

Muli-Max -F Prefabricated Wastewater Pump Station

Wastewater lifting plant as per DIN EN 12050-1 for collection and automatic lifting of wastewater containing faeces and free of faeces above the backflow level, of polyethylene PE-HD, for ground installation

Muli-Max -F mono



- for ground installation – exception: roads with permanently flowing HGV traffic
- with manhole cover class A15, B125 or D400
- with liquidisers for wastewater containing faeces
- with grey water pumps for wastewater free of faeces
- container with inlet DN 150, 2 x DN 100 for blank cable duct / ventilation
- working volume app. 150 l

Official test sign Z-42.1-418

Muli-Max -F duo



- for ground installation – exception: roads with permanently flowing HGV traffic
- with manhole cover class A15, B125 or D400
- with liquidisers for wastewater containing faeces
- with grey water pumps for wastewater free of faeces
- container with inlet DN 150, 2 x DN 100 for blank cable duct / ventilation
- working volume app. 150 l

Official test sign Z-42.1-418



For a safe and proper use,
read operating manual and
further product-related
documents thoroughly.
Hand over to end user.

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1. Product identification

1.1 Manufacturer

ACO Passavant GmbH
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Telephone 49-(0) 36965 819 - 0
Telefax 49-(0) 36965 819 - 361

Service
ACO Haustechnik GmbH
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Service telephone 49-(0) 36965 819 - 444
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1.2 Important addresses

Telephone	
Telefax	

Telephone	
Telefax	

Telephone	
Telefax	

Telephone	
Telefax	

Telephone	
Telefax	

Telephone	
Telefax	

1.3 EC Conformity Declaration

Muli-Max -F mono/duo **Prefabricated pump station for wastewater containing faeces / ground installation**

The manufacturer:

- ACO Passavant GmbH
Ulsterstraße 3
36269 Philippsthal

herewith certifies that the pump station:

- Muli-Max -F mono/duo

is in conformity with directive:

- EG-RL 2006/42/EG Machine Directive

Plant components are in conformity with further guidelines:

- EG-RL 2006/95/EG Low Voltage Directive

The following harmonized standards were applied:

- DIN EN 12050-1 2001-05 edition

The following approved bodies were employed:

- - -

Addition:

- -

Note:

- The prefabricated pump station serves for collection and automatic lifting of wastewater containing faeces and wastewater free of faeces above the backflow level.

Responsible document representative:

- Mr Marco Eulenstein ACO Passavant GmbH
Im Gewerbepark 11c
36457 Stadtlengsfeld

Philippsthal, 08.01.2010

- Mr Ralf Sand  Management Board
ACO Passavant GmbH

1.4 Installation of wastewater lifting plants, where and why

General

Building regulations | In accordance with the state building regulations, structural plants may only be erected if wastewater disposal is carried out professionally and safe in a continuing basis. Land areas with wastewater incidence must be connected to the public sewers if these are ready for use. The backflow problem in this area arises only by this connection compulsion, i. e. by the direct connection of land drainage with the public sewers.

Depending on the drainage system, either separate or combined sewerage system, different backflow frequency must be anticipated. With the separate sewerage system, foul water and rain water are drained via separate pipe systems. Backflow in foul water sewers in consequence of either illegal discharging of waste material or pipe blockages or operational measures does not occur frequently, however cannot be basically ruled out.

For economic reasons and for securing self purification, drainage installations are nowadays designed for a medium rain incident. Heavy rain incidents above the calculated rainfall must, however, be regularly expected. This means that overcharge of drainage installation must always be anticipated.

Drain backflow | The physical effect of a drain backflow is based on the principle of interacting pipes. As the pipe systems of land drainage are directly connected to the public sewers, the wastewater enters the land drainage via these pipe systems in the case of a backflow. The water level rises to the same height as in the public sewers. This means that wastewater leaks from all unsecured openings as e. g. floor drains, toilets until the water level has balanced.

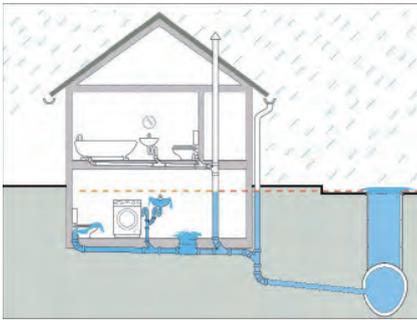


Fig. 1



General

Fig. 2



Backflow level | For the backflow hazard of lands, this results in a certain level below which special measures against backflow have to be taken within land drainage. This level is called backflow level. The standard backflow level is determined by the local authorities in a bye-law. If there is no such determination, the road top edge above the connection point of land drainage line to public sewers is considered as backflow level, in accordance with DIN EN 12056-4 and DIN 1986-100. Nonetheless, a backflow incident above this level, e. g. by pipe blockage, cannot be ruled out. If backflowing wastewater from within buildings is able to enter non-protected premises, brickwork and foundation are imbrued. Damages at fitments occur. Damage caused to people's health cannot be ruled out. Therefore, damages and hazards coming from backflowing wastewater must be kept as low as possible by taking safeguard measures against backflow. Generally, this lies in the land owner's obligation in accordance with the local wastewater bye-laws. The land owner can authorize relevant specialists as e. g. expert planners and plumbers to carry out expert planning and proper execution.

Fig. 3



Backflow protection | The best possible protection against backflow can be achieved by installing a wastewater lifting plant, the pressure pipe of which is taken above the backflow level.

Outside buildings, pump stations are fitted (fig. 3).

Regulations | DIN 1986-100 "Drainage Plants for Buildings and Land" and EN 12056 "Gravity Drainage Plants Inside Buildings" state that grey water which collects below the backflow level and rain run-off water from areas below the backflow level are to be fed into the public sewage system via automatic lifting plants without backflow.

For the planning of a drainage installation, the following principle applies: „Surface water must be drained away from buildings and must not be taken into buildings“. Taking this into consideration, rain surfaces have to be drained via separate pump stations outside buildings.

All drainage objects located above the backflow level must be drained via natural incline (gravity principle); wastewater from these drainage objects may not be drained via backflow stops. Only in compulsory exceptional cases (e. g. old-building renovations) may it be drained via wastewater lifting plants.

1.5 Short description

ACO Multi-Max -F mono / duo pump station

The ACO Multi-Max-F pump station made of PE-HD has particularly compact dimensions.

The telescopic height-adjustable top section enables installation to a total depth of 3 metres.

The pump shaft is structurally designed to be fitted with class A 15, B 125 or D 400 manhole covers (with a load distribution plate) without any in situ concrete work, as e. g. a reinforcement in the cover area.

Thanks to its innovative design, the new ACO pump station cannot be pushed upwards by groundwater even if the water table rises to the top of the manhole cover.

The inside is designed to accommodate a whole range of different pump types depending on the specifications and applications.

The duo model has two pumps (higher operating safety), the mono model has one pump.

The pressure pipe and the tension chain are made of high quality stainless steel.

The pneumatic water level switch guarantees high levels of operational safety.

The switchgears guarantee optimal function and monitoring.

The ACO Multi-Max-F multipurpose pump shaft is suitable for single and multifamily homes, for commercial properties, industry, and for syphonic drainage.



◀ **Fig. 4**
- mono -



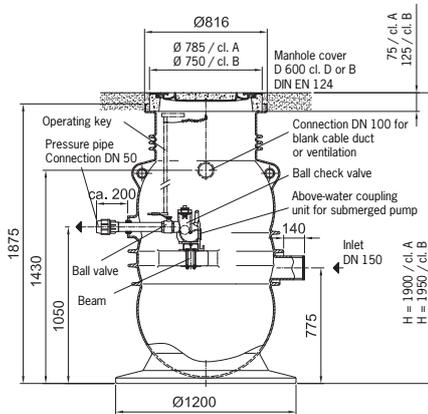
Fig. 5
▶ - duo -

1.6 Technical data

**Shaft with manhole cover class A15,
Shaft with manhole cover class B125,**

**H = 1900 mm
H = 1950 mm**

**175 to 200 kg
210 to 250 kg**

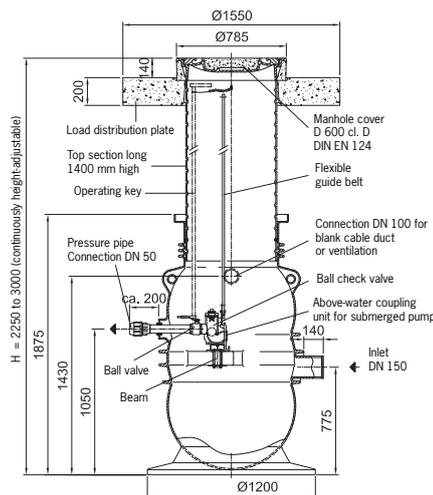


- Container nominal dia. 1043 mm, powder-coated GG beam, automatic above-water coupling to support an ACO Passavant submerged motor pump, pressure pipe connection (DN 40 or 50) of stainless steel and 1 ball valve G2 with operating key, vertically closing ball check valve G2
- Pressure piping outlet PE outside DN 50/for external dia. 63 mm (by-pack kit compression screw joint), dimensions from lower edge of basic shaft up to pressure pipe centre 1050 mm, arrangement at 9.00 h
- 1 x inlet DN 150, connection as per DIN EN 877, dimensions from lower edge of basic shaft up to inlet centre 775 mm, arrangement at 3.00 h
- 2 x connecting sockets DN 100 for blank cable duct/ventilation, connection as per DIN EN 877, arrangement at 6.00 h and 12.00 h, dimensions from lower edge of basic shaft up to connecting socket centre 1430 mm
- Manhole cover nominal size 600 - class A15 as per DIN EN 124, loosely applied, H = 75 mm or
- Manhole cover nominal size 600 - class B125 as per DIN EN 124, loosely applied or odourproof sealed, H = 125 mm

Shaft with manhole cover class D400,

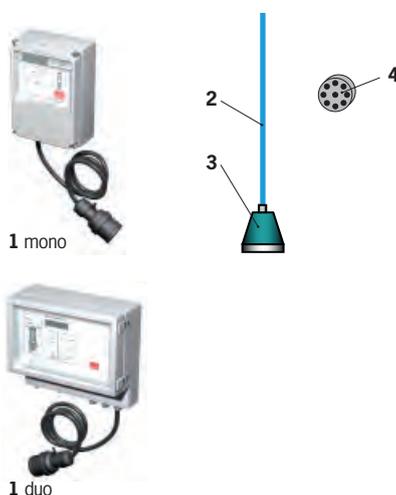
H = 2250 to 3000 mm

1080 kg



- Container nominal dia. 1043 mm, powder-coated GG beam, automatic above-water coupling to support an ACO Passavant submerged motor pump, pressure pipe connection (DN 40 or 50) of stainless steel and 1 ball valve G2 with operating key, vertically closing ball check valve G2
- Pressure piping outlet PE outside DN 50/for external dia. 63 mm (by-pack kit compression screw joint), dimensions from lower edge of basic shaft up to pressure pipe centre 1050 mm, arrangement at 9.00 h
- 1 x inlet DN 150, connection as per DIN EN 877, dimensions from lower edge of basic shaft up to inlet centre 775 mm, arrangement at 3.00 h
- 2 x connecting sockets DN 100 for blank cable duct/ventilation, connection as per DIN EN 877, arrangement at 6.00 h and 12.00 h, dimensions from lower edge of basic shaft up to connecting socket centre 1430 mm
- Top section long, 1400 mm high for installation depths H = 2250 to 3000 mm
- Load distribution plate class D400, D1550 x 200 mm high, with type-tested statics
- Manhole cover nominal size 600 - class D400 as per DIN EN 124, loosely applied or odourproof sealed, H = 160 mm

Accessory: Switchgear with pressure transmitter (open back pressure bell with 20 m control line) and cable lead-in 2 kg



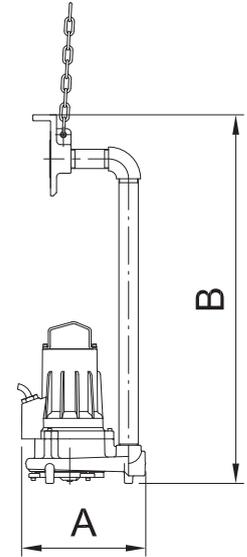
- ACO Multi Control Mono switchgear for levelling of liquid levels: filling level can be determined optionally via back pressure, air bubble injection, external sensor (4-20mA) or float switch. The motor contactor directly activates one pump of up to max. 4kW performance. Furthermore, 2 relay contacts for triggering off of fault signals are available. Operation and setting is very easy. All values may be taken from the LCD display.
Housing size WxHxD : 180 x 290 x 105 (mm) - operating voltage: 400V - frequency: 50/60Hz - control voltage: 230V/AC - power consumption during standstill operation: max. 8 VA - temperature range: -20 to + 60°C - protection type IP 54, menu languages completely elective.
- ACO Multi Control Duo switchgear for levelling of liquid levels: filling level can be determined optionally via back pressure, air bubble injection, external sensor (4-20mA) or float switch. The motor contactor directly activates two pumps of up to max. 4kW performance. Furthermore, 5 relay contacts for triggering off of fault signals are available. Operation and setting is very easy. All values may be taken from the LCD display.
Housing size WxHxD : 320 x 300 x 120 (mm) - operating voltage: 400V - frequency: 50/60Hz - control voltage: 230V/AC - power consumption during standstill operation: max. 10 VA - temperature range: -20 to + 60°C - protection type IP 54, menu languages completely elective.

Supply unit:

1. ACO Multi Control Mono switchgear or ACO Multi Control Duo switchgear, ready-to-plug in with 1.5 m connecting cable and CEE plug (16 A mono, 32 A duo) with phase changing switch
 2. 20 m pneumatic control line 10 x 1.5 mm and cable screw connection
 3. Back pressure bell
 4. Cable duct
- Installation and operating manual of switchgear

SITA submerged motor pump for wastewater containing faeces, with pressure pipe connection

- Submersible motor pump with liquidiser (SITA 200 N-ex, 260 N-ex and 300 N-ex) for wastewater containing faeces, protection type IP 68
- Motor housing with oil filling, seating of motor shaft in continuously lubricating and maintenance-free roller bearings
- Pressure piping cpl. with pressure connection unit for the problem-free support and sealing in the above-water coupling of shaft, incl. attached chain with shackle
- Three-phase motor 400 Volt 50 Hz, P1 ..., P2 ..., IN = ... (see performance data), n = 2705 r.p.m., with 10 m connecting cable, motor and medium side: Silicium Carbide rotating mechanical seal, independent of sense of direction



SAT submerged motor pump for wastewater free of faeces, with pressure pipe connection

- Submersible motor pump with free flow impeller (SAT-V 75 and 150) or open impeller (SAT 100, 150 and 200) for wastewater free of faeces, protection type IP 68
- Shaft sealing: rotating mechanical seal on motor side in oil bath, shaft sealing ring on medium side
- Pressure piping cpl. with pressure connection unit for the problem-free support and sealing in the above-water coupling of shaft, incl. attached chain with shackle
- Three-phase motor 400 Volt 50 Hz, P1 ..., P2 ..., IN = ... (see performance data), n = 2900 r.p.m., with 10 m connecting cable, rotating mechanical seal on motor side in oil bath, shaft sealing ring on medium side

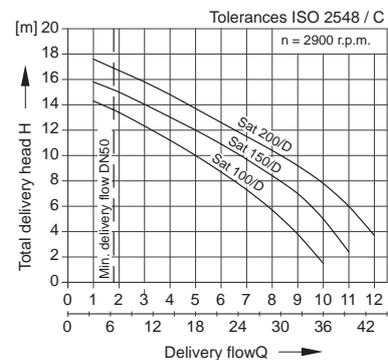
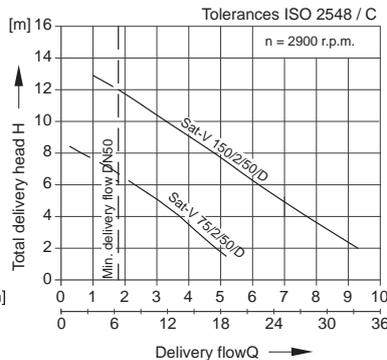
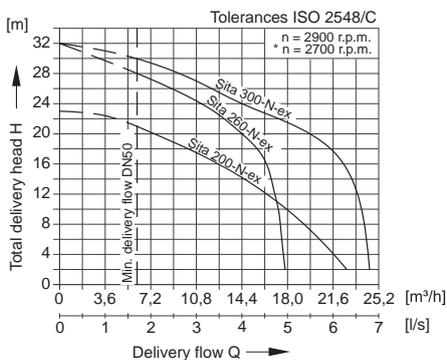
Performance data of SITA submerged motor pumps

Type	A mm		Motor output in kW		Nom. current IN in A	Delivery flow [Q]	Total delivery head H in m													
	B mm	P1	P2	2			4	6	8	10	12	14	16	18	20	22	24	26	28	30
SITA 200 N-ex	410	1.97	1.5	3.7	m³/h	22.7	21.6	20.5	19.4	18.0	16.6	14.8	12.6	10.1	7.6	4.3				
	880				l/s	6.3	6.0	5.7	5.4	5.0	4.6	4.1	3.5	2.8	2.1	1.2				
SITA 260 N-ex	310	2.76	2.4	5.3	m³/h	17.8	17.7	17.6	17.4	17.3	17.0	16.6	16.2	15.5	14.4	13.0	11.2	9.0	6.1	
	930				l/s	4.95	4.91	4.88	4.84	4.8	4.7	4.6	4.5	4.3	4.0	3.6	3.1	2.5	1.7	
SITA 300 N-ex	220	2.8	2.2	5.1	m³/h	24.5	24.3	24.1	24.0	23.8	23.4	23.0	22.3	21.6	19.8	17.3	14.4	11.9	9.4	6.1
	910				l/s	6.8	6.75	6.7	6.65	6.6	6.5	6.4	6.2	6.0	5.5	4.8	4.0	3.3	2.6	1.7

Performance data of SAT submerged motor pumps

Type	A mm		Motor output in kW		Nom. current IN in A	Delivery flow [Q]	Total delivery head H in m											
	B mm	P1	P2	2			4	6	8	10	12	14	15	16	17			
SAT-V 75/2/50/D	410	1.3	0.55	1.3	m³/h	22.3	14.4	7.2										
	880				l/s	6.2	4.0	2.0										
SAT-V 150/2/50/D	250	2.5	1.1	2.5	m³/h	33.5	27.7	22.3	17.3	11.9	6.5							
	930				l/s	9.3	7.7	6.2	4.8	3.3	1.8							
SAT 100/D	370	1.15	0.89	1.96	m³/h	34.9	31.7	27.8	23.4	18.0	11.2	4.3						
	910				l/s	9.7	8.8	7.7	6.5	5.0	3.1	1.2						
SAT 150/D	370	1.54	1.14	2.7	m³/h		37.1	34.2	29.9	24.1	18.0	10.8	7.2					
	950				l/s		10.3	9.5	8.3	6.7	5.0	3.0	2.0					
SAT 200/D	370	2.03	1.5	3.6	m³/h		43.2	39.6	34.6	29.9	23.4	16.6	13.7	9.4	6.5			
	950				l/s		12.0	11.0	9.6	8.3	6.5	4.6	3.8	2.6	1.8			

Performance diagram of submerged motor pumps



2. Field of application

2.1 Field of application of installation and operating manual

CAUTION



The manual has to be kept in safe custody by the user.

If enclosed to this manual, there are further manuals of components of the complete plant, these must also be observed!

This manual refers to ACO Passavant prefabricated wastewater pump station type **Multi-Max-F mono or duo**.

The manual is used for installation, commissioning, operation, maintenance, repair and decommissioning.

All information on possible standards, test signs, quality marks or trade marks were state-of-the-art at the time this manual was printed. Deviations in figures, dimensions and weights are possible. For reasons of technical developments we reserve the right to carry out alterations and modifications without prior notice.

2.2 General notes

CAUTION

ACO Passavant holds the copyright for these operating instructions.

The manual is intended for assembly, operation, servicing and monitoring staff.

Availability of the instructions | The operating instructions must be permanently available at the place where the pump station is operated.

Supplements | The operator of this plant has to add to this manual all accident prevention and environment protection instructions based on national regulations.

Besides the accident prevention regulations mentioned in this manual and pertained in the user country and at place of installation, the approved technical regulations for safe and professional working also have to be observed.

3. Notes

General | This manual contains basic information which has to be observed during assembly, operation and maintenance. It must therefore be read by the fitter as well as the competent skilled personnel/user prior to installation, assembly and commissioning and must always be available at location of plant. Not only must the notes mentioned in this main menu be observed, but also the special safety instructions included in the other main menus, e. g. for private use.

Please also observe the special operating manuals by other manufacturers relating to the components used in the pump station (refer to attachment or complete documents supplied)!

3.1 Symbols and reference notes explanations

This symbol is found throughout these operating instructions wherever there are job safety instructions involving health and safety risks. In all areas where there is a potential risk to human health and safety, it is particularly important that these instructions are observed and that the work is carried out carefully. All instructions involving health and safety at work must also be passed on to any other persons operating the equipment. In addition to the instructions in this operating manual, it is also essential that all of the general safety and accident prevention regulations are observed.



This symbol marks positions in the operating instructions where special care must be taken to fully observe the regulations, standards, rules and instructions, and carrying out working procedures in the proper sequence, and to prevent damage to the equipment, its components and their surroundings, and to guarantee problem-free operation.

CAUTION

This symbol marks environmental protection measures.



This bullet point marks listings



Please also observe the notes which are directly attached to the pump station.

3.2 Safety notes

Endangering in the case of non-observance of safety notes

Non-observance of safety notes may lead to endangering persons as well as the environment and plant.

The following may occur in the case of non-observance:

- Failure of important plant functions
- Failure of stipulated methods for servicing and maintenance
- Endangering of human beings by electrical, mechanical and chemical influence
- Endangering of environment by leakage of hazardous media

Safety-conscious working

The safety notes mentioned in this manual, the existing national accident prevention regulations as well as possible internal working, operating and safety regulations of the user have to be observed.

Staff, safety notes for maintenance, inspection and assembly works

CAUTION



- If hot or cold machine parts are hazardous, these must be protected on site against contact.
- Contact protection for moving parts (e. g. impeller); may not be removed as long as machine is in operation.
- Leakages (e. g. of shaft seal) of hazardous delivery media (e. g. explosive, toxic, hot) must be handled in such a way that human beings and environment are not endangered; observe legal regulations.
- Endangering by electrical energy has to be ruled out. (Details may be taken from VDE regulations and regulations of local power utilities).

Staff | The operations, servicing, inspection and assembly staff must have the appropriate qualifications to carry out the work. The operator must precisely specify and regulate the department responsible for management, the accountabilities and the supervision of the staff.

If staff do not have the necessary qualifications, they must be trained and instructed accordingly. The operator must also ensure that the contents of the operating instruction manual are completely understood by the staff.

To protect the health and safety of the staff, the operator must take relevant action.

Safety notes for maintenance, inspection and assembly works | The user has to make sure that all maintenance, inspection and assembly works are carried out by authorised and qualified skilled personnel who have read instructions of this manual thoroughly. Basically, all works at plant are to be carried out during still-stand periods only. The procedure to shut down the plant, described in this manual, must be observed.

Pumps or components delivering health-hazardous media must be decontaminated. Directly following finishing of works, all safety and protection devices have to be re-assembled and made operable.

Prior to re-commissioning, the points mentioned in chapter „Commissioning“ have to be observed.

Proper use

This pump station is designed to deliver wastewater containing and free of faeces. The use of the pump station for all other purposes is unauthorised. The manufacturer is not liable for any damage resulting from improper use; the risks associated with improper use are borne solely by the operator.

Refer to page 48, chapter 6.2, for all media which may not be led in

CAUTION

Proper use also includes

- Observation of all national laws and regulations.
- Observation of the inspection and service instructions.
- Observation of the manufacturer's specified assembly, commissioning, operating and maintenance instructions.
- For safety reasons, it is also not permitted for any alterations to be carried out on the equipment.

Arbitrary modifications and spare parts production

Modifications or alterations at plant are permissible only with manufacturer's prior consent.

CAUTION

- Original spare parts and accessories authorised by the manufacturer serve safety purposes. When using non-original components, no damage claims are accepted for the consequences arising.
- Using original ACO Haustechnik components guarantees safe and reliable operation of wastewater lifting plant.

Delayed installation

If it is already known or anticipated at the time of installation that a protracted period will elapse pending commissioning, the following measures have to be taken to protect the plant:

- Protect the plant (components) against moisture and soiling (especially electrical parts).
- Occasionally operate the moving parts to prevent seizing.
- If pump cables are not yet connected, protect cable ends against moisture.

CAUTION

If the period before commissioning exceeds one year, have the plant checked by the ACO Haustechnik after-sales service (subject to a charge).

Stopping and re-commissioning

Works at the plant may basically only be performed during stillstand periods. The process sequence to stop plant, described in the operating manual, must be adhered to. Directly following completion of works, all safety and protection devices must be re-installed or set into function.

CAUTION

Prior to re-commissioning, all points mentioned in section "Commissioning" have to be observed.

Electrical safety

CAUTION



Before any work is carried out on the electrical equipment, it is essential for the following measures to be implemented in the following order:

- All-pole disconnection (switching off the main switch or disconnecting the mains plug).
- Securing the electrical equipment against accidental switching on and checking that the system is not connected to the circuit.

The electrical installation of equipment and components must comply with the requirements of European Standards EN 1012 part 1 and EN 60 204 part 1; possibly local regulations of power utilities have to be considered.

The local potential equalisation must also be observed.

Work on the electrical equipment of the pump station must only be carried out by a properly qualified electrician or by properly instructed persons working under the instruction or supervision of a properly qualified electrician in accordance with the electrical regulations.

Environmental protection



Observe the waste law regulations when disposing of substances taken out of the plant.

Safety and health protection measures

As regards the safety and health protection measures which have to be carried out basically, we point to the pertinent regulations of the Government Safety Organisation and those of the Federal Association of Accident Insurances.

3.3 Regulations and Standard specifications

(Note: the following summaries make no claim to be complete)

Legal regulations

The requirements for operating land drainage plants are defined in the Federal and state Building Law, Water Rights and Waste Law as well as in the municipal Bylaws. Depending on federal state, the decrees and laws may vary.

What all legal foundations have in common is the fact that they refer to status and generally accepted technical rules as far as concrete requirements are concerned.

Decisive standards and directives

Standard/directive	Latest edition	Title
DIN EN 12050-1/2 (Product standard)	05-2001	Wastewater lifting plants for building and land drainage Design and test principles Part 1: Faeces lifting plants / Teil 2: Lifting plants for wastewater free of faeces
DIN EN 12056-1	01-2001	Gravity drainage plants inside buildings Part 1: General and design requirements
DIN EN 12056-4	01-2001	Gravity drainage plants inside buildings Part 4: Wastewater lifting plants - planning and dimensioning
DIN 1986-100	01-2001	Drainage objects for building and land drainage Part 100: Additional regulations on DIN EN 752 and DIN EN 12056
DIN EN 752	01-2001	Drainage installations outside buildings
DWA-M 167-4	12-2007	Backflow safety by lifting plants or backflow stops

Standards and directives for planning

Keyword	Symbol	Title	Standard/directive; -chapter- (excerpt)
Drainage object	-	Installation comprising of drainage objects, pipes and other components which collects and drains wastewater by gravity. A wastewater lifting plant can be part of a gravity drainage object.	DIN EN 12056-1; -3.1.3-
Natural incline	-	All drainage objects located above the backflow level must be drained with natural incline and may thus not be connected to the wastewater lifting plant.	DIN EN 12056-1; -4.1-
Backflow protection	-	Drainage points below the backflow level must be protected against backflow. This backflow prevention is carried out by wastewater lifting plants with backflow loop. Only the backflow loop design offers a high degree of safety against backflow.	DIN EN 12056-4; -4-
Backflow level	-	If not determined otherwise by competent authorities, at least road level at connection point is considered as backflow level.	DIN EN 12056-4; -4-
Selection	-	Planning and selection of wastewater lifting plants must be carried out according to DIN EN 12056-4 and DIN 1986-100.	DWA-M 167; -3.1-
Planning documents	-	Prior to assembling the lifting plant or the backflow stop it must be checked if the plant, which is to be fitted, corresponds to the approved planning documents as well as the applicable standards.	DWA-M 167; -3.1-
Accessibility	-	Accessibility for installation, maintenance, check and disposal must be guaranteed, even during operation.	DWA-M 167; -3.1-
Installation location	-	The installation location must be sufficiently sustainable and must be in accordance with noise protection regulations in civil engineering, among others.	DWA-M 167; -3.1-
Connecting heights	-	The existing drainage lines must be checked for suitable connecting height.	DWA-M 167; -3.1-
Surface water	-	Surface water occurring outside the building below the backflow level must be delivered via a wastewater lifting plant, separated from domestic wastewater and outside the building.	DIN EN 12056-4; -5.1-
Useable volume	-	The useable volume of the lifting plant must be bigger than the volume in the pressure pipe above the backflow preventer up to the backflow loop, however it must at least be 20 l. This guarantees that the volume in the pressure pipe is exchanged in the case of a pumping process.	DIN EN 12056-4; -6.3-

Standards and directives for installation

Keyword	Symbol	Title	Standard/directive; -chapter- (excerpt)
Collective container		Collecting containers for wastewater containing faeces may not be connected directly to the building.	DIN EN 12056-4; -5.1-
Twin plant		A twin system must be installed for plants for which the sewage flow must not be interrupted.	DIN EN 12056-4; -5.1-
Emptying of line		All pipelines must be routed so they are self-emptying (apart from the pressure pipe).	DIN EN 12056-4; -5.2-
Strainless		The drainage pipes must be connected strainlessly to the pump station.	DIN EN 12056-4; -5.2-
Nom. width reduction		The pipes must not narrow in the direction of flow.	DIN EN 12056-4; -5.2-
Inlet line		A gate valve must be fitted on the inflow side.	DIN EN 12056-4; -5.2-
Noise protection		All pipes must be connected to the pump station flexibly and sound-absorbing.	DIN EN 12056-4; -5.1-
Load release		The weight of the pipes must be absorbed appropriately.	DIN EN 12056-4; -5.1-
Ventilation		Vent lines (mainly with faeces lifting plants) must be taken above the roof, permanently rising and without reducing their nominal width). The pipe may be inserted into either the main or secondary uptake.	DIN EN 12056-4; -5.3-
Ventilation		The vent line for the pump station must not be connected to the vent line for a grease separator on the inflow side.	DIN EN 12056-4; -5.3-
Pressure pipe		The pressure pipe for the pump station must be routed with the bottom of the backflow loop (So) above the backflow level (RS).	DIN EN 12056-4; -5.2-
Pressure pipe		The weight of the pressure pipe must be absorbed appropriately.	DIN EN 12056-4; -5.1-
Pressure pipe		A backflow preventer must be installed in the pressure pipe. If a valve is not fitted behind this, the backflow preventer must have an extractor device or there must be another means of evacuation.	DIN EN 12056-4; -5.2-
Pressure pipe		A valve must be installed in the pressure pipe behind the backflow preventer. This can be dispensed with if the nominal diameter of the pipe is > DN 80.	DIN EN 12056-4; -5.2-
Pressure pipe		In the case of elastic connections that are not non-positive in the vertical direction, the pipe must be secured against becoming loose.	DIN EN 12056-4; -5.2-
Pressure pipe		The min. nominal size of the pressure pipe must correspond to table 5 of DIN EN 12056-4.	DIN EN 12056-4; -5.2-
Pressure pipe		Pressure pipes must always be connected to ventilated drainage systems or collecting mains. The pipes must be connected in the same way as unpressurised pipes.	DIN EN 12056-4; -5.2-
Pressure pipe		The pressure pipe must withstand at least 1.5 times the maximum pumping pressure of the system. Appropriate pressure pipes must be used to comply with this requirement.	DIN EN 12056-4; -5.2-

Standards and directives for installation

Keyword	Symbol	Title	Standard/directive; -chapter- (excerpt)
Pressure pipe		No other pipes may be connected to the pressure pipe.	DIN EN 12056-4; -5.2-
Pressure pipe		Pressure pipes of pump stations must not be connected to downpipes.	DIN EN 12056-4; -5.2-
Pressure pipe		The flow rate in the pressure pipe must not be less than 0.7 m/s or exceed 2.3 m/s.	DIN EN 12056-4; -6.1-
Pressure pipe		Ventilating valves are not permitted in the pressure pipe.	DIN EN 12056-4; -5.2-
Pipeline		The pipe must be routed so that it is protected against frost.	DIN EN 12056-4; -5.2-
Electrical appliances		Electrical devices that will not withstand flooding must be installed in dry and well ventilated rooms so that they are safe from flooding	DIN EN 12056-4; -5.5-
Electrical connection		The electrical connection must only be performed by an electrician. The relevant national regulations must be observed.	DIN EN 12056-4; -5.5-

Standards and directives for operation

Keyword	Symbol	Title	Standard/directive; -chapter- (excerpt)
Commissioning		Commissioning must be carried out by a specialist, the availability of whom lies with the direct supplier of the wastewater lifting plant. For commissioning, a test run with water over at least two switching cycles is required. During the test run, a dry running must be avoided. Prior to, during and after this test run, the following must be checked: see standard.	DIN EN 12056-4; -8.1-
Inspection		Wastewater lifting plants should be checked once a month for operating ability by the operator by observing at least two switching cycles.	DIN EN 12056-4; -8.1-
Maintenance		The system must be serviced by an expert. The intervals must not exceed the following: - Every 3 months on industrial sites. - Every 6 months in multiplex houses. - Once a year in single-family houses. During maintenance, the following works have to be carried out: see standard.	DIN EN 12056-4; -8.2-
Maintenance contract	-	It is recommended to the plant operators to take out a maintenance contract for the maintenance and servicing works which have to be carried out regularly.	DIN EN 12056-4; -8.3-

4. Product description

4.1 Pump station layout (wastewater lifting plant)

Basic design

PE-HD shaft

- 1 x inlet DN 150
- 2 x DN 100 for vent connection and blank cable duct
- Beam of powder-coated cast iron
- Automatic above-water coupling for support of an ACO Passavant submersible motor pump
- Pressure pipe connection (DN 40 or 50) of stainless steel
- 1 ball valve G 2 with operating key
- Vertically closing ball retaining valve G 2
- PE pressure piping outlet / compression screw joint DN 50
- Manhole cover, nominal dia. 600 / loosely applied or odourproof sealed: class A15, B125 or D400 (with class D, with top section H = 1300 mm and load distribution plate)

Submersible pump with pressure piping connection

- Submersible motor pump cpl., with liquidiser or with impeller with 10 m connecting cable
- Pressure piping cpl. with pressure connecting unit and attached chain with shackle

Accessories

Switchgear with pressure transmitter and cable lead-in

- With display
- Pressure transmitter (back pressure bell) with 20 m pneumatic control line and high-strength cable gland PG11
- Cable lead-in

Pressure transmitter

- Pressure transmitter (level probe) with 20 m or 40 m connecting cable and high-strength cable gland

Ex-barrier (required only when using pressure transmitter - level probe - in an Ex area)

- Housing equipped with 2 high-strength cable glands and connecting cable

Top section

- PE-HD top section (H = 750 or 1400 mm),
- Sealing ring
- Operating key with chain (L = 1100 or 1750 mm)

Flexible guide belt (required only when using top section)

- Short or long design

Rinsing connection of pressure piping

- Stainless steel pipe DN 40 with threaded connection R 1 ½, to screw in pressure piping in the shaft
- On one side with ball valve and connection coupling R 1 ½ Storz C 52 system with blind coupling
- Length 430 mm for installation in shaft without top section. In the case of designs with top sections, pipeline has to be extended accordingly on site.

Vacuum relief valve

- Pipe bend with connecting coupling C 52 and ball ventilation valve

Signalling unit

- Self-loading, independent alarm, visual and audible, with potential-free contact, visual and audible, without contact maker, for assembly outside the Ex area, housing: 125 x 175 x 75 (mm), protection type: IP65, operating voltage: 230 V/AC 50/60 Hz, ready-to-plug in with cable: 2 m

Air bubble injection for pneumatic level switch

- Mini compressor, ready to plug in, connection 230 V
- Spring check valve, T-screw joint, control line 2 x 0.5 m long

Open air cabinet (for installation of switchgear mono or duo and the air bubble injection unit, 2 designs as accessories)

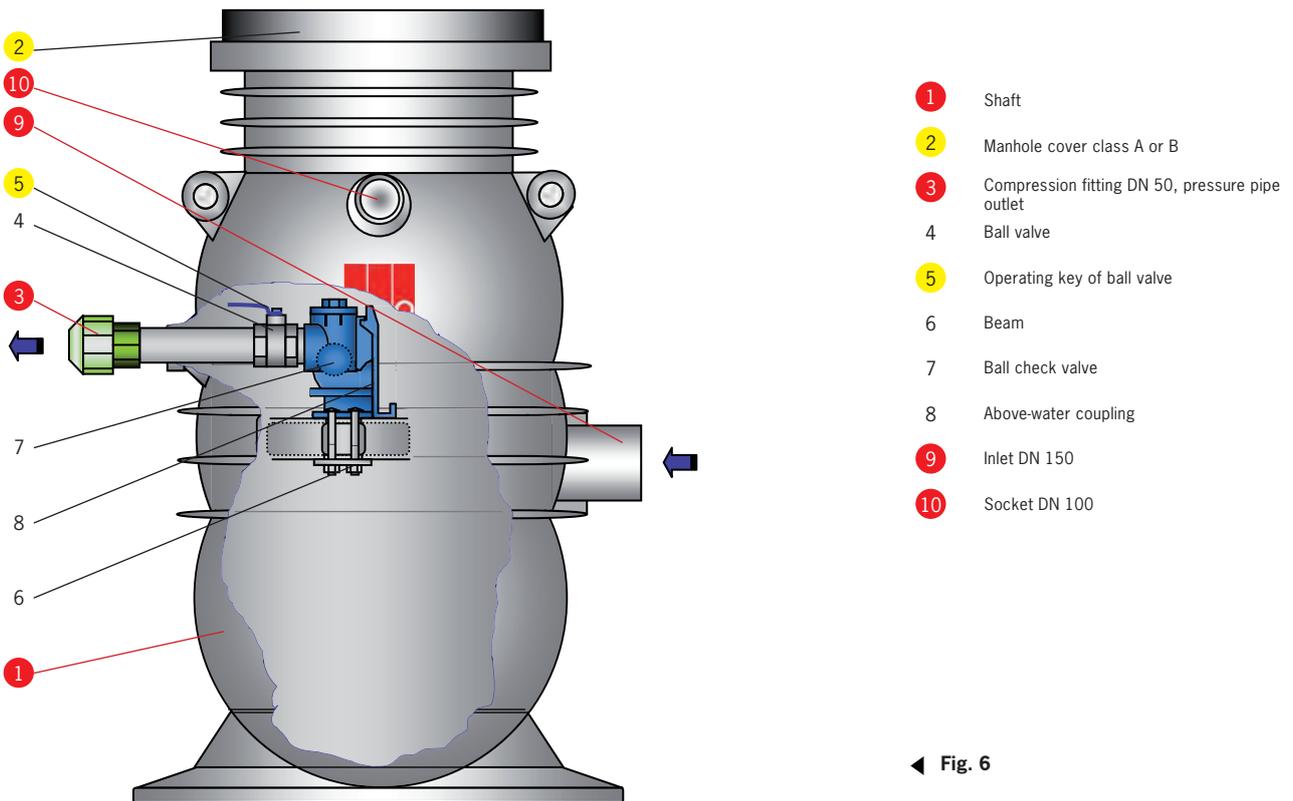
- Cylinder lock (simultaneously locking)
- Pre-fuse C16 (mono) or C25 (duo) with simultaneous function of main switch
- Permanent light, impact-proof
- Terminal for potential equalisation

4.2 Pump station components (wastewater lifting plant)

■ ACO Passavant scope of supply for in situ installation or assembly

■ Here, in situ installation and connecting works with in situ material are required

Shaft with manhole cover class A15 and B125



◀ Fig. 6

Submerged pump with pressure connection line



◀ Fig. 7

Switchgear (accessory)

- 1 Switchgear with and without display
- 2 Pressure transmitter with control line
- 3 Cable lead-in

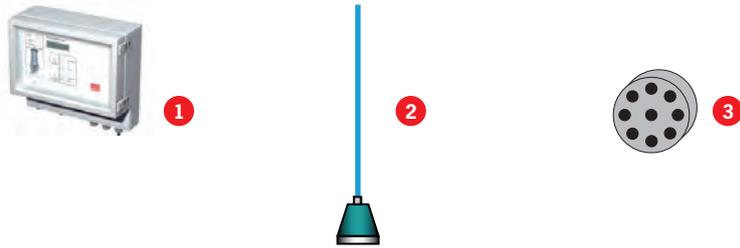


Fig. 8

Shaft with manhole cover class D400

- 1 Shaft
- 2 Manhole cover class A or B
- 3 Compression fitting DN 50, pressure pipe outlet
- 4 Ball valve
- 5 Operating key of ball valve
- 6 Beam
- 7 Ball check valve
- 8 Above-water coupling
- 9 Inlet DN 150
- 10 Socket DN 100
- 11 Top section
- 12 Load distribution plate

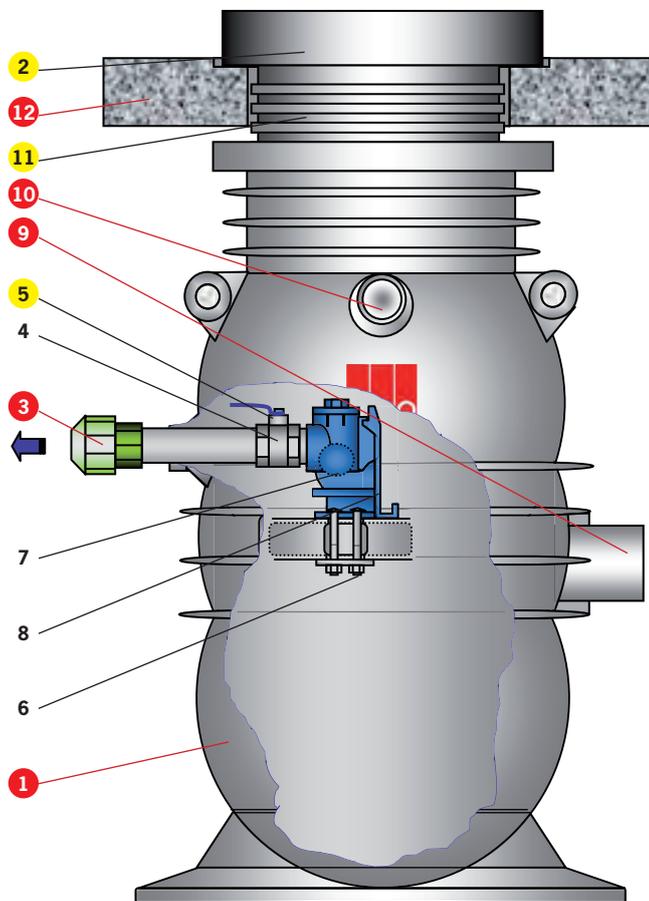


Fig. 9

Top section / flexible guide belt / operating key (accessory)

- 1 Top section
- 2 Operating key
- 3 Guide belt

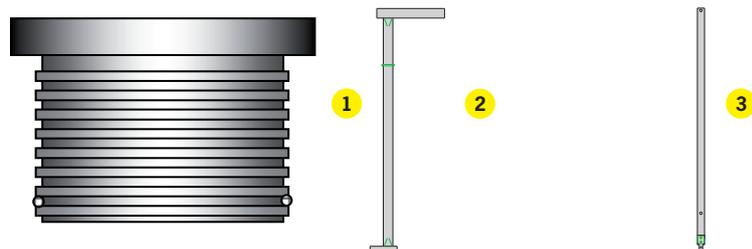


Fig. 10

Pressure transmitter -level probe- (accessory)



1 Pressure transmitter with 20 or 40 m cable

◀ Fig. 11a

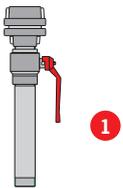
Ex-barrier (accessory)



1 Ex-barrier with housing, cable glands and connecting cable

◀ Fig. 11b

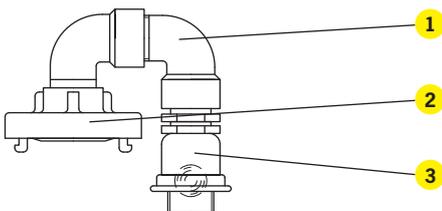
Rinsing connection of pressure pipe (accessory)



1 Rinsing connection

◀ Fig. 11c

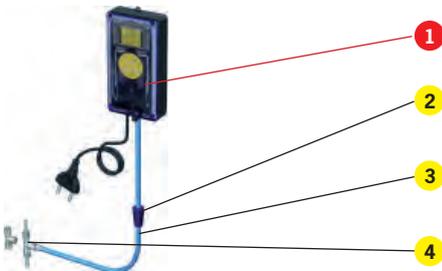
Vacuum relief valve (accessory)



- 1 Pipe bend
- 2 Connecting coupling
- 3 Ball ventilation valve

◀ Fig. 12

Air bubble injection for pneumatic level switch (accessory)



- 1 Compressor
- 2 Spring check valve
- 3 Control line
- 4 T-screw joint

◀ Fig. 13

Signalling unit (accessory)



◀ Fig. 14

Open air cabinet (accessory)



◀ Fig. 15

4.3 Pump station function (wastewater lifting plant)

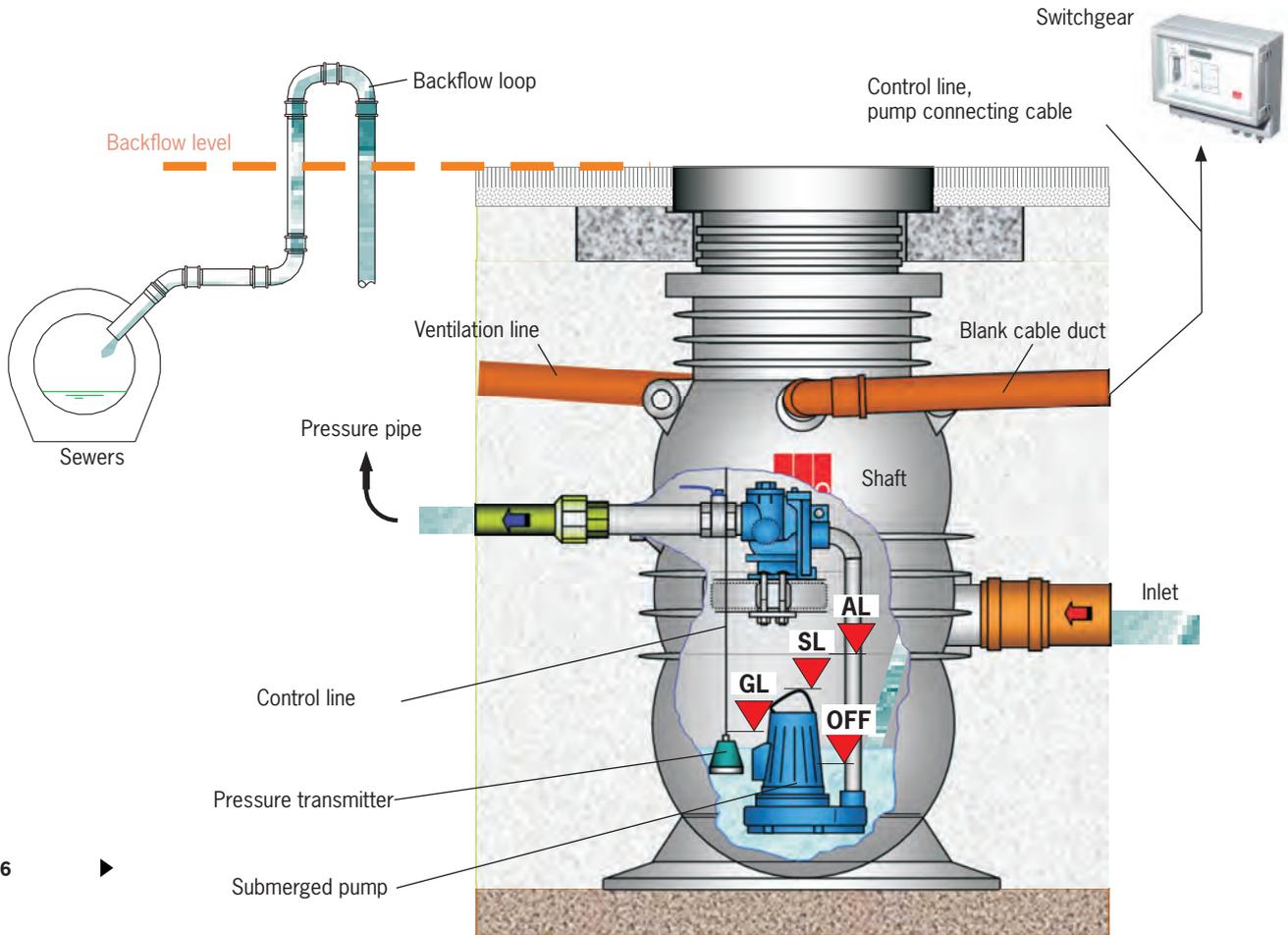


Fig. 16

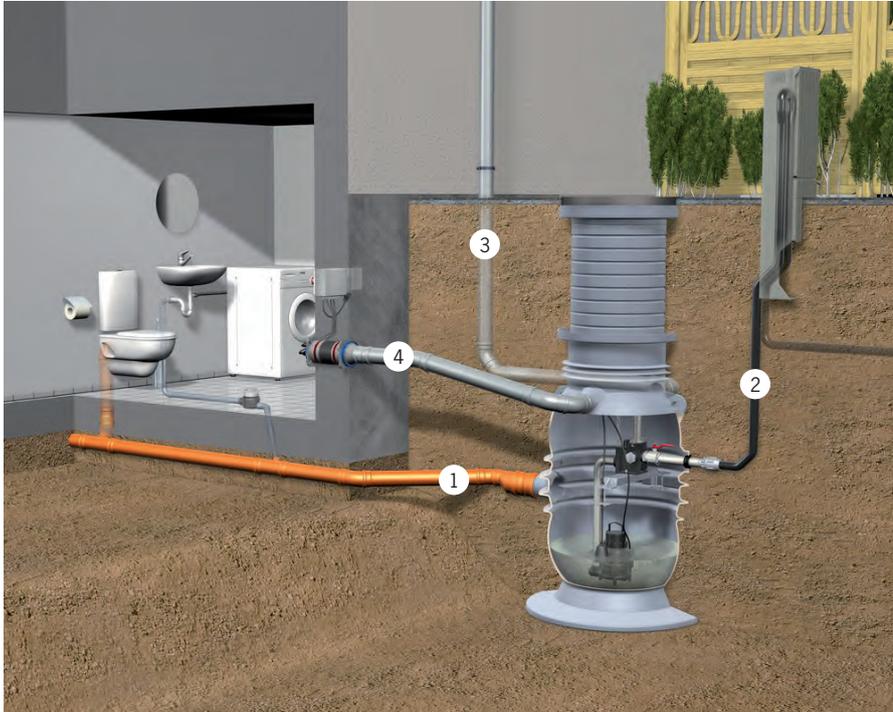
Description | The ACO MULI-MAX-F is a wastewater lifting plant which is used to protect properties against backflow. All drainage installations located below the backflow level are at risk of flooding from backflow. Wastewater generated by these drainage installations (free of faeces or containing faeces) flows through the pipes and into the pump station via the inlet. The submersible pump is switched on once the wastewater reaches a preset level. Wastewater is raised via the pressure pipe up to the bottom of the pipe in the „backflow loop“ and then flows down gradient into the sewers. The operation of the pump is automatically controlled by a water-level-dependent pneumatic level switch. The pressure transmitter (open back pressure bell or level probe) installed in the shaft is connected by a continuously rising control pipe or a connecting cable to the switchgear.

Two submersible pumps are installed in the Muli-Max-F duo model to guarantee higher levels of operational safety. The two pumps are operated alternately, i.e. after one pump has gone into action and finished the operation, the change-over switch automatically switches over to the second pump which springs into action the next time the water level reaches the preset height. The second pipe is additionally switched on together with the first pump if large volumes of wastewater are being generated or if the level „SL - peak load“ is reached.

The pump is switched on when the water level reaches the “GL - base load” level, and the pump is switched off again when the water level drops down to the “OFF” level. The volume of liquid between these two “switching points” is the working volume of the pump station. When the “AL - high level alarm” is reached, this sets off the alarm in the switchbox and means that the condition of the pump must be inspected. The operational safety of the automatic level switch by the open back pressure bell can be improved by installing the optional air bubble injection system (accessory). A mini compressor continuously produces compressed air and injects this into the pressure transmitter via the control pipe. The compressed air bubbles freely into the wastewater inside the pressure transmitter to reduce the risk of blockages.

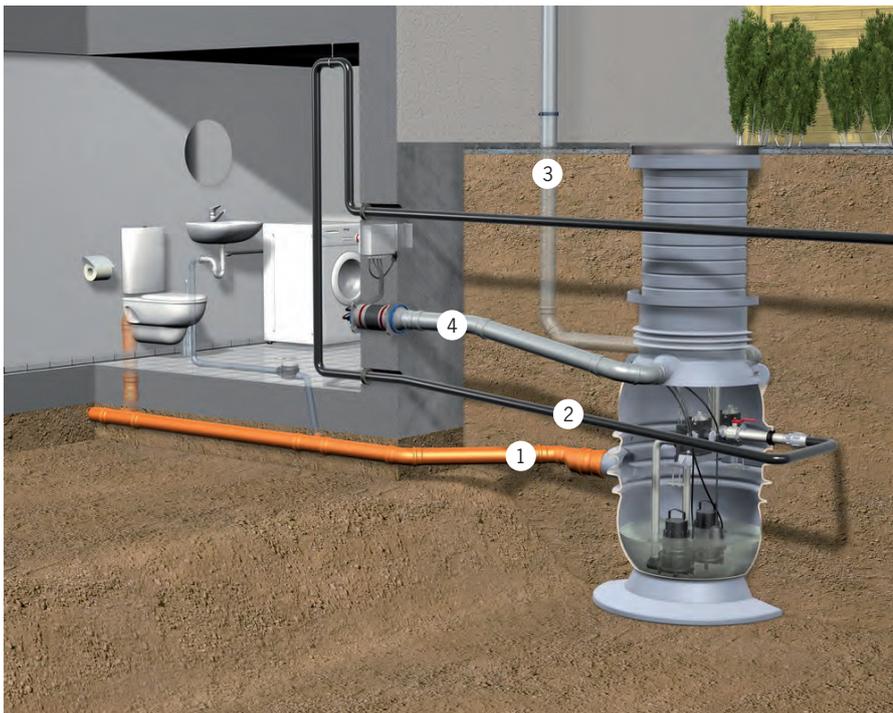
The switching levels must be tested before commissioning the pump station by filling it with water via the inlet or the manhole cover.

4.4 Suggested installation



- 1 Inlet line
- 2 Pressure pipe
- 3 Ventilation pipe
- 4 Blank cable duct

◀ **Fig.17**
mono design



- 1 Inlet line
- 2 Pressure pipe
- 3 Ventilation pipe
- 4 Blank cable duct

◀ **Fig.18**
duo design

4.5 Power supply information

Water supply

For general cleaning works and internal cleaning of shaft tank, a fresh water tap R ¾" should be provided in the vicinity of pump station, if possible. Warm water connection should preferably also be available.

Mains supply

Unit: switchgear |

For mains supply, a CEE socket (16 A mono, 32 A duo) with connecting value of 400 V, 50/60 Hz is required. Fuse protection in accordance with local conditions.

Unit: air bubble injection for pneumatic level switch |

For mains supply, a socket with earth contact with connecting value of 230 V/ 50 Hz is required. Fuse protection in accordance with local conditions.

4.6 Information on potential-free contact - collective fault signal / operating signal

Refer to switchgear manual (enclosed hereto).

5. Preparing the product for use

5.1 Transport, delivery and storage

Transport

Transport instructions | To ensure that the pump station (wastewater lifting plant) and its components are not damaged during transport, use a forklift truck, lifting truck or sling straps.

Transport with forklift trucks or lifting trucks | When transporting the pump station with a forklift truck or a lifting truck, make sure that the plant and its components are firmly placed on a suitable transport medium (e.g. wooden pallet).

Delivery | The pump station and its components are usually fixed to non-returnable wooden pallets and wrapped with a film.

Transport with crane hooks | When transporting the wastewater lifting plant with crane hooks, please fix the proper sling belts to the substructure or to the supply units.

CAUTION

Never lift up the unprotected plant on its own without an underlying transporting medium, otherwise there is a significant risk of damaging the plant.

CAUTION

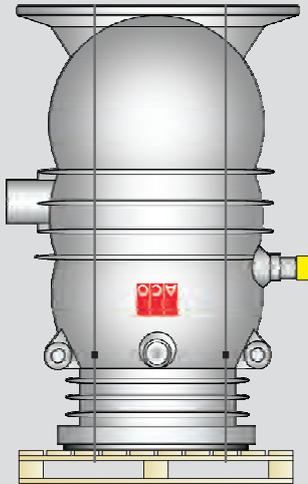


When transporting the wastewater lifting plant and its components with a crane, it is essential to observe all of the safety regulations for load suspension equipment and lifting equipment.

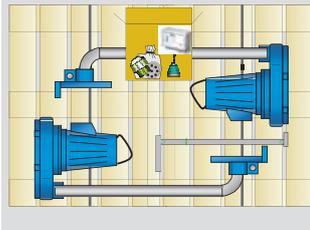
- Never stand beneath any suspended loads.
- Never exceed the authorised max. lifting weight of the lifting equipment.

Delivery (possible supply units)

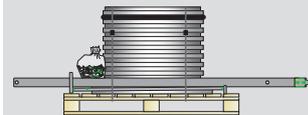
- Pallet with manhole cover and shaft (upside down)



- Pallet with submersible pump and pressure connection line (2 x with duo design)
- Operating key of ball valve
- Switchbox and pressure transmitter with 20 m control line, bypack bag with compression screw joint and cable lead-in



- Pallet with top section (750, 1300 or 1400 mm long)
- Sealing ring (2 off with class D)
- Appropriately long operating key for ball valve
- Bypack bag with fixing material (bolts, washers, nuts)
- Hooks



- Pallet with load distribution plate



Packing

The type of packaging used partially depends on the means of transport. If not specified otherwise, the packaging must comply with the packaging regulations (HPE) of the German Wooden Articles, Pallets and Export Packaging Federation, and those specified by the Federation of German Mechanical Engineering Institutes. The plant components are mounted to wooden pallets for transport purposes.

CAUTION

For transport of plant components at a later date, wooden pallets should again be used.

Storage

Pump station components should be stored in a closed, frostproof room in packed condition.

CAUTION

Storage of shaft and PE-HD top section must not exceed 4 months.

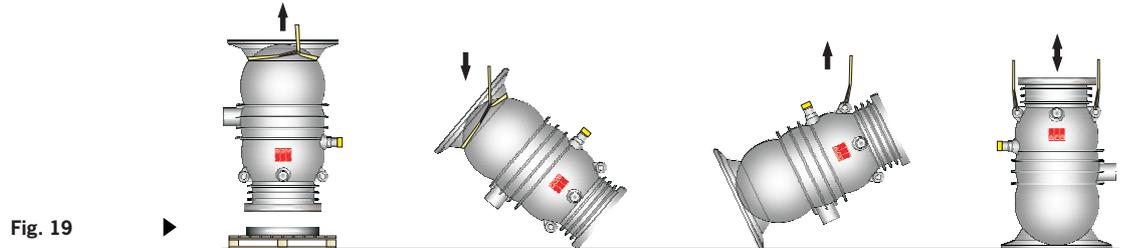
5.2 Installation and assembly of plant

ACO Passavant scope of supply for in situ installation or assembly

Here, in situ installation and connecting works with in situ material are required

Shaft installation preparation

Turning the shaft



- Remove tension straps from shaft and turn and install upside down shaft with adequate lifting gear (observing the safety instructions).

CAUTION

Prior to installing the shaft, note down its serial number under para 10.2.

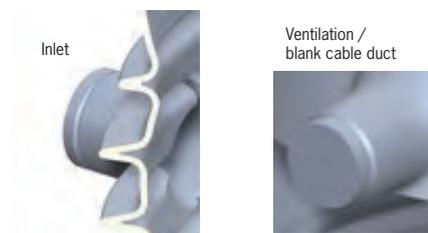
Note down serial number

Fig. 20



Open sockets

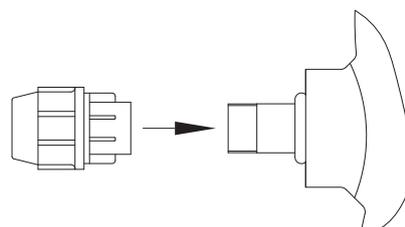
Fig. 21



- The connecting sockets DN 150 (inlet), 2 x DN 100 (ventilation and blank cable duct) are closed and must be opened by a saw cut (approx. 10 mm from outer edge).

Compression fitting DN 50

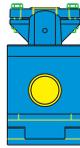
Fig. 22



- Remove protective cap from pressure piping spigot end.
- Take compression fitting out of bypack bag.
- Seal thread at pressure piping thoroughly and screw on compression fitting.

Removing the protective cap / above-water coupling unit

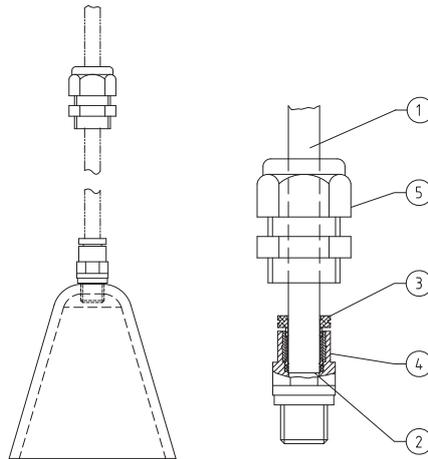
- Remove protective cap from above-water coupling unit (two in the case of duo design).



◀ Fig. 23

Prepare the pressure transmitter (open back pressure bell) for installation

- Follow this procedure when connecting the pneumatic pipe to the threaded connection:
- Push the PG screw joint (5) used later to suspend the water level pressure bell, over the pneumatic pipe.
- Cut the pneumatic pipe (1) orthogonally with a sharp knife or a pipe cutter to shorten it to the right length (side cutters are not suitable).
- Make sure that there is no external damage such as cracks or squashed sections in the pneumatic pipe (1). Any damage to the pipe may destroy its integrity.
- Insert the pneumatic pipe (1) until it reaches the stop (2) in the hose push-fit connection (4). The connection is now complete.
- Release the pressure pipe by pressing the outer pressure ring (3).



◀ Fig. 24

Install the pressure transmitter in the shaft

- The pressure transmitter - open back pressure bell with and without air bubble injection or level probe - is fixed into place with the high-strength cable gland into the intended rebate in the cross beam and adjusted to dimension.

CAUTION

Draw 20 m control line or the cable into the blank cable duct (refer to fig. 30).

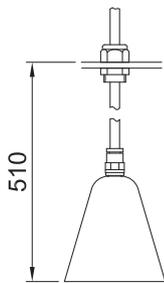
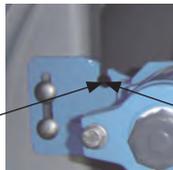
CAUTION

Pneumatic control line

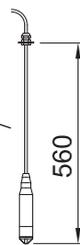
- Lay the pneumatic pipe ensuring that there are no sharp bends or squashed pipe along the whole length of the pneumatic pipe.
- The pipe must be laid so that it rises continuously.
- The pipe must be laid at a frostfree depth (in the ground min. 50 – 80 cm).
- It is vital no dirt or water is allowed to enter the pneumatic pipe.

The pneumatic pipe should be laid in a protective pipe when installed in the soil or areas at risk of mechanical deformation (best of all, lay it in the blank cable duct right from the start)..

▼ Fig. 26



▲ Fig. 25a
Open back pressure bell



▲ Fig. 25b
Level probe

Setting up potential compensation in the shaft

CAUTION



Set up potential compensation in accordance with VDE 0100, part 540.
The electrical connection of beam with the protective conductor must be checked for free passage.

- The potential compensation cable (in situ) (NYY-J 6mm²) should be laid with an appropriate length of cable through the KG pipe intended for the purpose (see fig. 32) between the shaft and the position of the switchgear.
- The connection point in the shaft is the PA-labelled connection on the cross beam which is also used to fix the coupling feet into place.

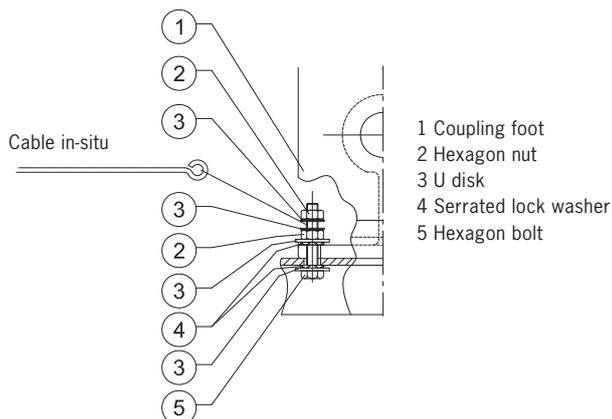


Fig. 27

Assemble guide belt (in the case of design with top section)

CAUTION

Suspend guide belt in hook of top section.

- Bolt down guide belt to coupling foot by means of fixing material supplied

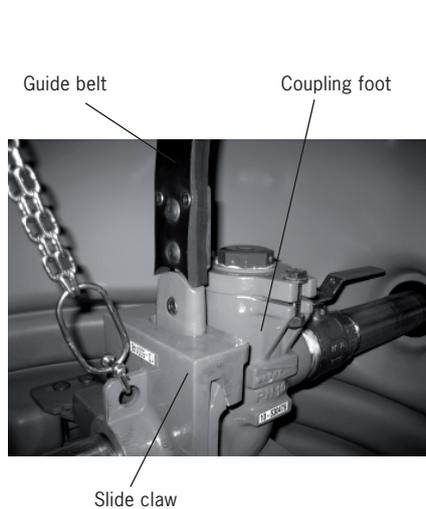


Fig. 28

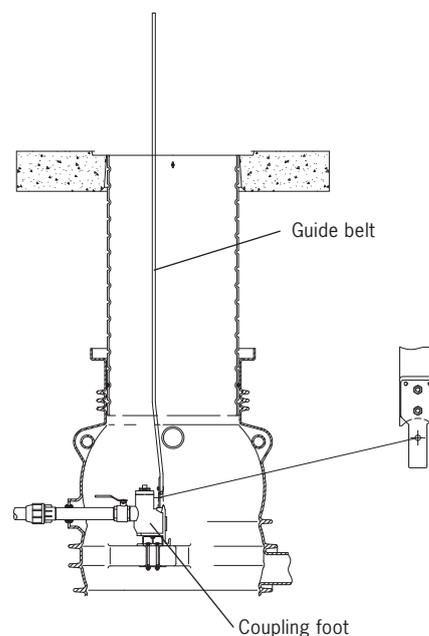
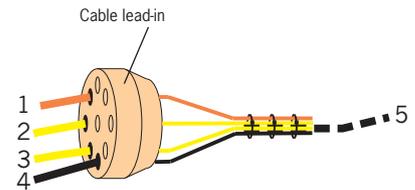


Fig. 29

Pulling in the cable and control pipe through the cable lead-in

- Push the pump cable (no. 2,3; 10 m long) through the cable opening and fasten it to the transmission wire of the blank cable duct (2 in the case of the duo model).
- Push the pneumatic pipe or the cable (no. 1, 20 m long) of the pressure transmitter through the cable lead-in and fix to taut wire of blank cable duct.
- Push the potential compensation cable (no. 4) through the cable lead-in and connect it to the taut wire.
- Now pull the taut wire (no. 5) with the attached cables and control pipe carefully through to the position where the switchbox is to be installed.
- Now press the cable lead-in into the opening of the blank cable duct connection. This avoids or makes it more difficult for water to enter the blank cable duct when it reaches a high level in the shaft.

Fig. 30



CAUTION

An adequate length of pump cable must remain in the shaft to ensure that the pump unit can be pulled out of the shaft (dispend slap cable loop in the shaft).

CAUTION

Pneumatic control line

- Lay the pneumatic pipe ensuring that there are no sharp bends or squashed pipe along the whole length of the pneumatic pipe.
- The pipe must be laid so that it rises continuously.
- The pipe must be laid at a frost-free depth deep (in the ground min. 50 – 80 cm).
- It is vital that no dirt or water is allowed to enter the pneumatic pipe.

Fig. 31

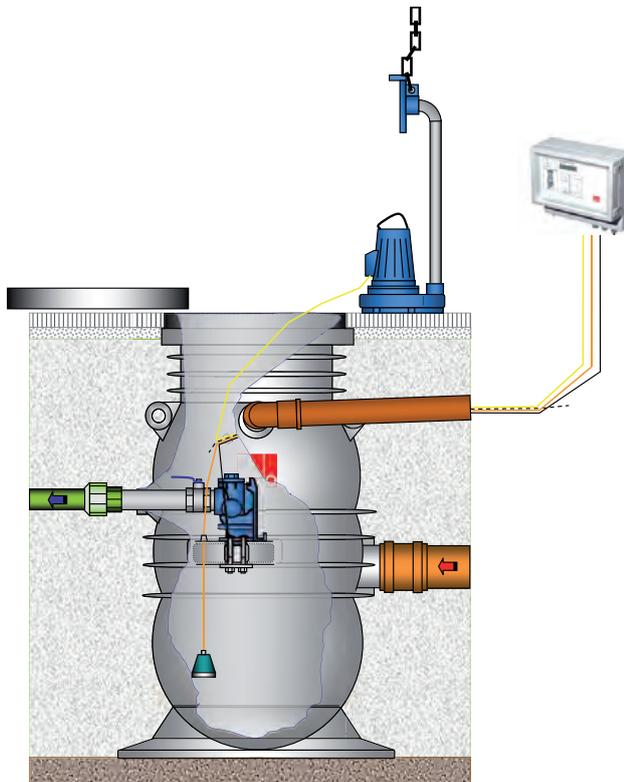
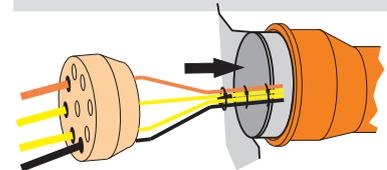


Fig. 32

- Cable and control line in the blank cable duct -

Assembly of rinsing connection of pressure piping (accessory, 2 off in the case of duo design)

- Remove plug from coupling foot.
- Seal thread R 1 ½ at end of rinsing pipe DN 40 thoroughly and turn in unit in threaded socket of coupling foot.

CAUTION

Rinsing connection unit is about 430 mm long and can be extended in-situ.

Carry out retrofit during a maintenance.

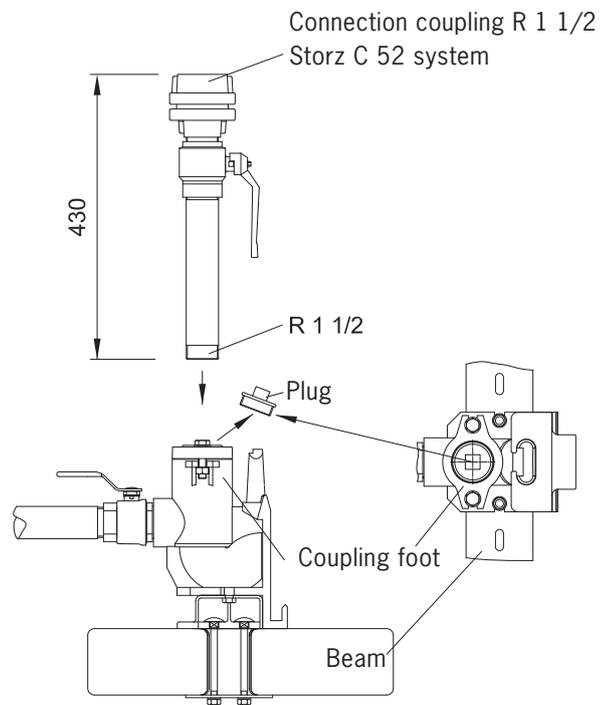


Fig. 33

Location / determining pump shaft location

OPTION 1

Walk-on area A15 and car-proof area B125

Footpaths, pedestrian areas and similar areas, car parking areas and multi-storey car parks.

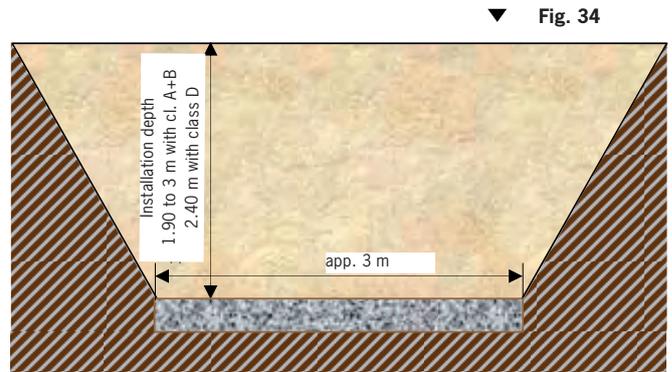
OPTION 2

HGV-proof area D400 / SLW 60

Hard shoulders of roads and parking areas approved for all kinds of road vehicles. Operation areas with short-time traffic load by HGV traffic SLW 60 as well as parking areas for cars, lorries and storage areas are suitable locations. Roads with permanently flowing HGV traffic, as e. g. industrial and public roads, have to be excluded as locations.

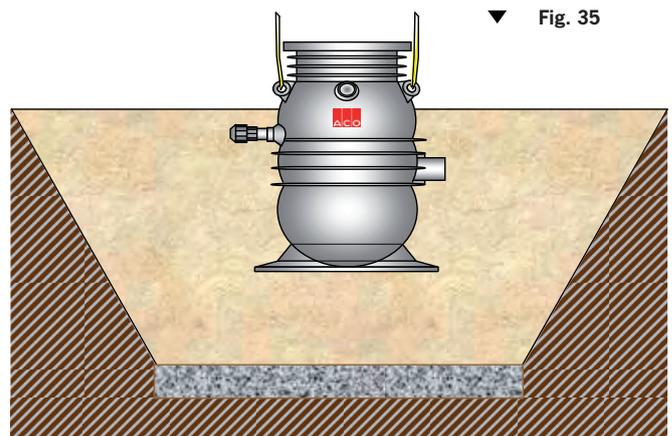
Carrying out the excavation / foundation

- For the ACO pump shaft, an excavation of 1.9 m to 3.0 m has to be carried out plus 30 cm for underfilling.
- In unfixed soil, carry out trench slope below 45° and in binding soil, below 60°.
- Steeper slopes have to be properly and professionally safeguarded by sheeting and other measures.
- The foundation must be carried out on non-binding soil (group G1 pursuant to ATV-DWK-A127).
- The underfilling must have a thickness of about 30 cm and it has to be compacted to a Proctor density of Dpr 97%.
- An even level supporting area has to be permanently guaranteed for the ground plate.



Bringing in the shaft in the excavated trench

- Bring in shaft in excavation by means of appropriate lifting gear (observing all safety regulations).

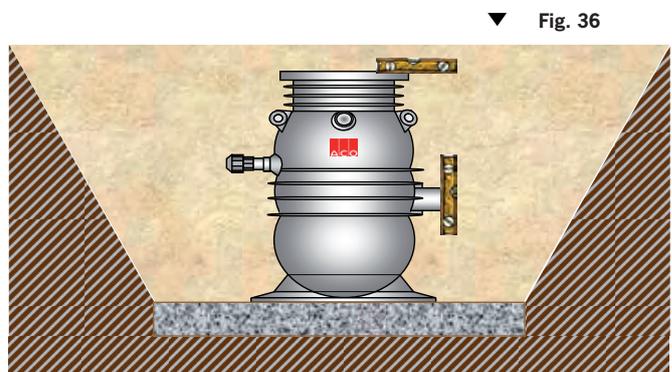


Aligning the shaft

- Align shaft vertically and horizontally.

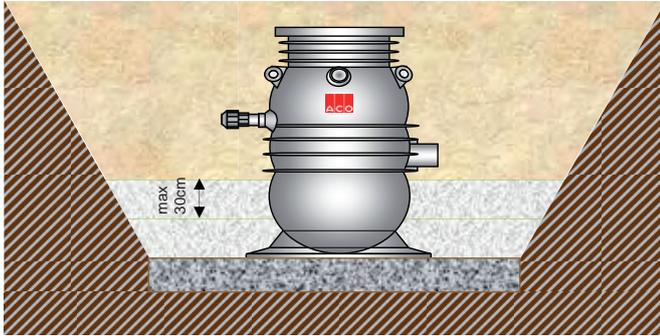
CAUTION

Align with the pipe axis.



Filling in the excavated trench

Fig. 37



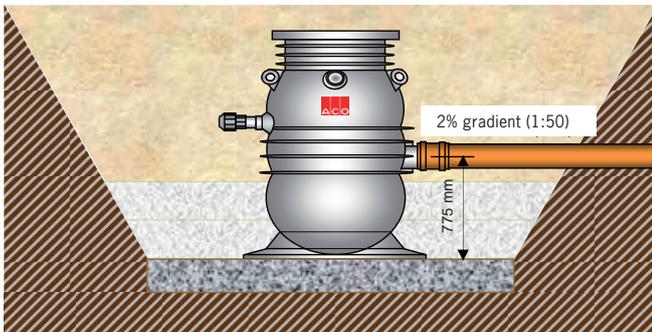
- For the excavated trench, use non-binding soil to embed the shaft by 1.0 m.
- Fill in excavated trench in individual layers up to underneath the inlet socket, evenly all around with gravel of low sand content. Layers should not exceed 30 cm height. Compact up to a Proctor density of Dpr 97%.

CAUTION

The used building materials and installation procedures may not cause damaging deformation, other damages or unfavourable loading conditions to the pump shaft!

Connecting the inlet line

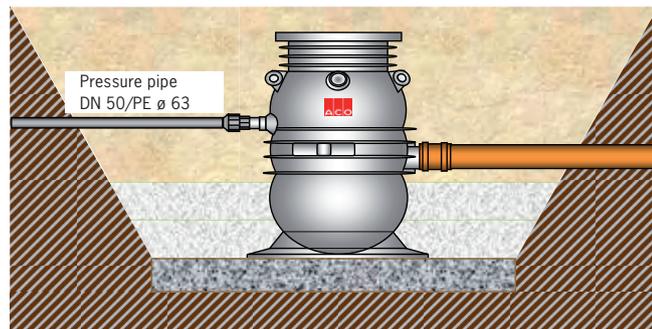
Fig. 38



- Connect inlet line to inlet socket DN 150 (connecting dimensions as per DIN EN 877, outside \varnothing 160).

Connecting pressure piping

Fig. 39



- Insert pressure piping DN 50, outside \varnothing 63, into compression screw joint of pressure connections and seal by tightening the spigot nut.

CAUTION

- For further information on laying of pressure piping, see para 3.3.
- Laying options of pressure piping, see under para 4.4, suggested installation.

NOTE

■ In order to guarantee best possible protection against backflow from the public sewers, lay pressure pipe base above the backflow level (highest level up to which water may be able to rise, in most cases pavement level).

CAUTION

Please observe the following as regards distance between pump station and base of backflow loop:

■ The pump delivery flow and delivery head of wastewater lifting plant must be bigger than the total delivery head.

Pump delivery flow in l/s:

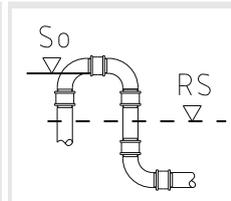
- Volume flow pumped above the total delivery head by operating pump station pump.

Delivery head in m:

- Pressure head of the operating pump station pump to come over the static height difference as well as the total loss height in the pressure pipe.

Total delivery head in l/s:

- The total delivery head is the sum of static delivery head plus pressure height losses in fittings plus pipe frictional loss (all in m).



Backflow loop:

- PB = Pipe base of backflow loop
- BL = Backflow level

Connecting the ventilation line and the blank cable duct

- Connect ventilation line to the socket DN 100 (connecting dimensions as per DIN EN 877, outside Ø 110).

CAUTION

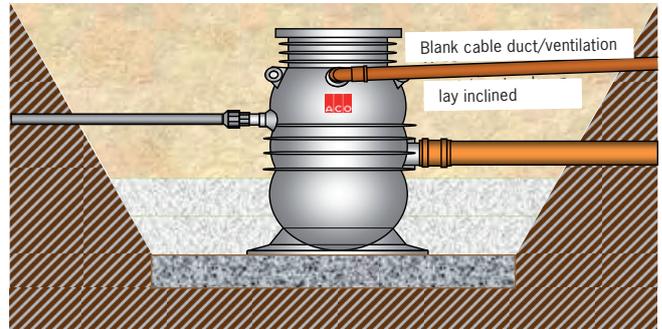
- During laying, pipe section must not become smaller and line must be laid permanently rising.
- For further information on laying ventilation line, see para 3.3.
- Laying options of ventilation line, see under para 4.4, suggested installation.

- Connect blank cable duct to second socket DN 100 (connecting dimensions as per DIN EN 877, outside Ø 110).

CAUTION

- During laying, pipe section must not become smaller and line must be laid permanently rising
- Insert taut wire.

▼ Fig. 40



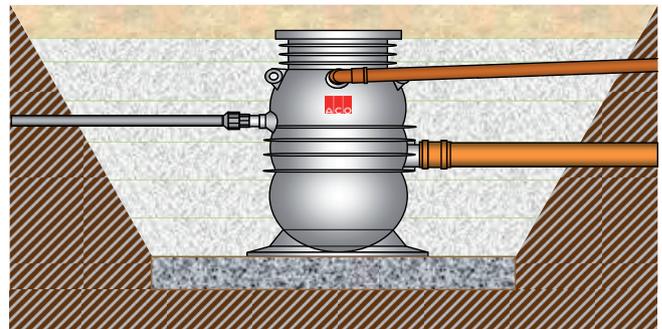
Continuing filling in the excavated trench

- For the excavated trench, use non-binding soil to embed the shaft by 1.0 m.
- Fill in excavated trench in individual layers up to underneath the shaft upper edge, evenly all around with gravel of low sand content. Layers should not exceed 30 cm height. Compact up to a Proctor density of Dpr 97%.

CAUTION

The used building materials and installation procedures may not cause damaging deformation, other damages or unfavourable loading conditions to the pump shaft!

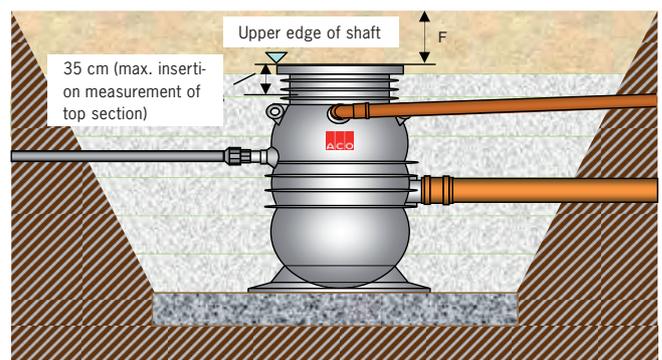
▼ Fig. 41



Determining measurement F up to upper edge of ground

- If level of upper edge of shaft is flush with ground level, no top section is required.
- Otherwise, the distance dimension F has to be determined.

▼ Fig. 42



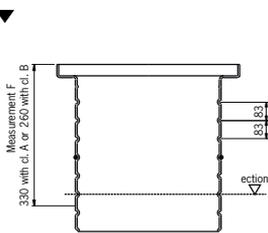
Different installation examples

Installation case class A and B

Adjusting the top section

- Mark off the measured length F plus 330 mm with class A and 260 mm with class B on the housing of the top section.
- Cut off the top section above the first cutting notch above the marked off length (the top section has cutting notches every 83 mm).
- Place the sealing ring in the 2nd cutting notch.

Fig. 43

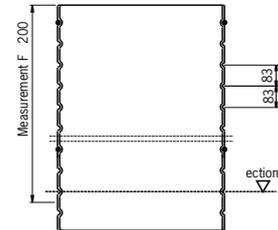


Installation case class D

Adjusting the top section

- Mark off the measured length F plus 200 mm on the housing of the top section.
- Cut off the top section above the first cutting notch above the marked off length (the top section has cutting notches every 83 mm).
- Place the sealing ring in the 2nd cutting notch.
- Place the 2nd sealing ring in the first cutting notch on the other side of the top section.

Fig. 44



Placing the top section in the shaft

- Grease sealing ring at top section and lug in shaft with acid-free grease and position top section to relevant measurement between upper edge of ground and lower edge of manhole cover (80 with class A, 145 with class B) into the shaft.

Fig. 45

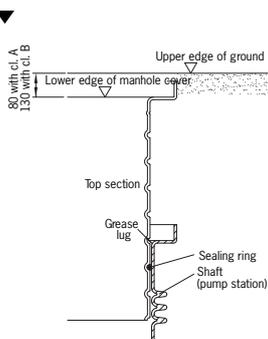
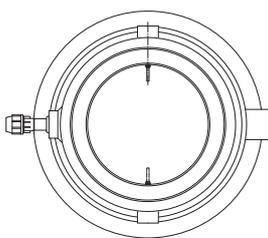


Fig. 47



Placing the top section in the shaft

- Grease sealing rings at top section and lug in shaft with acid-free grease and position top section to relevant measurement 170 mm between upper edge of ground and lower edge of top section (= lower edge of manhole cover) into the shaft.

Fig. 46

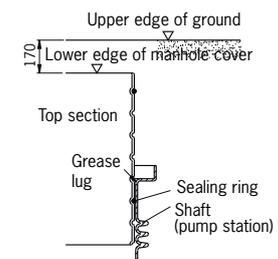
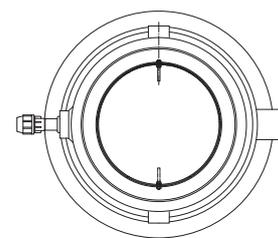


Fig. 48



CAUTION

If possible, position top section in such a way that the hook is positioned on the connecting socket ventilation or blank cable duct axis.

CAUTION

If possible, position top section in such a way that the hook is positioned on the connecting socket ventilation or blank cable duct axis.

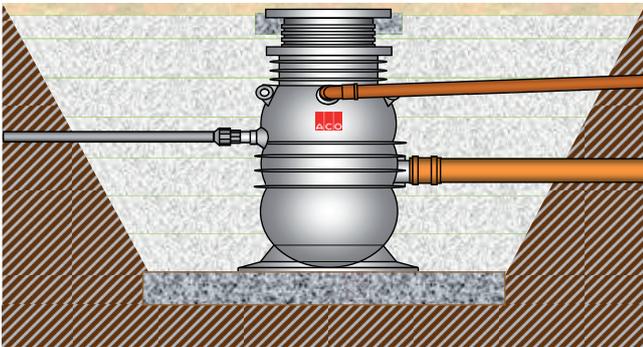
Different installation examples

Installation case class A or B

Continuing filling in the excavation

- For the excavated trench, use non-binding soil to embed the shaft by 1.0 m.
- Fill in excavated trench in individual layers up to below upper edge of shaft top, evenly all around with gravel of low sand content. Layers should not exceed 30 cm height. Compact up to a Proctor density of Dpr 97%.

Fig. 49



CAUTION

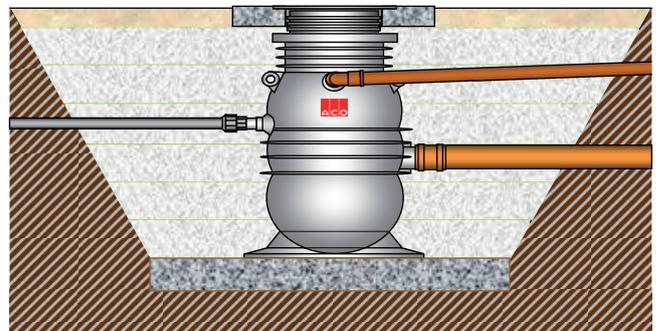
- Sliding of the top section has to be prevented by appropriate measures (lean concrete casing round the collar of the top section).
- The used building materials and installation procedures may not cause damaging deformation, other damages or unfavourable loading conditions to the pump shaft!

Installation case D

Continuing filling in the excavation

- For the excavated trench, use non-binding soil to embed the shaft by 1.0 m.
- Fill in excavated trench in individual layers up to below the load distribution plate (app. 350 mm below upper edge of ground), evenly all around with gravel of low sand content. Layers should not exceed 30 cm height. Compact up to a Proctor density of Dpr 97%.

Fig. 50



- Suspend the load distribution plate by the 3 fitted lifting loops using proper lifting gear, and push it until the opening is above the top section until the lower edge of the sliding rebate is located approx. 10 mm above the upper edge of the top section.

Fig. 51

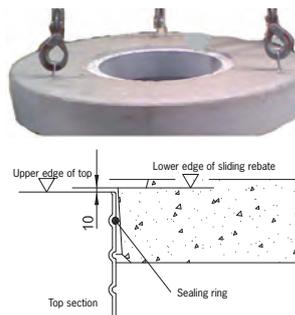


Fig. 52



- Compact material below the load distribution plate in order to avoid sliding.
- Fill in excavated trench in individual layers up to upper edge of the load distribution plate, evenly all around with gravel of low sand content. Layers should not exceed 30 cm height. Compact up to a Proctor density of Dpr 97%.

CAUTION

The used building materials and installation procedures may not cause damaging deformation, other damages or unfavourable loading conditions to the pump shaft!

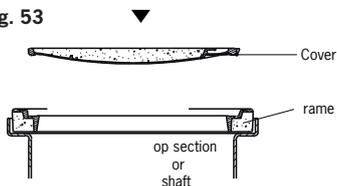
Different installation examples

Installation case class A or B

Fitting the manhole cover

- Clean bearing surfaces in cover support at shaft and at top section.
- Clean underside of manhole frame.
- Insert frame into support, fully in a mortar bed, if applicable, and align to upper edge of ground level.
- Clean bearing surfaces of frame and cover. Only then insert cover.

Fig. 53



CAUTION

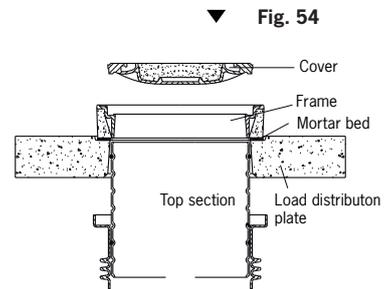
- Prior to fitting the manhole cover make sure that its classification corresponds to application of installation area.
- Clean bearing surfaces of frame and cover. Only then insert cover, otherwise no stable cover position and increased wear.
- Load manhole cover only after mortar, which was possibly used, has set, at the earliest after 72 hours. (This period may be shortened by using quick setting concrete or plastic mortar).

Installation case class D

Fitting the manhole cover

- Clean bearing surfaces in cover support at load distribution plate.
- Clean underside of manhole frame.
- Insert frame fully in a mortar bed and align to upper edge of ground level.
- Clean bearing surfaces of frame and cover. Only then insert cover.

Fig. 54



Completing filling in the excavated trench

- Apply a coating (e. g. an asphalt coating) as finish of the excavation.

Completing filling in the excavated trench

- Above the load distribution plate apply a coating (e.g. an asphalt coating) of ≥ 140 mm, which admits a load distribution of 45° .
- If for in-situ reasons the asphalt coating must be higher than 140 mm, standard adjustment rings as per DIN 4034 part 1 can be fitted between the distribution plate and the manhole cover.

CAUTION

- When applying the last coating for filling the excavated trench, do not slide manhole cover any more.
- Frame of manhole cover shall in no way protrude the coating. It is better if coating protrudes the frame and is drawn to frame edge.

Fig. 55

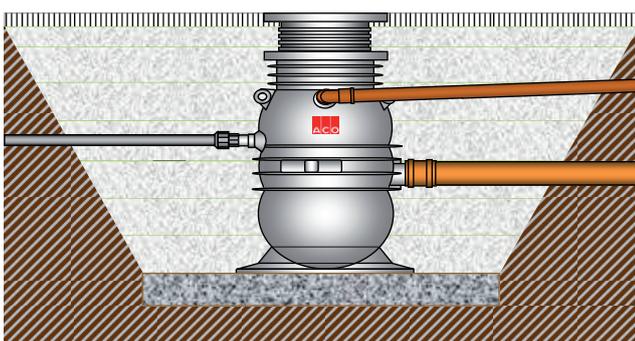
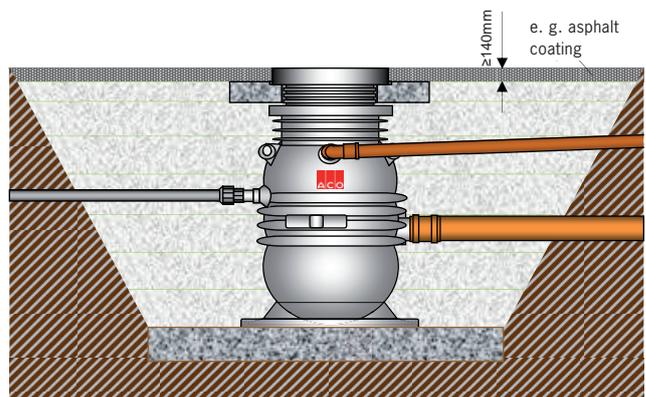


Fig. 56



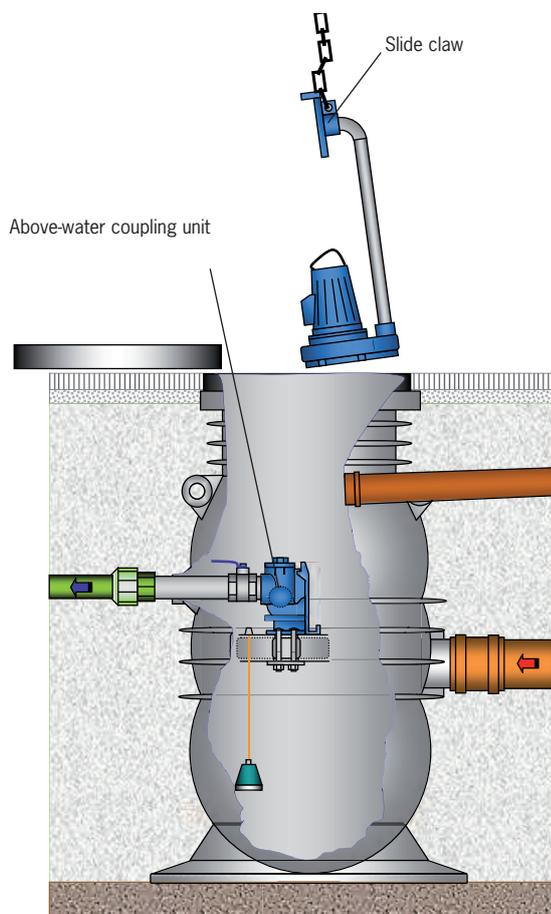
Different designs

Design without top section

Bringing in the submersible pump

- Lift submersible pump with pressure piping connection with appropriate lifting gear and let down unit in the shaft until slide claw adopts to above-water coupling.

Fig. 57



CAUTION

Prior to inserting the pump unit make sure that possible protective caps were removed from pressure piping openings (above-water unit / slide claw) and that sealing at slide claw is clean. Otherwise connection may be leaky or non-permeable.

Design with top section

Bringing in the submersible pump

- Lift submersible pump with pressure piping connection with appropriate lifting gear, lead guide belt through opening of slide claw and let down unit in the shaft until slide claw adopts to above-water coupling.

Fig. 58

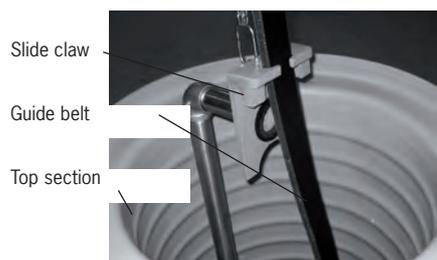
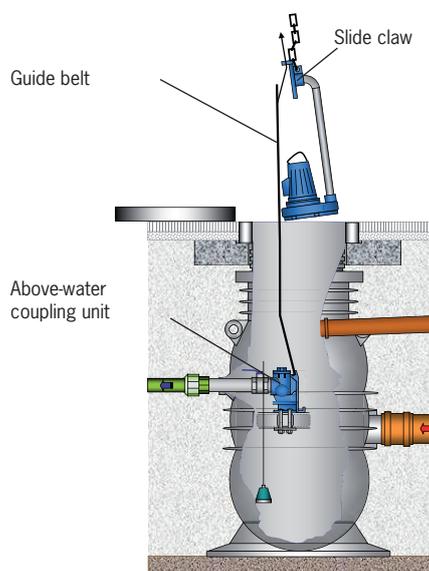


Fig. 59

CAUTION

- Prior to inserting the pump unit, clean up internal shaft from possible contamination.
- Prior to inserting the pump unit make sure that possible protective caps were removed from pressure piping openings (above-water unit / slide claw) and that sealing at slide claw is clean. Otherwise connection may be leaky or non-permeable.
- Carry out works with 2 people. One person threads and holds the guide belt and the other person lets down the pump unit in the shaft.

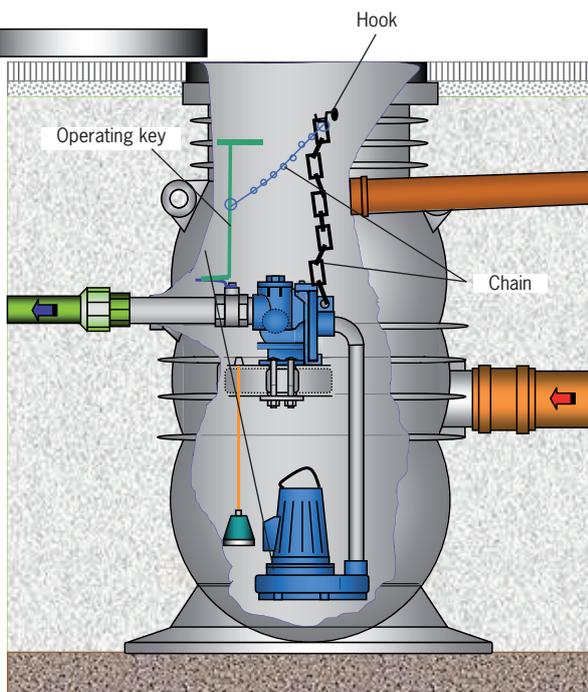
Different designs

Design without top section

Fix operating elements

- Suspend the chain of the pump unit on the hook in the shaft.
- Push operating key (included in scope of supply) over the handle of the ball valve in the shaft and hang it by the chain from the hooks in the shaft (if the operating key is too long, hang it from the chain in the shaft and only push it over the handle of the ball valve when operating it).

Fig. 60

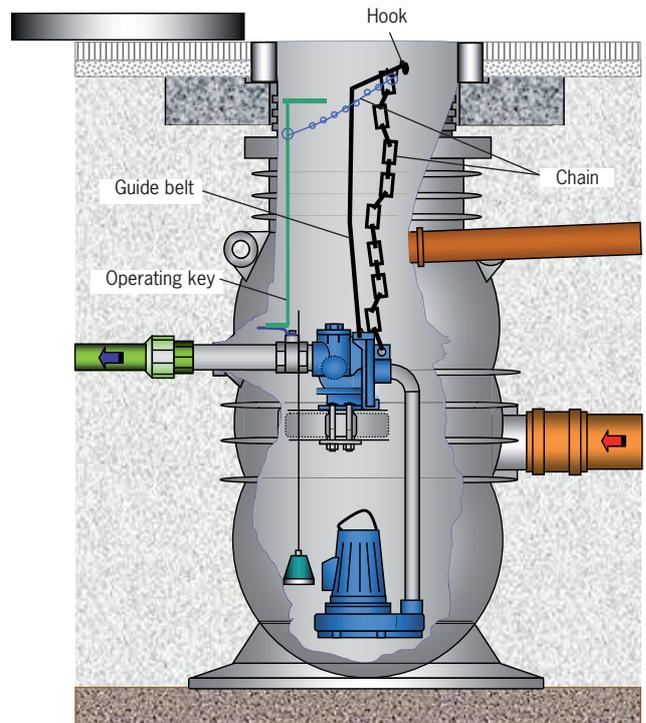


Design with top section

Fix operating elements

- Suspend the chain of the pump unit on the hook in the shaft.
- Suspend the guide strap from the hook in the shaft.
- Push operating key of the right length (supplied with the top section) over the handle of the ball valve in the shaft and hang it by the chain from the hooks in the shaft (if the operating key is too long, hang it from the chain in the shaft and only push it over the handle of the ball valve when operating it).

Fig. 61



CAUTION

Clean frame and insert cover after works are finished.

CAUTION

Clean frame and insert cover after works are finished.

5.3 Installation and assembly of further accessories (carry out retro-fit works during servicing works)

Vacuum relief valve

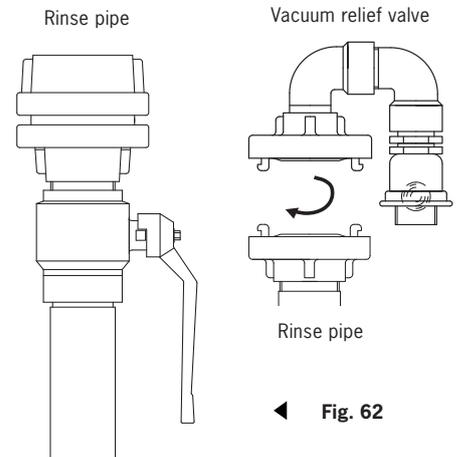
Necessity (also refer to explanation of special installation case / attachment):

In the case of pump stations with descending and low level pressure pipe, a vacuum relief valve is required.

If the pressure pipe end is located lower than the level switch-off stop position in the pump shaft, a vacuum - and thus a siphon effect - occurs in the pump pressure line after switching off the pumps.

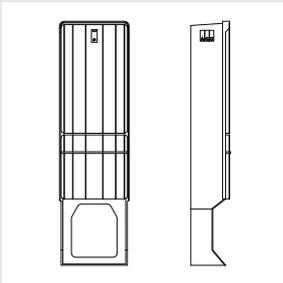
Due to this siphon effect, the pump shaft is sucked off up to lower edge of pump housing, even with switched off pumps. This means that an air cushion builds up with next wastewater inlet into the pump housing(s) which inevitably results in a dry running operation when switching on the pumps.

- For fitting the vacuum relief valve, a rinse pipe with a C 52 firm coupling is required.
- Here, the vacuum relief valve is applied and connected by means of a C52 counter coupling.

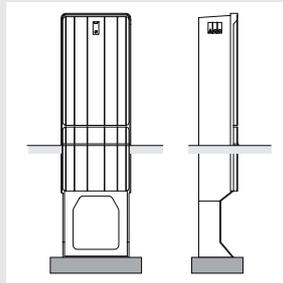


◀ Fig. 62

Open air cabinet for in situ pressure pipe



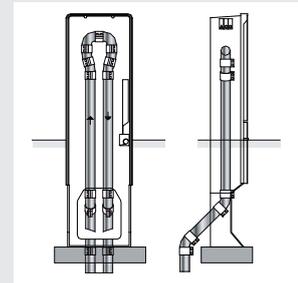
□ Open air cabinet is supplied as accessory



■ Insert open air cabinet partly into ground and put on concrete foundation.

NOTE

■ Arrange pipe bottom SO of backflow loop above the backflow level RS (not blocking cabinet inside).



■ Local pressure pipe is mounted in cabinet as backflow loop.
 ■ Further components as heating with thermostat, CEE and isolated ground receptacle are mostly pre-mounted and need only be fitted into the cabinet. Arrangements depends on residual free space after installation of backflow loop.

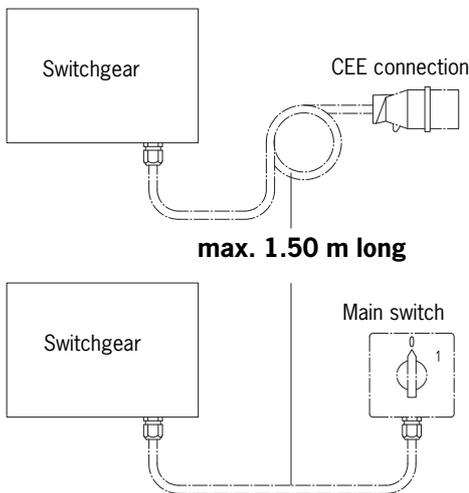
5.4 Works for the electrician

CAUTION



The electrical connection must be carried out by a specialist contractor in accordance with pertinent VDE regulations.

Switchgear



- The switchgears are supplied ready-to-plug in with 1.5 m long connecting cables and CEE plug (16 A mono, 32 A duo).
- For mains supply, a CEE socket (32 A) with connecting value 400 V, 50/60 Hz is required. Fuse protection must correspond to local requirements.

CAUTION

At a distance of max. 1.50 m, a voltage separation has to be carried out locally in electrical inflow line (e. g. CEE wall socket/plug or a main switch).

Fig. 64 ▲

Assembly types



- Switchgears are supplied loosely applied (pre-mounted in the open air cabinet).

CAUTION

- The switchgear must be fitted at a dry, weatherproof place:
 - inside buildings or in the open air cabinet (available as accessory).

NOTE

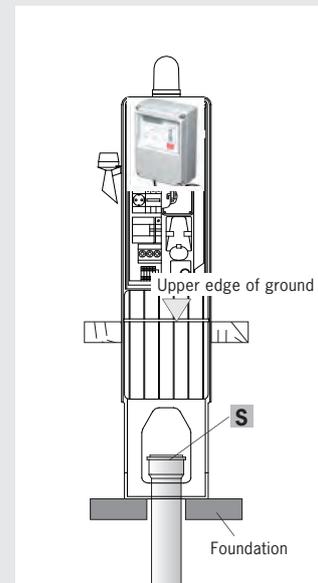
- For further details on assembly of switchgear, please refer to operating manual of switchgear (enclosed to appliance).

Assembly inside buildings



- The cable pipe end **S** must be sealed locally by suitable material (e. g. end cover) after the cabling to protect it against rising moisture.

Assembly in the open air cabinet (outside buildings)



- The cable pipe end **S** must be sealed locally by suitable material (e. g. end cover) after the cabling to protect it against rising moisture.
- Fit all accessories (as e. g. air bubble injection) if they had not been pre-mounted before.

Operation and connection of switchgears

ACO Multi Control mono



ACO Multi Control duo



Please refer to operating manual of switchgear
(attached to the switchgear)

- Warnings and safety notes
- General product description, features and optional functions
- Setting procedure, operating elements and operating displays
- The setting menu, graphics and notes on setting the parameters
- Fault signals at display, possible malfunctions, remedy
- Assembly, pneumatic and electrical connection and connection of 3 ~ and 1 ~ motors
- Test run without pumps
- Technical data
- Conformity Declaration
- Attachment: terminal wiring diagram

CAUTION

- The electrical connection must be carried out by a specialist contractor in accordance with pertinent VDE regulations.
- Terminal wiring diagrams are attached to the switchgears.



Connecting cable of submersible pumps

- The connecting cable to the submersible pump(s) is 10 m long. Do not shorten the ends of the cable, roll the excess cable up into wide loops and hang it in the shaft.
- Make the electrical connections to the terminal strip in the switchgear in accordance with the circuit diagram (see switchgear installation manual).
-

Potential compensation

The potential compensation protects the installations from dangerously high potential differences, and is used to disperse any dangerous touch voltages, e.g. because of faulty insulation on electrical paths.

In potentially explosive atmospheres, potential compensation also provides additional protection from explosions caused by the emission of flammable gases by ignition sparks.

- Adjust the length of the potential compensation cable (in situ, NYY-J 6mm²).
- Make the electrical connections to the terminal strip in the switchbox in accordance with the circuit diagram (see switchgear installation manual).

CAUTION



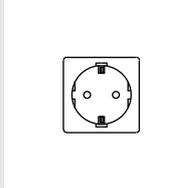
- Set up potential compensation in accordance with VDE 0100, part 540.
- Check to ensure that the cross beam is electrically connected to the protective conductor.
- Pump shafts connected to the public sewers are classified as zone 1 potentially explosive atmospheres. Potential compensation systems are obligatory in zone 1 (VDE 0165-5.3.3 dated 2.91).

Compressor for air bubble injection (in connection with switchgear Multi Control and back pressure bell)

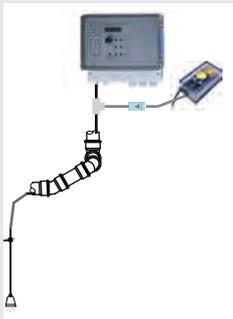


□ Compressor with connecting cable and components is loosely supplied.

- Check valve
- T-piece
- 2 x 0.5 m hose

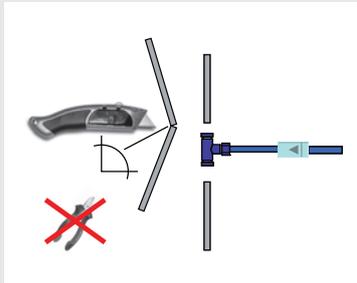


■ For power supply, an isolated ground receptacle has to be fitted in situ.



□ Parts:

- **A** = 20 m control line of open back pressure bell
- **B** = T-piece
- **C** = Check valve
- **D** = 2 x 0.5 m hose

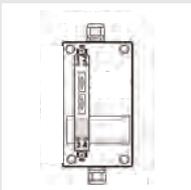


■ Cut control lines **A + D** at relevant position with a knife at right angles.

■ Loosen spigot nut of T-piece **B**, insert control line ends **A + D** and re-tighten screw joints.

■ Insert check valve **C** accordingly in control line **D** (arrow must point towards back pressure bell).

Ex-barrier (when using a level probe in the Ex area)



□ Ex-barrier is supplied with 2 screw joints and loose connecting cable.



■ Mount Ex-barrier in the vicinity of the switchgear and wire connecting cable of level probe and switchgear in accordance with terminal diagram.

Switching points or set values of level switch

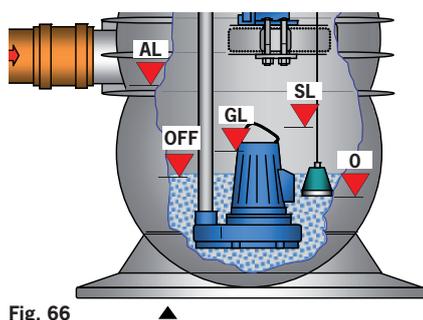


Fig. 66 ▲

Design		Switching points / set points at switchgear in mbar or cm			
Pressure transmitter	Multi-Max-F	OFF	GL	SL	AL
▲	mono	5	10	-	30
	duo	5	10	15	30
▼	mono	10	15	-	35
	duo	10	15	20	35

Level	Explanation
0	Lower edge back pressure bell or level probe = bench mark
OFF	Stop position of pump
GL	Base load = switching point of pump
SL	Peak load = switching on of 2nd pump (duo)
AL	High alarm On

NOTE

Switching points at switchgear are set at our works, however, can also be set differently or adjusted to operating conditions after prior agreement with the ACO Haustechnik after-sales service (refer to manual).

CAUTION

- With design open back pressure bell with air bubble injection and level probe, set after-running range to 0 sec.
- Determine after-running range for open back pressure bell without air bubble injection according to test run.
- With level probe: At first, set measuring range of level probe to 4 m at switchgear, then only set switching points.

6. Operating manual

6.1 Commissioning

Prerequisites

- All connection and mounting works must be finished.
- All electrical installations must be carried out.
- Connecting terminals of motor / switchgear were re-adjusted.
- Pipes must be flushed through.
- The collecting container must be cleaned thoroughly (from possible construction waste).
- Test run was carried out successfully.

NOTE

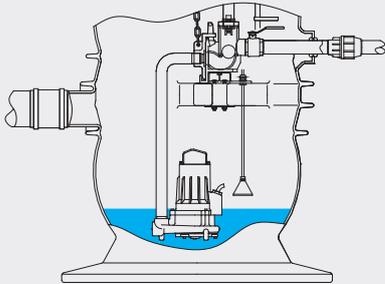
Following persons should be present during commissioning:

- Plumber
- Electrician
- Operating staff / operator

Test run and hand-over

Level measuring design

Open back pressure bell



CAUTION

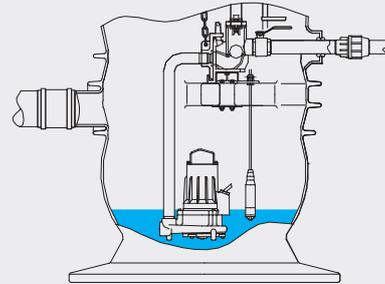
As long as the control line is not connected to the switchgear, the back pressure bell may not come into contact with water or be flooded.

- Open gate valve in inlet line and pressure pipe (if any).
- Close voltage separation (e. g. CEE socket/plug).

At switchgear (refer to special manual):

- Set after-running time to 0.
- Check operating displays and set switch to automatic operation.
- Let water enter via connected drainage objects.

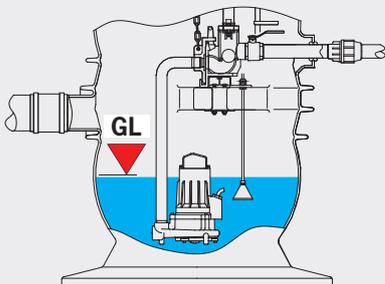
Level probe



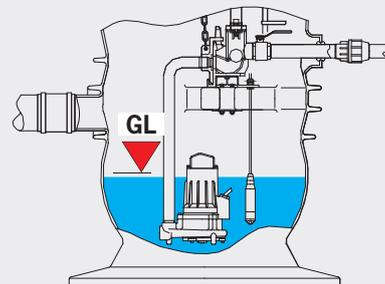
- Open gate valve in inlet line and pressure pipe (if any).
- Close voltage separation (e. g. CEE socket/plug).

At switchgear (refer to special manual):

- Enter probe measuring range = 4 m.
- Set switching points at switchgear (see page 44).
- Set after-running time to 0.
- Check operating displays and set switch to automatic operation.
- Let water enter via connected drainage objects.



- Water reaches „level GL (base load)“, pump switches on and pumps contents above backflow level.
- Interrupt water inflow.



- Water reaches „level GL (base load)“, pump switches on and pumps contents above backflow level.
- Interrupt water inflow.

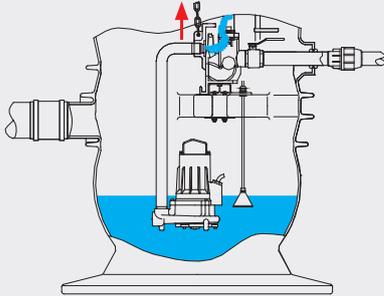
Start

Test run step 1

Test run and hand-over

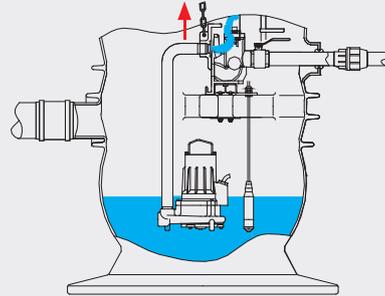
Level measuring design

Open back pressure bell



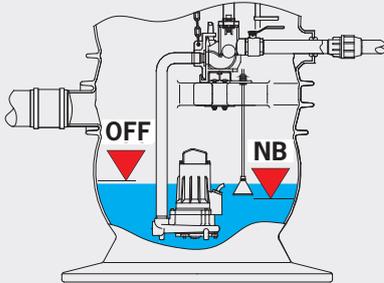
- Lift pump unit slightly for 5 seconds (slide claw must remain in guide of above-water coupling unit).
- Pump is ventilated.
- Let down pump unit again.

Level probe



- Lift pump unit slightly for 5 seconds (slide claw must remain in guide of above-water coupling unit).
- Pump is ventilated.
- Let down pump unit again.

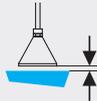
Test run step 2



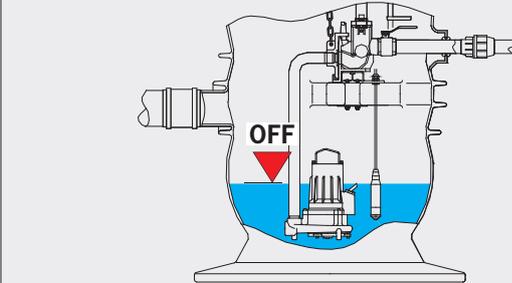
- Water reaches „OFF level“, pump switches off.
- In the case of design without air bubble injection:**
- Switch on pump manually at switchgear, take time until water is 2 - 3 cm below lower edge of back pressure bell.
- Switch off pump and set time taken at switchgear as after-running time.

NOTE

With this procedure only, the bell is vented following every pump OFF process.

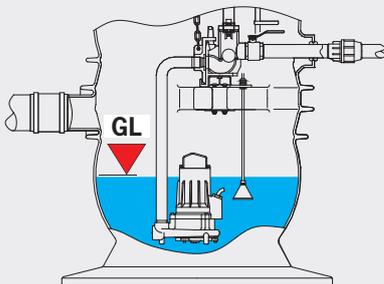


- Set switch again to automatic operation.
- Allow water to enter again.

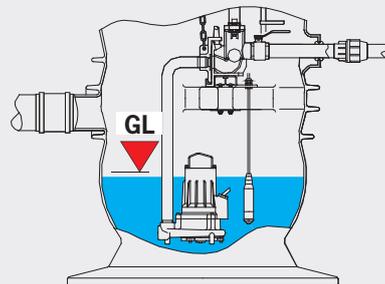


- Water reaches „OFF level“, pump switches off
- Allow water to enter again.

Test run step 3



- Water reaches „GL level (base load)“, pump switches on (pump 2 in the case of duo plants) and pumps contents above the backflow level.
- Increase water inflow.



- Water reaches „GL level (base load)“, pump switches on (pump 2 in the case of duo plants) and pumps contents above the backflow level.
- Increase water inflow.

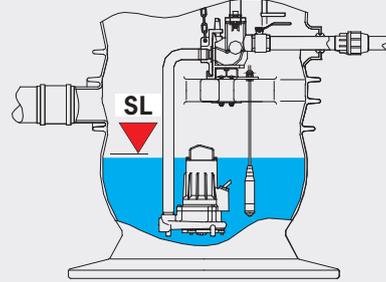
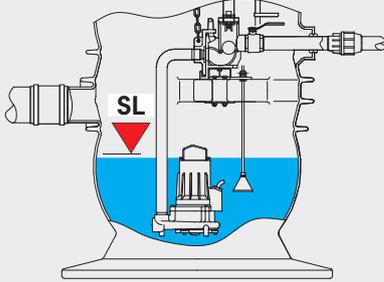
Test run step 4

Test run and hand-over

Level measuring design

Open back pressure bell

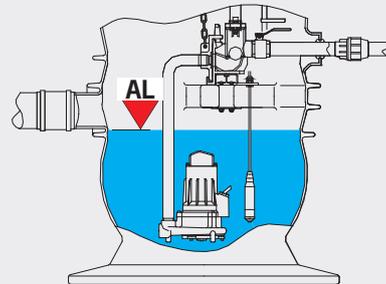
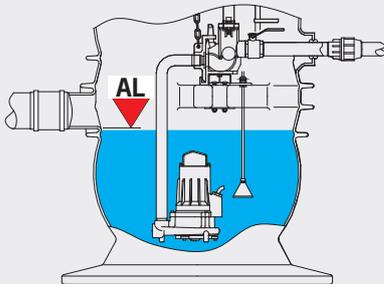
Level probe



- Water reaches „SL level (peak load)“, 2nd pump switches on automatically with duo design and both pumps pump contents above the backflow level.
- Disconnect water inflow.
- Switch off pumps at switchgear.

- Water reaches „SL level (peak load)“, 2nd pump switches on automatically with duo design and both pumps pump contents above the backflow level.
- Disconnect water inflow.
- Switch off pumps at switchgear..

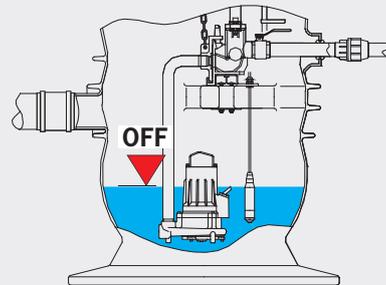
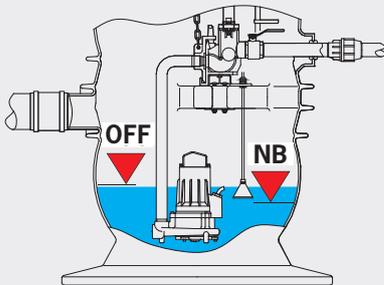
Test run step 5



- Water reaches „AL level (alarm)“, hooter sounds and alarm display lights.
- Switch on pumps again.
- „AL level (alarm)“ is undercut, hooter stops and alarm display goes out.

- Water reaches „AL level (alarm)“, hooter sounds and alarm display lights.
- Switch on pumps again.
- „AL level (alarm)“ is undercut, hooter stops and alarm display goes out.

Test run step 6



- Water reaches „OFF level“ and pump(s) switch(es) off.
- In the case of design without air bubble injection:**
- Water reaches „OFF level“, after-running time is triggered off and pump(s) switch(es) off as soon as „NB level (after-running range)“ is reached. The back pressure bell is thus ventilated automatically again.

- Water reaches „OFF level“ and pump(s) switch(es) off.

Test run step 7

- Carry out test run at least for a second time.

- Carry out test run at least for a second time..

NOTE

- Plant is ready for operation.
- Hand over the plant to the operator in operational condition, explain operating mode and

- hand out a handover certificate.
- Hand out an installation and operating manual.

Hand-over

6.2 Operation

Use / proper use / likely misuse

Use / proper use | This wastewater lifting plant is designed for delivery of wastewater containing faeces and free of faeces.

The use of the plant for all other purposes is unauthorised.

The manufacturer is not liable for any damage resulting from improper use; the risks associated with improper use are borne solely by the operator.

Likely misuse | As per DIN 1986 part 3, para 2.3.1, no harmful substances may be taken to the lifting plant.

These include:

(The list below is not exhaustive)

- Waste products such as domestic refuse, glass, etc.
- Hardening substances, such as cement, lime, gypsum, mortar etc.
- Flammable mixtures, such as petrol, heating oil, paints etc.
- Aggressive and/or toxic substances, such as acids, alkaline solutions etc.
- Pipe cleaning agents damaging drainage objects, pipes etc.
- Cleaning, disinfecting, rinsing and washing agents in excessive quantities
- Animal faeces, such as liquid manure, solid manure, waste discharge etc.
- Bacteria containing and infectious substances, such as slaughterhouse waste, animal bodies, blood etc.
- Vapours and gases, such as water vapour, chlorine etc.
- Radioactive substances

Harmful substances in very low quantities and in highly diluted form or very low concentration may be entered.

Operation

The pump station operates fully automatically. Regular work on the plant is confined to inspection works described by paragraph 7.2 and servicing/maintenance works (see para 7.3).

CAUTION



The pump station may only be operated, serviced and maintained by persons who are familiar with the manual, the instructions contained therein and the pertinent regulations for working safety and accident prevention!

CAUTION

- Proper use also includes:
- Observing of national laws and regulations.
- Adhering to inspection and maintenance information.
- Adhering to manufacturer's assembly, commissioning, operating and servicing instructions.
- For safety reasons it is prohibited to carry out arbitrary modifications at the plant.

Warranty

Information on warranty conditions are contained in our General Terms and Conditions of Sale and Supply.

6.3 Faults and their remedy



Can the pump be operated manually?

YES →

1st option

Problem with the water level equipment (switch on controller).

Clean or renew.

2nd option

Problem with the control.

Check:

- Control voltage
- Any loose cables
- Relays and coils
- Control switch „MANUAL“ - „AUTOMATIC“

NO ↓

Is the ATEX mode active?

YES →

This means that the water level must have risen at least as far as the switch-off level in the pump sump.

Switch off the ATEX mode for commissioning.

NO ↓

Is the system voltage-free?

YES →

Check:

- If main switch is switched on
- If control voltage is correct and if back-up fuses are intact
- If all phases are carrying voltage
- If all fuses are intact and were installed properly
- If the motor cable is intact

NO ↓

Is the pump impeller blocked?

YES →

Remove the blocked parts from the pump and clean pump shaft.

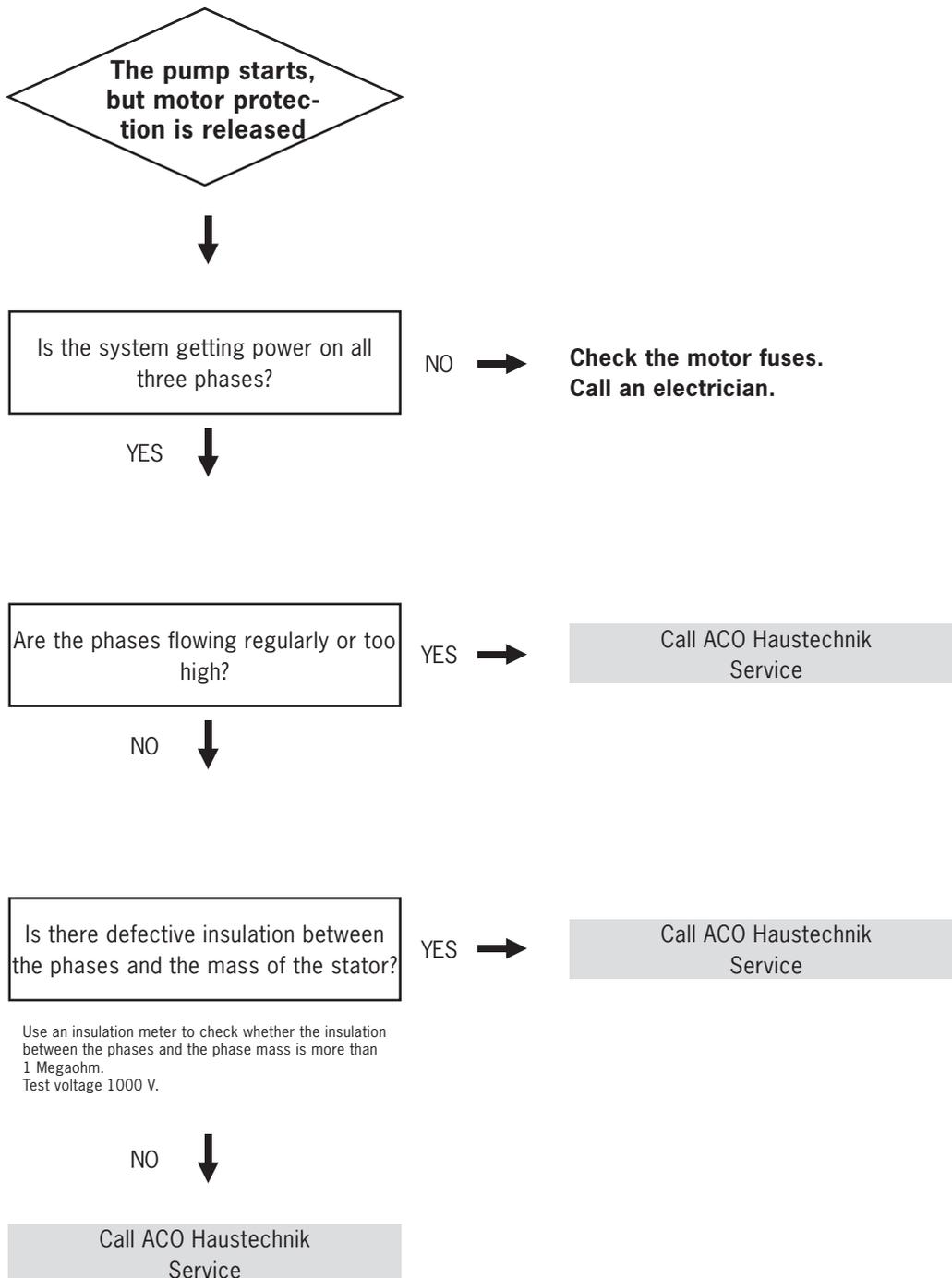
NO ↓

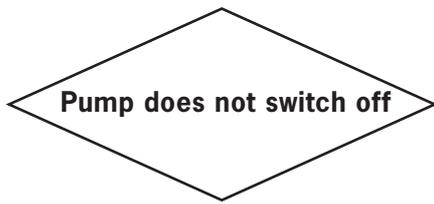
Call ACO Haustechnik
Service

CAUTION



Switch off the electricity to the pump before checking the impeller.





Can the pump empty the station down to the switch-off level?

NO →

Check:

- Leaks in the pipes and/or the coupling foot?
- Is the impeller blocked?

CAUTION



Switch off the electrical power to the pump before checking the impeller

YES ↓

- Check the ball retaining valve and make sure it is working properly

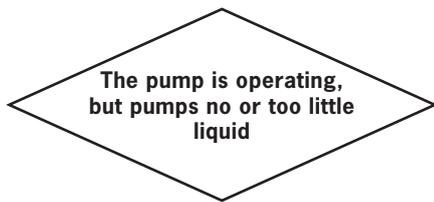
If the level control faulty?

YES →

Clean the pressure transmitter.

Check that the pressure transmitter is functioning properly.

NO ↓



→

Check:

- refer also to the operating instructions of the pump
- direction of rotation of the pump
- that the valves are in proper working order
- that the pipes and impeller are not blocked
- that the impeller runs freely
- that the delivery head has not been changed
- presence of any leaks in the pipe system
- to see if there is any sign of wear on the impeller and/or the pump housing
- if pump is siphoning air

CAUTION

If the motor protection has triggered, do not repeatedly force the pump to operate.

7. Maintenance

7.1 To be observed during all maintenance and servicing works

General

- Work on the electrical equipment of the wastewater lifting plant must only be carried out by a properly qualified electrician or by properly instructed persons working under the instruction or supervision of a properly qualified electrician in accordance with the electrical regulations.
- Before carrying out any maintenance work on the wastewater lifting plant, first switch off the electrical supply to the electrical equipment and secure it to prevent it from being switched on accidentally.
- Use voltage-isolated tools only!
- Always retighten any connections loosened during maintenance or servicing work.
- All contents of the wastewater lifting plant removed during operations, and any parts of the pump station which are replaced, must be disposed of in accordance with the environmental protection regulations.



CAUTION



Conservation of value and performance, maintenance contract

To maintain the value and performance of the plant as well as the warranty prerequisites, we recommend 1 - 4 servicings annually (refer to chapter 3.3).

We recommend to have the regular servicing and maintenance works carried out directly by the manufacturer, ACO Passavant GmbH. This does not only guarantee permanent operational reliability, but you also benefit from revisions and upgradings which are carried out in the course of our product development.

If you require a quotation for a **maintenance contract**, please copy below article, fill it out completely and fax it to **fax no: +49 (0) 36965/819-367**.

In case of any questions, please contact our service, **telephone: +49 (0) 36965/819-444**.

Enquiry for a maintenance contract for wastewater lifting plants

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

Fax no.: +49 (0) 36965/819-367

Name

Post code, City

Type as per type plate



Street, house number

Installation date

Telephone/telefax number

Single-family house

Multiplex house

Commercial establishment

7.2 Regular inspections

Wastewater lifting plants should be checked once a month by the operator for serviceability by observing at least two switching cycles.

7.3 Regular maintenance and servicing works

Standard requirements

The plant must be serviced regularly by a **properly qualified technician**.¹⁾ The intervals may not exceed

- 3 months with plants in commercial establishments;
- 6 months with plants in multiplex houses;
- 1 year with plants in single-family houses.

Overview

Maintenance and servicing plan		Intervals			Maintenance and servicing plan		Intervals		
		3 months	6 months	1 x annually			3 months	6 months	1 x annually
Carried out by:					Carried out by:				
	Electrician					Electrician			
	Properly qualified technician ¹⁾					Properly qualified technician ¹⁾			
1	Control and measuring devices				3.5	Grease adjusting spindle of gate valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.1	Check condition and function of signalling lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.6	Check compressor condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	Check condition and function of operating elements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.7	Clean backflow preventer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Clean level switches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.8	Check inlet line condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Check function of alarm device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.9	Check ventilation line condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5	Check function of remote signalling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.10	Check pressure pipe condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6	Check setting of motor protection switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4	Pumps			
1.7	Check condition, allocation of electrical components	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.1	Check condition and function of pumps and direction of rotation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8	Check condition of electrical equipment inside/outside the switchgear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.2	Check operating noise of pump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9	Check firm seating of fuses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3	Clean pump chamber	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10	Check function of level switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4	Clean pump impeller	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11	Clean switchgear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5	Electric motors			
2	Shaft				5.1	Check condition of electric motors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.1	Check container condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5.2	Clean electric motors outside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Clean container inside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6	Remaining plant components			
2.3	Check condition of installation components	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.1	Check condition of all remaining plant components	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Pipes and fittings				7	Electric protective measures			
3.1	Check condition of pipes, screw joints and connections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7.1	Check electric protective measures with firmly installed consumer loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	Check condition of hose, hose connections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7.3	Check electric safety with consumer loads connected via push-fit connections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3	Check condition, function of gate valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8	Clean plant surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	Clean gate valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

After completion of the maintenance works, the plant must be recommissioned after carrying out a test run.

A maintenance record has to be prepared containing information on all works carried out and essential data. If faults are detected which cannot be remedied, they have to be reported to the plant operator immediately in writing by the properly qualified technician carrying out the maintenance works.

¹⁾ „Properly qualified technicians are staff members of independent companies, authorized experts or other institutions who verifiably have the required technical know-how for operation, maintenance and checking of wastewater lifting plants at their disposal and who possess adequate testing equipment. In particular cases and when larger companies are concerned, these checks may also be carried out by internally independent experts having adequate qualification and technical know-how, however who are not bound by instructions of the operator.“

8. Repair

For repair works, please contact **ACO - Service**

Telephone **+49 (0) 36965 - 819-444**

Fax **+49 (0) 36965 - 819-367**

Email **service@aco-online.de**

CAUTION



Works at the electric equipment of wastewater lifting plant may only be carried out by an electrician.

There exists danger to life in the case of improper works.

CAUTION

Please also observe special product manual of submersible pump and installation manual of switchgear.

CAUTION



Repair works at pump or switchbox must only be carried out in our works.

CAUTION



Use voltage-isolated tools only!

9. Decommissioning

9.1 Dismantling

Admit water over several pump cycles, shut the water inlet, prevent further wastewater from entering, remove power from switchgear, remove the fuses, drain the pressure piping, empty the shaft, dismantle the electric supply cable.

9.2 Disposal

The pump station consists of re-usable materials. They must be disposed of in accordance with local regulations.



9.3 Temporary shutdown

1. Protect plant against moisture.
2. Operate functional parts (e. g. gate valve, pump) from time to time to avoid seizing.
3. Protect switchgear from moisture.
4. Depending on duration and surroundings, dismantle functional parts and switchgear and keep in a dry place.

CAUTION

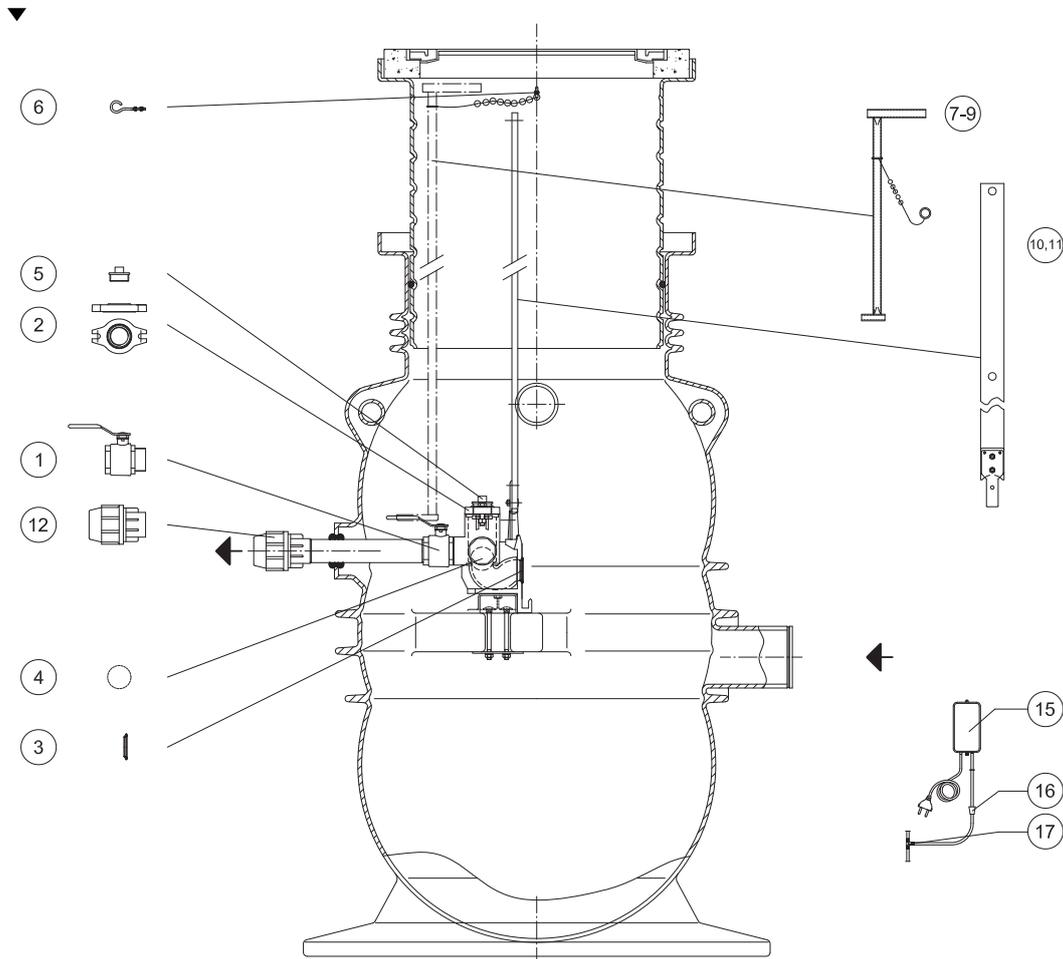
for 2.:
In this case, wastewater lifting plant must be filled with clear water.

In the case of decommissionings, paras 1, 3 and 4 are recommendable.

10. Spare parts keeping and after-sales service

10.1 Maintenance and wear-and-tear parts

Fig. 67



Item	Designation	Order no.	Item	Designation	Order no.
1	Ball valve MS IG-AG PN25 2"	0178.09.12	12	Compression fitting and cable lead-in	0178.08.62
2	Cover for coupling foot 1 1/2" and 2"	0178.09.13	13	Operating key for cover class B and D, loosely applied	0178.05.85
3	Sealing of coupling foot	0178.09.14	14	Operating key for cover class B and D, odourproof sealed	4143.00.00
4	Rubber valve ball	0178.09.15	15	Mini compressor	upon request
5	Plug octagon 1 1/2" , PVC-U, PN 16	0178.09.16	16	Spring check valve	upon request
6	Hook for PE shaft	0178.09.17	17	T-pipe union	upon request
7	Standard operating key without top section	0178.08.64			
8	Operating key 1200 mm for short top section	0178.08.77			
9	Operating key 1750 mm for long top section	0178.08.78			
10	Guide belt 2000 mm for short top section	0178.08.79			
11	Guide belt 2500 mm for long top section	0178.08.80			

10.2 Order data

In the case of spare parts order or queries, mention the following

Serial number:



Type plate information (fixed to pump)

Example:

	ACO Passavant GmbH Im Gewerbepark 11c 36457 Stadtlengsfeld Tel. 0 36965 / 819-0 Fax 0 36965 / 819-361
Fertigpumpstation MULTI-MAX-F	
Abwasserpumpstation	DIN EN 12050-1
Pumpentyp	SITA-260 N-ex
Artikel-Nummer Pumpe	0178.08.53
Gewicht Pumpe	45 kg / Stck
Nutzvolumen	151 Liter
Baujahr	-----
Seriennummer	-----
	

CAUTION

ACO Passavant expressly point out that maintenance and spare parts as well as accessories which do not correspond with original parts have neither been tested nor released.

Fitting and/or use of such products may possibly affect design-relevant properties of pump station in a negative way and interfere with active and/or passive safety.

ACO Passavant do not accept any liability or guarantee claims for damages arising from the use of such non-original parts and accessories.

In order to avoid fitting of maintenance or spare parts of minor quality, only original parts of the plant manufacturer should be used.

Attachment 1

Special installation case:

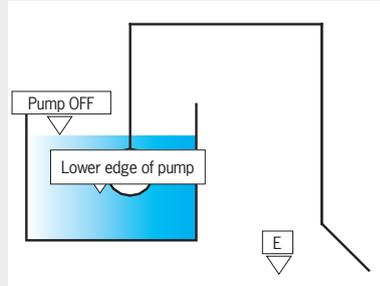
Pressure pipe end is located deeper than the switching-off point level in the collecting container

Condition

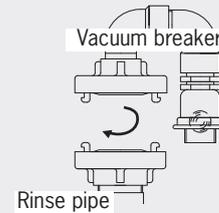
- Pressure pipe end (E) is located deeper than the switching-off point level in the collecting container.

Consequence

- Pump switches off, vacuum generates in pressure pipe, siphon effect drains contents up to lower edge of pump housing, dry run with next pump start.



Remedy



Condition and remedy

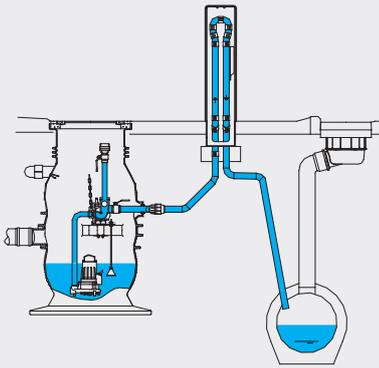
Pressure process up to pump OFF

Disposal process

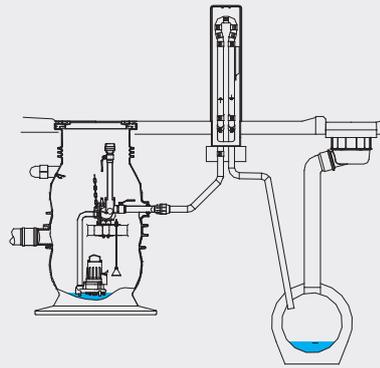
Static condition

Design without vacuum relief valve

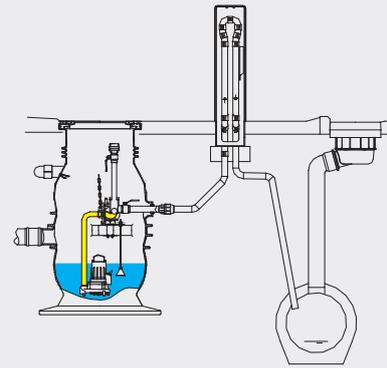
Design with vacuum relief valve



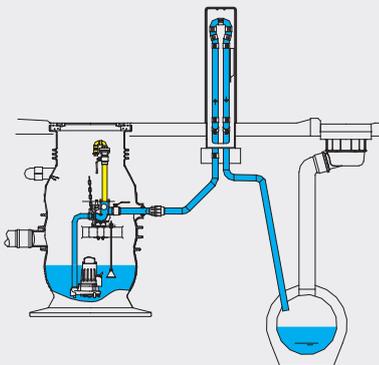
- If the pressure pipe end is located deeper than the switching-off point level in the collecting container, a vacuum builds up in the pressure pipe after switching off the pump and thus a siphon effect.



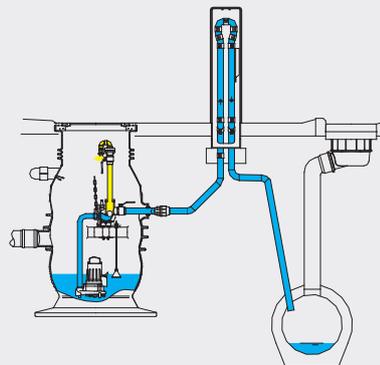
- Due to the siphon effect, the collecting container is sucked off also with switched-off pump up to lower edge of pump housing.



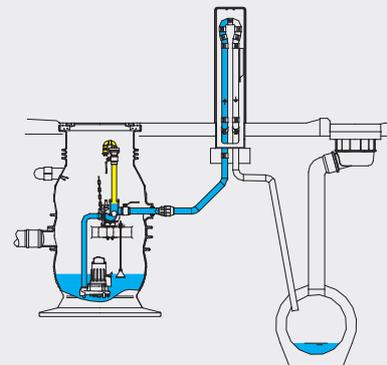
- With the next wastewater inflow, an air cushion builds up in the pump housing up to the backflow preventer and leads inevitably to dry run of pump.



- During pumping process, an air cushion builds up in the rinse pipe and the applied vacuum relief valve which is compressed by means of the existing pump pressure.



- After switching off the pump(s), the pressure reduces in the pressure pipe, in the rinse pipe and thus also in the vacuum relief valve up to the range negative, i. e. up to the vacuum. The ventilation valve opens, air enters the pressure pipe and the siphon effect which was due to the vacuum, stops.



- These processes recur with every pumping process.
- A siphon effect or suction and dry run of the pump is thus avoided.

Operating manual
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