INSTALLATION AND OPERATING INSTRUCTIONS

KESSEL - *Aqualift® F* Lifting Station (400 Volt)

For all wastewaters (with / without sewage)
For installation in frost free areas

Aqualift® F Lifting Station (400 V)	Product Advantages

Aqualift®F

Aqualift®F Duo/XXL

- Easy connection to pre-formed inlets
- Connection areas for additional inlets

- Fully automated operation
- Maintenance friendly
- Certification No. Z-53.2-424

The installation and service of this unit should be carried out by a licensed professional servicer Company - Telephone No.	

Edition 01/2006-HG

ID number 010-606

(Subject to technical amendments)

KESSEL

Declaration of EC-Conformity

according to machine guide line 89/392/EWG of 14.06.1989 and modification guidelines 91/368/EWG of 20.06.1991, 93/44/EWG of 19.07.1993 and 93/68/EWG of 22.07.1993, low-voltage guideline 73/23/EWG and guideline regarding electromagnetic compatibility 93/97/EWG of 29.10.1993

The producer

KESSEL GmbH, D-85101 Lenting

confirms that the product

KESSEL *Aqualift® F* lifting station for free standing installation

was developed and produced
in accordance with the following norms:

EN 292
VDE 31001
VDE 0113
EN 55082-2
EN 55011
EN 55014
EN 60335

Lenting, 01.01.1999

B. Kessel

G. Vanetta

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1. Safety Precautions

Caution: The *Aqualift® F* uses electricity to operate rotating and mechanical parts. Not following the User's Manual can result in damage to the unit as well as injury or a possible fatal accident.

Before maintaining or servicing the *Aqualift® F* make sure to disconnect it from ALL power sources and secure that power cannot be re-connected during maintenance / servicing. During electrical installation or servicing of the unit, VDE 0100 and all applicable safety regulations should be followed.

The control unit and pressure sensor switch are electrically powered systems which should not be opened or serviced except by licensed professional electricians. Licensed professional electrician is defined in VDE 0105.

It is important that all electrical cables and units relating to the *Aqualift® F* are always in good operating condition. If damage to any of the electrical cables or systems of the *Aqualift® F* are noticed, the *Aqualift® F* unit must be immediately disconnected and taken off line.

Danger of hot surfaces: During operation, the *Aqualift® F* can become hot. Take caution before touching or coming into contact with all hot surfaces on the *Aqualift® F*.

Danger for hands and fingers: The *Aqualift® F* pump is equipped with a closed impeller. Any inspection or maintenance work must take place after the *Aqualift® F* has been fully disconnected from its power source. Also, during maintenance and inspection take caution of any sharp surfaces or edges.

Heavy weight – Caution: KESSEL *Aqualift® F* with single pumps weigh approximately 45 Kg (approx 100 pounds) and double pump systems weight approximately 84 Kg (approx. 185 Kg). The *Aqualift® F* units should be handled by at least two people equipped with appropriate equipments (e.g. safety shoes, back support).

1. Safety Precautions

Health Safety - The *Aqualift® F* is designed to pump wastewater containing untreated / raw sewage which can cause health hazards. It is important that no direct or indirect contact between the *Aqualift F®* and skin, eyes or mouth occurs. If contact does occur it is important to immediately wash and disinfect the contaminated area. Also, in cases when the pump itself is to be removed from the *Aqualift® F*, make sure that the room is properly ventilated to allow and methane or biogases to escape or be diluted.

Noise - During operation of the *Aqualift® F* emits approximately 65.5 dB. Based on the installation of the *Aqualift® F* this could present an unwanted noise. Take care in selecting the installation location of the system. A vibration dampening support matt (available from KESSEL) may be placed underneath the *Aqualift® F* to reduce noise / vibration.

Explosion Risk - The interior of the *Aqualift® F* is deemed as an explosion risk area by EN 12050. In the case that the pump, pressure switch or inspection port is to be removed, it is important to first assure that the room is well ventilated. During this time it is also important that no source of ignition occurs (such as smoking, electrical work, welding, cooking . . .)

2. General

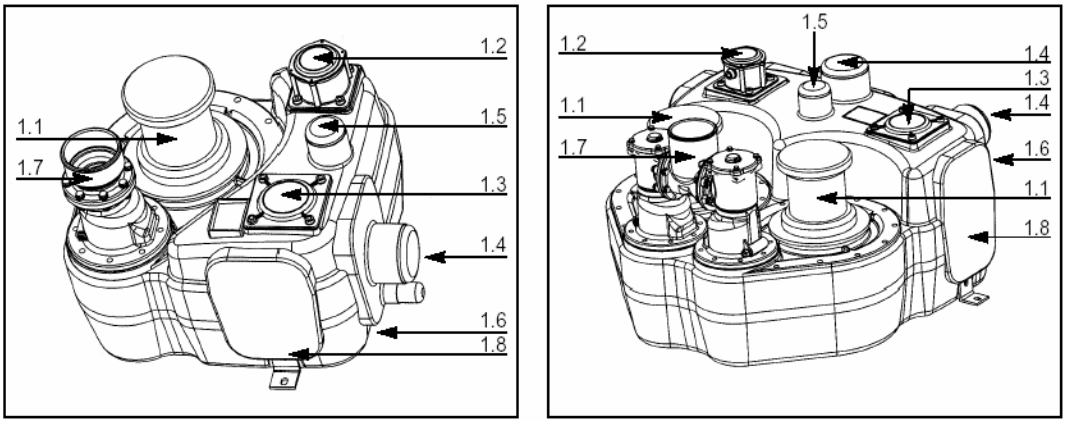
2.1 Application / Installation

The *Aqualift® F* is designed to pump wastewater (with or without sewage collected below the outgoing sewer level) up to the sewer level so that it may flow with gravity out of the building and into a septic system / public sewer piping. Installation examples of the *Aqualift® F* would be single and multi-family homes, commercial buildings, hotels, restaurants, hospitals, schools or similar buildings. In circumstances where the interruption of wastewater is not allowed or desired, a twin pump system (*Aqualift® F Duo*) is required for installation.
The *Aqualift® F* is designed to be installed on a sturdy floor in a room which can be ventilated and is protected from freezing temperatures. The *Aqualift® F* control unit is designed for installation flood protected, frost proof dry room. The *Aqualift® F* is equipped with a single vane impeller and has a free passage of 40mm. The outlet is size DN 100 and the ventilation port is size DN 70. Abrasive materials should not come in contact with the impeller.

The *Aqualift® F* is designed constant usage with wastewater at 35 deg C (95 deg F) and can also handle for short durations (max 10 minutes) temperatures up to 60 deg C (140 deg F)

2.2 Aqualift® F description

The KESSEL *Aqualift® F* 400 Volt lifting station in single or twin pump variations is comprised of the following systems.



1. Polyethylene collection chamber, gas and water tight with:
1. PEHD gas and watertight holding chamber with:
1.1 single or double wastewater pump(s) with 5 meter cable
1.2 Pneumatic pressure switch with 5 meter cable
1.3 Access / Cleaning port
1.4 Connection for DN 100 inlet
1.5 Connection for DN 70 ventilation (mandatory)
1.6 Connection for DN 40 manual emergency pump
1.7 DN 100 pressure pipe outlet with integrated backflow flap and release lever
1.8 Area for additional connection of inlet pipes

2. Electrical control unit (see illustration in Chapter 8)

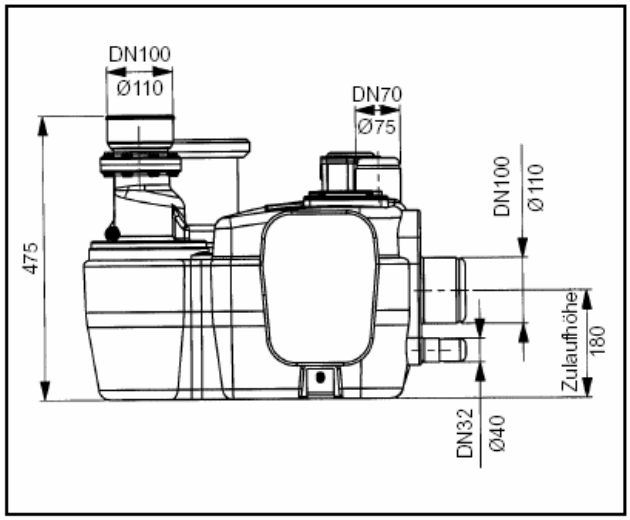
3. Accessories (without illustration)
3.1 Securing brackets (for secure installation with sub-surface
3.2 Flexible coupling for attaching DN 100 *Aqualift® F* outlet to outlet piping.

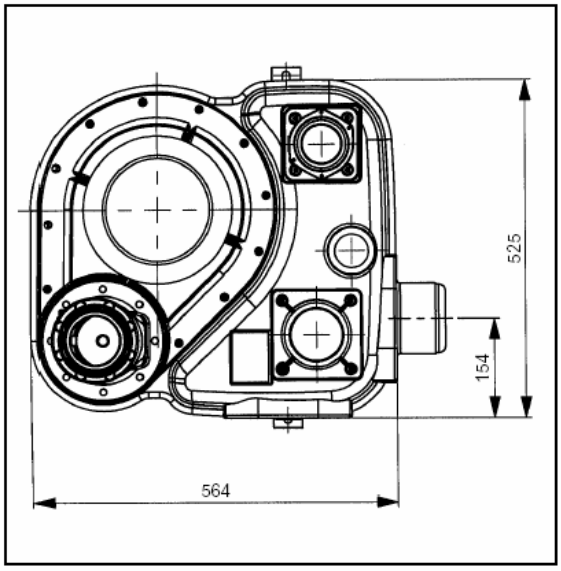
A complete list of main pump parts is illustrated in Chapter 10.

3. Technical Data

3.1 Dimensions

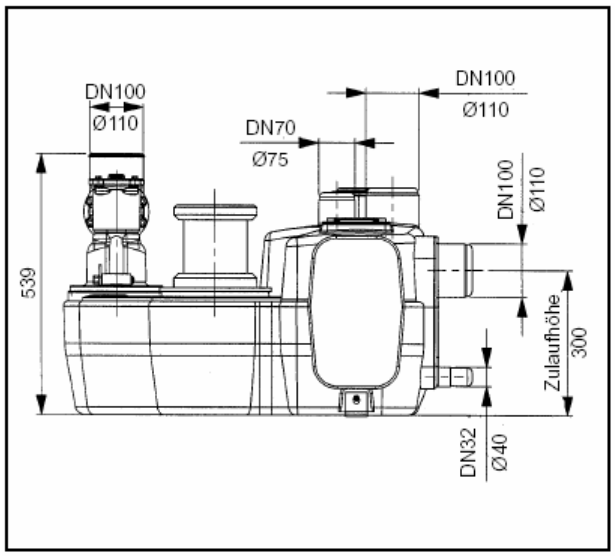
3.1.1 Single pump *Aqualift® F*, 1.1 kW, DN 100 outlet - Article Number 28645
Single pump *Aqualift® F*, 2.2 kW, DN 100 outlet - Article Number 28647

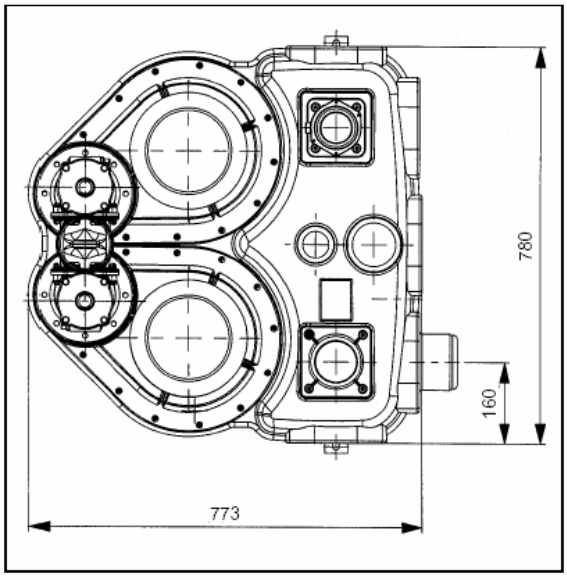




3. Technical Data

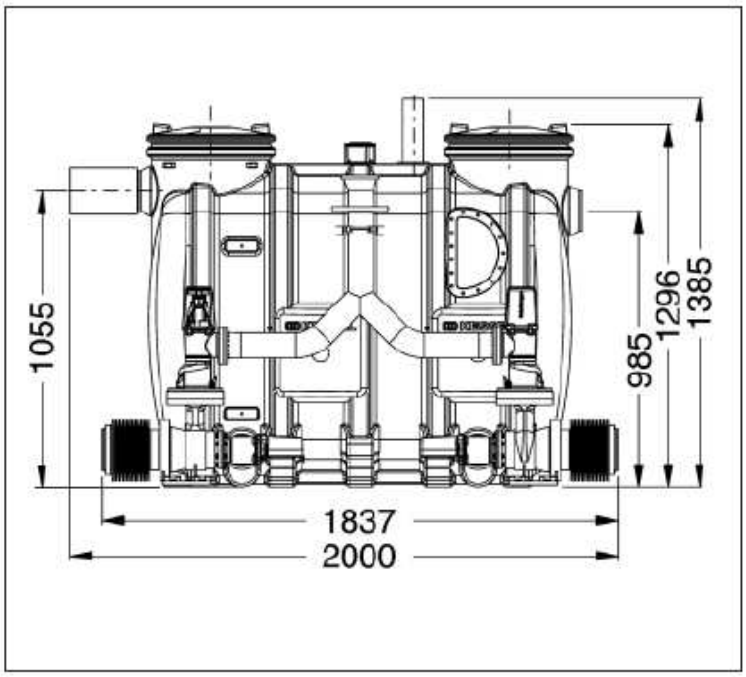
3.1.2 Twin pump *Aqualift® F*, 1.1 kW, DN 100 outlet - Article Number 28652
Twin pump *Aqualift® F*, 2.2 kW, DN 100 outlet - Article Number 28634



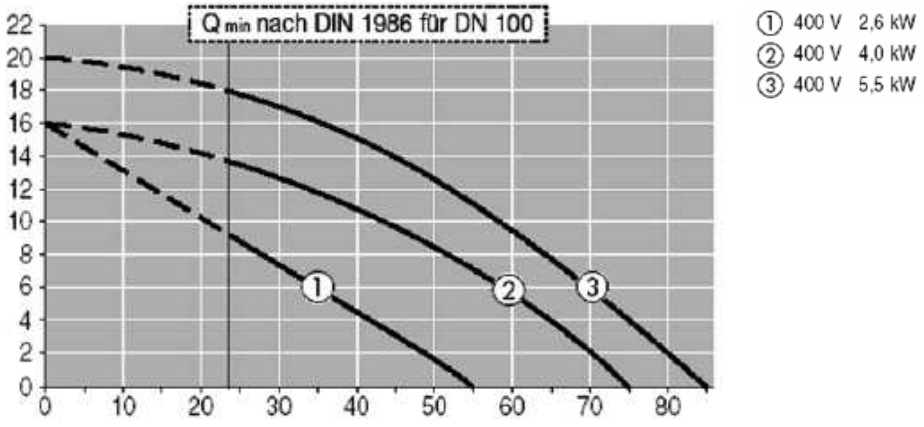


3. Technical Data

3.1.3 Twin pump *Aqualift® F*, 2.6 kW, DN 100 outlet - Article Number 28638
Twin pump *Aqualift® F*, 4.0 kW, DN 100 outlet - Article Number 28639
Twin pump *Aqualift® F*, 5,5 kW, DN 100 outlet - Article Number 28640



Performance curve for *Aqualift® F Duo XXL*



Height H (meters) **Volume (cubic meters / hour)**

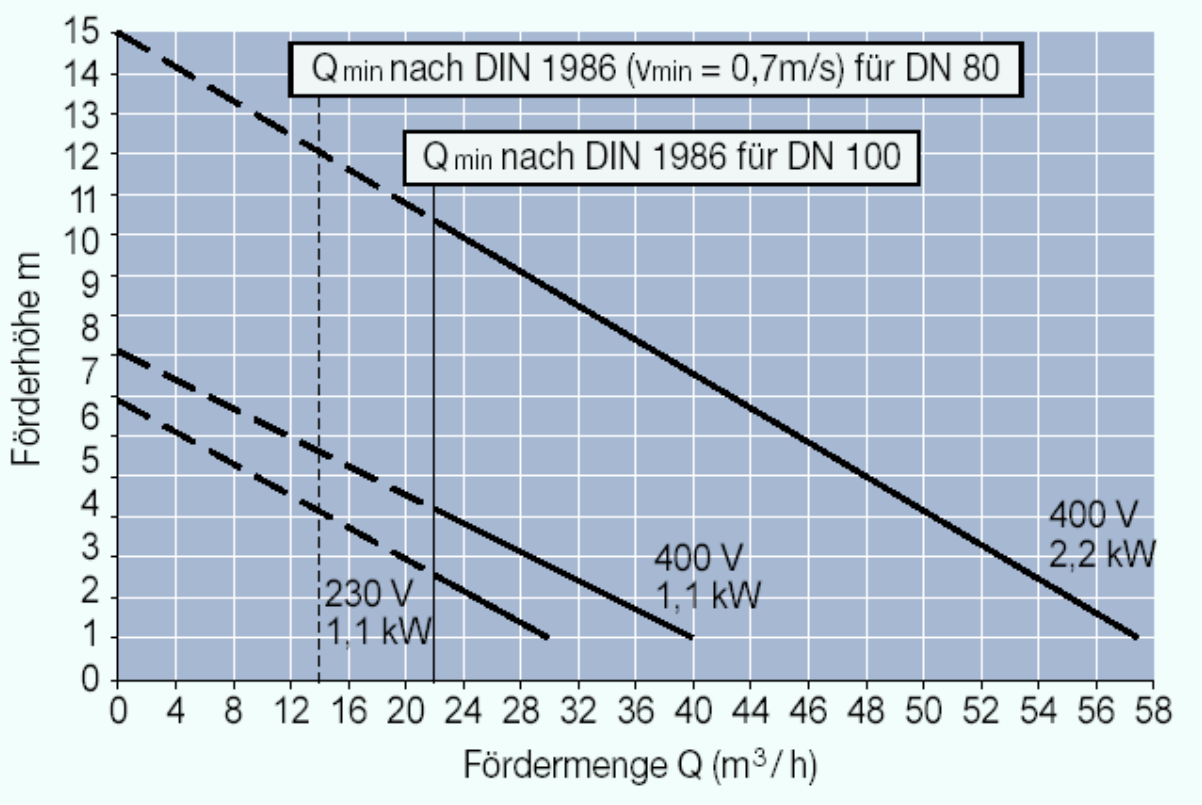
Type	**400 V – 2,6 kW**	**400 V – 4,0 kW**	**400 V –5,5 kW**
Operating power P2	2,6 kW	3,5 kW	4,8 kW
Total power usage P1	3,3 kW	4,2 kW	5,6 kW
Voltage (direct)	400 V DC	400 V DC	400 V DC
Frequency	50 Hz	50 Hz	50 Hz
Amps	5,6 A	8,2 A	10,2 A
Cables	5 m 7 x 1,5 mm^2	5 m 7 x 1,5 mm^2	5 m 7 x 1,5 mm^2
Wastewater temp.	40 ° C	40 ° C	40 ° C
Protection	IP 68	IP 68	IP 68

3. Technical Data

3.2 Pumps (Mono, Duo)

Type	400 V – 1.1 kW	400 V – 2.2 kW
Operating power P2	1.1 kW	2.2 kW
Total power usage P1	1.4 kW	2.7 kW
Voltage	400 Volt DC	
Frequency	50 Hz	
Operating current	2.7 Amp	4.9 Amp
Starting current	14.4 Amp	30.8 Amp
Fuse	3 x 10 Amp	
Connection cables	length - 5 meters, 1.5 square mm, 7 inner cables	
Advised wastewater temperature	35 deg C (95 deg C)	
Weight (pump only)	30 Kg	31 Kg
Protection	IP 68 (2 meter water head)	
Operation	S1, 240 min max. run time	S3, 30% run time

Performance curve
Q_{min} according to norm DIN 1986 (v_{min} = 0,7m/s) for DN 80
Q_{min} according to norm DIN 1986 (v_{min} = 0,7m/s) for DN 100



Height H (meters) **Volume (cubic meters / hour)**

3. Technical Data

3.3 Operating Volume

As delivered, the *Aqualift® F* single pump will pump approximately 20 litres per activation. *Aqualift® F* twin pump systems pump approx 50 litres per activation. The pumping levels can be changed by setting the pneumatic switch - this will later be explained in this manual.

3.4 Electrical Control Unit

3.4.1 General technical information

Ambient conditions for control unit
Allowable temperature range - 0 to 50 deg C (32 to 122 deg F)
Humidity - 10 to 80 % (no condensation)
Max elevation - 2000 meters above sea level

Power consumption from electronics (without pump) -11 VA for single pump system
Power consumption from electronics (without pump) -15 VA for double pump system

Protection Class - Class 1

Protection Type - IP 54 (with closed control unit cover and factory gasket)
Protection Type - IP 21 (wall mounted without factory supplied cover)

3.4.2 Supply

Operating power
400 / 230 Volt 3 phase 50 Hz +- 10%

Power connection
Standard plug (from control unit - with 1.7 meter length)

Required protection
max. 16 A (to be supplied on site)

4. Installation

When the shipment arrives, please inspect it immediately for damages which may have been caused during transport / shipping!

Important: KESSEL Aqualifts with single pumps weigh approximately 45 Kg (approx 100 pounds) and double pump systems weight approximately 84 Kg (approx. 185 Kg). The *Aqualift® F* units should be handled by at least two people equipped with appropriate equipments (e.g. safety shoes, back support, etc.).

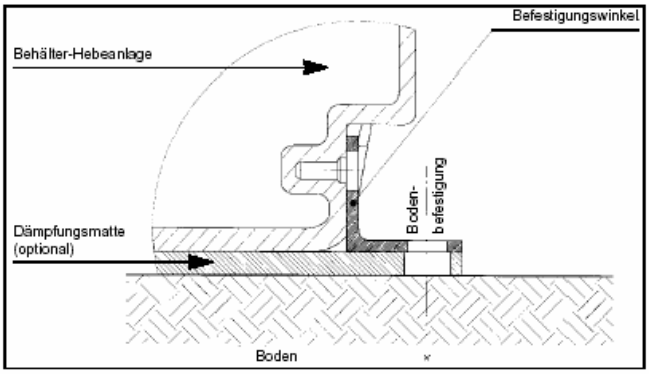
Important After the receiving the *Aqualift® F* but before installation, it is important that the control unit is stored in a dry, frost free area until time of connection.

Installation area: The KESSEL *Aqualift® F* lifting station is to be installed on a sturdy floor in a frost free area. The accompanied control unit is designed to be wall mounted in a dry, flood protected, frost protected room.

4.1 Installation location tips

In order to provide easy of installation, operation and maintenance it is important that the *Aqualift® F* is installed in a location where it is easily accessible from all sides. According to DIN 1986 a minimum distance of 60 cm should be kept free completely surrounding the *Aqualift® F* (including above the unit).

The *Aqualift® F* should be installed level on a solid floor. To further dampen the noise level of the *Aqualift® F* (during operation) it is recommended that the unit is placed on top of a rubber dampening matt (available from KESSEL). The *Aqualift® F* is to be securely bolted to the floor with the supplied anchors and bolts to prevent it from being moved or shifted.



Behälter-Hebeanlage = *Aqualift® F* storage chamber
Dämpfungsmatte = Vibration dampening matt (optional)
Befestigungswinkel = Securing bracket
Bodenbefestigung = floor mounting
Boden = floor

4. Installation

4.2 Pipe connections

All drainage pipes connected to the *Aqualift® F* should be laid with the proper slope so that they run completely empty (no standing water in pipes). All connected pipes should be properly secured to prevent vibration and provide a flexible connection to the *Aqualift® F* body.

Two types of connection to the *Aqualift® F*:

I - Connecting using the preformed, closed inlets.
The *Aqualift® F* has preformed (closed) inlet stubs for the main inlet, ventilation pipe and the emergency manual pump - as seen in Illustration A. The closed tip of all needed preformed inlets should be cut off with a standard saw as seen in Illustration C. A standard drainage pipe (HT pipe with gasket) can then be push-fit over the open inlet. An additional alternative to connecting pipes is to use rubber couplings - these can provide additional flexibility and help prevent the preformed inlet stubs from becoming deformed from forces / stress caused by pumping. If couplings are used it is important to insert a metal reinforcement ring inside the preformed inlet (as seen in Illustration D).

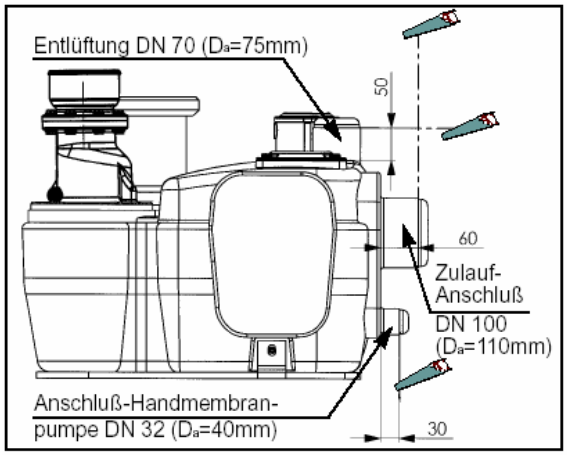


Abb. A: Einzelanlage

Ill. A: single pump unit

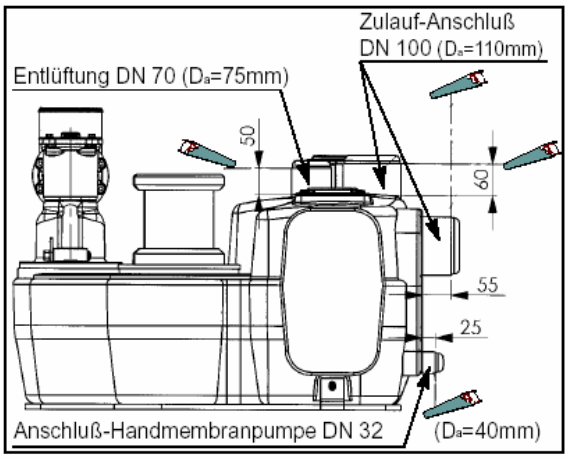


Abb. B: Doppelanlage

Ill B: double pump unit

Entlüftung = Ventilation port
Zulauf = Inlet connection
Anschluß Handmembranpumpe = Emergency hand pump connection
Einzelanlage = Single pump unit
Doppelanlage = Double pump unit

4. Installation

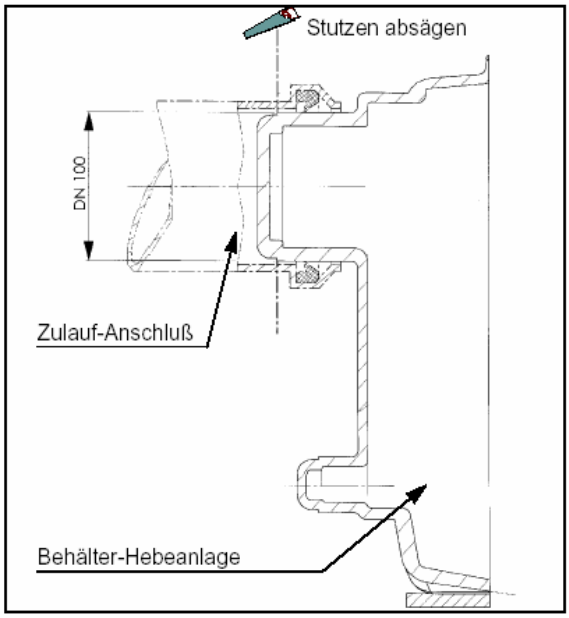


Abb. C:

Ill. C

Stutzen absägen = Saw off outlet stub
Zulauf-Anschluß = Inlet connection
Behälter-Hebeanlage = Storage chamber

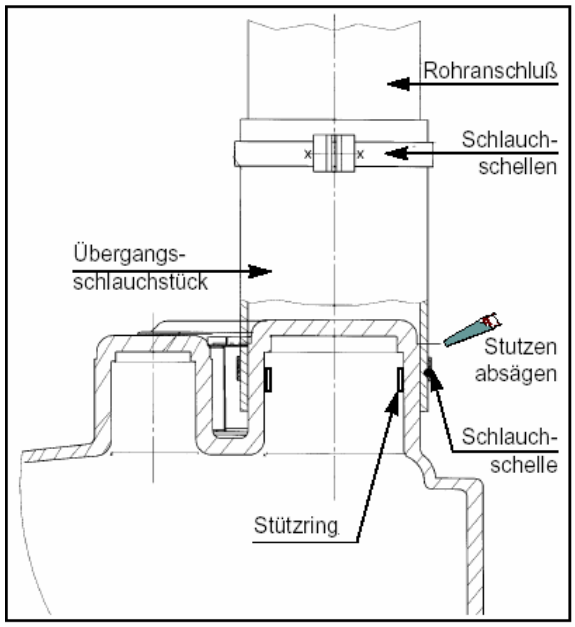


Abb. D:

Ill. C

Rohranschluß = Outlet pipe connection
Schlauchschellen = Steel coupling fastener
Übergangsschlauchstück = Rubber coupling
Stutzen absägen = Saw off outlet stub
Stützring = Interior support ring

4. Installation

II - Connecting using the flat connection areas on the *Aqualift® F*.
Additional inlets can be connected to the *Aqualift® F* by drilling out properly sized holes (with a hole saw) in the flat connection area of the *Aqualift® F* (as seen in illustration E). Properly sized inlet gaskets are then inserted in the cut out hole. Additional pipes can then be inserted into the gaskets.

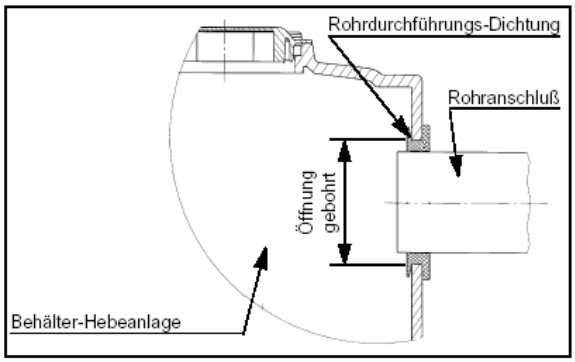


Abb. E
Ill. E

Rohrdurchführungsdichtung = Inlet gasket
Rohranschluß = Inlet pipe
Öffnung gebohrt = Sawed out inlet hole
Behälter-Hebeanlage = Storage chamber

Important - if additional pipes are connected to the flat connection areas, it is important that they are not too low. The bottom of all attached inlet pipes should be, at the lowest, equal to normal operational wastewater level inside the *Aqualift® F* chamber. This will prevent stagnant water and the build-up of solids in inlet pipes which have been attached too low.

All inlet pipes should be laid with the appropriate slope (according to DIN 1986). The DN 70 ventilation pipe is critically important to the proper operation of the *Aqualift® F*. The ventilation pipe prevents positive and negative air pressures from building up inside the chamber. The ventilation pipe should be run to the exterior of the building, preferably to a high point on the roof of the building.

The DN 100 outlet of the *Aqualift® F* is to be connected to the outlet pressure pipe with the included rubber coupling. The rubber coupling should be fitted approximately 4 cm over the outlet of the *Aqualift® F* and then secured. This rubber connection is important in providing a flexible connection between the *Aqualift® F* and the outgoing pressure pipe - this will also greatly reduced vibrations in the outlet pressure pipe.

The outgoing pressure pipe should be plumbed to a height over the local backwater level (normally ground or street level) and then into the main wastewater pipe exiting the home / building. A closure valve should be installed in this pressure pipe, preferably close to the outlet of the *Aqualift® F*.

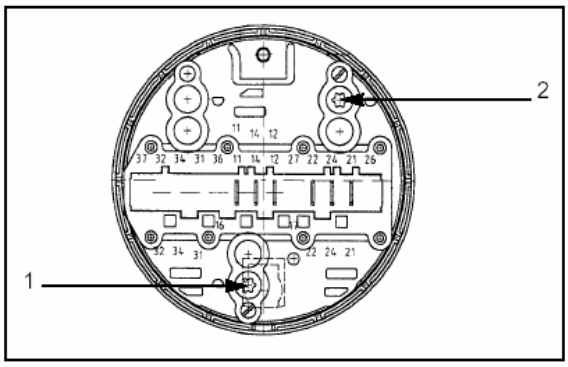
4. Installation

4.3 Setting the pressure switch (controls on level of pump)

Caution - *Aqualift® F* must be completely disconnected from its power source before any work on the pressure switch, control unit or pump is undertaken. Also, make sure that while this work is being done that the *Aqualift® F* will not be mistakenly re-connected to a power source.

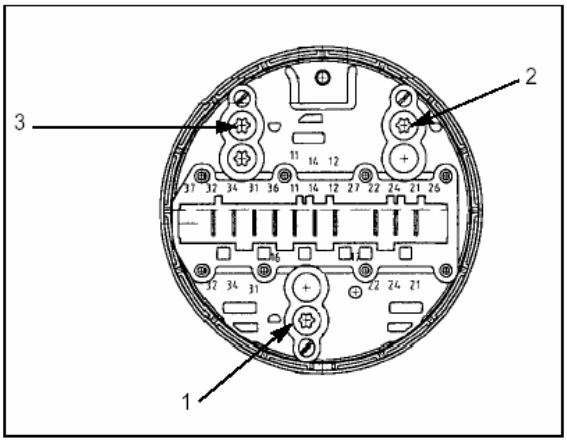
Single Pump Unit

The pressure switch is designed to monitor the wastewater level inside the *Aqualift® F* storage chamber. The wastewater levels at which the pump and alarm activate can be changed by re-setting the pressure switch. The *Aqualift®* F is supplied with factory settings which turn on the pump when the wastewater level reaches approximately the 160mm level and the alarm will activate when the wastewater level reaches approximately the 200mm level (levels measured from the bottom of the *Aqualift® F* storage chamber).
If for whatever reason a custom pressure switch activation level is required it can be set by doing the following:
Remove the cover of the pressure switch and find the two setting screws (marked 1 and 2 in the illustration). Screw 1 controls the pump activation level and screw 2 controls the alarm activation level. Turning a screw in the clockwise direction will increase the activation level as turning a screw in the counter-clockwise direction will decrease the activation level. A complete turn of a screw (360 deg) will change the activation level by 20 mm (half a turn (180 degrees) will provide a 10 mm change). After setting the activation levels it is important to replace the pressure switch cover and properly tighten.



Twin Pump Unit

The twin pump *Aqualift® F* is equipped with two pumps and a total of three pressure switches to control Pump 1 ON, Pump 2 ON and the alarm. The wastewater levels at which the pumps and alarm activate can be changed by re-setting the pressure switch. The *Aqualift® F* is supplied with factory settings which turn on the first pump when the wastewater level reaches approximately the 180mm level (measured from the bottom of the storage tank) and the second pump when the wastewater level reaches approx 210mm. The alarm will activate when the wastewater level reaches approximately the 270mm level.
If for whatever reason a custom pressure switch activation level is required it can be set by doing the following (it is important not to adjust the Pump 1 ON level too low - this will prevent the pump from starting too often. Also keep a respectable difference between the Pump 1 ON and Pump 2 ON levels):



Remove the cover of the pressure switch and find the three setting screws (marked 1, 2 and 3 in the illustration). Screw 1 controls the Pump 1 ON activation level and screw 2 controls the Pump 2 ON activation level. Screw 3 control the Alarm activation level. Turning a screw in the clockwise direction will increase the activation level as turning a screw in the counter-clockwise direction will decrease the activation level. A complete turn of a screw (360 deg) will change the activation level by 20 mm (half a turn (180 degrees) will provide a 10 mm change). After setting the activation levels it is important to replace the pressure switch cover and properly tighten.

5. Electrical connections

The cables for the pump(s) and pressure switch have been connected to the *Aqualift® F* control unit at the factory.

5.1 General Notice

All electrical work concerning the *Aqualift® F* should be handled by a licensed professional electrician and should follow all local and national electrical guidelines.

After the control unit has been wall-mounted it is important that the cover is securely closed and that the cable entering the control unit are secured to the wall to prevent the cables from being accidentally pulled or tugged out of the control unit.

The power cables for the pump and the pressure switch should not be installed next to each other - this will prevent interference which could potentially cause false starts / alarms.

5.2 Control unit installation / mounting

The control unit for the *Aqualift® F* should be installed in a frost free, dry, well ventilated room which is protected from flooding. It should be securely mounted on a sturdy wall, preferably at eye level.

To mount the control unit first place the provided drilling template on the desired wall location and drill out the four holes. The screw holes for fastening the control unit to the wall are located in the four corners of the control unit (the control unit cover must first be opened in order to access these four screw holes). Information concerning the connection of the cables can be found in section 5.3 of this User's Manual.

After the control unit is mounted be sure to securely close the cover.

5.3 Control unit cable connections

Cables for the pump and the pressure switch have already been connected at the factory. If other systems, such as a potential free contact, need to be installed please do in the following manner:

unscrew the desired plastic hand nut from the bottom of the control unit and place over the wire which is to be connected. With a sharp instrument, pierce the rubber seal (see illustration a). Now insert the cable through the pierced rubber seal and insert until the required amount of cable length is inside the control unit. Replace the plastic hand nut and tighten. Cables can know be connected to their corresponding jack by the method illustrated in illustration c.

The pump and pressure switch have a 5 meter cable which is connected to the *Aqualift® F* control unit. Only the pump's cable can be lengthened using a VDE certified connection.

5. Electrical connections

The pressure cable is a special cable containing a small hollow pipe used to equalize pressure fluctuations in the pressure switch. Important points concerning the pressure switch cable:

– The pressure switch cable can be shortened to any desired length but MUST NOT be lengthened. Any custom cable lengths must be ordered from KESSEL.
– The cable for the pressure switch should have a constant and equal downward slope from the control unit to the pump (no zig-zags or positive slopes (upwards) is allowed.
– The plastic hand nut sealing the pressure switch cable with the control unit must not be tightened over a torque of 2.5 Nm (this could put unwanted pressure on the hollow equalization tube).
– Not abiding by the above three conditions could cause the pressure switch as well as the pump to malfunction.

Cable connection table for *Aqualift® F* 400 Volt (single pump) system. For additional information concerning these connection please see Chapter 8 of this manual.

Connections	Description
Power Cable	Power cables L1 / L2 / L3 / N and PE must be connected to the upper row of grey connection jacks. Please note that jacks N and PE MUST BE connected. The power cable must be connected to an all-polar on / off switch The maximum fuse rating for each of the 3 phases is 16 Amps Improper cable connection could damage or destroy the unit.
Pump cables	Pump cables U / V / W is to be connected to the ABB Protection B6-30-10 by connecting to the T1/T2/T3 screws to the LEFT of the motor protection switch. Be sure that the phases are properly connected. PE should be connected to the lower level of the grey power connection jacks (marked 'Platinenaufdruck'
Motor temp sensor	Entry TF - Cable 4 from the motor cable is to be connected to on the left side of the TF entry. Cable 5 to be connected to the right side of the TF entry. Entry E7 – the bridge is to be left alone.
Pressure switch 'On' and 'Alarm'	The cables for the pressure switch should be connected to their corresponding jacks - connect the white cable on the right side and the brown cable on the left side on the 'Ein' entry. On the 'Alarm' entry connect the green cable to the right and the yellow cable to the left. The jacks are marked with a switch symbol.
Control unit battery	The battery for the control unit should be a NiCd-9V-Block Type IEC 6F22. This battery serves to provide warning and alarms in the case of a power failure. Do not use a standard battery - this must be a rechargeable batter with the above characteristics. Only replace or remove the battery when the control unit is not connected to a power source. Make sure polarity is correct. If a rechargeable batter with no power (dead / empty battery) is laced in the control unit it will take at least 36 hours to reach a full charge.

5. Electrical connections

Cable connection table for *Aqualift® F* 400 Volt (twin pump) system. For additional information concerning these connection please see Chapter 8 of this manual.

Connections	Description
Power Cable	Power cables L1 / L2 / L3 / N and PE must be connected to the upper row of grey connection jacks. Please note that jacks N and PE MUST BE connected. The power cable must be connected to an all-polar switch which is clearly marked as the on/off switch of the *Aqualift® F*. The maximum fuse rating for each of the 3 phases is 25 Amps Improper cable connection could damage or destroy the unit
Pump cables	Pump cables U / V / W is to be connected to the ABB Protection B6-30-10 by connecting to the T1/T2/T3 screws below the motor protection switch (Pump1 left, Pump 2 right). Be sure that the phases are properly connected. PE should be connected to the corresponding upper level power connection jacks marked Platinenaufdruck, colour coded
Motor temp sensor	Entry TF1 - Cable 4 from the motor cable from Pump 1 is to be connected to on the right side of the TF1 entry. Cable 5 to be connected to the left side of the TF entry. Entry TF2 - Cable 4 from the motor cable from Pump 2 is to be connected to on the right side of the TF2 entry. Cable 5 to be connected to the left side of the TF2 entry. Entry E7 - The bridge is to be left alone Entry E8 - The bridge is to be left alone
Pressure switch 'On 1', 'On 2' and 'Alarm'	The cables for the pressure switch should be connected to their corresponding jacks - connect the white cable on the right side and the brown cable on the left side on the 'Ein 1' entry. Connect the green cable to the right and the yellow cable to the left of the 'Ein 2' entry. On the 'Alarm' entry connect the grey cable to the right and the pink cable to the left. The jacks are marked with a switch symbol.
Control unit battery	The battery for the control unit should be a NiCd-9V-Block Type IEC 6F22. This battery serves to provide warning and alarms in the case of a power failure. Do not use a standard battery - this must be a rechargeable batter with the above characteristics Only replace or remove the battery when the control unit is not connected to a power source. Make sure polarity is correct If a rechargeable batter with no power (dead / empty battery) is placed in the control unit it will take at least 36 hours to reach a full charge.

After all control unit connections have been made be sure to close the cover to the control unit and secure with the 4 screws.

5. Electrical connections

5.4 Impeller / Motor rotation

Before placing the *Aqualift® F* into operation, check to make sure that the rotation of the motor / impeller is correct. If the impeller turns in the wrong direction either switch L1 with L2 **or** switch L2 with L3.

5.5 Motor protection switch

The motor protection switch must be set to handle the appropriate power rating listed section 3.1 of this User's Manual.

5.6 Custom pump settings

The standard settings can be custom set by adjusting the S604 switch (4-way DIP switch each with ON/OFF setting)
Different settings are not permitted.

S604/1	level controlled	OFF
S604/2	with OFF level switch	OFF
S604/3	rotation monitor on	ON
S604/4	anti-blocking function on	ON

S604/1	level controlled	OFF
S604/2	without OFF level switch	ON
S604/3	rotation monitor on	ON
S604/4	anti-blocking function	ON

The pump start delay time can be custom set by adjusting the S601 switch. This delay can be set between 1 and 3 seconds in 0.2 second increments. (tolerance +- 0.1 seconds)

S601	0	1	**2**	3	4	5	6	7	8	9	A	B	C	D	E	F
t_V [s]	0,0	0,2	**0,4**	0,6	0,8	1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6	2,8	3,0

The maximum running time can be custom set by adjusting the S602 switch. This can be set between 40 and 640 minutes in 40 minute increments (tolerance +- 4 minutes)

S602	0	1	2	3	4	**5**	6	7	8	9	A	B	C	D	E	F
t_{GL} [min]	40	80	120	160	200	**240**	280	320	360	400	440	480	520	560	600	640

The pump stop delay time can be custom set by adjusting the S603 switch. This can be set between 0.5 and 8 seconds in 0.5 second increments (tolerance +- 0.1 seconds)

S603	0	**1**	2	3	4	5	6	7	8	9	A	B	C	D	E	F
t_N [s]	0,5	**1,0**	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0

Before making any of the above adjustments make sure to disconnect the *Aqualift® F* from its power source. Any setting changes should be handled by a licensed professional and should be documented in this User's Manual.

5.7 Completion of electrical work

After all electrical work has been completed on the *Aqualift® F* or the control unit make sure replace the cover and the transparent cover of the control unit.

6. Commissioning

6.1 General Instructions

Please follow DIN 1986 Part 31 when commissioning pumps / lifting stations

Caution - Before commissioning the *Aqualift® F* make sure that all inlet pipes as well *Aqualift® F* storage chamber and the pump is free from metal, sand or any other potentially damaging debris.

Before commissioning, the *Aqualift® F* must be filled with water / wastewater to at least the elevation of the ventilation port on the pump housing.

Pump must not intake air!

Only place the *Aqualift®* F into operation after it has been thoroughly checked to assure that installation and pipe and electrical connection have been properly made. Make sure that all closure valves are fully open before starting.

Important - the commissioning of the *Aqualift® F* must be handled by a licensed professional.

Make sure to follow all safety instructions in Part 1 of this User's manual and do not place the *Aqualift® F* in operation if the pump, control unit or cables show any signs of damage.

Important - All screws / bolts should be tighten to a maximum of 3 Nm

6.2 Outlet Pressure Flange

The outlet pressure flange is equipped with a backflow flap and a manual opening lever. During standard operation, the backflow flap must be in the operational position as seen in Illustration 1. During pumping the flap will be forced open by the pressure of the outgoing wastewater (as seen by the dotted lines).

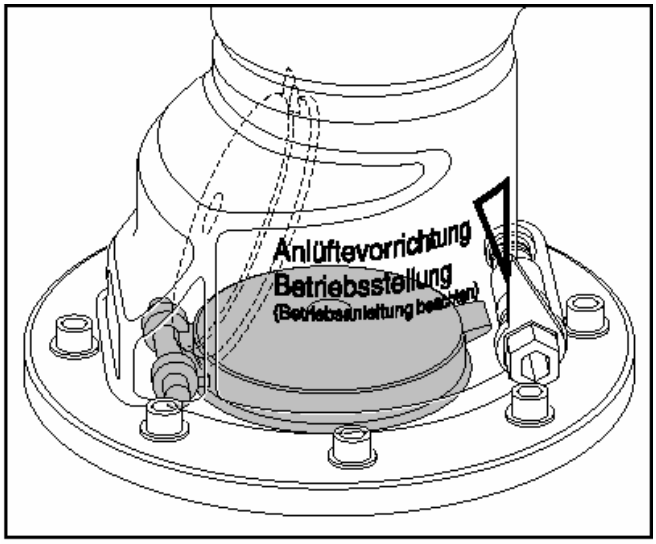


Abb. 1
Ill. 1

6. Commissioning

6.3 Description of operation

6.3.1 'Auto' mode

Single pump unit

The single pump *Aqualift® F* is in standard operating mode when the control unit switch is set to 'Auto' and no failures or warnings are displayed. As the wastewater level inside the *Aqualift® F* storage chamber rises it increases the inside air pressure on the pressure control switch which will activate when the wastewater level reaches a certain height inside the chamber. After activation of the pressure switch the pump start delay time begins to count down and when this delay is over the pump begins to run. As the wastewater level decreases the air pressure inside the pressure switch also decreases until it reaches a point when the pressure switch will 'de-activate'. After the pressure switch has 'de-activate', the pump start delay time begins to count down and when this delay is over the pump stops running. In the case that the pump runs for longer than the set maximum pump run time, the pump will turn off and at this time the 'Laufzeit' LED will turn on to let the operator know that the motor has run to its maximum run time. The warning will remain until the 'Alarm Reset' button is pressed. Pressing the 'Alarm Reset' button will then allow the pump to restart.

Double pump unit

The double pump *Aqualift® F* is in standard operating mode when the control unit switch is set to 'Auto' and no failures or warnings are displayed.

Alternating Operation

As the wastewater level inside the *Aqualift® F* storage chamber rises it increases the inside air pressure on the pressure control switch which will activate when the wastewater level reaches a certain height inside the chamber. After activation of the pressure switch the pump start delay time begins to count down and when this delay is over the pump begins to run. As the wastewater level decreases the air pressure inside the pressure switch also decreases until it reaches a point when the pressure switch will 'de-activate'. After the pressure switch has 'de-activate', the pump start delay time begins to count down and when this delay is over the pump stops running. The next time the pressure switch activates the second pump will operate. This process will continue with the pumps operating alternatingly.

Parallel Operation

As the wastewater level inside the *Aqualift® F* storage chamber rises it increases the inside air pressure on the pressure control switch which will activate when the wastewater level reaches a certain height inside the chamber. After activation of the pressure switch the pump start delay time begins to count down and when this delay is over the pump begins to run. If the wastewater level continues to rise (i.e. - more wastewater is entering the chamber as the single pump can pump out) the pressure inside the pressure switch will continue to rise and if it reaches a certain level the second pump will begin to operate (after the pump start delay time has passed). Both pumps will continue to run simultaneously until the pressure inside the pressure switch falls below the original 'Pump 1 On' level and the pump stop delay time has passed.

In the case that one or both of the pumps runs for longer than the set maximum pump run time, the pump(s) will turn off and at this time the 'Laufzeit' LED will turn on to let the operator know that the motor has run to its maximum run time. The warning will remain until the 'Alarm Reset' button is pressed. Pressing the 'Alarm Reset' button will then allow the pump to restart.

6.3.2 '0' Mode
When the control unit is set to the '0' mode the pump(s) will not operate although the warning and failure displays on the control unit will continue to function.

6.3.3 'Hand' Mode
When the control unit is set to the 'Hand' mode the pump will begin (or continue) to run (regardless of the wastewater level inside the *Aqualift® F*) until the switched off of the 'Hand' mode setting.

Attention - A pump running without water circulating through it causes increase temperatures and a drastic increase on the wear and tear of the motor. Excessive dry running of the pump(s) (above 5 minutes) can lead to irreparable damage to the pump. This damage is easily detectable and is not covered under the *Aqualift® F* warranty.

6.4. Operational Test

The functions of the *Aqualift®* F, dependant on wastewater levels inside the unit, should be tested after installation by filling up the *Aqualift® F* with wastewater to specific levels. Filling of the unit should take place by draining fixures connected to the unit. During the filling and emptying procedure the control unit of the *Aqualift® F* should be set to the “Betriebsart” – “0” setting.

7. Inspection and Maintenance

The *Aqualift® F* should be visually checked once per month by the operator. This involves a visual check to make sure no cable are damaged and that the holding chamber is water tight. During this inspection, a fixture connected to the *Aqualift® F* (such as a sink or toilet) should be run until the *Aqualift® F* pump activated - this will confirm that the float switch system and the pump is operating properly.

Thorough inspections should take place at regular intervals according to DIN 1986 Part 31. These inspections should only be handled by a licensed professional. Repairs of the *Aqualift® F* should only be handled by the manufacturer. The inspection should include the following:

- Visual inspection of the entire unit including the pump and accessories.
- Cleaning of the entire unit including the pump.
- Inspection of entire unit including pump housing for exterior damage or wear and tear.
- Check pump to make sure movable parts move freely and that now deposits have developed.
- Check all cables of the *Aqualift® F* to make sure they are in excellent condition.
- Check all connections of the *Aqualift® F* to make sure they are firm and water tight.

Important - all screws and bolt on the *Aqualift® F* should be tightened to a maximum torque of 3 Nm.

The above listed inspection should also be carried out after the *Aqualift® F* has been stored or not operated for an extended period of time.

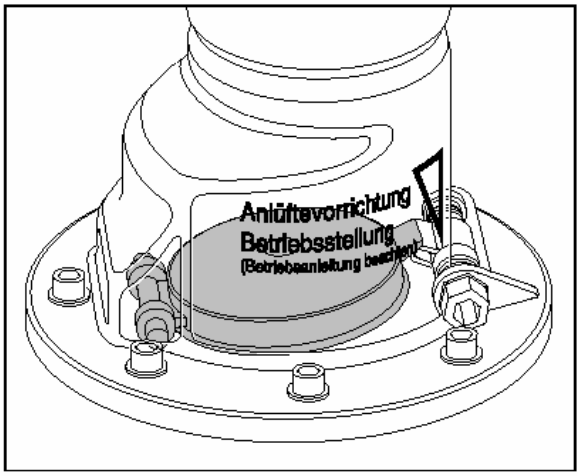
7.1 Pump Information

The *Aqualift® F* pump should be inspected in regular intervals. In the case that pump operates louder than normal or loses pumping efficiency the pump and its impeller must be well cleaned and inspected. To do this the 4 holding screws for the pump must be removed (as seen in Illustration 10.2.1) and the entire pump taken out of the chamber for inspection. During this inspection it is important to check that the ventilation port on the pump body is open and free of any debris.

7.2 Backflow Preventer Information

The backflow preventer (seen in Illustrations 2 and 3 below) can be used to empty the vertical section of the outlet pressure pipe. This must be done in order to disconnect the *Aqualift® F* from the outlet pressure pipe (As seen in Illustration 4). With a size 8 (15 mm) wrench, turn the bolt clockwise until the wastewater collected in the outlet pressure pipe begins running back into the *Aqualift®* F chamber. After all the wastewater is out of the vertical section of the pressure pipe it is important to close the flap again be turning the bolt counter-clockwise until closure.

7. Inspection and Maintenance



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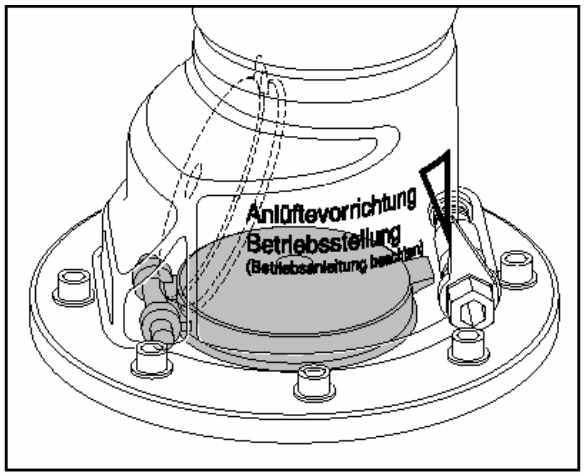

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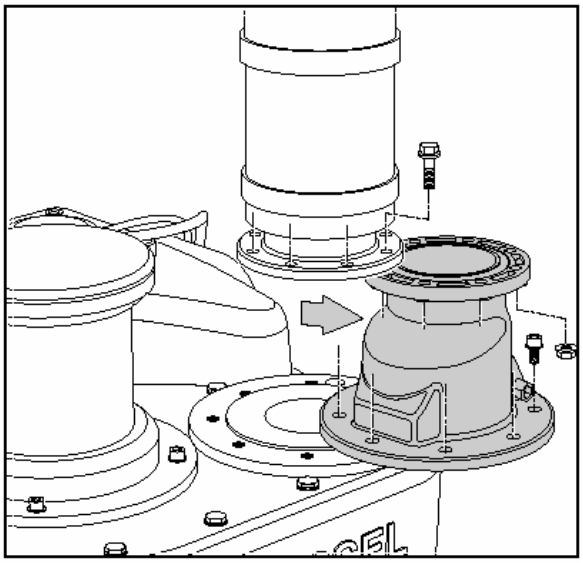

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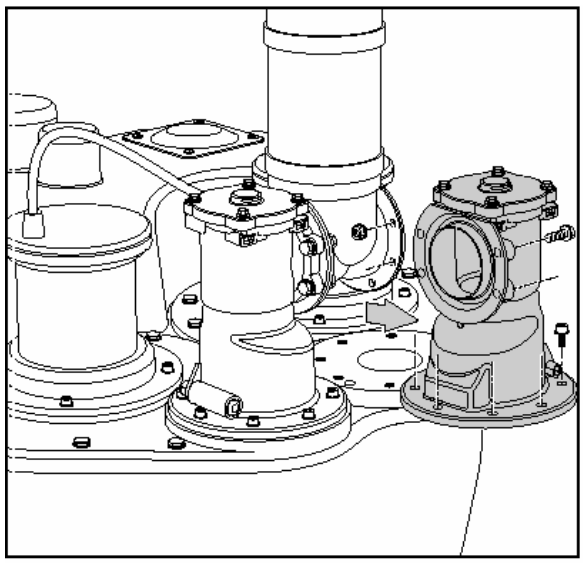

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7.3 Control Unit Information

- Be sure to unplug the *Aqualift® F* control unit before any maintenance work is done.
- Repairs should only be handled by the manufacture.
- After maintenance work is done, be sure that the control unit cover is closed and that the four cover screws are firmly tightened.

8. Problems and Solutions

The following checks and shut-down procedures should only be handled by a licensed professional.

8.1 General Problems

	Problem	Reason	Solution
1	**Pump does not start**	Control unit not plugged in	Plug in control unit Switch control unit to “Auto”
		Over load or max temp exceeded, motor is blocked	Remove motor, remove obstacle from impeller / pump housing – caution pump may be hot!
		Motor difficult to turn	Check for free rotation of impeller – call for professional repair
		No power	Check fuses and electrical cables that they are properly attached Check that all 3 phases are fonctioning.
2	**Pump operates but alarm level is reached**	*Aqualift® F* is receiving too much wastewater	Check to see if multiple fixtures are being drained simultaneously – if so, temporarily do not use certain fixtures – or, if necessary disconnect fixtures from *Aqualift® F*
		Aqualift® F does not pump enough wastewater	- Check for blockage in impeller or pump housing - Check for blockages in outlet or pressure pipe - Impeller is worn, replace impeller / replace pump - *Aqualift® F* improperly installed, consult KESSEL Customer Service
		Ventilation improper or not connected	Repair or install proper ventilation pipe
3	**Pump operates rough or noisy and LED “Phase / Drehfeld” lights**	Wrong motor rotation	Check impeller rotation Switch cable polarity
		For twin pump units both motors rotate wrong	Switch 2 phases on main cable in control unit
		Low pump performance to due damage	Check motor and impeller Replace if necessary
	Pump operates rough or noisy and LED “Phase / Drehfeld” does not light	Wrong motor rotation	Check impeller rotation Switch cable polarity
		For twin pump units both motors rotate wrong	Switch 2 phases on motor cable in control unit

8. Problems and Solutions

Problem		Reason	Solution
4	**Wastewater is not pumped away. Backwater problems in fixtures connected to**	*Aqualift® F* is not plugged in	Plug in *Aqualift® F*
		Cable to control unit not receiving power	Check outlet and fuse Insure outlet is supplying power
		Level switch malfunction	Check and clean float switch
		Inlet(s) to *Aqualift® F* blocked	Check and clean inlet(s) to *Aqualift® F*
	Aqualift® F	Wastewater temperature too high for extended time period (15 min)	Reduce wastewater temperature (run cold water into system)
5	**Pump suddenly runs loud**	Phases on house electrical system switched	Check impeller rotation
		Damage to pump parts caused by foreign objects	Check pump and impeller Replace if necessary
		Foreign object stuck in pump / impeller	Remove foreign object
6	**Bad odor / smell** **Sharp / acidic odor**	System is not airtight	Ventilation, inlet, outlet, inspection port, float switch seal – check for leaks
		Pump not leak proof	Check pump and contact customer service / replace pump if necessary
		Motor(s) too hot overloaded	Check motor and pump for ease of rotation
			Too frequent starting / stopping of the motor Too much incoming wastewater
		Contactor too hot due to switch malfunction	Check *Aqualift® F* for switch malfunction
7	**System runs too much Starts without reason**	Too much incoming wastewater	Check for cause of excessive incoming wastewater
		Backflow prevent defective wastewater returning into *Aqualift® F* chamber after it is pumped out	Check backflow preventer for blockage or improper function
8	**System does not stop running**	Foam build up inside *Aqualift® F* chamber	Reduce use of soap or cleansers
		Interior of chamber / pump / impeller / float switch coated with grease / fat	Completely clean all parts coated with grease / fat. Reduce amount of grease enterring system
		Ventilation tube inside float switch cable blocked	Check float switch cable for kinks / bends. Make sure properly layed with continuous slope to *Aqualift® F*
		Pressure switch system dirty Pressure switch improperly connect / defect	Remove pressure switch, clean tube coated

8. Problems and Solutions

8.2 Irregular level conditions

Problems or failures with the level switches can often be detected by the control unit and be displayed while in the Auto mode. If the control unit detects an impossible level switch situation, the 'Laufzeit / Niveau' LED will begin to blink. This can be confirmed and cancelled by pressing the 'Alarm Reset' button if the problem has been fixed or the wastewater level has changed and this 'impossible' level is no longer present. Problems with the 'Alarm' closure switch and the opening of the 'On' level switch cannot be detected.

Single Pump *Aqualift® F*

The level switches of a single pump *Aqualift® F* cannot tell the difference between an 'On' level switch which does not activate and an 'Alarm' switch which does not turn off. In the case that the 'Alarm' level is reached without the 'On' level activating, a level failure will be displayed and the motor / pump will not be turned on. If, in this situation, the 'On' level does activate - then the pump will turn on. When the 'On' level switch again opens the pump will turn off.

Double Pump *Aqualift® F*

• 'On' level switch which does not close (activate)
An alarm will be activated after the wastewater level reaches the 'On 2' level. In the case that the 'Alarm' level is exceeded will activate both pumps. When the wastewater level falls below the 'On 2' level both pump will be turned off.

• 'On 2' level switch which does not close (activate)
An alarm will be activate after the wastewater level exceeds the 'Alarm' level. At the same time both pumps will be activated. Both pumps will remain in operation until the wastewater level falls below 'On 1' level.

• Constantly closed (activated) 'On 2' level switch
An alarm will activate after the wastewater level has fallen below the 'On 1' level. One pump will activate after the 'On 1' level has been reached and the second pump will also be activated after the 'Alarm' level has been reached.

• Constantly closed (activated) 'Alarm' level switch
Am alarm will activate after the 'Alarm' level switch has been activated and at the same the wastewater level has fallen below the 'On 2' level. This will result in a constant 'Alarm' warning. The actual audible alarm can be confirmed and cancelled by pressing the 'Alarm Reset' button on the control unit. The 'Alarm' relay switch will remain as it is until the problem has been corrected. One pump will be activated after the 'On 1' level has been exceeded and the second pump will also activate after the 'On 2' level has been exceeded. Both pump will turn off after the wastewater level has fallen below the 'On 1' level.

8. Problems and Solutions

8.3 Disturbances / Internal controls

The control unit continuously monitors the signals from the motor protection switches and the motor temperature sensors. In the case of a disturbance the pump will either be shut off or prevented from starting. This will result in a corresponding alarm and the lighting of an LED.

8.3.1 In the case that L2 and / or L3 fail, the 'Phase/Drehfeld' LED will continuously light and the 'Störung' relay will activate. Since the control of L1 is still active, the failure of L1 will not be displayed.

8.3.2 In the case that a motor protection switch is activated either manually, by a short circuit or by an overload, the 'Motorschutzschalter' LED will activate ('Pumpe . . . MSS/Temp' LED).

8.3.3 Motors of the *Aqualift® F* contain a temperature sensor which will activate when the otor temperature reaches 110 degrees Celsius and the motor will automatically be shut off. At this point the 'Motortemperatur' LED ('Pumpe . . . MSS/Temp' LED with double pump units) will signal. As soon as the motor has cooled to an appropriate temperature the motor will automatically restart.

8.4 'Alarm' Warnings

There are two situations which will result in an Alarm warning

1. Wastewater in the *Aqualift® F* which has exceeded the 'Alarm' level will cause the alarm to activate. This can be turned off by pressing the 'Alarm Reset' button on the control unit. If the wastewater level falls below the 'Alarm' level then the alarm will automatically be turned off.
2. The alarm will also be activated in the case of a power failure. This alarm can be turned off by pressing the 'Alarm Reset' button on the control unit.

8.5 What to do when . . . .

- The motor protection switch is activated - Open the transparent cover of the control unit and press the 'START' button. If the motor protection switch reactivated immediately after being pressed please contact a licensed electrician.
- The *Aqualift® F* no longer reacts to incoming signals (for example from the float switches) - unplug the control unit of the *Aqualift® F* for at least 10 seconds and then plug back in. In the case that the *Aqualift® F* still no longer response to incoming signal please contact a licensed professional.

9. Control Unit

9.1 Control unit for single pump *Aqualift® F*

9.1.1 Description of displays and operational button on control unit

LED's			
Normal operation (user information)	Betrieb	green	power supply functioning
	'Alarm' level	yellow	'Alarm' level reached
	'On' level	yellow	pump on level reached
	'Off' level	yellow	no function
	Pumpe	green	pump outlet activated
Warning (for installer)	Phase	red	constant - phase not active blinking - rotating field problem
	Motor protection	red	motor protection activated
	Motor temperature	red	blinking - 'Temperature A' (TF)
	Running time/level	red	constant - running time failure blinking - level failure
Buttons			
Hand - 0 - Auto	Rotating switch		Chooses operation type
Alarm reset	button		Turns off alarm from level switch
			Turns off level failure alarm
			Turns of motor temperature alarm
Motor protection switch	switch		Activated when pump overloads

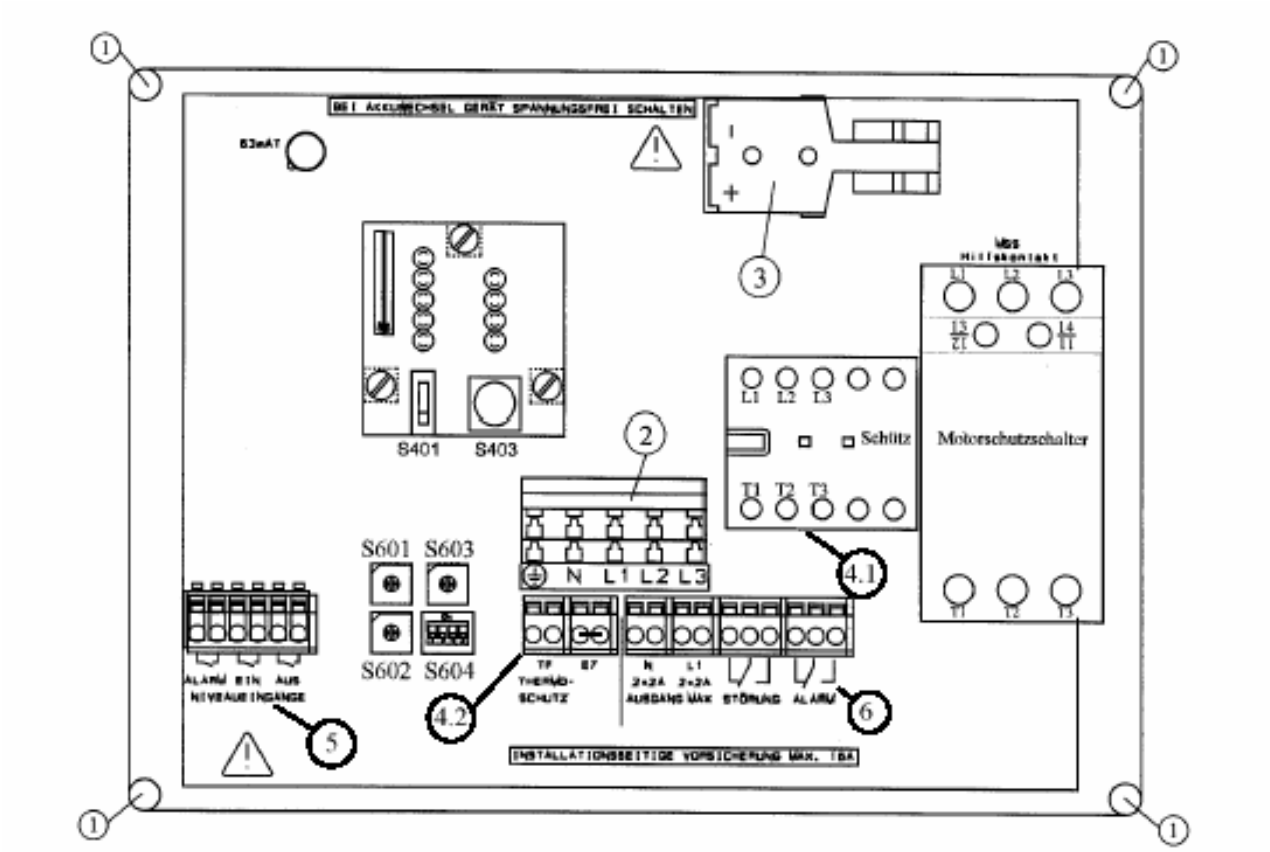
The control buttons can be accessed by removing the transparent cover of the *Aqualift® F* control unit. The cover should only be removed and the control buttons accessed by a licensed professional.

During the time that the transparent control unit cover is removed, the control units protection class is reduced. In the case that a humid condition or splashing water may be present - first unplug the control unit before removing the transparent cover.

Be sure that the transparent cover is properly replaced and secured so that the proper protection class is ensured.

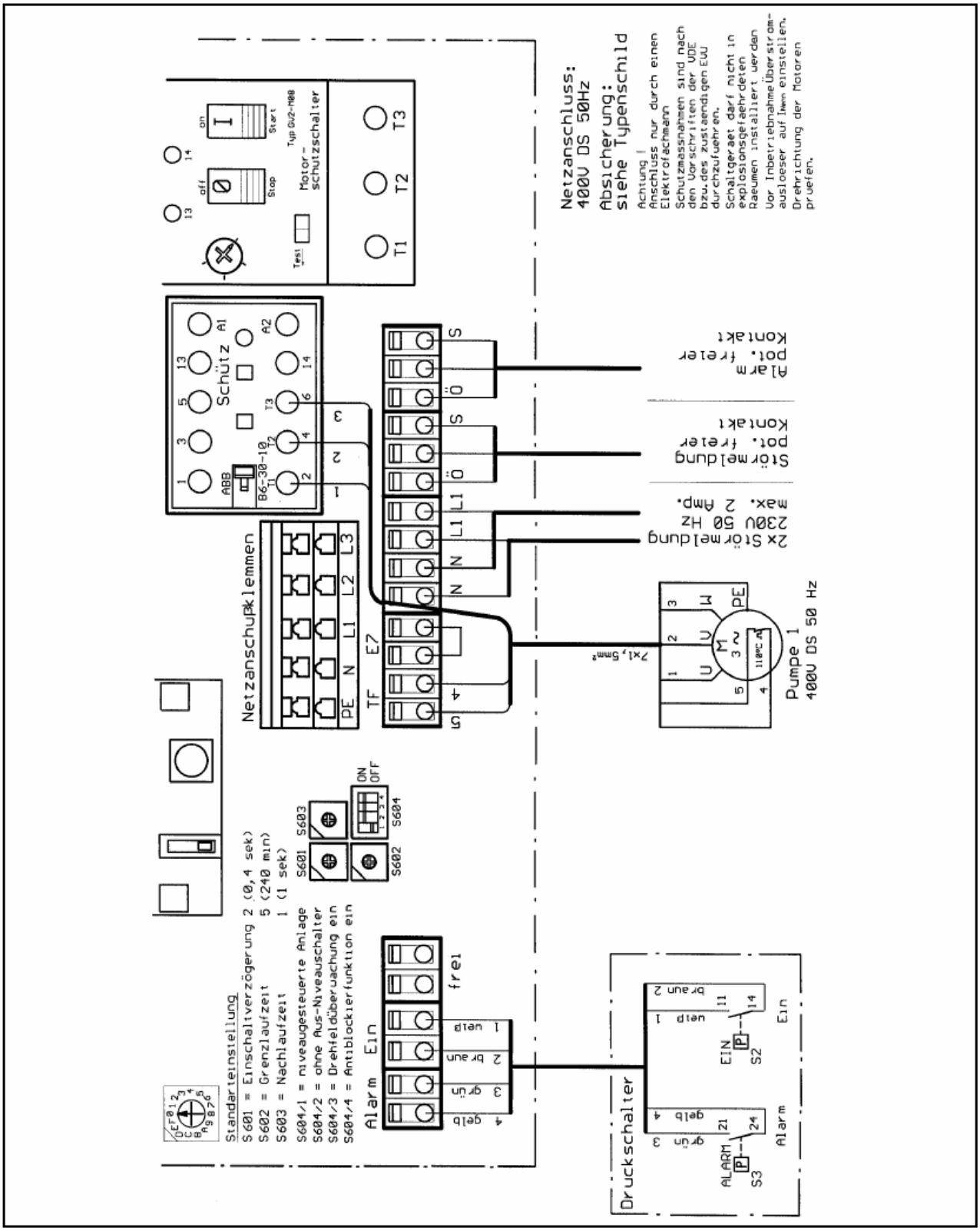
9. Control Unit

9.1.2 Interior view of single pump *Aqualift® F* control unit



1. Holes for wall mounting
2. Power cable connections
3. Back up battery housing
4.1 Connections for pump / motor power
4.2 Connection for pump temperature sensor
5. Connections for float switch level sensors
6. Connections for external warning and alarm notifies.

9.1.3 Connecting plan for single pump *Aqualift® F*



Stand 04.99 / Du / EINZ-F

9. Control Unit

9.2 Control unit for double pump *Aqualift® F*

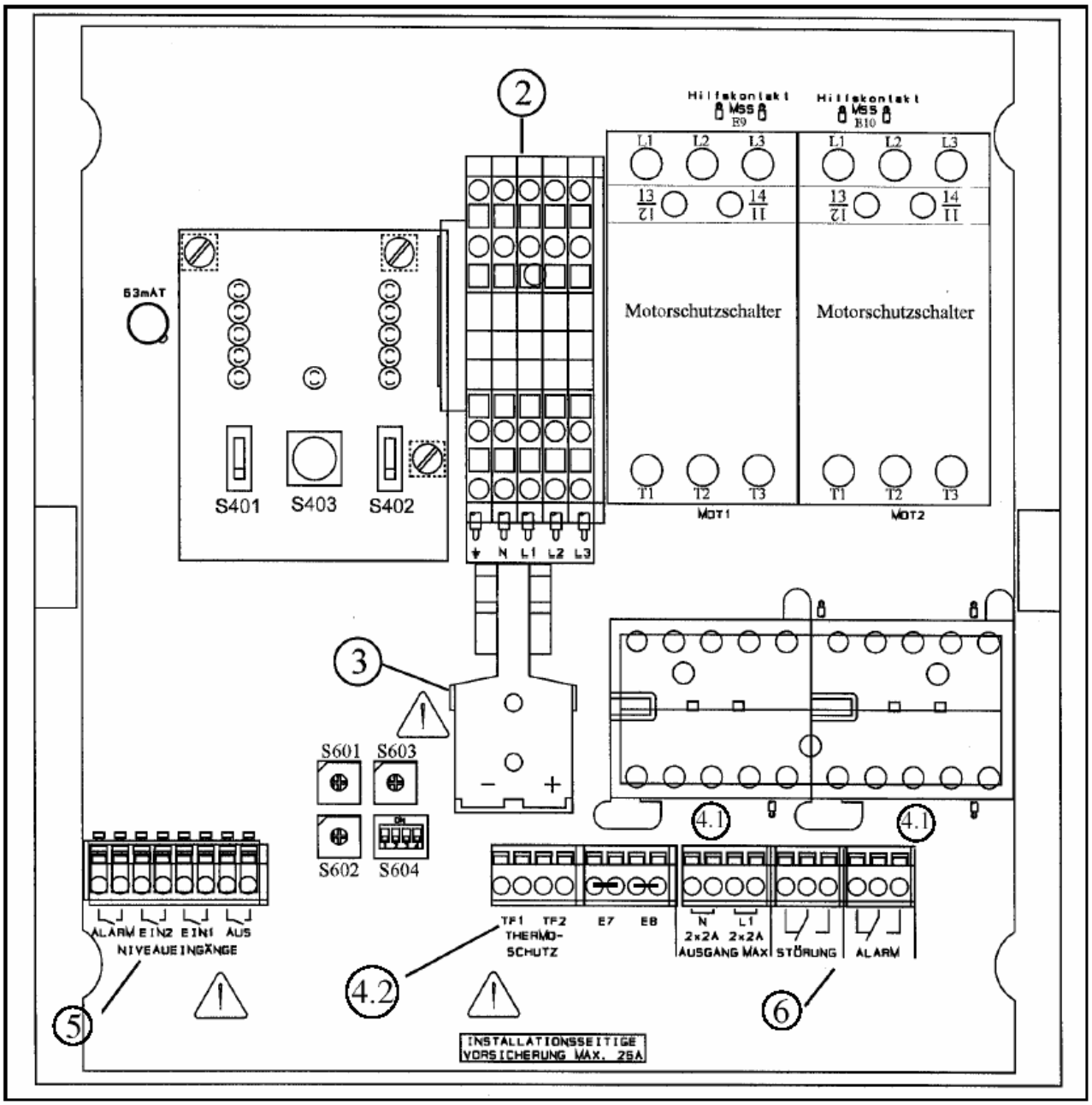
9.2.1 Description of displays and operational button on control unit

LED's			
Normal operation	Betrieb	green	power supply functioning
	'Alarm' level	yellow	'Alarm' level reached
	'On 2' level	yellow	pump 2 on level reached
	'On 1' level	yellow	pump 1 on level reached
	'Off' level	yellow	no function
	Pump1	green	pump outlet 1 activated
	Pump2	green	pump outlet 2 activated
Warning	Phase	red	constant - phase not active blinking - rotating field problem
	Pump 2 MSS/Temp	red	constant - Pump 2 motor protection switch activated blinking - Pump 2 thermal switch
	Pump 1 MSS/Temp	red	constant - Pump 1 motor protection switch activated blinking - Pump1 thermal switch
	Running time/level	red	constant - running time failure blinking - level failure
Buttons			
Hand - 0 - Auto (Pump 1)	Rotating switch	Chooses Pump 1 operating type	
Hand - 0 - Auto (Pump 2)	Rotating switch	Chooses Pump 2 operating type	
Alarm reset	button	Turns off alarm from level switch Turns off level failure alarm Turns of motor temperature alarm	
Motor protection switch 1	switch	Activated when pump overloads	
Motor protection switch 2	switch	Activated when pump overloads	

The control buttons can be accessed by removing the transparent cover of the *Aqualift® F* control unit. The cover should only be removed and the control buttons accessed by a licensed professional.
During the time that the transparent control unit cover is removed, the control units protection class is reduced. In the case that a humid condition or splashing water may be present - first unplug the control unit before removing the transparent cover.
Be sure that the transparent cover is properly replaced and secured so that the proper protection class is ensured.

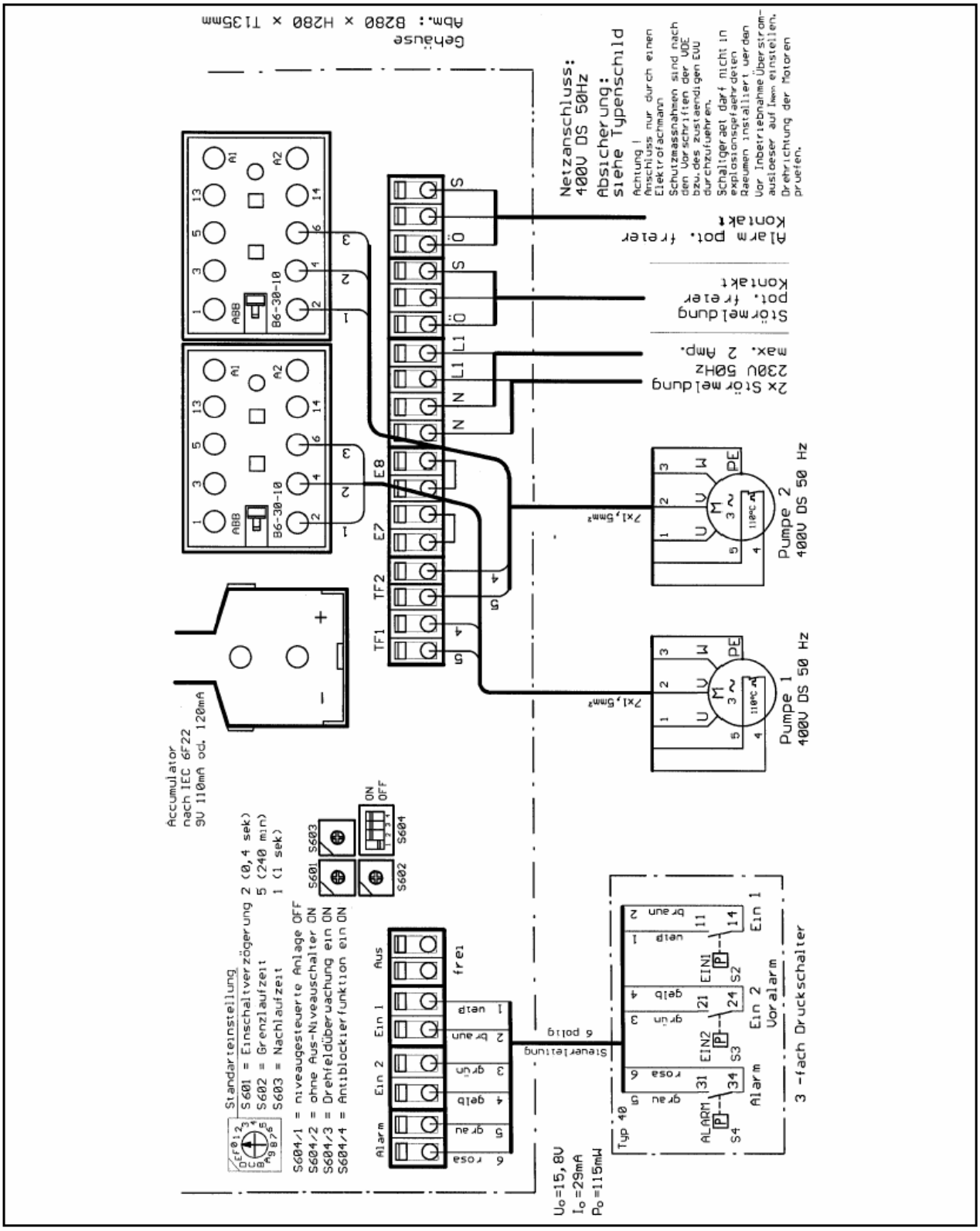
9. Control Unit

9.2.2 Interior of Control Unit



2 Power connection
3 Housing for battery (rechargeable)
4.1 Connection for pump power cables
4.2 Connection for pump temperature sensors
5 Connection for float switches
6 Connection for external warning and alarm notifiers

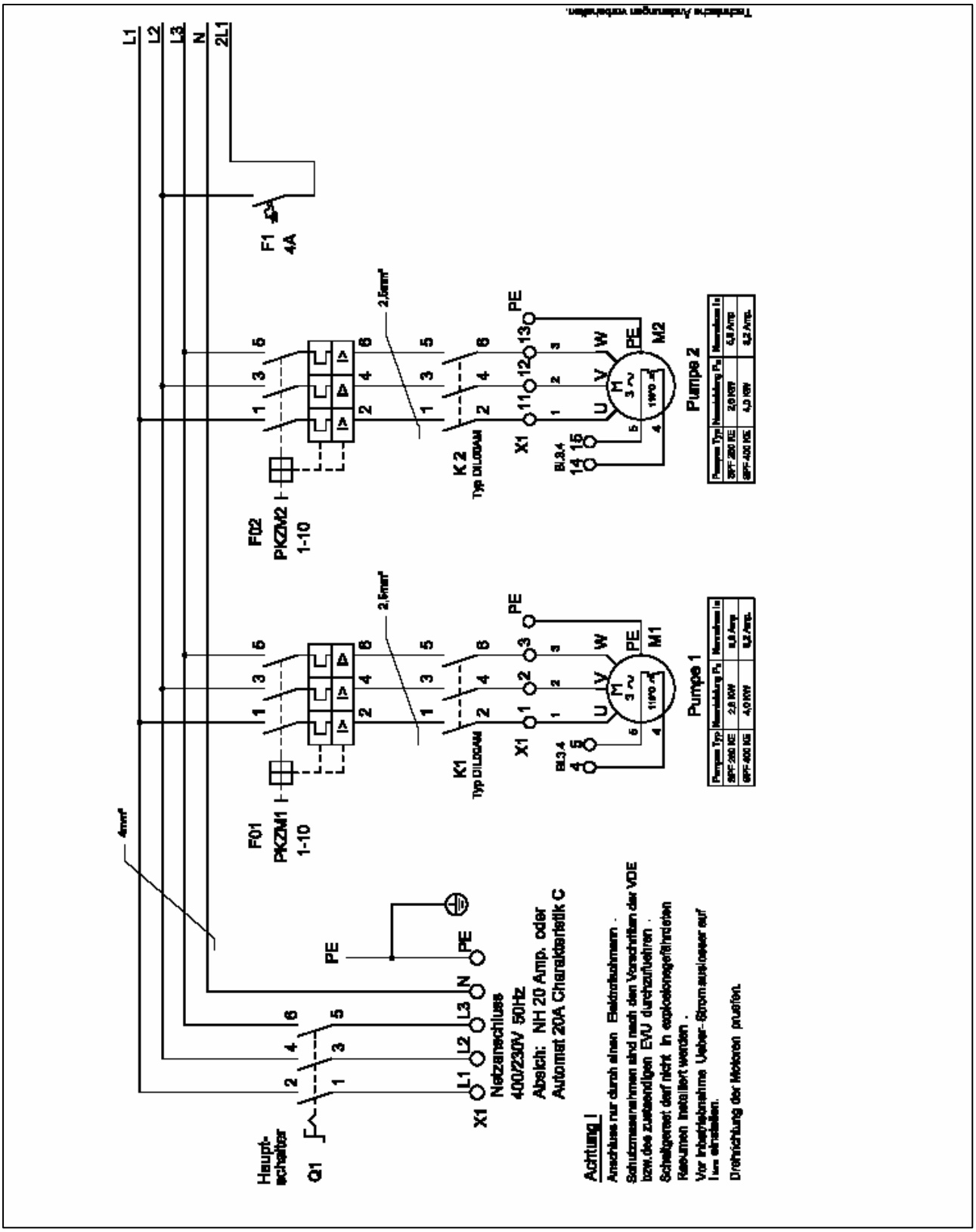
9.2.3 Connecting plan for double pump *Aqualift® F*



Stand 04.99 / Du / DUO-F

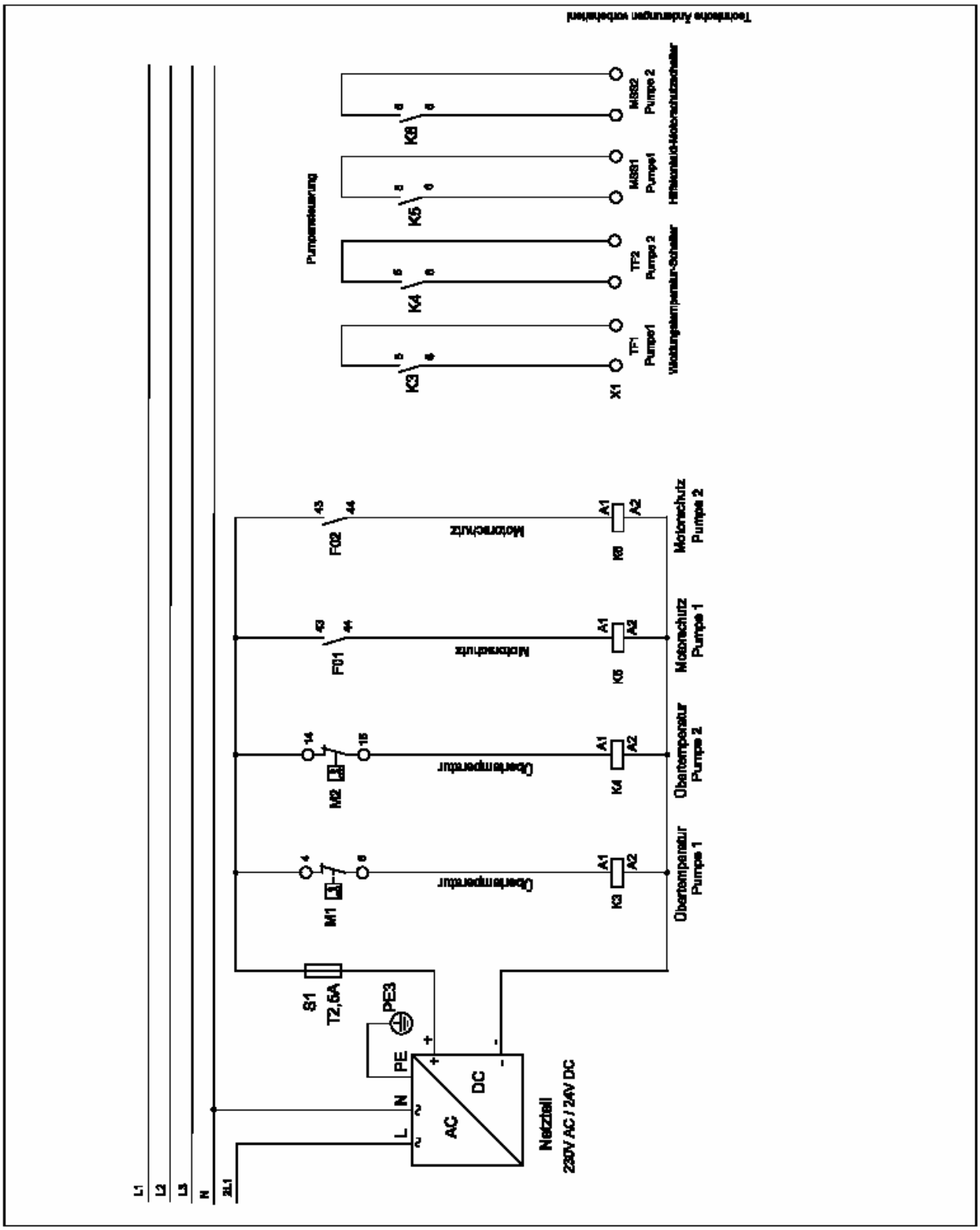
Electrical Switching Plan

9.3 Switching Plan for *Aqualift® F Duo XXL*



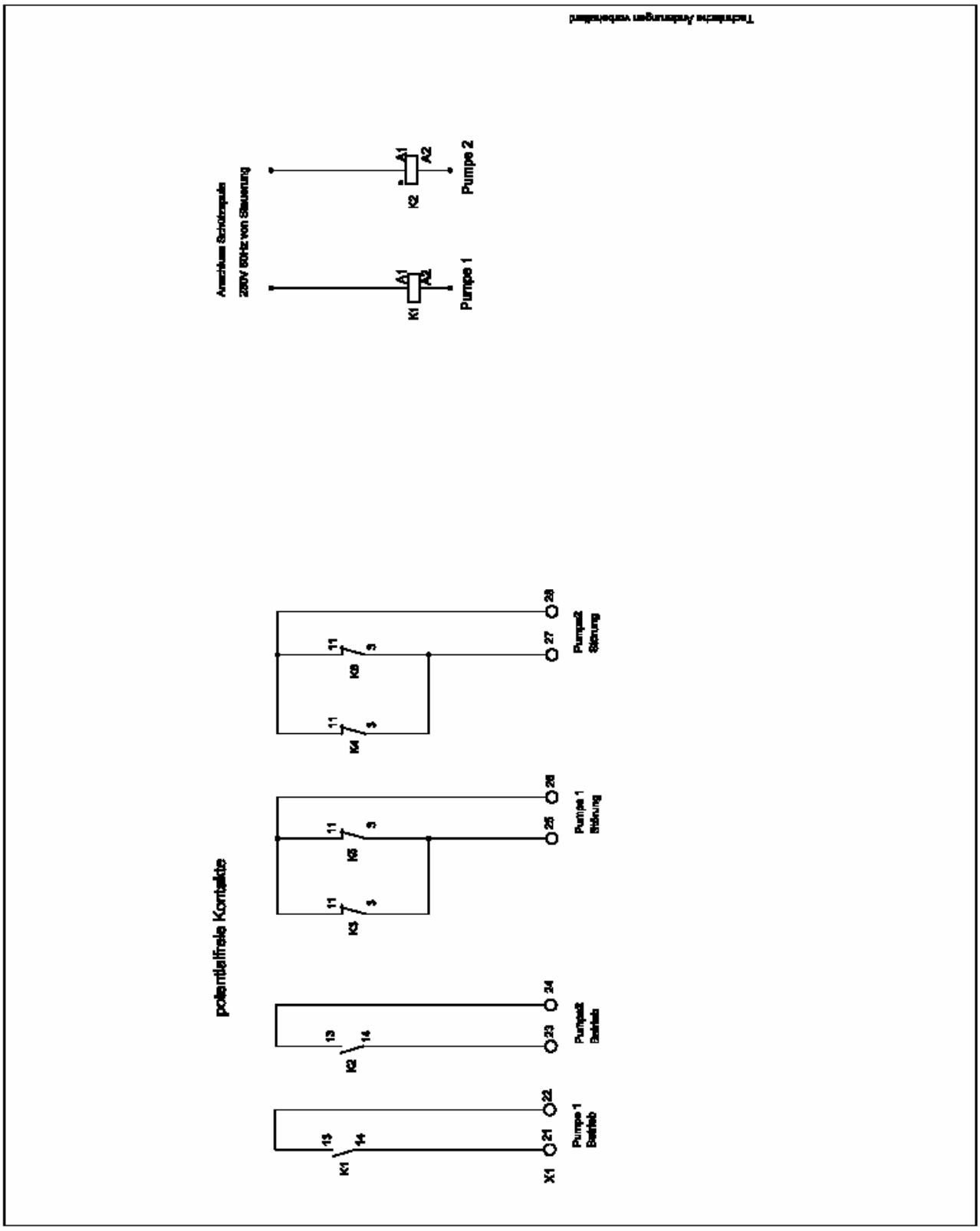
Electrical Switching Plan

Aqualift® F Duo XXL



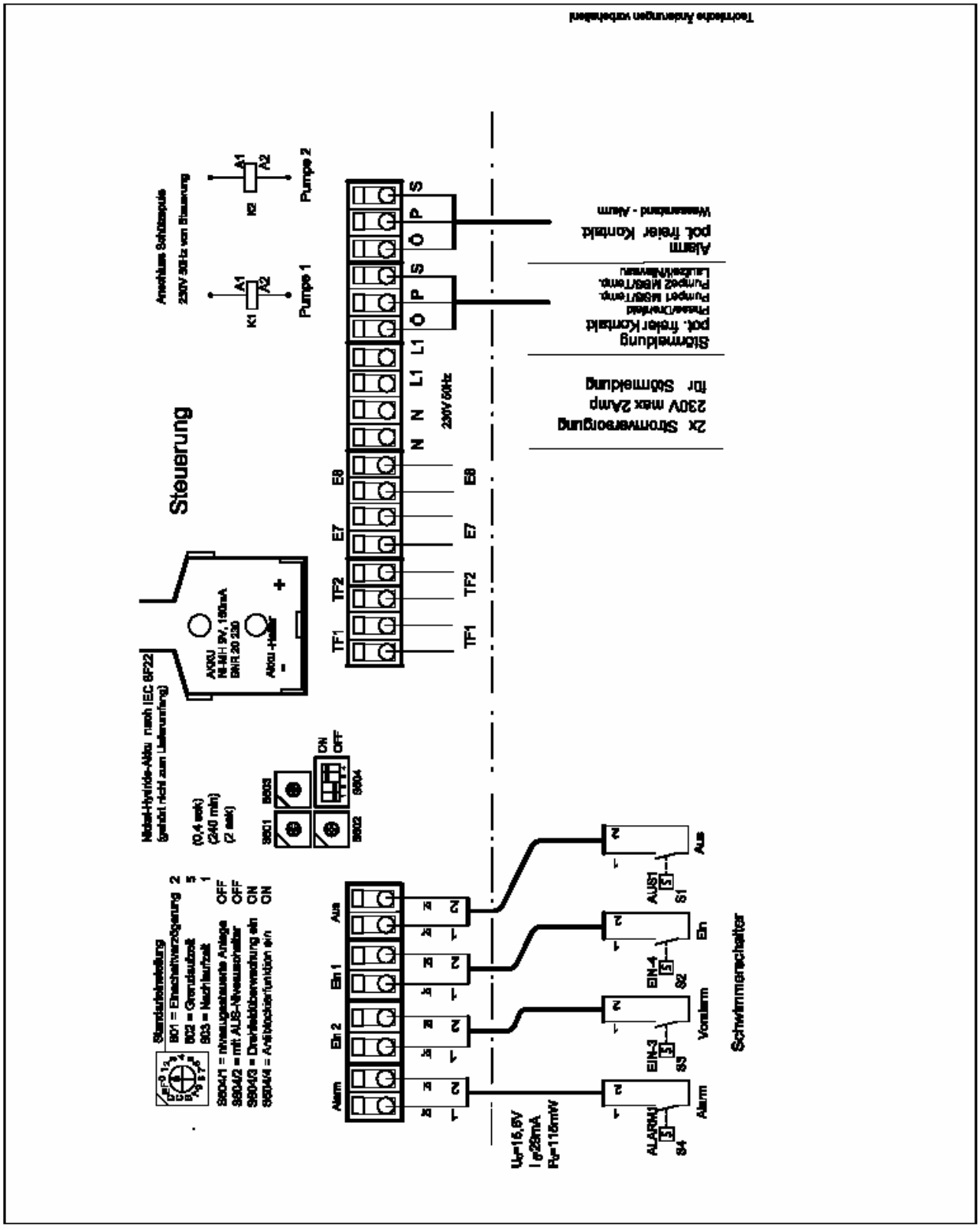
Electrical Switching Plan

Aqualift® F Duo XXL



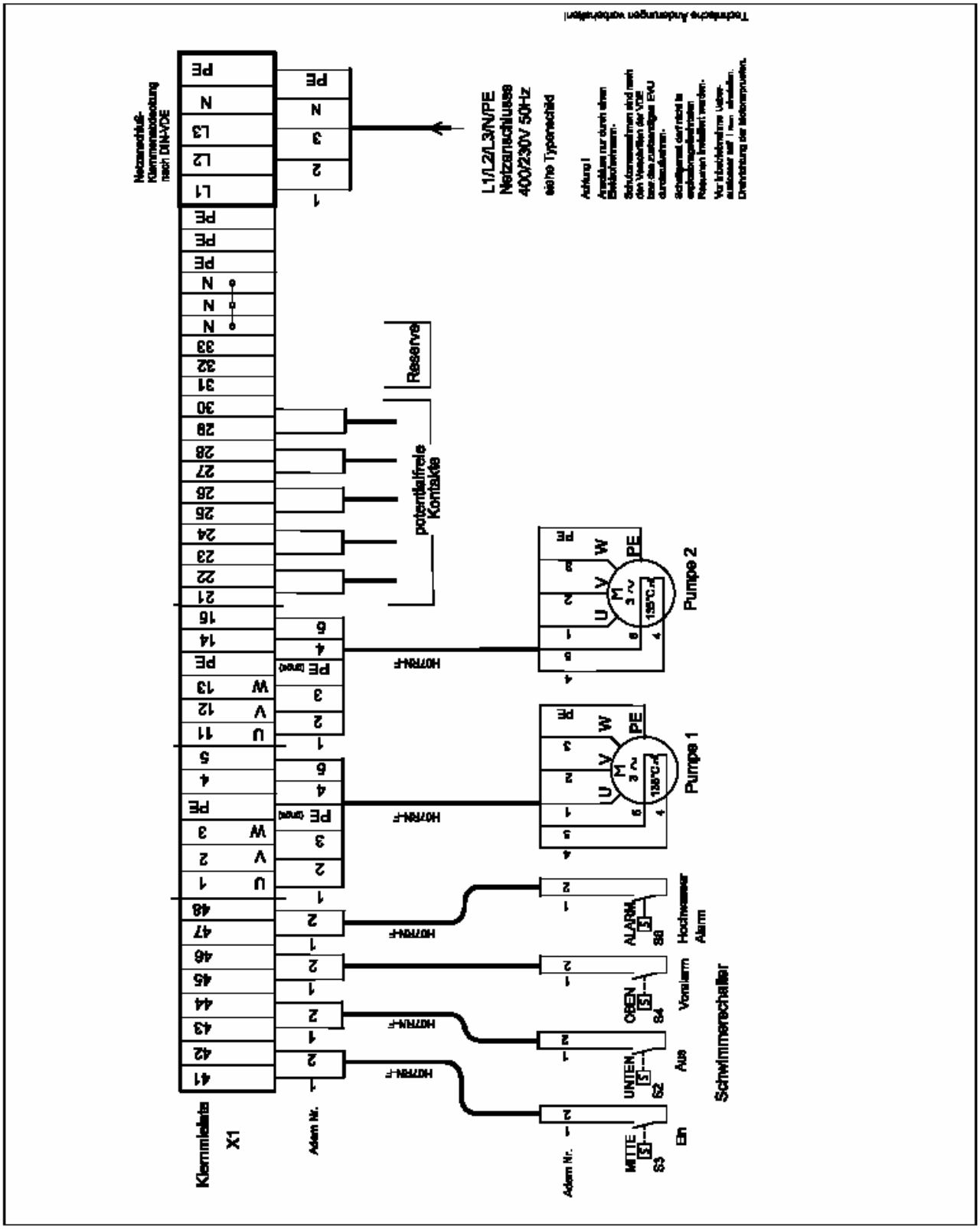
Electrical Switching Plan

Aqualift® F Duo XXL



Electrical Switching Plan

Aqualift® F Duo XXL



10. Replacement parts and Accessories

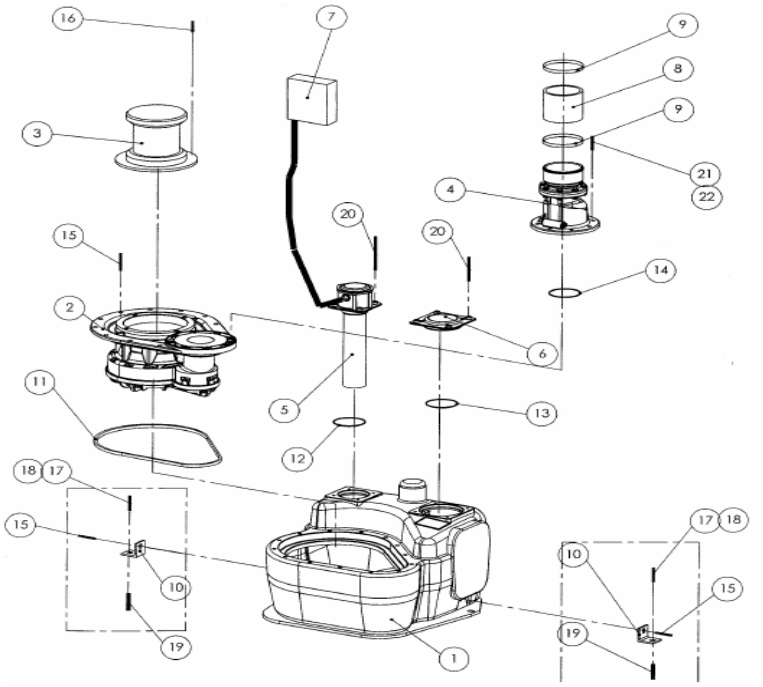
10.1 Accessories

Description		Order #
Emergency hand pump		28680
Rubber connection couplings	DN 40	28660
	DN 70	28661
	DN 80	28662
	DN 100	28663
Stainless steel pipe supports	DN 70	28653
	DN 100	28654
Flange-rubber connection	DN 80	28655
	DN 100	28656
Flange-sleeve adapter	DN 100	28657
	DN 150	28658
Closure cover (when pump is removed)		28678
Shut-off valve	DN 80	28687
	DN 100	28688
	DN 150	28689
Shut-off valve for emergency hand pump		28681
Rubber vibration dampening matt (for under *Aqualift® F*)	Single pump unit	28692
	Double pump unit	28693
Rubber inlet seal (for additional inlets into *Aqualift® F*)	DN 50	850114
	DN 70	850116
	DN 100	850117
	DN 125	850118
	DN 150	850119
Hole saw attachment for drill DN 50 - DN 150		50100
Batteries		20230
Shut-off device for single pump units	DN 100	28683
Shut-off device for double pump units	DN 100	28694

10. Replacement parts and Accessories

10.2 Replacement parts

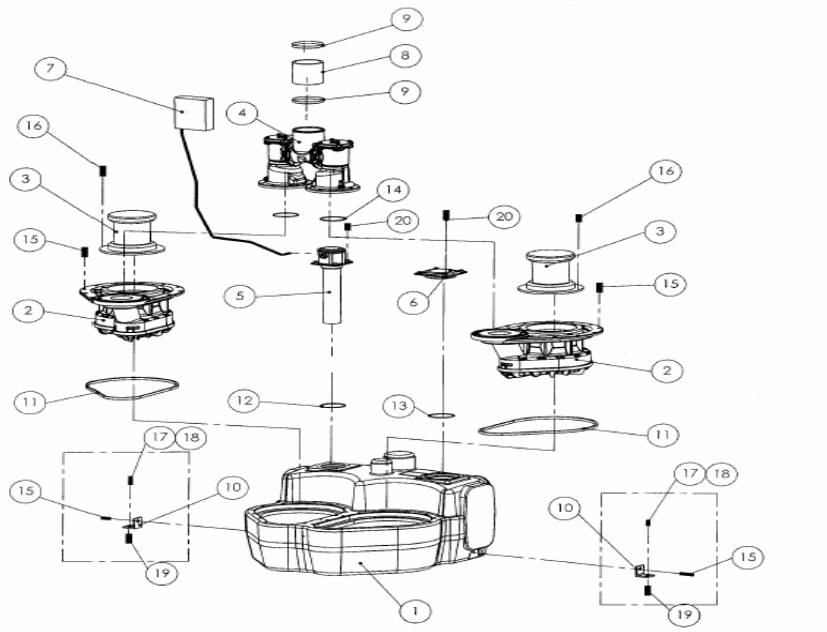
10.2.1 For single pump *Aqualift® F*



Pos.	Quantity	Oder #	Name
1	1	206-004	Chamber for single pump
2	1	206-127	Pump flange assembly (complete)
3A	1	206-129	Complete motor 1.1 KW / 400 volt
3B	1	206-128	Complete motor 2.2 KW / 400 volt
4	1	240-051	Housing for backflow flap DN 100
5	1	206-017	Complete pressure switch (for 1 pump)
6	1	206-018	Inspection port cover
7	1	206-048	Control unit (for single pump)
8	1	003-155	Rubber pipe connector D = 110 x 6 for DN 100
9	2	003-144	Connector fasteners D = 120 (for DN 100)
10	2	206-021	Floor fastener
11	1	206-042	Seal for pump flange
12	1	049-010	Seal for pressure switch
13	1	049-011	Seal for inspection port
14	1	049-005	Roll ring
15	16	206-090	PT-fastening screws
16	4	017-095	Fastening bolts
17	2	206-055	Half round wooden screws
18	2	017-114	Washers
19	2	206-051	Screw housing
20	8	206-074	PT-fastening screws
21	8	017-199	Fastening bolts M8x25
22	8	017-012	Washers

10. Replacement parts and Accessories

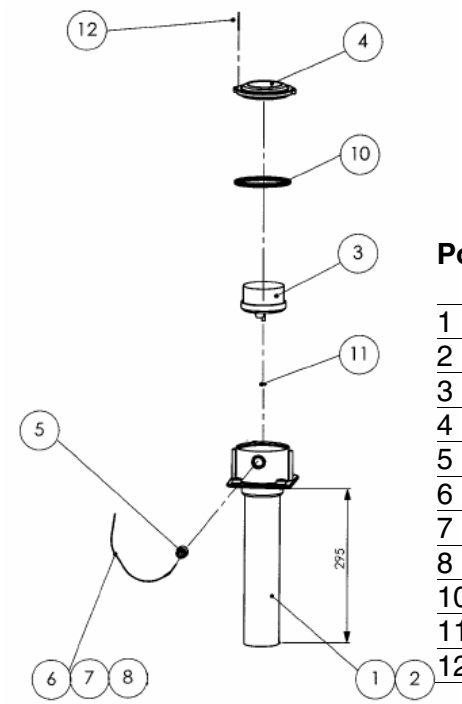
10.2.2 For double pump *Aqualift® F*



Pos.	Quantity	Order #	Name
1	1	206-005	Chamber for double pump
2	2	206-127	Pump flange assembly (complete)
3A	2	206-129	Complete motor 1.1 KW / 400 volt
3B	2	206-128	Complete motor 2.2 KW / 400 volt
4	1	240-056	Housing for twin backflow flaps (DN100)
5	1	206-022	Complete pressure switch (for 2 pumps)
6	1	206-018	Inspection port cover
7	1	206-049	Control unit (for double pump)
8	1	003-155	Rubber pipe connector D = 110 x 6 for DN 100
9	2	003-144	Connector fasteners D = 120 for DN 100)
10	2	206-021	Floor fastener
11	2	206-042	Seal for pump flange
12	1	049-010	Seal for pressure switch
13	1	049-011	Seal for inspection port
14	2	049-005	Roll ring
15	30	206-090	PT-fastening screws
16	14	017-095	Fastening bolts
17	2	206-055	Half round wooden screws
18	2	017-114	Washers
19	2	206-051	Screw housing
20	8	206-074	PT-fastening screws
21	14	017-199	Fastening bolts M8x25
22	14	017-012	Washers

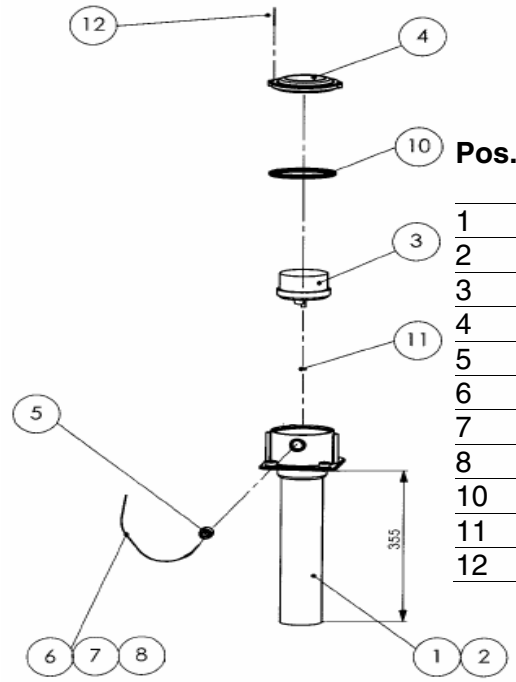
10. Replacement parts and Accessories

10.2.3 For Pressure Switch for single pump unit (Part Number 206-017)



Pos.	Quantity	Order #	Name
1	1	206-023	Hollow air holding pipe
2	1	206-008	Pressure sensor Mono
3	1	206-050	Pressure controller Mono
4	1	206-014	Cover for pressure switch
5	1	206-045	Cable nut
6	5m	206-047	Cable
7	4	099-119	Flap cap case
8	4	011-050	Lead end case
10	1	206-043	O-ring
11	1	206-053	O-ring
12	2	017-153	PT-fastening screws

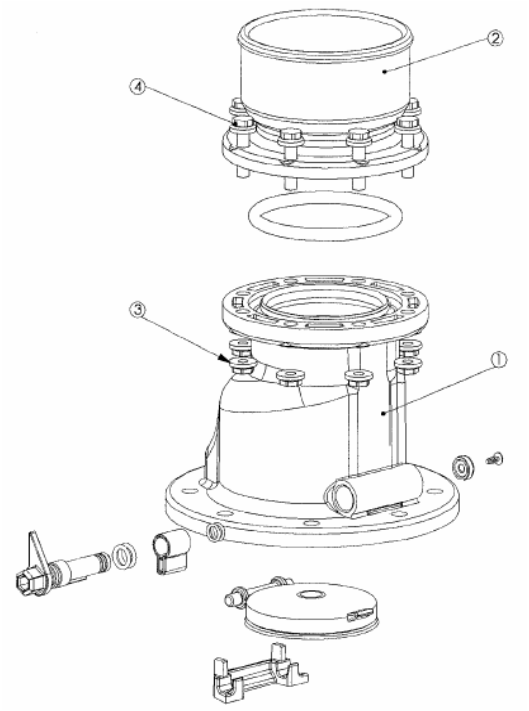
10.2.4 For Pressure Switch for double pump unit (Part Number 206-022)



Pos.	Quantity	Order #	Name
1	1	206-023	Hollow air holding pipe
2	1	206-030	Pressure sensor Duo
3	1	206-044	Pressure controller Duo
4	1	206-014	Cover for pressure switch
5	1	206-045	Cable nut
6	5m	206-047	Cable
7	6	099-119	Flap cap case
8	6	011-050	
10	1	206-043	O-ring
11	1	206-053	O-ring
12	2	017-153	PT-fastening screws

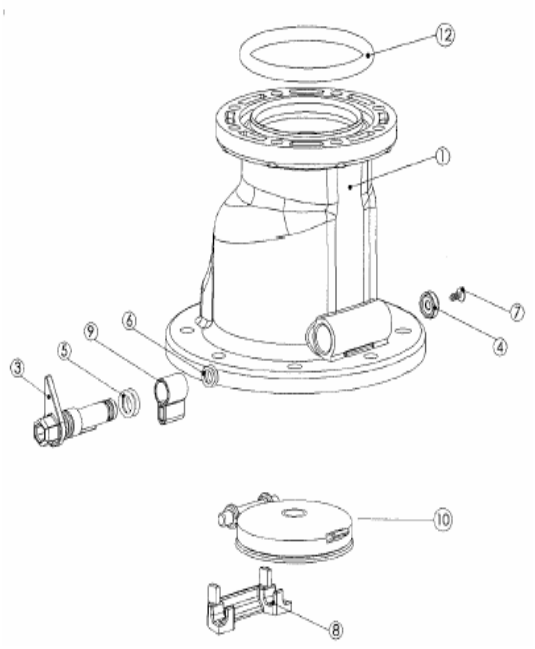
10. Replacement parts and Accessories

10.2.5 Mono - Backwater Flap Housing (Part Number 240-051)



Pos.	Quantity	Order #	Name
1	1	240-052	Housing
2	1	240-048	Outlet hose connection 110
3	8	240-039	Securing nuts M8
4	8	240-038	Securing bolts

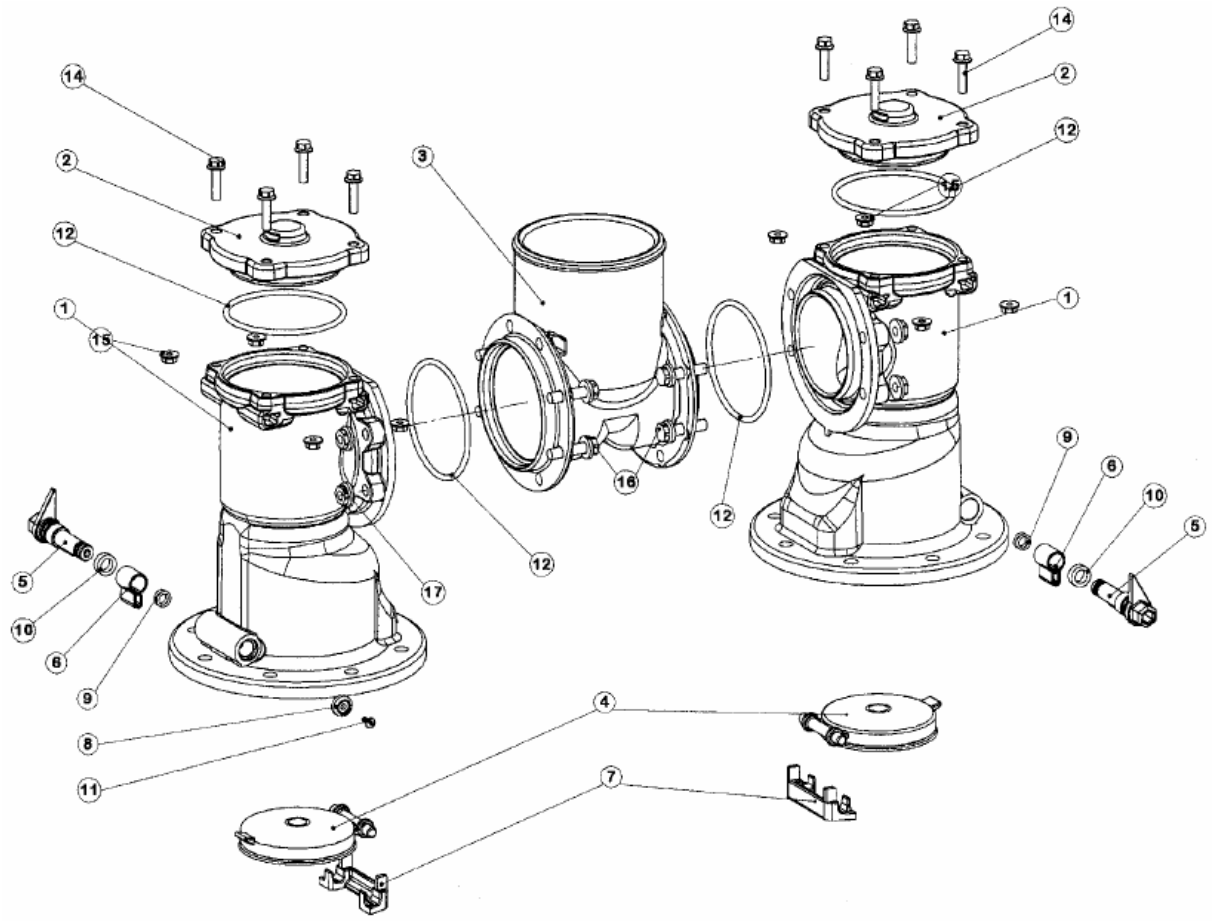
10.2.6 Backwater Flap Housing (Part Number 240-052)



Pos.	Quantity	Order #	Name
1	1	240-046	Housing
3	1	240-019	Flap lever
4	1	240-034	Lever bolt
5	2	091-017	O-ring
6	2	049-018	O-ring
7	1	134-025	PT- fastening screw
8	1	206-010	Flap holder
9	1	240-026	Flap opener
10	1	240-042	Backflow flap
12	1	240-037	O-ring

10. Replacement parts and Accessories

10.2.7 Backwater Flap Housing for double pump (Part Number 240-056)

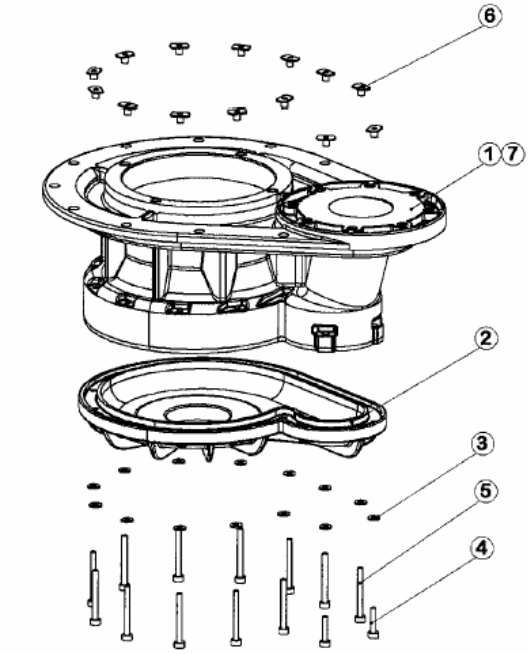


Pos.	Quantity	Order #	Name
1	2	240-007	Double backwater flap housing
2	2	240-045	Pressure cover for housing
3	1	240-009	T-connector DN 100
4	2	240-042	Backflow flap
5	2	240-019	Flap lever
6	2	240-026	Flap opener
7	2	206-010	Flap holder
8	2	240-034	Lever bolt
9	4	049-018	O-ring
10	4	091-017	O-ring
11	2	134-025	PT- fastening screw
12	4	240-027	O-ring
14	8	240-058	Fastening bolts M6
15	8	240-059	Fastening nuts M6
16	8	240-038	Fastening bolts M8
17	8	240-039	Fastening nuts M8

10. Replacement parts and Accessories

10.2.8 Pump Flange (Part Number 206-127)

Pos.	Quantity	Order #	Name
1	1	206-126	Pump flange
2	1	206-160	Lower portion pump flange
3	14	206-134	Washers
4	2	071-106	Short fastening screws
5	12	206-139	Long fastening screws
6	14	206-135	Bolts
7	12	206-052	Threaded nut



11. Guarantee

1. In the case that a KESSEL product is defective, KESSEL has the option of repairing or replacing the product. If the product remains defective after the second attempt to repair or replace the product or it is economically unfeasible to repair or replace the product, the customer the has the right to cancel the order / contract or reduce payment accordingly. KESSEL must be notified immediately in writing of defects in a product. In the case that the defect is not visible or difficult to detect, KESSEL must be notified immediately in writing of the defect as soon as it is discovered. If the product is repaired or replaced, the newly repaired or replaced product shall receive a new warranty identical to that which the original (defective) product was granted. The term defective product refers only to the product or part needing repair or replacement and not necessarily to the entire product or unit. KESSEL products are warranted for a period of 24 months. This warranty period begins on the day the product is shipped from KESSEL to its customer. The warranty only applies to newly manufactured products. Additional information can be found in section 377 and 378 of the HGB.

2. Wear and tear on a product will not be considered a defect. Problems with products resulting from improper installation, handling or maintenance will also not be considered a defect.

01.01.2002

Important contacts / Info

Type _____

KESSEL Order Number _____

Production Date _____

Project description / _____
Building services supervisor _____
Address _____
Telephone / Fax _____

Planner _____
Address _____
Telephone / Fax _____

Contracted construction company _____
Address _____
Telephone / Fax _____

Contracted plumbing company _____
Address _____
Telephone / Fax _____

Contracted electrical company _____
Address _____
Telephone / Fax _____

System operator _____
Address _____
Telephone / Fax _____

Other remarks _____

The system operator, and those responsible, were present during the commissioning of this system.

_____
Place and Date

Everything for drainage

- Backwater valves and cleanouts
- Polymer and cast iron drains
- Volatile liquid traps
- Lifting stations, pumps, warning and control units
- Rainwater management systems
- Grease separators
- Oil/fuel and coalescence separators
- Inspection chambers
- Custom projects for industrial applications