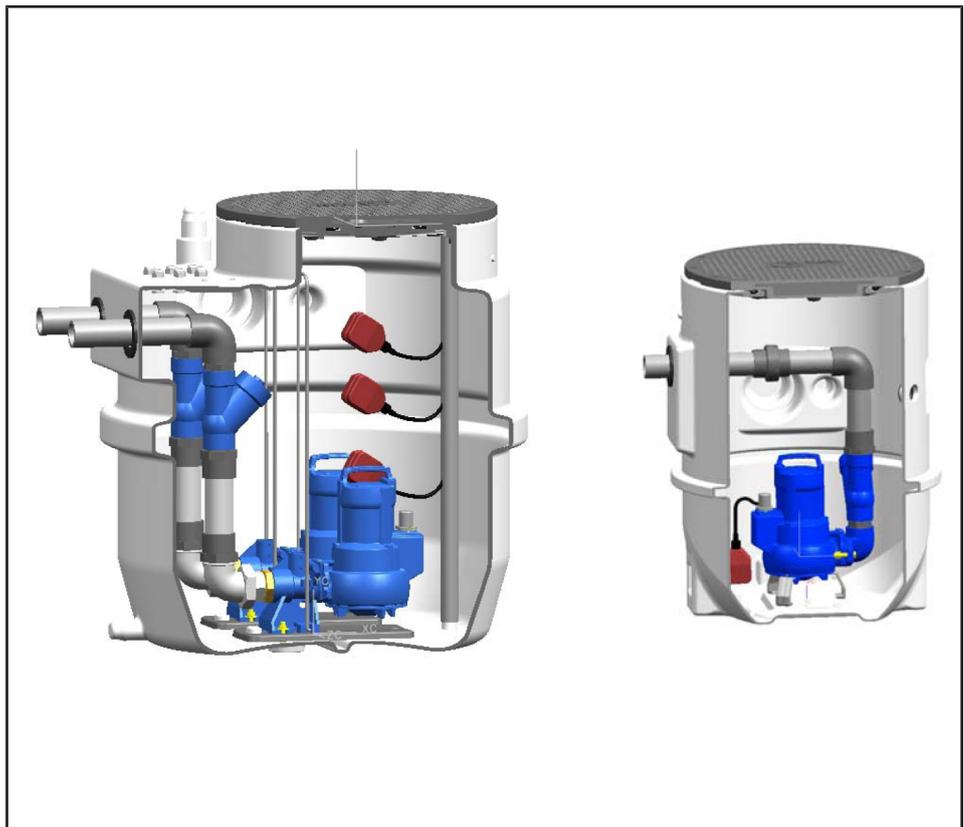


Automatic Waste Water Pump Station

Evamatic-Box N

Installation/Operating Manual



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Installation/Operating Manual Evamatic-Box N

Original operating manual

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Glossary

Backflow loop

The section of the discharge pipe of a waste water lifting unit that is located above the flood level

Certificate of decontamination

A certificate of decontamination is enclosed by the customer when returning the product to the manufacturer to certify that the product has been properly drained to eliminate any environmental and health hazards arising from components in contact with the fluid handled.

Check valve

Element of a waste water lifting unit which prevents waste water from flowing back from the discharge line into the lifting unit.

Domestic waste water

Faecal-free waste water (grey water) from washbasins, showers, washing machines, etc.

EN 12050-2

European Standard for waste water lifting units which are used to dispose of faeces-free waste water occurring below the flood level of buildings and sites. It defines general requirements as well as principles of construction and testing.

Flood level

Maximum backflow level of waste water in a drainage system

Inlet line

Pipe used for draining waste water from sanitary installations into the lifting unit

Stormwater

Water from natural precipitation which has not been contaminated by any form of use

Waste water

Water which has been changed by some type of use, e.g. domestic waste water

1 General

1.1 Principles

This operating manual is valid for the type series and variants indicated on the front cover.

The operating manual describes the proper and safe use of this equipment in all phases of operation.

The name plate indicates the type series/size and main operating data. The works number/serial number uniquely describes the system and is used as identification in all further business processes.

In the event of damage, immediately contact your nearest KSB Service centre to maintain the right to claim under warranty.

1.2 Installation of partly completed machinery

To install partly completed machinery supplied by KSB refer to the sub-sections under Servicing/Maintenance.

1.3 Target group

This operating manual is aimed at the target group of trained and qualified specialist technical personnel. (⇒ Section 2.2, Page 8)

1.4 Other applicable documents

Table 1: Overview of other applicable documents

Document	Contents
Sub-supplier product literature	Operating manuals and other product literature of accessories and integrated machinery components, operating manual of submersible motor pump

1.5 Symbols

Table 2: Symbols used in this manual

Symbol	Description
✓	Conditions which need to be fulfilled before proceeding with the step-by-step instructions
▷	Safety instructions
⇒	Result of an action
⇔	Cross-references
1. 2.	Step-by-step instructions
	Note Recommendations and important information on how to handle the product

1.6 Key to safety symbols/markings

Table 3: Definition of safety symbols/markings

Symbol	Description
	DANGER This signal word indicates a high-risk hazard which, if not avoided, will result in death or serious injury.
	WARNING This signal word indicates a medium-risk hazard which, if not avoided, could result in death or serious injury.
	CAUTION This signal word indicates a hazard which, if not avoided, could result in damage to the machine and its functions.
	General hazard In conjunction with one of the signal words this symbol indicates a hazard which will or could result in death or serious injury.
	Electrical hazard In conjunction with one of the signal words this symbol indicates a hazard involving electrical voltage and identifies information about protection against electrical voltage.
	Machine damage In conjunction with the signal word CAUTION this symbol indicates a hazard for the machine and its functions.



2 Safety

All the information contained in this section refers to hazardous situations.

In addition to the present general safety information the action-related safety information given in the other sections must be observed.

2.1 General

- This operating manual contains general installation, operating and maintenance instructions that must be observed to ensure safe operation of the system and prevent personal injury and damage to property.
- Comply with all the safety instructions given in the individual sections of this operating manual.
- The operating manual must be read and understood by the responsible specialist personnel/operators prior to installation and commissioning.
- The contents of this operating manual must be available to the specialist personnel at the site at all times.
- Information and markings attached directly to the product must always be complied with and kept in a perfectly legible condition at all times. This applies to, for example:
 - Arrow indicating the direction of rotation
 - Markings for connections
 - Name plate
- The operator is responsible for ensuring compliance with all local regulations not taken into account.

2.2 Personnel qualification and training

All personnel involved must be fully qualified to install, operate, maintain and inspect the equipment this manual refers to.

The responsibilities, competence and supervision of all personnel involved in installation, operation, maintenance and inspection must be clearly defined by the operator.

Deficits in knowledge must be rectified by means of training and instruction provided by sufficiently trained specialist personnel. If required, the operator can commission the manufacturer/supplier to train the personnel.

Training on the lifting unit must always be supervised by technical specialist personnel.

2.3 Consequences and risks caused by non-compliance with this manual

- Non-compliance with these operating instructions will lead to forfeiture of warranty cover and of any and all rights to claims for damages.
- Non-compliance can, for example, have the following consequences:
 - Hazards to persons due to electrical, thermal, mechanical and chemical effects and explosions
 - Failure of important product functions
 - Failure of prescribed maintenance and servicing practices
 - Hazard to the environment due to leakage of hazardous substances

2.4 Safety awareness

In addition to the safety information contained in this operating manual and the intended use, the following safety regulations shall be complied with:

- Accident prevention, health regulations and safety regulations
- Explosion protection regulations
- Safety regulations for handling hazardous substances
- Applicable standards, directives and laws

2.5 Safety instructions for the operator/user

- Fit protective equipment (e.g. contact guards) supplied by the operator for hot, cold or moving parts, and check that the equipment functions properly.
- Do not remove any protective equipment (e.g. contact guards) during operation.
- Provide the personnel with protective equipment and make sure it is used.
- Contain leakages (e.g. at the shaft seal) of hazardous fluids handled (e.g. explosive, toxic, hot) so as to avoid any danger to persons and the environment. Adhere to all relevant laws.
- Eliminate all electrical hazards. (In this respect refer to the applicable national safety regulations and/or regulations issued by the local energy supply companies.)

2.6 Safety information for maintenance, inspection and installation

- Modifications or alterations of the lifting unit require the manufacturer's prior consent.
- Use only original spare parts or parts authorised by the manufacturer. The use of other parts can invalidate any liability of the manufacturer for resulting damage.
- The operator ensures that maintenance, inspection and installation are performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.
- Carry out work on the lifting unit during standstill only.
- The pump casing must have cooled down to ambient temperature.
- Pump pressure must have been released and the pump must have been drained.
- When taking the lifting unit out of service always adhere to the procedure described in the manual.
- Decontaminate lifting units which handle fluids posing a health hazard.
- As soon as the work has been completed, re-install and re-activate any safety-relevant devices and protective devices. Before returning the product to service, observe all instructions on commissioning.
- Make sure the lifting unit cannot be accessed by unauthorised persons (e.g. children).

2.7 Unauthorised modes of operation

Always observe the limits stated in the product literature.

The warranty relating to the operating reliability and safety of the lifting unit supplied is only valid if the equipment is used in accordance with its intended use. (⇒ Section 2.8, Page 9)

2.8 Intended use

- The lifting unit must not be used in potentially explosive atmospheres.
- The lifting unit must only be operated within the operating limits described in the other applicable documents.
- Only operate lifting units which are in perfect technical condition.
- Do not operate partially assembled lifting units.

- Only use the lifting unit to handle the fluids described in the product literature of the respective design variant.
- Never operate the lifting unit without the fluid to be handled
- Observe the minimum flow rates indicated in the data sheet or product literature (to prevent overheating, bearing damage, etc).
- Observe the minimum flow rate and maximum flow rate indicated in the data sheet or product literature (to prevent overheating, mechanical seal damage, cavitation damage, bearing damage, etc).
- Do not throttle the flow rate on the inlet side of the lifting unit (to prevent cavitation damage)
- Consult the manufacturer about any use or mode of operation not described in the data sheet or product literature.
- Never exceed the permissible application and operating limits specified in the data sheet or product literature regarding pressure, temperature, etc.
- Observe all safety information and instructions in this manual.

3 Transport/Temporary Storage/Disposal

3.1 Checking the condition upon delivery

1. On transfer of goods, check each packaging unit for damage.
2. In the event of in-transit damage, assess the exact damage, document it and notify KSB or the supplying dealer and the insurer about the damage in writing immediately.

3.2 Transport

	 DANGER
	<p>System falling off the pallet Risk of injury by falling system!</p> <ul style="list-style-type: none"> ▷ Always transport the system in vertical position (with the cover on top). ▷ Never suspend the system by its power cable. ▷ Prevent the system from getting knocked or dropped.

- ✓ Transport equipment / lifting equipment suitable for the corresponding weight has been selected and is on hand. (⇒ Section 4.7, Page 18)
1. Check for any in-transit damage.
 2. Transport the waste water pump station to the place of installation.
 3. Carefully place down the waste water pump station at the site of installation.

3.3 Storage/preservation

	CAUTION
	<p>Damage during storage due to frost, humidity, dirt, UV radiation or vermin Corrosion/contamination of the lifting unit!</p> <ul style="list-style-type: none"> ▷ Store the lifting unit in a frost-proof, roofed area.

	CAUTION
	<p>Wet, contaminated or damaged openings and connections Leakage or damage of the lifting unit!</p> <ul style="list-style-type: none"> ▷ Only open the openings of the lifting unit at the time of installation.

If commissioning is to take place some time after delivery, we recommend that the following measures be taken for storing the lifting unit:

Store the lifting unit in a dry, protected room where the atmospheric humidity is as constant as possible.

3.4 Return to supplier

1. Drain the system as per operating instructions.
2. Always flush and clean the system, particularly if it has been used for handling noxious, hot or other hazardous fluids.
3. If the pump set has handled fluids whose residues could lead to corrosion in the presence of atmospheric humidity or could ignite upon contact with oxygen, the pump set must also be neutralised, and anhydrous inert gas must be blown through the pump to ensure drying.
4. Always complete and enclose a certificate of decontamination when returning the system. (⇒ Section 11, Page 61)
It is imperative to indicate any safety and decontamination measures taken.

	NOTE
	<p>If required, a blank certificate of decontamination can be downloaded from the following web site: www.ksb.com/certificate_of_decontamination</p>

3.5 Disposal

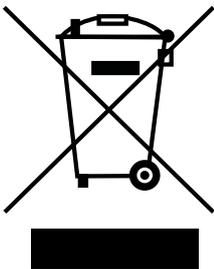
	 WARNING
	<p>Fluids handled, consumables and supplies which are hot and/or pose a health hazard Hazard to persons and the environment!</p> <ul style="list-style-type: none"> ▷ Collect and properly dispose of flushing fluid and any fluid residues. ▷ Wear safety clothing and a protective mask if required. ▷ Observe all legal regulations on the disposal of fluids posing a health hazard.

1. Dismantle the system.
Collect greases and other lubricants during dismantling.
2. Separate and sort the pump materials, e.g. by:
 - Metals
 - Plastics
 - Electronic waste
 - Greases and other lubricants
3. Dispose of materials in accordance with local regulations or in another controlled manner.

Electrical or electronic equipment marked with the adjacent symbol must not be disposed of in household waste at the end of its service life.

Contact your local waste disposal partner for returns.

If the used electrical or electronic equipment contains personal data, the user is responsible for deleting it before the equipment is returned.



4 Description

4.1 General description

- Automatic waste water pump station
- Lifting unit for collecting unpressurised, domestic waste water without faeces as well as stormwater and automatically lifting it above the flood level.

4.2 Designation

Example: Evamatic-Box N 2 501 E P M

Table 4: Designation key

Code	Description	
Evamatic-Box N	Type series	
2	Number of pumps	
	1	1 pump
	2	2 pumps
501	Pump type	
	32	Amarex NS 32
	5..	Ama-Porter
	6..	Ama-Porter
E	Motor version	
	E	Single-phase AC motor
	D	Three-phase asynchronous motor
- ¹⁾	Start capacitor	
	- ¹⁾	Without start capacitor
	B	With start capacitor
P	Installation type	
	P	Transportable, mounted on 3 pump feet
	S	Stationary, mounted on flanged bend
M	As-delivered condition	
	M	Collecting tank fully assembled
	K	Collecting tank as assembly kit

4.3 Name plate

The pump station is not fitted with a separate name plate.

The pump(s) of the pump station is (are) fitted with a name plate. A description of the information on the name plate is contained in the operating manual of the pump supplied with the delivery.

1) Blank

4.4 Design details

Design

- Tank made of impact-resistant plastic for above-floor installation/ underfloor installation
- Single-pump unit or dual-pump unit
- Tank volume 200 or 500 litres
- To EN 12050-2
- Closed with odour-proof cover²⁾
- Lift check valve integrated in the supplied piping

Installation

Evamatic-Box N 200 l:

- Stationary dry installation
- Wet-installed stationary model
- Transportable model for dry installation
- Wet-installed transportable model

Evamatic-Box N 500 l:

- Stationary dry installation
- Wet-installed stationary model

Drive

- AC motor, 50 Hz, 230 V, with integrated temperature switch
- Three-phase asynchronous motor, 50 Hz, 400 V, DOL starting
- Enclosure IP68 (permanently submerged) to EN 60529 / IEC 529
- Thermal class F

Shaft seal

Drive end:

- Shaft seal ring

Pump end:

- 1 bi-rotational mechanical seal with oil reservoir filled with environmentally friendly oil

Impeller type

- Various application-oriented impeller types

Bearings

- Grease-packed bearings sealed for life

Automation

- KSB recommends the use of a LevelControl Basic 2 control unit. (Electrical accessories optionally available.)

Connections

- Inlet side DN 50/DN 70/DN 100/DN 150 for cutting open
- Discharge outlet DN 50/DN 65 for cutting open if supplied as an assembly kit
- Drain DN 40 for cutting open

2) The tanks are absolutely odour-proof. They have been successfully leak-tested at a test pressure of 0.5 bar (in accordance with DIN EN 12050-1).

4.5 Configuration and function

Evamatic-Box N 200 I

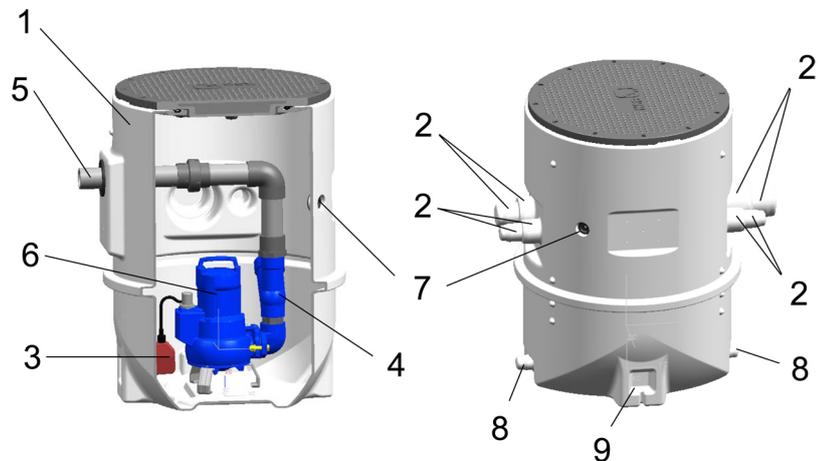


Fig. 1: Illustration of the waste water pump station, 200 l

1	Collecting tank	6	Submersible motor pump
2	Nozzles for inlet or venting	7	Cable entry for power cable
3	Float switch	8	Drainage nozzle
4	Ball check valve	9	Floor mount
5	Discharge line		

Design The pump station consists of a stable collecting tank (1) with integrated submersible motor pump (6), an inlet nozzle (2) and a vent nozzle (2) (8 options available for selection) as well as a discharge line (5).

Function The fluid handled flows into the pump station through the inlet nozzle (2) and is collected in a gas-, odour- and water-tight tank (1) made of polyethylene. As soon as the float switch (3) detects a defined fill level, the submersible motor pump (6) is started up automatically. The fluid handled is pumped off through the discharge line to a level above the flood level and into the public sewer. As soon as the float switch (3) detects a defined minimum fill level, the submersible motor pump (6) is stopped automatically.

Evamatic-Box N 500 I

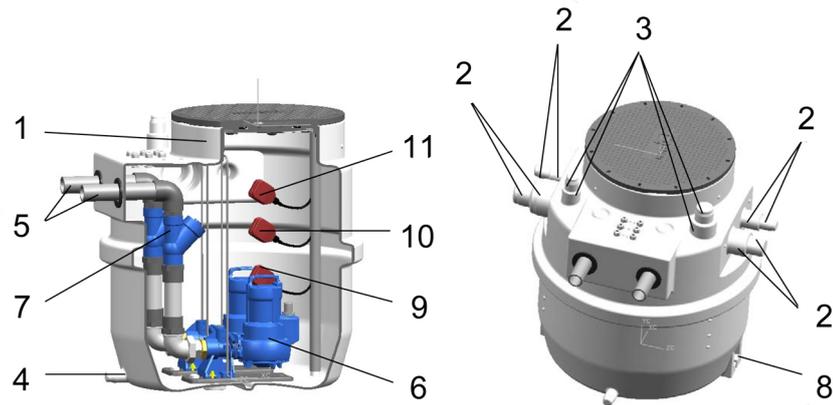


Fig. 2: Illustration of the waste water pump station, 500 l

1	Collecting tank	7	Ball check valves
2	Horizontal nozzles for inlet or venting	8	Floor mount
3	Vertical nozzles for inlet or venting	9	Float switch pump 1 ON and pump 1 and 2 OFF
4	Drainage nozzle	10	Float switch pump 2 ON
5	Discharge lines	11	Float switch for alarm
6	Submersible motor pumps		

Design The pump station consists of a stable collecting tank (1) with two integrated submersible motor pumps (6), a horizontal (2) or vertical (3) inlet nozzle, a horizontal (2) or vertical (3) vent nozzle (12 options available for selection) as well as two discharge lines (5).

Function The fluid handled flows into the pump station through the inlet nozzle (2) or (3) and is collected in a gas-, odour- and water-tight tank (1) made of polyethylene. As soon as the float switch (9) detects a defined fill level, the first submersible motor pump (6) is started up automatically. The fluid handled is pumped off through the discharge line to a level above the flood level and into the public sewer. If the float switch (10) detects a rising fill level while one pump is in operation, the second submersible motor pump (6) is started up automatically. As soon as the float switch (9) detects a defined minimum fill level, both pumps (6) are stopped automatically. The alarm float switch (11) needs to be connected to an alarm switchgear for acoustic or visual alarm (optional alarm switchgear can be supplied by KSB).

4.6 Scope of supply

Depending on the model, the following items are included in the scope of supply:

Evamatic-Box N 200 I with transportable pump version (supplied as assembly kit)

- 200-litre tank, access cover with screws and sealing element
- Complete discharge line with ball check valve and sealing element
- Ama-Porter submersible motor pump with single-phase motor and float switch
- Lifting chain made of stainless steel 1.4401
- Cable entry for power cable
- Hook made of stainless steel 1.4571

Evamatic-Box N 200 I with stationary pump version (supplied as assembly kit)

- 200-litre tank, access cover with screws and sealing element
- Complete foot with cast iron baseplate, pump claw, guide hoop and bolts/screws
- Complete horizontal discharge line, DN 50/DN 65, with ball check valve and sealing element
- Ama-Porter submersible motor pump with single-phase motor and float switch
- Lifting chain made of stainless steel 1.4401
- Cable entry for power cable
- Hook made of stainless steel 1.4571

Evamatic-Box N 200 I with stationary pump version (supplied fully assembled)

- Baseplate with foot, guide hoop and discharge line, fully assembled
- Ama-Porter pump with single-phase motor and float switch, or Amarex N S 32 pump with three-phase motor and float switch, foot-mounted
- Power cable
- Cable grommet or PG cable gland
- Lifting chain made of stainless steel 1.4401
- The cover is mounted, temporarily fastened with 2 screws; the remaining 10 screws are in a bag inside the collecting tank.
- 8 nozzle options for inlet and venting, from DN 50 to DN 150, for cutting open
- DN 40 drain nozzle, for cutting open

Evamatic-Box N 500 I with horizontal or vertical discharge outlet and stationary pump versions (supplied as assembly kit)

- 500-litre tank, access cover with screws and sealing element
- Two complete feet with cast iron baseplates, pump claws, guide hoops and bolts/screws
- Two complete discharge lines with ball check valve and sealing element (the discharge line supplied is suitable for horizontal or vertical discharge)
- 2 Ama-Porter submersible motor pumps with single-phase or three-phase motor
- Two lifting chains made of stainless steel 1.4401
- Five PG cable glands for routing the two power cables of the pumps and the three float switch cables through the tank wall
- Three float switches fastened to a removable rod for installation in the tank. The arrangement of the float switches is predefined in the factory.
- One hook made of stainless steel 1.4571 (per pump)

Evamatic-Box N 500 I with horizontal discharge outlet and stationary pump versions (supplied fully assembled)

- Baseplates with feet, guide hoops and horizontal discharge lines, fully assembled
- Pumps mounted on feet
- Power cables
- Rod for float switches
- Cable clips
- PG cable glands
- Lifting chains
- The cover is mounted, temporarily fastened with 2 screws; the remaining 10 screws are in a bag inside the collecting tank.
- 12 nozzle options for inlet and venting, from DN 50 to DN 150, for cutting open
- DN 40 drain nozzle, for cutting open

4.7 Dimensions and weights

Dimensions For the dimensions refer to the outline drawings of the station.

Weights **Table 5:** Approximate weights for Evamatic-Box N

Size	[kg]
132 U D-S	61
1500 E-P - 1503 E-P	54
1601 E-P - 1603 E-P	64
1500 E-S - 1503 E-S	70
1601 E-S - 1603 E-S	83
2500 E-S - 2503 E-S	110
2500 D-S - 2503 D-S	110
2601 E-S - 2603 E-S	122
2601 D-S - 2603 D-S	122
1545 EB-P	57
1545 EB-S	73
2545 EB-S	117
2545 D-S	114

4.8 Accessories

Further required accessories can be purchased from our distributors.

- Level-adjusting piece, height: 300 mm
- Gate valves DN 50 and 65 made of cast iron or PVC
- Cable connectors for connecting the electric cables inside the tank
- Control unit for Evamatic-Box N 200 I, only for a pump station with one Amarex N S32 with three-phase motor
- Control unit for Evamatic-Box N 500 I
- Alarm float switch for Evamatic-Box N 200 I (for connection to an alarm switchgear)
- Alarm switchgear for Evamatic-Box N 200 I
- Noise reduction pads
- Adapters (increasing adapters or reducing adapters)

Level-adjusting piece (height: 300 mm)

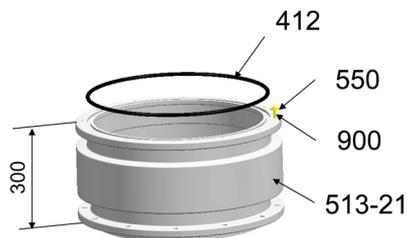


Fig. 3: Level-adjusting piece

Part No.	Description	Quantity
412	O-ring	1
513-21	Level-adjusting piece	1
550	Disc	12
900	Bolt/screw	12

IP68 cable connectors

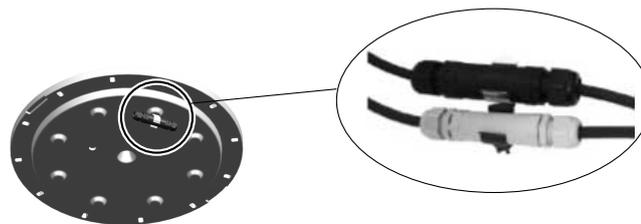
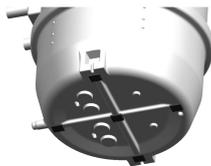


Fig. 4: Cable connectors for fitting at the cover

- For connecting the power cables of the pump sets and float switches inside the collecting tanks.
Scope of supply: cable support, two gaskets and one fastening screw
- For removing the submersible motor pumps during maintenance work without having to disconnect the cables at the control cabinet.
- Available for connecting a cable with a maximum of three cores and for connecting a cable with a maximum of five cores.
- Provide one cable connector for each power cable to be connected. Allow sufficient power cable length.

Self-adhesive noise reduction pads made of natural rubber**Fig. 5:** Noise reduction pads for fitting on the floor of the collecting tank

- Noise reduction pads for reducing noise emission and vibrations during operation inside buildings.

5 Installation at Site

5.1 Safety regulations

	<p>⚠ DANGER</p> <p>Power supply not disconnected Danger to life!</p> <ul style="list-style-type: none"> ▷ Pull the mains plug and secure the pump against unintentional start-up.
	<p>⚠ DANGER</p> <p>Electrical connection work by unqualified personnel Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Always have the electrical connections installed by a trained and qualified electrician. ▷ Observe regulations IEC 60364.
	<p>⚠ DANGER</p> <p>Unsuitable electrical installation Danger to life!</p> <ul style="list-style-type: none"> ▷ Make sure the electrical installation meets the VDE 0100 installation rules (i.e. sockets with earthing terminals). ▷ Make sure the electric mains is equipped with a residual current device of maximum 30 mA. ▷ Always have the electrical connections installed by a trained and qualified electrician.
	<p>⚠ DANGER</p> <p>Improper use Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Any extension cords must match the quality of the power cable supplied with the pump. ▷ Do not expose electrical connections or devices to moisture.
	<p>⚠ DANGER</p> <p>Insufficient preparation of work Risk of injury!</p> <ul style="list-style-type: none"> ▷ Wear personal protective equipment (PPE) for all work.

5.2 Checks to be carried out prior to installation

Before installing the pump station make sure that the following requirements are met:

- Check the data on the name plate of the pump(s) to make sure the pump station can be operated on the available mains.
- The fluid to be handled matches the description of suitable fluids.
- The above safety instructions have been complied with.
- The place of installation is frost-proof.

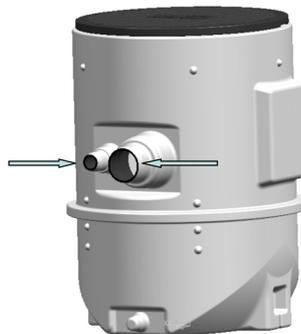
	NOTE
	For the installation at site observe EN 12056 Gravity drainage systems inside buildings .
	NOTE
	Comply with all other operating manuals referring to components of this unit. If transport locks are used, remove them prior to installation.
	NOTE
	Lifting units should not be installed next to sleeping or living quarters.
	NOTE
	In countries which require the use of explosion-proof pumps for handling water containing faeces, this system must not be used for this specific fluid.

5.3 Preparing the collecting tank

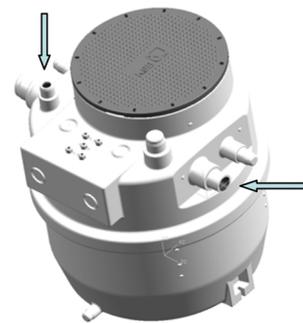
5.3.1 Inlet nozzles and vent nozzles

The collecting tanks are fitted with a selection of inlet and vent nozzles of various sizes and alignments.

	⚠ DANGER
	No vent line fitted Explosion hazard from gas accumulation! ▶ Always make sure that a vent line is fitted.



Evamatic-Box N 200 I



Evamatic-Box N 500 I

1. Saw off the end of the selected nozzles, making sure that the nozzle passage is completely open.
To facilitate fitting the connections always leave some of the chamfered protrusion.

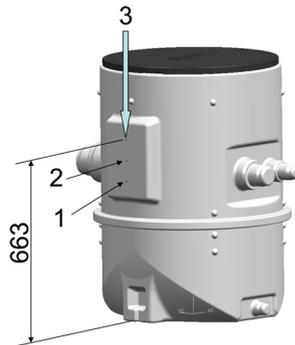
5.3.2 Discharge-side connection

	<p>CAUTION</p>
<p>Incorrect openings in the collecting tank Collecting tank cannot be used!</p> <ul style="list-style-type: none"> ▸ Always provide openings in the correct places, at the correct distance, with the correct diameter. 	

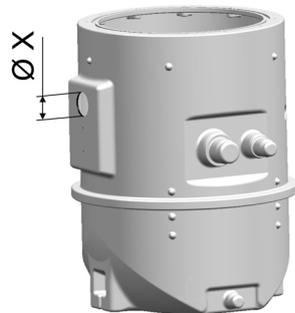
Evamatic-Box N 200 litres

1. Cut an opening with a suitable hole saw.

- Height:
 - 663 mm from the floor
 - Recess number 3

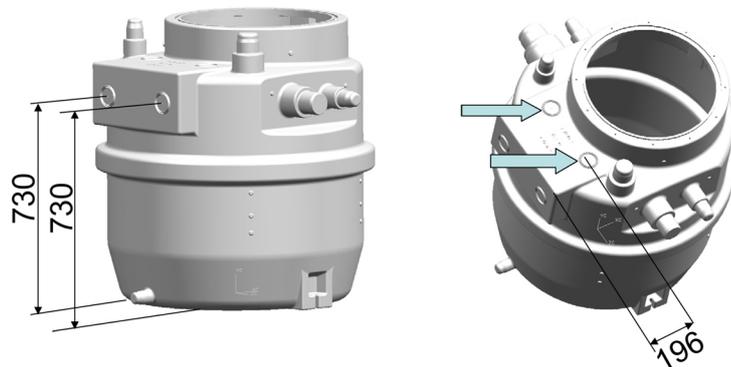


- Diameter:
 - $\text{Ø } 67 + 1$ for pipe DN 50 (PVC pipe diameter $\text{Ø } 63$)
 - $\text{Ø } 79 + 1$ for pipe DN 65 (PVC pipe diameter $\text{Ø } 75$)

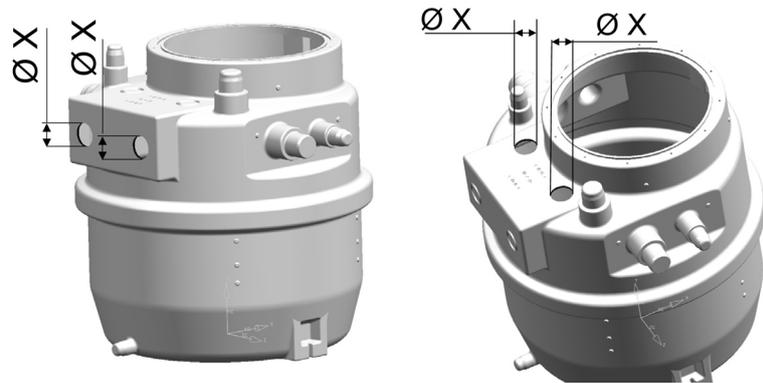


Evamatic-Box N 500 litres

1. Cut an opening with a suitable hole saw.
(Position the hole saw on the corresponding recess from the outside!)
- Arrangement:



- Diameter:
 - $\text{Ø } 67 + 1$ for pipe DN 50 (PVC pipe diameter $\text{Ø } 63$)
 - $\text{Ø } 79 + 1$ for pipe DN 65 (PVC pipe diameter $\text{Ø } 75$)



5.3.3 Drain

The 200 litre pump station is fitted with two opposite, closed DN 40 drain nozzles in its lower part. The 500 litre pump station is fitted with one closed DN 40 drain nozzle in its lower part.
One nozzle can be opened and connected to a manual pump to facilitate draining of the fluid for maintenance or repair.

5.3.4 Fitting the profile joint for the discharge line

	CAUTION
	<p>Superfluous sealant Leakage due to uneven pressure on the seal! ▷ Always completely remove any sealant residues.</p>

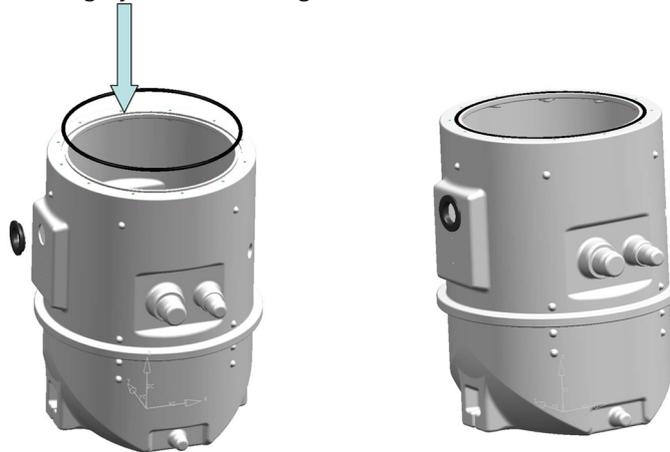
1. Thoroughly debur the edges of the opening after cutting it open.
2. Generously cover both seal faces with sealant prior to fitting the seal. (The sealant serves to increase the elastic fit of the seal.)



3. Carefully fit the seal in the opening for the discharge line at the collecting tank.
4. Remove any sealant residues from the collecting tank.

5.3.5 Fitting the O-ring for the tank cover

1. Thoroughly clean the seal groove on the tank.



2. Generously cover the bottom of the groove with sealant. (This is of particular importance when installing pump stations in buildings to ensure the pump station is odour-proof.)
3. Thoroughly press the O-ring into the groove.
4. Remove any sealant residues at the edges of the groove or on the O-ring.

5.4 Connecting the piping

	CAUTION
	<p>Superfluous sealant Damage to the machinery! Damage to the lift check valve! ▷ Do not use too much Teflon tape or sealant when sealing the lift check valve.</p>

	<p>NOTE</p> <p>Pipe 710-1 measures 300 mm in length and is chamfered at both ends. This pipe is especially designed to protrude from the collecting tank. Do not install this pipe anywhere else in the piping system.</p>
	<p>NOTE</p> <p>Use special glue suitable for PVC for fitting and sealing the cylindrical parts.</p>

1. Seal the pipe unions with Teflon tape or sealant.
2. Fit the parts and make sure they are correctly seated.
 Check that the lift check valve is fitted for the correct direction of flow.
 Observe the alignment of the discharge line protruding from the collecting tank (alignment of elbow 13-18).

5.4.1 Evamatic-Box N 200 I, transportable version

	CAUTION
	<p>Superfluous sealant Damage to the machinery! Damage to the lift check valve!</p> <p>▷ Do not use too much Teflon tape or sealant when sealing the lift check valve.</p>

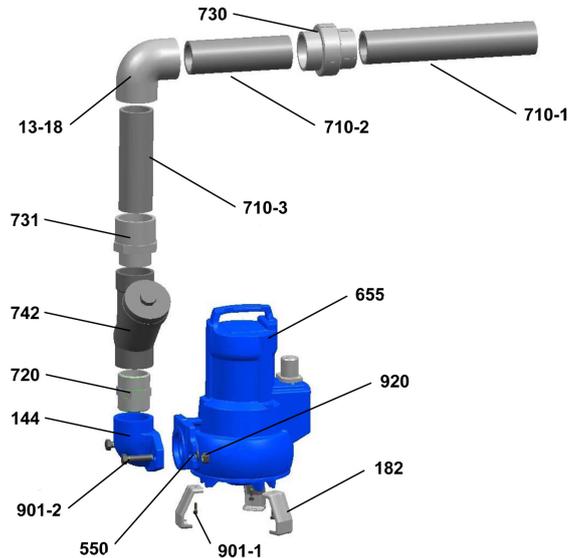


Fig. 6: Installing the piping

1. Undo the screw which fastens the suction cover of the pump.
2. Fit three pump feet 182 at pump 655.
3. Seal male threaded fitting 720 and screw it to elbow 144.
4. Seal lift check valve 742 and screw it to male threaded fitting 720. Check that the lift check valve is fitted for the correct direction of flow.
5. Seal threaded socket 731 and screw it to lift check valve 742.
6. Check that the joint ring has been fitted in the discharge nozzle. Fasten the pre-assembled piping with screws 901-2, discs 550 and nuts 920 to the pump.
7. Fasten elbow 13-18 to pipe 710.2 and secure it with glue.
8. Fasten pipe adapter 730 to pipe 710.2 and secure it with glue.
9. Install outlet pipe 710-1 in the collecting tank. (⇒ Section 5.5.1, Page 36)
10. Position the pump together with the assembled piping in the collecting tank.
11. Fasten the pre-assembled piping consisting of elbow 13-18, pipe 710.2 and pipe adapter 730 to outlet pipe 710-1 without using glue.
12. Accurately measure dimension A.

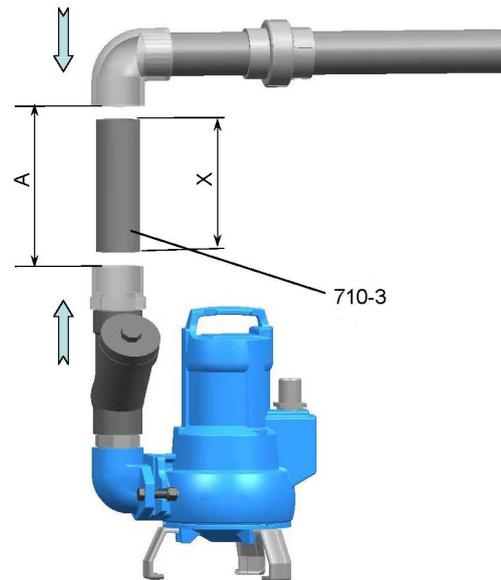


Fig. 7: Calculating length X

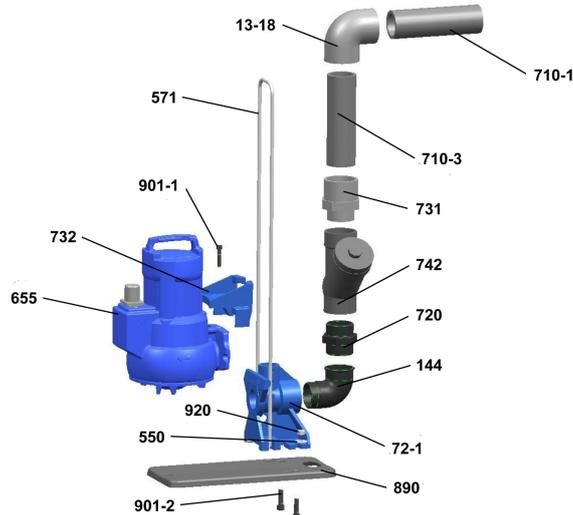
⇒ The length of pipe 710-3 equals:

- $X = A + (2 \times 38)$ for an outside diameter of 63 mm
- $X = A + (2 \times 44)$ for an outside diameter of 75 mm.

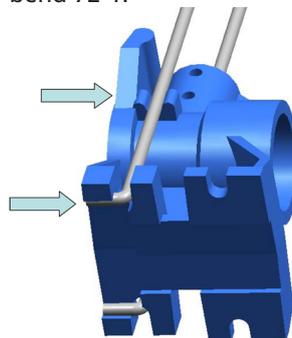
13. Shorten pipe 710-3 to match the calculated length X.
14. Glue pipe 710-3 to threaded socket 731.
15. Move outlet pipe 710-1 back by approx. 50 mm.
16. Fasten the pre-assembled piping consisting of elbow 13-18, pipe 710.2 and pipe adapters 730 to outlet pipe 710-3. Align and secure with glue.
17. Quickly press outlet pipe 710-1 into pipe adapter 730 and secure the connection with glue. Hold the entire piping tightly in position for this step.
18. Move the pump back as far as possible to prevent the float switch from touching the wall of the collecting tank.

5.4.2 Evamatic-Box N 200 I, stationary version (with Ama-Porter)

	CAUTION
	<p>Superfluous sealant Damage to the machinery! Damage to the lift check valve!</p> <p>▷ Do not use too much Teflon tape or sealant when sealing the lift check valve.</p>


Fig. 8: Installing the piping

1. Insert guide hoop 571 into the grooves provided for this purpose in flanged bend 72-1.



2. Fasten flanged bend 72-1 with screws 901-2, discs 550 and nuts 920 to baseplate 890.
3. Seal elbow 144 and screw it to flanged bend 72-1.
4. Seal male threaded fitting 720 and screw it to elbow 144.
5. Seal lift check valve 742 and screw it to male threaded fitting 720. Check that the lift check valve is fitted for the correct direction of flow.
6. Seal threaded socket 731 and screw it to lift check valve 742.
7. Fasten outlet pipe 710-1 to the collecting tank. (⇒ Section 5.5.2, Page 37)
8. Position the baseplate, flanged bend and pre-assembled piping in the collecting tank. Make sure that the baseplate is positioned exactly on the protrusion provided for this purpose. (⇒ Section 5.5.2, Page 37)
9. Fasten elbow 13-18 to outlet pipe 710-1 without using glue.
10. Accurately measure dimension A.

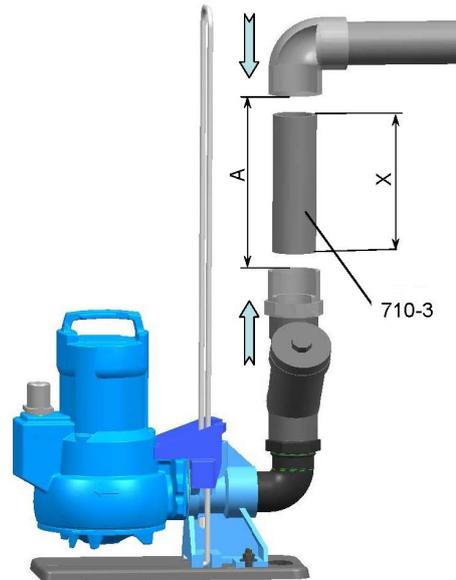


Fig. 9: Calculating length X

⇒ The length of pipe 710-3 equals:

- $X = A + (2 \times 38)$ for an outside diameter of 63 mm
- $X = A + (2 \times 44)$ for an outside diameter of 75 mm.

11. Shorten pipe 710-3 to match the calculated length X.
12. Glue pipe 710-3 to threaded socket 731.
13. Move outlet pipe 710-1 back by approx. 50 mm.
14. Fasten elbow 13-18 to pipe 710-3, align it and secure it with glue.
15. Quickly press outlet pipe 710-1 into pipe adapter 730 and secure the connection with glue. Hold the entire piping tightly in position for this step.

5.4.3 Evamatic-Box N 200 I, stationary version (with Amarex N S 32)

	CAUTION
	<p>Superfluous sealant Damage to the machinery! Damage to the lift check valve!</p> <p>▷ Do not use too much Teflon tape or sealant when sealing the lift check valve.</p>

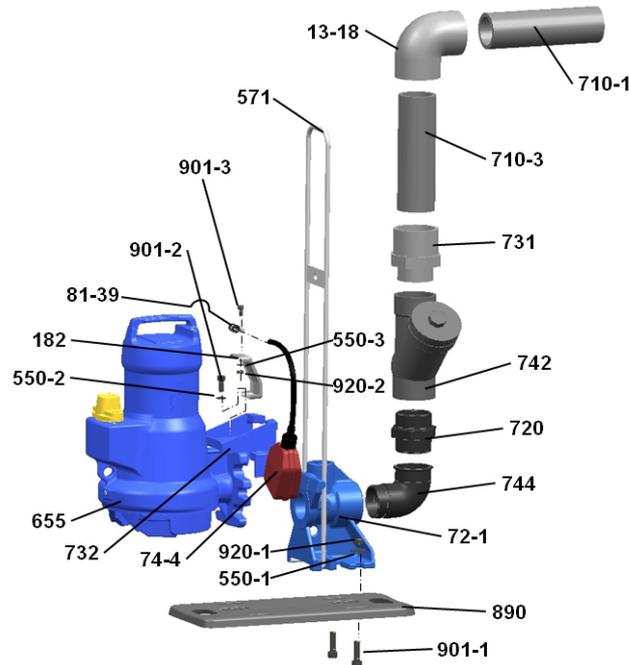
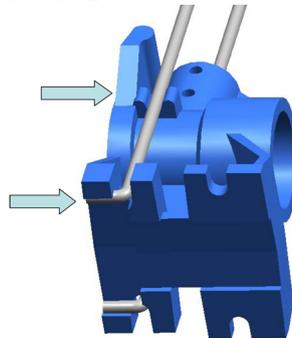


Fig. 10: Installing the piping

1. Insert guide hoop 571 into the grooves provided for this purpose in flanged bend 72-1.



2. Fasten flanged bend 72-1 with screws 901-2, discs 550 and nuts 920 to baseplate 890.
3. Seal elbow 144 and screw it to flanged bend 72-1.
4. Seal male threaded fitting 720 and screw it to elbow 144.
5. Seal lift check valve 742 and screw it to male threaded fitting 720. Check that the lift check valve is fitted for the correct direction of flow.
6. Seal threaded socket 731 and screw it to lift check valve 742.
7. Fasten outlet pipe 710-1 to the collecting tank. (⇒ Section 5.5.2, Page 37)
8. Position the baseplate, flanged bend and pre-assembled piping in the collecting tank. Make sure that the baseplate is positioned exactly on the protrusion provided for this purpose. (⇒ Section 5.5.2, Page 37)
9. Fasten elbow 13-18 to outlet pipe 710-1 without using glue.
10. Accurately measure dimension A.

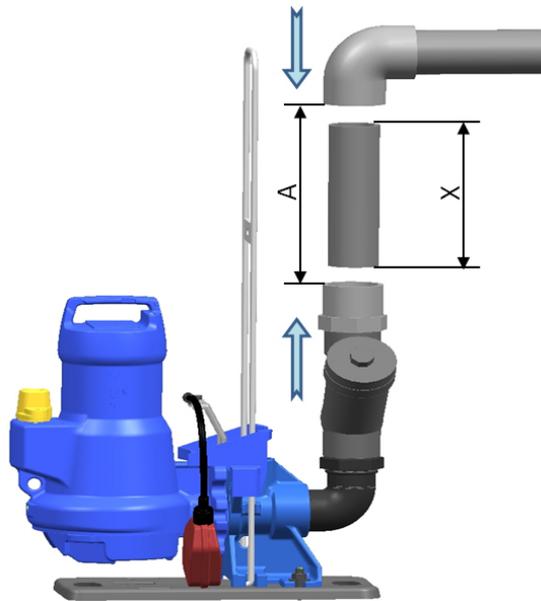


Fig. 11: Calculating length X

⇒ The length of pipe 710-3 equals:

- $X = A + (2 \times 38)$ for an outside diameter of 63 mm
- $X = A + (2 \times 44)$ for an outside diameter of 75 mm.

11. Shorten pipe 710-3 to match the calculated length X.
12. Glue pipe 710-3 to threaded socket 731.
13. Move outlet pipe 710-1 back by approx. 50 mm.
14. Fasten elbow 13-18 to pipe 710-3, align it and secure it with glue.
15. Quickly press outlet pipe 710-1 into pipe adapter 730 and secure the connection with glue. Hold the entire piping tightly in position for this step.

5.4.4 Evamatic-Box N 500 I

	CAUTION
<p>Superfluous sealant Damage to the machinery! Damage to the lift check valve!</p> <p>▷ Do not use too much Teflon tape or sealant when sealing the lift check valve.</p>	

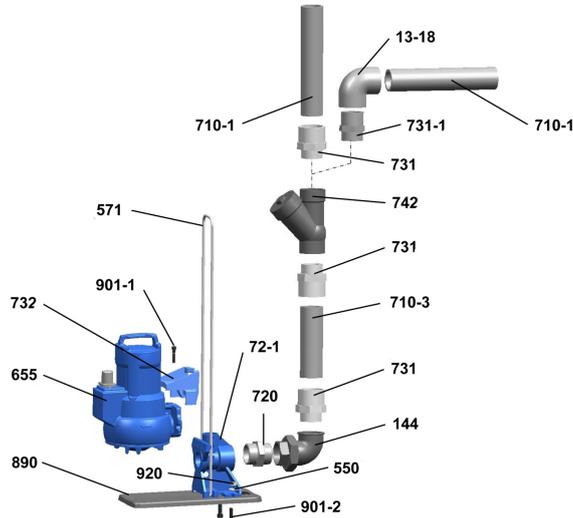
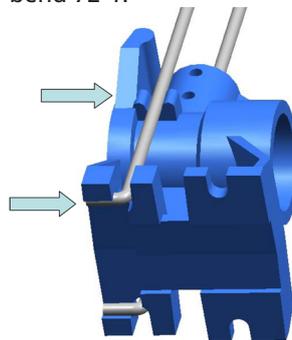


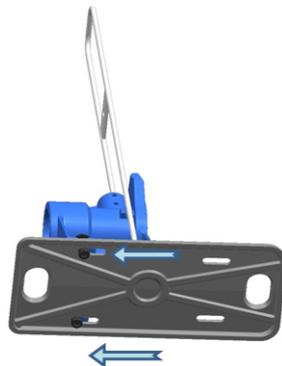
Fig. 12: Installing the piping

Horizontal discharge line

1. Insert guide hoop 571 into the grooves provided for this purpose in flanged bend 72-1.



2. Fasten flanged bend 72-1 with screws 901-2, discs 550 and nuts 920 to baseplate 890. Move the flanged bend as far as possible towards the discharge side and install it in this position to allow the float switches to move freely.



3. Seal male threaded fitting 720 and screw it to flanged bend 72-1.
4. Seal elbow 144 and screw it to male threaded fitting 720. Verify the vertical alignment.
5. Seal first threaded socket 731 and screw it to elbow 144.

6. Seal second threaded socket 731 and screw it to lift check valve 742.
7. Seal threaded socket 731-1 and screw it to lift check valve 742.
8. Connect elbow 13-18 to threaded socket 731-1 and secure it with glue. Verify the alignment with the lift check valve.
9. Fasten outlet pipe 710-1 to the collecting tank. (⇒ Section 5.5.4, Page 40)
(⇒ Section 5.5.5, Page 41)
10. Position the baseplate, flanged bend and pre-assembled piping in the collecting tank. Make sure that the baseplate is positioned exactly on the protrusion provided for this purpose. (⇒ Section 5.5.2, Page 37)
11. Fasten the assembly consisting of elbow 13-18, lift check valve 742 and sockets 731 and 731-1 to pipe 710-1 without using glue.
12. Accurately measure dimension A.

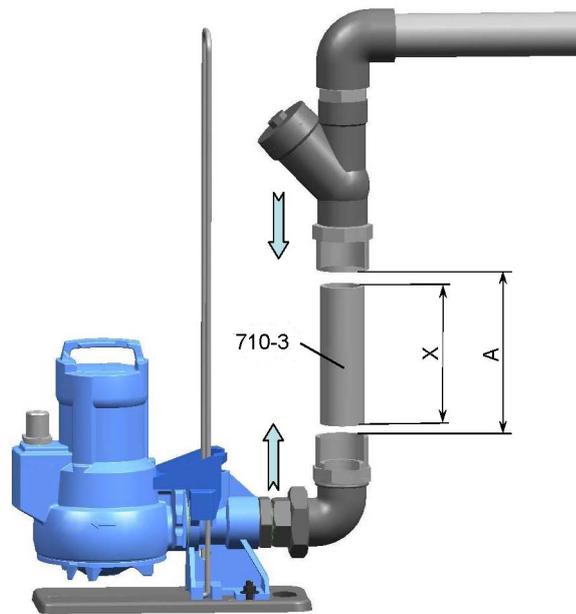


Fig. 13: Calculating length X

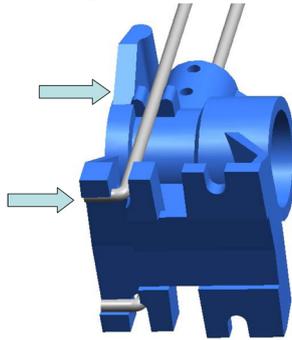
⇒ The length of pipe 710-3 equals:

- $X = A + (2 \times 38)$ for an outside diameter of 63 mm
- $X = A + (2 \times 44)$ for an outside diameter of 75 mm.

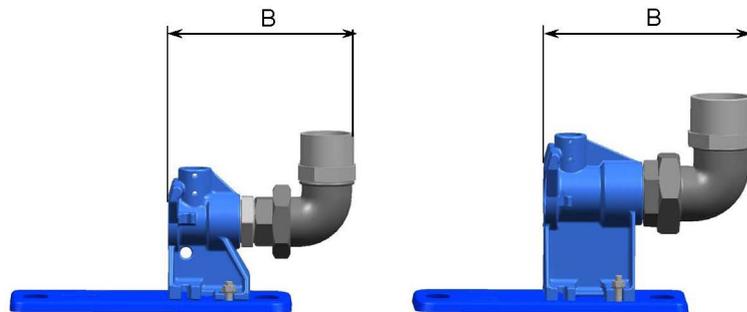
13. Shorten pipe 710-3 to match the calculated length X.
14. Glue pipe 710-3 to threaded socket 731 of elbow 144.
15. Move outlet pipe 710-1 back by approx. 50 mm.
16. Fasten the assembly consisting of the lift check valve, socket and elbow 13-18 to pipe 710-3. Align it and secure it with glue.
17. Quickly press outlet pipe 710-3 into elbow 13-18 and secure the connection with glue. Hold the entire piping tightly in position for this step.

Vertical discharge line

1. Insert guide hoop 571 into the grooves provided for this purpose in flanged bend 72-1.



2. Fasten flanged bend 72-1 with screws 901-2, discs 550 and nuts 920 to baseplate 890.
3. Seal male threaded fitting 720 and screw it to flanged bend 72-1.
4. Seal elbow 144 and screw it to male threaded fitting 720. Verify the vertical alignment and observe dimension B:



- ⇒ Pipe DN 50 (pipe diameter 63 mm): B = 265 mm to 290 mm
- ⇒ Pipe DN 65 (pipe diameter 75 mm): B = 310 mm to 335 mm
- ⇒ Dimension B must always be observed. An incorrect pipe alignment would lead to impermissible tension and leakage at the connections and sockets.

5. Seal first threaded socket 731 and screw it to elbow 144.
6. Guide pipe 710-3 into threaded socket 731 until it will not go any further. Secure it with glue.
7. Seal second threaded socket 731 and screw it to lift check valve 742.
8. Guide the assembly unit consisting of the lift check valve and sockets onto pipe 710-3 until it will not go any further. Secure it with glue. Check that the lift check valve is fitted for the correct direction of flow.
9. Seal the second threaded socket 731 and screw it to lift check valve 742. (⇒ Section 5.5.5, Page 41)



NOTE

Only fit pipe 710-1 after the pump has been installed in the collecting tank.
(⇒ Section 5.5.5, Page 41)

5.5 Installing the pump(s) and pipe(s) in the collecting tank

5.5.1 Evamatic-Box N 200 I — transportable version

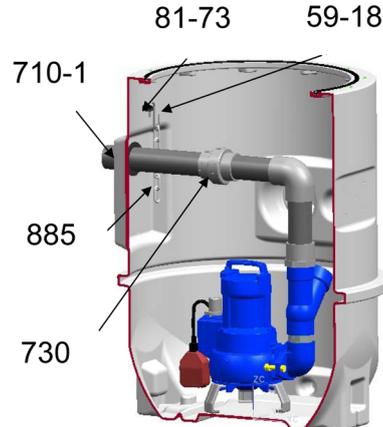


Fig. 14: Installing the pump and piping

1. Cut the cover of the seat for cable grommet 916 open with a 45 mm diameter hole saw.
2. Deburr the edges and smoothen the surface until the diameter equals 46 ± 0.5 mm.
Alternatively, for tanks installed underfloor, the power cable can be guided through the vent nozzle. In this case, do not alter the original condition of the cable grommet seat.
3. Fasten clamp holder 81-73 to the tank with the screw supplied for this purpose. (A protrusion for inserting the screw is provided on the outside of the tank. Use this precise position when fitting the clamp holder.)
4. Fasten the clamp to clamp holder 81-73 and tighten it.
5. Attach hook 59-18 to the clamp.
6. Fasten the shackle and chain 885 to the pump handle.
7. Lower the submersible motor pump with the fitted piping into the tank. (⇒ Section 5.4.1, Page 27)
8. Wet the outlet pipe with soapy water.
9. Insert the chamfered outlet pipe 710-1 (length 300 mm) from the outside into the tank opening through the profile seal.

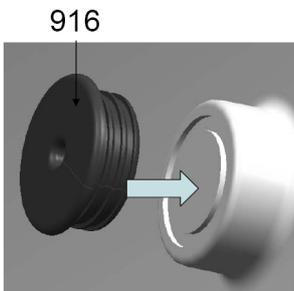
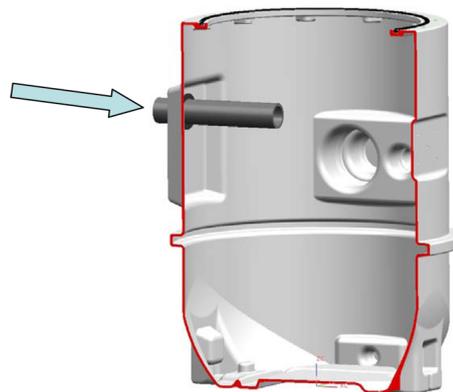


Fig. 15: Cable grommet



10. Install the piping. (⇒ Section 5.4.1, Page 27)
11. Attach chain 885 to hook 59-18.
12. Fit the three supplied clamp holders for fastening the power cable in the tank.

13. Fasten the power cable.
Protrusions for inserting the screws are provided on the outside of the tank. Use these precise positions when fitting the clamp holders.
14. Pull the power cable through cable grommet 916 and press the cable grommet into its seat.

5.5.2 Evamatic-Box N 200 I — stationary version, with Ama-Porter

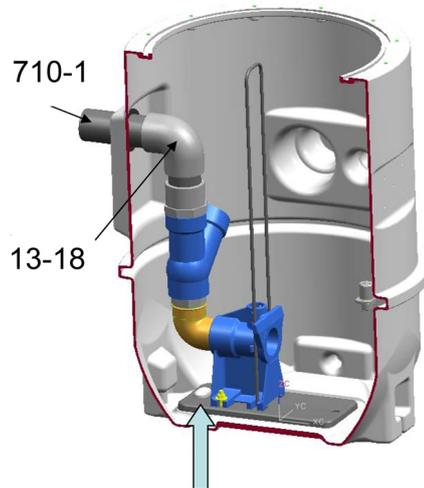


Fig. 16: Installing the pump and piping

1. Cut the cover of the seat for cable grommet 916 open with a 45 mm diameter hole saw.
2. Deburr the edges and smoothen the surface until the diameter equals 46 ± 0.5 mm.
Alternatively, for tanks installed underfloor, the power cable can be guided through the vent nozzle. In this case, do not alter the original condition of the cable grommet seat.
3. Fasten clamp holder 81-73 to the tank with the screw supplied for this purpose. (A protrusion for inserting the screw is provided on the outside of the tank. Use this precise position when fitting the clamp holder.)
4. Fasten the clamp to clamp holder 81-73 and tighten it.
5. Attach hook 59-18 to the clamp.
6. Fasten the shackle and chain 885 to the pump handle.
7. Lower the pre-assembled piping into the tank and position the baseplate on the protrusion provided for this purpose. (⇒ Section 5.4.2, Page 29)
8. Slide outlet pipe 710-1 into elbow 13-18 until it will not go any further. Secure it with glue.
9. Attach chain 885 to hook 59-18.
10. Fasten claw 732 to submersible motor pump 655 with bolt 901-1.

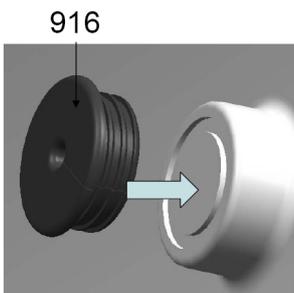
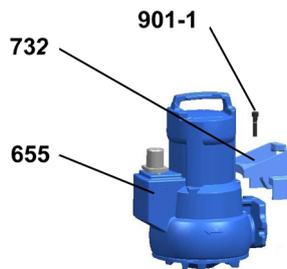


Fig. 17: Cable grommet



11. Guide the claw into the hoop and slowly lower the pump into the tank.
12. Fit the three supplied clamp holders for fastening the power cable in the tank.

13. Fasten the power cable.
Protrusions for inserting the screws are provided on the outside of the tank. Use these precise positions when fitting the clamp holders.
14. Pull the power cable through cable grommet 916 and press the cable grommet into its seat.

5.5.3 Evamatic-Box N 200 I — stationary version, with Amarex N S 32

Installing the piping

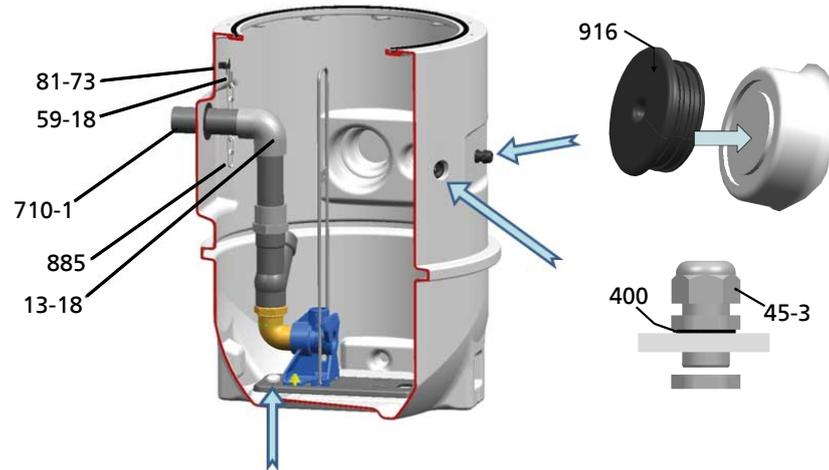


Fig. 18: Installing the piping

1. Cut the cover of the seat for cable grommet 916 open with a 45 mm diameter hole saw.
2. Debur the edges and smoothen the surface until the diameter equals 46 ± 0.5 mm.
Alternatively, for tanks installed underfloor, the float switch cable can be guided through the vent nozzle. In this case, do not alter the original condition of the cable grommet seat.
3. Drill a hole of diameter $25 + 1$ mm for fitting PG cable gland 45-3 for the power cable of the pump (7×1.5 mm²). Use the marking in a central position of the tank provided for drilling the hole.
Alternatively, for tanks installed underfloor, the power cable of the pump can be guided through the vent nozzle. In this case, do not drill any holes for the PG cable glands.



NOTE

For fitting PG cable glands 45-3, gasket 400 must be fitted on the outside of the tank.

4. Fasten clamp holder 81-73 to the tank with the screw supplied for this purpose. (A protrusion for inserting the screw is provided on the outside of the tank. Use this precise position when fitting the clamp holder.)
5. Fasten the clamp to clamp holder 81-73 and tighten it.
6. Attach hook 59-18 to the clamp.
7. Fasten the shackle and chain 885 to the pump handle.
8. Lower the pre-assembled piping into the tank and position the baseplate on the protrusion provided for this purpose.
9. Slide outlet pipe 710-1 into elbow 13-18 until it will not go any further. Secure it with glue.
10. Attach chain 885 to hook 59-18.

Installing the pump

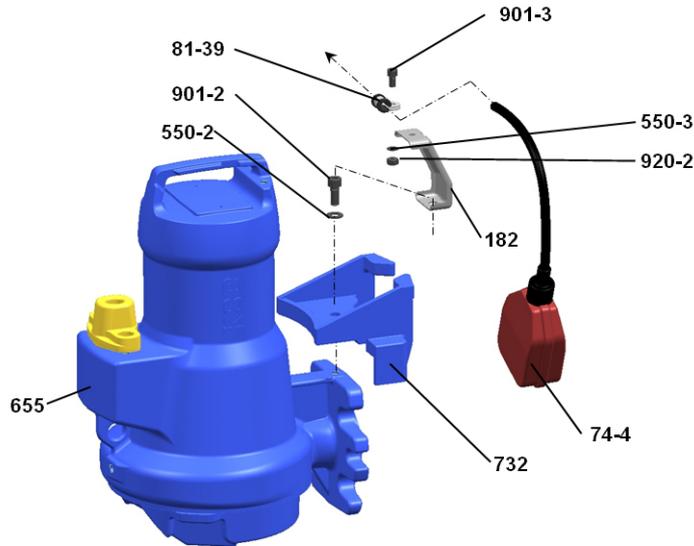


Fig. 19: Installing the pump

1. Fasten claw 732 to submersible motor pump 655 with bolt 901-1.
2. Fasten foot 182 of claw 732 to pump 655 with screw 901-2 and disc 550-2.
3. Insert the cable of float 74-4 into clamp 81-39. Fasten the clamp to foot 182 with screw 901-3, lock washer 550-3 and nut 920-2.

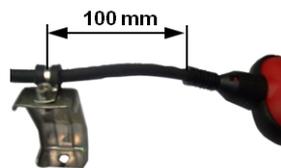


Fig. 20: Adjusting the float distance

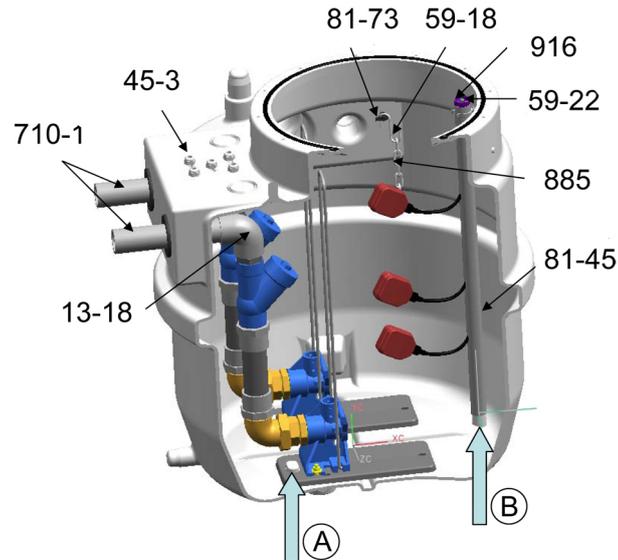
4. Adjust the float distance to 100 m. Tighten nut 920-2.

	CAUTION
	<p>Incorrect position of float Damage to the machinery! The pump and float may not be able to work properly!</p> <ul style="list-style-type: none"> ▷ Position the float on the side opposite the inlet.

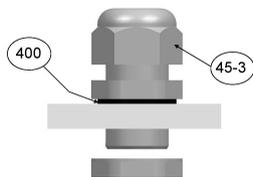
5. Guide the claw into the hoop and slowly lower the pump into the tank.
6. Fit the three supplied clamp holders for fastening the power cable in the tank.
7. Fasten the power cable.
 Protrusions for inserting the screws are provided on the outside of the tank. Use these precise positions when fitting the clamp holders.
8. Pull the float switch cable through cable grommet 916. Press the cable grommet into its seat.
9. Insert the power cable of the pump into PG cable gland 45-3.

	NOTE
	<p>KSB supplies optional cable connectors for connecting the power cables (for pumps and float switches) inside the tanks. When cable connectors are used, the power cables do not need to be disconnected in the control cabinet and pulled out through the PG cable glands of the tank or the vent line for removing the submersible motor pumps for maintenance.</p>

5.5.4 Evamatic-Box N 500 I — horizontal discharge line outlet


Fig. 21: Installing horizontal pipes and baseplates in the tank

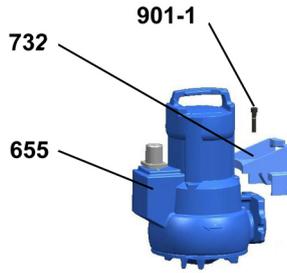
1. Drill five holes of diameter $20 + 1$ mm for fitting PG cable glands 45-3 for the power cables of the submersible motor pumps and the float switch cables. The marked recesses in the tank indicate the position for the drilled holes. Alternatively, the power cable can be guided through the vent nozzle. In this case, do not drill any holes for the PG cable glands.


Fig. 22: Fitting PG cable glands

	NOTE
	For fitting PG cable glands 45-3, gasket 400 must be fitted on the outside of the tank.

2. Fasten the two clamp holders 81-73 to the tank with the screws supplied for this purpose.
(Two protrusions for inserting the screws are provided on the outside of the tank. Use these precise positions when fitting the clamp holders.)
3. Fasten the clamps to clamp holders 81-73 and tighten them.
4. Attach the two hooks 59-18 to the clamps.
5. Fasten the shackle and chain 885 to the pump handle of each pump.
6. Lower the pre-assembled piping of the first pump into the tank and position the baseplate on the protrusion provided for this purpose (see arrow A).
(⇒ Section 5.4.4, Page 33)
7. Slide outlet pipe 710-1 into elbow 13-18 until it will not go any further. Secure it with glue.
8. Attach chain 885 to hook 59-18.
9. Install the second piping assembly as described above.

10. Fasten claws 732 to submersible motor pumps 655 with bolts 901-1.



11. Slowly lower the pumps into the tank and slide claws 732 into the guide hoops.

12. Tightly screw threaded rod M8 59-22 into the protrusion on the tank floor (see arrow B).

13. Guide the rod of float switch 81-45 over the threaded rod and tightly insert it into the protrusion on the tank floor.

14. Screw screw plug 916 onto the threaded rod until it abuts the rod of float switch 81-45.

15. Fit the three supplied clamp holders for fastening the power cable in the tank.

16. Fasten the power cable with the cable clamps provided.

Protrusions for inserting the screws are provided on the outside of the tank. Use these precise positions when fitting the clamp holders.

	<p>NOTE</p> <p>KSB supplies optional cable connectors for connecting the power cables (for pumps and float switches) inside the tanks. When cable connectors are used, the power cables do not need to be disconnected in the control cabinet and pulled out through the PG cable glands of the tank or the vent line for removing the submersible motor pumps for maintenance.</p>
	<p>NOTE</p> <p>Using these cable connectors is especially recommended for connecting the pump stations Evamatic-Box N 1545 EB and 2545 EB. The benefits of adjusting the cable length and using a cable connector are that the cable does not need to be disconnected and reconnected at the "Booster" control unit during installation and that the pumps can easily be removed for maintenance.</p>

5.5.5 Evamatic-Box N 500 I — vertical discharge line outlet

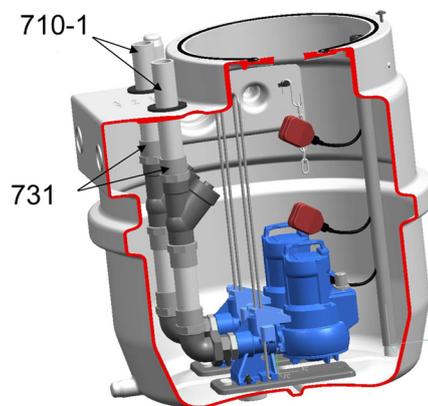


Fig. 23: Installing horizontal pipes and baseplates in the tank

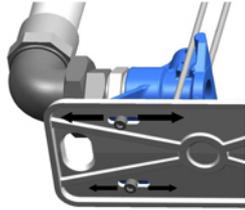


Fig. 24: Adjusting the pipe position

1. Drill five holes of diameter 20 + 1 mm for fitting PG cable glands 45-3 for the power cables of the submersible motor pumps and the float switch cables. The marked recesses in the tank indicate the position for the drilled holes. Alternatively, the power cable can be guided through the vent nozzle. In this case, do not drill any holes for the PG cable glands.



NOTE

For fitting PG cable glands 45-3, gasket 400 must be fitted on the outside of the tank.

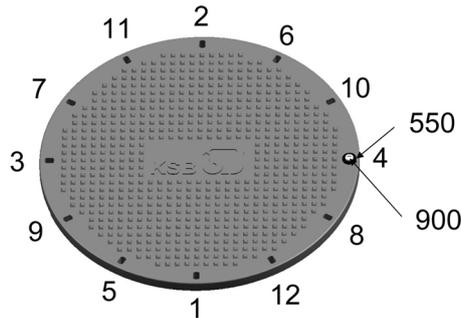
2. Fasten the two clamp holders 81-73 to the tank with the screws supplied for this purpose.
(Two protrusions for inserting the screws are provided on the outside of the tank. Use these precise positions when fitting the clamp holders.)
3. Fasten the clamps to clamp holders 81-73 and tighten them.
4. Attach the two hooks 59-18 to the clamps.
5. Fasten the shackle and chain 885 to the pump handle of each pump.
6. Lower the pre-assembled piping of the first pump into the tank and position the baseplate on the protrusion provided for this purpose (see arrow A).
(⇒ Section 5.4.4, Page 33)
7. Adjust the pipe position by moving the foot 72-1 along baseplate 890.
8. Move outlet pipe 710-1 into socket 731 until it will not go any further. Secure it with glue.
9. Attach chain 885 to hook 59-18.
10. Install the second piping assembly as described above.
11. Fasten claws 732 to submersible motor pumps 655 with bolts 901-1.



12. Slowly lower the pumps into the tank and slide claws 732 into the guide hoops.
13. Tightly screw threaded rod M8 59-22 into the protrusion on the tank floor (see arrow B).
14. Guide the rod of float switch 81-45 over the threaded rod and tightly insert it into the protrusion on the tank floor.
15. Screw screw plug 916 onto the threaded rod until it abuts the rod of float switch 81-45.
16. Fit the three supplied clamp holders for fastening the power cable in the tank.
17. Fasten the power cable with the cable clamps provided.
Protrusions for inserting the screws are provided on the outside of the tank. Use these precise positions when fitting the clamp holders.

5.6 Fitting the cover

1. Thoroughly clean the groove for the joint ring in the tank.
2. If the pump station is to be installed in a building, generously cover the bottom of the groove with sealant.
3. Press the O-ring into the groove until it will not go any further.
4. Remove any sealant residues from the edges of the groove or the joint ring.
5. Check that the side of the cover which will sit on the seal is clean. It must be free from any traces of sealant.
6. Mount the cover and fasten it with screws 900 and discs 550.
7. Tighten the screws in the order shown below (see illustration) to a torque of 2 Nm.



5.7 Installing the pump station

	⚠ DANGER
	<p>No vent line fitted Explosion hazard from gas accumulation!</p> <p>▷ Always make sure that a vent line is fitted.</p>
	CAUTION
	<p>Danger of frost! Damage to pipelines and pump!</p> <p>▷ Observe the frost protection measures recommended for the corresponding region.</p>
	NOTE
	<p>Fitting a grease separator upstream of the pump station is recommended.</p>
	NOTE
	<p>Option of connecting a hand diaphragm pump (available as accessory) to allow drainage of the tank in case of a power failure or for servicing work.</p>

5.7.1 Underfloor installation of the pump station

	NOTE
	<p>Do not install the pump stations underfloor in areas which are subject to a risk of pressing groundwater.</p>

1. Excavate a sump.
2. Cover the floor of the sump with a 15 cm layer of fine sand. Compact the sand layer.
3. Position the completely assembled pump station in the sump.
4. Connect the discharge line, inlet line and vent line.

	CAUTION
	<p>Transport lock not removed Damage to the machinery!</p> <p>▶ Prior to commissioning a pump station which has been supplied completely assembled, always remove the transport lock of the pump.</p>

	NOTE
	<p>Prior to burying the pump station, make sure that all preparatory and connection work at pump and piping has been completed.</p>

	NOTE
	<p>KSB recommends connecting the piping with commercially available "System J" spigot and socket connections. This system allows for PVC sockets to be fitted and glued in.</p>

	NOTE
	<p>Guide the power cable(s) through the vent nozzle. Do not alter the original condition of the cable grommet seat. Do not drill any holes for the PG cable glands.</p>



Fig. 25: Spigot and socket connections

5. Provide a conduit for the power cables.

	NOTE
	<p>KSB optionally offers reducing or increasing adapters made of synthetic rubber with two clamps. They can be ordered from specialist suppliers.</p>

6. Adjust the level of the cover to the site conditions.

	NOTE
	<p>The cover is fastened with 12 screws. It has an anti-slip feature. Its conformance with Standard EN 12053 category K3 (non-trafficable area) has been verified.</p>

	<p>NOTE</p> <p>KSB optionally offers a level-adjusting piece (height 300 mm).</p>
	<p>CAUTION</p> <p>Improper installation</p> <p>Danger of frost/freezing!</p> <ul style="list-style-type: none"> ▷ For frost-proof installation in regions with extreme climatic conditions the use of a second level-adjusting piece is permitted as long as the pump in the tank is mounted on a foot. ▷ Never fit more than 2 level-adjusting pieces.

7. If the sump floor is made of concrete, fasten the collecting tank to the sump floor at the two anchor points with (composite) anchor bolts.
8. Fill the collecting tank with water.
9. Fill the sump with sand. Compact the sand evenly.

5.7.2 Above floor installation of the pump station

1. Position the completely assembled pump station at the selected place of installation.
2. Connect the discharge line, inlet line and vent line.
3. Provide a cable duct for the power cables.
4. Fasten the collecting tank to the floor at the two anchor points with (composite) anchor bolts.

	<p style="background-color: #FFD700; margin: 0;">CAUTION</p> <p>Transport lock not removed Damage to the machinery!</p> <ul style="list-style-type: none"> ▸ Prior to commissioning a pump station which has been supplied completely assembled, always remove the transport lock of the pump.
	<p style="background-color: #0070C0; color: white; margin: 0;">NOTE</p> <p>As an option, KSB offers a set of eight noise reduction pads made of natural rubber, which can be stuck to the bottom of the tank from the outside. This set is available from specialist suppliers.</p>

5.8 Electrical connection

	<p style="background-color: #e67e22; color: white; padding: 5px;">⚠ DANGER</p> <p>Electrical connection work by unqualified personnel Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Always have the electrical connections installed by a trained and qualified electrician. ▷ Observe regulations IEC 60364.
	<p style="background-color: #f1c40f; color: white; padding: 5px;">⚠ WARNING</p> <p>Incorrect connection to the mains Damage to the mains network, short circuit!</p> <ul style="list-style-type: none"> ▷ Observe the technical specifications of the local energy supply companies.
	<p style="background-color: #f1c40f; color: white; padding: 5px;">CAUTION</p> <p>Improper routing of power supply cables Damage to the power supply cable!</p> <ul style="list-style-type: none"> ▷ Never move the power supply cable at temperatures below -25 °C. ▷ Never kink or crush the power supply cable.

Lightning protection

- Electrical installations must be protected against overvoltage (binding since 14 December 2018) (see DIN VDE 0100-443 (IEC 60364-4-44:2007/A1:2015, modified) and DIN VDE 0100-534 (IEC 60364-5-53:2001/A2:2015, modified). Every time the existing installation is modified retrospectively, overvoltage protection to VDE must be retrofitted.
- The maximum cable length between the surge arrester (usually type 1, internal lightning protection) at the point where electricity enters the building and the device to be protected should not exceed 10 m. For longer cables additional surge arresters (type 2) must be fitted in the upstream sub-distribution system or directly in the device to be protected.
- The lightning protection concept must be provided by the operator or by a suitable supplier contracted by the operator. The corresponding protective equipment for the control units / switchgears can be offered on request.

Connecting the waste water pump station to the power supply

- Evamatic-Box N 200 I** ✓ The original operating manual of the pump sets is on hand and is observed.
1. Plug the mains plug into the mains socket.
- Evamatic-Box N 500 I** ✓ The original operating manual of the pump sets is on hand and is observed.
1. Connect the power cables and float switch cables in the control cabinet.

6 Commissioning/Start-up/Shutdown

6.1 Commissioning/Start-up

6.1.1 Prerequisites for commissioning/start-up

Before commissioning/starting up the pump set, make sure that the following conditions are met:

- The pump set has been properly connected to the power supply and is equipped with all protection devices.
- Any safety regulations have been observed. (⇒ Section 2, Page 8)
- The operating data has been verified.
- The VDE standards and regulations applicable in the country of use are complied with.
- A functional test has been performed.
- All connections and pipes have been checked for tightness and re-sealed, if required.
- The operating manual of the pump set has been taken into account.
- The transport lock of the pump in the collecting tank has been removed.

6.1.2 Starting up/switching off the pump set

The pump (set) has been properly connected to the electric power supply.

The pump's automatic control system will automatically cut in or out when the respective specified levels are reached.

The float switches are fitted on a removable rod. The floats have been arranged at the factory. This arrangement must not be altered in any way. If a float switch or several float switches need replacing as part of maintenance, arrange them as shown below. The free length of the floats must equal $240 \text{ mm} \pm 5$ from the rod centre to the end of the float.

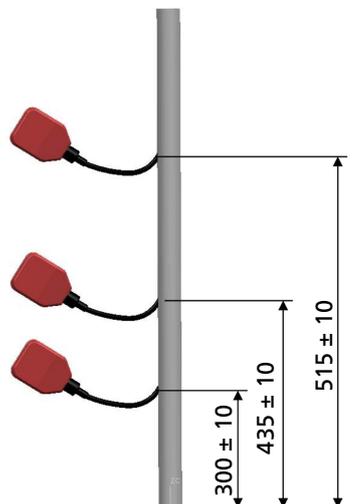


Fig. 26: Arrangement of floats

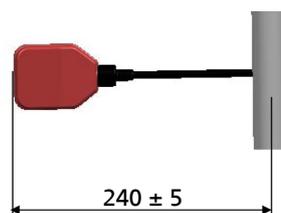


Fig. 27: Free length of the float

6.2 Shutdown/storage/preservation

6.2.1 Measures to be taken for shutdown

	<p>⚠ WARNING</p> <p>Unintentional start-up of the waste water lifting unit Risk of injury by moving parts!</p> <ul style="list-style-type: none"> ▷ Only carry out work on the waste water lifting unit after the electrical connections have been disconnected. ▷ Make sure that the waste water lifting unit cannot be started up unintentionally.
	<p>⚠ WARNING</p> <p>Fluids handled and supplies posing a health hazard Hazard to persons and the environment!</p> <ul style="list-style-type: none"> ▷ Units which handle fluids posing a health hazard must be decontaminated. Wear safety clothing and a protective mask, if required. ▷ Observe all legal regulations on the disposal of fluids posing a health hazard.

1. Disconnect the system from the power supply and protect it against inadvertent start-up.
2. Pull the pump(s) out of the system.
3. Flush the system as per operating instructions.
4. Leave the system to dry.

Special preservation measures are not required.

6.3 Returning to service

For returning the equipment to service, observe the sections on commissioning/start-up (⇒ Section 6.1, Page 48) and the operating limits

In addition, carry out all servicing/maintenance operations before returning the waste water lifting unit to service. (⇒ Section 7, Page 50)

7 Servicing/Maintenance

7.1 Safety regulations

	<p>⚠ DANGER</p> <p>Power supply not disconnected Danger to life!</p> <ul style="list-style-type: none"> ▸ Pull the mains plug or disconnect all electrical connections and secure against unintentional start-up.
	<p>⚠ DANGER</p> <p>Work on the lifting unit by unqualified personnel Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▸ Have system components modified and dismantled by authorised personnel only.
	<p>⚠ DANGER</p> <p>Insufficient preparation of work Risk of injury!</p> <ul style="list-style-type: none"> ▸ Wear personal protective equipment (PPE) for all work.
	<p>⚠ WARNING</p> <p>Insufficient stability Risk of crushing hands and feet!</p> <ul style="list-style-type: none"> ▸ During assembly/dismantling, secure the pump (set)/pump parts to prevent tilting or tipping over.

The operator ensures that maintenance, inspection and installation are performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.

- Observe the safety instructions and information.
- Never use force when dismantling and reassembling the equipment.
- For any work on the pump (set) observe the operating manual of the pump (set).

7.2 Servicing/inspection

	⚠ DANGER
	<p>Vent opening clogged Gas accumulation! Explosion hazard!</p> <p>▷ Regularly check the vent line. The opening must never be clogged.</p>
	NOTE
	<p>A regular maintenance schedule will help avoid expensive repairs and contribute to trouble-free, reliable operation with a minimum of maintenance expenditure and work.</p>
	NOTE
	<p>For all inspection and servicing work to be carried out at regular intervals we recommend taking out the maintenance contract offered by KSB.</p>

Operational reliability will be improved by regularly checking the lifting unit's proper functioning.

Check the inside of the waste water lifting unit for any deposits, especially in the area of the float switch. Clean it if required.

KSB recommends regular maintenance in accordance with the following plan:

- Every 1/4 of a year for lifting units installed in industrial businesses
- Every 1/2 year for lifting units in multiple dwelling buildings
- Every year for lifting units installed in single-family houses

7.3 Drainage/disposal

	⚠ WARNING
	<p>Fluids handled, consumables and supplies which are hot and/or pose a health hazard Hazard to persons and the environment!</p> <p>▷ Collect and properly dispose of flushing fluid and any fluid residues. ▷ Wear safety clothing and a protective mask if required. ▷ Observe all legal regulations on the disposal of fluids posing a health hazard.</p>

1. Drain the tank (using the manual pump connected to the drain, if applicable).
2. Pull the submersible motor pump out of the tank. The pump will be automatically drained when it is taken out of the fluid handled.
3. Flush the system. Always flush and clean the pump station thoroughly before transporting it to the workshop.

7.4 Recommended spare parts stock

It is not necessary to keep spare parts on stock for the pump station.

For a recommended spare parts stock for the pump(s) refer to the operating manual of the pump.

8 Trouble-shooting

	<p>⚠ WARNING</p>
	<p>Improper work to remedy faults Risk of injury!</p> <p>▷ For any work performed to remedy faults, observe the relevant information given in this instruction manual and/or in the product literature provided by the accessories manufacturer.</p>
	<p>NOTE</p>
	<p>Before performing any work on the pump's internal parts during the warranty period please always consult the manufacturer. Our after-sales service will be at your disposal. Non-compliance will lead to forfeiture of any and all rights to claims for damages.</p>

If problems occur that are not described in the following table, consultation with the KSB customer service is required.

- A Pump is running, but does not deliver
- B Insufficient flow rate
- C Excessive current/power input
- D Insufficient discharge head
- E Vibrations and noise during pump operation

Table 6: Trouble-shooting

A	B	C	D	E	Possible cause	Remedy ³⁾
-	-	X	-	X	Pump is running in the off-design range (part load/overload).	Check the pump's operating data.
X	X	-	-	-	Pump intake clogged by deposits	Clean the intake, pump components and lift check valve.
-	X	-	X	X	Supply line or impeller clogged	Remove deposits in the pump and/or piping.
-	-	X	-	X	Dirt/fibres in the clearance between the casing wall and impeller; sluggish rotor.	Check whether the impeller can be easily rotated; clean the hydraulic system if required.
-	X	X	X	X	Wear of internal components	Replace worn components by new ones.
X	X	-	X	-	Defective riser (pipe and sealing element)	Fit new riser pipes. Fit new sealing elements.
-	X	-	X	X	Wrong direction of rotation (three-phase drive)	Check the electrical connection.
-	X	X	-	-	Pump clogged by sand, dirt in the tank, insufficient inflow	Clean the intake, sand trap, pump components and check valve. Drain and clean the tank.
X	-	-	-	-	Temperature control device monitoring the winding has tripped the pump as a result of excessive winding temperatures (single-phase drive).	The motor will restart automatically once the winding has cooled down. If the motor trips repeatedly, check the lifting unit.
-	X	-	X	-	Deposits in the collecting tank	Clean the collecting tank; in case of greasy deposits, fit a grease separator.
-	X	-	-	-	Check valve does not close tightly.	Clean the check valve.
X	-	-	-	-	Defective CE plug / incorrect connection in the control cabinet	Check the CE plug / electrical connection, see operating instructions of the pump or switchgear.
X	-	-	-	-	Defective float switch; float blocked by dirt or fluff	Check the float switch. Clean the float.

3) Release the pump pressure and let the pump cool down before attempting to remedy faults on pressure-retaining parts. De-energise it and secure it against unintentional start-up.

9 Related Documents

9.1 General assembly drawings

9.1.1 Evamatic-Box N 200 I, transportable version (with Ama-Porter)

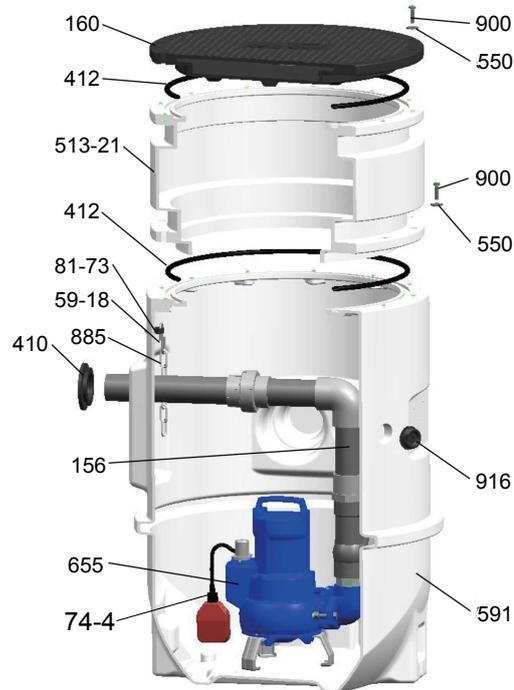


Fig. 28: Exploded view of the transportable version

Part No.	Description	Part No.	Description
156	Discharge nozzle	591	Collecting tank
160	Cover	655	Pump
410	Profile seal	74-4	Float switch
412	O-ring	81-73	Cable support
513-21	Level-adjusting piece + 1 x O-ring 412 (optional)	885	Chain
550	Disc	900	Bolt/screw
59-18	Hook	916	Cable grommet

9.1.2 Evamatic-Box N 200 I, stationary version (with Ama-Porter)

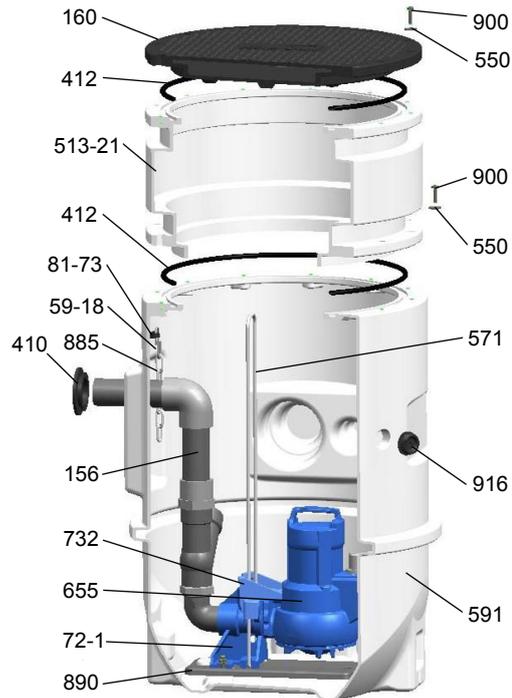


Fig. 29: Exploded view of the stationary version

Part No.	Description	Part No.	Description
156	Discharge nozzle	591	Collecting tank
160	Cover	655	Pump
410	Profile seal	72-1	Flanged bend
412	O-ring	81-73	Cable support
513-21	Level-adjusting piece + 1 x O-ring 412 (optional)	885	Chain
550	Disc	890	Baseplate
571	Guide hoop	900	Bolt/screw
59-18	Hook	916	Cable grommet

9.1.3 Evamatic-Box N 200 I, stationary version (with Amarex N S 32)

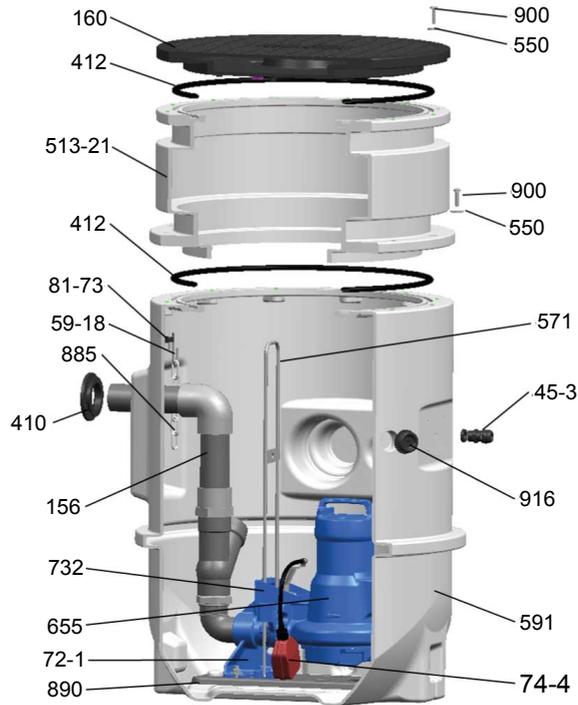


Fig. 30: Exploded view of the stationary version

Part No.	Description	Part No.	Description
156	Discharge nozzle	591	Collecting tank
160	Cover	655	Pump
45-3	Wall stuffing box	72-1	Flanged bend
410	Profile seal	74-4	Float switch
412	O-ring	81-73	Cable support
513-21	Level-adjusting piece + 1 x O-ring 412 (optional)	885	Chain
550	Disc	890	Baseplate
571	Guide hoop	900	Bolt/screw
59-18	Hook	916	Cable grommet

9.1.4 Evamatic-Box N 500 I

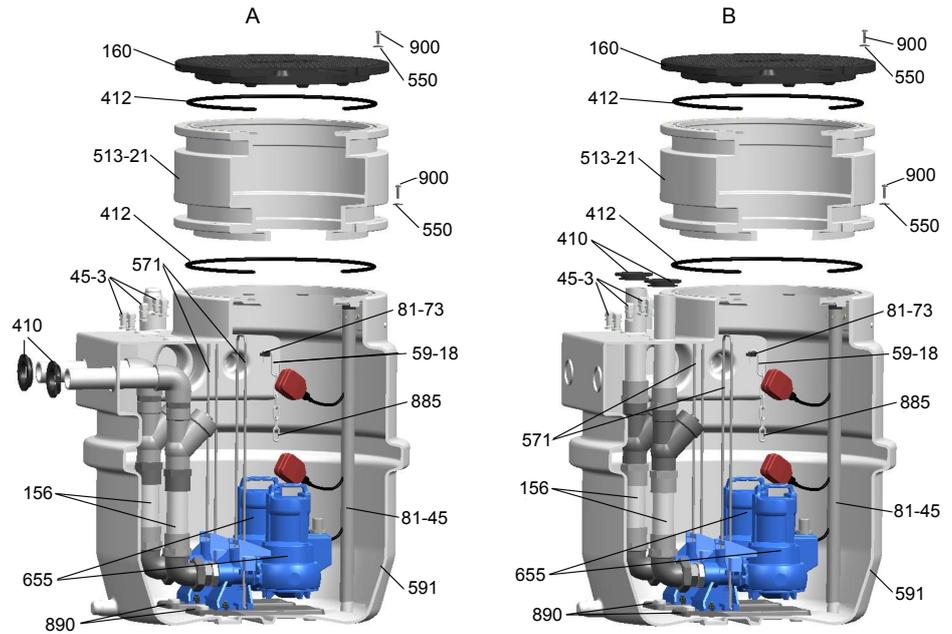


Fig. 31: Exploded view of versions with horizontal and vertical discharge outlet

Part No.	Description	Part No.	Description
A	Version with horizontal discharge outlet	59-18	Hook
B	Version with vertical discharge outlet	591	Collecting tank
156	Discharge nozzle	655	Pump
160	Cover	72-1	Flanged bend
410	Profile seal	81-45	Float switch
45-3	Wall stuffing box	81-73	Cable support
412	O-ring	885	Chain
513-21	Level-adjusting piece + 1 x O-ring 412 (optional)	890	Baseplate
550	Disc	900	Bolt/screw
571	Guide hoop		

9.2 Dimensions

9.2.1 Evamatic-Box N 200 I

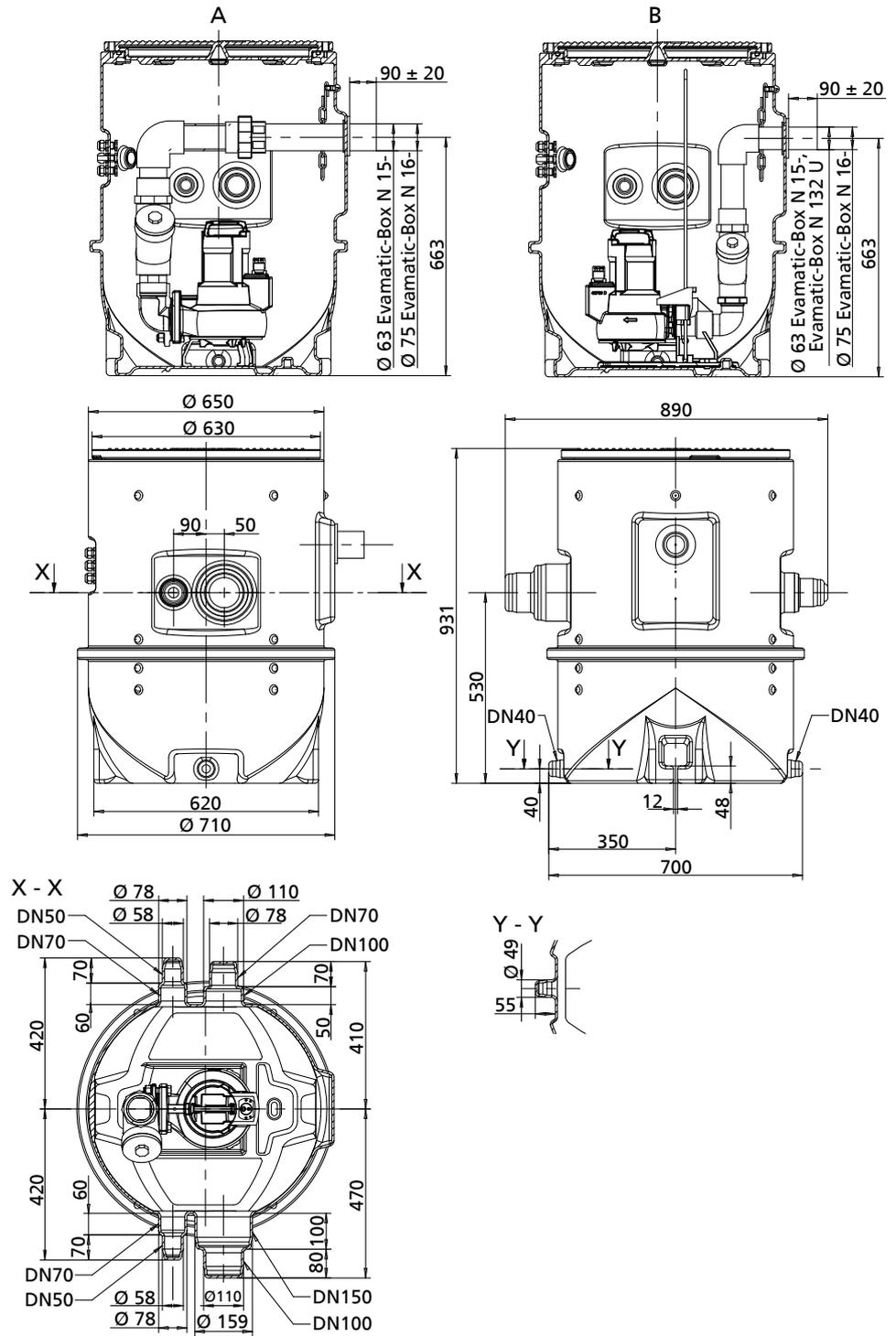


Fig. 32: Outline drawing of Evamatic-Box N 200 I

A	Transportable version	B	Stationary version
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9.3 Installation drawing

Installation above floor

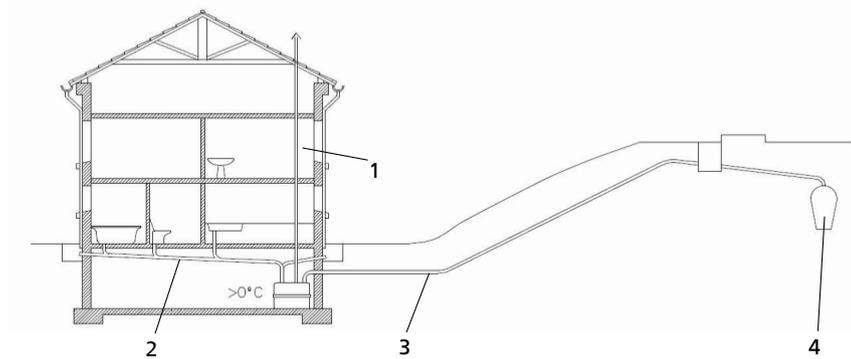


Fig. 34: Installation drawing for above floor installation

1	Vent line	2	Inlet line
3	Discharge line	4	Public sewer system

Installation underfloor

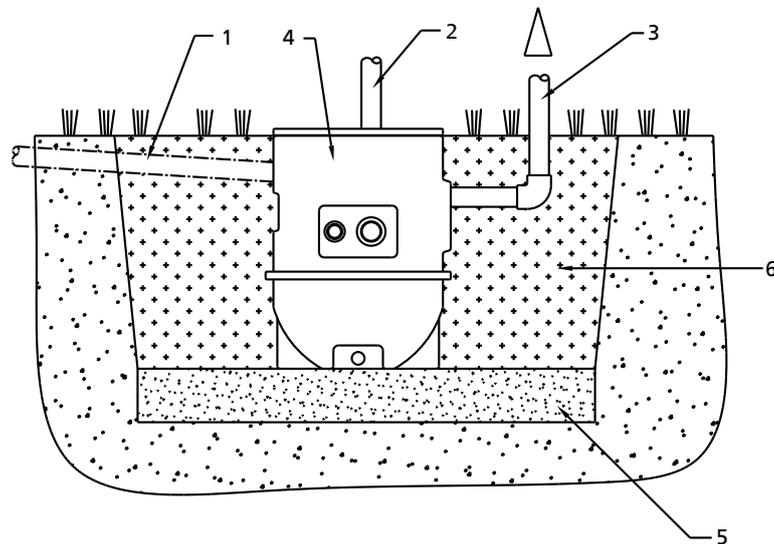


Fig. 35: Installation drawing for underfloor installation

1	Inlet line	2	Vent line
3	Discharge line	4	Evamatic-Box N collecting tank
5	Sand or gravel (compact thoroughly prior to installing the tank)	6	Sand (compact evenly while filling the sump)

10 EU Declaration of Conformity

Manufacturer: **KSB S.A.S.**
128, rue Carnot,
59320 Sequedin (France)

The manufacturer herewith declares that the product:

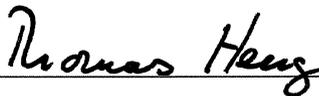
Evamatic-Box N

- is in conformity with the provisions of the following Regulations as amended from time to time:
 - Construction Products Regulation 305/2011/EU
- Applied harmonised standards
 - EN 12050-1

Certified by TÜV Rheinland LGA Products GmbH (0197)

The EU Declaration of Conformity was issued in/on:

Frankenthal, 1 February 2018



Thomas Heng
Head of Product Development Series Pumps
KSB SE & Co. KGaA
Johann-Klein-Straße 9
67227 Frankenthal

11 Certificate of Decontamination

Type:

Order number/

Order item number⁴⁾:

Delivery date:

Applications:

Fluid handled⁴⁾:

Please tick where applicable⁴⁾:



Corrosive



Oxidising



Flammable



Explosive



Hazardous to health



Harmful



Toxic



Radioactive



Bio-hazardous



Safe

Reason for return⁴⁾:

Comments:

.....

The product/accessories have been carefully drained, cleaned and decontaminated inside and outside prior to dispatch/ placing at your disposal.

We herewith declare that this product is free from hazardous chemicals, biological and radioactive substances.

For mag-drive pumps, the inner rotor unit (impeller, casing cover, bearing ring carrier, plain bearing, inner rotor) has been removed from the pump and cleaned. In cases of containment shroud leakage, the outer rotor, bearing bracket lantern, leakage barrier and bearing bracket or intermediate piece have also been cleaned.

For canned motor pumps, the rotor and plain bearing have been removed from the pump for cleaning. In cases of leakage at the stator can, the stator space has been examined for fluid leakage; if fluid handled has penetrated the stator space, it has been removed.

- No special safety precautions are required for further handling.
- The following safety precautions are required for flushing fluids, fluid residues and disposal:

.....

.....

We confirm that the above data and information are correct and complete and that dispatch is effected in accordance with the relevant legal provisions.

.....
Place, date and signature

.....
Address

.....
Company stamp

4) Required fields

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