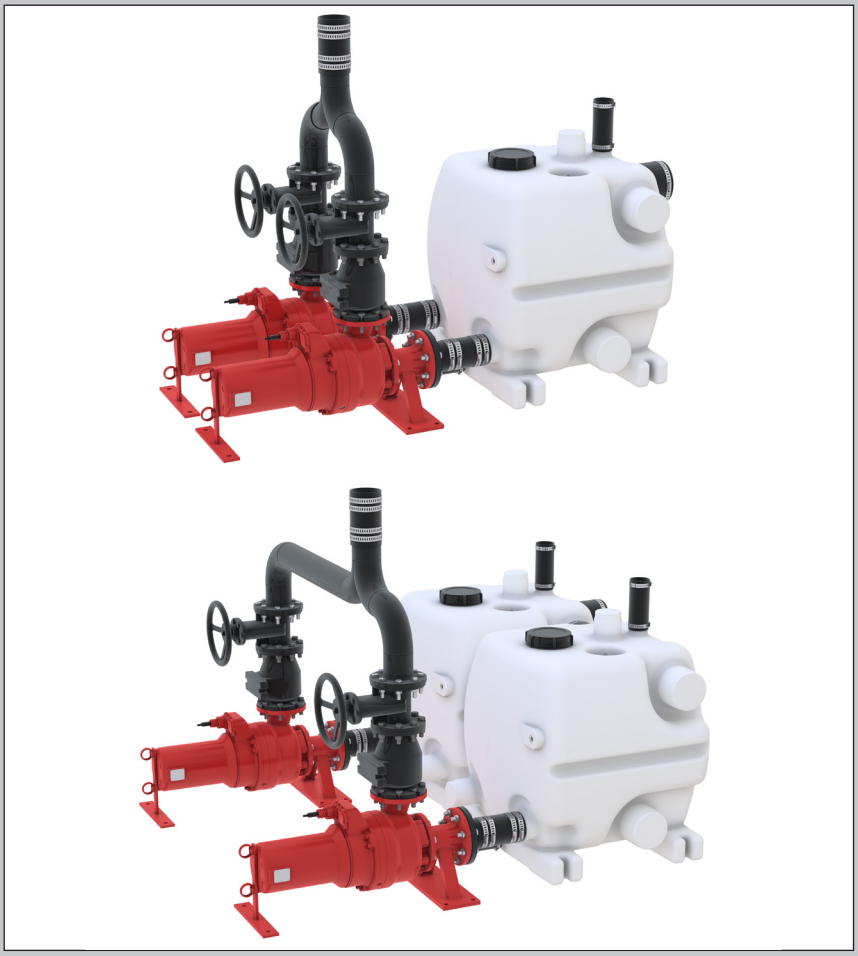
INSTRUCTIONS FOR INSTALLATION, OPERATION AND MAINTENANCE

KESSEL Lifting station Aqualift F XXL 400 Liter
KESSEL Lifting station Aqualift F XXL 800 Liter

50 Hz series - special series

for above ground installation in frost-free rooms.

GB Page 1- 30



Product advantages

- For wastewater with or without sewage
- Safety thanks to control unit with SDS function (self-diagnosis-system)
- Pressure sensor for the safe recording of filling levels
- Free passage of 70mm or 80mm for extremely safe operation
- Large useful volume for long discharge pipes

☐ Installation ☐ Putting into operation ☐ Instructional briefing for the system was carried out by your specialist company:

Name/Signature Date Town/City

Stamp of specialist company

Subject to technical modifications

KESSEL

As at 2023/08

Code no. 010-985_02_SON_EN

Table of Contents

Table of Contents

1 Introduction

Dear Customer,

We are pleased that you have decided to buy a product from KESSEL AG. The product you have purchased has been manufactured and tested in accordance with the latest technical standards. We are certain that it will fully meet your requirements.

These operating instructions contain all the necessary product specifications to guarantee its correct and effective use. Prior to carrying out any work on the system, the operator and the responsible specialist staff must carefully read and heed these instructions. This is the only way to guarantee safe and economical use of the product. In addition, you will find information about discovering hazards in good time, avoiding repairs and downtimes and increasing the reliability and service life of the product.

We wish you smooth and successful installation.

All safety regulations and manufacturer specifications must be fulfilled before operation starts. These operating instructions supplement and/or extend the existing national regulations concerning accident protection and accident prevention. These operating instructions must be available to operating staff at all times at the product‘s installation location.

In trying to keep our quality standard as high as possible, we rely on your help of course. Please let us know of any possible improvements we could make to our product.

Do you have any questions? We look forward to hearing from you.

1.1 Warranty

You can find warranty details in the General Terms and Conditions on our website www.kessel.de.

1.1.1 Spare parts, additions and conversion work

Only genuine spare parts from the manufacturer may be used for repairs, replacement as well as additions and conversion work. Only these guarantee maximum service life and safety. These parts have been specially designed for our products. Unauthorised additions and conversion work or use of non-genuine spare parts can lead to serious damage to the product and/or serious personal injuries.

1.1.2 Maintenance

The prescribed maintenance and inspection work must be carried out regularly and may only be carried out by qualified and authorised persons. Maintenance work and all types of repair work not listed in these operating instructions may only be carried out by authorised customer services partners of KESSEL AG.

1.1.3 Product damage

Any damage and faults must be eliminated immediately and correctly by specially trained members of staff. The product may only be operated if it is in perfect technical condition. During the agreed warranty period, the product may only be repaired by authorised customer services partners of KESSEL AG. KESSEL AG retains the right to have the damaged product delivered to the plant for inspection.

1.1.4 Exclusion of liability

No warranty or liability are accepted for damage to the product if one or more of the following points apply:

- Faulty design by ourselves on account of poor and/or incorrect specifications by the operator or client
- Non-observation of the safety notes, regulations and necessary requirements applicable according to German law and these operating instructions.
- Inappropriate storage and transport
- Incorrect assembly/removal
- Poor maintenance
- Inappropriate repairs
- Poor foundations or construction work
- Chemical, electrochemical and electrical influences
- Wear

In the event of a power failure or other technical fault due to which the correct operation of the pump is no longer guaranteed, care must always be taken that potential damage caused by the collecting tank overflowing is safely prevented e.g. by installing an alarm circuit that works without mains voltage or other suitable protective measures. The manufacturer liability thus excludes any liability for personal injury, property damage and/or financial losses.

1.1.5 Manufacturer‘s address

KESSEL AG
Bahnhofstrasse 31, D-85101 Lenting, Phone: +49 8456 / 27-0; E-mail: info@kessel.de, www.kessel.de;

2 Safety

This chapter lists all generally valid safety notes and technical instructions. All the notes and instructions must be heeded and complied with during transport, set-up, operation, maintenance etc. The operator is responsible for all members of staff keeping to the following notes and instructions.

2.1 Instructions and safety notes

These operating instructions uses instructions and safety notes for property damage and personal injury. To mark these clearly for operating staff, these instructions and safety notes are printed in **bold type** and marked by hazard symbols. The symbols used comply with the generally valid directives and regulations (DIN, ANSI etc.).

Symbols and keys used

<1>	Reference in the text to a key number in an illustration
[2]	Reference to an illustration (Figure)
•	Work step
3.	Work step in numbered order
–	List
Italics	talic type: Reference to a section / item in the control menu
	Isolate device!

Safety notes always start with the following signal words:

Danger: Very severe injuries or death can be the result!

Warnung: Warning: Severe injuries can be the result! (For example: Electricity )

 **Caution:** Warns of a hazard for persons and material.

Caution (note without symbol) Ignoring the instructions marked with this symbol can lead to serious injuries and material damage.

Note: Technical information or instructions which must be paid particular attention.

Note: Technical information or instructions which must be paid particular attention.

The signal word is followed by the naming of the danger, the source of the danger and possible consequences. The safety note ends with a note on avoiding the danger.

2.2 Directives and CE marking used

Our systems are subject to

– various EC directives
– various harmonised standards
– and various national standards

Precise information about the directives and standards used can be found in the EC Declaration of Conformity at the beginning of these operating instructions.

In addition, various national regulations are taken as given for the use, assembly and removal of the product. These include, for example, accident prevention regulations, VDE regulations, Equipment Safety Act etc. The CE mark is on the type plate, which is located on the motor housing.

2.3 Correct use

KESSEL products comply with the applicable safety regulations and technical standards. If they are not used correctly, this can result in fatal danger for the user and for third parties. In addition, the product and/or add-on parts can become damaged or destroyed.

Care must be taken that the product is only operated if it is in perfect technical condition and used correctly. Follow these operating instructions for this.

The lifting station KESSEL Aqualift F XXL - speicial series has been designed for collecting and pumping off wastewater with and without sewage automatically over the level of backed-up water according to EN 12056-4 (Gravaty drainage systems inside buildings) as well as EN 12050-1 (Wastewater lifting plants for buildings and sites).

National regulations for the use of wastewater with and without sewage may differ in certain countries. The company KESSEL recommends to keep the intended use also in countries with different regulations due to higher operational safety. Regional introductory regulations of the municipality are to be observed. For example, maximum wastewater temperatures are often prescribed (e.g. 35°C).

The installation of the product must be carried out in such a way that water-carrying components are at a frost-free depth (regionally defined).

All:

– modifications or attachments (including use of component configurations not intended for joint use, e.g. 400 V pump with 230 V unit control)
– use of non-genuine spare parts
– repairs carried out by companies or persons not authorised by the manufacturer
– Usage under other conditions than required in the current directives and norms

not explicitly authorised by the manufacturer in writing can lead to a loss of warranty

Note:

In order to protect the electrical components of the system from damage in the event of possible voltage peaks, the control unit is provided with a protective circuit. This does not protect against lightning strikes. If there are any requirements in this regard, appropriate protective equipment must be provided on site.

2.4 General safety notes

- All work (assembly, removal, maintenance, installation) may only be carried out with the system switched off. The product must be disconnected from the mains power supply and secured against being switched on again. All rotating parts must have come to a standstill.
- The operator has to report any faults or irregularities to his superior immediately.
- The system must be brought to a standstill immediately if defects occur which endanger safety. These include:
  - Failure of the safety and/or monitoring devices
  - Damage to important parts
  - Damage to electrical devices, cables and isolation
- Tools and other objects may only be stored in the designated places in order to guarantee safe operation
- When work is carried out in closed rooms, care must be taken that there is sufficient ventilation
- During welding work and/or work with electrical devices, care must be taken that there is no explosion hazard
- To exclude suffocating and poisoning, it must be guaranteed that there is sufficient oxygen available at the workplace and that no toxic gases occur in the working area
- Directly following completion of the work, all safety and protective devices must be attached again or made functional again.
- Accident prevention regulations as well as generally accepted technical regulations must be complied with.We would like to point out that in accordance with the Product Liability Act we are not liable for damage caused by our device if the notes and regulations in these operating instructions have not been complied with. The same provisions apply to accessory parts.

These notes must always be complied with. Non-compliance can lead to personal injury and/or serious property damage.

2.5 Personnel selection and qualification

The relevant operational safety regulations and the hazardous substances ordinance or national equivalents apply for the operation of the system. The operator of the system is obliged to:

– prepare a risk assessment
– identify and demarcate corresponding hazard zones
– carry out safety training
– secure the system against unauthorised[1] use.

People* who operate and/or maintain the pumping systems must

– be at least 18 years old.
– have been sufficiently trained for the respective tasks.
– be familiar with and follow the relevant technical rules and safety regulations.

The owner-operator must ensure that only qualified staff work on the pumping system.

Qualified personnel are persons who, on the basis of their training and experience as well as their knowledge of the relevant provisions, current standards and accident prevention regulations, can carry out the required tasks and both recognise and avoid any possible hazards.

Work on electrical components may only be carried out by specially trained specialist staff and under adherence to all the valid accident prevention regulations (UVV).

1) see Person*.

It must be ensured that the personnel have read and understood the instructions in these instructions for installation, operation and maintainance. If necessary, these instructions must be reordered by the manufacturer in the required language.

Person*	Approved activities on KESSEL systems
Operating company	Visual inspection, inspection, change of battery
Qualified person (familiar with, understands operating instructions)	Emptying, cleaning (inside), functional check, configuration of the control unit
Technical expert (Specialist craftsmen, according to instructions for installation, operation and maintainance as well as execution standards)	Installation, replacement, maintenance of components, start-up
Electrical specialist VDE 0105 (per regulations for electrical safety, or per national equivalents)	Work on electrical installation

2.6 Electrical work

Our electrical products are operated with three-phase alternating current. The local regulations must be complied with. The wiring diagram must be heeded for connection. Technical specifications must be strictly complied with. If a machine has been switched off by a protective device, it may only be switched back on again after the fault has been eliminated.

Risk caused by electric current!

There is a danger to life if current is not handled properly during electrical work. This work may only be carried out by a qualified electrician.

Beware of humidity!

The penetration of humidity in the cable will render it damaged and useless. In addition, water can penetrate as far as the connection chamber or motor and cause damage to terminals or the winding.

Never dip the end of the cable into the pumping medium or any other liquid.

2.6.1 Electrical connection

The system operator must be briefed about the power circuits and their switch-off possibilities. When the system is connected to the electrical control unit, particularly when e.g. frequency converters and gentle start-up control are used, the control unit manufacturer‘s regulations must be heeded for compliance with EMC. Special shielding measures may be necessary (e.g. special cables) for the power and control cables.

Connection may only be made if the control units comply with the harmonised EU standards. Wireless devices can cause interference in the system.

Beware of electromagnetic radiation!

Electromagnetic radiation is a potentially fatal risk for people with cardiac pacemakers. Put up appropriate signs on the system and inform anyone affected accordingly.

2.6.2 Earth connection

Our systems must always be earthed. If there is a possibility of persons coming into contact with the system and the pumping medium, the earthed connection must be additionally protected by a residual current-operated protective device. The electric motors meet motor protective class IP 68.

2.7 Behaviour during operation

During operation of the product, the laws and regulations governing safety at the workplace, accident prevention and handling electric machinery valid at the installation location must be heeded. In the interest of a safe working procedure, the operator must delegate work to members of staff. All members of staff are responsible for complying with the regulations. During operation, certain parts (impeller, propeller) rotate in order to pump the medium. Certain substances can cause very sharp edges to be formed on these parts.

Beware of rotating parts!

The rotating parts can crush and sever limbs. Never reach into the system part or touch the rotating parts during operation. Always switch the machine off and allow the rotating parts to come to a standstill before carrying out maintenance or repair work.

2.8 Safety and monitoring devices

Our systems are equipped with different safety and monitoring devices. These devices must not be removed or switched off. Before operation, devices must be connected by a qualified electrician and checked for correct function. Staff must be instructed about the devices used and their function.

Caution!

The machine must not be operated if the safety and monitoring devices have been removed inadmissibly, the devices have been damaged and/or do not work.

2.9 Pumping media

All pumping media differ on account of their composition, aggressiveness, abrasiveness and many other aspects. Generally speaking, our systems can be used in many areas. Please see the system data sheet and order confirmation for more detailed information. It must be noted that a change in density, viscosity or the composition in general can lead to changes in many of the system parameters. In addition, different materials and impeller shapes are required for the different media. The more precise the details in your order, the better we can modify our system to your requirements. If there should be any changes in the area of application and/or pumping medium, we will be happy to provide assistance.

Risk due to explosive media!

The pumping of explosive media (e.g. petrol, kerosene etc.) is strictly prohibited. The products have not been designed for these media.

2.10 Sound pressure

Depending on the size and output (kW), the pump has a sound pressure of approx. 40dB (A) to 70dB (A) during operation. However, the actual sound pressure depends on several factors. These include e.g. type of installation and set-up, attachment of accessories, pipes, operating point, submersion depth etc.

3 General description

3.1 Use

KESSEL Aqualift F XXL lifting stations in Special construction are used for draining buildings below the backwater level as per EN 12056. The powerful pumps and large tank volume make them particularly suitable for disposal in large private, industrial or public buildings. The compact design permits space-saving set-up and simple installation or even retro fit.

The pump station starts automatically through the switch in the control unit. For this purpose, the control unit processes the level detection signals. This system uses a immersion tube for pneumatic level detection as standard. Where the pumping medium contains chemically aggressive substances, the resistance of the pumps and tank materials used must be heeded.

The pH value of the pumping medium may be 5 - 11.

3.2 Types of use

The grey water lifting station Aqualift F XXL Duo - special series has been designed, depending on the pump type, for intermittent duty type S3 (40% switch-on time) as well as continuous duty type S1.

3.3 Design

The collecting tanks in polymer have inlet muffs, discharge muffs, venting muffs and a connection for a manual diaphragm pump.

Tank type	Material	Total volume	Switching volume
Aqualift F XXL Duo 400 L - special series	Polyethylene	400 l	220 l
Aqualift F XXL Duo 800* L - special series		800 l	440 l

* two tanks in tandem lineup

3.4 Technical data

Aqualift F XXL Duo - 400 L-Tank - special series	11300 -MXS2328 -T72	11300 -MXS2328 -T72	11300 -MXS2330 -ET82	11300 -MXS2330 -T82	11300 -MXS2342 -ET44	11300 -TP70M16 /4D	11300 -TP70M31 /4D
Pump type	-||-	-||-	-||-	-||-	-||-	GTK1900	GTK3000
Duty type	S1	S3	S1	S3	S1	S3	S3
Power consumption* (P1)	10,5 kW	11,0 kW	12,7 kW	13,0 kW	4,3 kW	1,7 kW	3,3 kW
Motor capacity* (P2)	9,5 kW	9,5 kW	11,5 kW	11,5 kW	3,7 kW	1,3 kW	2,6 kW
Voltage	400 V						
Speed	2900 rpm				1450 rpm		
Rated currant	20,1 A	18,8 A	22,7 A	22,2 A	7,3 A	3,4 A	6 A
Frequency	50 Hz						
Protection Class (Pump)	IP68						
Protection Class (control unit)	IP54						
Control unit	Comfort Plus				Comfort		
Pressure pipe	PE-HD SDR11 Ø 110				PE-HD SDR11 Ø 90		
Free passage	80 mm				70 mm		
Permissible temperature of medium	35 °C **						
Impeller	one channel impeller						
Impeller size	140 mm	140 mm	150 mm	150 mm	210 mm	166 mm	212 mm
Pumping volume, max	160 m³/h	160 m³/h	195 m³/h	195 m³/h	155 m³/h	67 m³/h	112 m³/h
Pumping height, max	18,8 m	18,8 m	22,9 m	22,9 m	14,4 m	9,1 m	15,2 m
Weight of pump*	105 kg	105 kg	128 kg	128 kg	123 kg	40 kg	66 kg

* per pump

** short-term 60°C

Aqualift F XXL Duo - 800 L-Tank - special series	11301 -MXS2328 -ET72	11301 -MXS2330 -ET82	11301 -MXS2344 -ET54	11301 -MXS2342 -ET44	11301 -TP70M26 /4D	11301 -TP70M31 /4D
Pump type	-||-	-||-	-||-	-||-	GTK2500	GTK3000
Duty type	S1	S1	S1	S1	S3	S3
Power consumption* (P1)	10,5 kW	12,7 kW	6,1 kW	4,3 kW	2,5 kW	3,3 kW
Motor capacity* (P2)	9,5 kW	11,5 kW	5,0 kW	3,7 kW	1,9 kW	2,6 kW
Voltage	400 V					
Speed	2900 rpm		1450 rpm			
Rated currant	20,1 A	22,7 A	10,2 A	7,3 A	5,5 A	6 A
Frequency	50 Hz					
Protection Class (Pump)	IP68					
Protection Class (control unit)	IP54					
Control unit	Comfort Plus			Comfort		
Pressure pipe	PE-HD SDR11 Ø 110			PE-HD SDR11 Ø 90		
Free passage	80 mm			70 mm		
Permissible temperature of medium	35 °C **					
Impeller	one channel impeller					
Impeller size	140 mm	150 mm	220 mm	210 mm	191 mm	212 mm
Pumping volume, max	160 m³/h	195 m³/h	169 m³/h	155 m³/h	115 m³/h	112 m³/h
Pumping height, max	18,8 m	22,9 m	16,1 m	14,4 m	13,5 m	15,2 m
Weight of pump*	105 kg	128 kg	123 kg	123 kg	66 kg	66 kg

* per pump

** short-term 60°C

For more detailed information about putting the control unit into operation, please see the enclosed control unit installation and operating instructions.

3.5 Type plate

Information on the type plate of the lifting station

10	Serial number
52	Material description
53	Material number
55	Standard
56	Free text / explanation
57	Free text / explanation
58	Free text / explanation
59	Free text / explanation
75	Free text / explanation
76	Material
77	Approval
78	Gross weight
79	Date of manufacture
80	Order number

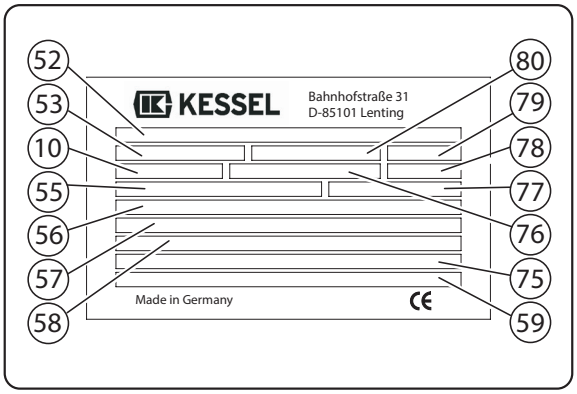


Fig. [1]

Information on the type plate of the control unit

1	Name of the control unit
2	Material number of the control unit
3	Connection voltage and connection frequency
4	Current consumption range
5	Protective rating (IP)
6	Serial number of the control unit
7	Spare part number of the control unit
8	Danger sign (electr. control unit)
9	Protective class I - protective earth
10	CE marking
11	Hazardous waste electric device - emptying not via domestic waste
12	**12 Hardware revision status**

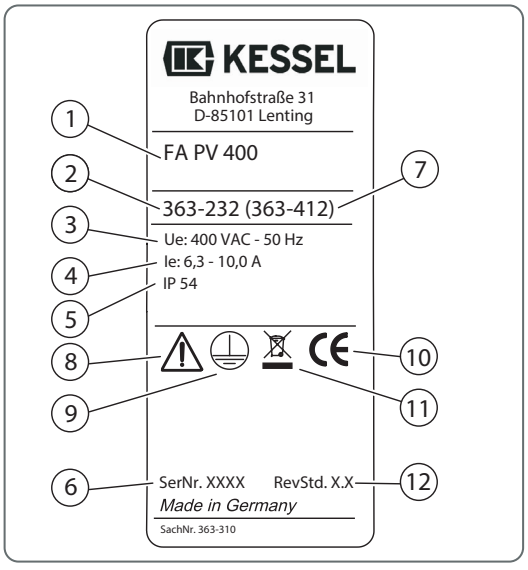


Fig. [2]

3.6 Scope of delivery

- KESSEL-lifting station Aqualift F XXL Duo in special contruction with backflow preventer, closure valve and pipe
- control unit with Self Diagnosis System (SDS)
- instructions for installation, operation and maintenance

4 Packaging, transport and storage

4.1 Delivery

The shipment must be checked for damage and completeness immediately after receipt. Any shortcomings must be reported to the transport company or manufacturer on the day of receipt, since claims can no longer be made otherwise. Any damage must be noted on the delivery or freight note.

4.2 Transport

Do not throw or push the lifting station over during transport.

Make sure that the lifting station does not come into contact with sharp edges. Protective the lifting station from heavy blows. The products are delivered by the manufacturer in suitable packaging. This usually excludes damage during transport and storage.

The product must always be cleaned before any intermediate storage.

The following must be heeded for storage:

- Set the product down safely on a firm base and secure it from falling over.
- Care must also be taken that the device is stored in dry rooms.
- In the case of products with suction and/or discharge connection, these must be sealed tight to prevent soiling.
- If the product is to be stored for longer periods, the inspection chamber must be protected against humidity, direct sunlight, heat and frost.

If you follow these rules, your product can be stored for a longer period. Please note, however, that the elastomer parts and the coating are subject to natural embrittlement.

4.3 Return delivery

Products that are returned to the plant must be clean and properly packed. Clean means that the product has been cleaned of soiling and decontaminated if used with hazardous media. The packaging must protect the product from damage. Please contact the manufacturer before returning the product.

5 Set-up and putting into operation

5.1 General points

To avoid damage to the lifting station during set-up and in operation, the following points must be taken into account:

- Set-up work must be carried out by qualified members of staff and taking the safety regulations into account.
- The lifting station must be examined for any damage before it is set-up.
- Protect the pump from frost.
- The pump‘s electric cables must be routed in such a way that hazardous operation and simple assembly/ removal is possible.
- Dry running must be avoided at all costs.

5.2 Installation

Subsequent damage e.g. caused by rooms flooding if there are problems with the pump have to be excluded by the operator taking precautionary measures (e.g. installation of alarm system, reserve pump etc.).

The lifting station must be installed in such a way that the cover can be opened. Make sure there is enough space between the vertical/horizontal inlets and any existing walls.

According to DIN EN 12050-2 (5.2 Pipe connections), draining equipment where the lowest odour trap point is more than 180 mm lower than the bottom edge of the lifting station must be connected to the system by a suitable pipe loop of at least 180 mm.

All excavation, concrete and masonry work as well as the connections must be carried out by a specialist appropriately qualified for the specific job.

- The system must be installed in such a way that the operating elements and elements which require maintenance are easily accessible. Make sure there is enough space (approx. 60 cm) between the side inlet and any existing wall.
- Fit a shut-off valve into the inlet and discharge pipe to make maintenance or any dismantling of the system easier.
- In order to avoid deposits in the horizontal discharge pipe, the pipe and system must be designed for a minimum flow speed of 0.7 m/s, in the case of vertical pipes the minimum flow speed is 1.0 m/s.
- The inlet is connected to the horizontal muff DN150 at an inlet height of 700 mm or 1000 mm. The respective opening must be cut off the respective tank inlet muff for the required connection. The inner diameter of the inlet pipe and the inlet muff must match.
- The discharge pipe should not be routed with tight elbows. The pipe must be routed above the backwater level i.e. it must be routed continually rising to above this level and then directly to the collecting pipe in a loop.
- A shut-off valve should be fitted in the discharge pipe directly downstream from the integrated backwater flap.

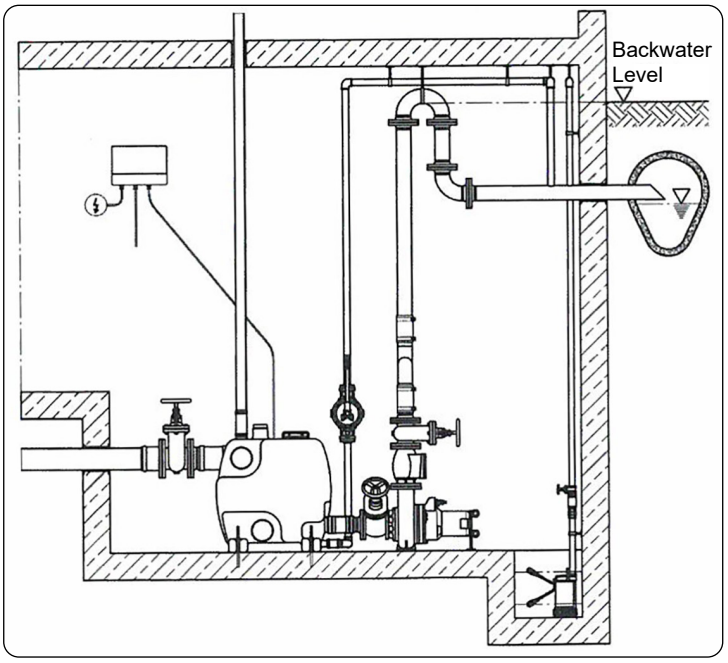


Fig. [3]

- For the level control for emptying the collecting tank to function perfectly, it is absolutely necessary to route the discharge hose between the collecting tank and the control unit without any kinks and on a steadily rising gradient without loop.
- Cut the vertical venting muffs open and fit a DN 70 ventilation pipe to the collecting tank with the aid of the flexible adaptor provided. The venting pipe must be installed blockage-free and secured against bending. The pipe must be routed to the outdoors in compliance with the local regulations.
- The control unit provided must be attached frost-free and flood-protected on the wall in the building, in compliance with local regulations.
- We recommend the installation of a manual diaphragm pump so that the collecting tank can be emptied in the event of a power or pump failure. Drill open the 1“ connection on the tank for this. Install the manual diaphragm pump in a 1“ riser pipe (pipe or hose). A backwater flap should be installed in the pipe above the manual diaphragm pump to prevent the pumping medium flowing back. Route the riser pipe to the collecting pipe via the backwater level.

5.3 Putting into operation

The chapter contains all the important instructions for the operating staff to be able to put the machine into safe operation and to operate it subsequently. The following specifications must always be heeded and checked:

- Type of set-up
- Mode of operation
- Minimum water cover / max. submersion depth

These specifications must also be checked following a longer period of standstill and any defects found must be eliminated.

The operating and maintenance manual must always be stored near the machine or in a specially designated place where it is always accessible for all members of the operating staff.

In order to avoid property damage or personal injury, the following points must always be heeded when putting the system into operation:

- The machine may only be put into operation by specially qualified and trained staff, taking the safety notes into account.
- All members of staff who work on the machine must have received, read and understood the operating instructions.
- Activate all safety devices and emergency-stop circuits before putting the system into operation.
- Electrotechnical and mechanical adjustments may only be carried out by specialists.
- This machine is only suitable for use under the given operating conditions.

Never allow the pump to run dry for longer periods (risk of overheating).

Before the system is put into operation, any pipe valves or shut-off valves must be opened.

5.4 Preparatory work

The machine was designed and assembled in accordance with the latest technical standards so that it will work reliably for a long time under normal operating conditions. This requires you to heed all requirements and notes. Small oil leaks at the floating-ring type shaft seal following delivery are uncritical, but they must be removed before lowering or submersion into the pumping medium.

Please check the following points:

- Cable routing – no loops, slightly tautened
- Check temperature of the pumping medium and submersion depth – see machine data sheet
- If a hose is used on the discharge side, this must be rinsed using clear water before use to prevent any deposits leading to blockages.
- The discharge pipe system must be cleaned and all gate valves opened.
- The pump housing must be flooded i.e. it must be completely filled with the medium and not contain any air whatsoever. Venting can be carried out using suitable venting devices in the system or, if available, through venting screws on the discharge nozzle.
- Check the accessories and pipe system for a tight and correct fit
- Check any level controls and/or dry-run protection

5.5 Electric system

connection of the motor. The motor must be protected by a motor protection switch. Have the motor connected in accordance with the circuit diagram in the control unit installation and operating instructions. Watch out for the correct direction of rotation. If the direction of rotation is not correct, the machine will not produce the given output and may become damaged under unfavourable circumstances.

Risk caused by electric current! There is a danger to life if current is not handled properly. All pumps with free cable ends must be connected by a qualified electrician.

An expert check before initial operation must guarantee that the electrical protective measures required are in place. Earthing, neutral connection, isolating transformer, residual current- or voltage-operated protective switches must comply with the regulations issued by the electricity board responsible.

The voltage specified in the technical data must correspond to the mains voltage on site.

Make sure that the electrical plug-type connectors are in the flood-protected area or are protected from humidity. Mains supply cables and plugs must be checked for damage before use.

The end of the connection cable must not be submersed in the water since otherwise water can get into the motor connection chamber.

Electrical connections must be made in accordance with the regulations of the local electricity board or VDE. The supply voltage and frequency can be found on the type plates of the pump and the control unit. The voltage tolerance must be within a range of +6% to -10% of the mains voltage. Care must be taken that the data specified on the type plates correspond with the power supply available. The lifting stations do not require any further motor protection.

The pump motors have a thermal switch installed in the motor windings which switches the pump off in the event of the motor overheating or being subjected to excessive load. No further motor protection is required.

5.5.1 Electronic control unit with Self Diagnosis System (SDS)

The control unit included in the scope of delivery regulates and monitors the operating functions and reports any problems which occur. For more detailed information please refer to the control unit‘s installation and operating instructions.

5.6 Direction of rotation

The direction of rotation of 3-phase motors must be checked before initial operation. When a KESSEL control unit is used, a rotary field fault is indicated. Where pumps are already installed, the correct direction of rotation can be checked by comparing the pumping height and pumping quantity with different directions of rotation. The direction of rotation with the greater pumping height and pumping quantity is the correct direction of rotation. If the direction of rotation is wrong, 2 phases of the mains connection must be swapped. The given pumping and output data are only achieved with a rotary field rotating clockwise. The machine has not been designed for operation with a rotary field rotating anti-clockwise.

5.7 Motor protection

The minimum requirement is a thermal relay / motor protection switch with temperature compensation, differential actuation and synchrocheck in accordance with VDE 0660 or corresponding national regulations. If the machines are connected to mains power supplies where frequent problems occur, we recommend th additional installation of protective devices e. g. overvoltage, undervoltage or phase failure relays, lightening protection etc.). Local and legal regulations must be complied with when the machine is connected.

5.8 Operation of Aqualift F XXL - special series

The control unit distributes the operating times to both pumps by changing the switch-on sequence after every pump run has finished. If the pump level in tank 1 has been reached, the first pump is put into operation. If the medium continues to rise in the tank up to switch-on level 2, the second pump is automatically switched on in addition. If the liquid level falls to level 1 again, the first pump is switched off. The pump which is still in operation is switched off when the switch-off level has been reached. If both pumps are in operation and the level of liquid exceeds the alarm level, an alarm signal is triggered and remains active until the level of liquid has fallen to below the alarm level.

5.9 After switch-on

The nominal current is exceeded briefly during the start-up process. After this process has been completed, the operating current should not exceed the nominal current again. If the motor does not start up directly after switchon, it must be switched off immediately. Before the motor is switched on again, the switching pauses specified in the technical data must be observed. If the problem is repeated, the machine must be switched off immediately again. Switch-on may only be attempted again after the problem has been eliminated.

The following points should be checked:

- Operating voltage (permissible deviation +/- 5% of the rated voltage)
- Frequency (permissible deviation -2% of the rated frequency)
- Current consumption (permissible deviation between the phases max. 5%)
- Difference in voltage between the individual phases (max. 1%)
- Switching frequency and pauses (see technical data)
- Minimum water cover, level control, dry-run protection
- Smooth running
- Check for leaks, carry out the necessary steps according to the “Regular maintenance” chapter if necessary.

6 Regular maintenance

6.1 General points

The entire system must be checked and serviced at regular intervals.

The following points must be taken into account:

- The operating instructions must be available to the maintenance staff and be heeded. Only maintenance work and measures described here may be carried out.
- All maintenance, inspection and cleaning work on the machine and system must be carried out with the greatest care, at a safe workplace and by trained specialists. The necessary personal protective equipment must be worn. The machine must be disconnected from the mains power supply for all work. Unintentional switch on must be prevented. In addition, all work in reservoirs and/or tanks must observe the respective protective measures in accordance with BGV/GUV.

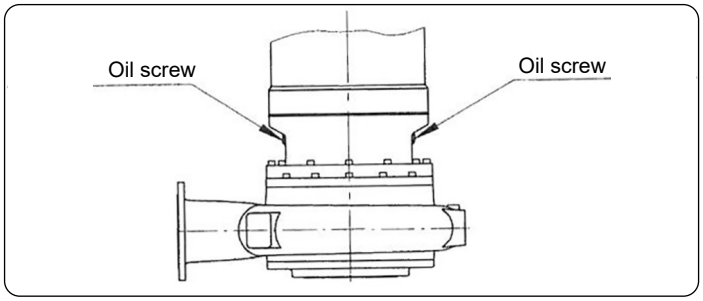


Fig. [4]

- Electrical work on the machine and the system must be carried out by specialists.
- Make sure that the required tools and material are available. Tidiness and cleanness guarantee safe and perfect work at the machine. Always remove used cleaning materials and tools from the machine after work. Store al materials and tools in the designated place.
- Operating media (e. g. oils, lubricants etc.) must be collected in suitable tanks and disposed of according to the regulations (in accordance with directive 75/439/EEC and decrees in accordance with §§5a, 5b AbfG [German Waste Law]). Appropriate protective clothing must be worn during cleaning and maintenance work. This must be disposed of according to waste key TA 524 02 and EC directive 91/689/EEC. Only the lubricants recommended by the manufacturer may be used. Oils and lubricants must not be mixed. Only use genuine spare parts from the manufacturer.

A test run or functional test on the machine may only take place under the general operating conditions.

6.2 Maintenance dates

Once a month:	Check current consumption and voltage Check the control units used, seal chamber check etc.
Every six months:	Visual inspection of the power supply cables Visual inspection of accessories
3,000 operating hours:	Visual check of pumps with oil boom chamber
8,000 operating hours or after 2 years at the latest:	Check on insulation resistance Changing the operating fluid in seal chamber Functional check on all safety and monitoring devices

In addition, the normative specifications concerning the inspection and maintenance of lifting stations must be heeded.

6.3 Maintenance work

Check current consumption and voltage

The current consumption and voltage at all 3 phases must be checked regularly. These remain constant during normal operation. Slight deviations depend on the properties of the pumping medium. Damage and/or faulty functions of the impeller/propeller, bearings and/or motor can be recognised early and eliminated on the basis of current consumption. Thus more serious subsequent damage can be avoided to a large extent and the risk of total failure be reduced.

Check the control units used, seal chamber monitoring etc.

Check the control units used for perfect function. Faulty units must be replaced immediately since they do not guarantee protection for the machine. The specifications related to the testing process must be heeded exactly (if necessary consult the operating instructions for the respective control units).

Visual inspection of the power supply cables

The power supply cables must be examined for bubbles, cracks, scratches, chafe marks and/or crushing. If damage is found, the damaged power supply cable must be replaced immediately.

Cables may only be replaced by the manufacturer or an authorised or certified customer service partner. The machine may only be put back into operation after the damage has been eliminated properly.

Visual inspection of accessories

The correct condition of accessories must be checked. Faulty accessories must be repaired or replaced immediately.

Visual check of pumps with oil boom chamber

Oil level and oil condition:

The condition of the floating-ring type shaft seal can be checked by a visual inspection of the oil. Place the pump horizontally so that the oil chamber control screw on the side of the motor casing (on larger pumps: one of the two oil chamber control screws) is located at the top.

Remove the screw and extract a small amount of oil. If the oil is cloudy or milky, the shaft seal is probably defective.

In this case, have a KESSEL Factory Customer Service or KESSEL AG check the condition of the shaft seals. Used oil must be disposed of in accordance with valid environmental provisions.

Functional check of the safety and monitoring devices

Monitoring devices are e.g. temperature sensor in the motor, seal chamber check, overvoltage relay etc.

Motor protection, overvoltage relay and other actuators can generally be triggered manually for testing. In order to test the seal chamber check or temperature sensor, the machine must have cooled down to the ambient temperature and the electrical connection cable of the monitoring device must be disconnected in the control cabinet. The monitoring device is then checked using an Ohmmeter.

The following values should be measured:

– Bimetal sensor: Value equal “0” - passage
– Seal chamber check: The value must approach “infinite”

If the value is low, there can be water in the oil. Please also note the instructions for the optional evaluation relay. **If there are major deviations, please contact the manufacturer.**

Changing operating fluid

The drained operating fluid must be checked for soiling and water constituents. If the operating fluid is heavily soiled and there is a water share of more than 1/3, it must be changed again after 4 weeks. If there is water in the operating fluid again, a seal is probably defective. Please contact your manufacturer in this case.

The following is generally valid for changing operating fluids:

Switch the machine off, allow it to cool, disconnect from the mains power supply (have a specialist do this work), clean and set down vertically on a firm base. Warm or hot operating fluids can be under pressure. Escaping operating fluids can lead to burns. For this reason, always allow the machine to cool to ambient temperature first. Secure it from falling over and/or slipping!

7 Repair work

7.1 General points

The following repair work is possible on this machine:

- Replacement of impeller and pump chamber
- Replacement of split ring

The following must always be heeded for this work:

- O-rings and existing sealing gaskets must always be replaced.
- Screw locking devices such as spring washers must always be replaced.
- The tightening torques must be kept.

The following is generally valid for repair work:

Switch the machine off, disconnect from the mains power supply, clean it and set it down horizontally on a firm base. Secure it from falling over and/or slipping!

Unless otherwise specified, the torque values in the tables must be used. Values for clean, lubricated screws.

Tightening torque [Nm] for screws A2/A4 (friction coefficient = 0.2)

	A2/A4	A2/A4
	material class 70	material class 80
	DIN 912/DIN 933	DIN 912/DIN 933
M6	7 Nm	11,8 Nm
M8	17 Nm	28,7 Nm
M10	33 Nm	58 Nm
M12	57 Nm	100 Nm
M16	140 Nm	245 Nm
M20	273 Nm	494 Nm

7.2 Replacement of various pump parts

Replacing impeller and pump housing

- Loosen the cylinder head screw with hexagon socket on the sealing housing and screw it off.
- Secure the pump housing using suitable aids e.g. lifting devices, and pull it off the sealing housing. Set down on a safe base.
- Fix the impeller in place using suitable aids, loosen the impeller attachment (cylinder head screw with hexagon socket) and screw this out.

Watch out for the screw locking device!

- Pull the impeller off the shaft using a suitable removal tool.
- Clean the shaft.
- Push the new impeller onto the shaft.

Make sure that the mating surfaces do not become damaged!

- Screw a new impeller attachment (cylinder screw with hexagon socket and a new screw locking device) back into the shaft. Fix the impeller in place and tighten the cylinder head screw. Insert the pump part onto the sealing housing and attach using hexagon nuts. The impeller must be able to be turned by hand.

Split ring replacement

- The split ring and raceway determine the gap between the impeller (raceway) and the suction muff (split ring). If this gap becomes too big, the machine‘s pumping capacity drops and/or blockages occur. Both rings have been designed in such a way that they can be replaced. This reduces wear on the suction muff and impeller and minimises spare parts costs.

Replacement of the floating-ring type shaft seal

- Replacement of the floating-ring type shaft seal requires basic knowledge and specific special knowledge of these sensitive components. In addition, the machines have to be dismantled to a major extent for this work to be carried out. Only use genuine spare parts for replacement. Checking and replacement of these parts is carried out by the manufacturer during general overhaul or by specially trained personnel.

8 Putting out of operation

8.1 Putting out of operation temporarily

With this type of switch-off, the machine remains installed and is not disconnected from the mains power supply. When out of operation temporarily, the pump must remain completely submersed so that it is protected from frost and ice. It must be guaranteed that the service room and pumping medium do not freeze completely. The machine is then ready for operation at any time.

Following longer periods of standstill, a 5-minute function run should be carried out at regular intervals (once a month to once every three months).

Caution!

A functional run may only take place under valid operating and usage conditions. Dry running is not permitted. Disregarding these facts can lead to total failure.

8.2 Putting out of operation finally/ putting in storage

Switch off the machine, disconnect the machine from the mains power supply and put it in storage. The following points must be taken into particular consideration for the storage procedure:

Beware of hot parts!

Watch the temperature of the housing parts when removing the machine. These can be far above 40°C. Always allow the machine to cool to ambient temperature first.

- Clean the machine.
- Store in a clean and dry location, protect the machine from frost.
- Set down vertically on a firm base and secure it from falling over.
- The discharge and suction connection of pumps must be sealed using suitable aids (e.g. film).
- Support the electrical connection cable at the cable ducts to prevent permanent deformation.
- Protect the ends of the power supply cables to prevent humidity penetration.
- Protect the machine from direct sunlight to prevent the danger of elastomer parts and housing coating becoming brittle.
- When storing in a workshop, heed the following: The radiation and gases which occur during electro-welding destroy the elastomers of the seals.
- During longer storage periods, the impeller or the propeller must be turned regularly by hand (every six months). This prevents pressure marks in the bearings and seizure of the rotor.

8.3 Putting back into service after longer periods of storage

Before it is put back into service, the machine must be cleaned of dust and oil deposits. Then all the necessary maintenance measures and work must be carried out (see chapter “Regular maintenance”). The floating-ring type shaft seal must be checked for proper condition and function.

When this work is finished, the machine can be installed (see chapter “Set-up”) and connected to the mains power supply by a specialist. Follow the instructions in the chapter “Putting into operation” when putting the machine back into operation.

The machine may only be switched on again if it is in a perfect condition and ready for operation.

9 Troubleshooting and fault elimination

To avoid property damage and personal injury during elimination of faults on the machine, the following points must be heeded:

- Only eliminate a fault if you have qualified staff i.e. the individual jobs must be carried out by trained specialists e.g. electrical work must be done by a qualified electrician.
- Always secure the machine against being started up again unintentionally by disconnecting it from the mains power supply. Take suitable precautionary measures.
- Ensure machine safety switch-off can be carried out by a second person at all times.
- Secure the moving machine parts so that no-one can become injured.
- Unauthorised changes to the machine are made at your own risk and absolve the manufacturer from any warranty claims.

Machine does not start up

Cause	Remedy
Interruption in power supply, short-circuit or earth fault on the cable and/or motor winding	**Have a specialist check the cable and motor and renew these if necessary**
Fuses, motor protection switch and/or monitoring devices have tripped	Have a specialist check the connections and change them if necessary. Have motor protection switch and fuses installed according to the technical specifications, reset monitoring devices. Check impeller/propeller for smooth running and clean and/or make serviceable again

Machine starts up, but motor protection switch trips shortly after operation starts

Cause	Remedy
Thermal trigger on the motor protection switch is not set properly	Have a specialist compare the setting of the trigger with the techn. specifications and have them corrected if necessary
Increased current consumption due to larger drop in voltage	Have a specialist compare the voltage values of the individual phases and have the connection changed if necessary
Impeller/propeller slowed by sticking, blockage and/or solids, increased current consumption	Switch the machine off, secure it against restart, make impeller/ propeller serviceable again and/or clean suction noozle
Density of the medium is too high	Consult the manufacturer

Machine is running, but not pumping

Cause	Remedy
No pumping medium available	Open inlet for tank or gate valve
Inlet blocked	Clean feed pipe, gate valve, suction adaptor, suction noozle
Impeller/propeller blocked or slowed	Switch the machine off, secure it against restart, make impeller/ propeller serviceable again
Defective hose/pipe	Replace defective parts

Machine is running, the given operating values are not being met

Cause	Remedy
Inlet blocked	Clean feed pipe, gate valve, suction adaptor, suction noozle
Gate valve in the discharge pipe closed	Open gate valve completely
Impeller/propeller blocked or slowed	Switch the machine off, secure it against restart, make impeller/ propeller serviceable again
Air in the system	Check pipes, pressure sheath and/or pump part and vent if necessary
Machine is pumping against excessive pressure	Check the gate valve in the discharge pipe and open completely if necessary
Signs of wear	Replace worn parts
Defective hose/pipe	Replace defective parts
Impermissible gas content in the pumping medium	Consult the manufacturer
2-phase running	Have a specialist check the connection and correct if necessary
Excessive drop in the water level during operation	Test supply and capacity of the system, check settings and function of the level control

Machine is not running smoothly and is noisy

Cause	Remedy
Machine is running in the impermissible operating range	Check machine operating data, correct if necessary and/ or adapt to operating conditions
Suction muff, suction strainer and/or impeller/ propeller are blocked	Clean the blocked parts
Impeller stiff	Switch the machine off, secure it against restart, make impeller serviceable again
Impermissible gas content in the pumping medium	Consult the manufacturer
2-phase running	Have a specialist check the connection and correct if necessary
Signs of wear	Replace worn parts
Motor bearing defective	Consult the manufacturer
Machine installed under tension	Check installation, use rubber compensators if necessary

Further steps for fault elimination

If the points listed here do not help to eliminate the fault, contact Customer Service. They will be able to help as follows:

- Phone and/or written support by Customer Service
- On-site support through Customer Service
- Inspection or repair of the machine at the plant

Please note that costs may be incurred when certain services provided by Customer Service are used. KESSEL Customer Service can give you more detailed information about this.

10 Construction dimensions (mm)

Aqualift F XXL Duo 400L/800L - special series

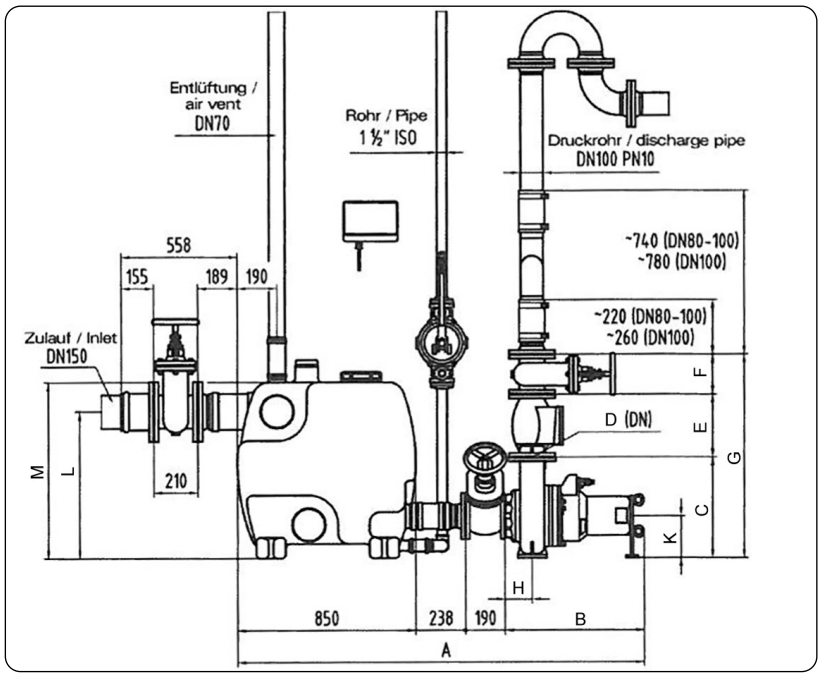


Fig. [5]

Aqualift F XXL Duo 400L - special series

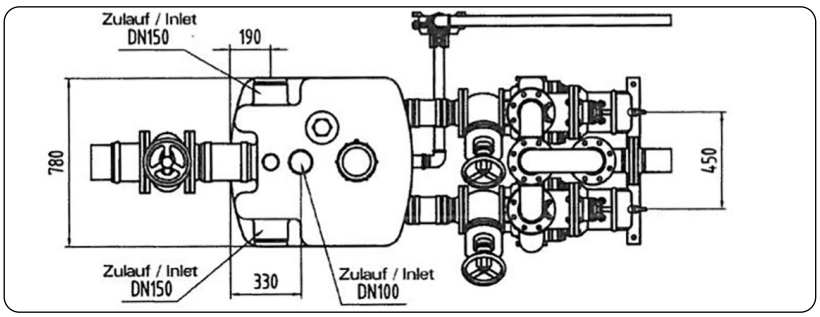


Fig. [6]

Aqualift F XXL Duo 800L - special series

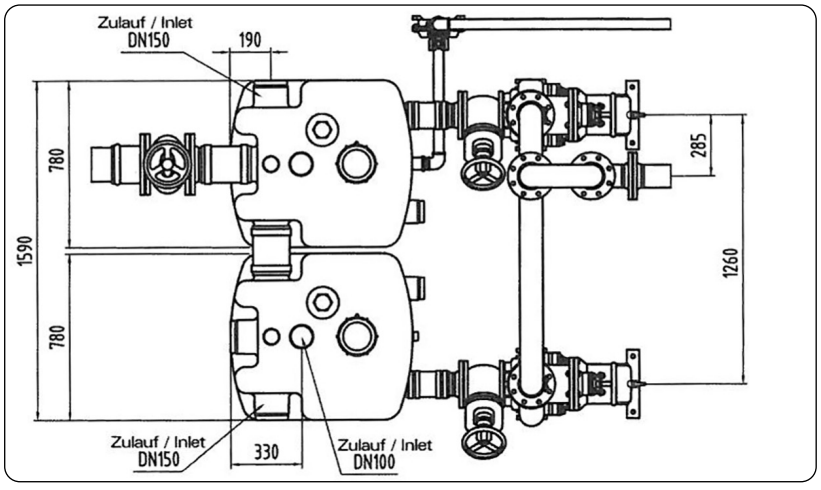


Fig. [7]

Construction dimensions (mm)

Aqualift F XXL Duo - 400 L-Tank - special series	11300 -MXS2328 -ET72	11300 -MXS2328 -T72	11300 -MXS2330 -ET82	11300 -MXS2330 -T82	11300 -MXS2342	11300 -TP70M16 /4D	11300 -TP70M31 /4D
Pump Type	-||-	-||-	-||-	-||-	MXS2342- ET44	GTK1900	GTK3000
A	1977	1977	1977	1977	1911	1717	1758
B	695	695	695	695	929	435	476
C	400	400	400	400	480	369	440
D	100	100	100	100	100	80	80
E	300	300	300	300	300	260	260
F	190	190	190	190	190	180	180
G	894	894	894	894	974	813	884
H	93	93	93	93	100	90	93
K	200	200	200	200	200	200	200
L	700	700	700	700	700	700	700
M	840	840	840	840	840	840	840

Aqualift F XXL Duo - 800 L-Tank - special series	11301 -MXS2328 -ET72	11301 -MXS2330 -ET82	11301 -MXS2332 -PU92	11301 -MXS2342	11301 -MXS2344 -ET54	11301 -TP70M26 /4D	11301 -TP70M31 /4D
Pump Type	-||-	-||-	-||-	MXS2342- ET44	-||-	GTK2500	GTK3000
A	1977	1977	2122	1911	1911	1758	1758
B	695	695	840	929	929	476	476
C	400	400	400	480	480	440	440
D	100	100	100	100	100	80	80
E	300	300	300	300	300	260	260
F	190	190	190	190	190	180	180
G	894	894	894	974	974	884	884
H	93	93	93	100	100	93	93
K	200	200	200	200	200	200	200
L	700	700	700	700	700	700	700
M	840	840	840	840	840	840	840

11 System passport / factory approval

Mat. Des.

Mat. no./Order no./Prod. Date

Rev.hrs./Material/Weight

Standard/Approval

Dimensions

Volume

Density

Designation 1

Designation 2

The system was checked for completeness and for leaks before it left the factory.

Date

Name of the tester