



SONDERMANN
PUMPEN + FILTER GMBH & Co. KG

Operating Instructions

**Magnetically coupled Centrifugal Pumps
Type RMB 3.1 – self-priming
Made of PP / PVDF**



SONDERMANN PUMPEN + FILTER GMBH & Co. KG, D-51149 KÖLN

Tel.: +49-2203-9394-0, Fax: +49-2203-9394-48, E-Mail: info@sondermann-pumpen.de

EG-KONFORMITÄTSERKLÄRUNG

EC Declaration of Conformity

Déclaration de Conformité CE

Hiermit erklären wir, dass die **SONDERMANN magnetisch gekuppelten Kreiselpumpen** in den gelieferten Werkstoffen und Ausführungen, folgenden einschlägigen Bestimmungen entsprechen:

We herewith confirm that the **SONDERMANN magnetically coupled centrifugal pumps** in the supplied materials and versions corresponds to the following EC-rules:

Nous confirmons que **les pompes centrifuges à accouplement magnétique SONDERMANN**, livrées en matériaux et versions différents, sont conformes aux dispositions réglementaires suivantes:

(1) EG-Richtlinie Maschinen
98/37/CE

EC Machinery Directive
98/37/CE

Directive CE Machines
98/37/CE

(2) EG-Niederspannungsrichtlinie
2006/95/EG

EC Low Voltage Directive
2006/95/EG

Directive CE Bas Voltages
2006/95/EG

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PUMPEN + FILTER GMBH & Co. KG



Klaus Hahn
Geschäftsführer

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1 General Information

The pump may only be used in the range of applications authorized by the manufacturer. In case of modified operating conditions, please consult your supplier and/or the manufacturer.

1.1 Fields of application

- Pumping of liquids, which are in viscosity like water, without abrasive particles
- Pumping of acids and alkanlines
- Pumping of gaseous fluids
- Any use other than the authorized one as well as any conversion of the pump is not permitted.

CAUTION!

Make sure that the materials of which the pump is made, are resistant to the fluids delivered. Ask your pump's supplier or the manufacturer for the respective chemical resistance chart.

- If you pump crystallizing fluids, make sure that the fluid does not crystallize within the pump. Should this happen, carefully clean all parts being in contact with the fluid immediately after shut off the pump.

NOTE

Disassembly of the pump will cancel the right to all warranty claims!

1.2 Capacity ratings

Besides the operational data of the pump, the type plate also gives its type and serial number. Please cite these data when

asking for additional information, placing reorders and, in particular, ordering spare parts. For additional information, please consult your supplier or the manufacturer.

Technical data:

Flow max.:	12/175 = 175 l/min. 15/225 = 225 l/min. 18/250 = 250 l/min.
Head max.:	12/175 = 12 m WC 15/225 = 15 m WC 18/250 = 18 m WC
Materials:	PP or PVDF, Ceramic, Teflon-Graphite, FKM, EPDM, FEP
Voltage:	see type plate
Motor power:	0,55 - 0,75 kW
Rated current: A	see type plate
Sense of rotation:	clockwise, seen from the pump towards the motor
Speed:	2800 min ⁻¹
Protection class:	IP 55
Weight	approx. 11 – 13 kg
Max. temperature of the pumped liquid:	
PP	65°C
PVDF	85°C
Max. system pressure at 20°C	
PP	2,5 bar
PVDF	3,5 bar

NOTE

In order to determine the maximally allowed temperature of the fluid, please refer to the delivery note and/or the type plate for information on the materials used for the pump!

The materials on the type plate are built on following key:

- PP = Polypropylene, glass-fiber reinforced
- PVDF = Polyvinylidenfluoride
- K = Oxide ceramic
- G = Teflon-Graphite
- V = Seal material *)
- K = Bearing: ceramic
- K = Casing thrust ring: ceramic
- K = Centering shaft: ceramic

- *) possible
- V = FKM
 - E = EPDM
 - T = FEP coated

2 Safety

This operating manual gives basic instructions which are to be observed during installation, operation and maintenance of the pump. Therefore it is imperative that this manual has to be read by the responsible personnel/operator prior to assembly and commissioning. It is always to be kept available at the installation site.

It is not only the general safety instructions contained under this main heading safety that are to be observed but also the specific information provided under the other main headings.

2.1 Identification of safety instructions in the operating manual

Safety instructions given in this manual non-compliance with which would affect safety are identified by the following



Safety sign according to DIN 4844-W9

Warning of electricity are identified by the specific



Safety sign according to DIN 4844-W

Instructions non-compliance with which would give rise to malfunctioning of the machinery are identified by the word:

CAUTION

Signs and labels affixed to the equipment such as:

- Arrows indicating the sense of rotation
- Symbols indicating fluid connections
- Warnings to protect the pump from dry-running

Must be strictly observed and always kept legible.

2.2 Qualification and training of operating personnel

The personnel responsible for operation, maintenance, inspection and assembly must be adequately qualified. Scope of responsibility and supervision of the personnel must be exactly defined by the plant operator. If the staff does not have the necessary knowledge, they must be trained and instructed, which may be performed by the machine manufacturer or supplier on behalf of the plant operator. Moreover the plant operator has to make sure that the contents of the operating manual are fully understood by the personnel.

2.3 Hazards in the event of non-compliance with the safety instructions

Non-compliance with the safety instructions may produce a risk to the personnel as well as to the environment and the machine and results in a loss of any right to claim damages. For example non-compliance may involve the following hazards:

- Failure of important functions of the machine/plant
- Failure of specified procedures of maintenance and repair
- Exposure of people to electrical, mechanical and chemical hazards
- Endangering the environment owing to hazardous substances being released

2.4 Compliance with regulations pertaining to safety at work

When operating the pump, the safety instructions contained in this manual, the relevant national accident prevention regulations and any other service and safety instructions issued by the plant operator are to be observed!

2.5 Safety instructions relevant for operation

- If hot or cold machine components involve hazards, they must be protected against accidental contact.
- Guards for moving parts must not be removed from the machine during operation!
- Any leakage of hazardous (e.g. explosive, toxic, hot) fluids (e.g. from the shaft seal) must be drained away so as to prevent any risk occurring to persons or the environment. Statutory regulations are to be complied with.

- Hazards resulting from electricity are to be precluded (see, for example, the VDE specifications and the bye-laws of the local power supply utilities).

2.6 Safety instructions relevant for maintenance, inspection and assembly work

It shall be the plant operator's responsibility to ensure that all maintenance, inspection and assembly work is performed by authorized and qualified personnel who have adequately familiarized themselves with the subject matter by studying this manual in detail. Any work on the machine shall only be performed when it is at a standstill, it being imperative the procedure for shutting down the machine described in this manual be followed.

Pumps and pump units which convey hazardous media must be decontaminated.

On completion of work all safety and protective facilities must be re-installed and made operative again.

Prior to re-starting the machine, the instructions listed under „Initial commissioning“ have to be observed.

2.7 Unauthorized alterations and production of spares

Any modifications may be made to the machine only after consultation with the manufacturer. Using spare parts and accessories authorised by the manufacturer is in the interest of safety. Use of other parts may exempt the manufacturer from any liability.

2.8 Unauthorized modes of operation

The reliability of the machine delivered will be only guaranteed if it is used in the manner intended, in accordance with clause 1 of this manual. The limit values specified in the data sheet must under no circumstances be exceeded.

3 Transportation and storage

3.1 Transportation

The pump is delivered by the manufacturer in a ready-to-work state. In the event of damages occurring during and due to transportation the forwarding agent must make a factual statement. The pump should always be transported appropriately and according to the state of the art.

3.2 Storage

An eventual storage place must be absolutely dry. Make sure that the interior of the pump is protected from pollutants.

4 Product features and accessories

4.1 General description

The magnetically coupled pumps of group 3.1 are **self-priming** pumps of plastics, single-staged, horizontal in block system. Pump and electrical motor are connected by a magnet coupling which transmits the motor power to the impeller.

The pumps are constructed with an integrated suction tank, which has to be filled-up prior to the first start-up!

4.2 Design

Housing, impeller, impeller magnet and rear casing are made of plastics. Standard pumps are equipped with centering shafts and bearings made of oxide ceramics. The rear casing hermetically seals the fluid from the ambient atmosphere. Because of magnetic power transmission, there is no

need to mechanically seal the shaft. So, in contrast to mechanical or gland sealed pumps, leakages through worn shaft sealing are definitely ruled out.



The pump is magnetically coupled. Attention: Coming in contact with permanent magnetic parts during repair or maintenance work dangerously exposes to magnetic forces which, for example, may influence pace-makers.

Keep your distance!

The pump housing parts are sealed by static o-rings. The impeller of the pump is a radial flow wheel. Depending on the fluid to be delivered each component of the pump is available in various materials.

NOTE!

The materials used are listed on the name plate or the delivery note!

Choice of material:

Pump housing, rear casing, impeller, impeller magnet coating and suction tank	PP, PVDF
Centering shaft	Oxide ceramics
Bearings	Oxide ceramics
Thrust rings	Oxide ceramics Teflon-Graphite
Seal material	FKM, EPDM, FEP (FKM/FEP-coated)

4.3 Accessories

Hose connections, thermo switches, switch-on and -off with cable and plug,

protective motor switches, sieves, foot valves and more components are available upon inquiry.

5 Mounting and installation

The place of installation should be dry and make easy to handle the pump. At moist area a good ventilation has to be guaranteed:

Ambient temperature:	-10 °C bis +40 °C
Humidity max.:	95 % relative humidity, non-condensing

NOTE!

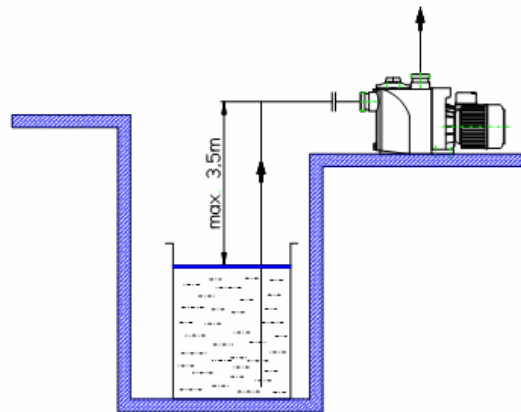
In case of higher ambient temperatures please consult your supplier/manufacturer!

5.1 Mounting

The pump is set up to be mounted horizontally and please attend to leave enough space for maintenance. In fact of the pump is conditionally self-priming it's also possible to install it above the liquid level.

Following geodetic suction heights have to be kept:

Type	Max. suction height @ water 20°C
12/175	3,0 m WC
15/225	3,5 m WC
18/250	1,0 m WC



The max. suction height, depending on the kind of liquid, can be reduced in reason of:

- Friction loss in the suction line
- Higher temperature of liquid
- Higher density or/and viscosity
- Lower boiling point

CAUTION!

Please take care for vacuum resistant connections at the suction line. If the suction line is leaky, the pump will suck-up very bad or not at all.

5.2 Hoses and pipe lines

Make sure that the cross-sections of the pipe lines fit the suction and discharge ports. All suction and discharge line to the pump housing should be free of tension. The weight of the hoses and pipes must not burden the housing.

CAUTION!

Do not install any quick-acting stop valves into the tubes! Pressure jerks may damage the pump- and magnet housing!

5.2.1 Suction line

- The suction line should be a tube or hose which will not deform by the

resulting partial vacuum or by high temperatures.

- The suction line should be as short as possible. Make sure to mount it so that there will be no gas accumulation.
- Especially at long suction lines and suction heights of more than 1,5 m we recommend the installation of a foot valve for shortening the suction time. The foot valve will prevent total drainage of the suction line when the pump stands still.
- When dimensioning pipelines, fittings etc., make sure to keep the flow resistances as low as possible.
- Flow velocity within the fitted suction line should not exceed the limit of 1m/s.
- For easy installation and removal of the pump, a shut-off valve (but no diaphragm valve) should be built into the suction line.

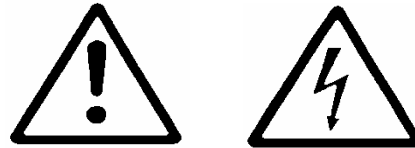
ACHTUNG

Do not use the shut-off valve built into the suction line to adjust the delivery rate.

5.2.2 Discharge line

- Standard flow velocity within the discharge line is 3m/s.
 - To adjust the flow rate, we recommend installing a control element to the discharge line.

5.3 Electrical connection



All electrical connections to the pump should be performed by experts only.

- All electrical connections and installations of additional protection devices should be performed by experts only and in accordance with the instructions of your local power supplier and/or the Association of German Electrotechnical Engineers VDE.
- The motor must be equipped with a motor circuit-breaker or a pilotherm to protect it from overloading.

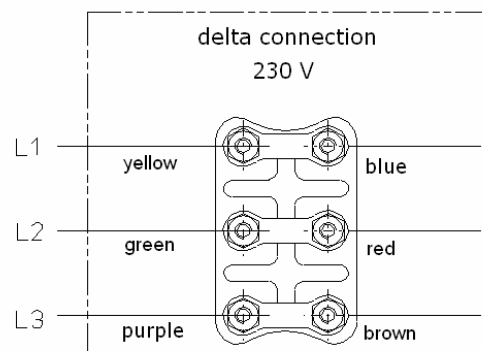
NOTE!

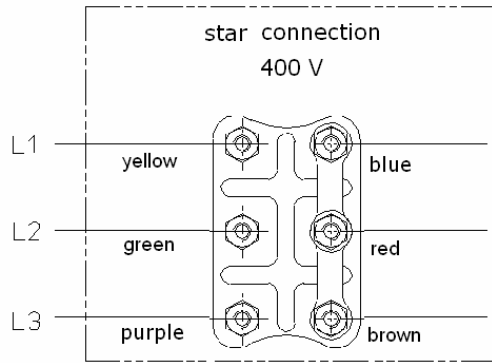
Motor protection devices are available with the pump's manufacturer.

- Make sure that the power supply has been cut off for at least 5 minutes before you start working on the terminal box of the pump.
- Check out whether the power supply available corresponds to the data given on the name plate.

The electrical connections had to be done according to the following schematic:

Three phase motor:



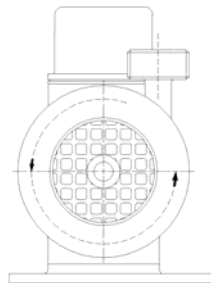


5.4 Check sense of rotation

CAUTION!

Do not check the sense of rotation before the pump is filled with fluid.

- Check the sense of rotation of the motor by switching it on and off in immediate succession. The sense of rotation must be in accordance with the arrow figuring on the pump. Slip a soft material, such as a paper strip, into the slits of the motor skirt to determine the sense of rotation



- Mind the sense of rotation indicated by an arrow on the pump and verify if after installation.
- If necessary, please change the sense of rotation by interchanging of 2 phases at the terminal board.

6 Starting and shut-down procedures

6.1 Preparations for starting

Always wear protective clothing!

- The suction housing has to be filled-up with water respectively pump medium.

Pump of PP:

Open both toggle screws at the cover on the pump housing and fill-up the liquid.

Set in the cover currently and tighten the toggle-screws equally.

Pump of PVDF:

Open the screwed cover on the pump housing and fill-up the liquid.

Screw the cover and tighten it closely.

Please take care the the cover at the pump housing is air-proof, otherwise the pump is not able to suck-up.

CAUTION!

Avoid any dry-running of the pump!

NOTE

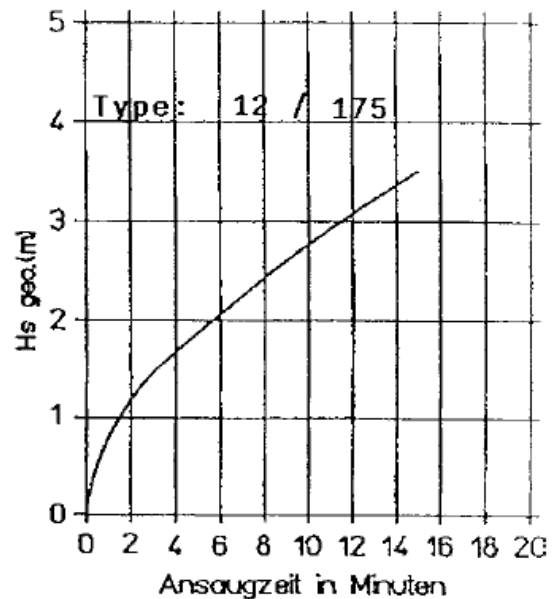
We recommend installing dry-running protection devices such as flow monitors, contact manometers, differential pressure switches or level controllers.

- Tighten all screwed connections..
- Entirely open all valves of the suction line.

6.2 Starting the pump

- Switch on the motor.

- Await the procedure of sucking up until the pump has evacuated the suction line. This can last until 15 minutes.



- Adjust the operating point by slowly opening the shut-off valve of the discharge line. If there is no shut-off valve installed to the discharge line, the operating point is automatically adjusted in accordance with the characteristic curve of the pump.

CAUTION!

Do not run the pump with the discharge line closed for a longer period of time. This may result in heating up the fluid inside the pump housing and damaging interior components of the pump.

CAUTION!

Always protect the pump from coarse impurities and magnetisable metal particles within the fluid delivered.

6.3 Operation

If the motor-circuit breaker switched off the pump motor, proceed as follows:

- Before switching on the motor again, check whether the impeller turns readily.
- Make sure that the suction line and the pump housing are filled with fluid.
- Switch on the motor.

CAUTION!

Please comply with the respective regulations that are currently in force at your place (especially with regard to electronic scrap).

If the pump delivers for a short period of time only and then stops pumping, the magnetic coupling has been disengaged. Proceed as described in chapter 8, Troubleshooting, below.

6.4 Shut-down procedure

- Switch off the motor.
- Close all valves.
- In case some fluid remains within the pump, secure the shut-off valves to prevent an accidental opening.
- If the pump is not to be used for some time, carefully rinse it off with a clean and neutral liquid. This is to prevent remaining fluid from depositing within the pump and the sleeve bearings.
- If the pump is shut down for repair or maintenance work, lock the driving unit so that it cannot be switched on. Before dismantling the pump, close the suction and the discharge lines and empty the pump under controlled conditions.
- Secure all valves to prevent an accidental opening. Wear protective clothing!

6.4 Waste disposal

This product as a whole as well as parts of it should be disposed of in an environmentally safe way.

7 Service and maintenance

7.1 General information

This pump is designed for continuous operation and does not require specific maintenance.

7.2 Preventive maintenance

- Although bearings, centering shaft and starting rings are designed for continuous operation, they should be periodically inspected for deposits.
- If you deliver crystallising fluids, make sure that the fluid does not crystallise within the pump. Should this happen, carefully rinse off all parts being in contact with the fluid once the pump has been shut off.
- Please check the condition of the static seals at regular intervals and replace them, if necessary!
- Before longer shutdown periods we recommend to flush the pump cleanly. Please take care that no residual dirt can cure in the pump and will block out the impeller at the re-start.
- If not only wear parts are replaced, but also repair work is to be done, this should be performed by an expert only. Inappropriate service and maintenance work often results in a waste of money.

CAUTION!

When assembling or disassembling the pump, make sure that there are no magnetisable metal particles in the working area.



When the complete head of the pump is assembled or disassembled, magnetic forces can cause serious injury.

CAUTION!

After completion the pump head the impeller (item 230) and the impeller magnet (item 847.1) should be sliding along the axis of the centering shaft (item 211)!

8 Troubleshooting

Malfunction	Causes	Corrective action
Pump does not run when switched on	No voltage	Test the voltage
	Impurities in the pump housing	Remove the impurities
Pumpe does not suck-up	Wrong sense of rotation	Reverse the polarity of the motor
	Pump housing is not filled-up	Fill-up the housing with liquid
	Suction line is not vacuum tight	Tighten the connections
	Discharge line is closed by valve or liquid, so that the suction line can not be evacuated	Open the valve and evacuate the discharge line
Magnet clutch is disengaged	Resistance in the suction line is too high	Reduce the suction height and/or clean the suction line
	Specific weight and/or viscosity of the fluid is too high	Reduce the delivery rate; use a stronger magnet clutch and a more powerful motor.
	Pump was switched off, then switched on again, before the rotor stopped.	The rotor should have stopped, before the pump can be switched on again.
Motor is overheating	Impeller blocks out	Clean the inner parts
	Clogged ventilator cowl	Clean the ventilator and the cowl
	Motor is overloaded	Reduce the delivery rate. Use a stronger motor.
Pump is working, but not delivering	Motor cooling is not sufficient	Care for a better motor cooling
	Gas accumulation in the lines	Evacuate the lines
Too much flow noises	Valve in suction/delivery line is closed	Open the valves
	Cavitation	Increase the suction line cross-section Reduce the delivery rate Cool down the fluid

Malfunction	Causes	Corrective action
Delivery rate is too low	Air in the system	Evacuate the system
	Suction and delivery line cross-sections are too small (significant losses)	Increase the suction- and delivery line cross-sections
	Cavitation	Increase the suction line corss-section
	Wrong sense of rotation	Reverse the polarity of the motor
	Valve is not entirely open	Open the valves
Delivery rate is too high	Pump losses are less significant than presumed	Install a flow control valve in the delivery line
Leakage between pump and motor	Casing is damaged, damage by solid parts or dry-run	Dismount the pump by an expert and repair the damage

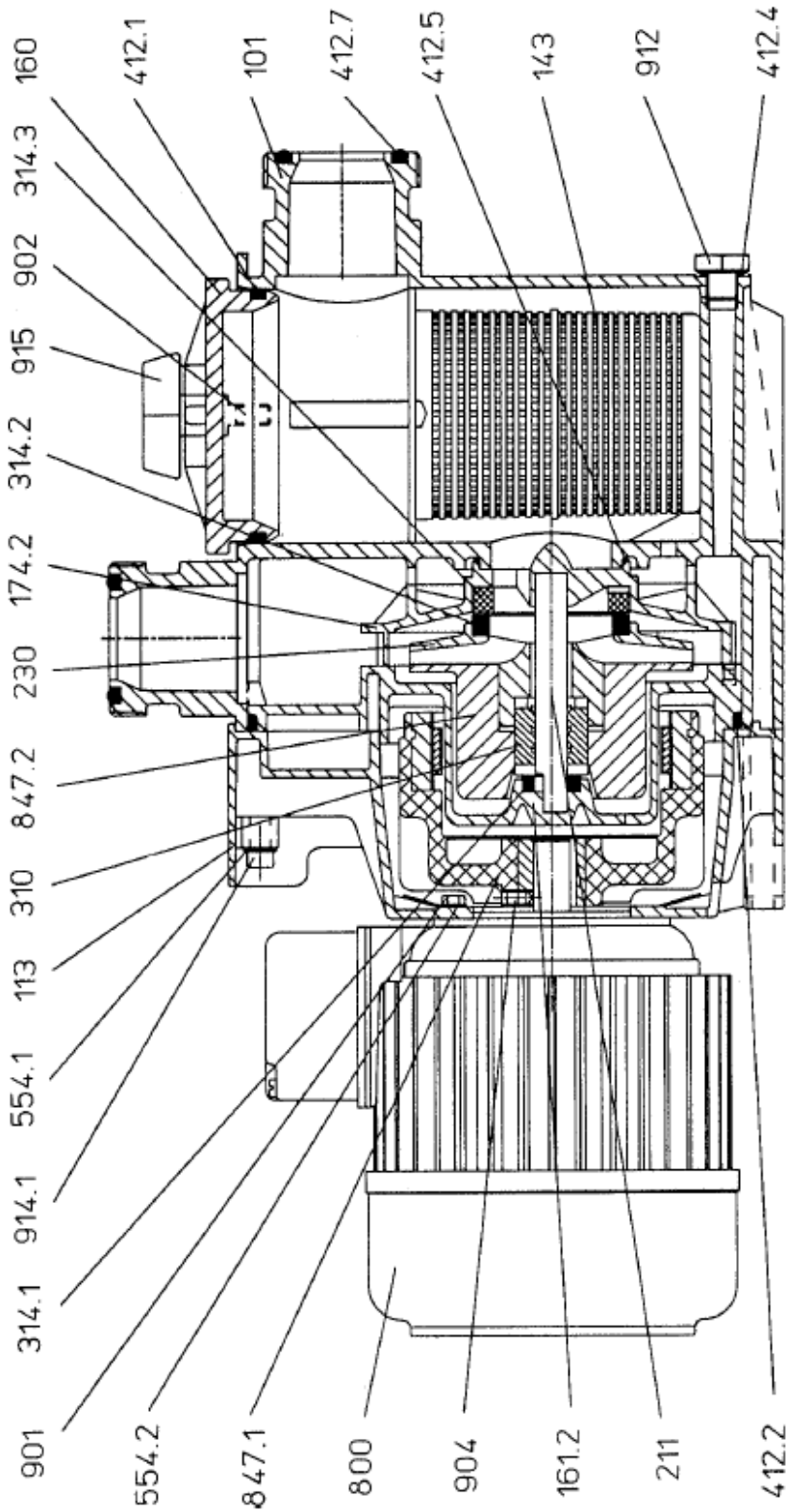
NOTE!

At dry-running of the pump, the impeller magnet will heat-sealed with the magnet housing. The remaining liquid heats up inside the casing in fact of the rotation of the impeller on the shaft and will vaporize. The heat cannot evacuate any more, the plastic material will lose it's consistency and this results into a frictional welding.

The pump may not run for longer time against the closed pressure line or with closed suction line. If the „dry-run“ is happened, liquid gets out of the hole in the intermediate housing between pump and motor, because by the welding of the inner parts the magnet housing can get leaky.

9 Spare parts

9.1 Sectional view RMB-3.1 made of PP



9.2 Spare parts list RMB-3.1 made of PP

Pos. Item.	Stück Qty	Bezeichnung	Description	Material	Abmessung Dimension
101	1	Gehäuse mit Gewinde 2"	Pump casing with R2"	PP	BG 3.1
113	1	Zwischengehäuse 0,75kW	Intermediate Casing	PP	BG 3.1
143	1	Saugsieb (optional)	Suction screen	PP	
160	1	Deckel (mit Knebel)	Cover with clamp	PP	BG 3.1
161.2	1	Spalttopf kpl. mit Anlaufscheibe	Casing cover cpl. with Item 314.1	PP	BG 3.1
174.2*	1	Leitschaufeleinsatz	Guide blade insert	PP	BG 3.1
211*	1	Zentrierwelle Oxidkeramik	Centering shaft	Keramik	60 mm
230*	1	Laufgrad 115 mm	Impeller	PP	
310*	1	Gleitlager	Bearing	Keramik	BG 3
314.1*	1	Anlaufring Spalttopf	Thrust disc casing	Keramik	
314.2*	1	Laufgrad-Anlaufring	Impeller thrust ring	Teflon-G.	
314.3*	1	Gehäuse-Anlaufring	Casing thrust disc	Keramik	
412.1*	1	O-Ring	O-ring	Viton	90 x 5
412.2*	1	O-Ring	O-ring	Viton	164,47x5,33
412.4*	1	O-Ring	O-ring	Viton	11 x 2,5
412.5*	1	O-Ring	O-ring	Viton	50 x 3,0
412.7*	1	O-Ring	O-ring	Viton	40,6 x 5,3
554.1	8	U-Scheibe DIN 125	Washer	A2	6,4
554.2	4	U-Scheibe DIN 125	Washer	A2	5,3
ohne	1	Motorzwischenflansch		Al	
800	1	Motor 0,75 kW, 230/400 V	Motor 0,75 kW, 400 V		3000 min-1
847.1	1	Antriebsmagnet 30(30S)	Drive magnet	PP	D = 17 mm
847.2	1	Innenmagnet	Impeller magnet	PP	D = 115 mm
901	4	Zylinderkopfschraube	Cylinder head screw	A 2	M 5 x 12
902	1	Stiftschraube	Pin screw		
904	1	Gewindestift DIN 914	Threaded pin	H 45	6 x 10
912	1	Entleerungsstopfen	Drain plug	PP	
914.1	8	Innensechskantschraube	Hexagon screw	A 2	6x100DIN912
915	2	Knebel RMB	Clamp	PP / A 2	
OHNE	1	Laufgradmagneteinheit bestehend aus den Pos. 230, 310, 314.2, 847.2.			

* Parts of wear and tear

NOTE!

In case of ordering spare parts, please indicate the item of the needed part, the pump type, the serial-no., motor power and drawing-no.

9.4. Spare parts list RMB-3.1 made of PVDF

Pos. Item.	Stück Qty	Bezeichnung	Description	Material	Abmessung Dimension
101	1	Gehäuse mit Gewinde 2"	Pump casing with G2"	PVDF	BG 3.1
113	1	Zwischengehäuse 0,75kW	Intermediate Casing	PP	BG 3.1
161	1	Spalttopf kpl. mit 314.3 Anlaufscheibe	Casing cover cpl. with Item 314.3	PVDF	BG 3.1
174	1	Leitschaufeleinsatz	Guide blade insert	PVDF	BG 3.1
211*	1	Zentrierwelle Oxidkeramik	Centering shaft	Keramik	60 mm
230*	1	Laufrad 115 mm	Impeller	PVDF	D=115
310*	1	Gleitlager	Bearing	Keramik	BG 3
314.1*	1	Anlaufring Gehäuse	Thrust disc casing	Keramik	
314.2*	1	Laufrad-Anlaufring	Impeller thrust ring	Teflon-G.	
314.3*	1	Anlaufscheibe Topf	Casing thrust disc	Keramik	
412.1*	1	O-Ring Gehäuse	O-ring casing	Viton	132 x 3
412.2*	1	O-Ring	O-ring	Viton	40 x 5
412.3*	1	O-Ring	O-ring	Viton	47 x 5,3
412.4*	1	O-Ring	O-ring	Viton	50 x 3,0
412.5*	1	O-Ring	O-ring	Viton	40 x 5
554.1	4	U-Scheibe DIN 9021	Washer	A2	6,4
554.2	8	U-Scheibe DIN 125	Washer	A2	6,4
554.3	20	U-Scheibe DIN 125	Washer	A2	6,4
723	1	Motorzwischenflansch		Al	0,75 kW
724	1	Blindscheibe PVDF		PVDF	G 2 1/4
800	1	Motor 0,75 kW, 230/400 V	Motor 0,75 kW, 400 V		3000 min-1
847.1	1	Innenmagnet PVDF 30 S	Impeller magnet 30 S	PVDF	D = 115 mm
847.2	1	Antriebsmagnet 30/30 S	Drive magnet 30/30S		D = 17 mm
901.1	4	Skf-Schraube DIN 933	Hexagon screw	A 2	M 6 x 25
901.2	10	Skf-Schraube DIN 933	Hexagon screw	A 2	M 6 x 30
901.3	8	Skf-Schraube DIN 931	Hexagon screw	A 2	M 6 x 65
904	1	Gewindestift DIN 914	Threaded pin	H 45	6 x 10
920.1	8	Sechskantmutter DIN 934	Hexagon nut DIN 934	A 2	M 6
920.2	10	Sechskantmutter DIN 934	Hexagon nut DIN 934	A 2	M 6
920.3	1	Überwurfmutter PVDF	Nut	PVDF	G 2 1/4
940	1	Paßfeder	Fitting spring		
OHNE	1	Laufradmagneteinheit bestehend aus den Pos. 230, 310, 314.2, 847.1	Impeller unit cpl. Item 230, 310, 314.2 + 847.1		

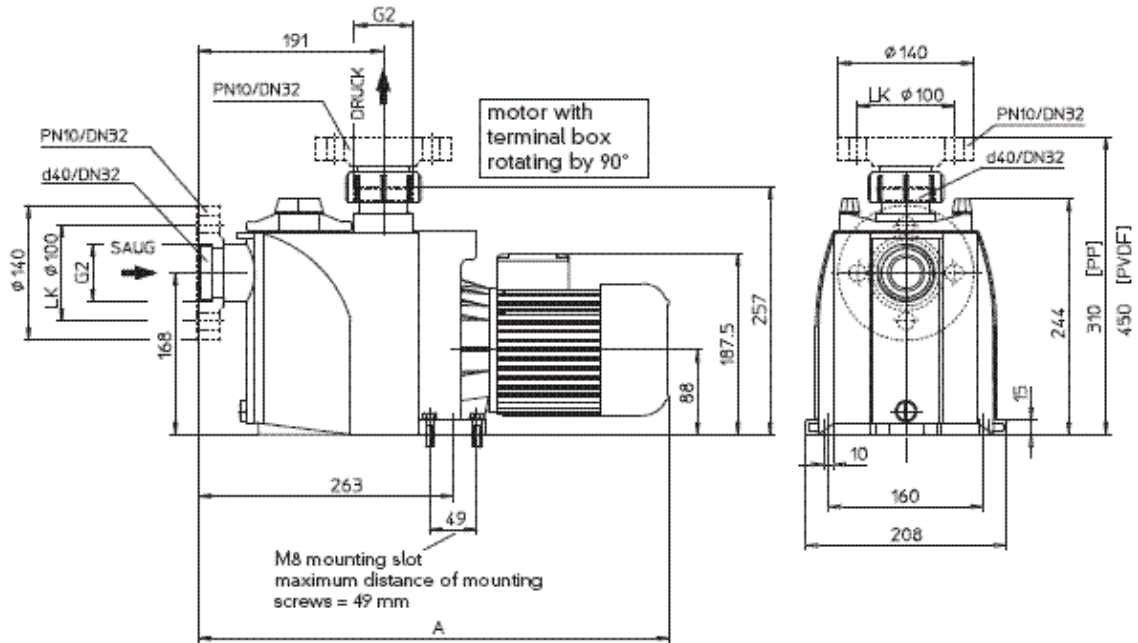
* Parts of wear and tear

NOTE!

In case of ordering spare parts, please indicate the item of the needed part, the pump type, the serial-no., motor power and drawing-no.

10 Appendix

10.1 Dimensioned drawing RMB 3.1



Position of the terminal box: standard position is on top (if you need it mounted on the right or the left, please indicate when placing your order).

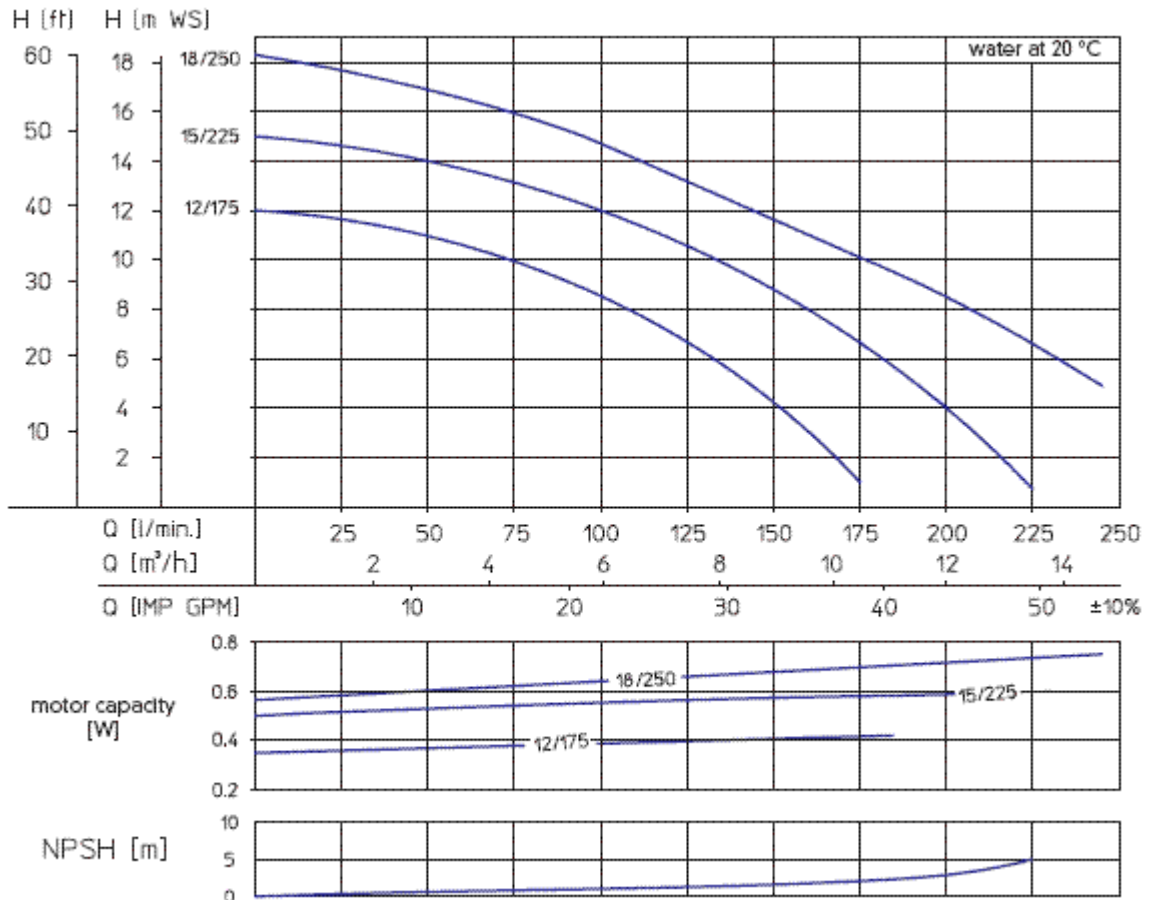
10.2 Technical Data

TECHNICAL DATA				
size	12/175		15/225	18/250
maximum delivery rate [l/min]	175		225	240
maximum delivery head [m wc]	12		15	18
max. suction head at 20 °C [m wc]	3.0		3,5	1.0
maximum density [g/cm ³]***	1.3	1.8	1.2	1.0
motor capacity at 50 Hz [kW]	0.55	0.75	0.75	0.75
motor capacity at 60 Hz [kW]	0.66	0.9	0.9	0.9
current rating (400 V) [A]	1.6	2.2	2.2	2.2
rated speed at 50 Hz [min ⁻¹]	2800	2800	2800	2800
rated speed at 60 Hz [min ⁻¹]	3400	3400	3400	3400
parts suction side	G2	G2	G2	G2
ports discharge side	G2	G2	G2	G2
weight approx. [kg]	10	13	13	13
dimension A [mm]	490	500	500	500
voltage**	230 V ac or 230/400 V three-phase current			
protection class	house-proof according to IP 55			
recommended maximum flow rate	suction side 1 m/s		discharge side 3 m/s	
materials	PP		PVDF	
maximum temperature	65 °C		85 °C	
maximum system pressure at 20 °C	2.5 bar		3.5 bar	

** Other voltages available upon request.

*** With maximum volume rate of flow. To deliver liquids with a higher relative density, the pump has to be throttled (see the following performance chart).

10.3 Performance Charts



10.4 Labour protection and accident prevention

NOTE!

In order to protect their employees and other people as well as the environment from harmful influences and effects when handling hazardous substances, industrial and commercial companies are obliged to comply with legal provisions referring to labour protection such as the German Workplace Regulations (ArbStättV), Hazardous Substances Regulations (GefStoffV) and regulations for the prevention of accidents, as well as environmental regulations such as the German Waste Act (AbfG) and the Water Resources Law (WHG).

We therefore ask you to enclose a declaration of harmlessness with any pump or component you send us for repair. With this form duly filled in and signed, you declare that the pump or the component was cleaned and thoroughly rinsed with neutral fluid before being shipped to us. Notwithstanding this, we reserve the right to refuse acceptance of repair orders for any other reason.

So SONDERMANN products and their components are neither serviced nor repaired unless this declaration of harmlessness is enclosed (see page 25 below).

Pumps that have been operated with radioactive substances are not accepted at all.

In case that, although the pump was carefully emptied and cleaned, we have to take any safety precautions, you have to give us the necessary information when sending the pump or its component.

10.5 Declaration of harmlessness

The undersigned herewith declares that the following pump and its accessories are harmless and asks you to service and/or repair it or them.

Type of the pump:

.....
.....

Serial number:

.....

Date of delivery:

.....

Kind of problem:

.....
.....

We herewith declare that

the pump was not used to deliver harmful or noxious substances;

it was used with the following fluids:

.....
.....

before being shipped, the pump was carefully emptied and cleaned inside and out;

it is not necessary to take any special safety precautions;

you have to take the following safety precautions with regard to residual fluids and waste disposal:

.....
.....

Date:

signature:

S O N D E R M A N N

PUMPEN + FILTER GMBH & Co. KG

August-Horch-Str.4

D - 51149 Köln (Cologne - Germany)

Tel.: +49 (0) 2203/9394-0

Fax: +49 (0) 2203/9394-48

info@sondermann-pumpen.de

www.sondermann-pumpen.de

Subject to alterations!