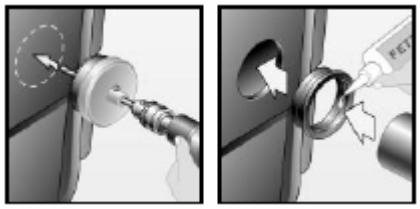
INSTALLATION AND OPERATING INSTRUCTIONS

KESSEL - *Aqualift® F* Lifting Station (230 Volt)

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

Aqualift® F Lifting Station (230 V)	Product Advantages

- Easy connection to pre-formed inlets
- Connection areas for additional inlets
- 
- Fully automated operation
- Maintenance friendly Polyethylene (PE) housing
- Certification No. Z-53.2-424
- KESSEL GmbH Z-53.2-424 LGA

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

Edition 08/2003-HG

ID number 010-605

(Subject to technical amendments)

KESSEL

Dear Customer,

Before the KESSEL - *Aqualift® F* 230 V Lifting Station is installed and placed in operation please carefully read and follow all of the instructions contained in this Installation, Maintenance and User's Manual.

Upon delivery of the lifting station please thoroughly inspect it to make sure that it has not been damaged during shipping. In case damage has occurred to the separator, please follow the instructions listed in the ‚Guarantee section of this user's manual.

The *Aqualift® F* is not to be installed or operated in an explosion endangered area.

KESSEL GmbH

Table of Contents

1. Safety Precautions		page 5
2. General	2.1 Application / Installation	page 6
	2.2 *Aqualift® F* description	page 6
3. Technical Data	3.1 Dimensions	page 7
	3.2 Pump	page 8
	3.3 Operating Volume	page 9
	3.4 Electrical control unit	page 9
4. Installation	4.1 Installation location tips	page 10
	4.2 Pipe connections	page 10
	4.3 Setting the pressure switch	page 13
5. Electrical Connections	5.1 General Notice	page 14
	5.2 Control unit installation / mounting	page 14
	5.3 Control unit cable connections	page 15
	5.4 Finishing of electrical works	page 16
6. Commissioning	6.1 Genera Instructions	page 17
	6.2 Outlet Pressure Flange	page 17
	6.3 Connecting the *Aqualift® F* to a power source	page 18
	6.4 Standard Operation	page 18
	6.5 Hand Operation	page 18
	6.6 Additional Functions	page 19
	6.7 Factory settings	page 20
	6.8 Checking the settings	page 20
	6.9 Changing the settings	page 21
7. Inspection and Maintenance	7.1 Pump Information	page 22
	7.2 Backflow Preventer Information	page 22
	7.3 Control Unit Information	page 23
8. Warnings, Failures and Shut-downs		
	8.1 General notices	page 23
	8.2 Warning and Failure displays	page 24
	8.3 Removal of Warnings and Failures	page 25
	8.4 General problems	page 26
	8.5 Illogical functioning of the level alarm switches	page 27
	8.6. What to do when…	page 28

Table of Contents

9. Control Unit	9.1 General Description	page 29
	9.2 Description of control unit display and button functions	page 29
	9.3 Connection plan	page 30
10. Replacement Parts / Accessories		
	10.1 Accessories	page 31
	10.2 Replacement parts	page 32
11. Guarantee		page 36

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).

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 . . .)

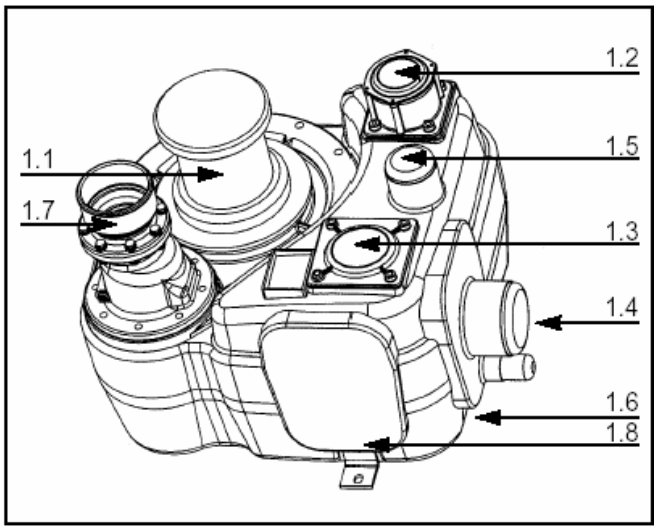
2. General

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* lifting station is run on alternating current (AC current) and consists of the following main components:



1.Polyethylene collection chamber, gas and water tight with:
- 1.1 Wastewater pump 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 9)

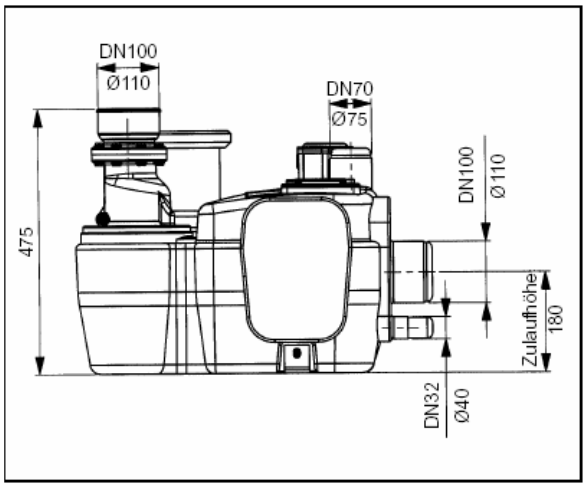
3.Accessories (without illustration)
- 3.1 Securing brackets (for secure installation with sub-surface
- 3.2 Flexible coupling for attaching DN 100 *Aqualift® F* outlet to outlet piping.

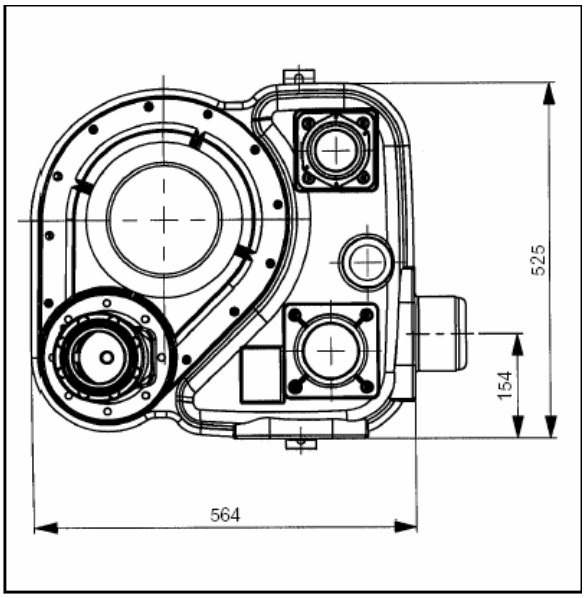
A complete list of main pump parts is illustrated in Chapter 10.

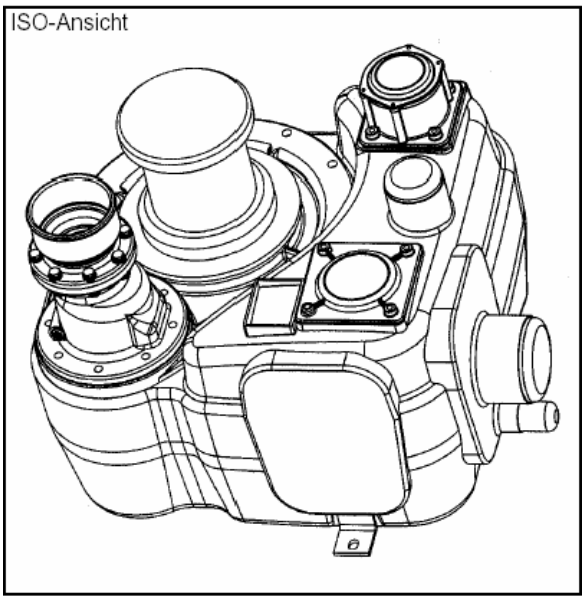
3. Technical Data

3.1 Dimensions

Dimensions of *Aqualift® F*, 1.1 kW, DN 100 outlet - Article Number 28646





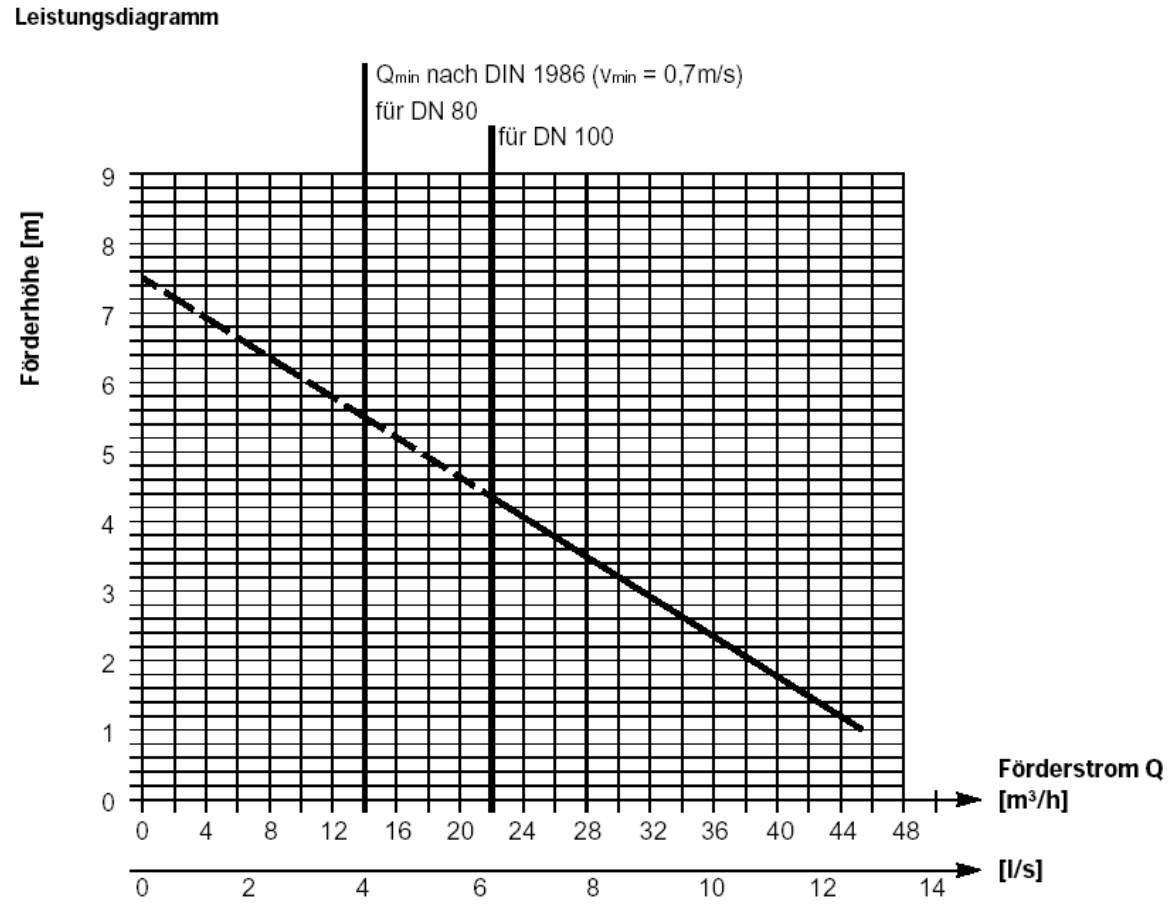


3. Technical Data

3.2 Pump

Type	230 Volt - 1.1 kW
Operating power	1.1 kW
Starting power	1.7 kW
Voltage	230 volt
Frequency	50 Hz
Operating current	7.3 Amps
Starting current	18.5 Amps
Capacitor	40 uF; 400 Volt AC DB
Fuse	10 Amp - slow blow
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 (77 Kg)
Protection	IP 68 (2 meter water head)
Operation	S3 , 60% starting period

Leistungsdiagramm = Performance curve
Förderhöhe (m) = Lifting height (meters)
Förderstrom (Q) = Flow (cubic meters / hour)



3. Technical Data

3.3 Operating Volume

As delivered, the *Aqualift® F* will pump approximately 20 litres per activation. The pumping level can be changed by setting the pneumatic switch - this will be explained in detail in Chapter 4.

3.4 Electrical Control Unit

3.4.1 General technical information

Control unit dimensions
length - 180mm, width - 200mm, depth - 70mm

Control unit weight - 1100 grams

Ambient conditions for control unit
Allowable temperature range - 0 to 40 deg C (32 to 104 deg F)
Humidity - 10 to 80 % (no condensation)
Max elevation - 2000 meters above sea level

Power consumption from electronics (without pump) - 5 VA

Protection Class - Class 1

Protection Type - IP 54 (with closed control unit cover and factory gasket)

3.4.2 Supply

Operating power
230 Volt AC 1/N/PE 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)
multi-polar main fuse switch for power to control unit

4. Installation

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

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.

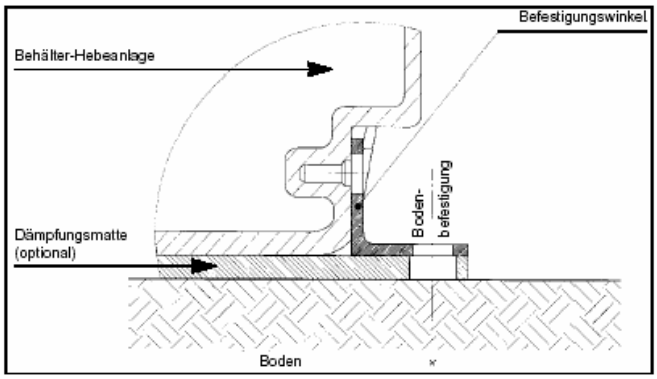
Caution: KESSEL Aqualift® *F* with single pumps weigh approximately 45 Kg (approx 100 pounds) and double pump systems weight approximately 84 Kg (approx. 185 Kg). The *Aqualift® F* units should be handled by at least two people equipped with appropriate equipments (e.g. safety shoes, back support).

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* F (during operation) it is recommended that the unit is placed on top of a rubber dampening mat (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.



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

.

4. Installation

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.)

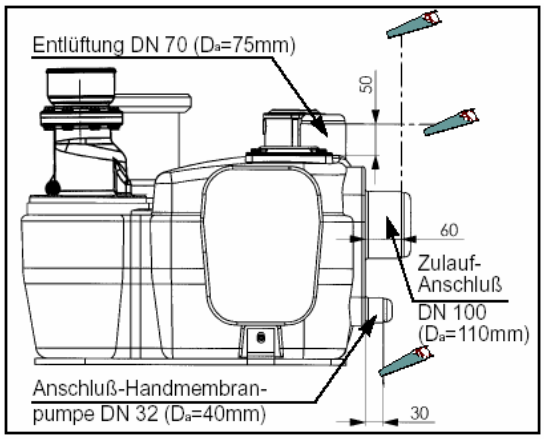


Abb. A: Einzelanlage

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

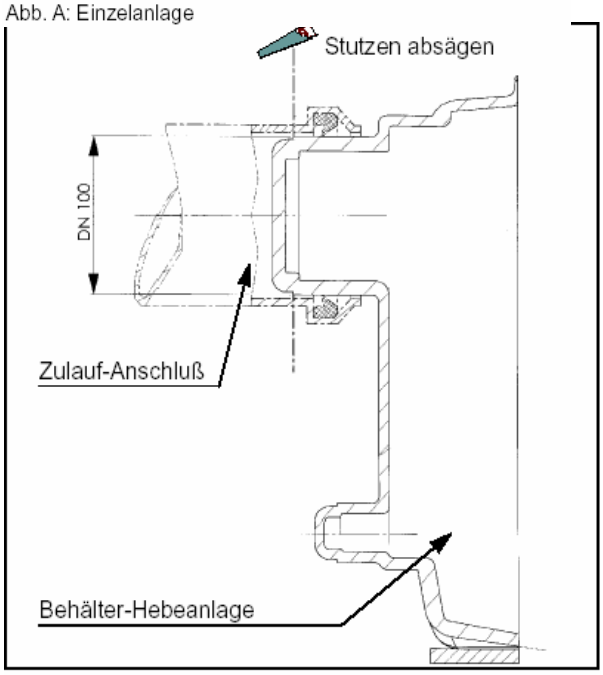


Abb. C:

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

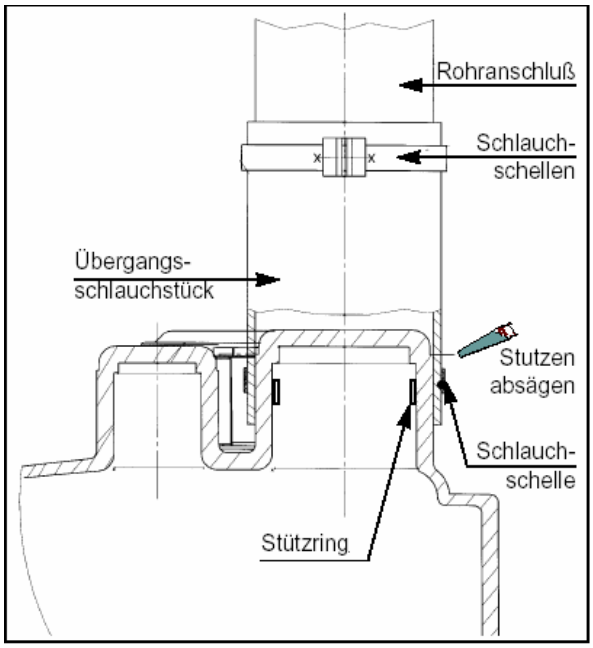
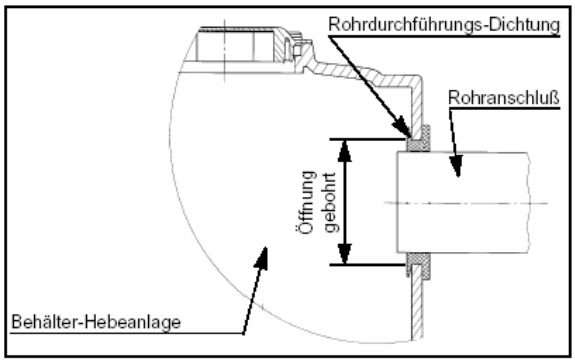


Abb. D:

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.



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

Abb. E

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*.

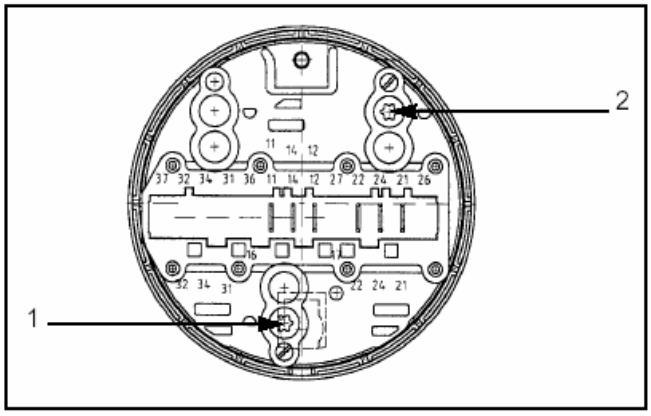
4. Installation

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.

The pressure switch is designed to monitor the wastewater level inside the *Aqualift® F* storage chamber. The wastewater levels at which the pump activates and a second level at which the alarm activates 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.



5. Electrical Connections

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

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

5.1 General Notice

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.

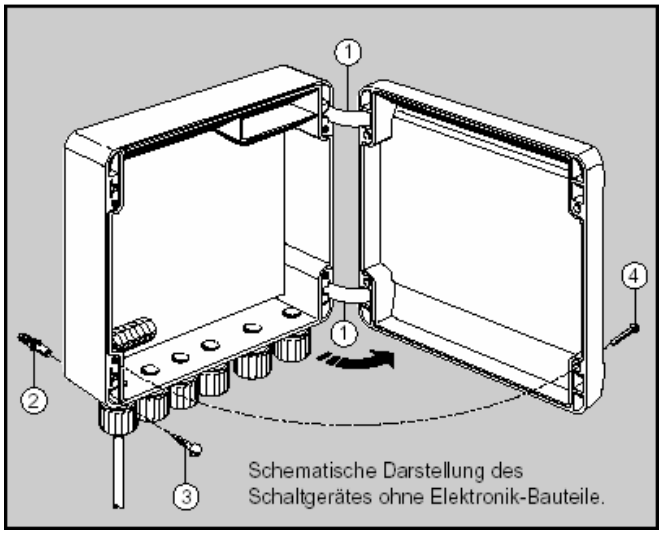
The power cables for the pump and the pressure switch should not be installed next to each other - this will prevent interference which could potentially cause false starts / alarms.

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. Place the provided plastic screw housings into the four holes, mount the control unit over the 4 holes and secure with the provided four screws.

1. Hinges (2x)
2. Plastic wall plugs (5 x 25 mm (4 x)
3. Mounting screws M3, 5x30 (4x)
4. Cover screws (4x)



Schematische Darstellung des Schaltgerätes ohne Elektronik-Bauteile.

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

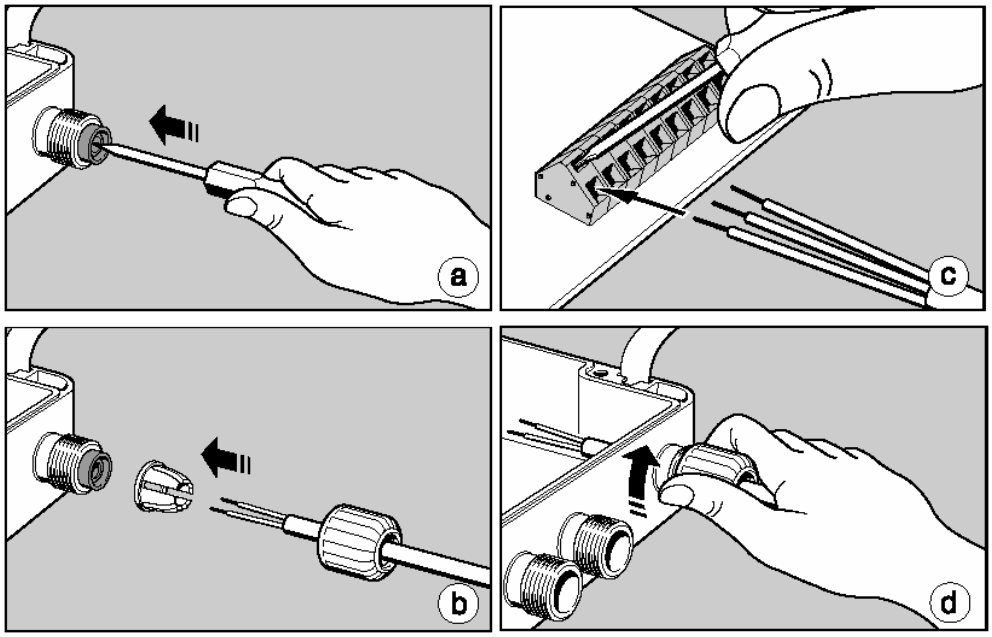
5. Electrical Connections

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.

CAUTION:
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 not be lengthened on site. 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**.



5. Electrical connections

Cable connection table for *Aqualift® F* 230 Volt (single pump) system

Connections	Description
Power Cable	The power cable must be connected to an all-polar outlet The fuse for the outlet to which the *Aqualift® F* is connected may not be over 16 Amps The length of the *Aqualift® F* power cable is 1.7 meters
Pump cables & temp cables	Cables for the pump and the temperature sensor must be connected to their corresponding marked jacks. Motor PE - Jack marked 'PE' Motor U1/Z1 - Jack marked '2' Motor U2 - Jack marked '1' Motor Z2 - Jack marked '3' Temp T1 - Jack marked '4' Temp T2 - Jack marked '5'
Pressure switch	The cables for the pressure switch should be connected to their corresponding jacks - connect the white cable to the left side and the brown cable to the right side of two jacks marked 'Ein'. For the jacks marked 'Alarm' connect the green cable to the right jack and the yellow cable to the left jack.
Potential Free Contact	The potential free relay is designed for 230 V, 2 Amp operation Power for the potential free contact must come from an external source. The potential free contact is used to notify the user of power failures, operation problems and relay failures.

5.4 Finishing of electrical works

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

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.

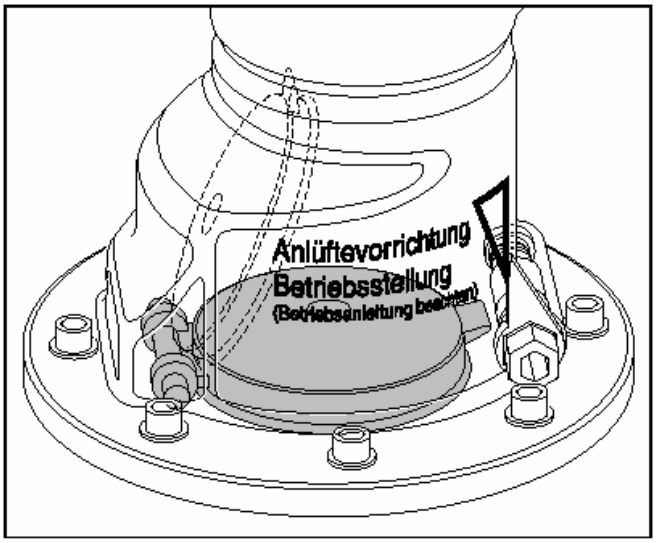
Important: The commissioning of the *Aqualift® F* must be handled by a licensed professional.

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 tightened 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).



6. Commissioning

6.3 Connecting the *Aqualift® F* to a power source.

After all electrical and mechanical connections have been properly made, the *Aqualift® F* may be connected to a live power source.
•Plug the *Aqualift® F* power chord into an appropriate outlet
•The control unit will emit a signal (approx 1 second in duration)
•LEDs on the control unit will light from top to bottom
•The pump will activate for approx 2 seconds.

If all connections have been made correctly the Aqaulift F will now be operation - the green 'Netz' LED will be lit on the control unit. If the plug-in test run was not successful, a temperature failure notice will be shown. If any other problem occurred, it will also be displayed on the control unit. If this is the case the should not be placed into operation and should immediately be removed from its power source and the problem identified (see the warning and problem table). If only a warning is displayed, the *Aqualift® F* will still be in operational status (see warning and problem table).

6.4 Standard Operation

When the 'On' or 'Alarm' level are reached inside the *Aqualift® F* the appropriate relay will close. When the wastewater level falls below the 'On' or 'Alarm' level the relay will open. The red 'Alarm' LED displays when the Alarm level has been reached and the orange 'Niveau' LED displays when the 'On' level has been reached. The orange 'Pumpe' LED displays when the pump is in activation.

The *Aqualift® F* operated by level control. Meaning that when the wastewater level inside the *Aqualift® F* reached specific level, the pump turns on after a factory set start delay. The pump will continue to run until the level falls below this specific level and the factory set stop delay has expired.

6.5 Hand Operation

During normal operation, the motor can be activated by pressing the 'Pumpe' button on the control unit regardless of the amount of wastewater inside the *Aqualift® F*. The motor will operate for a minimum of 2 seconds or however long the button is pressed.

Caution: Please note that the motor can not properly cool itself while running without water - this leads to increase wear and tear on the motor which after 5 minutes of running dry can lead to significant damage of the motor - this type of damage is easily identifiable and is not covered under any warranty.

6. Commissioning

6.6 Additional Functions

- Anti-Blocking Function

In order to keep the motor in operating condition and to keep the impeller from seezing, an automatic test run will take place for 2 seconds if the motor has not run in one week.

- Potential Free Contact

The potential free contact is used to notify power failures, warnings and problems in other areas where the *Aqualift® F* is not located.

- Under power conditions

When the control unit senses an under power condition (for example when the motor dry runs):

•The control unit will display visually and acoustically the problem.
•The pump will not longer receive power from the control unit.
•The control unit will show an operation failure and shut down the system.

- Over power conditions

In order to prevent damage to the pump due to over power conditions (for example impeller blockages) the pump will automatically shit itself off when it detects this condition. In an attempt to remove the blockage, the pump will automatically turn itself on three times. This will happen in the following order:

1. Control unit detects over power (over load)
2. Control unit turns off the pump
3. No over load warning will be displayed
4. The control unit waits three seconds plus the start delay time period.
5. The pump will turn on (first of the three start attempts)
6. Control unit checks to see if the blockage has been removed and the pump runs free.

At this point, if the control unit detects again an over load (blockage) the same procedure will be repeated a second and if necessary a third time. If the second or third attempt is successful, the pump will return to normal operation.

After an unsuccessful third attempt an overload failure will be audibly and visually displayed on the control unit. The control unit will then shut down the *Aqualift® F* system until the blockage / problem has been fixed.

6. Commissioning

6.7 Factory settings

	Increment	1	2	3	4	5	6	7	Factory setting	Your personal setting
1. Setting	Start delay	0	0.2	0.4	0.6	0.8	1.0	1.2	0.2 seconds	
2. Setting	Stop delay (for level control)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	1.0 seconds	
	Running time (for run time control)	3	4	5	6	7	8	10	none	
3. Setting	Max running time (for level control)	10	20	30	40	60	90	120	30 minutes	
	Running time multiplication factor for 3. Setting (for run time control)	10	20	30	40	60	90	120	none	
4. Setting	Unit type A = level control B = run time control with interruption C = run time control without interruption	A	B	C	/	/	/	/	A	

6.8 Checking the settings

The setting can only be checked when the control unit is currently not displaying any warnings or problems and when the pump is not running (both float switches are in the 'off' position) and only the green 'Netz' LED is lit.

The setting can be checked by pressing the 'Alarm' and the 'Pumpe' buttons on the control unit. Use the table below to determine which of the four setting the *Aqualift® F* is currently set to.

	Setting 1	Setting 2	Setting 3	Setting 4
Lit LEDs are in BOLD letters (with grey background)	**Netz**	**Netz**	**Netz**	**Netz**
	Alarm	**Alarm**	**Alarm**	**Alarm**
	Niveau	Niveau	**Niveau**	**Niveau**
	Pumpe	Pumpe	Pumpe	**Pumpe**

6. Commissioning

In order to enter the setting mode to change between settings 1, 2, 3 or 4 the 'Alarm' and the 'Pumpe' buttons on the control unit must be pressed at the same time. An audible beep will be heard and the LED 'Netz' will light. Release the two buttons on the control unit. The audible beep will now be off. The current setting can now be determined by LEDs on the control unit and the above table. In order to advance to the next setting all of the above listed steps must be re-done. In order to leave this setting mode and return the *Aqualift® F* to normal operation - press the 'Pumpe' button until a confirmation beep is heard. The *Aqualift® F* is now back to standard operation. If the 'Pumpe' button is not pressed within 20 seconds the *Aqualift® F* will return automatically to normal operation - this will be confirmed by a beep.

6.9 Changing the settings

Step	1	2	3	4	5	6	7
Lit LEDs are in BOLD letters with grey background	**Netz**	**Netz**	Netz	Netz	Netz	Netz	Netz
	Alarm	**Alarm**	**Alarm**	**Alarm**	Alarm	Alarm	Alarm
	Niveau	Niveau	Niveau	**Niveau**	**Niveau**	Niveau	Niveau
	Pumpe	Pumpe	Pumpe	Pumpe	Pumpe	**Pumpe**	**Pumpe**

In order to change between steps 1, 2, 3, 4, 5 ,6 or 7 the 'Alarm' and the 'Pumpe' buttons on the control unit must be pressed at the same time. An audible beep will be heard and the LED 'Netz' will light. Release the two buttons on the control unit. The audible beep will now be off. The current setting can now be determined by LEDs on the control unit and the above table. To change between the 7 settings press the 'Alarm' button - this will advance to the next step. The current step can be determing by observing the current LEDs lit on the control unit and comparing them with the above table. After the appropriate setting has been reached it can be entered by pressing the 'Pumpe' button until a confirmation beep is heard. If the new setting is not confirmed within 20 seconds the control unit will return automatically to normal operations - all unconfirmed settings will be lost. The new setting has now been set and the *Aqualift® F* is back in normal operation. In order to change the steps in setting 2, 3 or 4 - the above listed procedure must be repeated.
In the case of a complete power failure - all confirmed settings will remain in the *Aqualift® F* 's memory.

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.

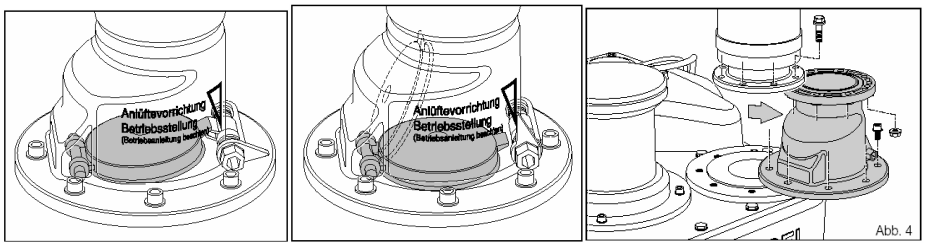


Abb. 4

7. Inspection and Maintenance

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. Warnings, Failures and Shut-Downs

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

8.1 General notices

Warnings are used to inform the user of current pump conditions without interfering with the operation of the pump.

Failures are used to prevent damage to the *Aqualift® F* system and must be inspected and repaired by licensed professionals to bring the *Aqualift® F* back into operation. A list of standard warnings and failures which frequently occur are listed later in Chapter 8. These listings often provide quick diagnosis of a problem and information on how the problem should be repaired.

Cancelling of audible alarms

Warnings and Failures are notified from the control unit by an audible alarm. This audible alarm can be turned off by quickly pressing the 'Alarm' button on the control unit - the LED display of the problem will remain.

Attention: The audible alarm cannot be turned off by pressing the 'Alarm' button when a relay problem or failure exists. The only way to stop the alarm during a relay problem is to unplug the control unit.

Cancelling of warning notices

In order to cancel a warning notice, first the audible alarm must be turned off and the cause of the warning must be corrected - after this has been accomplished the 'Alarm' button must be pressed for an extended period of time. The system is now back to standard operation.

Cancelling of failure notices

In order to cancel a failure notice, first the audible alarm must be turned off and the cause of the failure must be corrected - after this has been accomplished the 'Alarm' button must be pressed for an extended period of time. The system is now back to standard operation.

Attention:

- **A warming or failure caused by the temperature sensors cannot be manually corrected. This will correct itself automatically if and when the temperature sensors have sensed standard operating temperatures and bring the *Aqualift® F* back on line.**
- **A relay failure can also not be cancelled using the control unit. After a relay failure it should be assumed that the system no longer functions. The only way to cancel a failure warning is to unplug the control unit.**

Display of last warning or last failure notice

The last warning or failure is always saved in the control unit's memory and can be recalled in the future if desired. Prerequisites for recalling a past warning / failure are

- The warning or failure was originally cancelled
- Both the float switches are not in 'on' mode, the pump is not in activation, and only the green 'Netz' LED is lit on the control unit.

In order to recall the last warning or failure notice, press the 'Alarm' button for more than 5 seconds - this will shut off all 4 of the control unit's LEDs. The last warning or failure will then be displayed in coded LED form for approximately 5 seconds. The *Aqualift® F* then automatically returns to standard operation mode.

8. Warnings, Failures and Shut-Downs

8.2 Warning and Failure displays

Display	Problem cause	Result	Problem solved	Display code for last warning / failure
Warning				
“Alarm” LED blinks	Max. running time exceeded during level control		“Alarm” LED blinks	“Netz” and “Alarm” LED blinks
	Max. running time exceeeded during run time control		“Alarm” LED blinks	“Alarm” LED blinks
“Alarm” LED on	Alarm level exceeded		“Alarm” LED blinks	“Netz” LED blinks
	Level failure		“Alarm” LED blinks	“Niveau” LED blinks
Failure				
Alarm “LED” on “Niveau” and “Pumpe” blinking	Temperature shut down	**Interruption**	After cool down, all systems return **automatically** to operation	“Alarm” and “Pumpe” LEDs blinking
“Alarm” LED on, “Pumpe” LED blinking	Underload	**Stoppage** Control displays failure and pump remains off	After confirming the underload, system returns to normal operation	“Netz”, “Alarm”, and “Pumpe” LEDS blinking
	Overload	**Stoppage** Pump remains Off, control unit must be unplugged	After confirming the underload, system returns to normal operation	“Niveau” and “Pumpe” LEDS blinking
All LEDS blinking	Relay	**Stoppage Pump remains off, control unit must be unplugged**	After plugging in control unit system returns to normal operation	“Netz”, “Niveau” and “Pumpe” LEDs blinking

8. Warnings, Failures and Shut-Downs

8.3 Removal of Warnings and Failures

	Description	Audible Alarm	Potential free contact	Correction Tips
Warning				
Max. running time exceeded (level control)	The set running time is exceeded (too much incoming water, poor pump performance, level failure)	activates	no change	Check – inlets float switch, pressure outlet
Max. running time exceeded (run time control)	The number of running times is exceeded (too much incoming water, poor pump performance, level failure)	activates	no change	Check – inlets float switch, pressure outlet
Alarm level exceeded	The Alarm level is exceeded (too much incoming water, poor pump performance, level failure)	activates	activates	Check – inlets float switch, pressure outlet
Level failure	The control unit detects an illogical float switch set up (ex. Alarm level is on, the pump start level is off	activates	activates	Check float switch
Failure				
Temperature failure	The temperature sensor in the motor detects too high temps	activates	activates	After the motor has cooled and the sensor senses normal temps, the failure will automatically be deleted and the system brought back on-line
Underload failure	The control unit detects under load (pump running dry)	activates	activates	Ventilation hole blocked or pump is intaking air
Overload failure	The third automatic restart attempt was unsuccesful (Pump / impeller is blocked)	activates	activates	Check for free rotatation of impeller. Check for blockages in impeller and pump housing
Relay failure	The control unit senses motor power even though the motor is off. Relays fuse together. *Aqualift® F* is not longer operational	activates	activates	**Control unit must be unplugged**

8. Warnings, Failures and Shut-Downs

8.4 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
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

8.5 Illogical functioning of the level / alarm switches

The control unit continuously monitors the position of both the level switch and the alarm switch. A proper, chronological operation of the switches is as follows:

- On level is exceeded
  - •On level switch activates
  - •Pump is turned on
- Wastewater below on level
  - •On level switch de-activated
  - •Pump is turned off

OR

- On level is exceeded
  - •On level switch activates
  - •Pump is turned on
- Alarm level is exceeded

  - Alarm level switch activates
  - Alarm sounds
  - Pump remains turned on

- Wastewater below alarm level
  - Alarm level switch de-activates
  - Pump remains turned on

- Wastewater below on level
  - On level switch de-activated
  - Pump is turned off

The control unit is able to detect when the float switch send illogical message to the control unit. For example:

- the Alarm level has been reached without the Pump On Level ever being reached - this will produce a Warning level failure. The pump will continue to run until the wastewater level falls below the Alarm level. If the Pump On Level has also been reached then the pump will continue to run until the wastewater level has fallen below the Pump On level.
- The Pump On Level is continuously on. The pump will continue to run until the wastewater has fallen below the Pump On level. If the pump continues to run it will eventually either display that Maximum Run Time has been exceeded for the may operating temperature will be exceeded which will turn the pump off.
- The Pump On Level is activated and the Alarm Level is continuously on. The control unit will immediately display the warning that the alarm level has been exceeded. The pump will continue to operate until the wastewater level falls below the Pump On level or until the max pump temperature has been reached which will turn off the pump. The Maximum Run Time warning will not be displayed in this case because the Alarm Level warning has a higher priority.

The control unit cannot detect the following float switch failures:

- For whatever reason the Alarm level switch will not activate - The control unit is tricked and thinks that the wastewater level never reaches the Alarm level.
- For whatever reason the Pump On level switch never turns off - The control unit is tricked and things that the wastewater level never falls below the Pump On level.

Illogical float switch problems can be cause by the following:

- a technical defect
- a short circuit or interruption of the float switch cables
- improper connection of the float switch cables to the control unit.

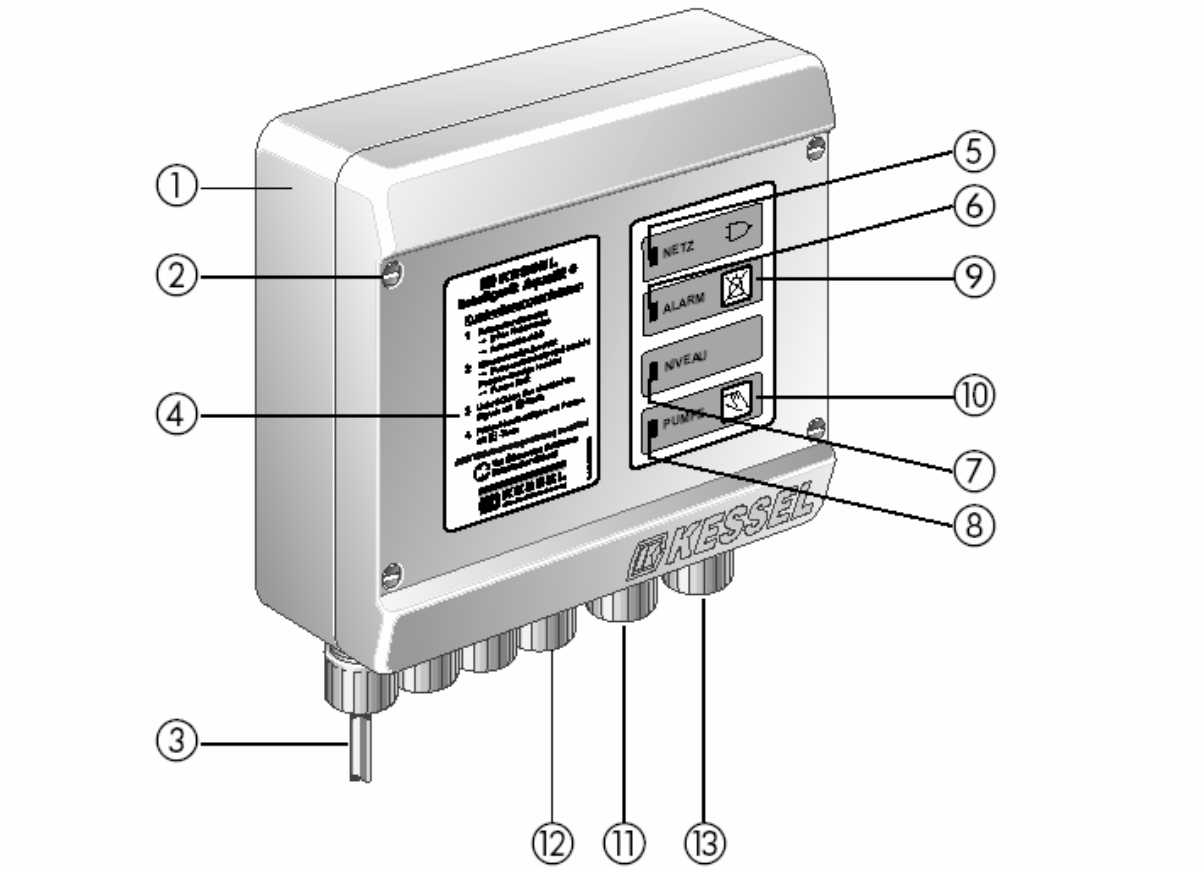
8.6 What to do when . . .

When a problem occurs that is not described in this User's Manuals - please contact a licensed professional

When the control unit does not react to the pressing of any of the buttons on the control unit - please unplug the control unit for at least 10 seconds (make sure that no water is entering the *Aqualift® F* at this time). Plug the control unit back in and check that the button function properly. If the buttons still do not react when pressed, please contact a licensed professional.

9. Control unit

9.1 General Description



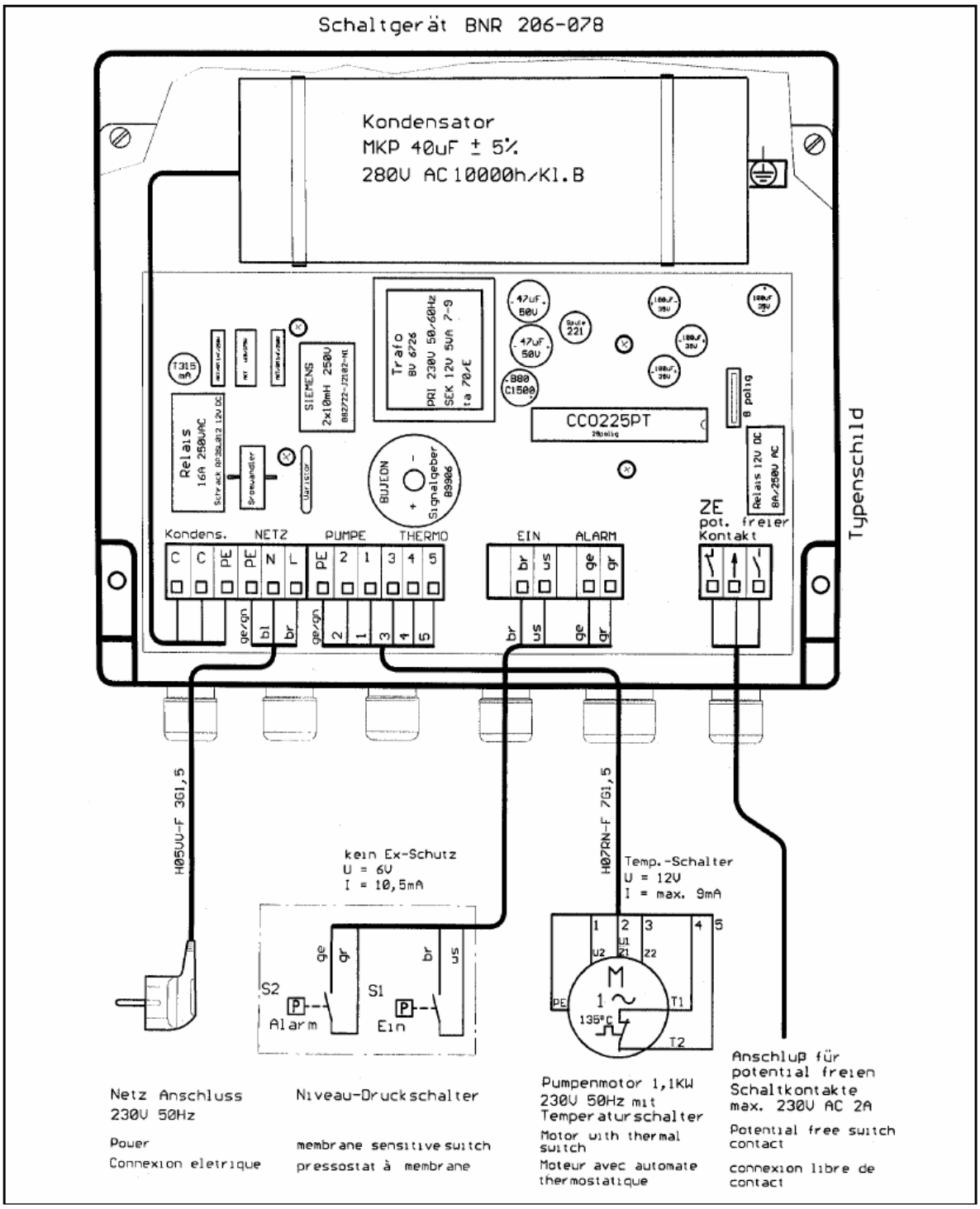
1. Control housing
2. Screws for control unit cover
3. Power cable
4. Abbreviated operation instructions
5. 'Netz' LED - Green (Power LED)
6. 'Alarm' LED - Red (Alarm LED)
7. 'Niveau' LED - Orange (Level LED)
8. 'Pumpe' LED - Orange (Pump LED)
9. Alarm button
10. Connection for Pump cables
11. Connection for Pressure switch
12. Connection for Potential Free Contact

9.2 Description of control unit display and button functions

Display			
Normal operation	'Net's	green	Unit receiving power
	'Alarm'	red	Alarm level exceeded
	'niveau'	orange	Pump on level exceeded
	'Pumpe'	orange	Pump is operating
Control unit buttons for entering settings			
	'Alarm' button		Used to turn off audible alarm to confirm warnings and failures to change and confirm settings
	'Pumpe' button		to manually start pump to change and confirm settings

9. Control unit

9.3Connection plan



Stand der Zeichnung 12/99

10. Accessories and Replacement parts

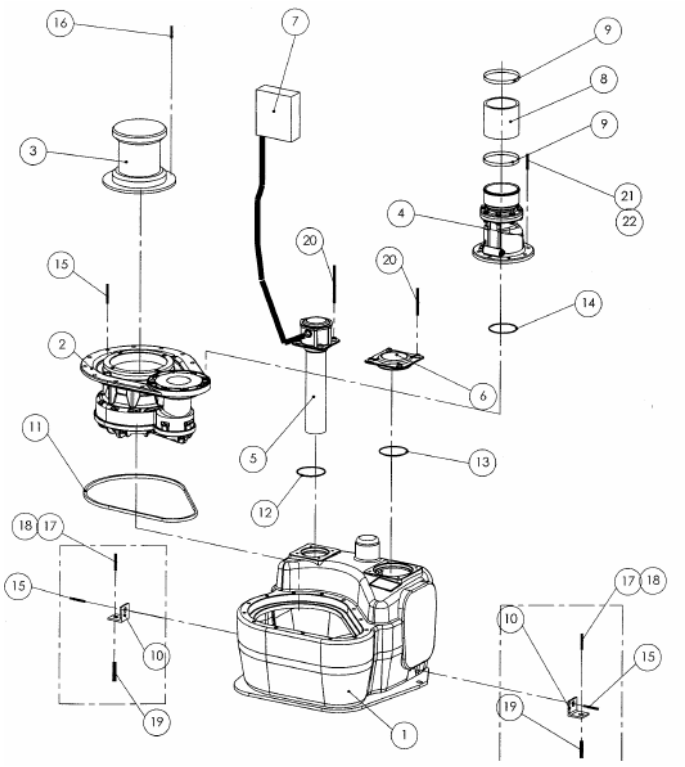
10.1 Accessories

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

10. Accessories and Replacement parts

10.2 Replacement parts

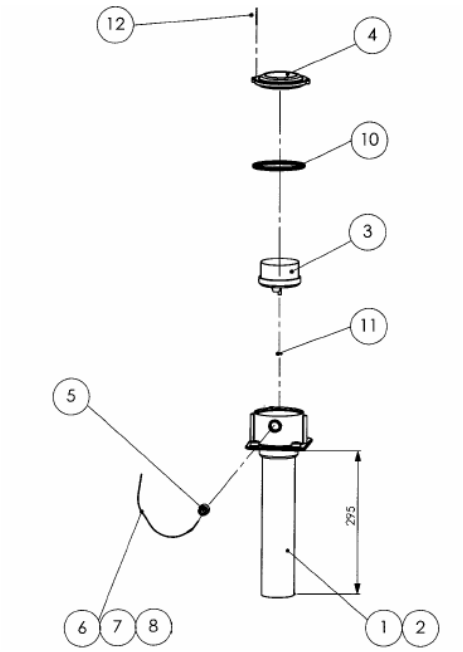
10.2.1 Replacement parts for entire *Aqualift® F*



Position	Quantity	Order Number	Name
1	1	206-004	Chamber for single pump
2	1	206-161	Pump flange
3	1	206-162	Complete motor 1.1 KW / 230 volt
4	1	240-051	Housing for backflow flap
5	1	206-017	Complete pressure switch (for 1 pump)
6	1	206-018	Inspection port cover
7	1	206-091	Control unit (for single pump)
8	1	003-155	Rubber pipe connector
9	2	003-144	Connector fasteners (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	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	Fastening screws
21	8	017-199	Fastening bolts
22	8	017-012	Washers

10. Accessories and Replacement Parts

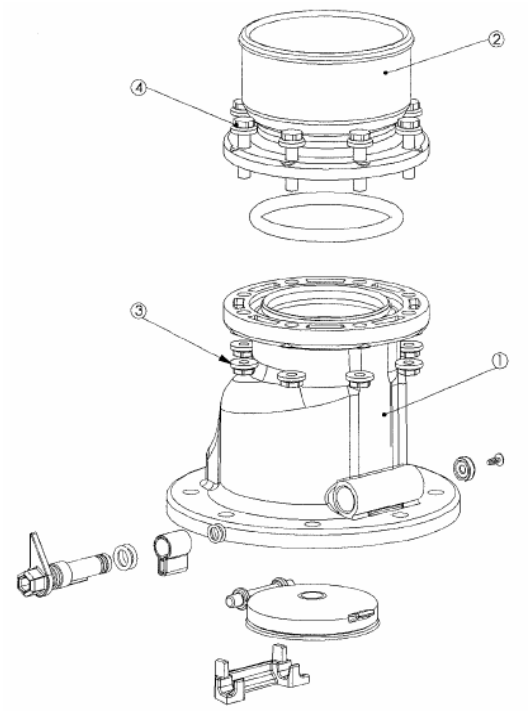
10.2.2 For Pressure Switch (Part Number 206-017)



Position	Quantity	Order Number	Name
1	1	206-023	Hollow air holding pipe
2	1	206-008	Pressure sensor
3	1	206-050	Pressure controller
4	1	206-014	Cover for pressure switch
5	1	205-084	Cable nut
6	5 meters	206-047	Pressure switch cable
7	1	206-043	O-ring
8	1	206-053	O-ring
9	2	017-153	Fastening screws

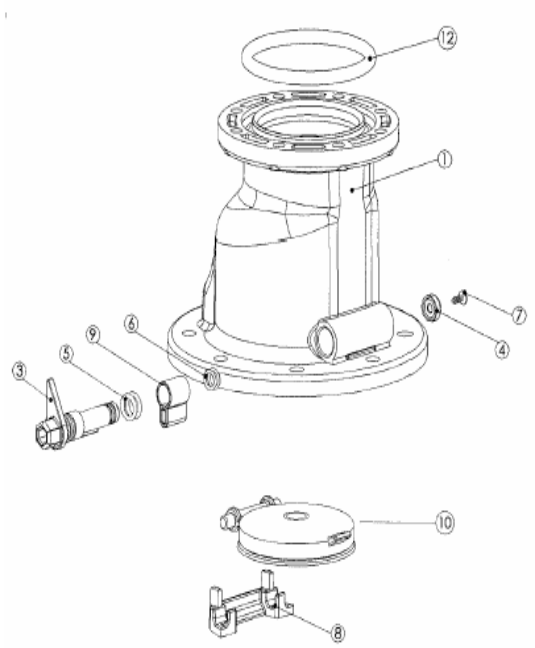
10. Accessories and Replacements Parts

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



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

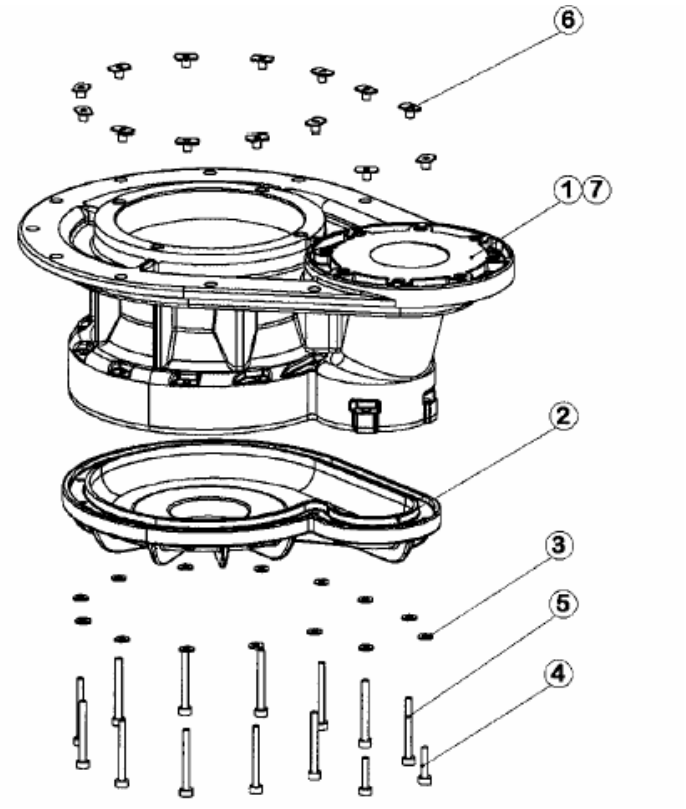
10.2.4 Backwater Flap Housing (Part Number 240-052)



Pos.	Quantity	Order N.	Name
1	1	240-046	Flap 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. Accessories and Replacement Parts

10.2.5 Pump Flange (Part Number 206-127)



Position	Quantity	Order Number	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

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

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