Operating instructions

Issued: 2024–04–26

Wastewater lifting plant Muli-Star DDP

Wastewater lifting plant > Wastewater containing faeces > Free-standing installation

Type DDP 1

D – Duo / D – Three-phase current / P – Pneumatic / Tank dimension 1



Type DDP 2

D – Duo / D – Three-phase current / P – Pneumatic / Tank dimension 2



For safe and proper application, read the operating instructions and other documents included with the plant carefully.

Hand over to users and save until the product is disposed of.

Introduction

ACO Passavant GmbH (referred to as ACO in the following) thanks you for your trust and hands over to you a wastewater plant (hereinafter referred to as the plant) which is state-of-the-art and has been tested for proper condition as part of quality controls implemented 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.

Service

Spare parts and accessories, refer to “Product Catalogue”: 🕮 http://www.aco-haustechnik.de
ACO Service is always pleased to be available for additional information.

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Guarantee

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

Declaration of Performance (DoP)

„Declaration of Performance“ (DoP) for the wastewater lifting plant
🕮 http://dop.aco.com

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 executed in the specified order

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

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1 For your safety



The safety instructions in this chapter must be read before using the plant. Serious injuries can occur with incorrect utilisation.

1.1 Intended Use

1.1.1 Area of use

This plant is intended for collecting and automatic lifting of wastewater above the backflow level. The wastewater is drained into the wastewater drain without endangering people or damaging structures.

The following wastewater may be discharged:

- Wastewater containing faeces and non-faecal wastewater from toilets, bathrooms, wash rooms and shower rooms of commercial operations and multi-dwelling buildings
- Wastewater from grease separators.

Other possible application and utilisation possibilities as well as alterations are not permitted.

The owner, user is responsible for the layout (planning and dimensioning) of the plant.

1.1.2 Improper utilisation

Types of improper utilisation are e.g.:

- Operating the plant when it exceeds the application limits, Chap. 4 “Technical Data”
- Operating the plant and/or pumps in dry run
- Utilising worn components (neglected maintenance)
- Failure to observe these operating instructions and documents which accompany the product
- Use in potentially explosive atmospheres

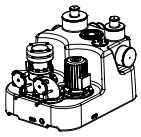
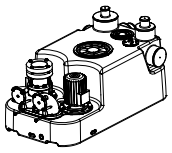
Never introduce damaging materials or substances into the plant which could lead to personal injuries, contaminate water as well as impair the functioning of the plant.

This includes in particular:

- Wastewater containing mineral oils and greases
- Heavy metals e.g. zinc, lead, cadmium, nickel, chromium
- Aggressive substances e.g. acids (pipe cleaning agent with pH value below 4), alkalis and salts
- 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.

1.2 Product identification

Identify the plant delivered on the basis of the key data on the type plate,
Chap. 3.6 “Type plates” and mark these in the following table.

	Article No.	Type	Motor power P2 [kW]	Figure	Year of construction	Serial No.
◯	1202.00.13	DDP ECO 1.0	1.5		_____	_____
◯	1202.00.01	DDP1.1	1.5		_____	_____
◯	1202.00.02	DDP1.2	3.0		_____	_____
◯	1202.00.14	DDP ECO 2.0	1.5		_____	_____
◯	1202.00.04	DDP2.1	1.5		_____	_____
◯	1202.00.05	DDP2.2	3.0		_____	_____

1.3 Personnel qualifications

All the work and activities on the plant must be executed by qualified specialists unless they are expressly permitted to be executed by other people (owner, user).

The direct plant supplier is responsible for ensuring they are available.

In addition to several years of professional experience, specialists must be able to prove they have the following know-how:

Activities	Person	Knowledge
Layout Changes in operation New usage context	Planners	■ Knowledge of building, sanitary technology and building services ■ Evaluation of the application cases for wastewater technology and the proper layout of wastewater lifting plants
Transport/storage	Forwarding agents/ retailers	■ Verification for loading safety instructions ■ Safe handling of lifting and lashing resources
Installation for sanitary/ electricity Initial commissioning, maintenance, repair work, decommissioning, dismantling	Skilled people	■ Safe handling of tools ■ Laying and connecting pipes and connections ■ Installation of electric cables ■ Assembly of distributors, residual current circuit breakers, miniature circuit breakers, electric machinery, switches, buttons, sockets etc. ■ Measuring the effectiveness of electric protective measures ■ Product-specific knowledge
Operating, operation Operation monitoring, simple maintenance and remedying malfunction	Owner, user	■ No specific requirements
Disposal	Skilled people	■ Proper and environmentally friendly disposal of materials and substances ■ Decontamination of pollutants ■ Knowledge about reuse

1.4 Personal protection equipment

Personal protection equipment is always required with various activities on the plant.

Personal protection equipment must be provided to a sufficient extent and sizes for your personnel from specialist companies and wearing it must be controlled by the supervisory staff.

Mandatory sign	Meaning	Explanation
	Always wear safety footwear	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.
	Always wear a safety helmet	A safety helmet protects against head injuries e.g. in case of falling objects or impacts, especially with low room heights and when someone is assembling overhead.
	Always wear protective gloves	Protective gloves protect the hands against light crushing, cutting injuries, infections and hot surfaces, particularly during transport, commissioning, maintenance, repair and dismantling.
	Always wear protective clothing	Protective clothing protects the skin against light mechanical impact and infections where wastewater occurs
	Always wear safety glasses	Safety glasses and goggles protect eyes from infections, especially during commissioning, maintenance, repair and decommissioning

1.5 Representation of warning symbols

Hazardous risks are marked in the operating instructions by the following warning symbols and signal words to enable improved differentiation:

Warning symbols and signal words		Meaning	
	**DANGER**	Personal injuries	Indication of a hazardous situation which, if not prevented, will lead to death or serious injuries.
	**WARNING**		Indication of a hazardous situation which, if not prevented, can possibly lead to death or serious injuries.
	**CAUTION**		Indication of a hazardous situation which, if not prevented, will possibly lead to moderate or slight injuries.
	IMPORTANT	Damage to property	Indication of a situation which, if not prevented, may possibly lead to damage to components, the plant and/or its functions or an object in its environment.

1.6 Non-approved parts

The plant has undergone extensive quality controls up to its market launch and all components have been inspected and tested under maximum load.

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.

1.7 Fundamental hazard potential

1.7.1 Thermal hazards

The electric motor operates in interval mode. There are no thermal hazards existing in the plant during proper operation. In the event of a fault or malfunction, however, the

motor can heat up to 110 °C and cause burns, always wear protective equipment 🕮 Chap. 1.4 “Personal protection equipment”.

1.7.2 Material hazards/substance hazards

If there is contact with faeces containing wastewater and/or contaminated pump parts e.g. When clearing blockages, then an infection can occur, always wear protective clothing 🕮 Chap. 1.4 “Personal protection equipment”.

1.8 Responsibility of the owner

The owner is responsible for compliance with the following points:

- Operation of the plant only as intended and in a proper working order and condition, 🕮 Chap. 1.1 “Intended Use”.
- The function of the protection devices or equipment must never be impaired.
- Always observe maintenance intervals and eliminate malfunctions without delay. Only eliminate malfunction yourself when the measures are described in these operating instructions. ACO Service is responsible for all other measures.
- Always control the type plate and safety characters on the plant for comprehensiveness and readability, 🕮 Chap. 1.9 “Safety symbols on the plant” and Chap. 3.6 “Type plates”.
- Personal protective equipment must be available to a sufficient extent and sizes and also be worn, 🕮 Chap. 1.4 “Personal protection equipment”.
- Provide complete and legible operating instructions at the location and instruct people in accordance with these.
- Only utilise qualified and authorised personnel, 🕮 Chap. 1.3 “Personnel qualifications”.
- Never exceed an air humidity level of 80 % in the plant installation room.

1.9 Safety symbols on the plant

Safety symbols are attached on the plant. The owner of the plant must ensure that the symbols, the type plate, Chap. 3.6 “Type plates” and the marking for connections are always completely present and can be read easily.

Symbols	Hazard	Plant part
	Improper utilisation of the plant	Collection tank and control system
	Electrical voltage	Drive motor (terminal box)
	Electrical voltage	Control system (terminal block)
	Damage to property and function malfunction with incorrect rotational direction	Motor bearing and impeller

2 Transport and storage

Packaging

The plant and loose parts are packaged in a cardboard box on delivery, which is secured on a pallet. The complete unit is protected with a film, Chap. 3.1 “Scope of supply”.

2.1 Safety during transport and storage

The following hazards must be anticipated during transport and storage:



WARNING

Always read the following safety instructions attentively before transport and/or storage. Serious injuries can occur with incorrect utilisation.

Ensure required qualification of transport and storage personnel, Chap. 1.3 “Personnel qualifications”.

Transport by people: Two people are required, Chap. 2.2 “Transport”.

Bodily damage caused by too high weight for one person

Transport with fork-lift truck or HGV

Serious crushing, impact and accidents with serious consequences can occur in the event of improper transport

- Always wear personal protective equipment, Chap. 1.4 “Personal protection equipment”.
- Transport the plant in the as-delivered condition (fixed onto the pallet).
- Secure the load sufficiently.
- Control the suitability and perfect condition of the slinging equipment.

WARNING

Transport by crane

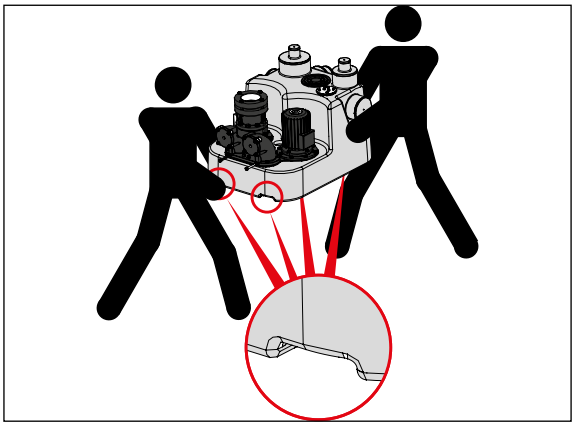
Serious crushing and impact in the event of falling loads

- Always wear personal protective equipment, Chap. 1.4 “Personal protection equipment”.
- Only implement the transport of the plant in the as-delivered condition (fixed onto the pallet).
- Control the maximum permissible 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.

2.2 Transport

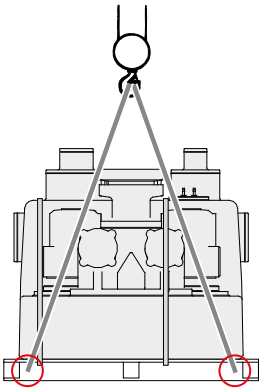
With 2 people:

➔ The plant must be carried by 2 people by utilising the carrying trough.



Transport with crane:

➔ The lifting belts and/or ropes must be attached on the prescribed lashing positions ◯.



2.3 Storage

IMPORTANT Improper storage or lack of preservation can lead to damage on the plant damage. The following measures must be implemented:

For short-term storage (up to 3 months):

- Always store the plant in a closed, dry, dust-free and frost-free room.
- Prevent temperatures outside the range -20 °C to +60 °C.

For long-term storage (longer than 3 months):

- Always store the plant in a closed, dry, dust-free and frost-free room.
- Prevent temperatures outside the range -20 °C to +60 °C.
- With material that is not rust-free: apply preservation agents to all the bright metal parts inside and outside.
- Control preservation after 6 months and renew if necessary.

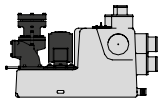
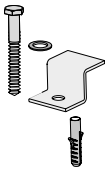
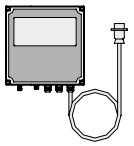
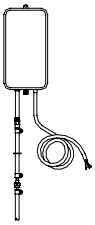
3 Product Description

3.1 Scope of supply

Control the perfect condition and completeness of the delivery on the basis of the table below.

IMPORTANT Never install damaged plants.

Report any possible damage to the plant to the supplier so that the complaint procedure can be processed quickly.

Unit	Individual component	Figure	Packaging
Tank	■ 1x Collection tank ■ 1x Control cable 10 m long ■ 2x Connection cable 10 m long, clamped on terminal box for motor and in control system		Wooden pallet
Fixing set	■ 4x Angle ■ 4x Wood screw ■ 4x Washer ■ 4x Dowel		PVC bag
Control	■ 1x Control, plug-in finished (accumulator enclosed)		Cardboard box
Accessories (optional) e. g. mini compressor 0154.81.27	■ 1x Mini compressor ■ 1x Hose 6 x 4, 100 mm long ■ 1x Hose 6 x 3, 500 mm long ■ 1x Hose 6 x 3, 9500 mm long ■ 1x Screw on connection complete ■ 1x Non-return valve ■ 1x Hose sleeve with USIT ring ■ 4x Hose clip		Cardboard box
Documentation	■ Operating instructions ■ Delivery papers	–	PVC bag

Additional accessories such as a sampling device, inlet shut-off disc, shut-off valve, signalling unit etc., Product Catalogue, www.aco-haustechnik.de.

3.2 Product features

Technical terms utilised

- Backflow level: Highest point in an installation up to where the polluted or contaminated water can rise to. The backflow level is located in the area of the largest cross-sectional expansion and must be designed in such a way that the water from the sewer system cannot flow back into the plant.
- Centrifugal pump with free flow impeller: Flow machinery; The centrifugal force is utilised for conveying the liquids by means of a rotating impeller.
- Free flow impeller: A large free space in the pump housing (free ball passage) enables the problem-free flow of liquids and solids (long fibrous thick materials such as long bandages, tampons, textiles etc.). An additional advantage is that no throttle gap between the impeller and pump casing can endanger operational safety in application areas with very long downtimes.

Brief description of the plant

The plant is designed according to DIN EN 12050-1 for free-standing installation in frost-proof premises below the backflow level.

The housing is made of high-quality plastic (PE-LLD). The plant is equipped with two pumps for faeces-containing wastewater and a level switching device.

The free-flow centrifugal pumps are equipped with robust three-phase motors and assembled on the collecting tank with an integrated cast plate.

The pump flange is sealed towards the motor by a mechanical seal.

The free-flow impeller is made of plastic (PUR), the motor housing of cast aluminium and the shaft of stainless steel.

The connecting cables for the pumps and the control cables for the level switching device are both 10 m long.

General

- LGA testing certificate: No. 7311203-01
- Reduced weight (104 – 128 kg), ready for connection, rapid assembly
- Adapted to door size 780 mm
- CFD (Computational Fluid Dynamics) - flow-optimised impeller.
- Low maintenance work
- High chemical resistance of all parts
- Selectable usable volume by means of different inlet heights
- Suitable for greasy wastewater
- Flood proof according to IP 68: Flooding height (from set-up flange): maximum 2 m, flooding time maximum 7 days

Housing made out of polyethylene

- Drain plug R 1
- Inspection opening for simpler maintenance (DDP1/1x Ø130 mm, DDP2/1x Ø130 mm and Ø250 mm)
- Fixing set for buoyancy-proof anchorage
- Connection for manual diaphragm pump DN 50
- 2x Horizontal DN 100 inlet sockets
- 4x Horizontal DN 150 inlet sockets
- 1x Vertical connection DN 100, for inlet and/or venting
- 1x Vertical inlet socket DN 150
- 1x Vertical inlet socket DN 200
- 1x Vertical socket DN 70 for ventilation pipe

Pumps

- Three-phase motor 400 V, 50 Hz; protection class IP 68
- Blockage-free free-flow impeller, free ball passage 65 mm
- S 3 Short-time operation
- 10 m Connection cable

Design of the pressure pipe

- Connecting flange for stop valve DN 80 PN 16
- Special back flow valve including ball in the housing, formed as a Y-branch pipe (with integrated aeration screw and locking screw)
- Integrated special DN 100 fastening piece for elastic connection of the pressure pipe from Ø108 – 114.3 mm external pipe diameter (optional Ø88 – 90 mm)

Level switching

- Level switching with 10 m control cable
- Optionally with air bubble injection

Control

- Degree of protection IP 54
- 1.5 m cable and CEE plug (16 A for Type DDP 1.1 and 2.1, 32 A for Type 1.2 and 2.2)
- Isolated group alarm and operating signal

Brief description of the control

The pump control is utilised for automatic level switching of liquid levels. The filling level is therefore determined by the dynamic pressure of the liquid.

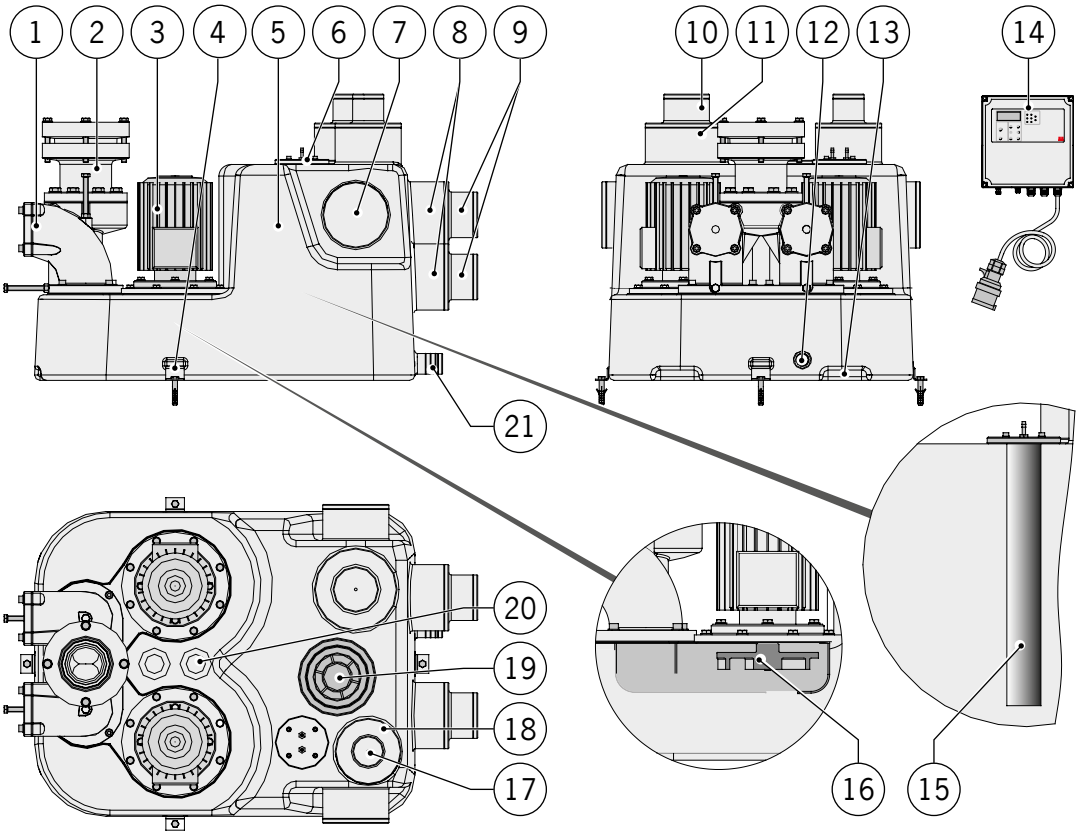
Separate switches with overload protection are installed to control the two pumps (max. 3.0 kW) and 3 relay contacts are available to output malfunction signals.

All settings and/or values can be queried and changed via the display panel.

Features
■ LCD plain text display
■ Manual – 0 – Automatic functions
■ Acknowledge button
■ Forced switching on of the pumps (24 h)
■ Internal acoustic alarm
■ Flood alarm, isolated
■ Operating hours counter
■ High interference resistance
■ Water level recording by an internal pressure transducer
■ All settings, malfunction and fault 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
■ Thermal and electrical monitoring for the pumps
■ Switching off of pump via switch-off point and overrun period
■ Electronic monitoring of the motor current
■ Group alarm isolated and non-isolated
■ Memory for “Number of pump starts”
■ Ampere meter
■ Automatic pump change
■ Easy operation
■ Service mode
■ Accumulator buffered, mains-independent alarm (approx. 7 h) through integrated 9 V accumulator, horn volume maximum. approx. 85 dB

3.3 Components

The following figure shows the structure and/or the position of the individual plant component and enables an unambiguous arrangement of the descriptions in the additional chapters.



1 = Y-branch pipe with integrated double backflow preventer

2 = Special fixing piece for elastic connection of the pressure pipe DN 100 (optional DN 80)

3 = Free flow centrifugal pump with three-phase motor, connection cable (10 m)

4 = Securing angle with bolts and dowels to secure buoyancy

5 = Collection tank

6 = Connecting flange of the level switch with assembled control cable (10 m) optionally with air bubble injection

7 = Socket DN 150

8 = Socket DN 150

9 = Socket DN 100

10 = Socket DN 100

11 = Socket DN 200

12 = Connection R 1 for base discharge

13 = Grip trough

14 = Control as ready to plug in with CEE plug and 1.5 m cable

15 = Pneumatic pipe (internally positioned)

16 = Volute casing with impeller (internally positioned)

17 = Socket DN 70

18 = Socket DN 150

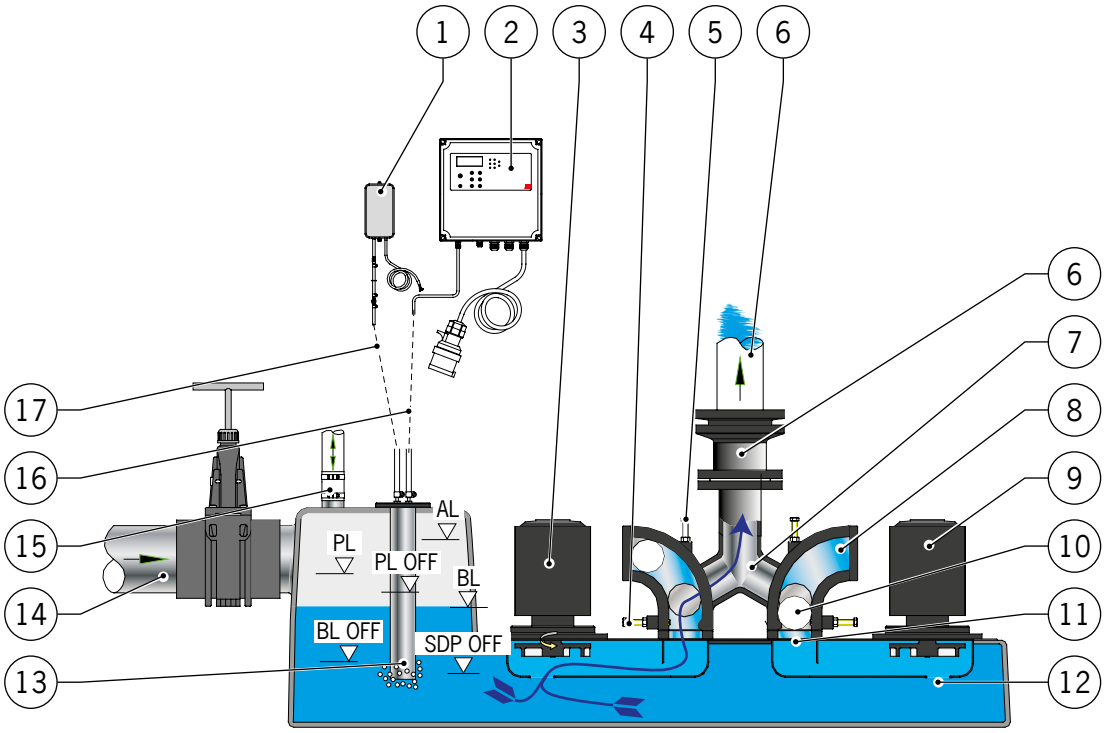
19 = Inspection cover (Ø130 mm with DDP1, Ø250 mm with DDP2)

20 = Stiffening web

21 = Connection R 50 for manual membrane pump

Figure: Illustration of components

3.4 Operating principle



1 = Mini compressor (optional)
2 = Control
3 = Pump 1
4 = Screw (for bleeding the pressure pipe)
5 = Screw (for fastening the ball)
6 = Pressure pipe
7 = Free room Y-branch pipe
8 = Y-branch pipe
9 = Pump 2
10 = Non-return ball
11 = Valve seat
12 = Collection tank
13 = Pneumatic pipe
14 = Inlet
15 = Tank ventilation
16 = Control cable for control
17 = Control cable for mini compressor (optional):
AL = High water
PL = Peak load
PL OFF = Peak load OFF
BL = Base load
BL OFF = Base load OFF
SDP OFF = Stop delay period OFF

Figure: Schematic diagram of the operating principle

Effect:

The wastewater flows via one (or more) inlet (14) into the collecting tank (12). The water level in the collection tank (12) is shown in the display panel of the control (2). If the waste water reaches a pre-determined level, then the pumps (3, 9) switch on automatically and the “flood alarm” is triggered.

The level switch functions as follows:

A pneumatic pipe (13) assembled in the collection tank (12) is connected to the membrane push-button switch in the control (2) via a control pipe (16). If the wastewater rises, then the air in the pilot pipe (13) is compressed. At a defined pressure, the pumps (3, 9) will be switched on and/or switched off via the membrane push-button switch.

The tank ventilation (15) and the continuous rise of the control pipe (16) are decisive for the proper functioning of the automatic level switch.

When the wastewater reaches the water level “BL”, the pump (3) and/or (9) switches on and the wastewater is pumped into the sewer via the pressure pipe (6) and the back flow loop. The wastewater flows through the associated part of the Y-pipe (7), displaces the non-return ball (10) into the free space (8) and flows through the freed valve seat (11) into the pressure pipe. If a pump is not in operation, then the ball sits in the valve seat and closes the pressure pipe in the Y-pipe. This prevents the contents of the pressure pipe from flowing back and/or emptying into the collecting tank. The ball can either be loosened with the screws (4) and (5) (pipe will be ventilated) or fixed (pipe will be closed).

If the wastewater level drops further to “BL OFF”, then the pre-determined overrun time of the pump is activated and the pump is switched off at “SDP OFF”. Both pumps (3) and (9) work in alternating operation i.e. the switch-on sequence of pump (3) and (9) is changed automatically after every restart.

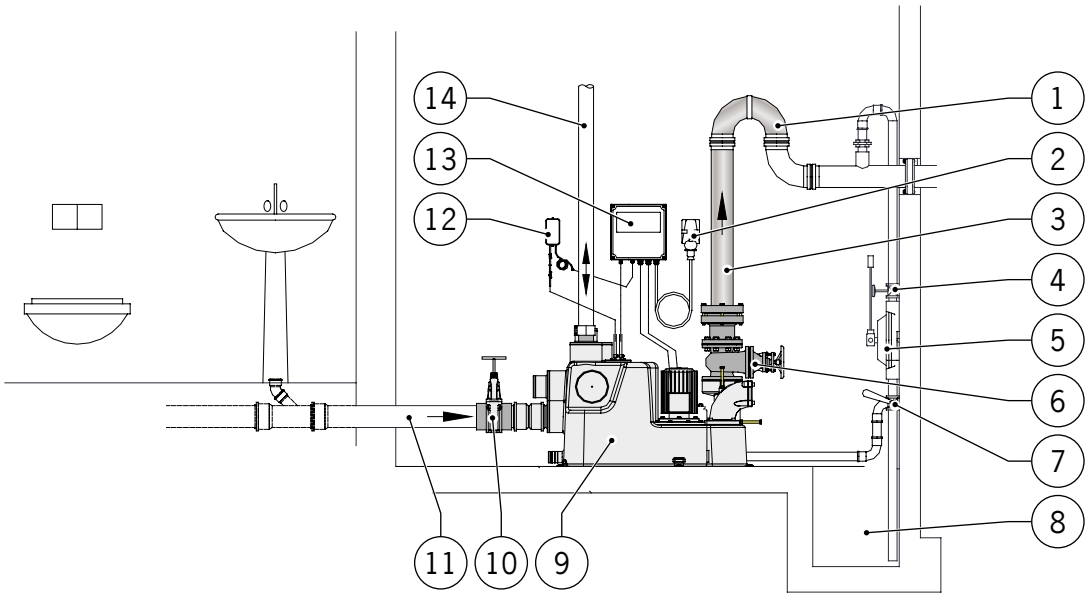
The second pump (9) switches on in the event of failure of the first pump, increased wastewater generation and/or reaching the water level “PL” and is automatically switched off again in the event of “PL OFF”. When the wastewater level “AL” is reached, then the “flood alarm” is triggered.

The content between the two switching points “SDP OFF + BL” gives the usable volume of the collection tank. Before commissioning, the system must be filled with water via the inlet pipe and the level switch must be tested, 📖 Chap. 6.5 “Test run”.

Operation with mini compressor (optional):

A mini-compressor (1) continuously generates compressed air and delivers it via a pipe (17) into the pilot pipe (13). The compressed air bubbles freely into the wastewater of the collecting tank (12) when it exits the pilot pipe, thereby reducing clogging of the pilot pipe and making the level switch even safer. The fluctuations of the measured values are kept very low with this procedure.

3.5 Recommendations for installation



1 = Backflow loop*
2 = CEE socket*
3 = Pressure pipe*
4 = Stop valve (optional)
5 = Manual membrane pump (optional)
6 = Stop valve for pressure pipe (optional)
7 = Three-way valve (optional)
8 = Pump sump*
9 = Tank
10 = Inlet shut-off valve (optional)
11 = Inlet pipe*
12 = Air bubble injection (optional)
13 = Control
14 = Ventilation pipe*
* On-site prerequisites

Figure: Installation suggestion

3.6 Type plates

A type plate is attached to the collector tank of the plant and on the electric motor. The following data must be copied from there for information and made available in case of any enquiries:

- Design type
- DoP Code
- Motor type
- Year of construction
- Article No.
- Serial No.

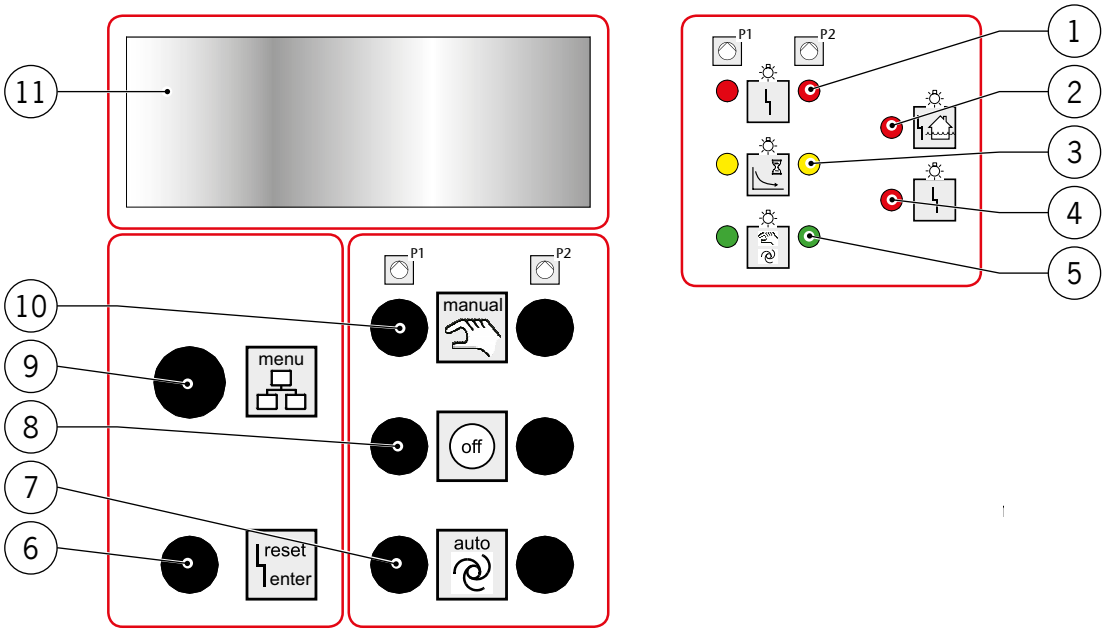
3.7 Accessories

Information regarding suitable accessories, Product Catalogue www.aco-haustechnik.de.

3.8 Control

3.8.1 Overview of the operating and display elements

The following figure shows the structure of the control and/or the position of the individual operating and display elements and makes it possible to clearly assign the descriptions in the further chapters.



1 = LED: Malfunction Pump 1 and/or Pump 2
2 = LED: Flood alarm
3 = LED: Operation for Pump 1 and/or Pump 2
4 = LED: General malfunction
5 = LED: Type of operation P1 and/or P2
6 = Button: Acknowledgement of the malfunction and value settings
7 = Button: Automatic mode P1 and/or P2
8 = Button: OFF P1 and/or P2
9 = Rotary knob: Display/ Menu selection
10 = Button: Manual mode P1 and/or P2
11 = Display panel

Figure: Operation control

3.8.2 Operating elements

Control elements and their meaning:

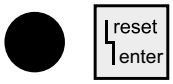
- Query menu settings

  All parameters (fault messages, operating hours, number of pump cycles and motor current) can be queried and all settings assumed with the rotary knob. The display automatically switches back to the home setting after 20 sec.



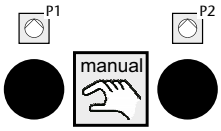
- Acknowledge malfunctions (confirm and reset malfunction messages) and amend settings.

  The button is utilised to acknowledge all faults and malfunctions after the cause has been eliminated and all settings have been amended. If a malfunction is still pending, then only the group malfunction signal relay and the alarm signal are switched off. This also applies to the „flood alarm“.



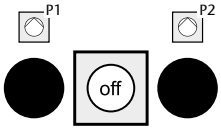
- Switch on manual operation

  Pump P1 and/or Pump P2 is put into manual operation with the button. Automatic shut-off hereby takes place after 2 min.



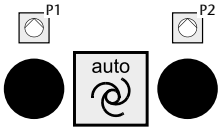
- Switch off operation

  Pump P1 and/or Pump P2 is put into manual operation with the automatic level switch.



- Switch on automatic operation

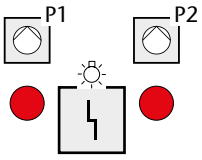
  Automatic operation of Pumps P1 and/or Pump P2 are switched on with the button. The pumps are switched on automatically via the „level switch“



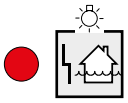
3.8.3 Display elements

Display elements and their meaning:

- Pump P1 and/or Pump P2 malfunction
  LED lights up with malfunction of Pump P1 and/or Pump P2.

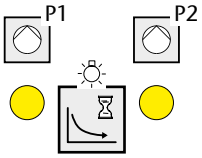


- Collection tank full
  If the collection tank is full = then “flood alarm”: LED lights up.

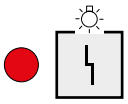


- Operational readiness
  If Pump P1 and/or Pump P2 is in operation: LED lights up permanently.

  If Pump P1 and/or Pump P2 is in operation via the overrun function: LED flashes.



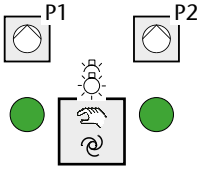
- Group alarm
  If a group alarm has been issued (e.g. incorrect rotating field): LED lights up.



- Pump mode of operation
  If Pump P1 and/or Pump P2 is switched on automatically in automatic operation via the „level switch“: LED lights up permanently.

  If Pump P1 and/or Pump P2 is operated manually: LED flashes regularly.

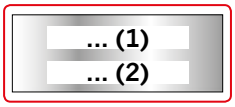
  If the plant switches off automatic after 2 min. in manual operation: LED flashes irregularly.



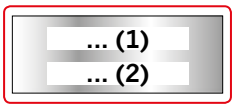
3.8.4 Messages in the display panel

Meaning of the messages in the display field:

- Messages in the upper line (1)
  - Water level in the collection tank (when no pump is in operation)
  - Motor current (when pump is in operation and/or switching value display when both pumps are running)
  - Setting option (in setting mode)



- Messages in the bottom line (2)
  - Operating hours of the pumps (when the pumps are not in requestion)
  - Occurred malfunctions (when alternating)
  - Amendable value (in setting mode)



3.8.5 Control settings

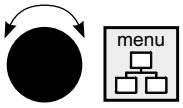
An amendment for the settings on the display panel is only possible in service mode. If service mode is not activated then the settings are still displayed but are not saved.

- The display automatically switches back to the home setting after 20 sec.
- Operating hours and pump cycles can be queried but not amended.

Amending the setting:

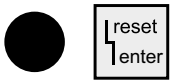
- ➔ Turn the rotary knob “Menu” (right/left) until the required setting value appears, Chap. 3.8.7 “Adjustment possibilities”.

Settings
(Top line)



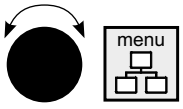
- ➔ Press the button “Reset/Enter” (the value which was saved last starts to flash).

Value/Flashes
(Bottom line)



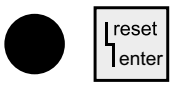
- ➔ Turn the rotary knob “Menu” until the setting value is reached (turning more quickly results in larger amendments in value, slow turning makes fine setting possible).

– Value –
(Bottom line)



- ➔ Press the button “Reset/Enter” (value stops flashing and is saved).

Value/Fixed
(Bottom line)



3.8.6 Setting values

IMPORTANT The setting values must be assumed according to the selected inlet connection, Chap. 6.4 “Setting the pump control-duo”.

3.8.7 Adjustment possibilities

The following table provides an overview of the various settings in the settings menu.

Top line	Bottom line	Explanation
Setting menu	Settings	Upper and lower line
Last fault	Delete value	The zero voltage safe remains saved with the last malfunction and can be deleted using the acknowledge button.
Next inspection	▪ 90 days ▪ 180 days ▪ 360 days	Maintenance/inspection is due.
Base Load ON	0 – 200 cm	Switch-on point for first pump.
Base Load OFF	0 – 200 cm	Switch-off point for first pump.
Peak Load ON	0 – 200 cm	Switch-on point of second pump.
Peak Load OFF	0 – 200 cm	Switch-off point for second pump.
High Water	Do not observe 0 – 200 cm	High Water is switched off. When the set value is exceeded, the “group alarm” relay is switched on the “High Water“ relay is switched on.
Run. Time max.	Is switched off 0 – 60 Min.	– The value zero deactivates this function. If a value of 1 – 60 min. is set, then a switch off is executed when the pump operates for longer than the set value without interruption. The pump does not start up again until the defect has been acknowledged.
Run. Time altern.	Is switched off 1 – 60 min.	– If the set time is exceeded in base load operation a pump change takes place. After three switches without interruption, the “High Water“ is also triggered and the “Run. Time altern.” message appears in the display.
Stop delay	0 – 180 sec.	After undershooting the switching off point, the pump continues to operate until the set time has expired.
Max. current-1	0.3 – 12 A	When Pump P1 exceeds the set current consumption for a certain time, then it is switched off. “Max. current -1” message appears. The pump is only released again after acknowledgement.
Max. current-2	0.3 – 12 A	When Pump P2 exceeds the set current consumption for a certain time, then it is switched off. “Max. current -2” message appears. The pump is only released again after acknowledgement.
Force activation	Is switched off Is activated	– When the pumps are not requested for a duration of 24 hrs., then they operate automatically for 5 sec.

Accoustic alarm	Is switched off Is activated	– In the event of a malfunction, the internal warning buzzer sounds.
Intermitt. Alarm	Is switched off Is activated	– The group alarm relay switches on.
Pump alternation	Is switched off Is activated	– After each operation of the base load pump, there is a switch over to the other pump.
Rot. Field error	Is switched off Is activated	– In the event of incorrect phase sequence or the lack of L2 and/or L3, the “High Water“ is triggered and the pumps cannot be put into operation.
Service mode	Is switched off Is activated	Settings are shown, but cannot be amended. All settings can be amended.
Language	German/English/ ...	The national language can be selected on the display panel.

- The following overview explains various settings in the setting menus:
- Block peak load operation
  For the pumps to be operated alternately, the switch-on point for peak load operation must be set to zero. The message “Peak Load ON is switched off” appears on the display panel.
- Setting the minimum level settings
- If a value smaller than 5 cm is selected as the switch-on point, then 5 cm is saved automatically.
- If a value smaller than 3 cm is selected as the switch-off point, then 3 cm is saved automatically.
- Setting the maximum runtime
  A maximum runtime period can be set for the base load pump. After this time has expired, a pump change takes place. This requires both pumps to be be in automatic operation. After three switch overs without interruption, the alarm is also triggered and the “runtime alarm” message appears in the display.

- Setting for runtime monitoring
  The runtime monitoring affects the automatic and manual modes. The maximum runtime point can be opened in the menu. In the as-delivered condition, the value is set to zero i.e. the function is switched off. If a value of 1 – 60 min. is set, then the pump is switched off when the pump operates for longer than the set value without interruption. In addition, an alarm sounds and a fault message appears on the display panel. The pump does not start up again until the defect has been acknowledged.
- Setting the runtime switch over and runtime monitoring
  It makes sense only to activate one of the two functions. If at time is set for both functions, then only the function with the smaller time setting will be executed.
- Setting the overrun time
  Allows and adjustment for the switch-off point.
- Read out fault memory
  The last fault is saved even in the event of a mains failure and is listed in the menu under “Last Fault”. The fault message can be deleted from the fault memory using the “reset/enter” button.
- Setting the current limitation
- Pump 1 (P1): max. current – 1
- Pump 2 (P2): max. current – 2
- These settings enable an increased start-up current to be taken into account.
- Message for rotary field fault
  The rotating field monitoring monitors the phase sequence and also reports the absence of a phase. In case of a phase error, the pumps do not switch on. An alarm occurs and the message “rot. Field error” appears in the display field. The rotary field monitoring can be switched on and switched off via the menu. When operating
  1 ~ motors, the rotary field monitoring must be switched off.
- Service mode
  In the as-delivered condition, the service mode is switched on (activated) i.e. all settings can be amended. If the service mode is switched off (deactivated) in the menu, then the settings, other than the national language, can only be queried with the rotary knob but not amended.
- Setting the national language
  The following languages can be selected: German/English/French/Italian/Spanish/ Dutch/Polish/Czech/Portuguese.

3.8.8 Operating principle of the level switch

The switching points of the possible connection variants (inlet 250 mm and inlet 400/top) are shown in the following figure and the corresponding values are stated in the table.

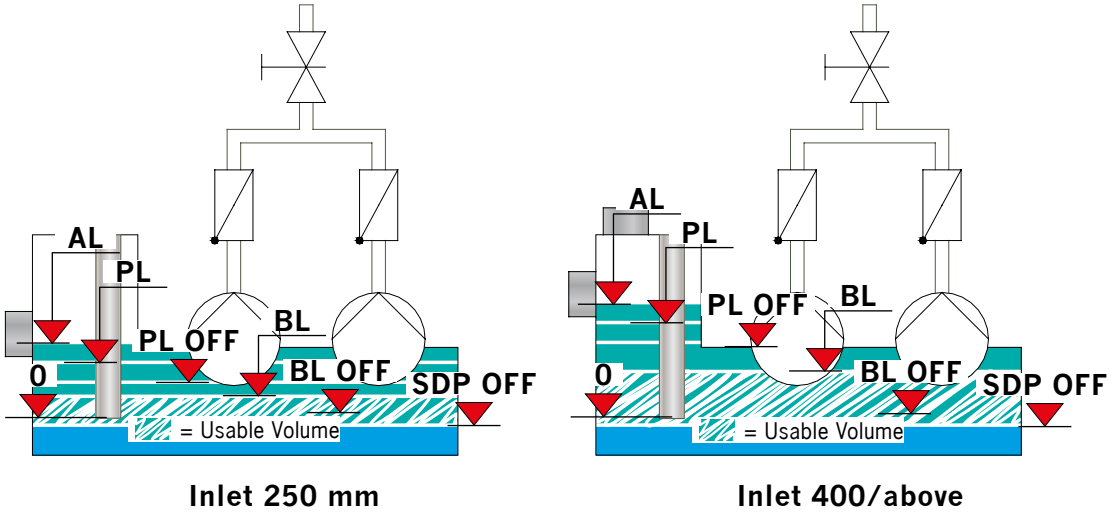


Figure: Schematic diagram of the level switch

	Switching points related to level "0" (Lower edge of pilot pipe)					Usable volume
Type	BL OFF [cm]	BL [cm]	PL OFF [cm]	PL [cm]	AL [cm]	[l]
Inlet 250 – DDP1.x	3	5	7	15	17	65
Inlet 400/above – DDP1.x	3	18	20	28	30	110
Inlet 250 – DDP2.x	3	5	7	15	17	95
Inlet 400/above – DDP2.x	3	18	20	28	30	185

4 Technical Data

4.1 Technical data of the plant

	Motor performance		Key data				Granulation size	Temperature limit values	
Type	P1 [kW]	P2 [kW]	Current consumption [A]	Voltage [V]	Frequency [Hz]	Revolutions [rpm]	[mm]	Material conveyed [°C]	Surrounding [°C]
Muli-Star DDP ECO 1.0	1.83	1.50	5.0	400	50	1400	65	40 max. 5 min. 60	40 (Air)
Muli-Star DDP1.1	1.83	1.50	5.0			1400			
Muli-Star DDP1.2	3.45	3.00	10.0			2800			
Muli-Star DDP ECO 2.0	1.83	1.50	5.0			1400			
Muli-Star DDP2.1	1.83	1.50	5.0			1400			
Muli-Star DDP2.2	3.45	3.00	10.0			2800			

	Inlet 250		Inlet 400 and from above		Empty weight
Type	Usable volume [l]	Total volumes [l]	Usable volume [l]	Total volumes [l]	[kg]
Muli-Star DDP ECO 1.0	65	150	110	150	104
Muli-Star DDP1.1					104
Muli-Star DDP1.2					123
Muli-Star DDP ECO 2.0	95	300	185	300	108
Muli-Star DDP2.1					108
Muli-Star DDP2.2					128

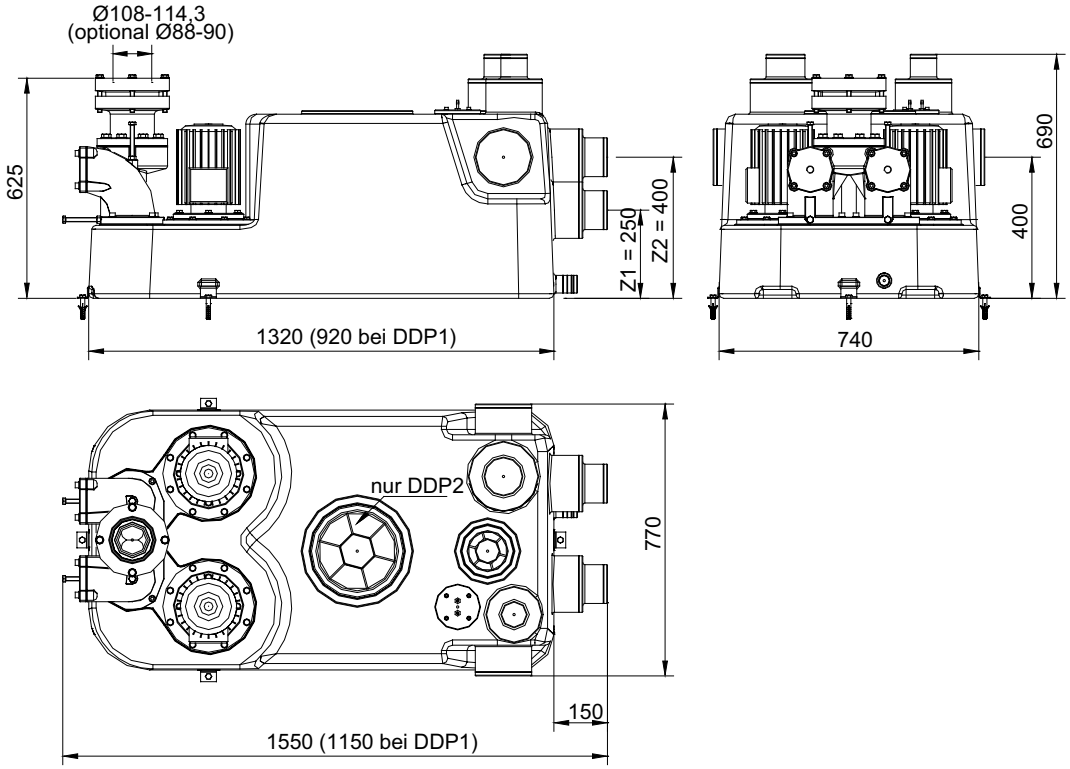


Figure: Dimensions of the plant

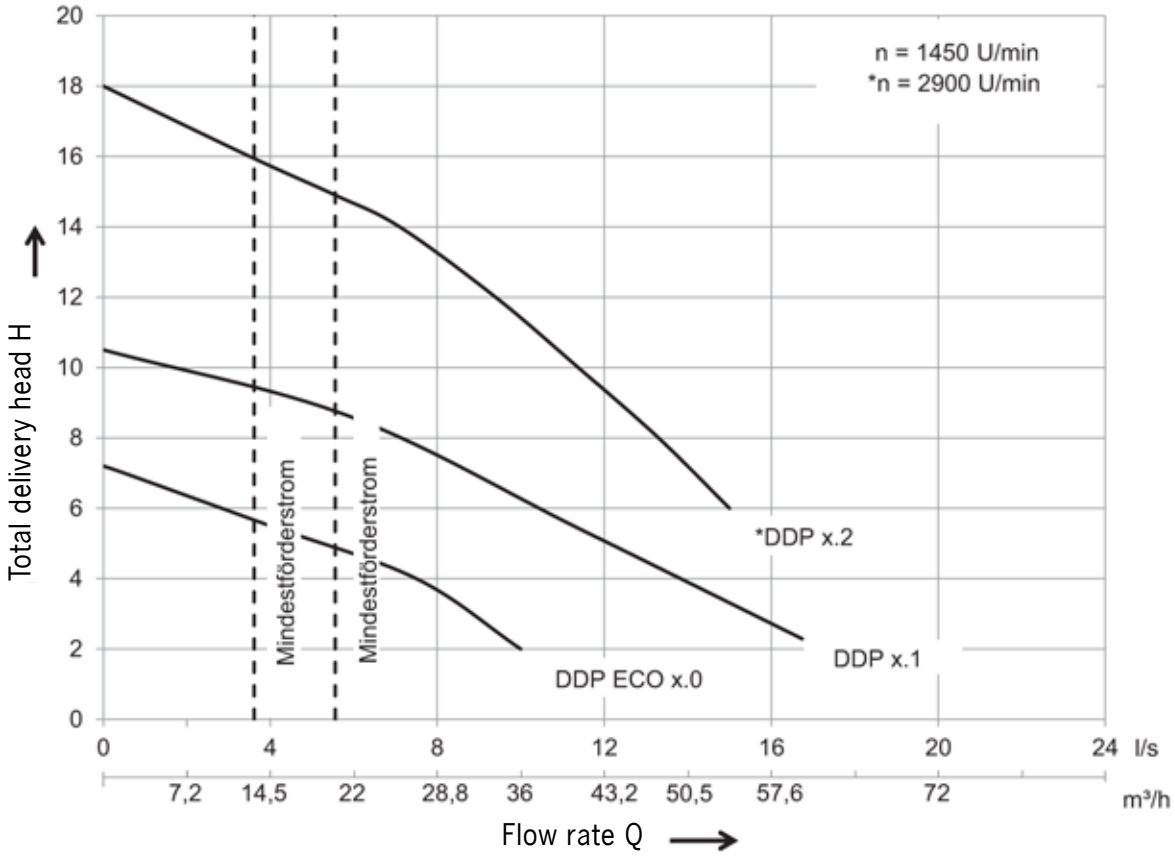


Figure: Characteristic curve

Performance Data

Type	Delivery head	Delivery flow						
	Area	Q [l/s] With total delivery head [m]						
	[m]	4	6	8	10	12	14	16
Muli-Star DDP ECO 1.0	2 – 4,8	7.5	3.0	–	–	–	–	–
Muli-Star DDP1.1	4 – 9.5	14.4	11,0	7.5	1.5	–	–	–
Muli-Star DDP1.2	6 – 16	–	15.0	13.3	11.4	9.4	7.1	3.5
Muli-Star DDP ECO 2.0	2 – 4,8	7.5	3.0	–	–	–	–	–
Muli-Star DDP2.1	4 – 9.5	14.4	11,0	7.5	1.5	–	–	–
Muli-Star DDP2.2	6 – 16	–	15.0	13.3	11.4	9.4	7.1	3.5

4.2 Technical data of the control

4.2.1 Key data and dimensions

Key data	Values
Operating voltage	3~ 400 V (L1, L2, L3, N, PE)
Frequency	50/60 Hz
Control voltage	230 V/AC/50 Hz
Power intake (contactors operated)	< 20 VA
Connected load, max.:	P2 < 5.5 kW
Range of electrical motor current limitation	0.3 – 12 A
Isolated alarm contact	3 A
Housing	Polycarbonate
Protection type	IP 54
Temperature range	- 20 °C to + 60 °C
Fuse	5 x 20 1AT (alarm output)
Mains-independent alarm	Accumulator 9 V/200 mAh, approx. 7 hrs., noise level 85 dB

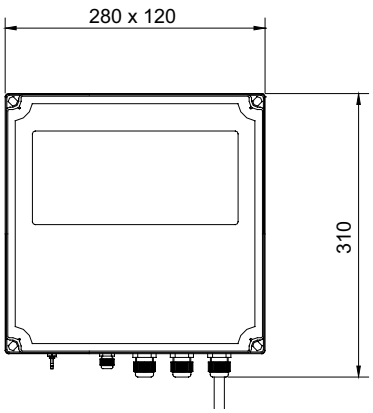


Figure: Dimensions of the control

4.2.2 Circuit diagram of the control

The following figure shows the scaled down circuit diagram for the control. The original size circuit diagram is enclosed with the control and, if it is lost, it can be re-ordered from ACO Service, page 2.

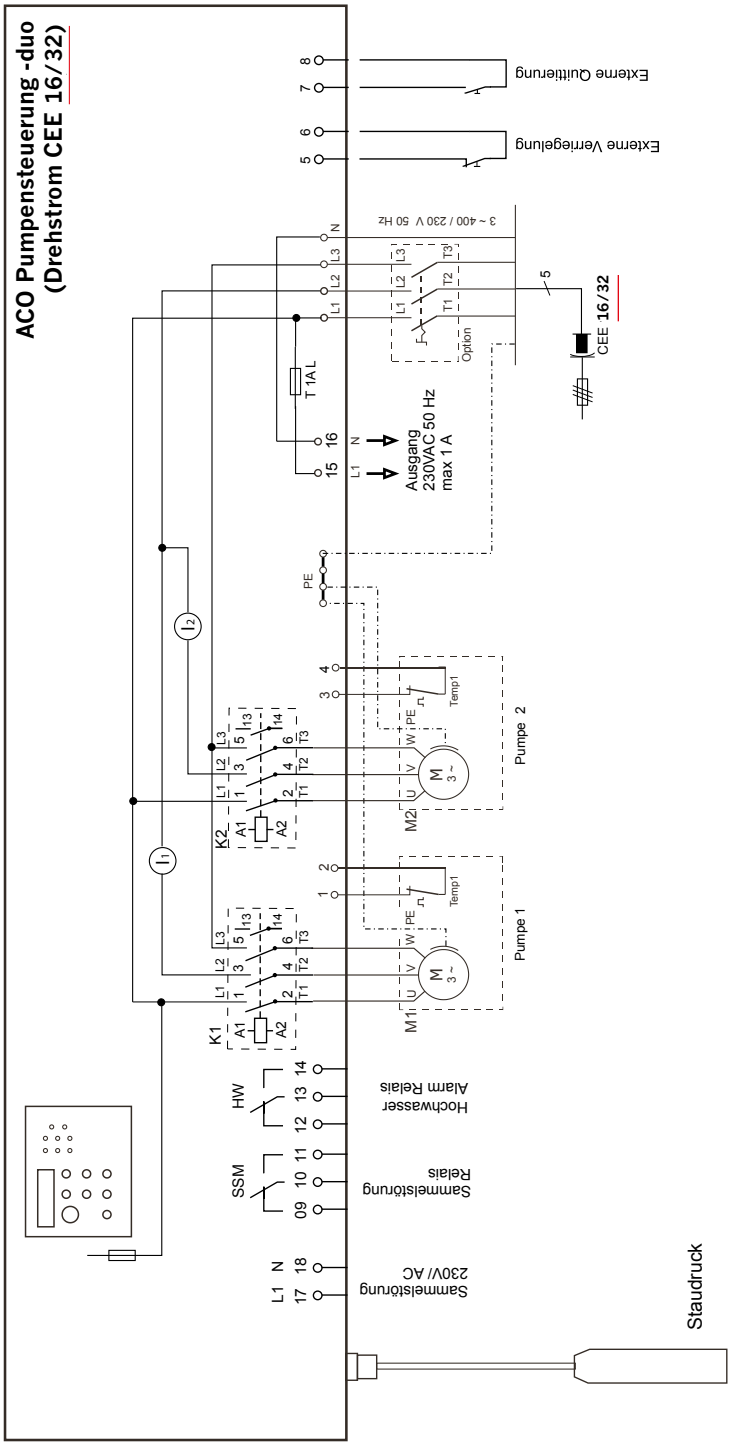


Figure: Circuit diagram

5 Installation

The table below gives an overview of the requirements (tools, parts, installation material) for the installation:

Tools, parts, installation material		
■ Pencil ■ CEE power socket 32 A ■ Cutter blade ■ Torque wrench SW 19, 24 ■ Lathe chuck ■ File ■ Hammer ■ Cable stripping knife	■ Cable: 2-wire/0.75 mm2 ■ Open-end spanner SW 13, 14, 19, 24 ■ Slow-blow fuses 25 A ■ Pipe wrench ■ Pipe clamps ■ Saw ■ Percussion drill with □ masonry drill Ø12 mm □ Hole saw Ø29 mm	■ Screws and dowels ■ Screwdriver (slotted and cross-head) ■ Side-cutting pliers ■ Vacuum cleaner ■ Acid-free lubricating grease ■ Incline measuring device (spirit level) ■ Tape measure

The planner is responsible for the layout of the pipework system.

5.1 Safety during installation

The following hazards must be expected during installation:



WARNING

Always read the following safety instructions attentively before installation. Serious injuries can occur if these are not heeded.

Ensure that the personnel are sufficiently qualified, 📖 Chap. 1.3 “Personnel qualifications”.

Mechanical hazards

Severe crushing when components fall down (e.g. special fixing piece, pipework parts) - especially with overhead assembly work

- Always wear personal protective equipment, 📖 Chap. 1.4 “Personal protection equipment”.
- Overhead assembly with at least 2 people.

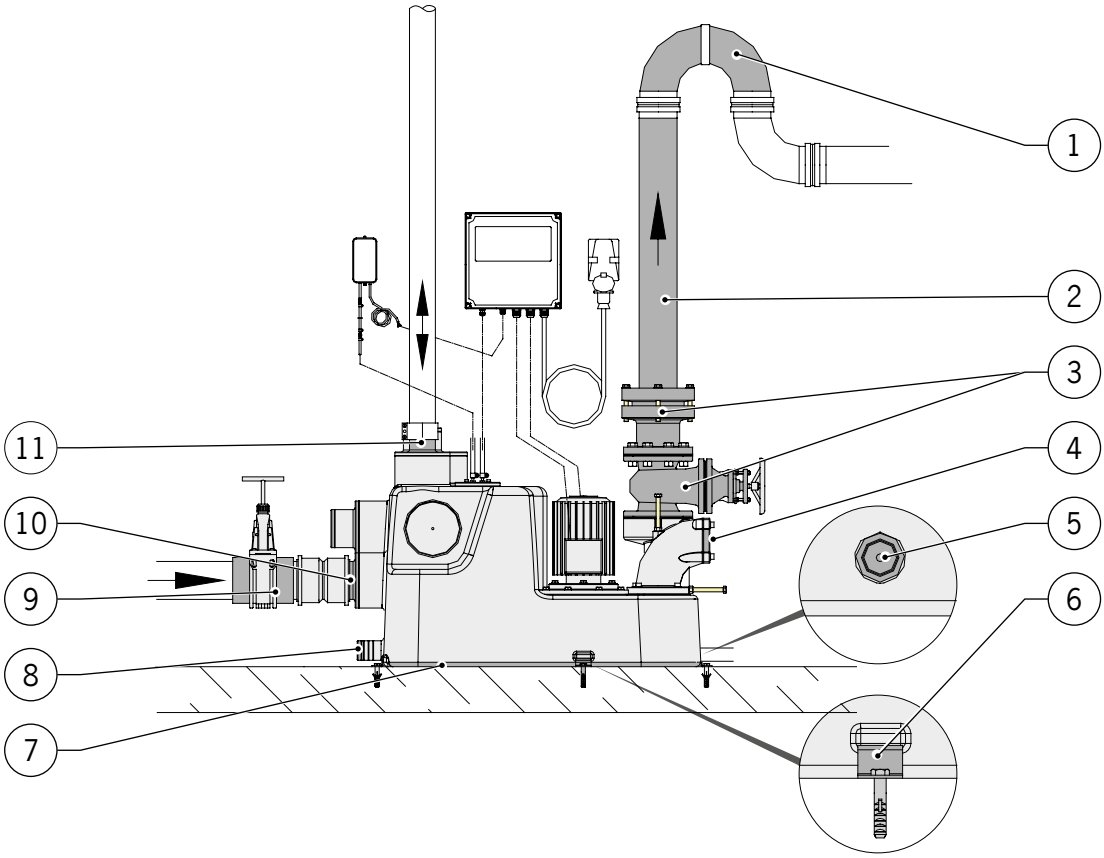
Electrical hazards

Serious injury or death possible in contact with energised parts

- Have the pumps, micro compressor and control unit connected by a qualified electrician.
- Never execute conversion work.

5.2 Sanitary installation

The following figure shows an overview of the installation work and the on-site prerequisites, which will all be described in more detail in the following chapters. Observe recommendations for pipework systems, Chap. 5.2.11 “Recommendations for pipework systems”.



1 = Executing the backflow loop*,
Chap. 5.2.6

2 = Connecting the pressure pipe*,
Chap. 5.2.7

3 = Installing the stop valve* and special fixing piece,
Chap. 5.2.8

4 = Preparing the drain cock connection (optional),
Chap. 5.2.9

5 = Preparing bottom outlet connection (optional),
Chap. 5.2.2

6 = Connecting the fixing set,
Chap. 5.2.12

7 = Aligning the collection tank,
Chap. 5.2.1

8 = Preparing drainage pipe* connection (optional),
Chap. 5.2.10

9 = Installing the stop valve*,
Chap. 5.2.4

10 = Connecting the inlet pipe*,
Chap. 5.2.3

11 = Connecting the ventilation pipe*,
Chap. 5.2.5

11 = Laying the pipework (general),
Chap. 5.2.11

* On-site prerequisites

Figure: Installation work

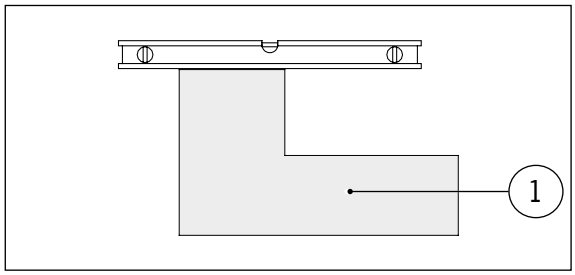
5.2.1 Aligning the collection tank

Rooms for plants must be large enough to provide a working space of at least 600 mm width and height next to and above all parts to be operated and maintained. The installation location must be level.

Requirement:

- Spirit level
- Tape measure

➔ Align the collecting tank (1) horizontally at the installation location.



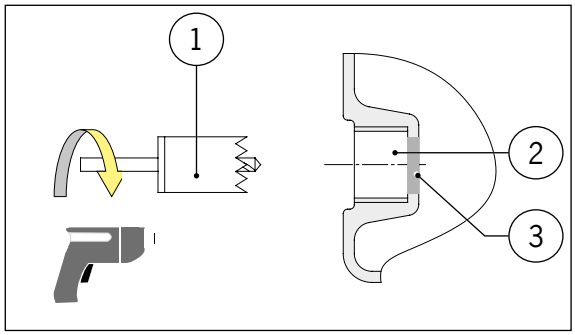
5.2.2 Preparing bottom outlet connection (optional)

A threaded collar R1 (2) on the collecting tank, 📖 Chap. 3.3/ Component No. 12, can be used to connect a drainage pipe.

Requirement:

- Drilling machine with tool hole saw Ø29 mm

➔ Drill open the closed collar base (3) with hole saw (1, max. Ø 29 mm).



5.2.3 Connecting the inlet pipe

Sockets with nominal diameters DN 100, 150 and 200, 🕮 Chap. 3.3/Component No. 7 – 11, 17 + 18, are formed on the collecting tank. All sockets are closed and must be opened according to the selection for the required connection (there can also be several).

The external diameters are 110 mm, 160 mm and 200 mm.

Prerequisites:

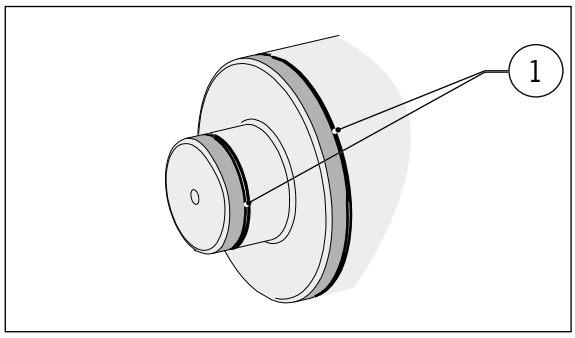
- Saw
- File

IMPORTANT

- Pipes may not be constricted in the flow direction.
- On the inflow side, a shut-off slide valve is to be arranged, 🕮 Chap. 5.2.4 “Installing the stop valve”

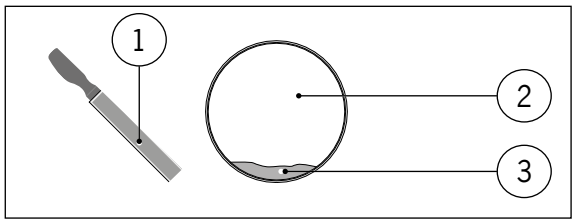
➔ Cut open the closed socket along the notch (1).

➔ Connect the inlet pipe (pipe connector, sliding sleeve etc.).



Due to the manufacturing process, uneven wall thicknesses can occur behind the material (accumulation of material).

➔ Remove any accumulation of material (3) in the base area of the pipe socket (2) with a file (1).



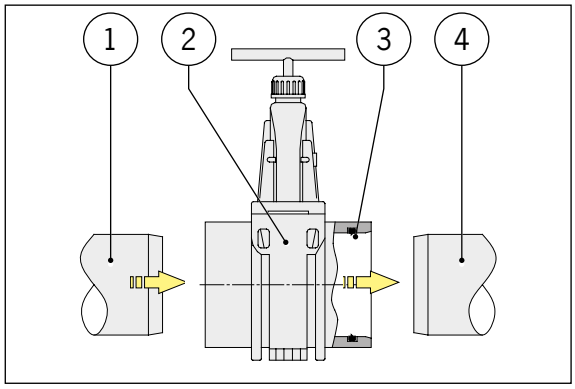
5.2.4 Installing the stop valve

If the plant is **not** connected directly to a toilet, then a stop valve must be installed in the inlet pipe (inlet side of the plant). Such a stop valve in the nominal sizes DN 100, 150 or 200 can be optionally ordered from ACO, 🕮 Chap. 3.7 “Accessories”.

Requirement:

- Acid-free lubricating grease

- Grease the end of the spigot end (4) from the inlet socket of the plant.
- Grease the lip seals (3) of the stop valve (2).
- Grease the end of the spigot end (1) of the inlet pipe.
- Push the stop valve (2) onto the end of the spigot end (4) of the inlet socket of the plant.
- Push the end of the spigot end (1) of the inlet pipe into the stop valve (2).



5.2.5 Connecting the ventilation pipe

One socket with nominal diameters DN 70, 🕮 Chap. 3.3/Component No. 17, is formed at the top of the collecting tank. The socket is closed off and must be opened.

The external diameter is 75 mm.

If the DN 150 socket, 🕮 Chap. 3.3/Component No. 18 is used as inlet, then the DN 100 socket, 🕮 Chap. 3.3/Component No. 10, must be used as ventilation.

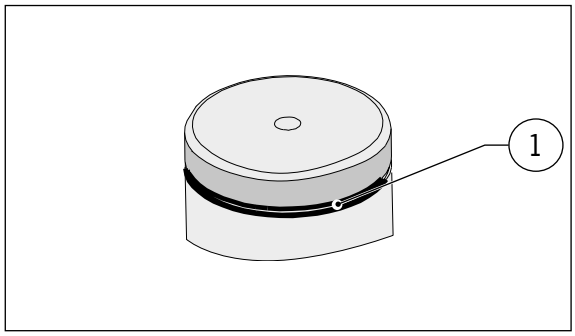
Requirement:

- Saw

IMPORTANT

- Ventilation pipes (mainly in systems for sewage containing faeces) must have the same cross-section and be routed steadily upwards over the roof of the house. The pipe may be routed into both the main vent stack and in the secondary vent stack.
- In order to prevent odours, never connect the plant ventilation to the inlet-side ventilation pipe of a grease separator.

- Cut open the closed socket along the notch (1).
- Connect ventilation pipe (pipe connector, sliding sleeve etc.).



5.2.6 Executing the backflow loop

The following figure shows a schematic diagram of a backflow loop (1). The subsequent list provides information about professional execution.

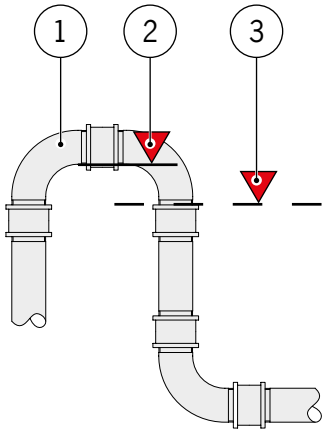


Figure: Backflow loop

IMPORTANT In order to guarantee the plant's function, the backflow loop must be routed with the pipe invert (2) over the "backflow level" (3).

- **Pump flow rate in l/s**
  Volume flow which the plant pump pumps over the total delivery head in the operating point.
- **Delivery head in m**
  Pressure level reached by the plant pump in the operating point. The static height difference as well as the total loss height in the pressure pipe are therefore overcome.
- **Total delivery head in m**
  The total delivery head is the total of the static delivery head, losses of pressure level in fittings and moulded parts and pipe friction losses.

5.2.7 Connecting the pressure pipe

The special fixing piece, 🕮 Chap. 3.3/Component No. 2; Assembly 🕮 Chap. 5.2.8 “Installing the stop valve and special fixing piece”, enables the elastic connection of the on-site pressure pipe DN 100 (pipe tip Ø108 – 114 mm).

In the as-delivered condition, the sealing ring (4) plus flange ring (3) is placed on the special fastening piece (5) and the screws (1) are screwed into the threaded hole of the flange ring (3).

Prerequisites:

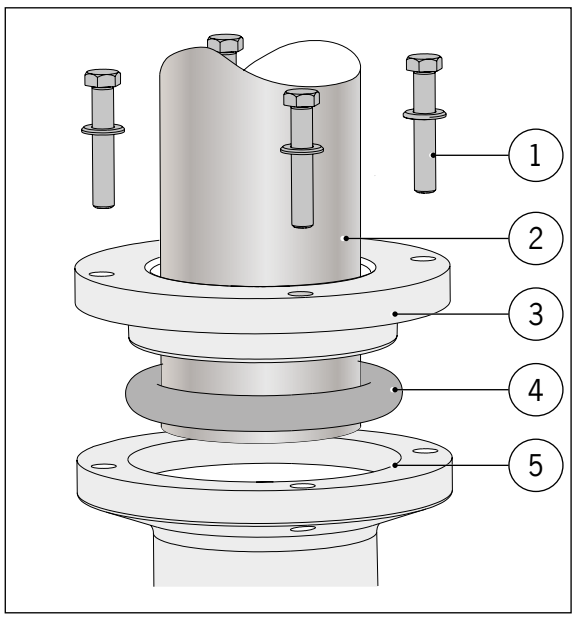
- Open-end spanner SW 19
- Torque wrench SW 19

IMPORTANT Always comply with and/or observe the following to prevent damage to property and functional failures:

- Pressure pipes must always be connected to a ventilated pipe system or collection pipes. The connections must be executed like connections for pressure-free pipes.
- The pressure pipe must withstand at least 1.5 times the max. pump pressure.
- The pressure pipe must be installed so that it is rising continually.
- 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.
- Never connect pressure pipes from lifting plants to wastewater downpipes.
- Never connect ventilation valves in the pressure pipe.

➔ Insert the pipe (2) through the flange ring (3) and the sealing ring (4) and push it approx. 50 mm into the special fixing piece (5).

➔ Tighten the M12 bolts (1) equally crosswise (max. 15 Nm).



Utilising another sealing ring (4), 🕮 Chap. 3.7 “Accessories”, enables the connection for a DN 80 pressure pipe (pipe tip Ø88 – 90 mm).

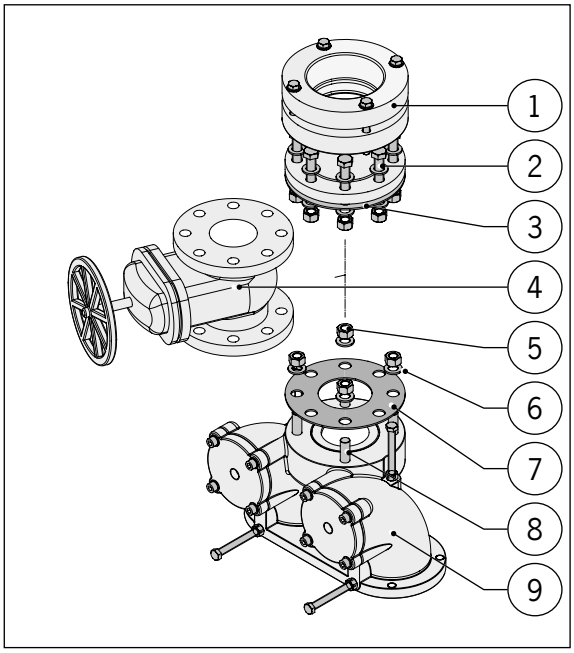
5.2.8 Installing the stop valve and special fixing piece

Prerequisites:

- Open-end spanner SW 19 and 24
- Torque wrench SW 19 and 24
- Lathe chuck
- Pipe wrench
- Stop valve (optional)

IMPORTANT Only ever utilise supplied seals.

A stop valve in nominal width DN 80 can be obtained from ACO as an accessory, Chap. 3.7 “Accessories”. The special fixing piece is delivered as loose.



- Screw in M16 stud bolts (8) with lathe chuck into the threaded holes of the connection flange/double backflow preventer (9) (max. 10 Nm).
- Position the flat seals (7) on the connection flanges of the double backflow preventer.
- Guide the stop valve (4) with the flange holes over the stud bolts.
- Guide the washers (6) over the stud bolts.
- Screw the nuts M16 (5) onto the stud bolts and tighten equally crosswise (max. 10 Nm).
- Position the flat seals (3) on the connection flanges of the stop valve.
- Arrange the special fixing piece (1) with the flange drill holes congruently over the drill holes of the stop valve.
- Create flange connections with the fixing material (2 bolts M16/washers/nuts) and then tighten equally crosswise (max. 10 Nm).

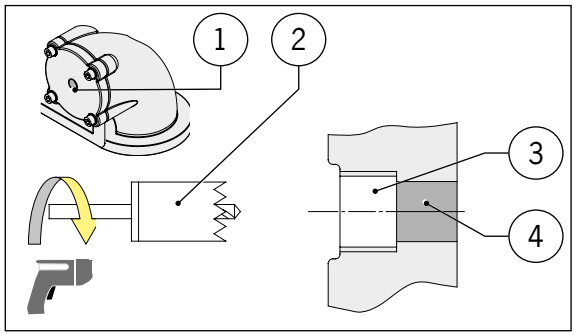
5.2.9 Preparing the drain cock connection (optional)

On both covers (1) of the double backflow preventer, position 🕮 Chap. 3.3/Component No. 1, there is a threaded collar R1/2 (3). An on-site drain cock for partial draining of the pressure line can be attached here.

Requirement:

- Drilling machine with tool hole saw Ø16 mm

➔ Drill open the closed collar base (4) with hole saw (2, max. Ø16 mm).



5.2.10 Preparing drainage pipe connection (optional)

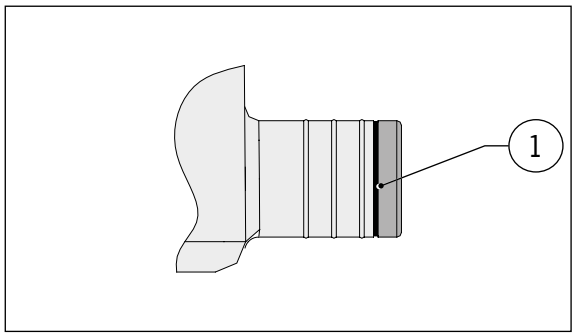
One socket for a hose connection with nominal diameters DN 50, 🕮 Chap. 3.3/ Component No. 21, is formed on the side of the collection tank. The socket is closed in the as-delivered condition and must be opened for connecting the drainage pipe.

Requirement:

- Saw

➔ Cut open the closed socket along the notch (1).

➔ Connect the drainage pipe (hose, hose clip etc.).



5.2.11 Recommendations for pipework systems

IMPORTANT Always comply with and/or observe the following to prevent damage to property and functional failures:

- Lay the pipework with gradients (except pressure pipes).
- Connect the drainage pipes as tension-free on the plant. Pipework forces and torque must not act on the plant Any expansion of the pipework caused by temperature must be compensated for.
- The weight of the pipes must be supported (e.g. with pipe supports).
- In the case of lateral non-restrained elastic connections, always secure the pipes against loosening (e.g. pipe supports).
- Pipes must be designed and laid as frost proof.

5.2.12 Installing the fixing set

Aligned collection tank, 📖 Chap. 5.2.1 “Aligning the collection tank”, aanchor on 4 positions in the ground using the supplied fixing set.

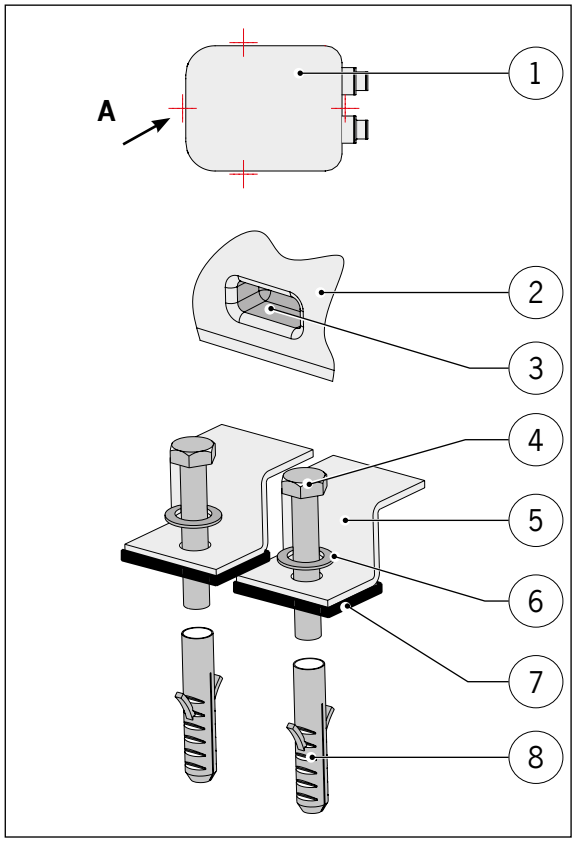
IMPORTANT Always comply with and/or observe the following to prevent damage to property and functional failures:

- Wastewater plants must be installed in a way that ensures no twisting.
- Plants at risk of buoyancy must be fixed to prevent buoyancy.

Prerequisites:

- Marking aid (e.g. pencil)
- Percussion drilling machine with masonry drill bit Ø12 mm
- Hammer
- Vacuum cleaner

- Create 4 fixing points + (opposite to each other), 📖 1 = Plant from above.
- Position angle (5) in the prescribed trough (3) of the collection tank, 📖 Elevation A = 2 and mark drill hole on ground.
- Remove the angle (5) from the trough (3).
- Drill a hole Ø12 mm, 60 mm deep.
- Suction out the borehole.
- Insert 12 W dowel (8) into the drill hole.
- Place a rubber mat (7) between the angle (5) and ground for noise insulation.
- Insert the angle (5) into the trough (3).
- Push the washers (6) over the wooden screws 10 x 60 (4) and through the hole in the angle and then twist into the dowel (8).
- Tighten the bolts 10 x 60 (4) (10 Nm).



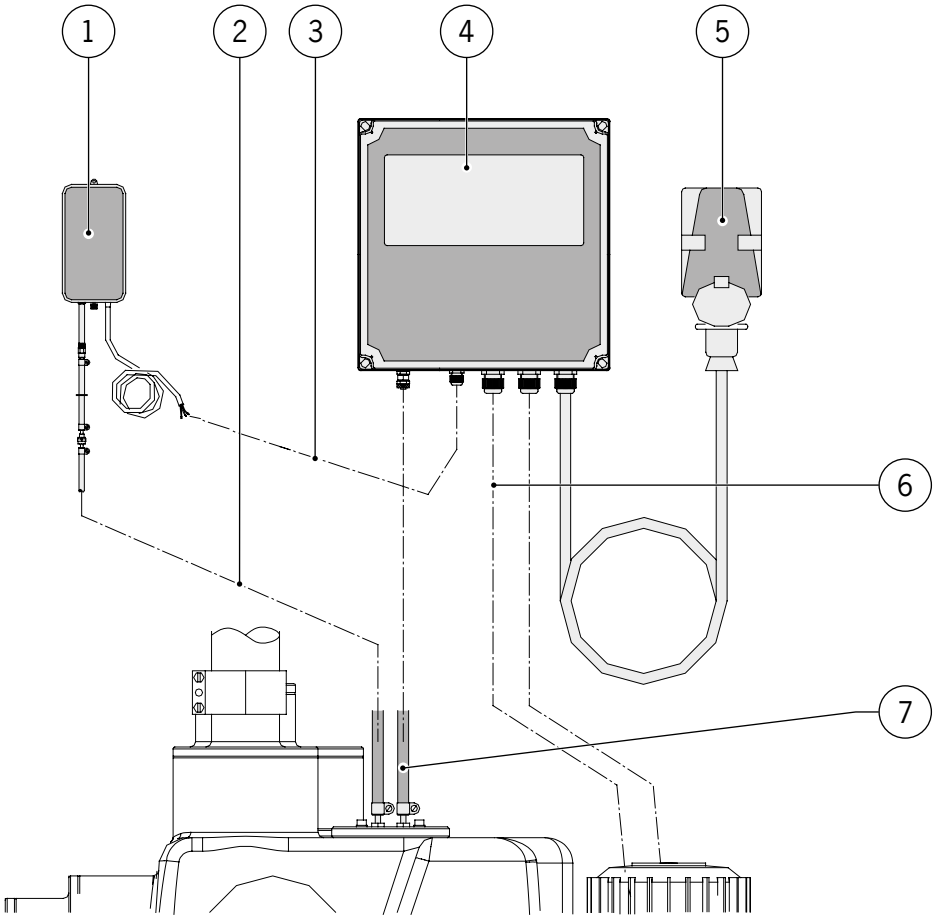
5.3 Leak test

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.

5.4 Electrical installation

The following figure shows an overview of the on-site prerequisites and the electric work, which will all be described in more detail in the following chapters.



1 = Attaching the mini compressor (optional),
Chap. 5.4.4

2 = Connecting the pipe for the air bubble injection (optional),
Chap. 5.4.5

3 = Connecting the electric cable for the mini compressor (optional),
Chap. 5.4.6

4 = Attaching the control,
Chap. 5.4.1

5 = Attaching the CEE plug socket.*,
Chap. 5.4.2

6 = Adjusting the length of the electric cable for the pumps,
Chap. 5.4.3

7 = Connecting the control pipe to the level switching,
Chap. 5.4.7

8 = Forwarding group alarm message (optional),
Chap. 5.4.8

* On-site prerequisites

Figure: Electric work

5.4.1 Attaching the control

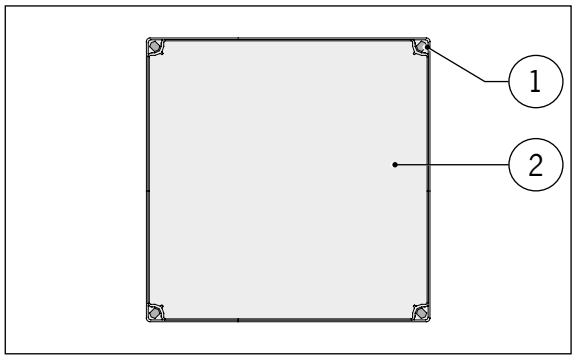
A flood-proof and free wall surface of approx. W x H = 400 x 500 mm is required for attaching the control.

The control cable for level switching and the electric cable for the pumps are respectively 10 m long and already connected on the control.

Prerequisites:

- Percussion drill and masonry drill bit
- Hammer
- Vacuum cleaner
- Screwdriver (slotted and cross-head)
- Screws and dowels

→ Transfer the hole pattern (1) from all corners of the rear wall of the original control (2) onto the wall.
→ Drill the holes.
→ Suction out the drill holes.
→ Hammer in the dowels.
→ Hold the control (2) onto the wall and fix in place using the screws.



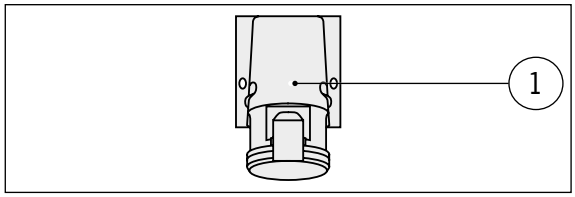
5.4.2 Attaching the CEE plug socket

The control is equipped with a 1.5 m connection cable with CEE plug 16 A for Type DDP 1.1 and 2.1 and/or 32 A for Type 1.2 and 2.2.

IMPORTANT

- Malfunction when plug socket is unsuitable
- Connecting value of 400 V/50 Hz
- Right rotating field
- The power supply must comply with the directives of the local power supplier. In particular, attention should be paid to the specific protection measures and the cable cross-sections and potential compensation.

→ Attach CEE plug socket (1) onto the wall according to manufacturer's specifications.



5.4.3 Adjusting the length of the electric cable for the pumps

The electric cables are respectively 10 m long and are already connected to the terminals in the terminal box of the pump and the control unit in the as-delivered condition.

IMPORTANT The ends of the wires are marked. There is a risk of short circuits when the wires are confused.

If the connecting cable has to be shortened, then always transfer the identification markings of the wires.

Prerequisites:

- Screwdriver
- Side-cutting pliers
- Cable stripping knife

→ Tighten connection terminal.

If the cable lengths are not shortened, then secure the not required lengths in loose, not too small hanging loops.

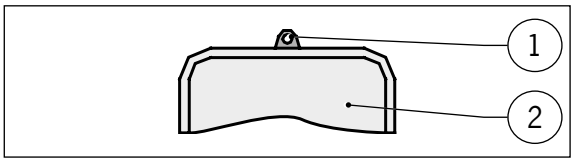
5.4.4 Attaching the mini compressor (optional)

A mini compressor for constant air bubble injection can be obtained as an option from ACO, Chap. 3.7 “Accessories”. The constant air bubble injection reduces the hazard of blockages in the pilot pipe and makes the level switch even safer. A flood-proof and free wall surface of approx. W x H = 200 x 100 mm is required.

Prerequisites:

- Percussion drill and masonry drill bit
- Hammer and vacuum cleaner
- Screwdriver (slotted and cross-head)
- Screws and dowels

→ Drill a hole for the strap (1) at the designated assembly location.
→ Suction out the borehole.
→ Insert dowel.
→ Hold the mini compressor (2) onto the wall and fix in place with screws.



5.4.5 Connecting the pipe for the air bubble injection (optional)

The pipes and connection parts are included in the scope of supply for the mini compressor.

IMPORTANT The pipe must be laid as constantly rising and frost-resistant.

The following prerequisites will be required:

- Open-end spanner SW 13, 14
- Screwdriver (cross-head or slotted)
- Cutter blade
- Pipe clamps

→ Unscrew the screw M8 (10) with the USIT ring from the threaded drill hole (13) of the connection flange (14) and dispose of it .

→ Screw the hose bush (11) with the USIT ring into the threaded drill hole (13).

→ Push the hose clamp (5) over the hose end (9) of the 9.5 m long hose.

→ Push the hose end (9) onto the hose bush (11) and fix it by using a hose clamp (5).

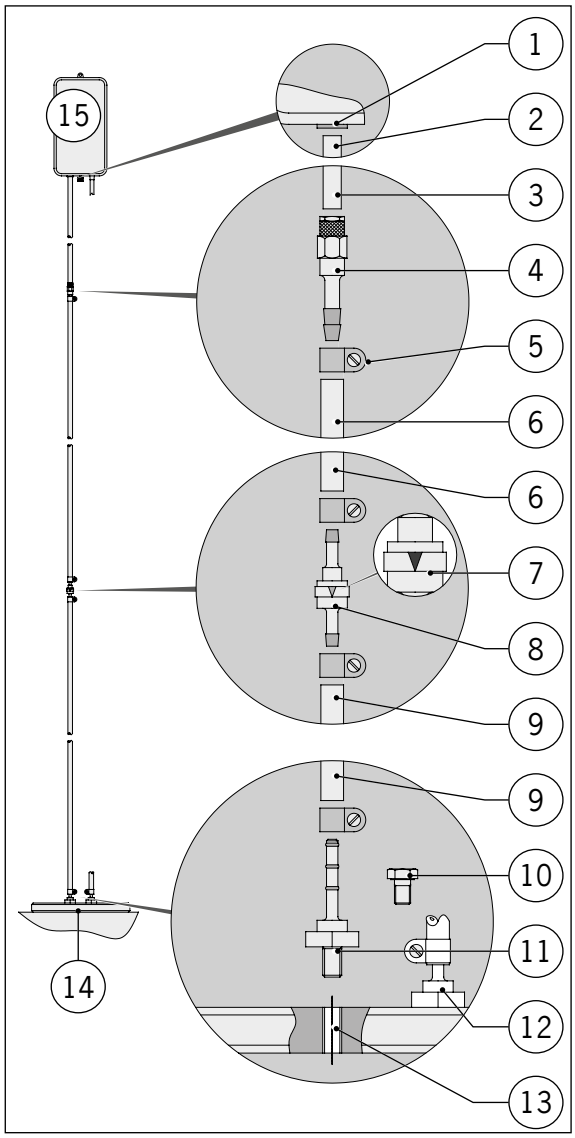
→ Push the hose clamp (5) over the other end of the hose (9).

→ Push the hose end (9) onto the hose bush of the spring check valve (8), installation direction 📖 7 and fix it by using a hose clamp (5).

→ Push the hose clamp (5) over the hose end (6) of the 500 mm long hose.

→ Insert the hose end (6) onto the hose bush of the spring check valve (8) and fix it by using a hose clamp (5).

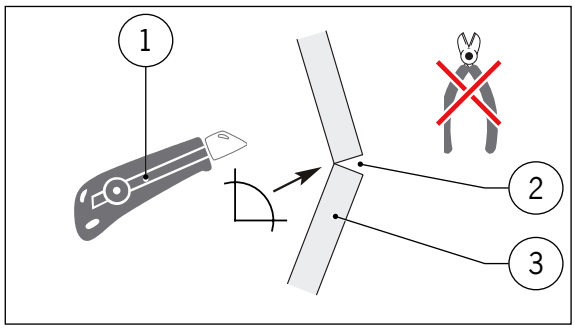
→ Push the hose clamp (5) over the other end of the hose (6).



- Insert the hose end (6) onto the hose bush of the screw on connection (4) and fix it by using a hose clamp.
- Insert the hose end (2, 100 mm long) into the retainer of the screw on connection and clamp it.
- Insert the other hose end (2, 100 mm long) above the retainer (1) of the mini compressor (14).

IMPORTANT Malfunction possible when the length adjustment of the cable is not executed professionally.

- Cut the cable (3) using a cutter blade (1) at right angles (2).



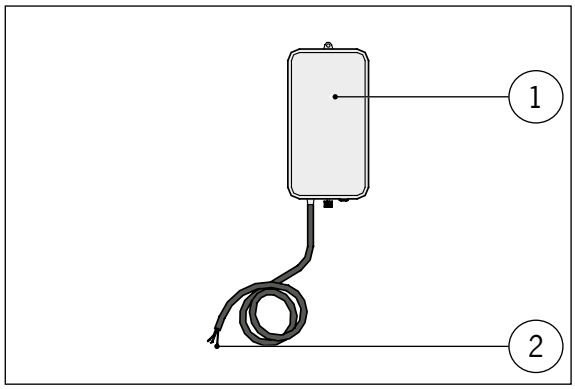
5.4.6 Connecting the electric cable for the mini compressor (optional)

The electric cable is already connected on the mini compressor (1) in the as-delivered condition. The electric cable must still be connected onto the control unit.

Prerequisites:

- Screwdriver (cross-head or slotted)
- Side-cutting pliers
- Cable stripping knife

- Strip the insulation of the ends of the cables (2) and fit on wire-end ferrules.
- Clamp them in the terminal box of the control, circuit diagram
  Chap. 4.2.2 “Circuit diagram of the control”.



5.4.7 Connecting the control pipe to the level switching

The control pipe (3) is already connected to the hose sleeve (4) of the connecting flange (5) of the level switch in the as-delivered condition and lies in loops on the plant and is fastened with cable ties.

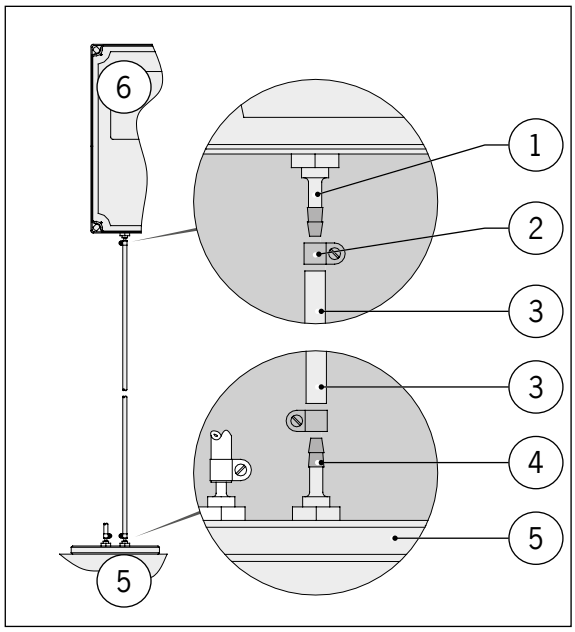
IMPORTANT The control pipe must be laid as constantly rising and frost-resistant.

Prerequisites:

- Screwdriver (cross-head or slotted)
- Cutter blade
- Pipe clamps

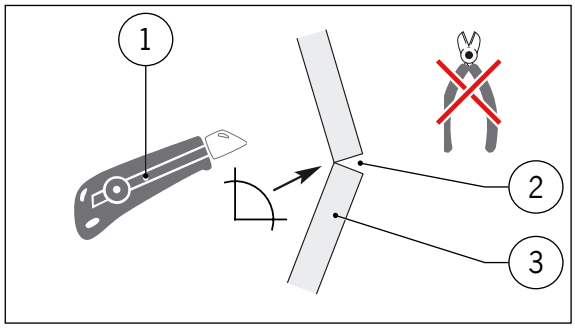
➔ Push hose clamp (2) over the hose end (3) of the 10 m control pipe.

➔ Insert the hose end (3) onto the hose sleeve (1) of the control unit (6) and secure it with the hose clamp (2).



IMPORTANT Malfunction possible when the length adjustment of the control pipe is not executed professionally.

➔ Cut the control pipe (3) open using a cutter blade (1) at right angles (2).



5.4.8 Forwarding group alarm message (optional)

A cable must be to laid to forward the potential-free contact as a group alarm.

Prerequisites:

- Cable: 2-wire/0.75 mm2
- Screwdriver (cross-head or slotted)
- Cutter blade
- Pipe clamps

➔ Connect the cable in the control according to the circuit diagram, Chap. 4.2.2 “Circuit diagram of the control”.

6 Initial commissioning and operation

6.1 Safety during initial commissioning and operation

The following hazards must be anticipated during initial commissioning and operation:



CAUTION

Always read the following safety instructions attentively before initial commissioning and operation. Injuries can occur if these are not heeded.

Ensure that the personnel are sufficiently qualified, Chap. 1.3 “Personnel qualifications”.

Leaks in the plant during initial commissioning and operation

Injuries/burnings of eyes and skin

- Always wear personal protective equipment, Chap. 1.4 “Personal protection equipment”.
- Immediately shut down the plant and leave the danger zone until the pressure is reduced.

Contact with wastewater containing faeces.

Skin and eye infections

- Always wear personal protective equipment, Chap. 1.4 “Personal protection equipment”.
- Following skin contact: Wash the skin areas affected with soap immediately and disinfect them.
- Following eye contact: Rinse eyes. If eyes continue to water, consult a doctor.

6.2 Initial commissioning

Prerequisites for initial commissioning:

- Installation has been concluded, Chap. 5 “Installation”.
- Collection tank is empty.
- There is no wastewater running into the plant.

People required for initial commissioning:

- Contractor/Fitter
- Electrician
- Owner and/or user

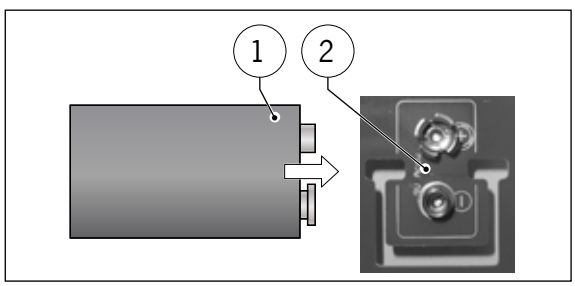
IMPORTANT For safe operation of the plant, always adhere to the following sequence during initial commissioning.

1. Insert accumulator in pump control-duo, Chap. 6.3.
2. Set pump control-duo, Chap. 6.4.
3. Execute test run, Chap. 6.5.
4. Execute control tasks, Chap. 6.6.
5. Set air bubble injection, Chap. 6.7.
6. Set automatic mode, Chap. 6.8.
7. Hand over the plant to the owner and/or user, Chap. 6.9.

6.3 Inserting the accumulator into pump control-duo

The accumulator guarantees the mains-independent alarm in the event of a power interruption. Once the accumulator in the pump control-duo is inserted, the alarm is automatically activated.

➔ Have the accumulator (1) fitted in this position (2) on the circuit board by a qualified electrician.



6.4 Setting the pump control-duo

Before the initial commissioning, the settings must be made in the setting menus of the pump control.

IMPORTANT In the as-delivered, the settings for a connection of the inlet pipe are set to a socket height of 250 mm.

The menu settings data and/or values for the menu settings can be taken from the table below. Assume the setting procedure according to description, 🕮 Chap. 3.8.5 “Control settings”.

Setting menu		Values			Unit	Explanation
		Inlet ...				
		Z1 = 250 mm	Z2 = 400 mm	from above	[...]	🕮 Chapter
Next maintenance		...			Days	7.4
Basic load ON (GL)		5	18	18	cm	3.4
Base Load OFF (GL OFF)		3	3	3	cm	3.4
Peak Load ON (SL)		15	28	28	cm	3.4
Peak Time OFF (SL OFF)		7	20	20	cm	3.4
High Water		17	30	30	cm	3.4
Run. Time max.		0			min.	3.8.7
Run Time altern.		2			min.	3.8.7
Stop delay		2			sec.	3.8.7
Maximum current –1 and -2	DDP 1.0/2.0/1.1/2.1	5			A	4.1
	DDP 1.2/2.2	10				
Force activation		Is activated			-	3.8.7
Accoustic alarm		Is activated			-	3.8.7
Intermitt. Alarm		Is switched off			-	3.8.7
Pump alternation		Is activated			-	3.8.7
Rot. Field error		Is activated				3.8.7
Service mode		Is switched off			-	3.8.7
Language		German			-	3.8.7

6.5 Test run

6.5.1 Specifications

IMPORTANT In order to prevent functional failure and property damage, the water level must be adhered to for the switching point “SDP OFF”. The values can be taken from the Tab. 17 and controlled during the test run via the opened inspection cover.

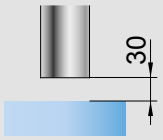
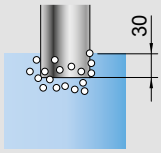
Version without air bubble injection (standard)

If the water level in the collecting tank is higher, switch on the centrifugal pump manually and stop the time until the water level is reached according to the table below (pilot pipe approx. 30 mm free). Add the determined time on the pump control to the pre-determined overrun time!

Version with air bubble injection (optional)

Set the overrun time on the controller to “0”. If the water level in the collecting tank is higher, switch on the centrifugal pump manually and stop the time until the water level is reached according to the table below (pilot pipe approx. 30 mm covered). The time determined on the pump control must be set as the overrun time!

Water level at switching point “SDP OFF”

Distance from waterline to lower edge of pilot pipe	
Without air bubble injection	With air bubble injection (optional)
	

6.5.2 Execute test run

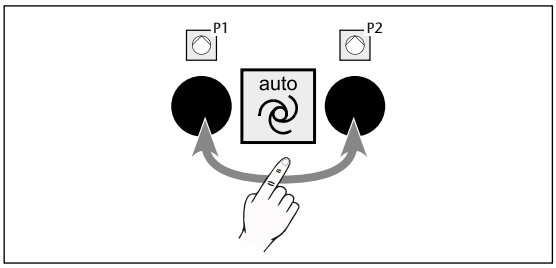
The work and procedures at and in the plant are described below. The figures are shown schematically.

➔ Open the stop valve in the inlet pipe and pressure pipe (if present).

➔ Set up power supply to the pump control.

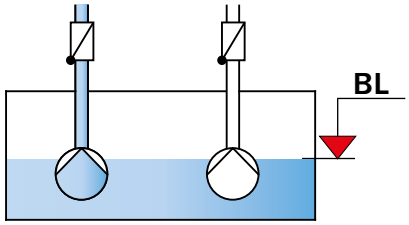
➔ Control operating displays on the control.

➔ Press button “AUTO” (P1 and P2) for automatic mode for Pump 1 and Pump 2.



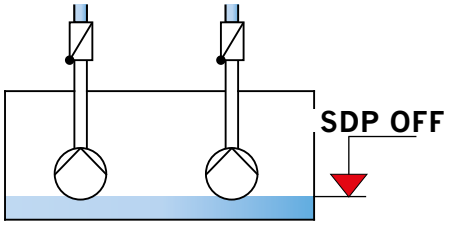
➔ Let the water run into the collecting tank via the inlet pipe or inspection opening.

- Water level reached “BL” level.
- “Pump P1” switches on and pumps the wastewater out of the collection tank to above the backflow level.



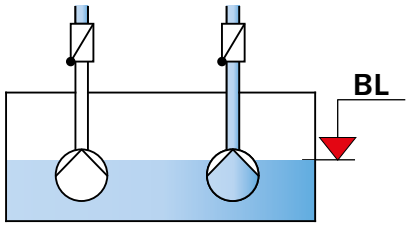
➔ Interrupt water inflow.

- Water level reached “BL OFF” level.
- Overrun time expires.
- “Pump P1” switches off.



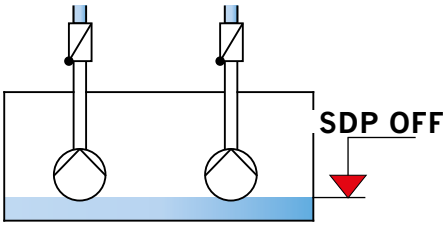
➔ Allow water to flow in again.

- Water level reached “BL” level.
- “Pump P2” switches on and pumps the wastewater out of the collection tank to above the backflow level.



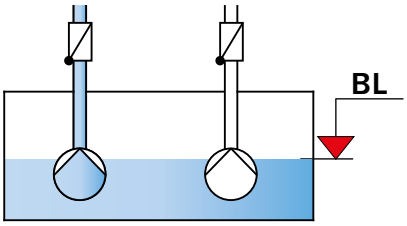
➔ Interrupt water inflow.

- Water level reached “BL OFF” level.
- Overrun time expires.
- “Pump P2” switches off.



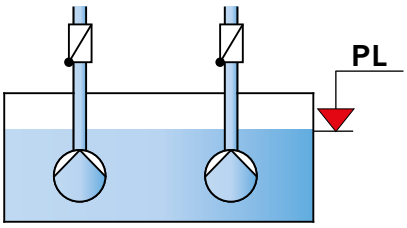
➔ Allow water to flow in again.

- Water level reached “BL” level.
- “Pump P1” switches on and pumps the wastewater out of the collection tank to above the backflow level.



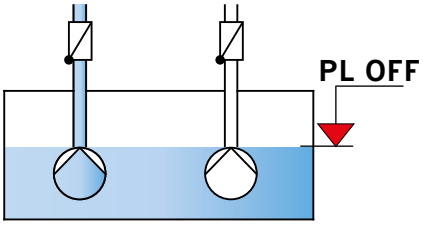
➔ Increase water inflow.

- Water level reached “PL” level.
- “Pump P2” switches on and both pumps pump the wastewater out of the collection tank to above the backflow level.

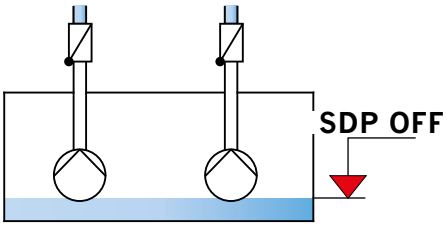


➔ Interrupt water inflow.

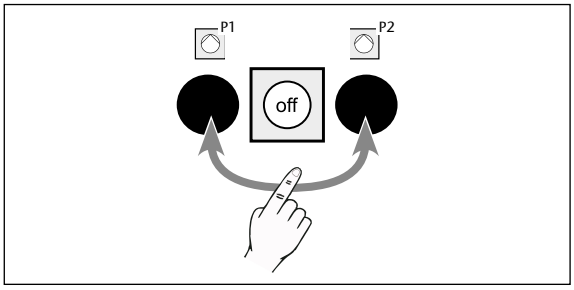
- Water level reached “PL OFF” level.
- “Pump P2” switches off and “Pump P1” pumps the wastewater out of the collection tank to above the backflow level.



- Water level reached “BL OFF” level.
- Overrun time expires.
- “Pump P1” switches off.

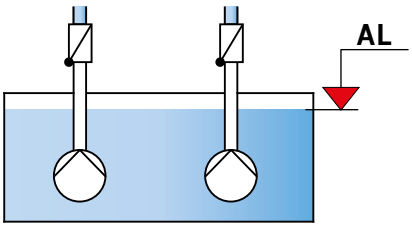


➔ Press button “OFF” (P1 and P2) of Pump 1 and Pump 2 and switch the pumps off.



➔ Allow water to flow in again..

Water level reaches “AL” level = flood alarm.

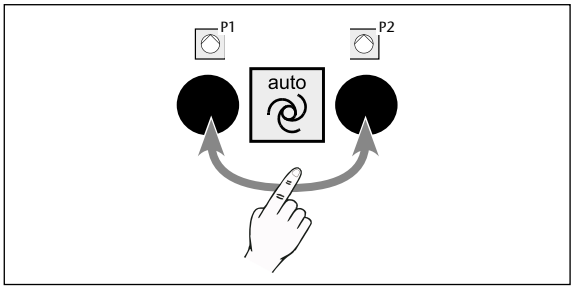


Red LED lights up and the acoustic alarm sounds.

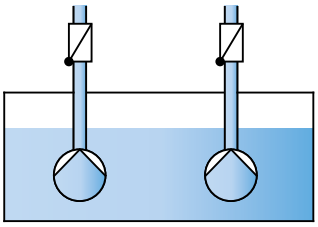


➔ Interrupt water inflow.

➔ Press button “AUTO” (P1 and P2) for automatic mode for Pump 1 and Pump 2.

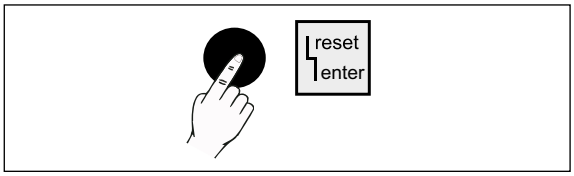


- “Pump P1 + Pump P2” switch on and both pumps pump the wastewater out of the collection tank to above the backflow level.

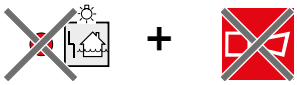


Water drops to below water level “AL”.

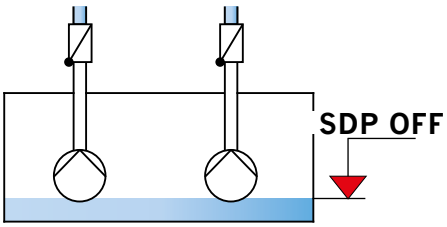
➔ Press the „Reset/Enter” button.



Red LED goes off and the acoustic alarm goes off.



- Water level reached “BL OFF” level.
- Overrun time expires.
- “Pump P1 + Pump P2” switch off.



IMPORTANT
If knocking noises/vibrations occur in the pressure pipe on switching off the centrifugal pump:

➔ Increase overrun time.

The trial run is finished.

➔ Execute the trial run a second time.

6.6 Control work

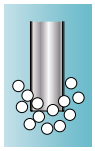
Control before and/or during or after the test run:

- Leaktightness of the plant, fittings and pipes
- Function of the shut-off devices
- Function of the possibly installed manual membrane pump
- Setting the air bubble injection, Chap. 6.7 “Setting the air bubble injection”.

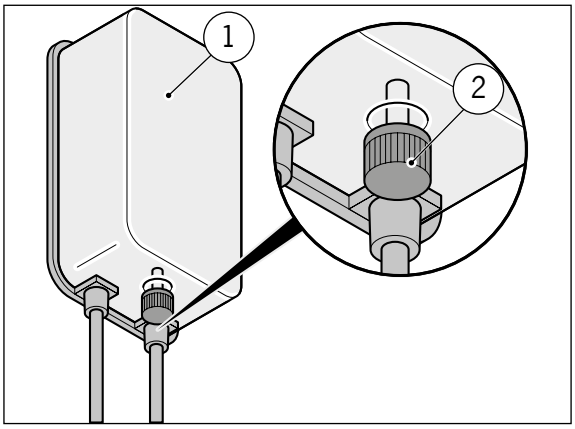
6.7 Setting the air bubble injection

To reduce the noise volume of the mini compressor, reduce the air flow.

IMPORTANT Reduce air flow only to the extent that air bubbles still emerge at the end of the pilot pipe and rise upwards in the wastewater (still bubbling, view via inspection opening).



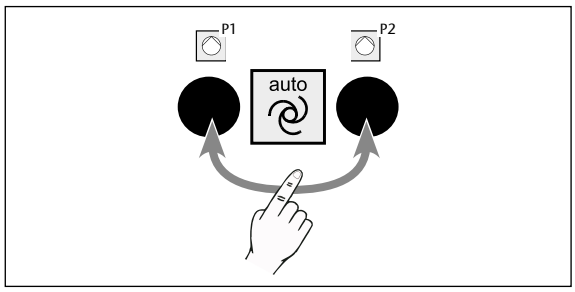
→ Reduce the air flow on the rotary knob (2) of the mini compressor (1).



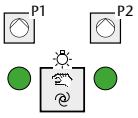
6.8 Setting automatic mode

Make the following setting on the pump control-duo:

➔ Press button “AUTO” (P1 and P2) for automatic mode for Pump 1 and Pump 2.



The green LED lights up permanently, Pump P1 and/or Pump P2 is located in automatic mode and is switched automatically by the level switch.



The plant is ready for operation.

6.9 Handing the plant over to user

On delivery to the user:

1. Explain how the plant functions work.
2. Hand the plant over in a functioning state.
3. Issue the handover report with the important commissioning data (e.g. supplements and/or amendments to the factory settings).
4. Hand over the operating instructions.

6.10 ACO Maintenance contract

To retain the value and function of the plant and as a requirement for the manufacturer’s guarantee, we recommend always having work executed directly by the manufacturer, ACO.

This guarantees permanent operational safety and you will benefit from reviews and modernisation which are implemented within the context of our product development.

To request a quotation regarding the **maintenance contract**, please copy the following section, complete it in full and fax it to

Telefax + 49 (0) 3 69 65 / 81 9 -3 67.

Requirement: **Quotation for a maintenance contract for the plant**

Please send me a non-binding quotation for regular maintenance.

Sender

Postcode, town

Type:

Installation on:

Use:

☐ ...

☐ ...

6.11 Operation

IMPORTANT The plant must only be operated according to its intended use, 🕮 Chap. 1.1 “Intended Use”.

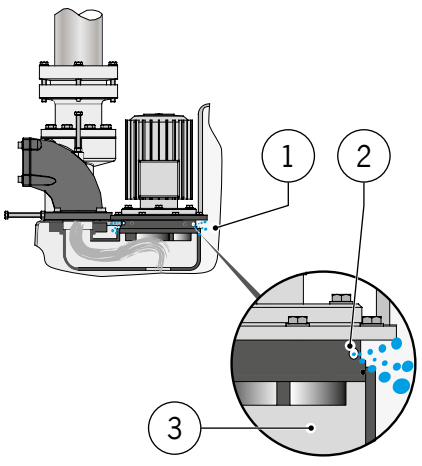
The plant functions automatically. The work necessary during operation is restricted to:

- Monthly implementation of at least 2 test runs, 🕮 Chap. 6.5 “Test run”.
- Other inspections on the plant are limited to maintenance work, 🕮 Chap. 7.3 “Maintenance work for the user” and Chap. 7.4 “Maintenance work for specialists”.

6.12 Automatic venting of the volute casing

During operation, the volute casing vents independently and protects the pump against damage.

The water splashes from drill holes (2) between pump and volute casing (3) into the collection tank (1).



7 Maintenance

Regular maintenance is essential for long years of safe and malfunction-free operation.

The necessary maintenance tasks are described in this chapter.

7.1 Safety during maintenance

The following hazards must be expected during maintenance on the plant:



WARNING

Always read the following safety instructions attentively before any maintenance work. Serious injuries can occur with incorrect utilisation.

Always ensure that maintenance personnel are sufficiently qualified, Chap. 1.3 “Personnel qualifications”.

The user may only execute out work which is described in these operating instructions.

All other work requires comprehensive specialist knowledge and a great deal of experience in handling plants. ACO Service is hereby responsible for this.

Electrical hazards

- Always have work on the electrical equipment on the plant executed by a qualified electrician.



CAUTION

Leaks in the plant during maintenance

Injuries/burnings of eyes and skin

- Always wear personal protective equipment, Chap. 1.4 “Personal protection equipment”.
- Always immediately shut down the plant and leave the hazard zone until the pressure is reduced (approx. 30 min.).

Contact with wastewater containing faeces.

Skin and eye infections

- Always wear personal protective equipment, Chap. 1.4 “Personal protection equipment”.
- Following skin contact: Wash the skin areas affected with soap immediately and disinfect them.
- Following eye contact: Rinse eyes. If eyes continue to water, consult a doctor.



CAUTION

Sharp edges due to material chipping

Injuries due to worn parts

- Be particularly careful and attentive.
- Always wear personal protective equipment, Chap. 1.4 “Personal protection equipment”.

7.2 Plant manual

IMPORTANT A plant manual should always be maintained.

Maintaining an plant manual provides many advantages e.g. traceability of measures and targeted troubleshooting.

Entries in the plant manual:

- Data regarding regular inspection and maintenance work
- Occurred malfunctions, causes of malfunction, measures implemented
- Data regarding repairs/repair work executed
- Data regarding inspections executed

7.3 Maintenance work for the user

This chapter describes the work that can be executed by the user.

7.3.1 Daily controls

The following controls must be executed every 1 – 2 days:

- Control the plant and its components for leaks.
- Control that the plant is ready for operation on the control unit.
- Pay attention to anything unusual (e.g.unusual pump operating noises), respond to these and initiate measures.

7.3.2 Maintenance work as required

The following work must be executed by the user as and when required:

- Cleaning work on plant and control

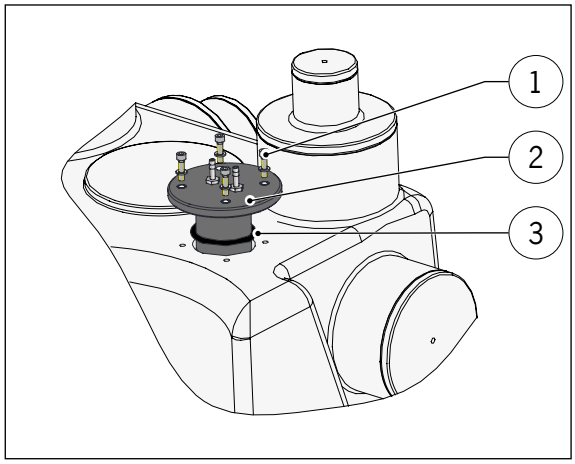
IMPORTANT To prevent damage to property, use only commercially available, non-aggressive cleaning agents.

- After flooding the system and before recommissioning, arrange for maintenance to be executed, Chap. 7.4 “Maintenance work for specialists”.
- Clean the pilot pipe

Prerequisites:

- □ Open-end spanner SW 13
- □ Allen key size 6

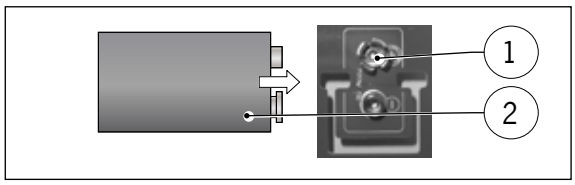
→ Loosen and unscrew 4 cheese head bolts M6 (1).
→ Remove the pilot pipe (2) from the collection tank.
→ Clean the pilot pipe (2) and seal (3).
→ Reinsert the pilot pipe (2).
→ Tighten the bolts (1) equally crosswise (tightening torque 8 Nm).



7.3.3 Annual maintenance work

Have the accumulator in the pump control-duo exchanged annually by a qualified electrician.

→ Have the accumulator (2) fitted in this position (1) on the circuit board by a qualified electrician.



7.4 Maintenance work for specialists

The following table gives an overview of the maintenance work to be executed by a specialist, Chap. 1.3 “Personnel qualifications”.

IMPORTANT Maintenance work must be executed at the following intervals:

Operation on the plant in **commercial businesses = every 3* months**

Operation on the plant in **multi-dwelling buildings = every 6* months**

* Only applies to Germany. Provisions in other countries can vary.

Maintenance schedule for specialist

Plant	Activity	Control/work	
Component	Description	to be carried out/ carried out	
Control	Control condition/function of the signal lamps	☒	☐
	Control condition/function of the operating elements	☒	☐
	Control condition/function of the display panel	☒	☐
	Control functions and menu settings	☒	☐
	Execute test run	☒	☐
	Control remote signalling function	☒	☐
	Control fuses are firmly fitted	☒	☐
	Tighten terminal connections	☒	☐
Level switching	Clean the pilot pipe	☒	☐
	Control control cable or control pipe	☒	☐
	Control the control cable or control pipe connection	☒	☐
Mini compressor	Control condition	☒	☐
	Control function	☒	☐
	Control air setting	☒	☐
Collection tank	Control condition	☒	☐
	Clean the inside and outside of the tank	☒	☐
	Control buoyancy safety	☒	☐
Pumps	Control condition and function of the motor	☒	☐
	Control operating noises	☒	☐
	Control the condition of the impeller and clean it	☒	☐
	Control the condition of the volute casing and clean it	☒	☐
	Clean the outside of the motors	☒	☐
Y-branch pipe with double backflow preventer	Control condition and function	☒	☐
	Control the condition of the balls	☒	☐
Special fixing piece	Control condition	☒	☐
Inlet stop valve	Control condition and function	☒	☐
	Lubricate adjusting spindle	☒	☐
Stop valve pressure pipe	Control condition and function	☒	☐
	Lubricate adjusting spindle	☒	☐
Inlet pipe	Control pipe condition	☒	☐
	Control connection positions	☒	☐
	Control fixings	☒	☐
Vent stack	Control pipe condition	☒	☐
	Control connection positions	☒	☐
	Control fixings	☒	☐
Pressure pipe	Control pipe condition	☒	☐
Accessory parts	Control condition	☒	☐
	Clean outside	☒	☐
Plant complete	Control flange connections and connections	☒	☐
	Clean outside	☒	☐
	Execute test run	☒	☐
	Clean surroundings	☒	☐
☐ = Free for ticking off ☑ the work executed			

8 Troubleshooting and repair work

8.1 Safety during troubleshooting and repair work

The following hazards must always be taken into account during troubleshooting and repair work on the plant:



WARNING

Always read the following troubleshooting and repair instructions attentively before installation. Serious injuries can occur with incorrect utilisation.

Always ensure that the personnel are sufficiently qualified, 🕮 Chap. 1.3 “Personnel qualifications”.

The user may only execute work which is described in these operating instructions.

All other work requires comprehensive specialist knowledge and a great deal of experience in handling wastewater lifting plants. Competence 🕮 page 2.

Electrical hazards

Serious injury or death possible in contact with energised parts

- Always have work on the electrical equipment on the plant executed by a qualified electrician.



CAUTION

Contact with wastewater

Injuries on skin and eye, risk of infections

- Always wear personal protective equipment, 🕮 Chap. 1.4 “Personal protection equipment”.
- Following skin contact: Wash the skin areas affected with soap immediately and disinfect them.
- Following eye contact: Rinse eyes. If eyes continue to water, consult a doctor.

Sharp edges due to material chipping

Cutting injuries due to worn parts

- Be particularly careful and attentive.
- Always wear personal protective equipment, 📖 Chap. 1.4 “Personal protection equipment”.

In the event of a malfunction, the motor of the centrifugal pump can get up to 110° C hot

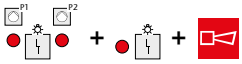
Injuries due to risk of burns

- Always wear personal protective equipment, 📖 Chap. 1.4 “Personal protection equipment”.
- Allow the motor to cool down for at least 30 min.
- Be particularly careful and attentive.

8.2 Troubleshooting

The following table helps you identify the reasons for faults and take the necessary measures.

Malfunction	Cause(s)	Measure(s)	Skilled worker required	
Malfunction on the plant and on the connections				
Pump does not deliver or too little or Collection tank full	Shut-off fitting in pressure pipe is not fully open and/or is closed	Open shut-off fitting completely		6.5
	Pressure pipe obstructed	Clean the pressure line	x	8.3
	Impeller obstructed	Dismantle the pump and clean the impeller	x	8.3
	Volute casing ventilation blocked	Dismantle pump and clean ventilation drill holes of volute casing	x	6.12
	Pump parts are worn	Replace worn pump parts	x	8.3
Pump does not run	Motor is defective	Replace motor	x	8.3
	Pump blocked by foreign bodies	Dismantle the pump, clean impeller and volute casing	x	8.3
	Electrical connection is interrupted	Control connecting cable and set up again if applicable	x	5.3
	Automatic operation is switched off	Switch on automatic operation		6.8
	Overload protection of the pump has tripped and cannot be acknowledged	Dismantle the pump, clean impeller and volute casing	x	8.3
Pump only runs in manual operation	Control pipe of the level switching is leaking, incorrectly laid, kinked or obstructed	Control control cable and create proper working order for condition		5.4.7
	Pneumatic pipe obstructed	Clean the pneumatic pipe		7.3.2
	Pressure switch in control defective	Replace control	x	8.3
Pump operates loudly and for a relatively long time or no longer switches off	Pressure pipe or ventilation pipe is blocked	Clean pipe	x	8.3
	Vent stack has not been installed or not installed properly	Install pipe properly	x	5.2.5
	Wrong dimensioning of the pressure pipe, losses too high	Reduce losses by choosing a larger nominal width	x	5.2.7
	Double backflow preventer is defective	Open the double backflow preventer, clean the chamber, seat of the ball and ball itself, replace if applicable	x	8.3
Pump leaks	Seal is defective	Renew seal	x	8.3

Malfunction	Cause(s)	Measure(s)	Specialist required	
Malfunction messages on the control				
Display panel: Maximum current Display elements: 	Pump is blocked by foreign body and current restriction has tripped malfunction	Dismantle the pump, clean impeller and volute casing	x	8.3
	Overload protection of the pump has tripped and cannot be acknowledged	Dismantle the pump, clean impeller and pump chamber	x	8.3
Display panel: Flood alarm Display elements: 	Shut-off fitting in pressure pipe is not fully open and/or is closed	Open shut-off fitting completely		6.5
	Automatic mode not switched on	Switch on automatic mode		6.8
	Pump motor is defective	Control manual mode, replace motor if applicable	x	8.3
	Impeller obstructed	Dismantle the pump and clean the impeller	x	8.3
	Volute casing ventilation blocked	Dismantle pump and clean ventilation drill holes of volute casing	x	8.3
	Pressure line obstructed	Clean the pressure line	x	8.3
	Pump parts are worn	Replace worn pump parts	x	8.3

8.3 Repairs and spare parts

Please contact ACO Service, page 2 for repair work and spare parts orders, specifying the type plate data.

9 Decommissioning and disposal

9.1 Safety during decommissioning and disposal

The following hazards must always be taken into account when decommissioning and disposing of the plan:



WARNING

lways read the following safety instructions attentively before decommissioning and disposing. Serious injuries can occur if these are not heeded.

Ensure that the personnel are sufficiently qualified, 🕮 Chap. 1.3 “Personnel qualifications”.

Additional safety notes to be observed, 🕮 Chap. 2.1 “Safety during transport and storage”.

Electrical hazards

Serious injury or death possible in contact with energised parts

- Always have work on the electrical equipment on the plant executed by a qualified electrician.
- Have decommissioning of the electrical equipment executed by a qualified electrician.



CAUTION

Contact with wastewater

Skin and eye infections

- Always wear personal protective equipment, 🕮 Chap. 1.4 “Personal protection equipment”.
- Following skin contact: Wash the skin areas affected with soap immediately and disinfect them.
- Following eye contact: Rinse eyes. If eyes continue to water, consult a doctor.

Sharp edges due to material chipping

Cutting injuries due to worn parts

- Be particularly careful and attentive.

9.2 Decommissioning

Decommissioning procedure:

1. Unplug the CEE plug of the control from the CEE plug socket.
2. Remove the accumulator from the control.
3. Empty collection tank and all pipes.
4. Cover control and protect against humidity.
5. Cover collection tank/plant and protect against humidity.
6. If decommissioning is to last more than one month, preserve the plant, Chap. 2.3 “Storage”.

9.3 Shutdown

Procedure for shutdown:

1. Unplug the CEE plug of the control from the CEE plug socket.
2. Disconnect the pump connection cable in the control.
3. Mini compressor available: disconnect in the control.
4. Remove the control cables on the control.
5. Empty the collection tank and all connected pipes.
6. Dismantle connecting pipes and cables.
7. Dismantle the collection tank/plant components.

9.4 Disposal

The plant comprises reusable materials.

IMPORTANT Improper recycling is an unnecessary environmental hazard. Regional disposal regulations must be heeded.

- Separate all steel components and/or cast components and recycle them.
- Separate all rubber parts (NBR) and recycle them.
- Separate all plastic parts (PE-HD and/or PUR) and recycle them.
- Separate control unit and mini compressor (if present) and dispose of as electrical waste for recycling.

Appendix: Commissioning report

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

Commissioning date: _____

Handover date: _____

Wastewater lifting plant

Type	Art. No.	Serial No.	Year of construction	Usable volume

Use location

Building/room: _____

Use: 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, 📖 Chap. 6.5 “Test run”.

Checks	OK	Not OK
Electrical fusing of the wastewater lifting plant in accordance with the IEC directives 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)	○	○
Inlet valve in the inlet pipe: Functioning test, actuation, open position, leak tightness	○	○
Shut-off valve and/or gate valve in the pressure pipe: functioning test, actuation, open position, leak tightness	○	○
Attachment of the inlet and pressure pipe	○	○
Switching and setting of the switching on levels in the pump control menu	○	○
Leak tightness: Wastewater lifting plant, fittings, pipework, connections	○	○
Fault and malfunction signalling equipment: Fault messages in the display panel, LED fault displays, acoustic alarm, telecommunication equipment (group fault)	○	○
Functioning test of the backflow valve	○	○

Instruction (by installer company)

Instruction	Remarks	Yes	No
Instruction:	Functions, pump control unit, operating information, troubleshooting, maintenance obligations	○	○
Handover:	Instructions for Use	○	○

Remarks:

Signature of Qualified person: _____

Signature of authorised acceptance inspection representative: _____

Notice

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