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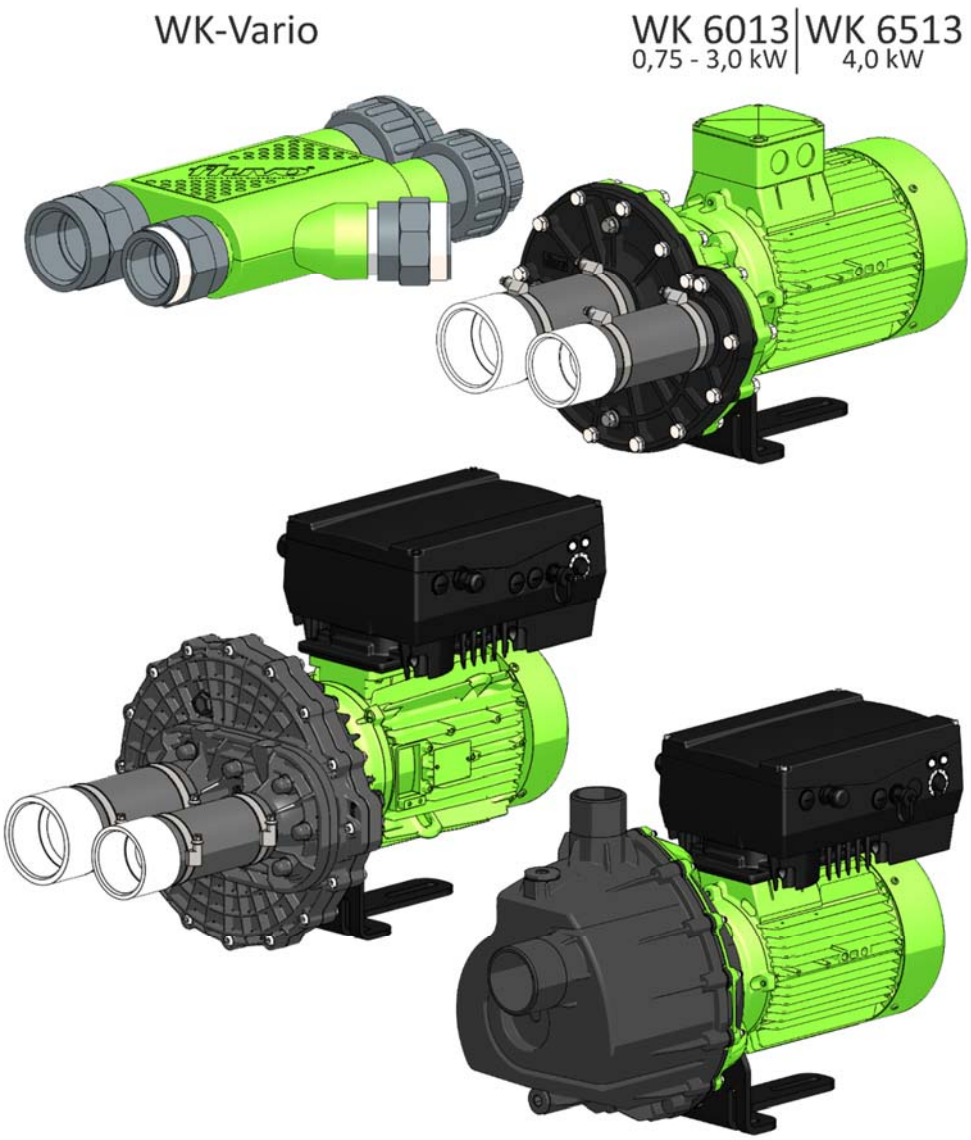
Centrifugal pump
Type WK/SMK

GB **Operating / Assembly manual**

Translation of the original



27220 – E.1

EU-Declaration of Conformity

Manufacturer:
Schmalenberger GmbH + Co. KG Strömungstechnologie
Im Schelmen 9-11
D-72072 Tübingen / Germany

The manufacturer hereby declares that the product:

Centrifugal pump type:
WK, WK-Vario, SMK (identification numbers: all)

Serial number range: 2023000001 - 2028999999

has been manufactured in accordance with the following directives:
Directive 2006/42/EC "Machinery"

Harmonised standards that were used:
EN 809:1998+A1:2009+AC:2010, EN ISO 12100:2010, EN 60034-1:2010, EN IEC 60034-5:2020, EN 60034-30-1:2014, EN 61800-3:2018

Authorised representative for the compilation of the technical documentation:

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The EU Declaration of Conformity has been issued:
Tübingen, 06. July 2023

Thomas Merkle
Head of Development & Design
Schmalenberger GmbH + Co. KG

UK Declaration of Conformity

Manufacturer:
Schmalenberger GmbH + Co. KG
Im Schelmen 9-11
D-72072 Tübingen / Germany

Importer:
Certikin International Ltd
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Colletts Way
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Oxfordshire, OX29 0AZ
United Kingdom
www.certikin.co.uk

Object of declaration:
WK, WK-Vario, SMK
Serial number range: 2022000001 - 2025999999

The manufacturer hereby declares:
The objects of the declaration described above are in conformity with the relevant Statutory Instruments:

SI 2019 No. 492: The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2019
SI 2008/1597: Supply of Machinery (Safety) Regulations 2018

References to the relevant Designated Standards used or references to the other technical specifications in relation to which conformity is declared:

EN 809+A1+AC, EN ISO 12100, EN 60034-1, EN IEC 60034-5:2020, EN60034-30-1, EN 61800-3.

Electromagnetic compatibility
BS EN 61000-6-1,2,3,4
BS EN (IEC) 60801, Part 2

Electrical safety
BS EN 50110, Parts 1 and 2
BS EN 982, BS EN ISO 12100
PD 5304, BS EN 60204

The UK declaration was issued:
Tübingen, 06. July 2023

Thomas Merkle
Head of Development & Design
Schmalenberger GmbH + Co. KG

Table of Contents

1. General Information

1.1. User Information

The Operator's Manual makes it easier to make full use of the device and its range of options. It contains important information for operating the centrifugal pump (pump) safely, properly and economically. Observing the instructions helps to avoid dangers, avoid repair costs and downtimes, and increase the reliability and service life of the centrifugal pump. The Operator's Manual does not take into consideration requirements for specific location. The operator is responsible for observing these requirements. The pump rating plate indicates the series and frame size, the most important operating data and the factory number.

Please specify this information if you have questions, a subsequent order, or especially when ordering spare parts

1.2. Proper Use

The pump is intended exclusively for use in accordance with the original specification. It must only be operated with the values defined in the Technical Documentation regarding pumping medium, pumping flow, speed, density, pressure, temperature, motor power and all other data defined in the specification. Do not use the pump for any other type of application. **Do not** make any changes to the pump. This may result in additional risks and property damage,

for which the manufacturer shall not be liable!

The manufacturer must always be consulted regarding adjustments for a new intended use. We will be pleased to determine what adjustments would be required for the new intended use.

Proper use also includes observing the Operator's Manual.

Residual risk

The centrifugal pump system is built according to the state of the art and recognised safety engineering rules. Nevertheless, danger to life and limb of the operator or third parties, or damage to other property may arise during use. The owner / operator must therefore take care to heed the safety instructions in this Operator's Manual.

1.3. Other Applicable Documents

Each centrifugal pump has various documents which belong together with the Technical Documentation for the centrifugal pump. They are:

- The Operator's Manual for the centrifugal pump
- The Operator's Manual for the drive
- The Operator's Manual for the accessories listed in the specification
- Acceptance reports from TÜV, etc.
- Test run report / performance run report
- Assembly drawing (dimension sheet)
- Declaration of Conformity / Manufacturer’s Declaration
- Specification with all information

Not all the documents named above exist or are included in every case. Observe the information in the specification in this regard.

1.4. Technical Data / Spezification

The specification of the delivered centrifugal pump is the most important document for every Operator's Manual. It contains a summary of all factual and technical data for the centrifugal pump. It is the centrifugal pumps "birth certificate" and must be treated as such. The confirmation of order together with the delivery slip can be used as a replacement as proof of technical data.

1.5. Technical Data WK5013

Type	Limit values of the pump			Rated values of motor					Pump connection		Weight	Sound level	
	Flow rate Q_{max}	Pressure P_{max}		Output	Frequency	Voltage	Nominal current	Speed	Suction end	Pressure end			
[1]Alternating current	[m³/h]	[bar]		[kW]	[Hz]	[V]	[A]	[min⁻¹]			[kg]	[db(A)]	
WK 5013/2 – 2,2 WS[1)]	60	1,6		2,2	50	230		2.900	DN65 | G2½“	DN50 | G2“			
WK 5013/2 – 3,0	70	1,9		3,0		400Y 230Δ	5,6				38 45 [FU]	66	
WK 5013/2 – 4,0		2,1		4,0		690Y 400Δ							
WK5013 Bearing carriers											+10		

1.6. Technical Data WK6013

Type	Limit values of the pump		Rated values of motor					Pump connection		Weight	Sound level
	Flow rate Q_{max}	Pressure P_{max}	Output	Frequency	Voltage	Nominal current	Speed	Suction end	Pressure end		
	[m³/h]	[bar]	[kW]	[Hz]	[V]	[A]	[min⁻¹]			[kg]	[db(A)]
WK 6013/2 - 0,75	24	1,0	0,75	50	400Y 230Δ	1,7 2,95	2.900	DN50 | G2“			65^{+2}
WK 6013/2 – 1,5	42	1,2	1,5		400Y 230Δ	2,86 4,95		DN65 | G2½“		34,5 41,5 [FU]	65^{+2}
WK 6013/2 - 1,5 WS[1)]	42	1,2	1,5		230	9,5				34,5	65^{+2}
WK 6013/2 - 1,9	48	1,4	1,9		400Y 230Δ	3,6 6,25				34,5 41,5 [FU]	67^{+2}
WK 6013/2 - 1,9 WS[1)]	48	1,4	1,9		230	11,5				34,5	67^{+2}
WK 6013/2 – 2,2 WS[1)]			2,2		230						67^{+2}
WK 6013/2 – 3,0	60	1,9	3,0		400Y 230Δ	5,75 I_{max} 6,6 [Y400V] 10				38 45 [FU]	70^{+2}
WK 6513/2 – 4,0	96	2,0	4,0		690Y 400Δ	4,3 7,5 I_{max} 8,5 [Δ 400V]		DN65 | G2½“		39,5 46,5 [FU]	71^{+2}

[1)] Alternating current

1.7. Technical Data SMK-5013

Type	Limit values of the pump		Rated values of motor					Weight	Sound level	Pump connection	
	Flow rate Q_{max}	Pressure P_{max}	Output	Frequency	Voltage	Nominal current	Speed			Suction end	Pressure end
	[m³/h]	[bar]	[kW]	[Hz]	[V]	[A]	[min⁻¹]	[kg]	[db(A)]		
SMK 5013/2 - 1,5	42	1,2	1,5	50	400Y 230Δ	2,86 4,95	2.900	34,5 41,5 [FU]	68^{+2}	DN65 | G2½“	DN50 | G2“
SMK 5013/2 - 1,5 WS[1)]	42	1,2	1,5		230	9,5		34,5	68^{+2}		
SMK 5013/2 - 1,9	48	1,4	1,9		400Y 230Δ	3,6 6,25		34,5 41,5 [FU]	70^{+2}		
SMK 5013/2 - 1,9 WS[1)]	48	1,4	1,9		230	11,5		34,5	70^{+2}		
SMK 5013/2 – 3,0	58	2,0	3,0		400Y 230Δ	5,75 I_{max} 6,6[Y400V] 10		38 45 [FU]	73^{+2}		
SMK 5013/2 – 4,0	62	2,1	4,0		690Y 400Δ	4,3 7,5 I_{max} 8,5[Δ 400V]		39,5 46,5 [FU]	73^{+2}		

[1)]Alternating current

2. Safety Instructions

2.1. General Information

- Make certain before commissioning that the operating personnel have read and understood the Operator's Manual. It is the owner rather than the operator who is responsible for safety!
- Make certain the safety requirements and laws for the use of pumps which apply to the operating company and/or country in which the system is operated are observed.
- All parts that come in contact with medium are resistant up to a salt content of 0.75% (4500 mg/l Cl^-). If higher concentrations of salt are present, please contact the manufacturer.
- Use the pump only when it is in flawless condition technically and according to its intended purpose. Be conscious of safety and dangers and observe all the instructions of this Operator's Manual!
- Eliminate all malfunctions that could have a detrimental effect on safety immediately.

2.2. Signs and Symbols

We warn you of sources of danger in this Operator's Manual through corresponding notices. The use of symbols is designed to direct your attention at these notices.

	Caution! Risk of injury! / Risk of damage! This symbol warns you of dangers due to mechanical effects.

	Caution! Danger of death! This symbol warns you of dangers due to electrical current.

Notices placed directly on the pump, such as the arrow for direction of rotation, must always be observed and must be maintained in legible condition.

2.3. Responsibilities of the Operator

- The owner/operator must take care to ensure,
  - that the Operator's Manual is always available for operating personnel
  - That the safety instructions in this Operator's Manual are observed

2.4. Safety Instructions for Installation

- The centrifugal pump is delivered without a contact safety device. The required contact safety device (for example when pumping hot liquids above 60°C) must be provided by the system manufacturer when the pump is installed in the system.
- If the pump is installed in a shaft, the shaft must have sufficient ventilation (motor cooling) and an adequate possibility for leakage water to flow off (at least DN 40).
- There must not be any conducting connection between the metallic components of the motor and a liquid.

2.5. Safety Instructions for Connection and Commissioning

- Electrical equipment must only be installed and serviced by qualified personnel in accordance with VDE 0105 and IEC 364.

	**Caution! Electrical shock!** Turn off the mains power voltage before starting work! Protect against unauthorised switching on!

- The pump must only be operated with an FI circuit-breaker.
- The information on the nameplate and the conditions for electrical connection must match.
- Before turning on the pump or placing it in operation, make certain no one can be endangered by the pump starting up!

	The centrifugal pump must be stopped immediately if any abnormal electrical voltages, vibrations, temperatures, noises, leaks, or other faults occur.

2.6. Safety Instructions for Maintenance and Repair

- Only persons with training as a mechanic and corresponding knowledge are permitted to perform maintenance and repair work on the pump.
- If liquids are pumped that can cause effects detrimental to health in any way, suitable measures must be taken (rinsing, cleaning, washing) to bring the wetted surfaces of the pump to a condition to ensure handling does not entail any dangers.

Tasks that are not described in this Operator's Manual are reserved for the manufacturer's service personnel.

2.7. Description of the Device

- The pump meets the requirements of VDE regulations.
- The electric motor and plastic pump through which water flows are electrically separated.
- The electric motor corresponds to protection type IP 54/55.
- The centrifugal pump overall corresponds to protection rating I.

Potential danger zones of the centrifugal pump are:

- The suction connection (strong suction effect)
- The pressure connection (high discharge speed of objects that may have been sucked in)
- The pump housing (heating)

3. Transport, Storage and Assembly

3.1. Transport and Storage

3.1.1. Transport

Centrifugal pumps must be transported lying down.

The lifting lugs on the motor are only designed for the weight of the motor alone. A unit consisting of a motor and a pump must be attached on both the motor and pump sides.
If necessary, the position of the centre of gravity is identified on the pump unit itself and on the packaging and the positions for inserting lifting equipment are marked.

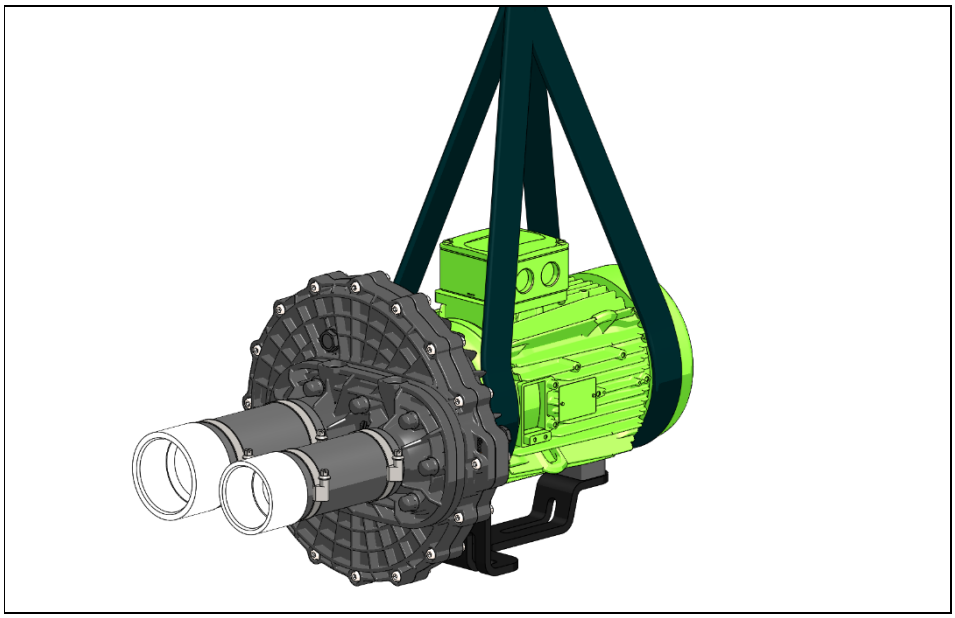


Fig. 1 Example of slinging for lifting

	**Caution! Risk of injury!** Use only suitable lifting equipment and load holding devices which are in perfect working order and have adequate load-bearing capacity! Never work or stand under suspended loads.

3.1.2. Storage

- Temporary storage
  Even for temporary storage of short duration, store in a dry, well-ventilated location free of vibration on wooden supports at a temperature that is as constant as possible.
- Unsuitable storage
  If storage conditions are unsuitable (for example high relative humidity), or if the pump will be in storage for longer than 6 weeks, the pump housing must be filled with oil **(see chapter 3.1.3 Preservation).**
- Storage for extended duration
  If the storage time exceeds 2 years, the roller bearings in the motor must be regreased or completely replaced. Before initial commissioning and after an extended down time, or after installation of a new mechanical seal, always check for smooth operation **(see chapter 10.1.3 Recommissioning).**

3.1.3. Preservation

The centrifugal pumps we deliver are provided with preservation according to the storage time specified by the manufacturer. This preservation must be removed before commissioning; see chapter **3.2.2 Cleaning.**

If the pump will be taken out of operation for an extended time or if the storage time originally planned before commissioning will be considerably exceeded, preservation should be performed as corrosion protection. The procedure to follow is described in detail in chapter **10.1 Decommissioning / Placing in Storage / Preservation.**

3.2. Unpacking, Cleaning and Assembly

3.2.1. Unpacking

The centrifugal pump is secured on a pallet with bands for transport. For transport over extended distances, it is packed in cases or crates. After the retaining bands are loosened, lift the centrifugal pump out of the packaging with auxiliary equipment (lifting tackle). Follow the instructions in chapter **3.1.1 Transport**.

3.2.2. Cleaning

Various measures are provided for protection against transport damage or corrosion. Find out which ones have been selected for your centrifugal pump.

1. Cover plates on the connections
2. Shaft protection, for delivery without motor
3. Protective paint on bare metal parts

Before set-up or installation of the centrifugal pump, these protective devices must be removed. No contamination can be allowed to remain inside the pump!

Important:

Depending on the pumping medium, the inside of the pump must be cleaned of oil residue. Use a cleaning agent to do this that will not damage the mechanical seal or the pump material. Make certain the pump is carefully dried after cleaning. Suitable cleaning agents include rectified spirits, Ritzol 155 or suds with a high alkaline content. If steam cleaners are used, allow the solvent to act first.
If possible do not use steam cleaners. If you do, make certain not to damage the electric motor and bearings during use.

3.2.3. Assembly

The centrifugal pump generally comes premounted and is therefore ready for delivery.
In special cases the centrifugal pump is delivered without a drive motor. Connect the drive to the centrifugal pump before the pump is mounted in the system.

	**Note:** Check to ensure the centrifugal pump is running easily and freely before starting assembly.

Other external accessories such as air chambers, etc., that are not premounted on the centrifugal pump in the factory should not be connected until after the centrifugal pump is installed in the system or on the pump foundation.

3.3. Setting up and Connecting

3.3.1. Before starting to set up, check the following:

- Is the machine / system / container connection prepared according to the dimensions of the dimension sheet / installation diagram?
- Do the concrete foundations have sufficient concrete strength (min. B 15) per DIN 1045?
- Is the concrete foundation hardened?
- Is the surface horizontal and even?

	**Caution! Risk of injury – stability** Pump with large drives that are installed vertically are top-heavy. These pumps must be secured against tipping during assembly or disassembly, for example by using retaining ropes.

3.3.2. Installation and Set-up of the Pump

Except for the special design, pumps are always placed on a base plate with the pump or motor mount and fastened with bolts.
For assembly on a foundation, the centrifugal pump must be aligned with a spirit level.

3.4. Connecting the Pipelines

	**Caution!** **The centrifugal pump must never under any circumstances be used as a point for securing the pipeline.** No forces or moments (for example caused by warping or heat expansion) from the pipelines may be allowed to affect the centrifugal pump.

Pipes must be intercepted directly before the pump and connected with no tension. Their weight must not place any load on the pump.
The alignment must be made very carefully, since it is the precondition for problem-free operation of the unit.

	**Caution!** With hot, corrosive and toxic pumping media!

- If pipeline forces are exceeded, points with faulty seals may develop on the centrifugal pump itself or on the flanges, which may result in powerful ejection of pumping medium.
- For short pipelines, the nominal widths should at least match those of the pump connections. For longer pipelines, determine the most cost-effective nominal width from case to case.

- Transition pieces to larger nominal widths should be designed with an expansion angle of about 8° to prevent increased pressure loss.
- Expansion of pipelines due to temperature must be countered by suitable measures.
- **We recommend installing compensators in the pipeline.**

	Valves that close very suddenly (abruptly) must be avoided in the pipework. The resulting pressure surges can greatly exceed the maximum permitted housing pressure of the pump!

3.4.1. Pipelines for WK

- The suction line rises continuously to the centrifugal pump. For drain, lay pipelines continuously falling to prevent air lock from forming. Depending on the type of system and pump, installation of backflow prevention valves and shut-off elements is recommended.
- Depending on the version, the pump is designed with composite connections. When assembling and disassembling the pipelines, be careful with the threaded connections. It must be ensured that only suitable composite screw connections are used (cylindrical thread).
- Do not use sealing tapes, sealing cords, hemp or pastes to seal the threaded connections, but use liquid pipe or thread sealant. We recommended using liquid sealants such as Weicon AN 305-72 or Loctite 5331.

3.4.2. Pipelines for SMK

- The suction pipes should be installed in a continuous rising way to avoid air pockets.
- The pump casing and the connections are made from synthetic fibres. The threaded connections should be handled with care during assembly and disassembly of the pipework. It must be paid attention on this, that only suitable plastic threaded connections are used (cylindrical thread).
- To seal the threaded connections do not use sealing tape, cords, hemp or any paste, but liquid pipe or thread sealant. We recommend the use of liquid seals such as Weicon AN 305-72 and Loctite 5331.

The inobservance of these instructions can lead to damages to the plastic parts and with that for the loss of all rights to claim under warranty!

3.4.3. Connection pipeline SMK

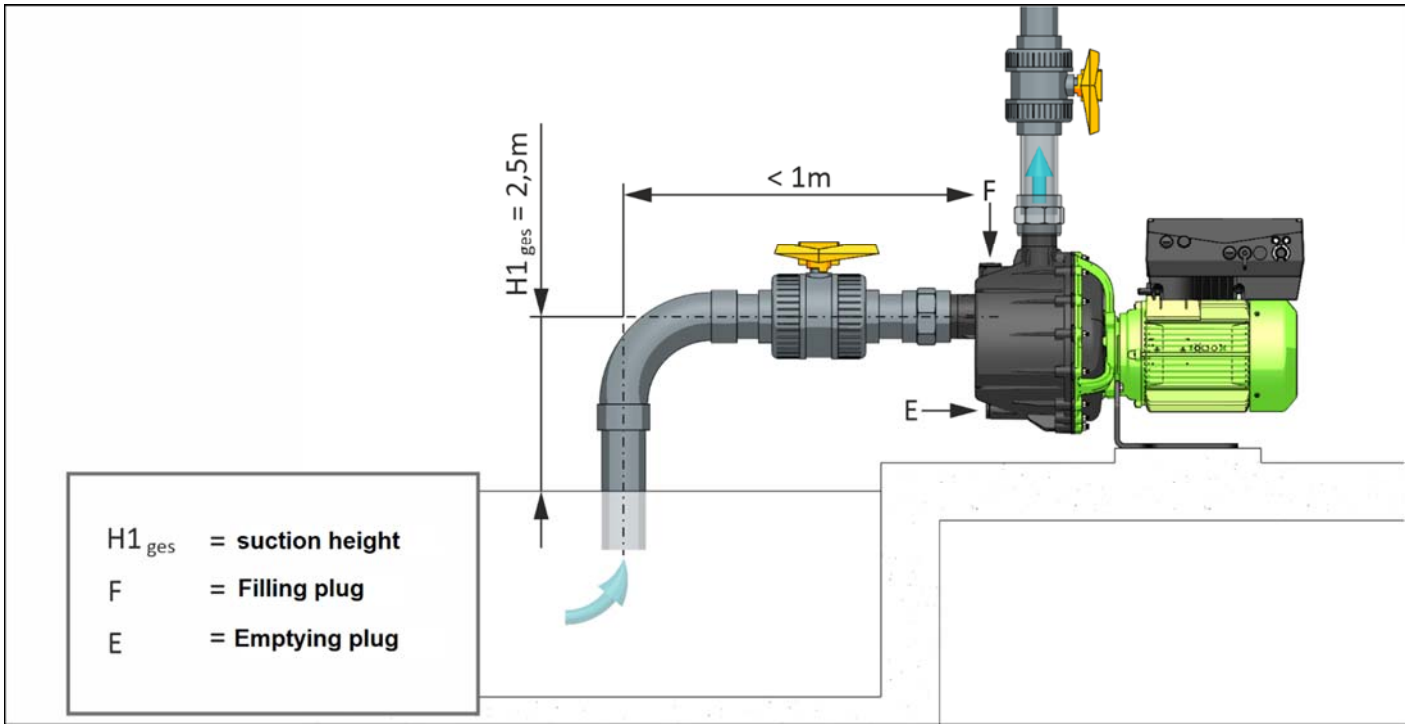


Fig. 2

The SMK is a self-priming centrifugal pump fitted with a semi-open impeller and a mechanical seal. The pump is suitable for clean and slightly contaminated liquids.
Suction lifts up to 2.5m are possible. The pump has to be filled with liquid once before the first pump start.
After the pump is started, the air from the suction pipe will be completely pumped away. The air disappears in the discharges pipes i.e. the pump can only vent through the open discharge pipes.

4. Electrical Connection

4.1. Electrical Connection - General

Connection tasks must only be performed by a certified installation electrician. Applicable **DIN VDE-requirements** must be observed.
Compare the existing mains power supply with the information on the factory plate of the motor and select a suitable circuit.

We recommend using a motor protection device.

	**Danger of explosion!** If there is danger of explosion, a motor protection device must be installed!

In compliance with VDE 0530-8, three-phase motors are always wired for clockwise rotation (looking at the motor shaft stub).
The direction of rotation of the pump is anti-clockwise as standard (viewed from the suction flange).

Always note the arrow on the pump indicating the direction of rotation.

4.2. Electrical Connection - Pump Type WK

Connect the motor according to the circuit diagram in fig. 3 "Delta connection" or fig. 4 "Star connection".

Make certain:

- The mains power connection must only be made via a fixed connection.
- There must be no conducting connection from metal components of the motor to the water.
- The mains supply line must be equipped with a fault current circuit breaker (rated current error £ 30 mA) and an all-pole separator with a contact opening of 3 mm.
- Equipotential bonding with a cross-section of 10 mm² must be applied on the connection terminal so identified (on the motor mount or next to the terminal box).
- The pump must only be operated with the terminal box cover closed!

4.2.1. Connection Diagrams for Three-Phase Motors

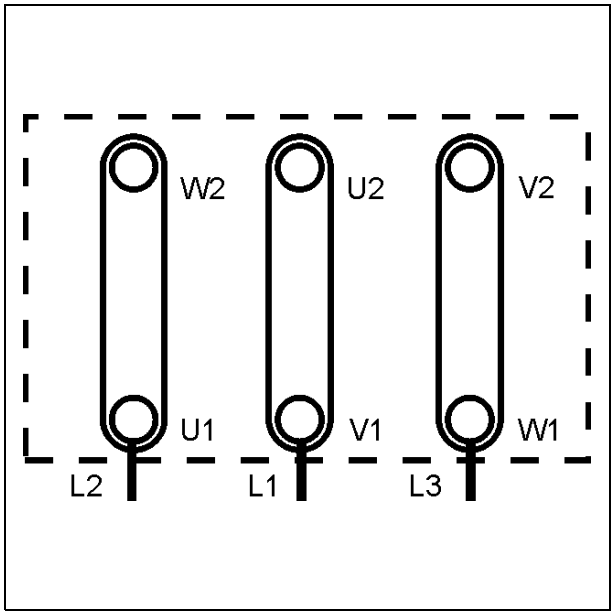


Fig. 3 Delta connection Δ
(low voltage)

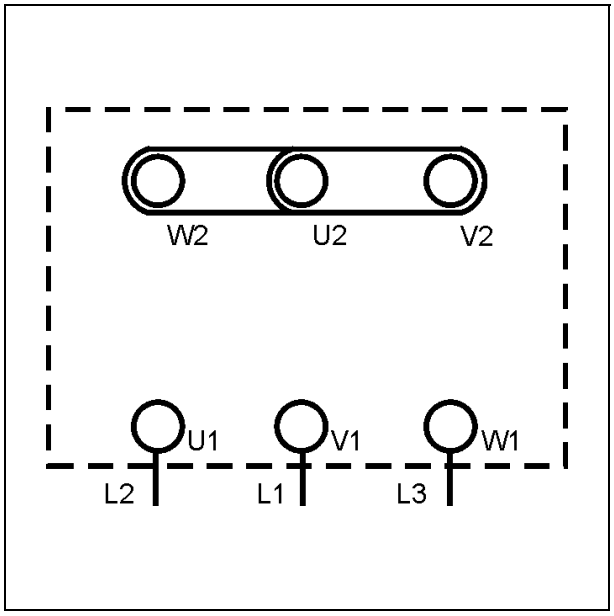


Fig. 4 Star connection Y
(high voltage)

4.2.2. Time Relay Setting

For three-phase motors with star-delta connection, you must ensure that the switching points between star and delta follow one after the other in as little time as possible. Longer switching times will result in damage to the motor. Time delay setting for star-delta connection: < 3 sec.

4.2.3. Direction of Rotation Check

The direction of rotation of the motor must agree with the direction of the rotation arrow on the motor housing of the pump. Check by switching on and off in quick succession. If the direction of rotation is incorrect, reverse any two phases L1, L2 or L3 of the mains power supply line in the motor terminal box.

4.2.4. Auxiliary Equipment for Motor

If special control devices are provided, for example in conjunction with use of the centrifugal pump in a technical system, the manufacturer's instructions for these control devices must always be observed.

	For additional information, see the Operator's Manual Pump Control (27122).

5. Device Units

5.1. Pump Kit Type WK

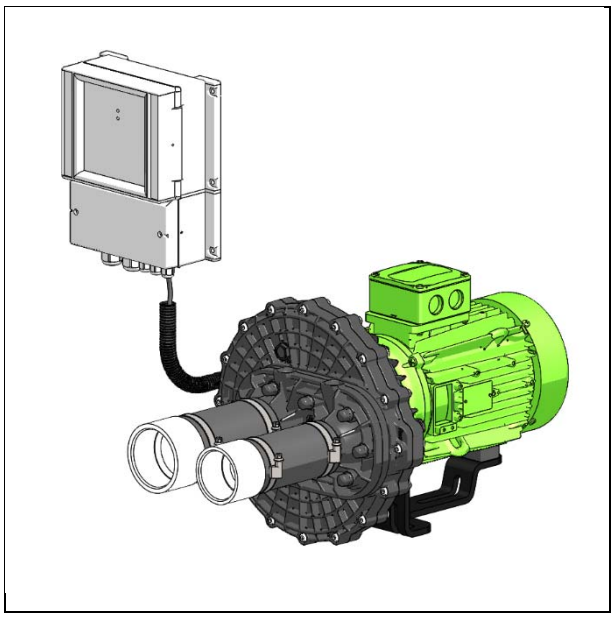


Fig. 5 Pump kit WK

The pump kit consists of:

1. Pump unit
2. Suction hose*
3. Pressure*
4. Switching tube ø 4 mm*
5. Control box*
6. Cable protection cover*

* If included in the scope of delivery

The pump kit is always the same regardless of the type of pool.

	The control box must always be positioned above the water level of the pool!

	When setting up the pump, there must be sufficient ventilation (motor cooling) and an adequate possibility for leakage water to flow off!

6. Assembly

6.1. Assembly - General

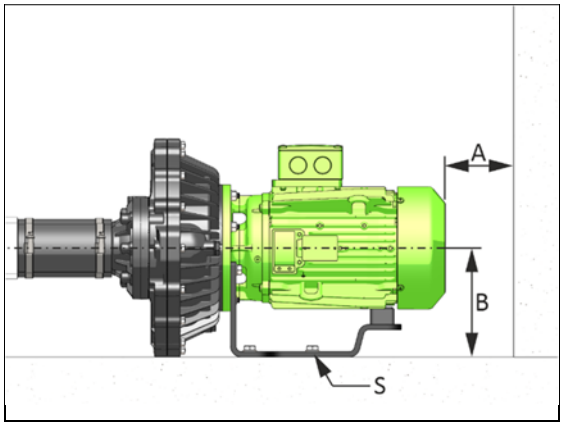


Fig. 6

A =min. 100 mm
B =160 mm
S Screw

Mount the support in the place provided for it.
Fasten the support in place with 3 screws (S).

6.2. Assembly of the Control Box

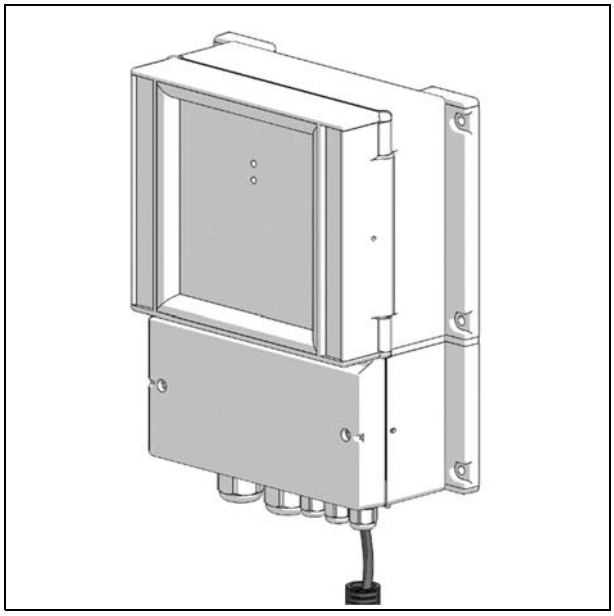


Fig. 7 Control Box

Mount the control box as close as possible to the installation kit. Connect the switching tube onto the nipple in the protection cover.

	Caution: Do not kink the switching tube and keep it as short as possible; maximum length 8 m. Connection information for Control box, refer to the corresponding operating instructions 27248.

6.3. Assembly of WK-Vario Combination with Massage Jets or Water Curtain

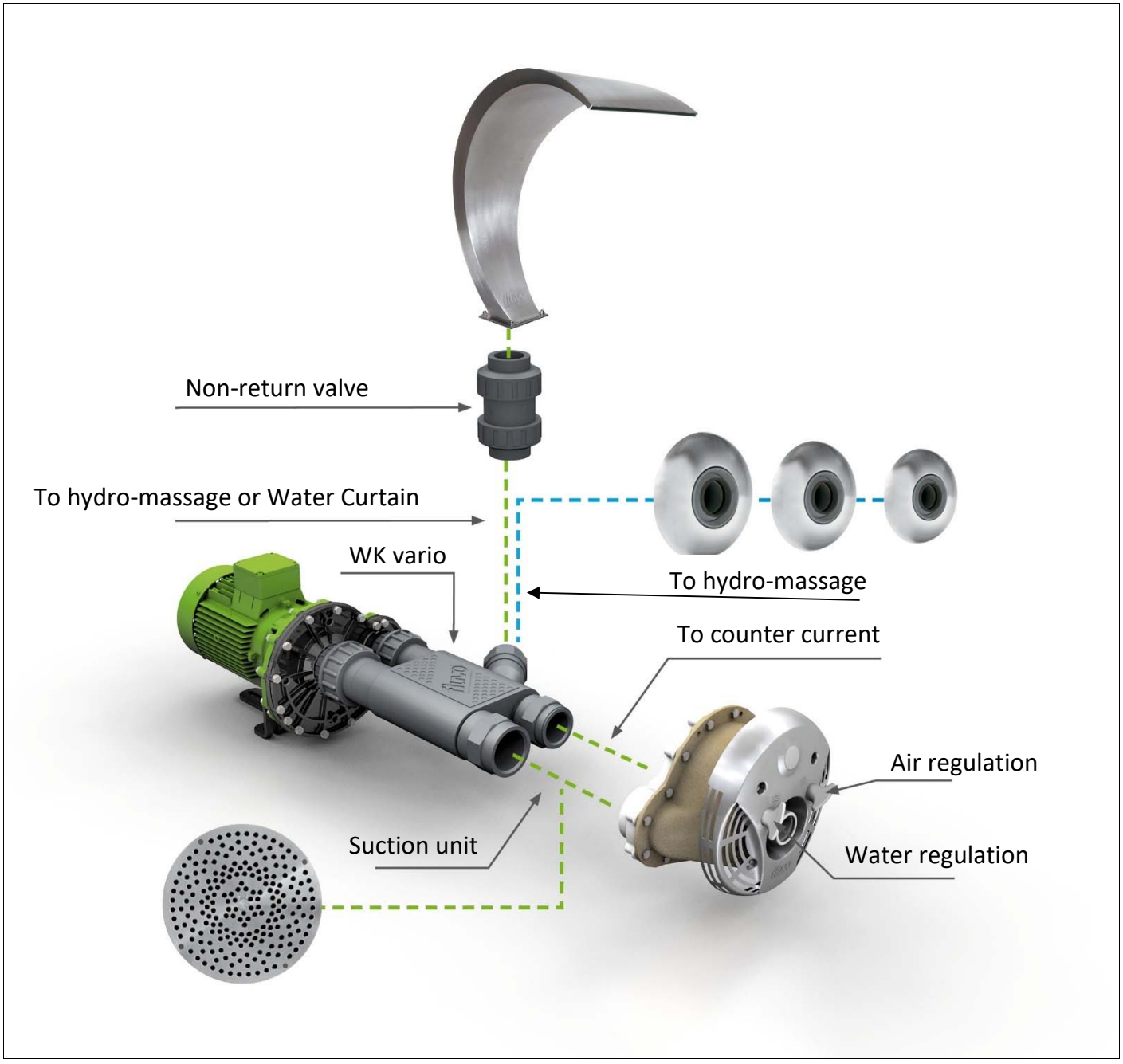


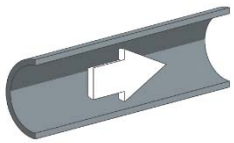
Fig. 8 Non-binding system illustration

6.4. Flow Losses - Pipes and Elements

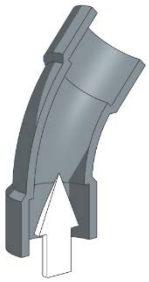
Water, 48 m³/h; turbulent flow; roughness value: 0,1 mm

Flow losses in the pipeline (pressure- and suction side) must be noted. Flow losses must be kept low in the components that are used.

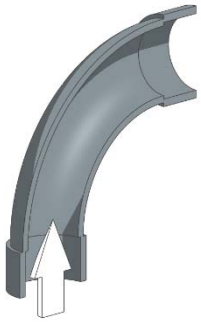
Sample flow values are listed in Fig. 9.

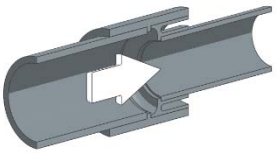


Pipe, 30m, PVC hard, DIN 19532	Pressure loss	Flow speed
DN 80	0,263 bar	2,562 m/s
DN 100	0,095 bar	1,718 m/s
DN 150	0,014 ba	0,812 m/s



DN 80	Pressure loss	Flow speed
45-degree elbow	0,015 bar	2,562 m/s
90-degree elbow	0,006 bar	2,562 m/s





DN 80	Pressure loss	Flow speed
Abrupt pipeline constriction DN 80 to DN 50	0,278 bar	2,562 m/s
Edged run-in under angle	0,027 bar	2,562 m/s

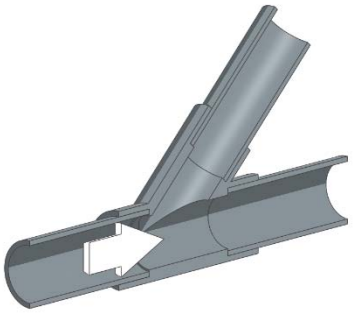


Fig. 9 Example flow values

7. Operating the Centrifugal Pump

7.1. Initial Commissioning

	Make certain the following preconditions are met before initial commissioning of the pump:

1. The centrifugal pump is connected electrically with all protective devices in accordance with requirements.
2. **for WK:** The centrifugal pump is completely filled with pumping medium and is receiving supply.
   for SMK: The centrifugal pump is filled with pumping medium (~ 10 litres).
3. All shut-off elements are open on the suction end and the pump as well as the suction line are emptied.
   Make certain: Dry running results in increased wear and damage to the pump!
4. Rotating parts of the centrifugal pump must be provided with a contact safety device. (In accordance with the accident prevention requirements (UVV) the pump may only be operated with a contact safety device.)
5. The shaft of the centrifugal pump has been tested to ensure it runs easily (observe the instructions in chapter **3.2.3 Assembly**).
6. The direction of motion has been checked.

7.1.1. Starting the Pump

The pump must only be turned on with the pressure-end shut-off element half open and the suction-end shut-off element completely open! Do not open it until full speed is reached. Then slowly open it and adjust control to the operating point.

7.2. Operation

7.2.1. Operation Monitoring

system. Data associated with the design of the centrifugal pump and related to the intended purpose (see specification) must be observed as a precondition for problem-free functionality.

It is especially important to observe the points listed below during manual operation of the pump:

1. **Temperature of the pumping liquid**
   The centrifugal pump must only be operated at water temperatures of t = 0 to +50°C.

2. **Temperature of the motor cooling air**
   The maximum temperature of the motor cooling air is 40°C. If higher temperatures occur (for example in a pump shaft), sufficient ventilation must be ensured.

3. **Switching frequency**
   To avoid large temperature increases in the motor and excessive load on the centrifugal pump, motor and bearings, one switching-on process per minute must not be exceeded.

4. **Minimum quantity**
   If the nature of the system includes the possibility of running against the shut-off element closed on the pressure end, a minimum flow of 2 m³/h with t = 0 to +50°C must be provided to exclude excessive heating up of the pump hydraulics (for example a bypass).

5. **Density of the pumping liquid**
   The power consumption of the pump varies proportionally to the density of the pumping medium. To avoid overload on the motor, the density must match the specification data of the pump.

7.3. Notices of Incorrect Operation

Avoid damage to the centrifugal pump and make certain that:

- the pump always runs quietly and without vibration
- the pump does not run dry
- extended operation against a closed shut-off element is avoided to prevent the pumping medium from heating up. For the required minimum pumping quantity, see chapter **7.2.1 Operation Monitoring.**
- the maximum permissible room temperature of +40°C is not exceeded
- the ball bearing temperature does not exceed +50°C above room temperature, or in any case +90°C (measured on the outside of the motor housing)
- when the centrifugal pump is in operation the shut-off element is not closed in the supply line

Chapter 8 Troubleshooting contains a table with the most frequent flow faults, their causes and recommendations for eliminating them.

7.4. Shutdown

1. Close the shut-off element in the pressure line. If a backflow prevention valve is installed in the pressure line, the shut-off element can remain open provided a counter pressure is present.
2. Turn off the motor. Make certain run-out is quiet. Depending on the system, when the heat source (if present) is turned off, the pump should have sufficient coast-down until the pumping medium temperature is reduced enough so that heat backup in the pump is avoided.
3. Close the shut-off element in the pressure line.

	**Caution! Risk of damage!** If there is danger of freezing and/or for extended periods of standstill, the pump must be emptied and/or protected against being emptied or freezing (auxiliary heating).

7.5. Emptying the Pump

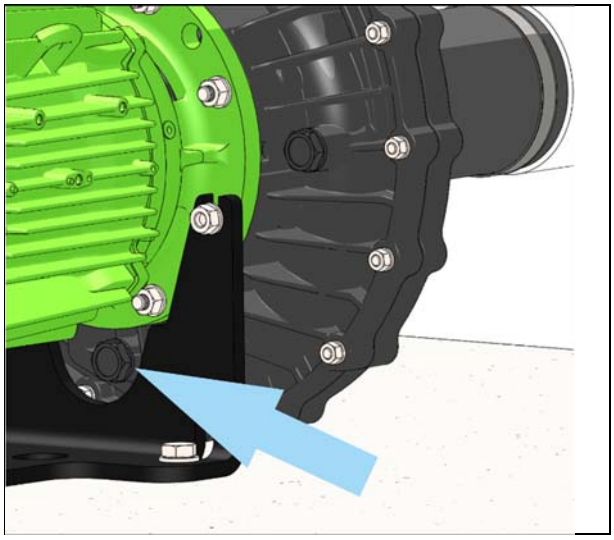


Fig. 10 Example presentation

To let the water out of the centrifugal pump, open the plug screw.

Make certain all the water runs out! Empty the pipe system leading to the centrifugal pump as well.

WK: Then screw the plug screw back in with a new O- ring.
SMK: Then screw the plug screw incl. gasket back in.

8. Troubleshooting

⚠	**Caution! If faults occur, turn off the centrifugal pump immediately!** All repairs and interventions must be done in accordance with accident prevention requirements (UVV) and must be performed by qualified specialists.

8.1. Type WK

Malfunction	Possible	Remedy
1. Pump runs very loud and produces little output	Wrong direction of rotation for the motor	Reverse the polarity of the motor in the terminal box, thereby switching the direction of rotation
	Motor fan scrapes against the fan hood	Correctly secure the fan hood
2. Pump starts up slowly and only with difficulty	A current-conducting phase is missing	Check the supply lines and fuses
3. The fuses are blown immediately at power-up	Wrong fuses or fast acting fuses	Install delayed fuses with the correct amperage rating
4. Motor protection switch is triggered	Wrong setting	Set the correct current value +10% (see Data Sheet p. 5)

5. The centrifugal pump cannot be turned on from the swimming pool	• The switching tube is kinked • Fuses / power supply • Motor protection switch • S witching tube is too long • Water in the switching tube	• Check whether the pump can be switched from the control box. • Eliminate possible causes as explained in chapters 2.3 and 3. • Shorten the switching tube if possible and blow through it from the pool
6. Air valve has a leak	Dirty	During operation, unscrew the air valve and replace if necessary **Note:** The air valve must be positioned above the water level.

For troubleshooting with type WKN, see the Pump Control Operator's Manual (27122)

8.2. Type SMK

Malfunction	Possible reason	Remedy
1. Pump does not prime	• Wrong direction of rotation • The pump has not been filled with liquid • Wrong speed of the pump • Air in the suction pipe • Blocked suction pipe	• Swap two phases in the terminal box • Fill the pump with liquid • Set the speed correct of the frequency converter • Check all connections
2. Irregular water flow, Pump vibrates	• Suction pipe not properly immersed in the liquid • Air in the suction pipe • Blocked suction pipe • Suction pipe too long	Check

3. Pump does not achieve the calculated output	• Check pipework • Wrong direction of rotation • Too low speed • Duty point different than calculated • Blockage in impeller or	• Swap two phases in the terminal box • Set the speed correct of the frequency converter
4. Pump noisy	• Suction pipe too long or not immersed • Air or gas in the liquid	Check and change
	• Blocked suction pipe • Pump not properly aligned • Faulty bearings • Badly installed valve in the pipework	Change the faulty parts
	• Cavitation	Make the pump run at its duty point
5. Motor overheated	• Speed too low • Pump overloaded • Faulty bearings • Impeller runs against the casing	• Check frequency converter settings, throttle the pump • Replace • Adjust properly
6. Pump leaking	• Faulty mechanical seal • Faulty gasket • Pump casing leaking	• Replace all seals • Replace

9. Maintenance / Repair

9.1. General Information

The operator must ensure that all inspection, maintenance and repair work on the pump are performed only by authorised and specially trained personnel. The operator must ensure that personnel is sufficiently informed through thorough study of the Operator's Manual.

We recommend creating and following a maintenance plan. This will help you to avoid costly repairs and achieve problem-free and reliable operation of the pump.

Only original spare parts may be used for repairs. This applies especially to the mechanical seal.

When working on the motor, the instructions of the relevant motor manufacturer and instructions must be followed.

	**Caution! Danger of death!** Normally work on terminal boxes and on the machine control box must only be performed with the electrical connections unclamped. Secure the pump unit against being turned on unintentionally (isolate it).

9.2. Maintenance / Inspection

The following information should be used to create a maintenance plan. It consists of minimum recommendations that must be adjusted and if necessary supplemented as required by local specific details of the actual installation site.

Continuous checks	Daily checks	Check/replacement every 6 months
Pumping data for the pump (pressure, quantity)	Pump running = quiet with no vibration	Check if screws are tight
Current consumption	Storage temperature	
	Mechanical seal leakage	

	**Note:** The mechanical seal must be inspected as part of a system overhaul after 8000 operating hours. If the mechanical seal is removed during the system overhaul, it must be replaced by a new one.

9.2.1. Lubrication and Change of Lubricant

Pumps of type WK / WKN and SMK in standard design have bearings only in the drive motor. The bearings are designed to last for life and have permanent grease lubrication that cannot be relubricated. Faulty bearings must be replaced.

9.3. Repair

9.3.1. General Information

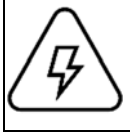
Servicing work must be performed on the centrifugal pump only after removal and in a suitable workshop. Observe all general instructions at the beginning of this chapter!

These instructions will allow you to disassemble the pump and reassemble it properly with the necessary new parts.
Special instructions must be followed when installing a new mechanical seal.

Other than this exception, jobs can be performed with standard workshop tools. Special tools are not required.
After disassembly, clean all the individual parts of the centrifugal pump. Check the individual parts for wear and damage. Parts that are not in flawless condition must be reworked or replaced.

9.3.2. Preparations for Disassembly

Before starting disassembly, the pump must be secured so that it cannot be turned on (isolated).

	Caution! Danger of death! Place a warning notice on the switch cabinet. If the system is in operation, inform the shift manager.

9.3.3. Disassembly / Removal of the Pump

The pump must have reached ambient temperature.

- Disconnect the power supply.
- Close the fittings (suction and pressure-end).
- Empty the pump through the drain screws (11/11.5).
- Unclamp the motor.
- Disassemble any additional connections that are present.
- Loosen the pressure and suction connections.
- Loosen the pump from the base plate.
- Lift the pump completely.

9.4. Disassembly / Dismantling the Pump

Before beginning:

Do not begin working until you have checked to ensure:

- that all necessary spare parts are present and they match the pump or the version of the pump you have, or that damaged parts which may still be discovered can be obtained in short order.
- that all tools and auxiliary equipment required for work are available.

	**Note:** Use only original spare parts for repairs!

Observing these instructions is a precondition for problem-free operation of the pump and for honouring any warranty claims that may be submitted.

10. Appendix

10.1. Decommissioning / Placing in Storage / Preservation

Every pump leaves the factory in carefully mounted condition. If commissioning will not take place for an extended time after delivery, we recommend the following measures for storage of the pump.

10.1.1.Placing New Pumps in Storage

If requested, new pumps have preservation protection according to the storage time specified by the customer when the pumps are ordered. If this time is significantly exceeded, the condition of the pumps must be check and they must be represerved if necessary.

10.1.2.Extended Decommissioning > 3 Months

- **Pump remains installed**
  To ensure the pump is always ready for operation and to prevent accumulation of residue from forming inside the pump and in the immediate area of the pump supply, the pump unit should undergo a functional run briefly (about 15 minutes) at regular monthly to quarterly intervals when it is shut down for extended times. As a precondition, the pump must be filled with sufficient liquid.

- **Pump has been removed and placed in storage**
  Empty the pump completely.
  To remove the pump, take the measures listed in chapter 9 Maintenance / Repair. Before the pump is placed in storage, it must be thoroughly cleaned and preserved. The pump must be preserved inside and out.

For winter shutdown, remove the transmitter / radio signal housing and store it at room temperature.

10.1.3. Recommissioning after Being Placed in Storage

- **Removal of preservation**
  Before the pump that was in storage is installed, the preservation material with which it was coated and/or filled must be removed. To do this, follow the instructions in chapter 3.2.2 Cleaning. After an extended storage time under preservation conditions, check elastomer parts (O-rings, mechanical seals) to ensure they have retained proper shape and elasticity. Brittle elastomer parts must be replaced. Elastomer parts made of EPDM must always be replaced.

- **Recommissioning**
  Reinstall the removed pump according to the process described in chapter 3.3 Setting up and connecting.
  Immediately after work is complete, all safety and protective equipment must be put back in place and/or placed in operation again.
  Before recommissioning of the installed pump, the checks and maintenance measures described in chapter 9.2 Maintenance / Inspection must be performed. Before using the pump again, all the points listed in chapter 7.1 Initial Commissioning must be observed.

- **Special feature of mechanical seals:**

	**Note:** Before initial commissioning and after an extended down time, or after installation of a new mechanical seal, always check for smooth operation.

Due to adhesive forces, the slide ring and counter ring may cling together strongly. When this happens, the driving spring does not have sufficient traction to break the slide ring free. Then the shaft runs into the fixed seals and driving spring, which results in damage. Remove the fan hood and rotate the fan wheel in the direction of the arrow indicating direction of rotation. If you encounter resistance and the fan wheel springs back, the mechanical seal must be removed and the slide and counter rings must be carefully separated.
Try not to rotate the shaft forcefully.

10.2. Disposal

If you want to shut down the pump permanently and take it out of operation, observe local regulations for disposal of industrial waste.

10.3. Important Information

10.3.1.Factory Repair

1. If you send the pump in to the manufacturer's plant for repairs or modifications, include exact information about the medium pumped by the pump (safety sheet).
2. Only completely emptied and cleaned pumps are accepted for repair.

10.3.2.Ordering Spare Parts

When ordering spare parts, always specify the following important information:

- Pump number and type designation, alternatively the motor number
- Pumping medium
- Item number / name of the part from the spare parts list
- Material information from the specification or confirmation of order

You will find the pump number on the nameplate, which is fastened onto the fan hood of the motor. The confirmation of order or motor number may also be helpful. This will help us deliver the right spare part for your pump!

10.3.3.Customer Service:

Address of main office:

Schmalenberger GmbH + Co. KG

Im Schelmen 9 – 11
D-72072 Tübingen / Germany

+49 (0)7071 70 08 – 0
+49 (0)7071 70 08 - 10 (Fax)

www.schmalenberger.de

info@schmalenberger.de

11. Spare parts

11.1. Explosion Drawing type WK5013

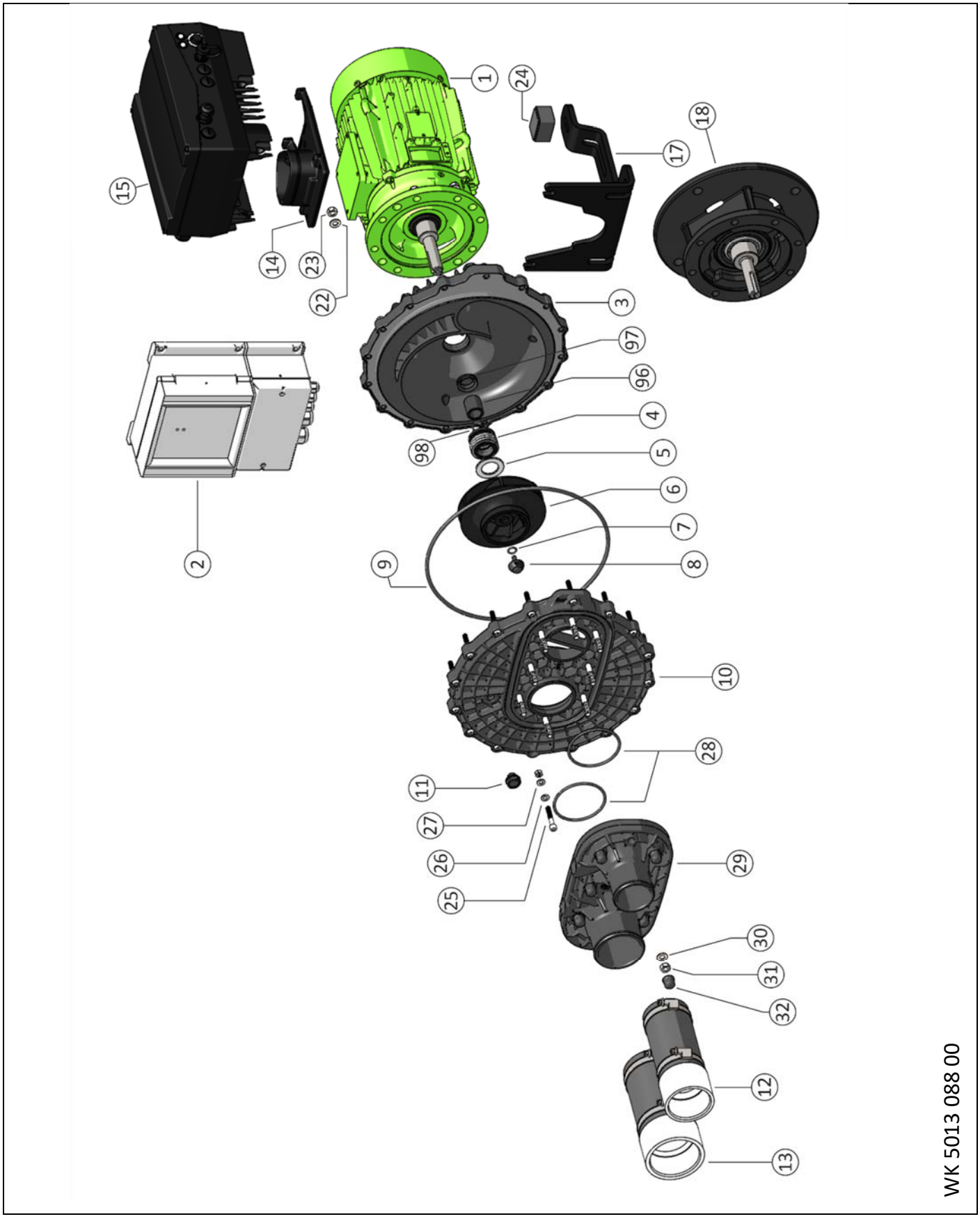


Fig. 11 exemplary presentation

11.2. Explosion Drawing type WK6013

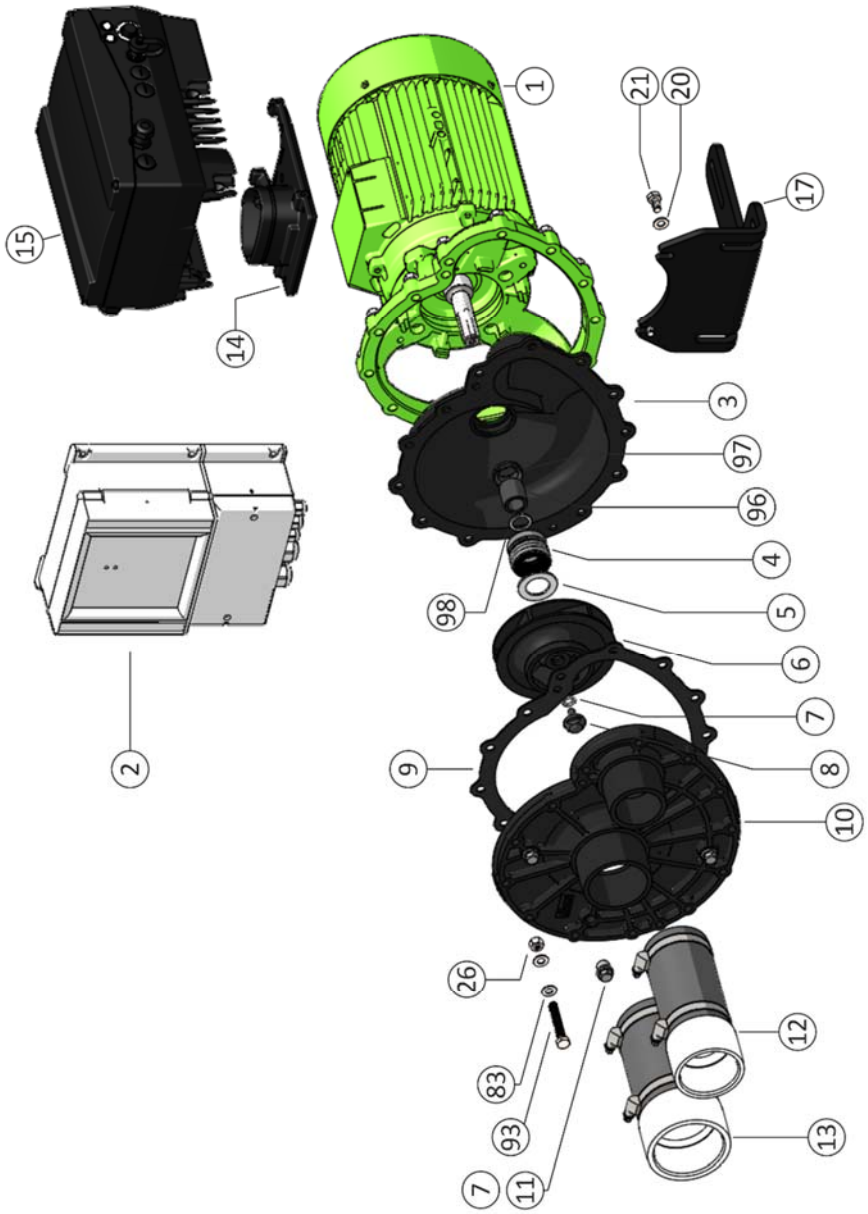


Fig. 12 exemplary presentation

11.3. Explosion Drawing type WK6513

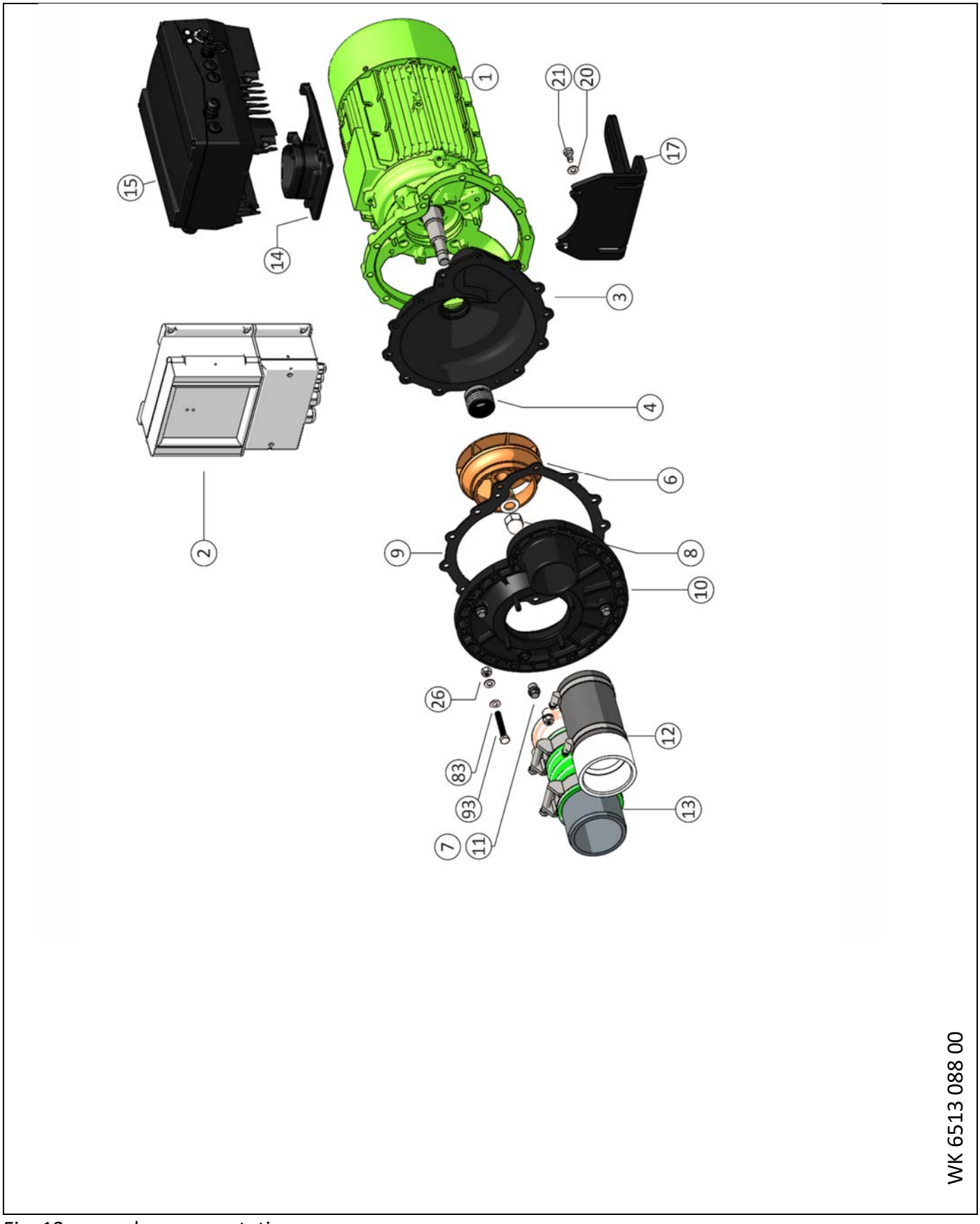
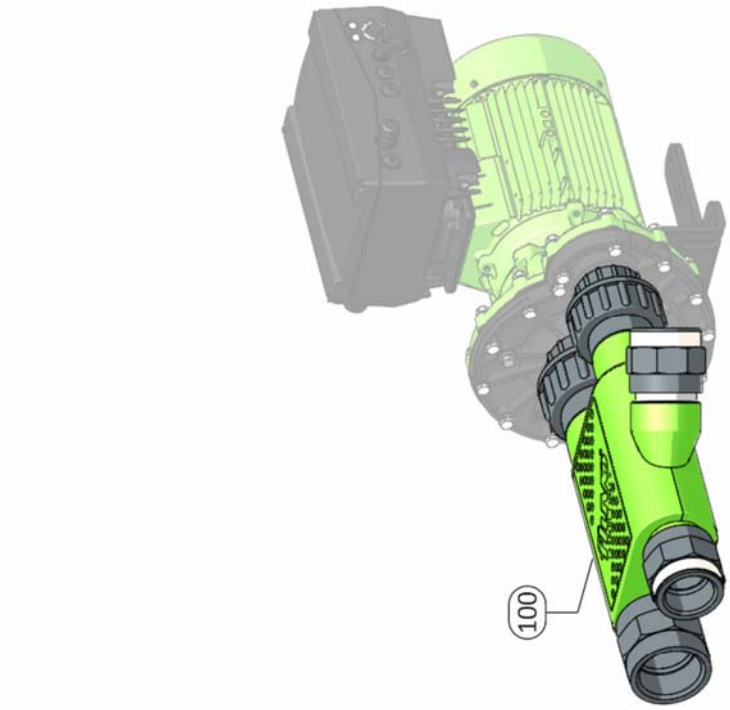


Fig. 13 exemplary presentation

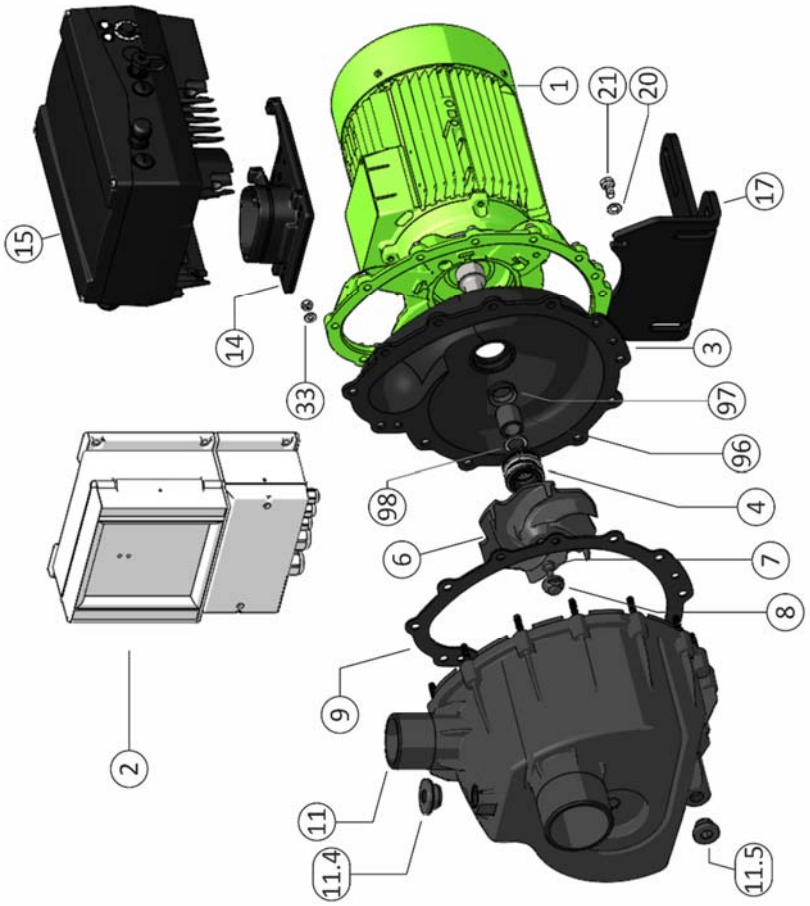
11.4. Explosion Drawing type WK6013 Vario



WP 6013 088 01

Fig. 14 exemplary presentation

11.5. Explosion Drawing type SMK- 5013



SMK 5013 088 00

Fig. 15 exemplary presentation

UK CA

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Certikin International Ltd
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Oxfordshire, OX29 0AZ
United Kingdom
www.certikin.co.uk

Manufacturer:
schmalenberger
strömungstechnologie
Im Schelmen 9 – 11
D-72072 Tübingen / Germany

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info@schmalenberger.de

Pump type WK/ SMK
27220 – E.1