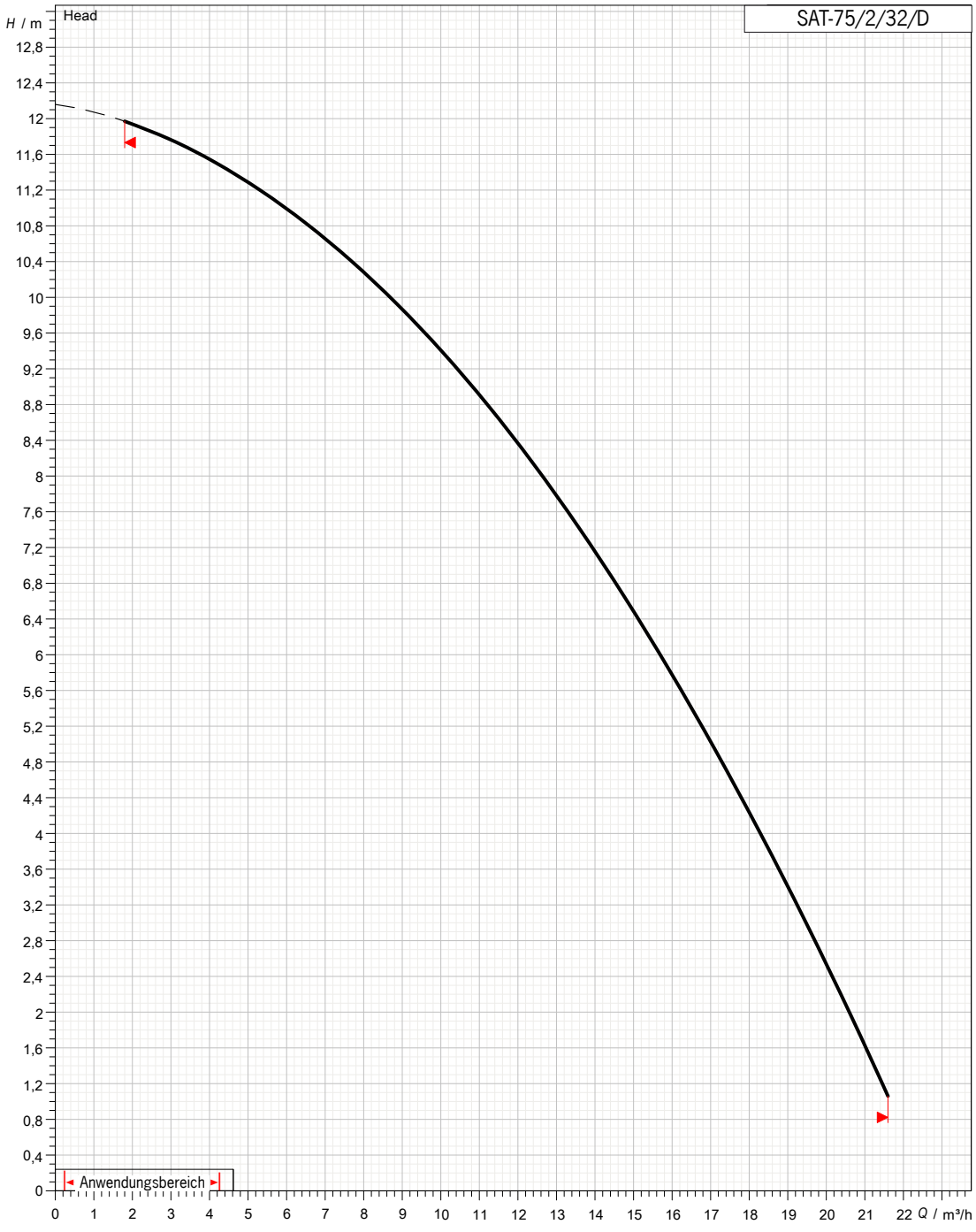
Characteristic data and use limits

Key data	SAT	
	50/2/32/D	75/2/32/D
Type of cable for connection cable:	4G1	4G1
Pump motor operating voltage [V]:	400	400
Frequency [Hz]:	50	50
Pump motor speed [1/min.]:	2,830	2,830
Pump motor power input P1 [kW]:	0.7	0.8
Pump motor output P2 [kW]:	0.4	0.6
Pump motor nominal current [A]:	1.1	1.3
Maximum starts per hour:	30	30
Maximum ball through-flow [mm]:	15	15
Medium temperature range [°C]:	40	40
Fluid pH-value:	6 – 14	6 – 14
Fluid viscosity [mm^2/s]:	1.005	1.005
Medium density [kg/ m^3]:	1,100	1,100
Weight [kg]:	11	13

Performance diagram SAT-50/2/32/D



Performance diagram SAT-75/2/32/D

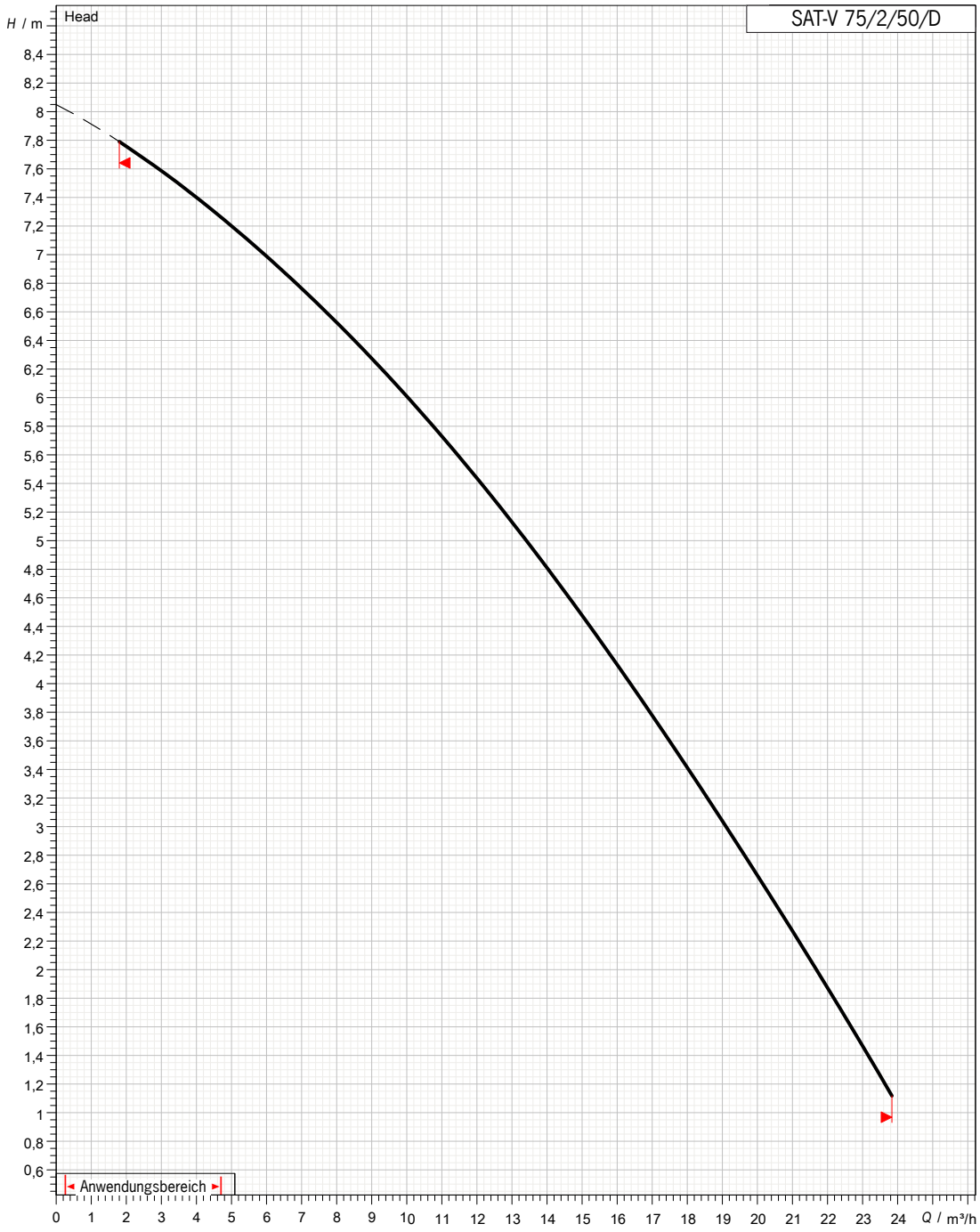


6.2.3 SAT-V 75/2/50/D and SAT-V 150/2/50/D

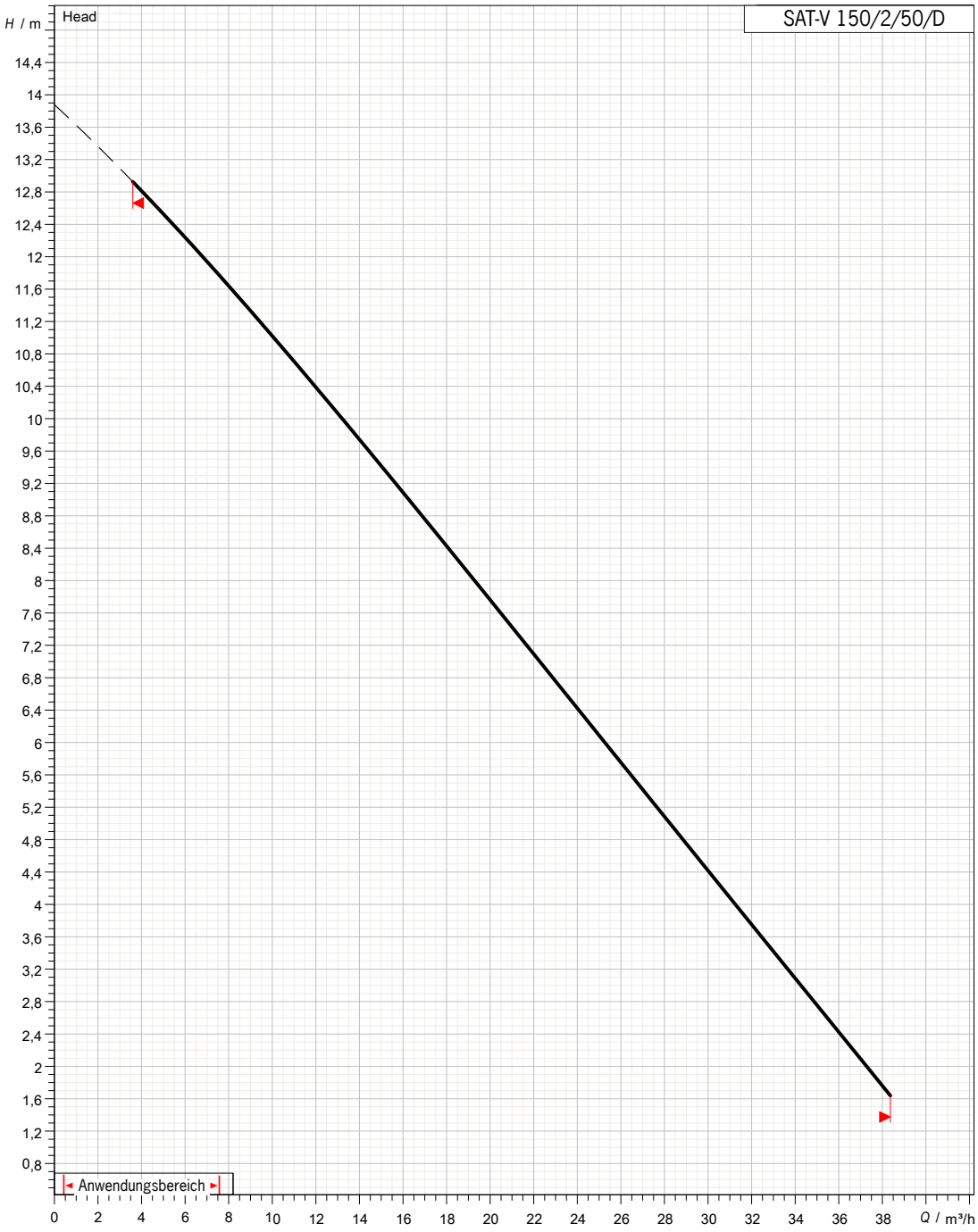
Characteristic data and use limits

Key data	SAT-V	
	75/2/50/D	150/2/50/D
Type of cable for connection cable:	4G1	4G1
Pump motor operating voltage [V]:	400	400
Frequency [Hz]:	50	50
Pump motor speed [1/min.]:	2,830	2,642
Pump motor power input P1 [kW]:	0.7	1.5
Pump motor output P2 [kW]:	0.6	1.1
Pump motor nominal current [A]:	1.3	2.6
Maximum starts per hour:	30	30
Maximum ball through-flow [mm]:	40	50
Medium temperature range [°C]:	40	40
Fluid pH-value:	6 – 14	6 – 14
Fluid viscosity [mm^2/s]:	1.005	1.005
Medium density [kg/ m^3]:	1,100	1,100
Weight [kg]:	14	20

Performance diagram SAT- V 75/2/50/D



Performance diagram SAT- V 150/2/50/D

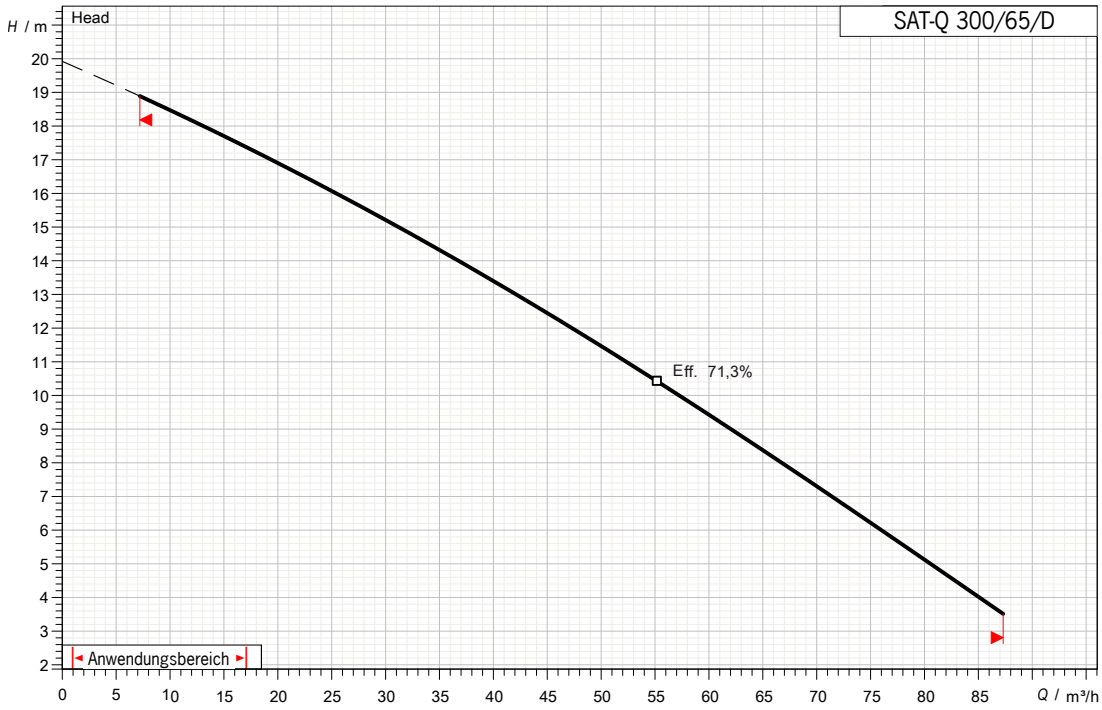


6.2.4 SAT-Q 300/65/D, SAT-Q 300/80/D, SAT-Q 400/65/D, SAT-Q 400/80/D and SAT-Q 750/80/D

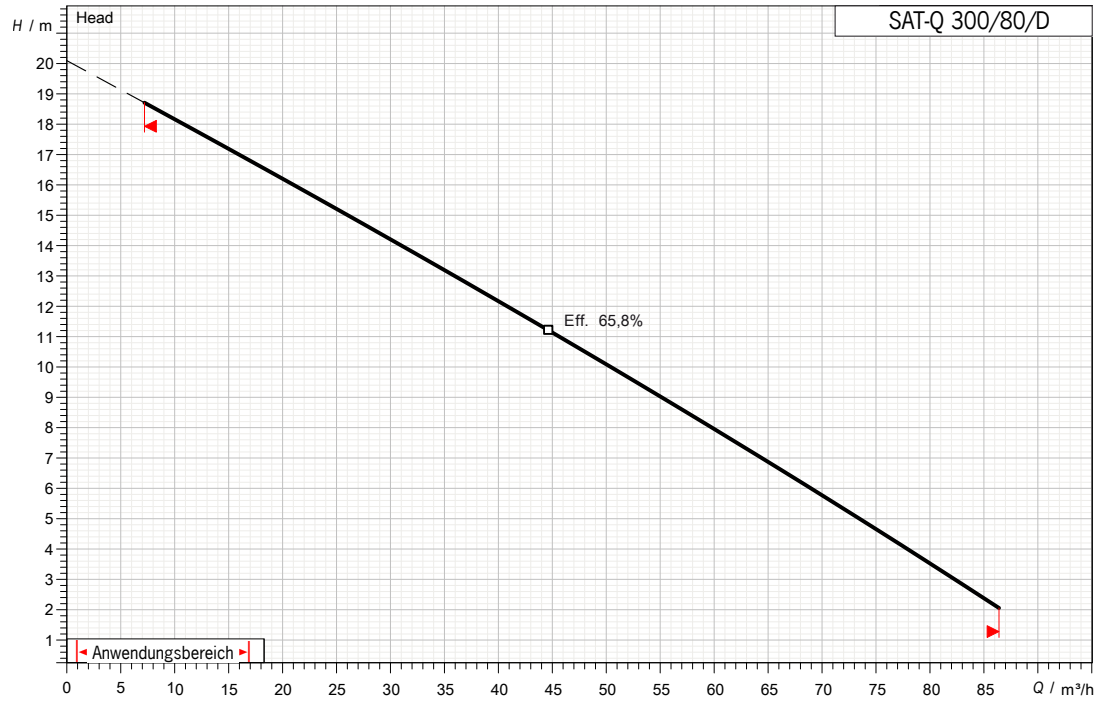
Characteristic data and use limits

Key data	SAT-Q				
	300/65/D	300/80/D	400/65/D	400/80/D	750/80/D
Type of cable for connection cable:	4G1.5+ 3x1	4G1.5+ 3x1	4G1.5+ 3x1	4G1.5+ 3x1	4G1.5+ 3x0.75
Pump motor operating voltage [V]:	400	400	400	400	400
Frequency [Hz]:	50	50	50	50	50
Pump motor speed [1/min.]:	2,835	2,835	2,842	2,842	2,868
Pump motor power input P1 [kW]:	2.9	2.9	4.0	4.0	10.0
Pump motor output P2 [kW]:	2.2	2.2	3.0	3.0	7.5
Pump motor nominal current [A]:	5.1	5.1	6.7	6.7	15.9
Maximum starts per hour:	30	30	30	30	30
Maximum ball through-flow and/or through-flow [mm]:	40	40	50	45	65 x 55
Medium temperature range [°C]:	40	40	40	40	40
Fluid pH-value:	6 – 14	6 – 14	6 – 14	6 – 14	6 – 14
Fluid viscosity [mm^2/s]:	1.005	1.005	1.005	1.005	1.005
Medium density [kg/ m^3]:	1,100	1,100	1,100	1,100	1,100
Weight [kg]:	58	58	74	79	100

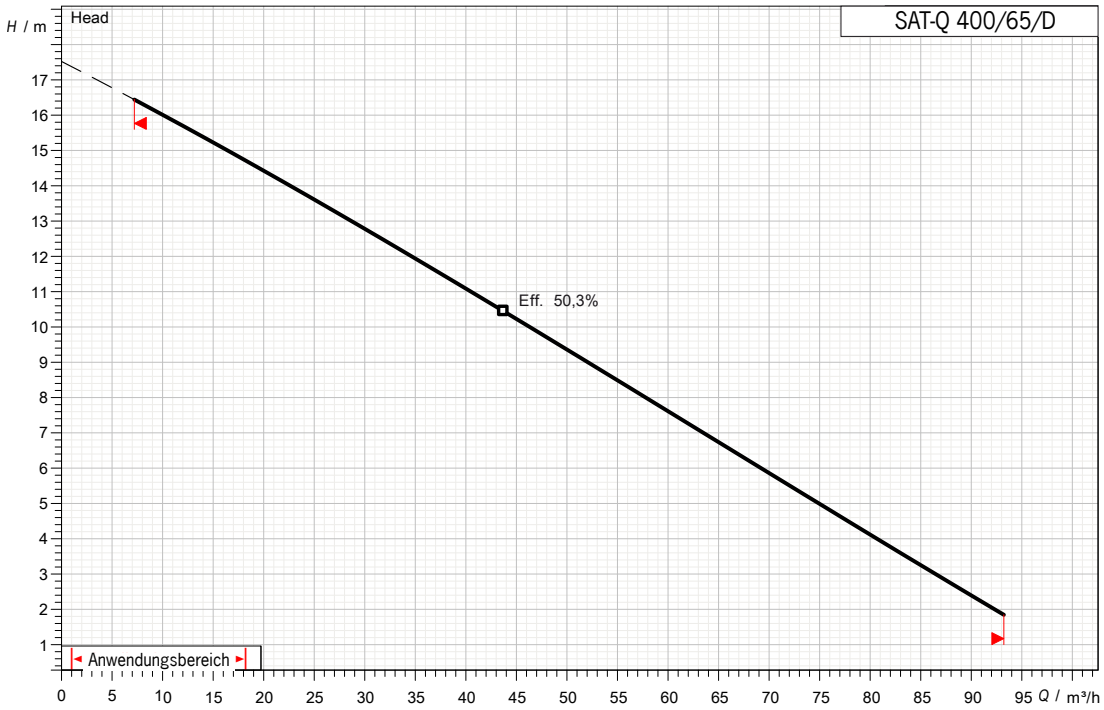
Performance diagram SAT-Q 300/65/D



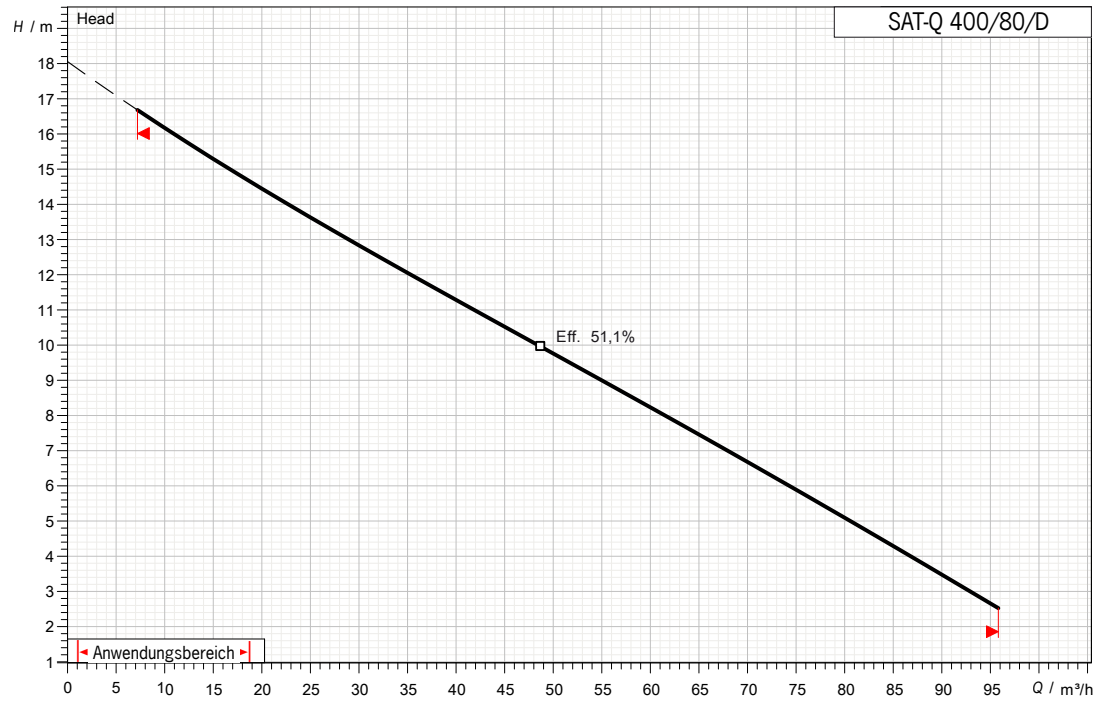
Performance diagram SAT-Q 300/80/D



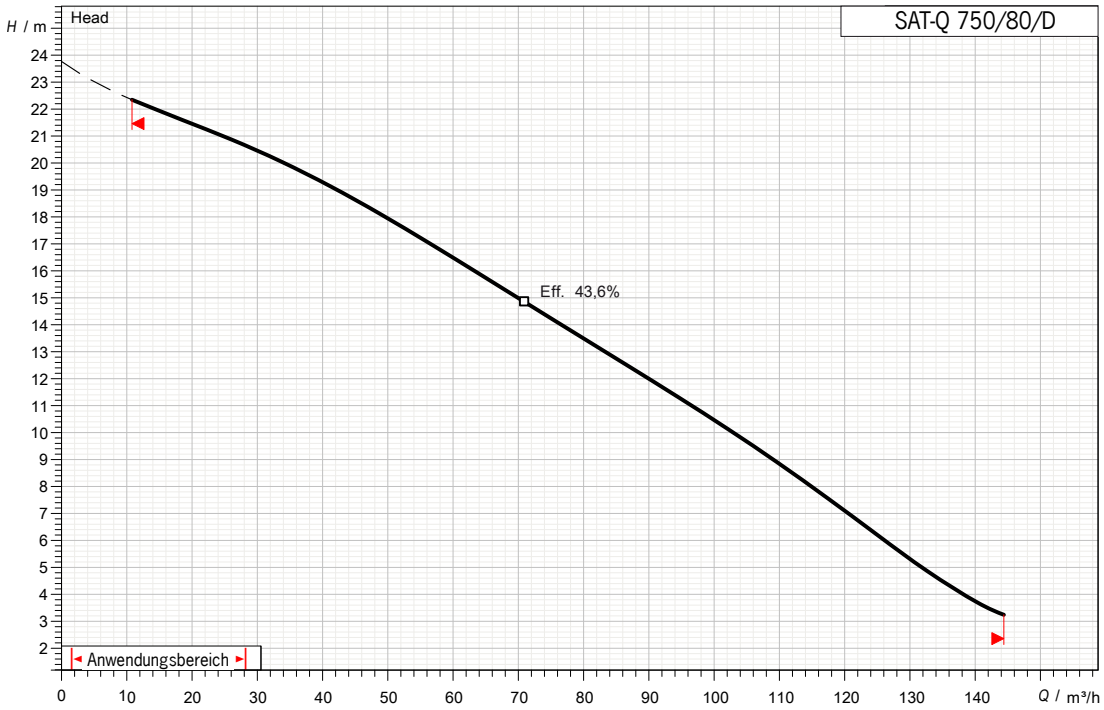
Performance diagram SAT-Q 400/65/D



Performance diagram SAT-Q 400/80/D



Performance diagram SAT-Q 750/80/D



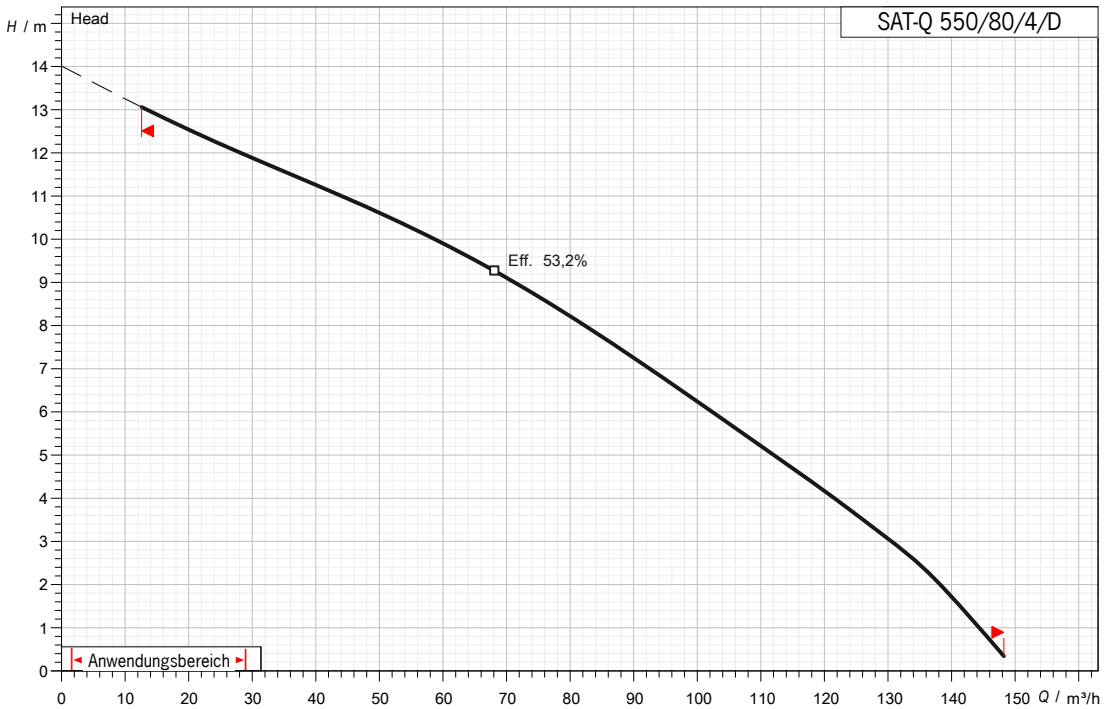
6.2.5 SAT-Q 300/80/4/D and SAT-Q 550/80/4/D

Characteristic data and use limits

Key data	SAT-Q	
	300/80/4/D	550/80/4/D
Type of cable for connection cable:	4G1.5+3x1	4G2.5+3x1
Pump motor operating voltage [V]:	400	400
Frequency [Hz]:	50	50
Pump motor speed [1/min.]:	1,428	1,397
Pump motor power input P1 [kW]:	2.9	5.2
Pump motor output P2 [kW]:	2.2	4.0
Pump motor nominal current [A]:	5.8	9.0
Maximum starts per hour:	30	30
Maximum ball through-flow and/or through-flow [mm]:	80	70 x 60
Medium temperature range [°C]:	40	40
Fluid pH-value:	6 – 14	6 – 14
Fluid viscosity [mm²/s]:	1.005	1.005
Medium density [kg/ m³]:	1,100	1,100
Weight [kg]:	87	82

Performance diagram SAT-Q 300/80/4/D

Performance diagram SAT-Q 550/80/4/D

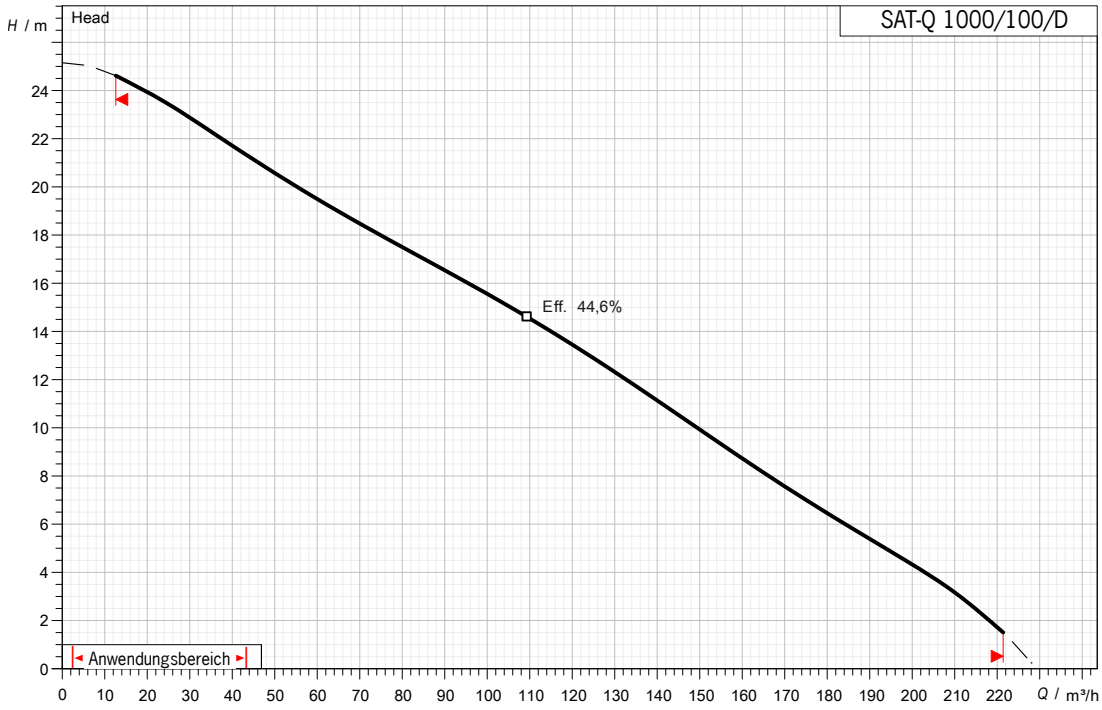


6.2.6 SAT-Q 1000/100/D, SAT-Q 1000/100/4/D and SAT-Q 1500/100/D

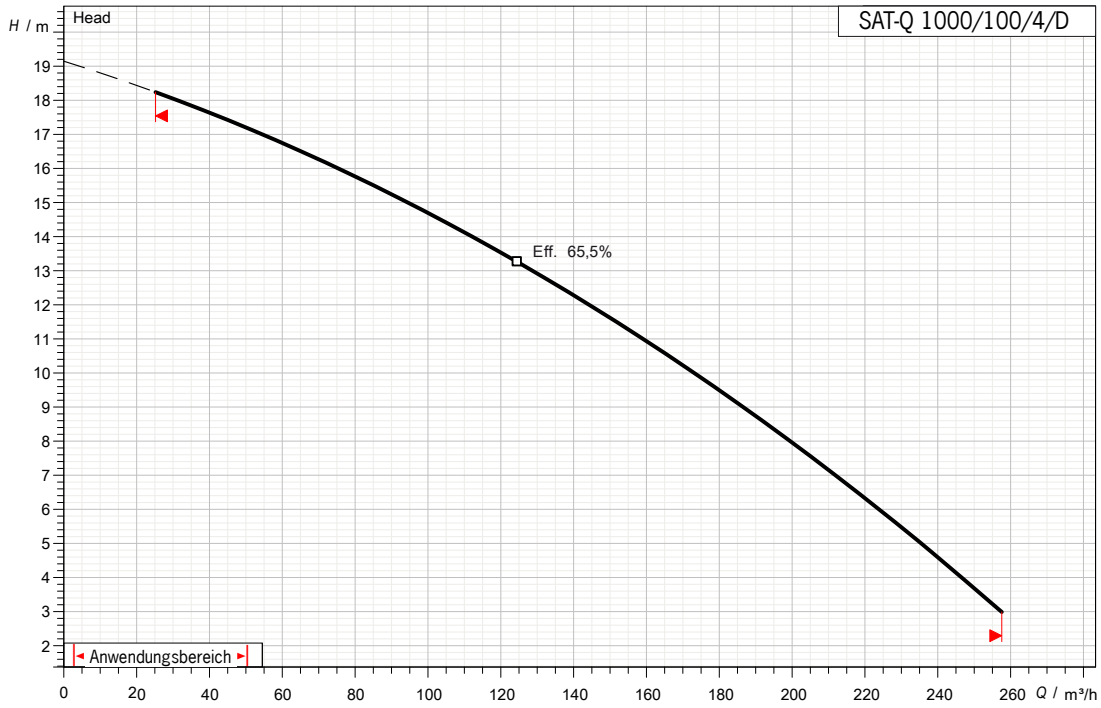
Characteristic data and use limits

Key data	SAT-Q		
	1000/100/D	1000/100/4/D	1500/100/D
Type of cable for connection cable:	7G1.5+3x0.75	7G1.5+3x0.75	7G2.5+3x0.75
Pump motor operating voltage [V]:	400	400	400
Frequency [Hz]:	50	50	50
Pump motor speed [1/min.]:	2,890	1,436	2,905
Pump motor power input P1 [kW]:	13.6	11.5	19.0
Pump motor output P2 [kW]:	10,8	8.9	16.1
Pump motor nominal current [A]:	21.6	20.0	28.8
Maximum starts per hour:	30	30	30
Maximum ball through-flow and/or through-flow [mm]:	80 x 75	95 x 80	80 x 70
Medium temperature range [°C]:	40	40	40
Fluid pH-value:	6 – 14	6 – 14	6 – 14
Fluid viscosity [mm²/s]:	1.005	1.005	1.005
Medium density [kg/ m³]:	1,100	1,100	1,100
Weight [kg]:	87	131	130

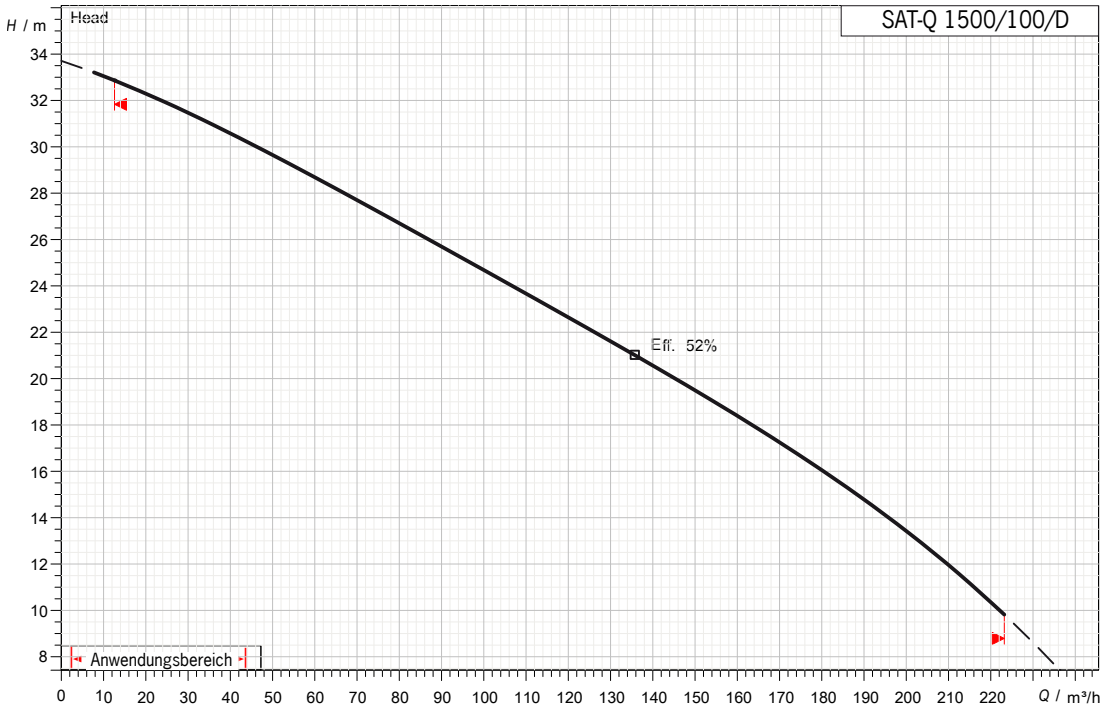
Performance diagram SAT-Q 1000/100/D



Performance diagram SAT-Q 1000/100/4/D



Performance diagram SAT-Q 1500/100/D

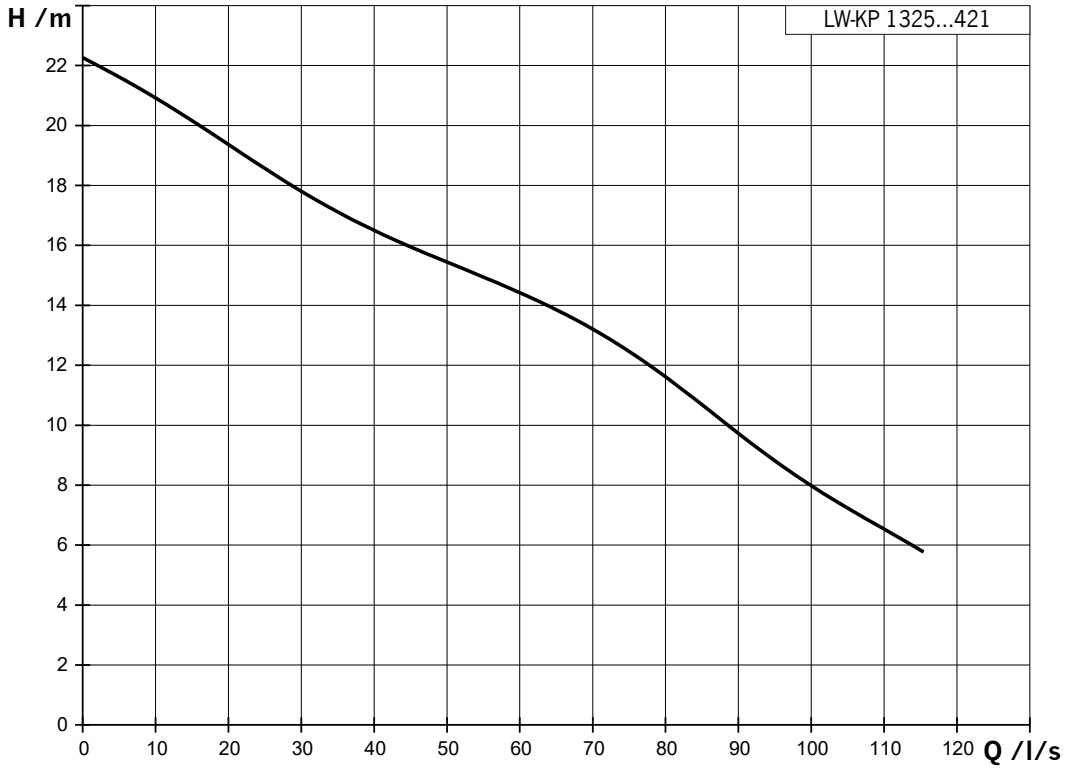


6.2.7 LW-KP 1325...421, LW-KP 1325...422, LW-KP 1325...423 and LW-KP 1325...424

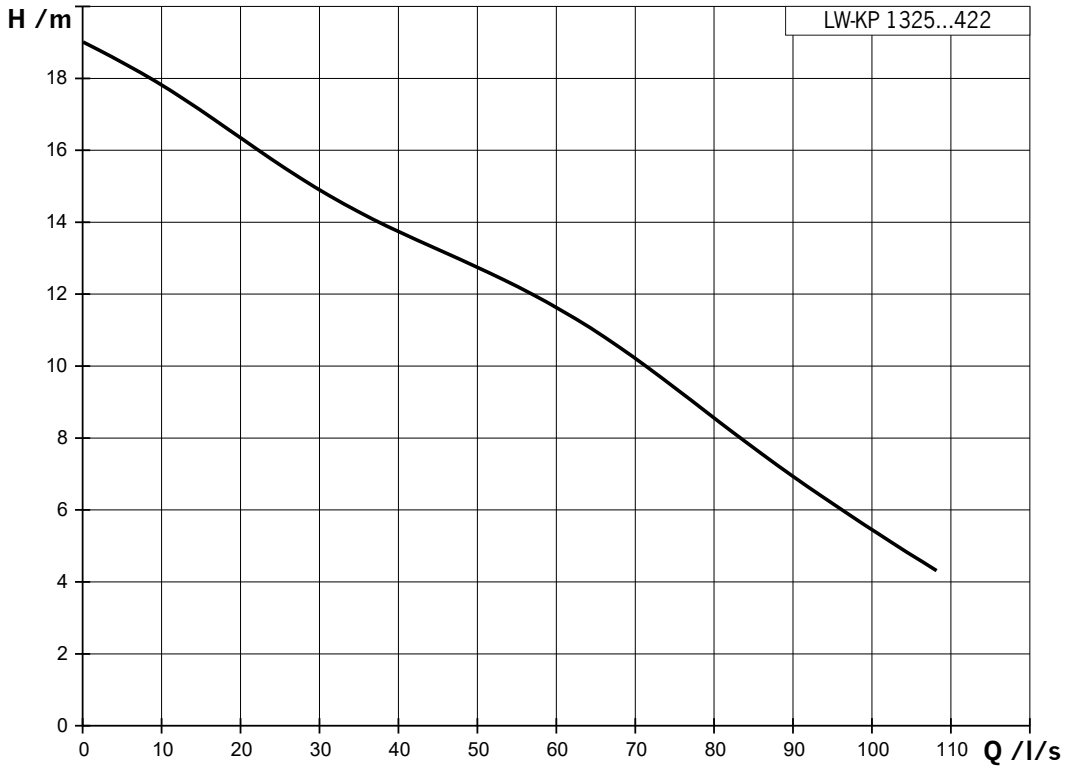
Characteristic data and use limits

Key data	LW-KP			
	1325...421	1325...422	1325...423	1325...424
Type of cable for connection cable:	7G2.5+2x1.5	7G2.5+2x1.5	7G2.5+2x1.5	7G2.5+2x1.5
Pump motor operating voltage [V]:	400	400	400	400
Frequency [Hz]:	50	50	50	50
Pump motor speed [1/min.]:	1,455	1,465	1,465	1,470
Pump motor power input P1 [kW]:	15,6	12.5	12.5	10.2
Pump motor output P2 [kW]:	13.5	11	11	9
Pump motor nominal current [A]:	27	23	23	20
Maximum starts per hour:	15	15	15	15
Maximum ball through-flow and/or through-flow [mm]:				
Medium temperature range [°C]:				
Fluid pH-value:				
Fluid viscosity [mm^2/s]:				
Medium density [kg/ m^3]:				
Weight [kg]:	190	190	190	190

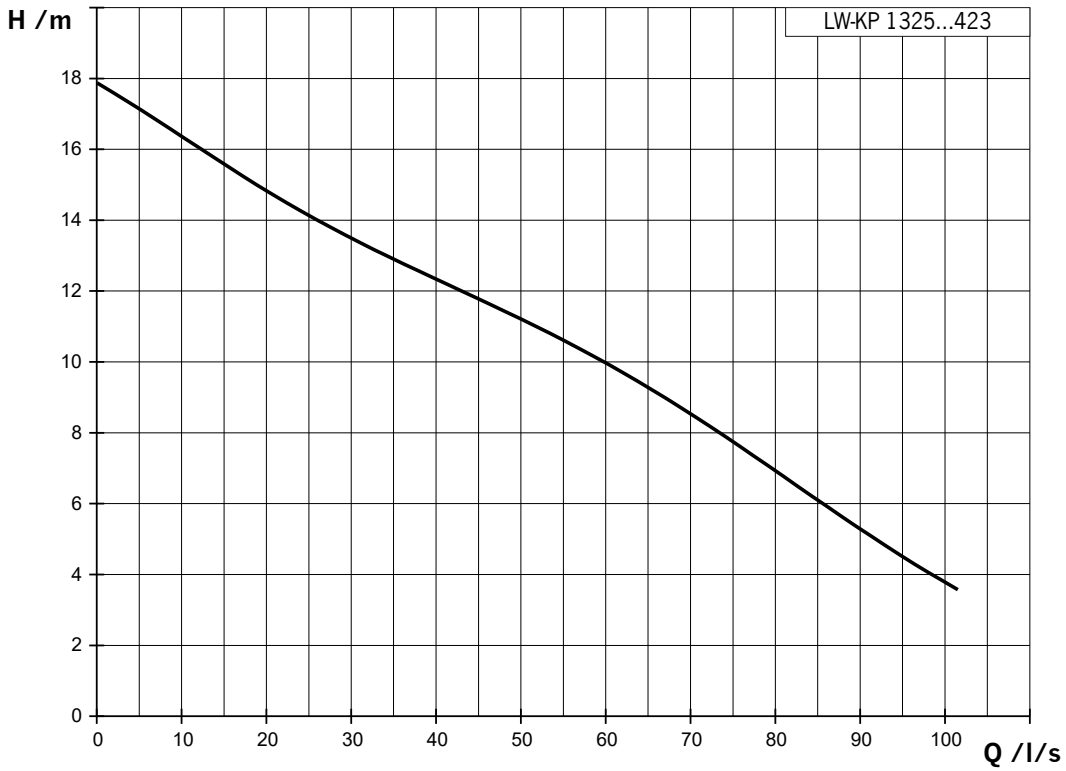
Performance diagram LW-KP 1325...421



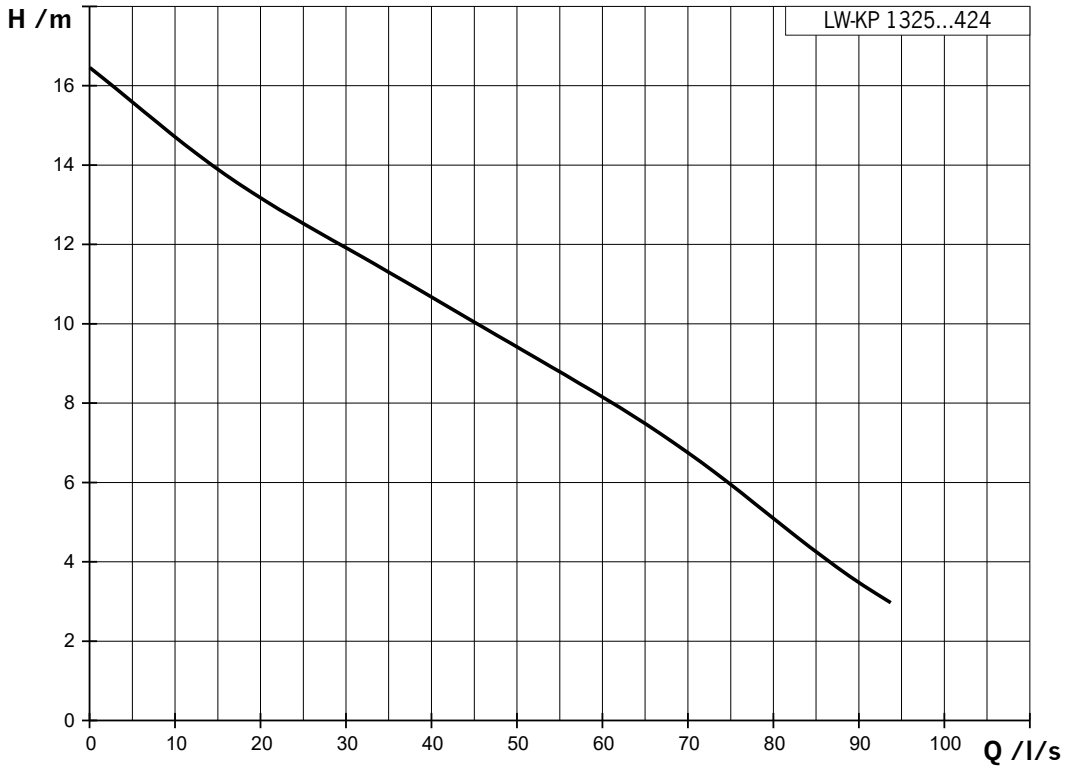
Performance diagram LW-KP 1325...422



Performance diagram LW-KP 1325...423



Performance diagram LW-KP 1325...424



6.3 Submersible pumps – faeces-containing wastewater

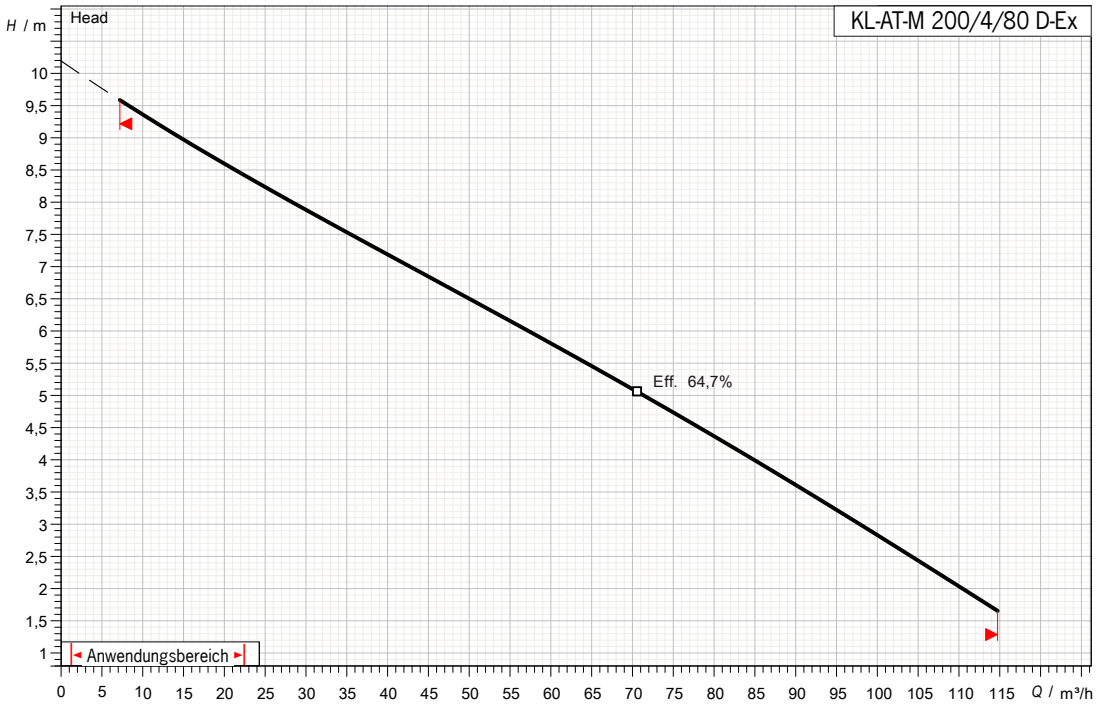
6.3.1 KL-AT-M 200/4/80 D-Ex, KL-AT-M 300/4/80 D-Ex and KL-AT-M 400/4/80 D-Ex

Characteristic data and use limits

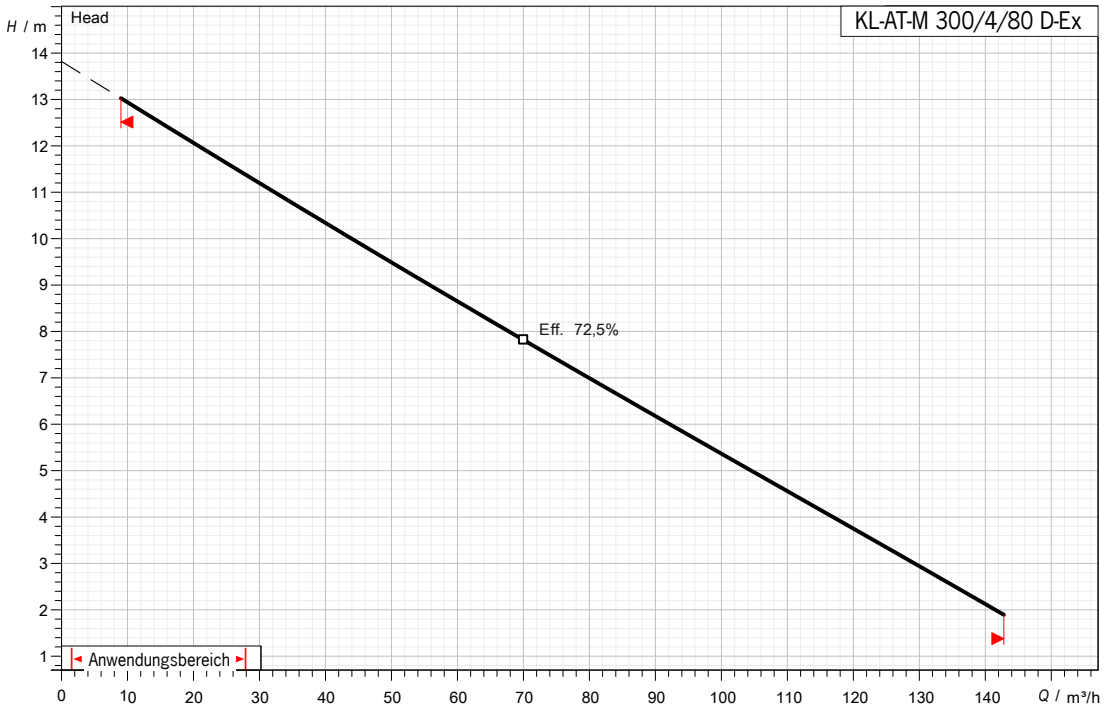
Key data	KL-AT-M ... D-Ex		
	200/4/80	300/4/80	400/4/80
Type of cable for connection cable:	4G1.5+2x0.75	4G2.5+2x0.75	4G2.5+2x0.75
Pump motor operating voltage [V]:	400	400	400
Frequency [Hz]:	50	50	50
Pump motor speed [1/min.]:	1,405	1,428	1,425
Pump motor power input P1 [kW]:	2.0	2.9	3.7
Pump motor output P2 [kW]:	1.5	2.2	3.0
Pump motor nominal current [A]:	4.1	5.8	7.3
Maximum starts per hour:	30	30	30
Maximum ball through-flow [mm]:	80	80	80
Medium temperature range [°C]:	40	40	40
Fluid pH-value:	6 – 14	6 – 14	6 – 14
Fluid viscosity [mm^2/s]:	1.005	1.005	1.005
Medium density [kg/ m^3]:	1,100	1,100	1,100

Key data	KL-AT-M ... D-Ex		
	200/4/80	300/4/80	400/4/80
Weight [kg]:	66	86	89

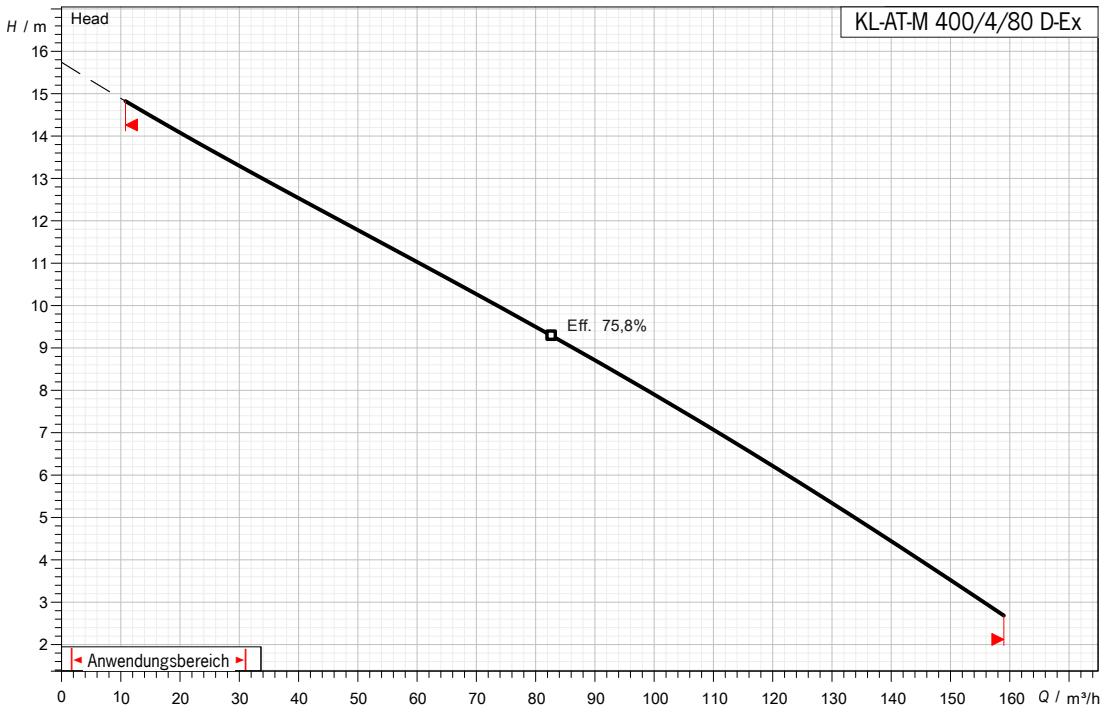
Performance diagram KL-AT-M 200/4/80 D-Ex



Performance diagram KL-AT-M 300/4/80 D-Ex



Performance diagram KL-AT-M 400/4/80 D-Ex

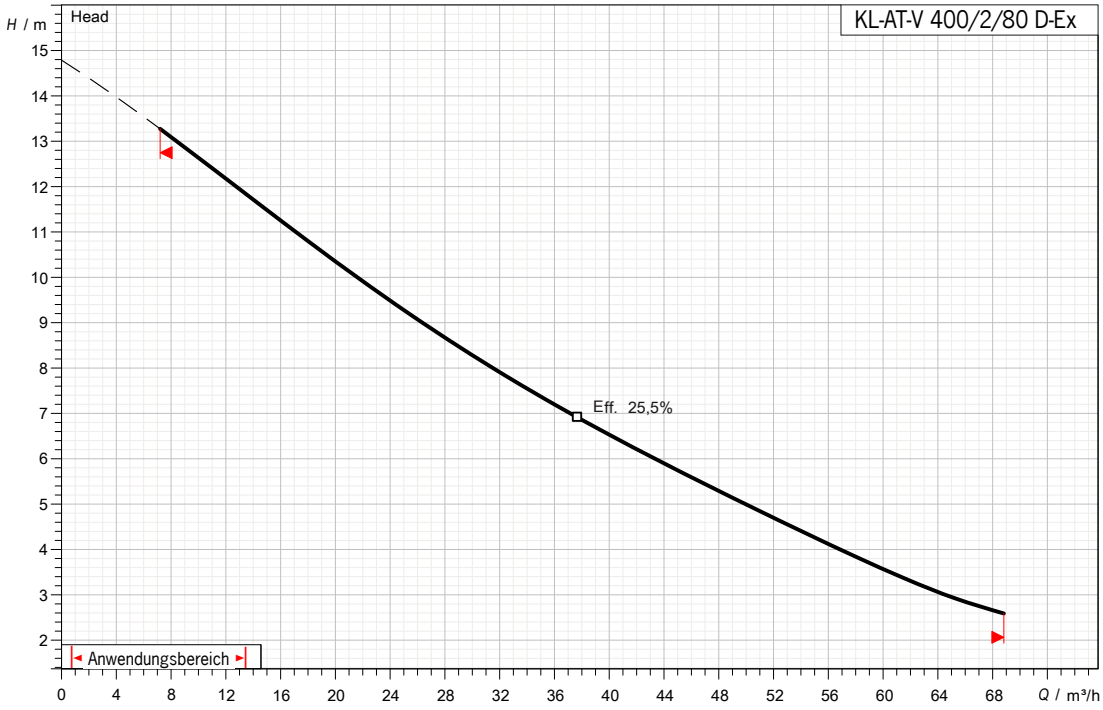


6.3.2 KL-AT-V 400/2/80 D-Ex, KL-AT-V 400/4/100 D-Ex and KL-AT-V 550/2/80 D-Ex

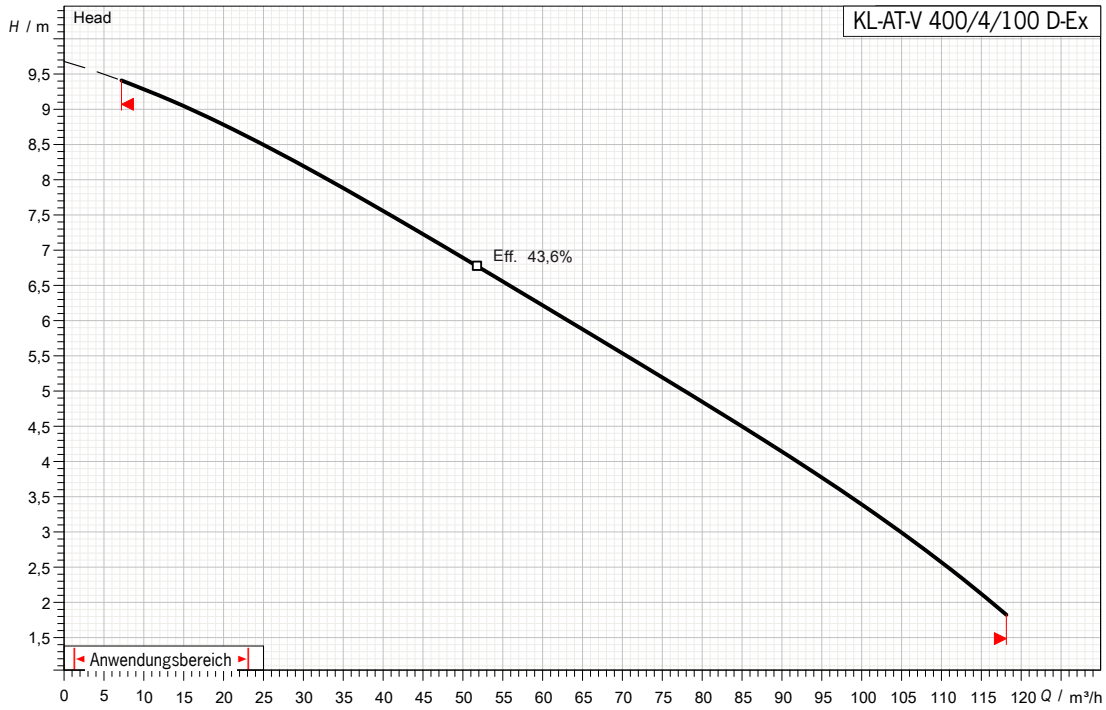
Characteristic data and use limits

Key data	KL-AT-M ... D-Ex		
	400/2/80	400/4/100	550/2/80
Type of cable for connection cable:	4G2.5+2x0.75	4G2.5+2x0.75	4G2.5+2x0.75
Pump motor operating voltage [V]:	400	400	400
Frequency [Hz]:	50	50	50
Pump motor speed [1/min.]:	2,842	1,425	2,880
Pump motor power input P1 [kW]:	4.0	3.7	5.0
Pump motor output P2 [kW]:	3.0	3.0	4.1
Pump motor nominal current [A]:	6.7	7.3	8.7
Maximum starts per hour:	30	30	30
Maximum ball through-flow [mm]:	80	100	80
Medium temperature range [°C]:	40	40	40
Fluid pH-value:	6 – 14	6 – 14	6 – 14
Fluid viscosity [mm²/s]:	1.005	1.005	1.005
Medium density [kg/ m³]:	1,100	1,100	1,100
Weight [kg]:	75	85	79

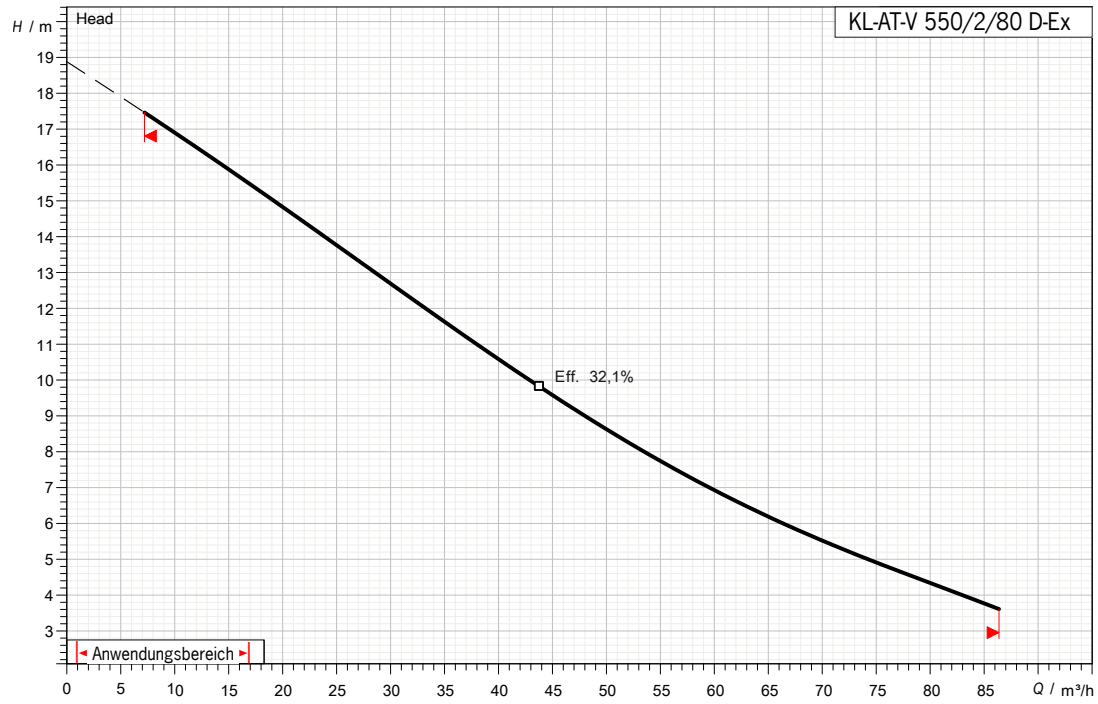
Performance diagram KL-AT-V 400/2/80 D-Ex



Performance diagram KL-AT-V 400/4/100 D-Ex



Performance diagram KL-AT-V 550/2/80 D-Ex

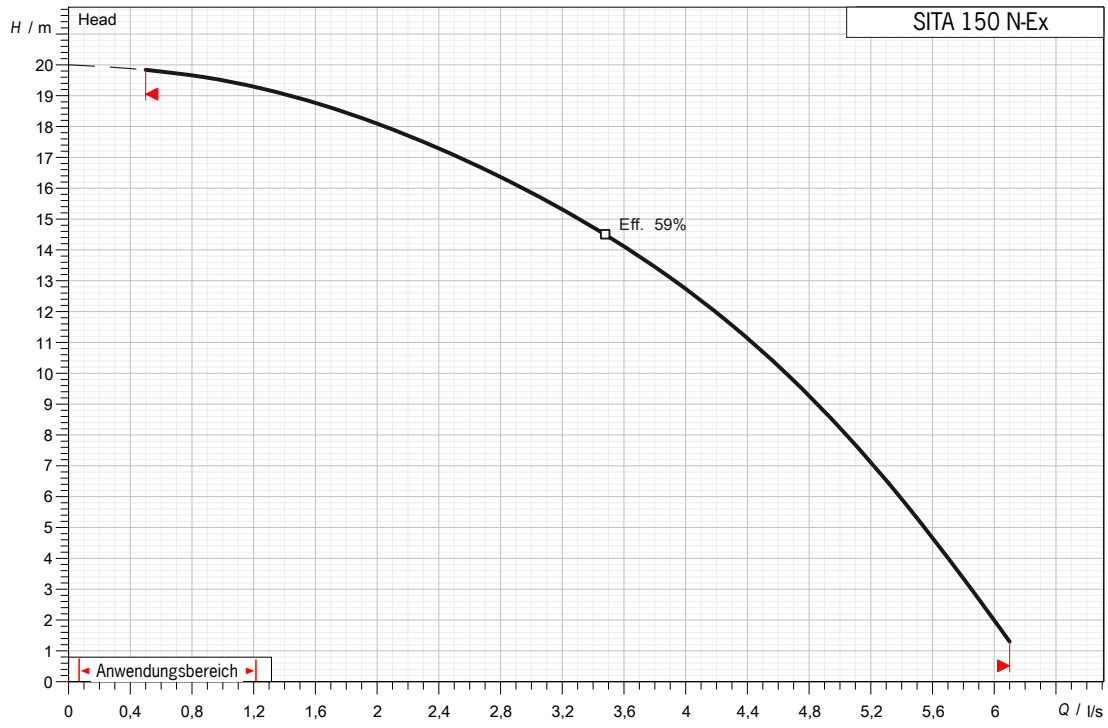


6.3.3 SITA 150 N-Ex, SITA 200 N-Ex, SITA 300 N-Ex and SITA 550 N-Ex

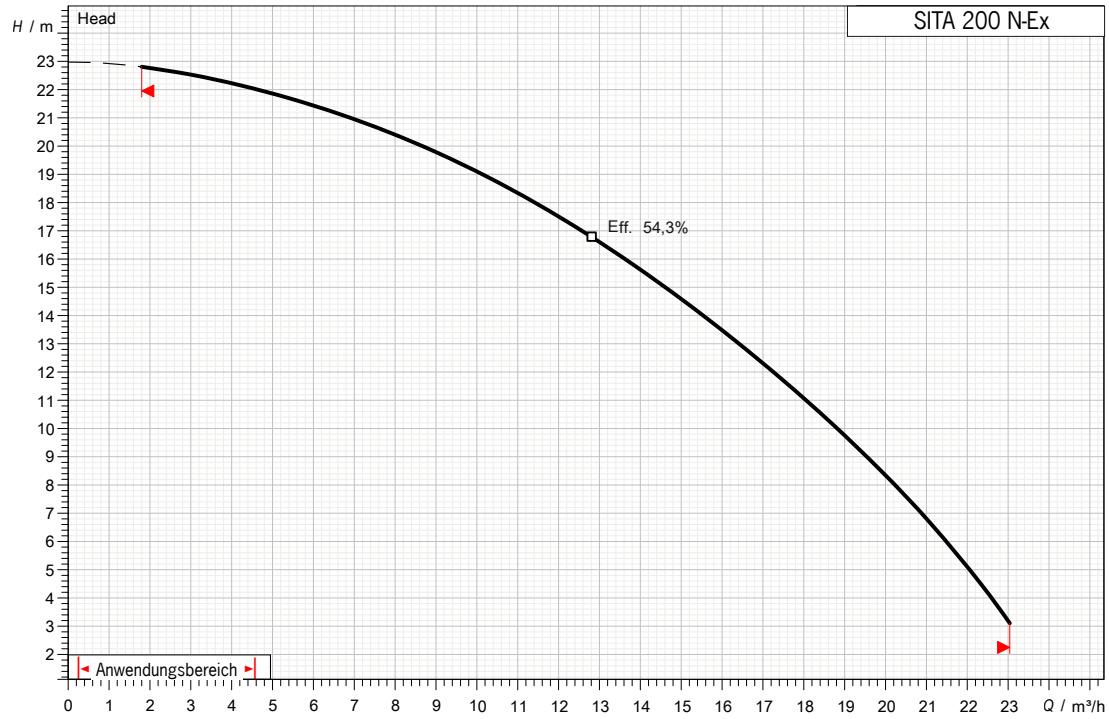
Characteristic data and use limits

Key data	SITA ... N-Ex			
	150	200	300	550
Type of cable for connection cable:	4G1.5+2x0.75	4G1.5+2x0.75	4G1.5+2x0.75	4G2.5+2x0.75
Pump motor operating voltage [V]:	400	400	400	400
Frequency [Hz]:	50	50	50	50
Pump motor speed [1/min.]:	2,850	2,760	2,835	2,880
Pump motor power input P1 [kW]:	1.53	2.1	2.9	5.0
Pump motor output P2 [kW]:	1.10	1.5	2.2	4.1
Pump motor nominal current [A]:	2.9	3.7	5.1	8.7
Maximum starts per hour:	20	20	30	30
Medium temperature range [°C]:	40	40	40	40
Fluid pH-value:	6 – 14	6 – 14	6 – 14	6 – 14
Fluid viscosity [mm^2/s]:	1.005	1.005	1.005	1.005
Medium density [kg/ m^3]:	1,100	1,100	1,100	1,100
Weight [kg]:	32	34	44	72

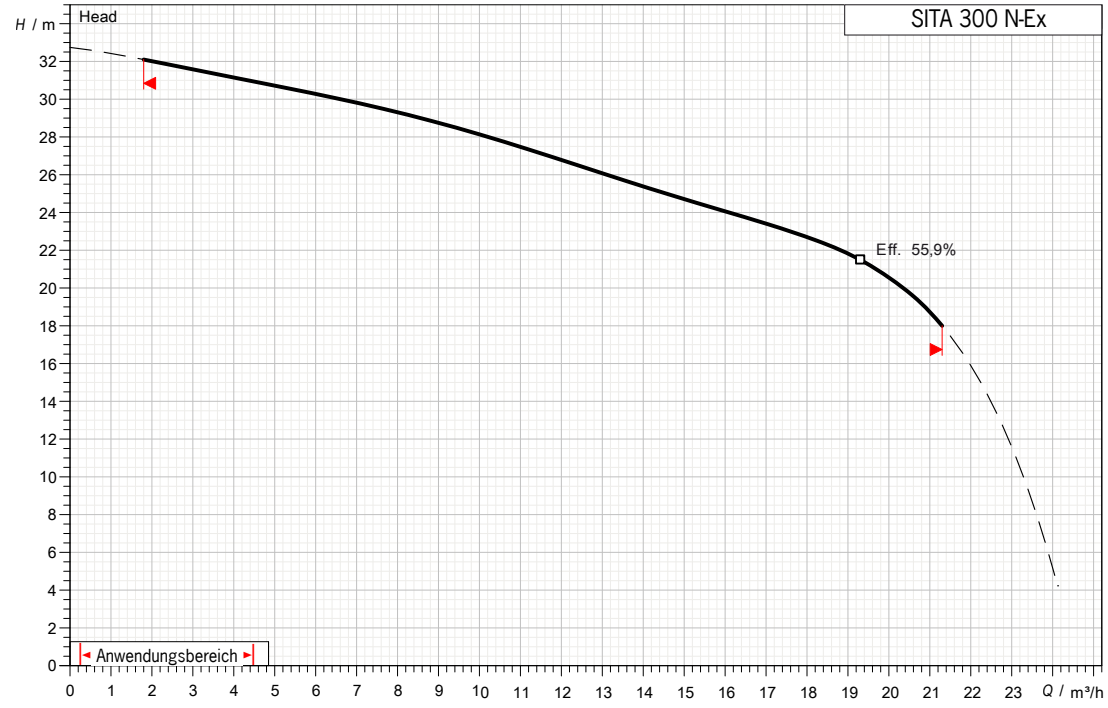
Performance diagram SITA 150 N-ex



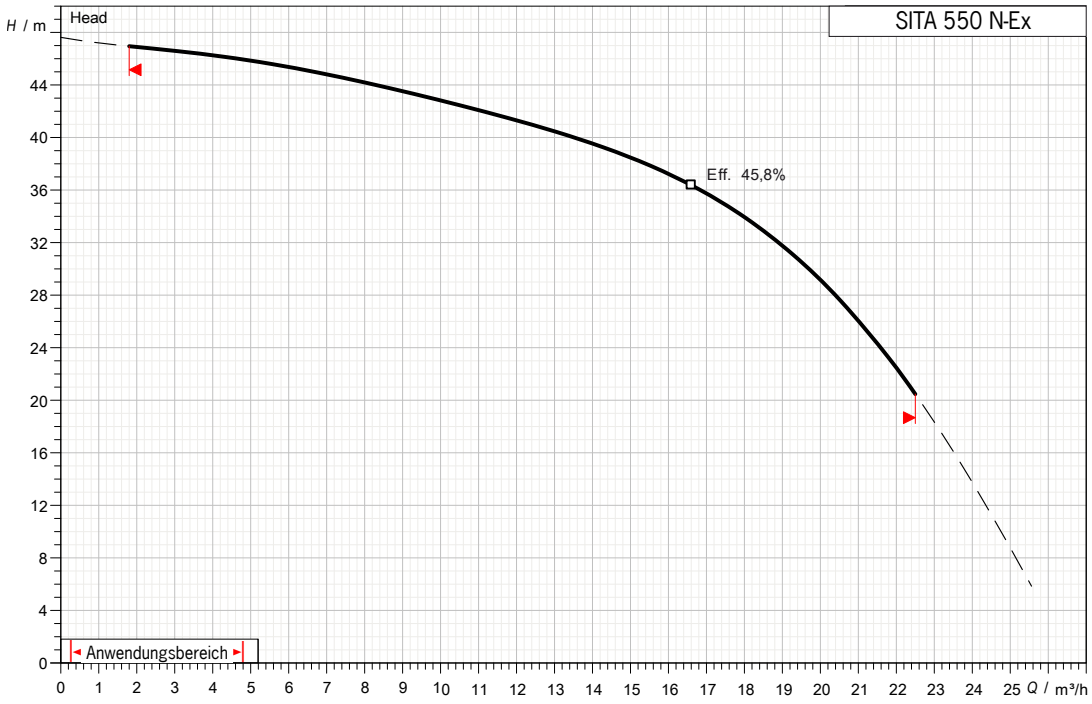
Performance diagram SITA 200 N-ex



Performance diagram SITA 300 N-ex



Performance diagram SITA 550 N-ex

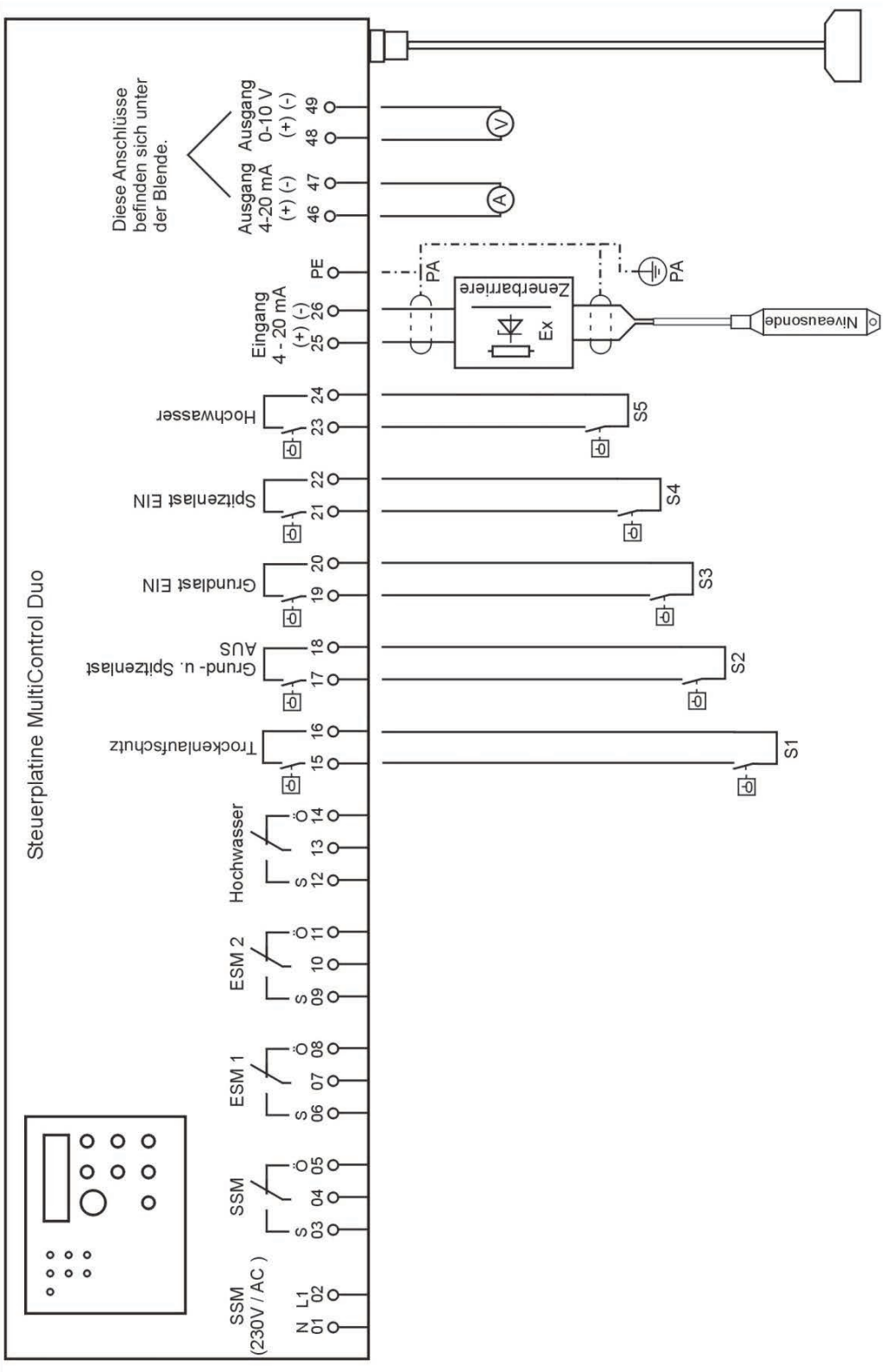


6.4 MultiControl Duo control

6.4.1 Key data

Key data	Values
Operating voltage:	~ 400 V (L1, L2, L3, N, PE), 50 Hz
Control voltage:	230 VAC, 50 Hz
Motor current limitation	0.3 A to 12 A (with duo: adjustable for each pump)
Power intake (contactors operated):	< 20 VA
Connected load, maximum:	P2 < 5.5 kW
Protection type, controller:	IP 54
Isolated alarm contact:	3 A
Fuse (alarm output):	5 x 20 AT
Rechargeable accumulator (mains-independent alarm):	9 V, 200 mAh (approx. 5 to 6 h)
Alarm volume:	85 dB
MultiControl Duo dimensions:	320 mm x 300* mm x 120 mm (W x H x D)
* incl. cable glands	

6.4.2 Circuit diagram



6.5 Level Control PS 2 Control System

6.5.1 Key data

Key data	Values
Operating voltage:	~ 400 V (L1, L2, L3, N, PE), 50 Hz
Control voltage:	230 VAC, 50 Hz
Motor current limitation	0.3 A to 12 A (with duo: adjustable for each pump)
Power intake (contactors operated):	< 20 VA
Connected load, maximum:	P2 > 5.5 kW
Protection type, controller:	IP 54
Isolated alarm contact:	3 A
Fuse (alarm output):	5 x 20 AT
Rechargeable accumulator (mains-independent alarm):	9 V, 200 mAh (approx. 5 to 6 h)
Alarm volume:	85 dB
Dimension:	Object related (W x H x D)
* incl. cable glands	

6.5.2 Circuit diagram

📖 Object documentation.

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: _____

Powerlift prefabricated pumping station

Prefabricated pumping station								Submersible pumps							Access ladder	Accessories						
○ PSD-P-1000/TBasin 685	○ PSD-B-1000/TBasin 480	○ PSD-B-1000/TBasin 1,070	○ PSD-B-1500/TBasin 395	○ PSD-B-1500/TBasin 795	○ PSD-B-2200/TBasin 515	○ PSD-B-2200/TBasin 505	○ PSD-B-2200/TBasin 585	○ SAT ...	○ SA-V ...	○ SAT-Q ...	○ LW-KP 1325...	○ KL-AT-M ...	○ KL-AT-V ...	○ SITA ...	○ Vertical ladder	○ MultiControl Duo control	○ Control Level PS 2 Control System	○ Open back pressure bell	○ Air bubble injection	○ Closed back pressure bell	○ Float switch	○ Level probe

Use location

Building/room: _____

Use: Detached house ○ Multi-dwelling building ○ Commercial operation ○

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)

Two trial runs are required before, during and after start up, Chapter 4.5 “Performing a trial run”.

Tests & Inspections (no claim is made that the list is complete)	**OK**	**Not OK**
Electrical fusing of the plant in accordance with the IEC regulations or national and local regulations	○	○
Rotational direction of pump motors	○	○
Operating voltage and frequency	○	○
Motor protection switch: Test by briefly unscrewing individual fuses (two-phase run)	○	○
Ball check valve in the pressure pipe: Function testing, actuation, leak tightness	○	○
Ball valve and/or gate valve in the pressure pipe: function test, actuation, open position, leak tightness	○	○
Fixing of the pressure pipe	○	○
Switching and setting of the switching on levels in the control menu	○	○
Leak tightness: Fittings, connections, leak tightness inspection for plant	○	○
Fault and malfunction signalling equipment: Fault messages in the display panel, LED fault displays, acoustic alarm, telecommunication equipment (group fault)	○	○

Instruction (by 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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