



SONDERMANN
PUMPEN + FILTER GMBH & Co. KG

OPERATION INSTRUCTIONS

**Magnetically Coupled Centrifugal Pumps
Type 2.1 / self-priming**

Made of PPS / PVDF



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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-Maschinenrichtlinie 2006/42/EG Die Schutzziele der Niederspannungs-Richtlinie werden gemäß Anhang I, Nr. 1.5.1 der 2006/42/EG eingehalten. | EC Machinery Directive 2006/42/EG The protection objectives of the low-voltage directive are realized according annex I, No. 1.5.1 of 2006/42/EG. | Directive CE Machines 2006/42/CG Le protection de bas voltage considerer de appendice I, Numero 1.5.1 de 2006/42/EG. |
| (2) Elektromagnetische Verträglichkeit 2004/108/EG | Electromagnetic Compatibiliy 2004/108/EG | Compatibilité électromagnétique 2004/108/EG |
| (3) Harmonisierte Normen insbesondere EN 809 | Harmonized standards in particular EN 809 | Norme en vigueur en particulier EN 809 |

Köln, 04.01.2010

S O N D E R M A N N
PUMPEN + FILTER GMBH & Co. KG



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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 pump's supplier and / or the manufacturer.

1.1 Fields of application

- Pumping low-viscosity liquids resembling water
- Pumping of acids, bases and others
- 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 list.

NOTE

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

- Beim Fördern von auskristallisierenden Medien ist unbedingt darauf zu achten, dass das Medium nicht in der Pumpe auskristallisiert. Ggf. sind alle flüssigkeitsberührten Teile unmittelbar nach der Außerbetriebsetzung gut zu spülen.

1.2 Technical data

The nameplate on the pump not only specifies its model type but also its operating data and serial number. Please indicate all these data when inquiring about an issue, reordering parts and especially when ordering spare parts. For further information, contact your pump's supplier or the manufacturer.

Technical data:

(see also appendix)

| | |
|--|--|
| Max. volume flow: | according to name plate |
| Max. delivery head: | according to name plate |
| Materials: | PPS oder PVDF, ceramic, FKM , EPDM, FEP |
| Supply voltage: | according to name plate |
| Motor power: | 0,37 - 0,55 kW |
| Rated current: A | according to name plate |
| Sense of rotation: | left, seen from the pumps towards the motor |
| Speed: | 1400 min ⁻¹ or 2800 min ⁻¹ |
| Protection class: | IP 55 (TEFC) |
| Weight: | approx. 9 kg |
| Max. admissible temperature of fluid delivered: | |
| PPS | 80°C |
| PVDF | 95°C |
| Maximum system pressure at 20°C: | |
| PPS | 6,0 bar |
| PVDF | 6,0 bar |

NOTE

To find out the maximum admissible temperature of the fluid delivered, check out the materials of which the pump is made and which are indicated on the nameplate or the delivery note.

The letters written on the nameplate are to be read as following:

| | | |
|------|---|----------------------------|
| PPS | = | PPS (Ryton) |
| PVDF | = | PVDF |
| K | = | Oxide ceramic |
| G | = | PTFE |
| V | = | Seal *) |
| K | = | Bearing ceramic |
| (G) | = | Bearing Teflon-Graphite |
| K | = | Casing thrust ring ceramic |
| K | = | Centering shaft ceramic |

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

2 Safety

When installing, operating and maintaining the pump, the mounting and operating instructions detailed in the following should be strictly observed. Hence it is absolutely necessary that prior to assembling and starting the pump, the responsible installation personnel and/or users carefully read these operating instructions. Make sure that they are always available wherever the pump is used.

Not only the safety instructions detailed in this Safety chapter are to be observed but also the specific safety instructions provided in the following chapters.

2.1 Marking of safety instructions in this operating manual

Safety instructions given in this manual and non-compliance with which could be injurious to human beings, are identified by the general symbols as following:



Safety sign according to: DIN 4844-W9 German standard

Warnings of electricity are identified by the specific



Safety sign According to DIN 4844-W German standard

Safety instructions non-compliance with which would give rise to malfunctions of the equipment are identified by

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

All personnel responsible for operation, maintenance, inspection and assembly of the pump must be adequately qualified. Scope of responsibility and supervision of the personnel must be exactly defined by the plant operator. If staff members do not have the necessary knowledge, they should be trained and instructed accordingly. If necessary, the pump manufacturer or supplier will hold this training on behalf of the plant operator. The operator should also make sure that all operating instructions are fully understood by all personnel.

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

Non-compliance with safety instructions may produce a risk to personal life and health as well as to the environment and the pump and may result in a loss of any right to claim damages.

Non-compliance may involve risks such as:

- failure of important functions of the pump and/or the installation;
- failure of specified procedures of service and maintenance;
- exposure of persons to electrical, mechanical, magnetic and chemical hazards;
- endangering of the environment because of hazardous substances leaking.

2.4 Working in compliance with safety regulations

When operating the pump, make sure to observe the safety instructions contained in this manual as well as the relevant national accident prevention regulations and any other service and safety instructions issued by the plant operator.

2.5 Safety instructions relevant for operating the pump

- If hot or cold machine components create any risk, they must be guarded against accidental contact.
- Guards for moving parts must not be removed from the equipment during operation.
- Hazardous (i. e. toxic, hot) fluids must be drained off to prevent any risk to persons or the environment. Statutory regulations are to be complied with in any case.
- Any hazard resulting from electricity should be ruled out completely. (For details see the German VDE specifications and the bye-laws of your local power supply utilities, for example.)

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 equipment shall only be performed when it is at a standstill. Make sure to strictly follow the procedure for shutting down the equipment prescribed in this manual.

Pumps and pump units that deliver hazardous fluids must be decontaminated after use.

On completion of work all safety and protective guards must be re-installed and be fully operational again.

Prior to restarting the pump, make sure to follow the instructions detailed in the Starting chapter below.

2.7 Unauthorized alterations and production of spare parts

The user is not allowed to subject the pump to any modification unless agreed upon with the manufacturer. It is in the interest of your safety to use genuine spare parts and accessories authorized by the manufacturer. Use of other parts may exempt the manufacturer from any liability resulting thereof.

2.8 Inadmissible modes of operation

Operational reliability of this equipment is only guaranteed if it is used in the manner intended, i.e. in accordance with chapter 1, General information, of this manual. The limit values specified in the data sheet must not be exceeded under any circumstances.

3 Transportation and storage

3.1 Transportation

The pump leaves the manufacturer's production site in a ready-to-work state. In the event of damages occurring during and due to transportation, the forwarding agent has to make a factual statement. The equipment should always be transported according to good professional practice.

3.2 Storage

The pump has to be stored absolutely dry and be protected from any pollutants entering.

4 Functional characteristics and accessories

4.1 General description

The magnetically coupled pumps of type RMS 2.1 are **self-priming** side-channel pumps made of plastics, single-staged in horizontal position and monobloc design. A magnetic coupling connects the pump to the motor and transmits the power of the motor to the impeller.

4.2 Constructional design

Housing, impeller, impeller magnet and rear casing are made of plastic. Standard pumps are equipped with centering shafts and bearings made of oxide ceramic. In the PVDF version the impeller is made of ceramic. Der Gehäusespalttopf dichtet das Fördermedium hermetisch gegen die Atmosphäre ab. Because of magnetic power transmission, there is no need to mechanically seal the shaft. So, in contrast to mechanically or gland sealed pumps, leakages through worn shaft sealings are definitely ruled out.



This pump is magnetically coupled. So when handling permanent-magnet components during repair or maintenance work you are exposed to magnetic forces which might influence pacemakers, for example.

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 delivered, each component of the pump is available in various materials.

NOTE

The materials used for the pump are specified on its nameplate or the delivery note!

Choice of materials:

Depending on type (see name plate)

| | |
|--|---------------------------------|
| Pump housing and rear casing, impeller and impeller magnet coating | PPS (Ryton) or PVDF |
| Impeller | PPS or ceramic |
| Centering shaft | Oxide ceramic |
| Bearing | Oxide ceramic |
| Thrust discs | Oxide ceramic |
| Static seals | FKM, EPDM, FEP (FKM/FEP-coated) |

4.3 Accessories and optional equipment

Accessory components including hose connections, pilot therms, motor circuit-breakers and flow monitors, are available on request.

5 Mounting and installation

The pump should be installed at a place that allows easy access at any time. Make sure to keep to the following limit values:

| | |
|---------------------------|--|
| Ambient temperature: | -10 °C up to +40 °C |
| Humidity of the air max.: | 95 % relative humidity, non-condensing |

NOTE

In case of higher ambient temperatures, please contact your pump's supplier or the manufacturer.

5.1 Mounting

The pump has to be mounted in horizontal position, suction- and pressure joints faced upwards! (For the pump housing cannot drain!). For suction operation it has to be filled up with liquid!

Cause this pump is **self-priming** it can be mounted also **above the liquid level**.

In this case the maximum geodetical suction head according to the data sheet has to be considered. Depending on the liquid it can be reduced by:

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

5.2 Hose and pipe lines

Make sure that the cross-sections of the pipelines fit the suction and discharge ports. All suction and discharge lines to the pump housing should be free of tensile stress. The weight of the hose and pipe lines must not rest on the housing.

NOTE

Do not install any quick-acting stop valves into the pipelines, since pressure jerks will damage the pump housing.

5.2.1 Suction line

- Intake line has to be mounted always „falling“and the suction line “upstream”. The suction line should have angles and valves as few as possible.
- For suction line please only use a pipe or hose material, which cannot be deformed by the vacuum, also not a higher temperatures!

- The suction line has to be mounted as short as possible so that no gases can accumulate.
- At design of the pipe lines, fittings etc. please take notice that the flow resistances have to be as low as possible.
- The flow speed inside the suction line should not exceed 1 m/s.
- For easy installation and removal of the pump, a shut-off valve (but no diaphragm valve) should be built into the suction line.

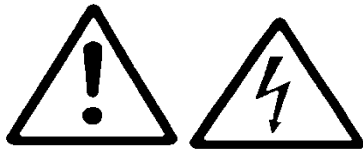
CAUTION!

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.

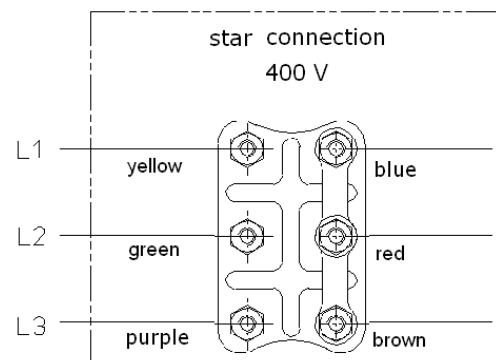
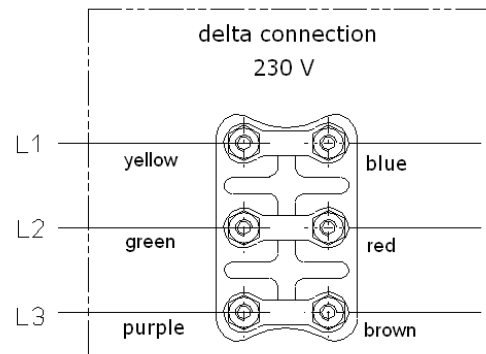
5.3 Electrical connection



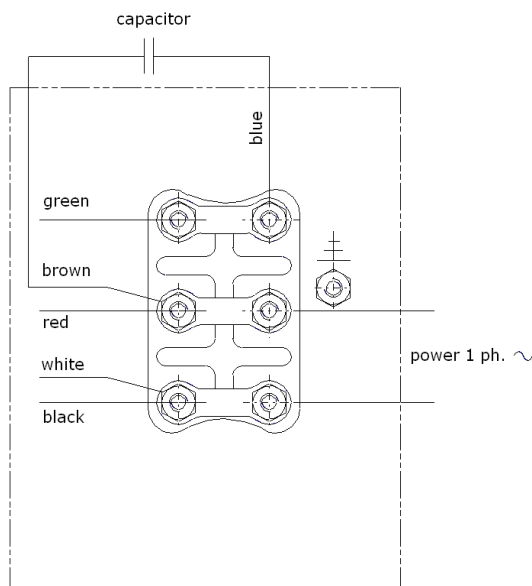
All electrical connections to the pump should be performed by experts only.

- 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.

Three phase motor:



Single phase motor:



NOTE

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

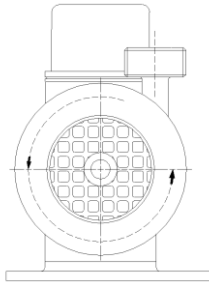
- Make sure that the power supply has been cut off for at least 5 minutes before you start working on the terminal box of the pump.
- Check out whether the power supply available corresponds to the data given on the nameplate.

5.4 Check sense of rotation

CAUTION

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

- Fill the pump housing and the suction line with water or the fluid to be delivered.
- 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 it after installation.

6 Starting and shut-down procedures

6.1 Preparations for starting

Always wear protective clothing!

- Fill the pump housing and the suction line with water or the fluid to be delivered.

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.
- 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.
- 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.

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.

6.5 Waste disposal

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

CAUTION

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

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 dirty, silty or crystallising fluids are delivered, the pump should be inspected more often and cleaned, if necessary.
- Check the static sealings in regular intervals and replace them, if necessary.
- 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.

7.3 Dismantling the pump head

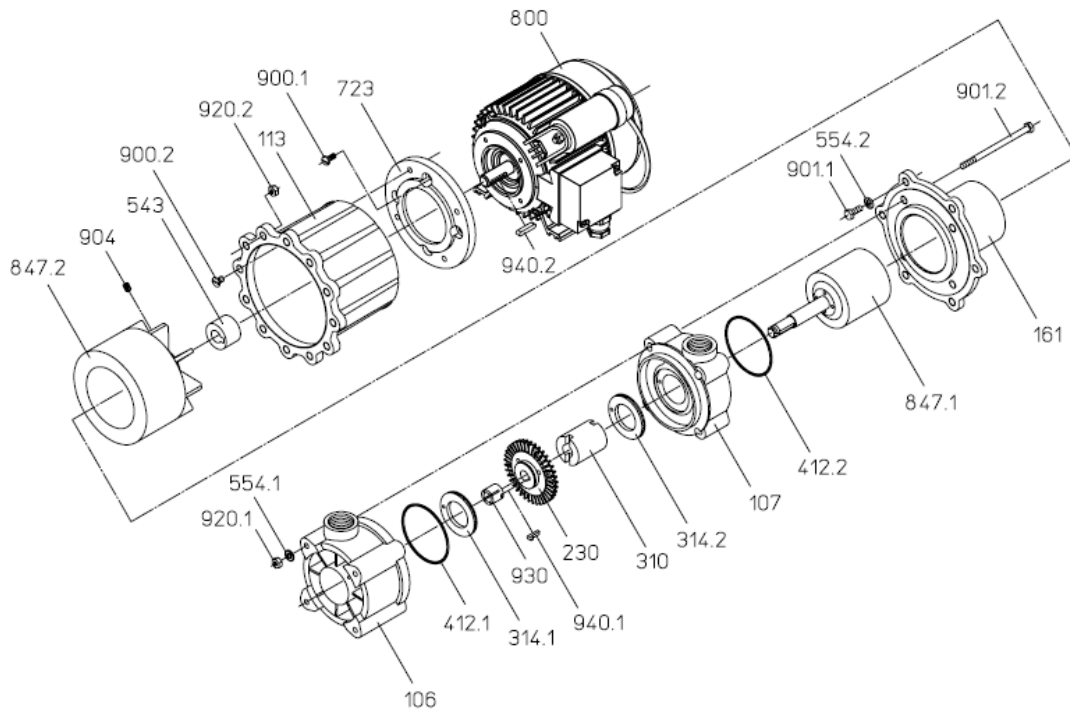
Dismounting the pump

The pump is easy to dismantle by using general tools.

1. After spring-cleaning the pump, please loosen the 4 hexagon nuts (920.1). The screws cling together suction- and pressure housing (106 + 107). Pull off the suction housing (106).
2. Now you have sight on the impeller (230) which is mounted on the ceramic shaft (211) with impeller magnet (847.1) . The fitting-key (940.1) provides a carrier between impeller and shaft.
3. In order to the impeller can't move on the shaft, a clamping sleeve (930) is attached on the shaft (211). At the version in PVDF there is mounted an additional distance sleeve (525).
4. When the impeller (230) is pulled-off the shaft (211) you can dismount the shaft in direction of the casing cover (161). The shaft is passed in a ceramic bearing (310) within the pressure housing (107). The bearing is pressed in the pressure casing and can be changed easily.
5. The casing cover (161) does seal hermetically the pump housing against the drive with drive magnet (847.2) which will transmit the power onto the impeller magnet (847.1).
6. Suction- and pressure housing are sealed by the o-ring (412.1) and the casing cover (161) by the o-ring (412.2) against the pressure housing.

Mounting the pump

1. Please re-assemble the pump in reversed order of above points.
2. Please take special care of exact assembling of o-rings and the intactness of the seals! Otherwise you run the risk of leakages.
3. At normal operation the thrust discs made of ceramic (314.1 + 2) are strained only marginal. When pumping abrasive liquids they are exposed to a higher wear. The discs are glued-in the housing and have a anti-twist device.
4. The rinse grooves in the bearing have to be spring-cleaned when the shaft will be assembled. The shaft must be of easy motion when put ting into the bearing. At signs of wear the shaft and the bearing have to be exchanged.
5. Impeller magnet (847.1) with shaft (211), pressure housing (107) with bearing (310) and assembled impeller (230) must be of easy rotation in the bearing, before this unit can be inserted into the casing cover.
6. The hexagon of the housing screws must catch into a seat in the casing cover. Please notice this at assembling the hexagon nuts.



CAUTION

After exchange of bearing, please check manually if the impeller magnet (847.1) is of easy rotation with the bearing on the centering shaft (211).

- Before longer shut-down periods we recommend a spring-cleaning. Only this way any residues may not harden in the pump (risk of blocking impeller at restarting the pump).

CAUTION

After assembling the pump head, the impeller (230) with impeller magnet (847.1) must still be movable axial on the centering shaft (211).

- Should any other repairs beyond exchange of parts of wear and tear get necessary, these works should only be worked out by an expert. Inappropriate maintenance often results into unnecessary charges.

8 Troubleshooting

| Malfunction | Causes | Corrective action |
|-------------------------------------|--|--|
| Pump does not work when switched on | No voltage | Test the voltage |
| | Impurities in the pump housing | Remove the impurities |
| Magnetic clutch is disengaged | Specific gravity and/or viscosity of the fluid is too high | Reduce the delivery rate; use a stronger magnetic 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 |
| | Impeller blocks out | Clean the inner parts |
| Motor is overheating | Clogged ventilator cowl | Clean the ventilator and the cowl |
| | Motor is overloaded | Adjust the motor protection switch; use stronger motor |
| | Motor cooling is insufficient by air circulation | Take care for well circulated installation location |
| Too much flow noise | Cavitation | Check the suction line; Increase the suction line cross-section; Cool down the fluid |
| | Wrong sense of rotation | Correct the sense of rotation |
| Pump does not suck-up | No fluid in the pump | Fill-up the pump casing with fluid |
| | Suction-line is leaky | Seal the suction-line |
| | Wrong sense of rotation | Correct the sense of rotation |
| Delivery rate too low | Pump suck-up air | Check the suction line and seal it |
| | Suction/Pressure line blocked | Clean and increase the lines |
| | Cavitation | see above |
| | Wrong sense of rotation | Correct the sense of rotation |
| Delivery rate too high | Valve not opened completely | Open the valve |
| | Pump losses are less significant than presumed | Install a flow control valve in the pressure line |
| Leakage between pump and motor | Pump casing is damaged (by solids or by dry-run) | Disassemble the pump by expert repair the damage |

NOTE

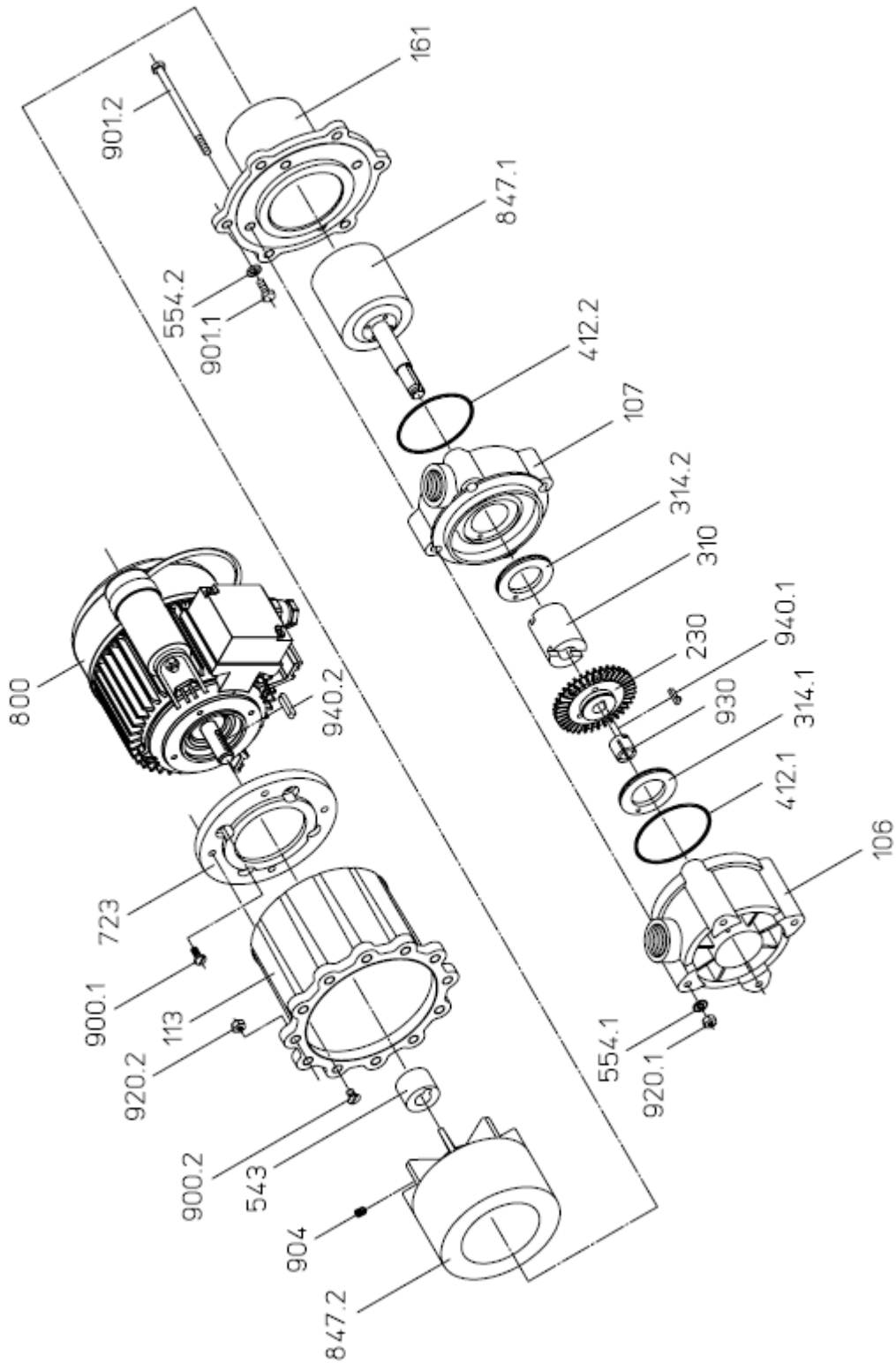
In case of dry-running the pump the impeller magnet will be welded with the casing cover. The remaining liquid inside the pump will be overheated by the rotation of the impeller and finally will evaporate.

The friction heat cannot be dissipated, the material will get more and more plastically and a “friction welding” will be the result.

The pump must not run for longer time with closed valves. If a “dry-run” did happen, liquid will leak out of the bore hole in the lantern between pump and motor, because by welding of the inner parts the casing cover will get leaky.

9 Spare parts

9.1 Spare parts drawing PPS



9.2 Spare parts for pump made of PPS

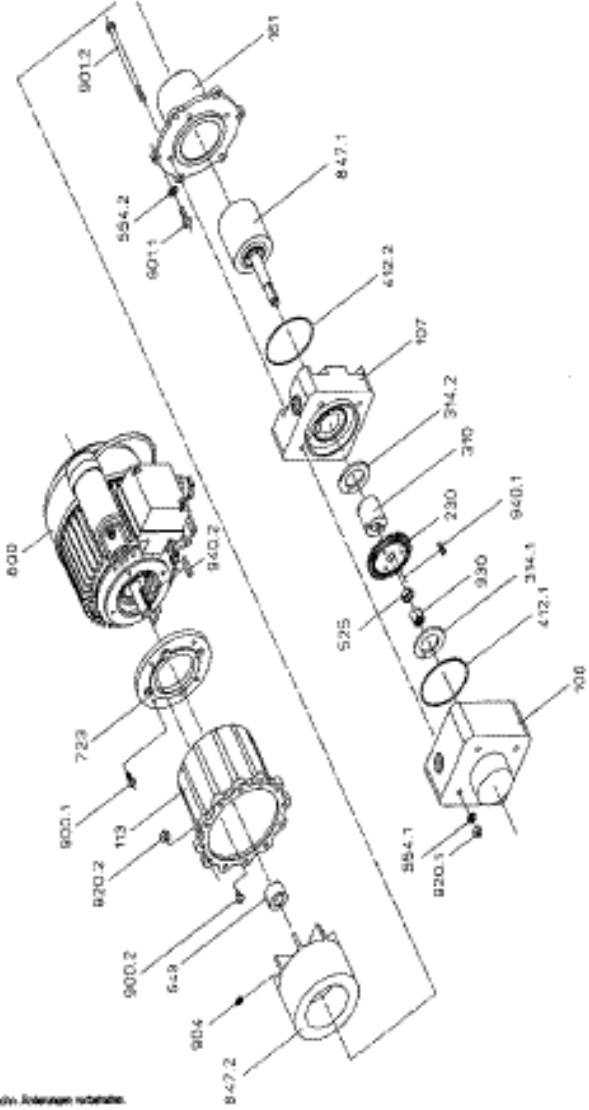
| Item | Qty. | Description | Dimension | Material |
|--------|------|----------------------------|---------------|--------------|
| 106 | 1 | Suction casing | BG 2.1 | PPS |
| 107 | 1 | Pressure casing | BG 2.1 | PPS |
| 113 | 1 | Lantern | BG 2.1 | PP |
| 161 | 1 | Casing cover | BG 2.1 | PPS |
| 230* | 1 | Impeller | BG 2.1 | PPS |
| 310* | 1 | Bearing | | Ceramic |
| 314.1 | 1 | Thrust disc | BG 2.1 | Ceramic |
| 314.2 | 1 | Thrust disc | BG 2.1 | Ceramic |
| 412.1* | 1 | O-Ring | 66 x 2 | FKM/EPDM |
| 412.2* | 1 | O-Ring | 66 x 2 | FKM/EPDM |
| 543 | 1 | Distance sleeve | BG 2.1 | A2 |
| 554.1 | 4 | Washer | 6,4 DIN 125 | A2 |
| 554.2 | 4 | Washer | 6,4 DIN 125 | A 2 |
| 723 | 1 | Flange | BG 2.1 | Al |
| 800 | 1 | Motor | 230/400 V | 0,37/0,55 kW |
| 847.1* | 1 | Impeller magnet with shaft | BG 2.1 | PPS |
| 847.2 | 1 | Drive magnet | D = 14 mm | 2.1-45 |
| 900.1 | 4 | Cylinder head bolt | M 5x12 DIN 84 | A2 |
| 900.2 | 4 | Counter sunk screw | M6x10 DIN963 | A2 |
| 901.1 | 4 | Hexagon screw | M6x16 DIN933 | A 2 |
| 901.2 | 4 | Hexagon screw | M6x100DIN 931 | A 2 |
| 904 | 1 | Threaded pin | M6x10 DIN914 | A2 |
| 920.1 | 4 | Hexagon nut | M 6 | A2 |
| 920.2 | 4 | Hexagon nut | M 6 | A2 |
| 930* | 1 | Clamping sleeve | BG 2.1 | PP |
| 940.1* | 1 | Fitting key | BG 2.1 | PPS |
| 940.2 | 1 | Fitting key | 0,37 kW | Steel |

*) parts of wear and tear

NOTE

**When ordering spare parts, please indicate:
Item-no., exact pump type, serial-no., motor power and drawing-no.**

9.3 Spare parts drawing PVDF



9.4 Spare parts for pump made of PVDF

| Pos. | Stück | Bezeichnung | Abmessung | Material |
|--------|-------|----------------------------|---------------|--------------|
| 106 | 1 | Suction casing | BG 2.1 | PVDF |
| 107 | 1 | Pressure casing | BG 2.1 | PVDF |
| 113 | 1 | Lantern | BG 2.1 | PP |
| 161 | 1 | Casing cover | BG 2.1 | PVDF |
| 230* | 1 | Impeller | BG 2.1 | Ceramic |
| 310* | 1 | Bearing | | Ceramic |
| 314.1 | 1 | Thrust discs | BG 2.1 | Ceramic |
| 314.2 | 1 | Thrust discs | BG 2.1 | Ceramic |
| 412.1* | 1 | O-Ring | 66 x 2 | FKM/EPDM |
| 412.2* | 1 | O-Ring | 66 x 2 | FKM/EPDM |
| 525 | 1 | Distance sleeve | | PVDF |
| 543 | 1 | Distance sleeve | BG 2.1 | A2 |
| 554.1 | 4 | Washer | 6,4 DIN 125 | A2 |
| 554.2 | 4 | Washer | 6,4 DIN 125 | A 2 |
| 723 | 1 | Flange | BG 2.1 | Al |
| 800 | 1 | Motor | 230/400 V | 0,37/0,55 kW |
| 847.1* | 1 | Impeller magnet with shaft | BG 2.1 | PVDF |
| 847.2 | 1 | Drive magnet | D = 14 mm | 2.1-45-30 |
| 900.1 | 4 | Cylinder head bolt | M5x12 DIN 84 | A2 |
| 900.2 | 4 | Counter sunk screw | M6x10 DIN963 | A2 |
| 901.1 | 4 | Hexagon screw | M6x16 DIN933 | A 2 |
| 901.2 | 4 | Hexagon screw | M6x100DIN 931 | A 2 |
| 904 | 1 | Threaded pin | M6x10 DIN914 | A2 |
| 920.1 | 4 | Hexagon nut | M 6 | A2 |
| 920.2 | 4 | Hexagon nut | M 6 | A2 |
| 930* | 1 | Clamping sleeve | BG 2.1 | PVDF |
| 940.1* | 1 | Fitting key | BG 2.1 | PVDF |
| 940.2 | 1 | Fitting key | | Steel |

*) parts of wear and tear

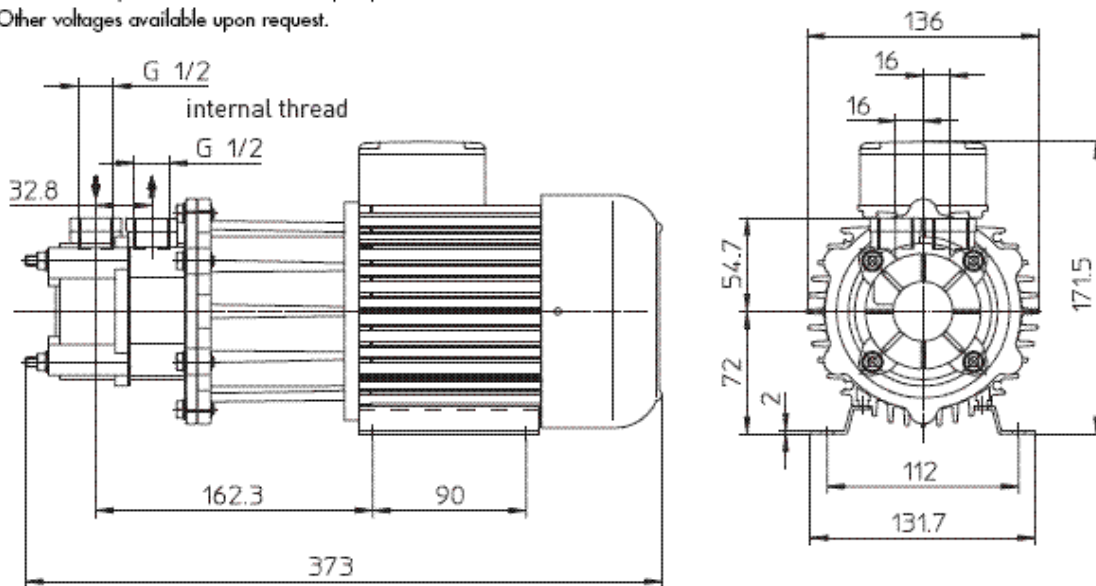
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| NOTE |
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***When ordering spare parts, please indicate:
Item-no., exact pump type, serial-no., motor power and drawing-no.***

10 Appendix

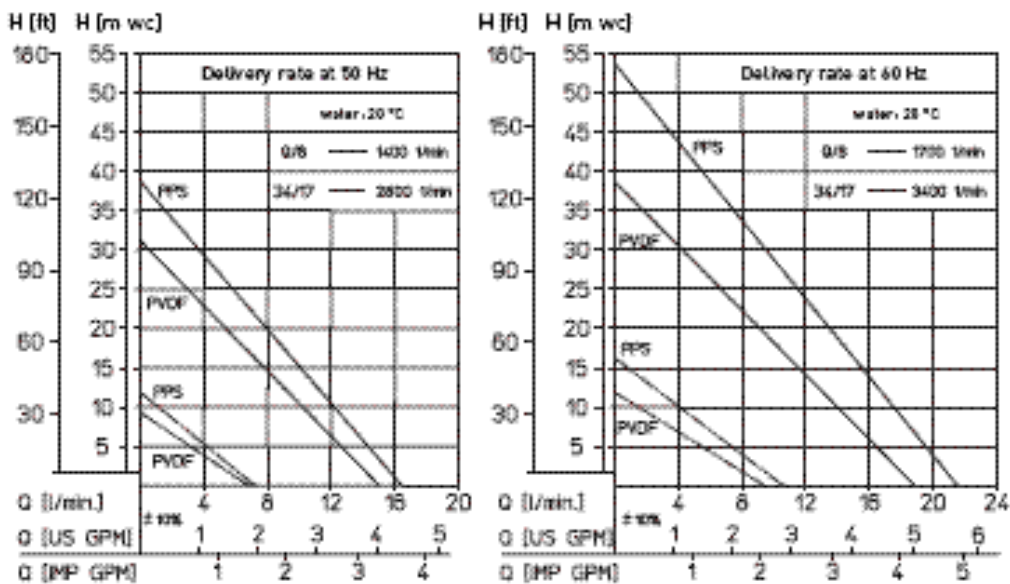
10.1 Dimensioned drawing RMS-PPS, Type 2.1

**Other voltages available upon request.



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 Performance charts



10.3 Technical data

| Type RMS | 9 / 8 | | | | | | 34 / 17 | | | | | |
|---|------------|------------|------------|------------|------------|------------|--------------|------------|--------------|------------|--------------|------------|
| | PPS | PVDF | PPS | PVDF | PPS | PVDF | PPS | PVDF | PPS | PVDF | PPS | PVDF |
| material | | | | | | | | | | | | |
| max. delivery rate value in brackets @ 60 Hz [l/min] | 7 (9,5) | 7 (9) | 7 (9,5) | 7 (9) | 7 (9,5) | 7 (9) | 16,2 (22) | 15 (19) | 16,2 (22) | 15 (19) | 16,2 (22) | 15 (19) |
| max. delivery head value in brackets @ 60 Hz [mWC] | 12 (16) | 10 (12) | 12 (16) | 10 (12) | 12 (16) | 10 (12) | 39 (54) | 31 (38) | 39 (54) | 31 (38) | 39 (54) | 31 (38) |
| max. suction head @ 20 °C [mWC] | 3,0 | 1,0 | 3,0 | 1,0 | 3,0 | 1,0 | 7,0 | 1,0 | 7,0 | 1,0 | 7,0 | 1,0 |
| max. vacuum @ 20 °C [bar] | 0,8 | 0,5 | 0,8 | 0,5 | 0,8 | 0,5 | 0,9 | 0,9 | 0,9 | 0,9 | 0,9 | 0,9 |
| max. temperature [°C] | 100 | 80 | 100 | 80 | 100 | 80 | 80 | 80 | 100 | 80 | 100 | 80 |
| magnet length + strength | 45 | | 45 (30) | | 45 (30) | | 45 | | 45 (30) | | 45 (30) | |
| max. density [g/cm ³] | 1,55 | | 1,35 | | 2,0 | | 1,55 | | 1,35 | | 2,0 | |
| motor capacity P2 @ 50 Hz [kW] | 0,37 | | 0,37 | | 0,55 | | 0,37 | | 0,37 | | 0,55 | |
| motor capacity P2 @ 60 Hz [kW] | 0,44 | | 0,44 | | 0,66 | | 0,44 | | 0,44 | | 0,66 | |
| rated current (400 V) [A] | 0,7 | | 0,7 | | 1,0 | | 1,0 | | 1,0 | | 1,5 | |
| rated speed @ 50 Hz [min ⁻¹] | 1400 | | 1400 | | 1400 | | 2800 | | 2800 | | 2800 | |
| rated speed @ 60 Hz [min ⁻¹] | 1700 | | 1700 | | 1700 | | 3400 | | 3400 | | 3400 | |
| weight approx. [kg] | 6,0 | | 6,5 | | 7,0 | | 7,0 | | 7,5 | | 8,0 | |

| | |
|-------------------------|---|
| voltage* | single phase 230 V ac or three-phase 230/400 V |
| protection class | IP 55 (TEFC) |
| ports | suction side IG ½ female thread discharge side IG ½ female thread |

* Other voltages available upon request

Materials

| Version | PPS | PVDF |
|----------------------------|----------------------|----------------------|
| Housing parts | PPS | PVDF |
| Impeller | PPS | 99,7 % oxide ceramic |
| Lantern | PP | PP |
| Impeller magnet coating | PPS or PP | PVDF |
| Center shaft, thrust discs | 99,7 % oxide ceramic | 99,7 % oxide ceramic |
| Bearings | 99,7 % oxide ceramic | 99,7 % oxide ceramic |

10.4 Labour protection and accident prevention

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| NOTE |
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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.

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:

SONDERMANN

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Website: www.sondermann-pumpen.de

Subject to technical alterations