

2. Safety

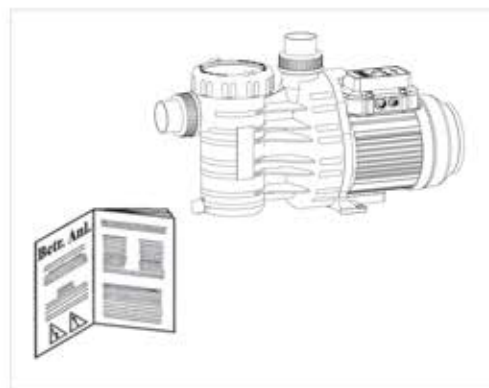
Possible user errors

- Installation of the pump with the pipes under tension.
- Operation of the pump outside the area of application as specified on the datasheet e.g. excessive system pressure.
- Opening and servicing of the pump by unqualified persons.

This user guide contains basic instructions that must be followed during installation, start-up, operation and maintenance of the pump. The safety instructions must be observed.

Therefore, this manual must be carefully read before installation and should be available at the installation site at all times. The manual **must** always be available to the personnel in charge.

This pump is not intended for use by persons (including children) with limited physical, sensory or mental capabilities or who lack experience and/or knowledge unless they are supervised by a person responsible for their safety or are provided with instructions on how to use the pump from them. Children must be supervised at all times to ensure that they never play with the unit.



Safety Symbols



Warning – Voltage



Danger – for safety warnings which, when ignored, may constitute a hazard for the machine and/or for persons.



Caution

Residual risks

Rotating parts

Risk of crushing or shearing from exposed rotating parts.

- Do not perform any work on the pump unless the power is shut down.
- Before starting work, make sure the pump cannot inadvertently be switched on again.
- Directly after finishing work, refit/reactivate all protective devices

In the case of AK version pumps the rotating pump shaft can trap hair, jewellery and items of clothing.

- When in the vicinity of a running AK version pump:
 - Wear close-fitting clothing.
 - Wear a hairnet.
 - Do not wear jewellery.

Electricity

When working on the electrical unit, there is an increased risk of electrocution due to the damp surroundings.

Incorrectly installed protective conductors can also lead to electrocution for e.g. as a result of oxidation or cable breakage.

- Make sure that the swimming pool and its surrounding protective zone are installed, commissioned and operated in accordance with the relevant local regulations.
- Before working on the electrical system, take the following precautions:
 - Disconnect the system from the electrical power supply.
 - Attach a warning sign: "Do not switch on! Work in progress on the system."
 - Be aware of the discharge time for the condenser: wait minimum 15 minutes after disconnecting the power supply and before starting work on the system.
 - Check the absence of voltage.
- Regularly check that the electrical system is in proper working order.

Hot surfaces

Risk of burns - the electric motor can reach temperatures of up to 70 °C.

- Do not touch the motor while it is running.
- Let the motor cool down before working on the pump.

Caution

3. General

Please take the necessary precautions when transporting the pump. During transportation, avoid intermediate storage in a damp location or locations subject to significant temperature fluctuations. The splash pumps have been designed for the circulation of swimming pool water.

Most plastic components that come into contact with the pumping medium are made of reinforced polypropylene (PP) and thus are highly resistant to corrosion by pool water. The water temperature must not exceed 60 °C.

Non-compliance with our installation and operating instructions will void any warranty.

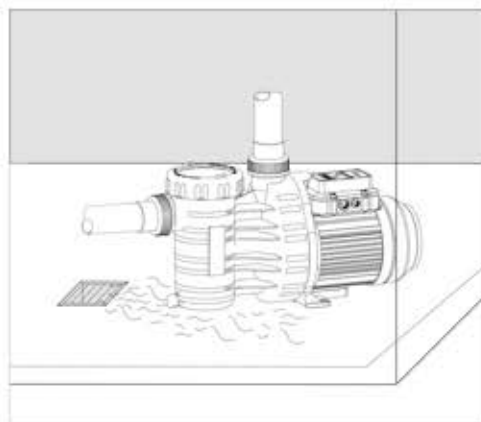
4. Installation

Caution

The installation site of the pump must be dry and well ventilated. When installed in a closed room, a drainage connected to the sewers must be installed.

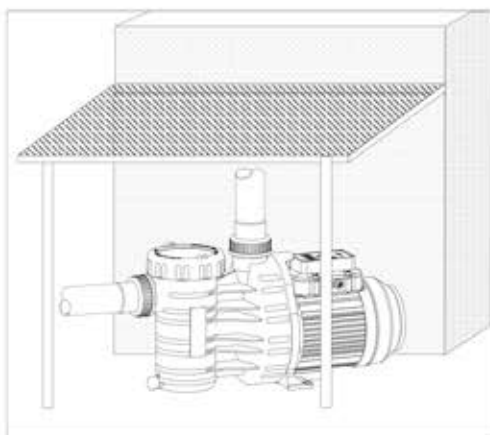
The size of the floor drain depends mainly on the size of the swimming pool and the circulation flow rate but also on possible leaks within the pool water circulation system.

The ambient temperature must not exceed 40 °C.



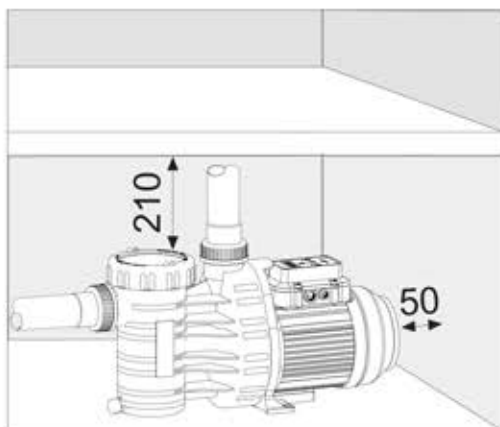
Caution

When the pump is installed outside, we recommend providing simple protection against the weather (rain, sun etc.).

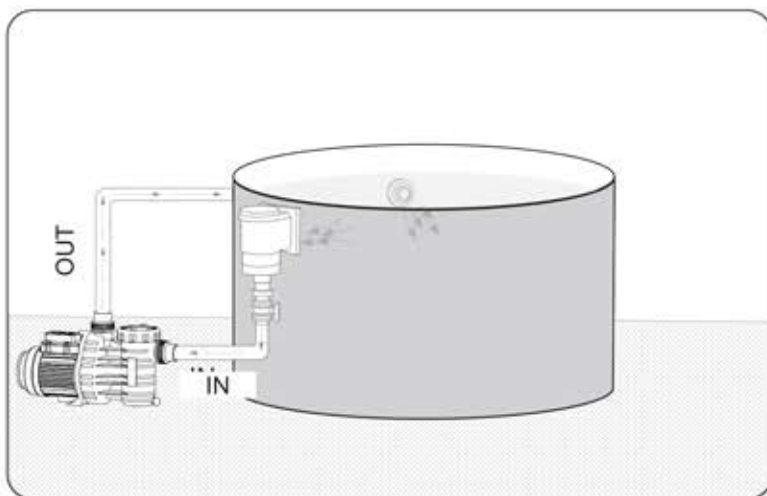


Caution

Implement appropriate measures to attenuate the noise generated by the pump to avoid damage to the environment. Fastening the pump to the foundation should be effected exclusively by means of bolts, threads or dowels, in order to avoid blocking the removal of the motor unit! Make sure that there is enough space between the fan cover and the wall, minimum 50 mm. You also need enough space to permit disassembly of the strainer basket, minimum 210 mm above.



The pump should be installed at water level or below water level and in a horizontal position, in order to keep the suction path as short as possible and to reduce head loss. The Aqua Vario Plus is self-priming and should never be installed more than 2 m above water level. Make sure that the suction line is not leaky, otherwise the pumps will prime insufficiently or not at all. We recommend the installation of check valves and shut-off valves, according to the type of pump or plant. The adhesive bonds at the suction and pressure lines require more time to cure, allow at least 12 hours before starting the pump.



5. Electrical Connection



All electrical connections should be performed by a qualified expert only!

Make sure all parts are free of tension before doing any maintenance work or electrical work.

The use of pumps for swimming pools and the restricted area around them is only permitted if pumps are installed in accordance with DIN/VDE 0100 part 702. The supply circuit has to be protected by a fault current contactor with a nominal fault current of $I_{AN} \leq 30 \text{ mA}$.

Please make sure that the electrical installation has a disconnecting device which allows disconnection from the power supply with a minimum of 3 mm contact gap at each pole.

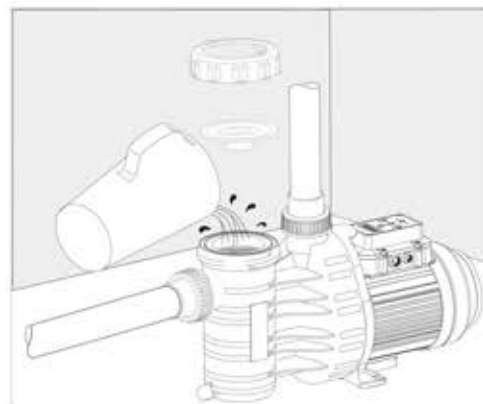
In accordance with norm requirements an electrical cable type H05RN-F or H07RN-F must be used.

Please ensure that the diameter of the electrical cable used adequately accommodates the power of the motor and the length of the cable. Pumps with single-phase motors are equipped with a built-in overload switch.

6. Initial start-up

Caution

Unscrew the ring nut and lift off the transparent lid. Slowly fill the pump with clean water until the water level reaches the inlet connection. Replace the transparent lid and tighten the ring nut by hand. **Never operate the pump without water even when checking the rotation direction of the motor!** Ensure that all valves in the suction and pressure lines are completely open. Before initial start-up and after extended periods of downtime make sure the pump shaft turns freely.



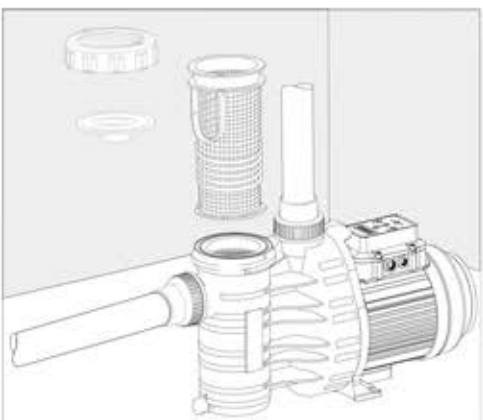
7. Maintenance

Caution

Before carrying out any maintenance work, the electricity supply to the pump must be switched off. Close the shut-off valves on the suction and on the pressure lines.

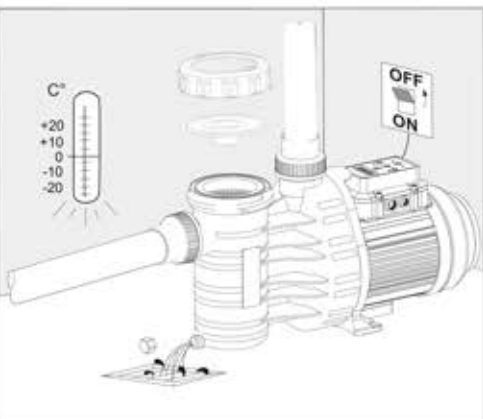
The strainer basket must be emptied periodically. A clogged strainer basket will reduce the flow rate of the pump and lead to insufficient filtration. The pump is to be thoroughly drained and cleaned after extended periods of storage or downtime.

Do not add water treatment agents, particularly agents in tablet form, into the strainer basket!



Caution

If there is danger of freezing during prolonged periods, the pump must be drained ahead of time. To do this open the drain plug in order to drain off all liquid. Drain all pipes subject to freezing. **Before doing any maintenance work, disconnect the pump from the power supply.**



8. Repairs

Repairs are only to be done by an authorized service center.

9. Recommendations

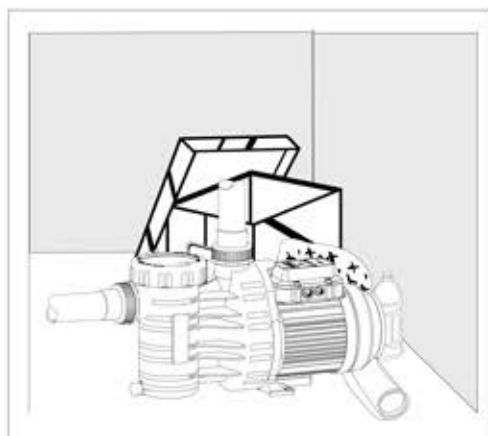
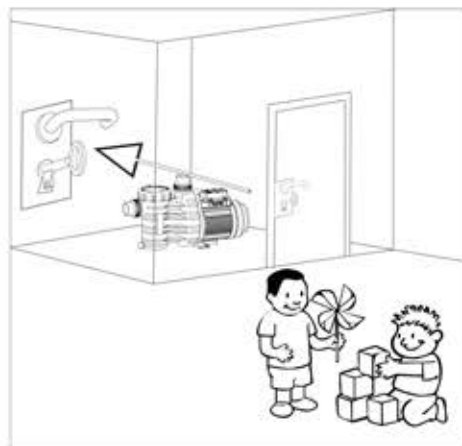
Caution



Only install the pump in a lockable room, out of the reach of children.

Ensure the motor's cooling. The installation site must be dry and well ventilated.

Never obstruct the air supply to the fan by putting any objects on the pump or too close to the pump.



10. Technical data

Technical data at 50 Hz	AQUA VARIO PLUS	
	min. 1000 min ⁻¹	max. 2850 min ⁻¹
Inlet / outlet d (mm)	50 / 50	
Rec. inlet / outlet pipe, PVC-pipe, d	50 / 40	
max. L (mm)	532	
Power input P ₁ (kW) 1~ 230 V	0.07	0.65
Power output P ₂ (kW) 1~ 230 V	0.03	0.45
Rated current (A) 1~ 230 V	0.6	3
Lpa (1m) / dB(A)	45.1	63.9
Lwa / dB(A)	53.0	72.0

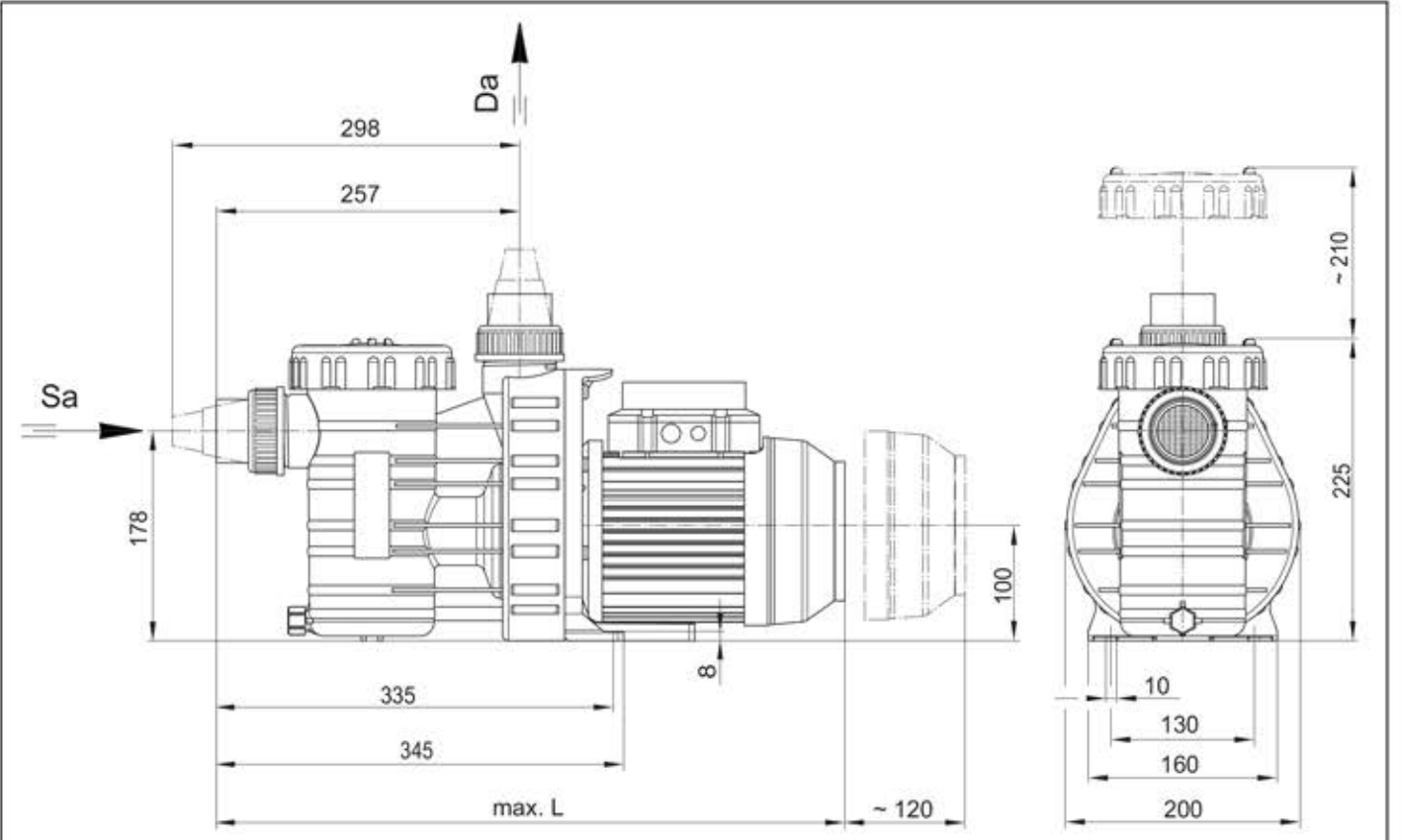
Type of motor enclosure	IP 55	For standard voltage according to DIN IEC 60038 and
Thermal class	B	DIN EN 60034 (Euro-voltage).
Water temperature	40 (60)*	Suitable for continuous operation at 1~ 220 - 240 V
Max. casing interior pressure (bar)	2.5	Tolerance ± 5%
Weight (kg)	6.4	¹⁾ Measured with a phonometer according to DIN 45635.

* Explanation of water temperature 40 (60) °C:

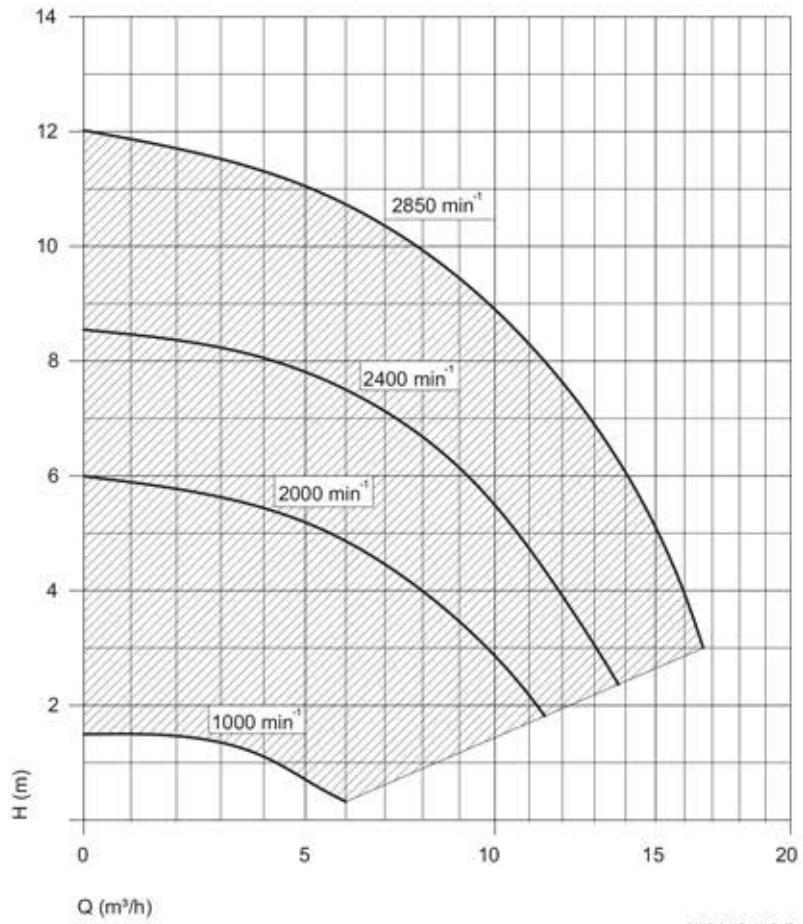
- 40 °C: maximum water temperature as certified by the GS approval.
- (60 °C): pump in its current design is however usable/designed for a maximum water temperature of 60 °C.

Subject to technical modifications!

10. Technical data



D91.40.900



KL91.40.610-P

Subject to technical modifications!

11. Motor display controller

The pump has a permanent magnet motor and is electronically protected against overload

Note

The motor speed is switched on using the manual button. The switch contacts and the assigned speed are activated.

If the pump starts from a standstill, it starts up in priming mode and subsequently with the selected fixed speed.

During running operation the pump is started up at the fixed speed directly, without priming time.

Note

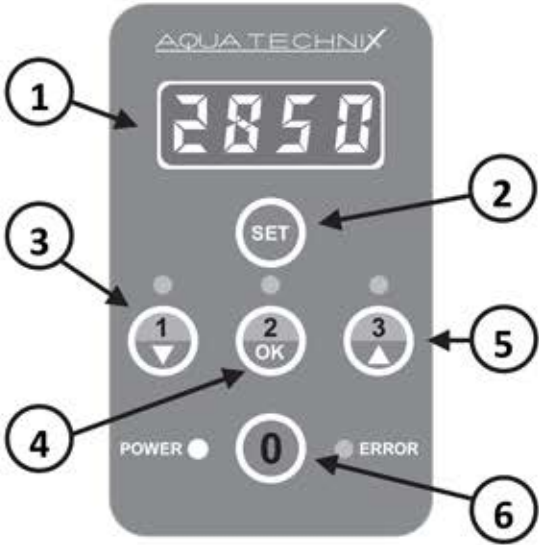
Installing a flow monitor in the circulation line is recommended so that a failure message can be displayed. In this way a lengthy interruption of the bath water circulation can be prevented.

Default setting:

Speed:	3 = 2850 min ⁻¹ 2 = 2400 min ⁻¹ 1 = 2000 min ⁻¹
Priming speed:	= 2850 min ⁻¹
Priming time:	= 5 minutes
Speeds which can be set:	1000 - 2850 min ⁻¹ (in 50 min ⁻¹ steps)
Priming time which can be set:	0 - 10 minutes (in 1 minute steps)

User interface

- (1) **LED display:** displays the current speed of the motor.
- (2) **"SET" button:** used to enter the programming mode or to reset the control.
- (3) **Button "1/ ▼":** used to select the fixed speed/to change the programming mode.
- (4) **Button "2/OK":** used to select the fixed speed/to save the programming mode.
- (5) **Button "3/ ▲":** used to select the fixed speed/to change the programming mode.
- (6) **Button "0":** used to stop the motor.



Operation

Press button "1", "2" or "3" to select the preset fixed speed.

If the pump starts from a standstill, it starts up in priming mode and subsequently with the selected fixed speed.

As long as the pump is in the priming phase, the LED of the selected speed flashes.

During running operation the pump is started up at the fixed speed directly, without priming time.

The motor is stopped by pressing the button "0". The "Power" LED flashes and the display shows "OFF".



Setting the fixed speeds

Press the button of the fixed speed which is to be changed and then keep the "SET" button pressed for at least 3 seconds until the speed displayed in the display begins to flash.

Now the speed can be changed with the buttons "▼" "▲". To save the speed confirm with "OK".

To cancel and retain the original speed press the "SET" button.



! Note: During the suction phase it is not possible to change the motor speed.

Setting the priming parameters

The motor has to be stopped ("0" button) to programme the priming time. Then press the "SET" button again for at least 3 seconds until the speed displayed in the display begins to flash.

Now the speed can be set with which the motor is to start up during the priming time.

The speed can be changed with the buttons "▼" "▲" and saved with "OK".

After the priming speed has been set, the length of the priming time can be specified. The priming time can be set between 0 (= Off) and 10 minutes.



Resetting

The motor can be reset to the factory settings by pressing the **"SET"** button for at least 15 seconds. The motor stops and the three LEDs of the fixed speeds light up.



The display of the control unit switches off after 3 minutes without action.



After a power cut the pump restarts automatically with the speed last set, or remains stopped if it was stopped beforehand.

Overview of possible operating and error messages

If an error occurs, the motor switches off permanently. Exception error: "Undervoltage". The motor automatically switches back on as soon as the voltage lies over 209V for at least 6 seconds.

If an error occurs, the system must be disconnected from the power supply and the motor must be reset.

An overview of possible error codes will help to determine the fault.

Code number	Content
E- 01	DC bus over voltage
E- 02	DC bus under voltage (alarm only, without motor stopping)
E- 03	DC bus low voltage (motor stops)
E- 04	Software level power module over current protection
E- 05	Hardware level power module over current protection
E- 10	Motor overload protection (electronical thermal protection)
E- 11	Motor over speed protection
E- 13	Power module over temperature
E- 16	Motor step out
E- 20	Earth short circuit
E- 21	Phase short circuit
E- 22	Output phase open circuit
E- 31	Communication error with masterboard
E- 41	Current sampling circuit error
E- 42	Starting current/relay error
E- 51	Power modul thermal sensor error
E- 60	Motor blocked
E- 61	Digital signal progressing on-chip ROM error
E- 62	Digital signal progressing on-chip RAM error
E- 63	Digital signal progressing, error, program out of control
E- 66	Communication error with control box

Malfunctions / Trouble shooting

Pump doesn't prime	Pump leaks	Flow rate is too weak	Pump is noisy	Pump/motor doesn't start	Motor is noisy	Reason	Solution
X						Suction speed, suction time is too low or deactivated	Activate the priming mode, set priming parameters
X		X				Leakage in inlet pipe	Check the inlet pipe for leakage
X		X				Lid is leaky	Eliminate the leak
	X					Mechanical seal is leaky	Replace it (to be done by an expert)
X		X				Excessive suction height	Reduce suction height
X						No water in pump casing	Fill pump casing with water
X						Suction line not below water level	Lower the suction line
X		X				Strainer is clogged	Clean the strainer
		X	X			Dia. of suction line too small	Use a suction line with larger dia.
X		X				Suction and pressure line clogged	Clean suction and pressure line
		X				Speed is set too low	Increase speed
			X	X		Foreign object in the pump	Check and clean pump, strainer and impeller
				X		Power supply interrupted	Check power supply and fuses
				X		Operation error – Please refer to the table of malfunctions	Disconnect the power and reset the motor using the „Reset“ button
					X	Defective bearing	Replace bearings
				X	X	Pump is blocked (due to sand)	Stop power supply and make sure pump turns freely, by using a screwdriver *)

*) The cause of the malfunction is to be determined by an expert.