



WEL-TECH EQUIPMENTS PVT.LTD

MFR.OF INDUSTRIAL CENTRIFUGAL PUMPS

P Series

USER MANUAL FOR " P " SERIES PUMP





P Series

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Introduction

Preface

This manual provides the information for proper functioning and maintenance of the pump and contains instructions to prevent possible accidents and damages and to ensure the safe and smooth functioning of the pump.

Before commissioning of the pump, read the manual carefully and strictly follow the instructions.

General information and safety instruction

The product supplied by WELTECH has been designed with safety in mind.

- Pump installation area must be kept clean and free of obstructions that may restrict safe access to the controls and maintenance access point
- The pump nameplate is fitted to each unit must not be removed. Loss of it could make identification impossible which in turn could cause difficulty in obtaining spare parts. If accidental loss occurs, contact WTE immediately.
- Access to the equipment should be restricted to the personnel responsible for installation, operation and maintenance and they must be trained adequately qualified and supplied with appropriate tools for their respective tasks.
- All personnel that are responsible for installation-operation-maintenance of the pump must study the product instruction manual before any work is done and that they will comply with all local and industry based safety instructions and regulations.
- Safety glasses or goggles should be worn where working with pressurized systems and hazardous substances. Other personal protection equipments must be worn where local rules apply.
-
- Do not wear loose clothing or jewelry which could catch on the controls or become trapped in the equipments.
- Read the instruction manual prior to installation and confirm that the manual is relevant copy by comparing pump type on the nameplate and with that on the manual.
- Note the 'limits of product application and permissible use' specified in the manual. Operation of the equipment beyond those limits will increase the risk from hazardous and may lead to premature hazardous pump failure.
- Clear and easy access to all controls, gauges, and dials etc. must be maintained at all the times.
- Hazardous or flammable material must not be stored in pump rooms unless safe area or racking and suitable containers have been provided.
- Improper installation, operation or maintenance of this WELTECH product could result in injury or death.



Warranty

WELTECH warrants the pump supplied by us is free from defective material and faulty workmanship. This warranty holds good for a period of 12 months from the date of commissioning of the pump or 18 months from the date of dispatch from our factory, whichever is earlier. Our liability in respect of any complaint is limited to replacing part/parts free of charge. Ex-works or repairs of the defective part/parts only to the extent that such replacement/repairs are attributable to our arise solely from faulty workmanship or defective material.

Warranty is void for Mech.seal if Brocken or dry run of pump.

This warranty holds good only for the products manufactures by us.

Service and support

This manual is intended for technicians and maintenance staff and for those who are in charge of ordering spare parts.

This manual contains the spare and replacement parts recommended by WEL-TECH EQUIPMENTS P.LTD.

The pump number is stated on the nameplate. Please refer to this number and the other data mentioned on the nameplate when corresponding or ordering parts.

- Check the consignment immediately on arrival for damage and conformity with the advice note.
- In case of damage and/or missing parts, have a report drawn up by the carrier at once.

2 Safety

These operating instructions contain basic instructions that are to be observed during installation, operation and maintenance. Therefore, it is essential for the erection engineer and the competent expert personnel or operating company to read these instruction before erection work starts and to have the instructions readily available at the site.

Please do not only observe the general safety instructions given in this main safety item, but also the special safety instructions contained in other main items, e.g. for private use.



2.1 Marketing of safety instructions in the manual

The individual safety-instructions here in contained, whose negligence may cause serious accidents and injury to the personnel, according to DIN 4844 W9, are marked with a general warning symbol:



According to DIN 4844 -W8, special warning against electrical voltage is marked with the warning symbol:



In safety instructions, whose negligence may endanger the machine or its functions, the word will be inserted.

CAUTION

It is essential that information attached directly to the machine, such as signs showing the sense of rotation, is observed and that these signs are always perfectly legible.

2.2 Qualification and training of personnel

The personnel for maintenance, inspection and erection must have the proper qualifications for this work. Fields of responsibility, competence and supervision of the personnel must be exactly specified by the operating company. If the personnel do not have the qualifications required, it must be trained and instructed accordingly. If necessary, this can be done by the manufacturer/supplier on behalf of the operating company of the machine. Furthermore, the operating company must make sure that the personnel fully understand the contents of the operating instructions.

2.3 Dangers arising if safety instructions are not observed

If these safety instructions are not observed, the pumps may be damaged and damage to persons and the environment may result. In this case, the manufacturer does not assume any responsibility for damages caused. In detail, the following damages may be caused if the safety instructions go unheeded.



In details, the following damages may be caused if the safety instructions go unheeded.

- Failure of important functions of the machine/plant
- Failure of methods prescribed for maintenance
- Risk of personal injury from electrical, mechanical and chemical sources
- Risk of environmental damage from leakage of dangerous substances

2.4 Safety-Conscious working

The Safety Instructions quoted in these operating instructions, the national regulations on accident prevention and any in-house working, operating or safety instructions issued by the operating company are to be observed.

2.4.1 Safety instructions for the operating company/operator

If hot or cold machine components conceal any risk, appropriate protective devices must be provided by the customer.



Any protective covers for moving parts (e.g. coupling) must not be removed from machines in operation.

Leakages (e.g. at shaft seal) of dangerous goods (e.g. explosive, toxic, hot) must be discharged such that no damages are caused to persons and the environment.

Legal regulations must be observed. Risks of injury from electrical energy are to be excluded (for details, see the regulations of the VDE and of local energy suppliers).

2.4.2 Safety instructions for maintenance, inspection and erection work

The operating company must ensure that all maintenance, inspection and erection work is carried out by authorized, qualified and skilled personnel which have obtained adequate information from thoroughly studying these operating instructions.



Basically, all work at the machine must be carried out during shutdown. The procedure for shutdown described in the operating instructions must be strictly observed.

Pumps or units pumping noxious liquids must be decontaminated.



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Immediately on termination of the work, all safety and protection devices must be put in place and operation again.

Before restarting the pump, the items started in the section "first start-up" are to be observed.

2.4.3 Unauthorized rebuild and manufacture of spares



Rebuilds or modifications at the machines are admissible only in coordination with the manufacturer. original spares and accessories authorised by manufacturer are to be used for safety purposes. if other components are used, the manufacturer will not be responsible for any damages resulting thereoff.

2.5 inadmissible operating modes

operating reliability of the pump supplied can only be guaranteed. if it is used for intended purpose and compliance with the operationg instructions. the limiting values given in the data sheet mst not be exceeded.

3 Technical description

3.1 Type

Single-stage, single-flow, centrifugal pump with volte casing based on process design, where the impeller, wear linings, casing cover/st. box body, shat sealing and bearing bracket can be dismantled and/or assembled as one pull out unit without disconnecting the suction and delivery pipes

3.2 impeller

the impeller is a three vane or six vane open type with high efficiency. this impeller type has the following advantages:

- * no axial thrust compensation necessary
- * easy maintenance
- * low risk of clogging



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3.3 Bearings

the pump shaft runs in oil lubricated or grease lubricated,amply dimensioned roller bearins, manufactured by well known international brands.the amply sized shaft ensures vibration free operations.

3.4 Technical data

the "P" series centrifugal pump is available in 14 diffeent sizes.for the detail data of yr pump, please check the data sheet,characteristic curves,dimensional drawing and the sectional view,which are supplied together with the pump.

3.6 Shaft seal

According to the different requirement and differend medium, you can choose the different shaft seal (Fig.2 - Fig.7):

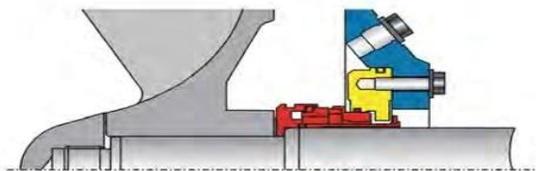


Fig.2 Standard Cartridge Single Mechanical Seal (Without Sealing Water)

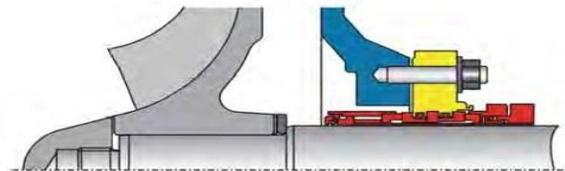


Fig.3 Cartridge Double Mechanical Seal (With Sealing Water)

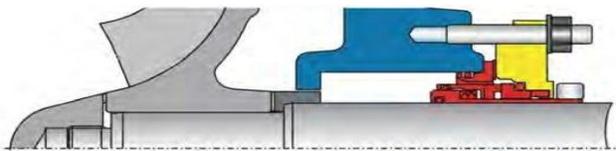


Fig.4 Cartridge Single Mechanical Seal (With Wash Water)

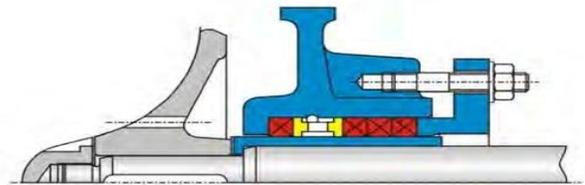


Fig.5 Stuffing Box Gland (With Sealing Water)

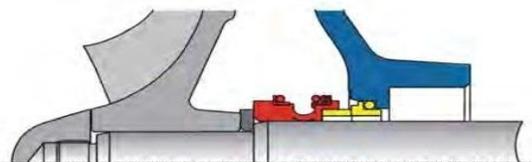


Fig.6 Single Mechanical Seal (Without Sealing Water)

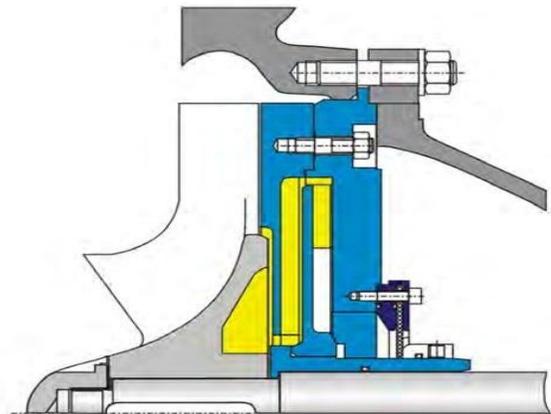
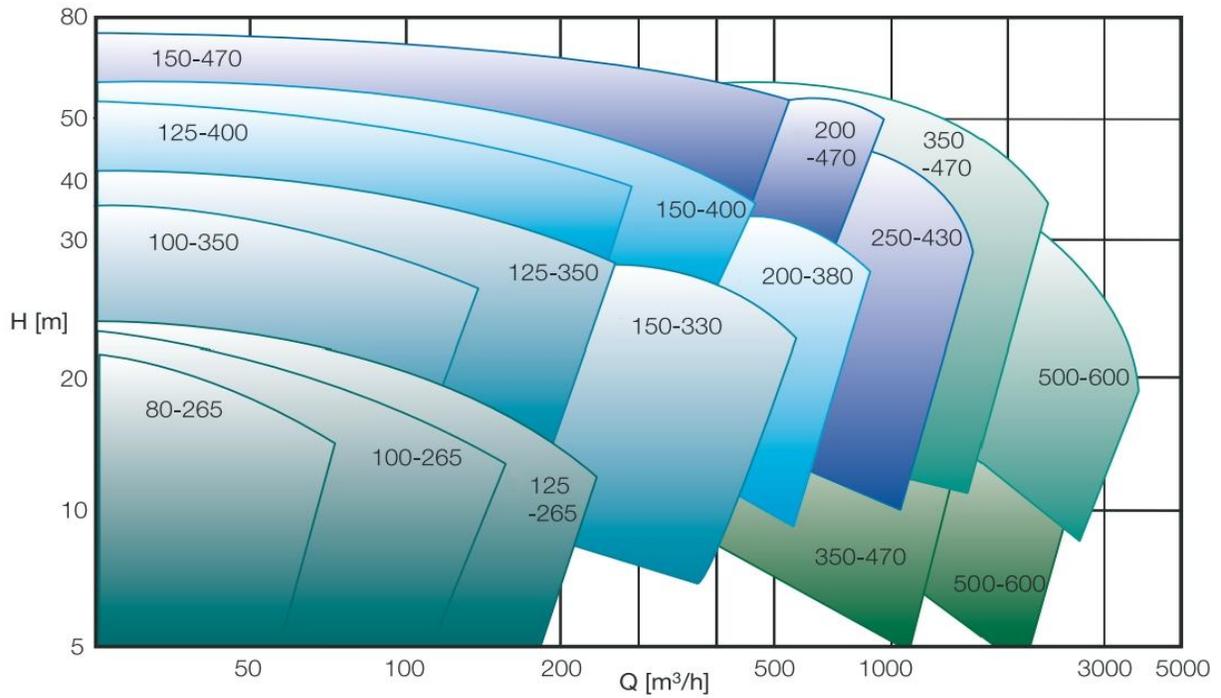


Fig.7 Dynamic Shaft Seal

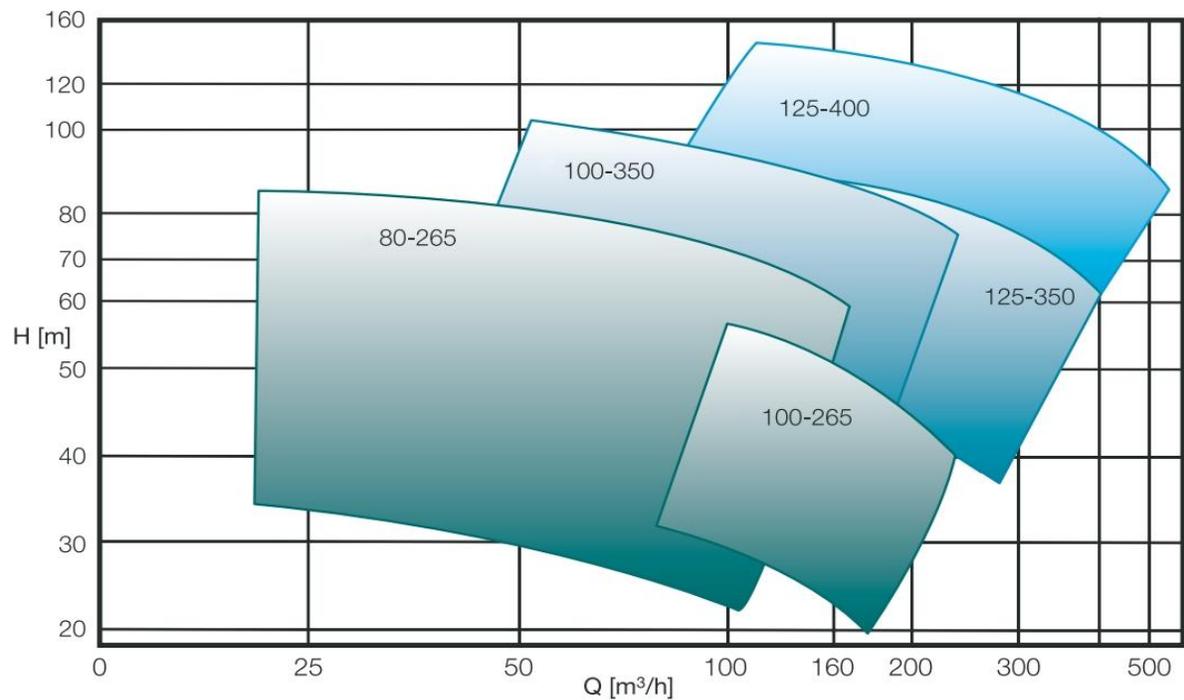


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Characteristic curve 1500 rpm



Characteristic curve 3000 rpm





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3.8 Material options

| Material type and material | | | | | | | | | | | | | | |
|----------------------------|-----------|-----------|---------------|-----------|-----------|------------|-----------------|-----------|---------------|-----------------|-----------|---------------|-----------------|---------------------------|
| Type | CD | | | SD | | | | DD | | | DT | | | |
| Material | Grey Iron | Hi-Cr S.S | Duplex S.S | Grey Iron | Hi-Cr S.S | S.S | Duplex S.S | Grey Iron | Duplex S.S | Duplex S.S | Grey Iron | Duplex S.S | Duplex S.S | High Wear Res. Duplex S.S |
| SYM | HT250 | X2Cr13 | X3CrNiMoN13-4 | HT250 | X2Cr13 | X5Cr2Ni189 | X3CrNiMoN27-5-2 | HT250 | X2Cr22Ni9Mo2N | X3CrNiMoN27-5-2 | HT250 | X2Cr22Ni9Mo2N | X3CrNiMoN27-5-2 | X2CrNiMoCuN25-6-3-3 |
| Volute casing | • | | | | | • | | | | • | | | • | |
| Casing cover | • | | | | | | • | | | • | | | • | |
| Impeller | | | • | | | | • | | | • | | | • | • |
| Wear lining | | | • | | | | • | | | • | | | • | • |
| Bearing housing | • | | | • | | | | • | | | • | | | |
| Pump shaft | | • | | | • | | | • | | | | • | | |

| Application for Material | Material type | | | |
|---|---------------|----|----|----|
| | CD | SD | DD | DT |
| Clean Water | • | | | |
| White Water | • | | | |
| Impurities, Ph6-8, Pressure 6bar | • | | | |
| Impurities, Ph6-8, high pressure | | • | | |
| Caustic and/or abrasive medium high pressure | | | • | |
| Strong caustic and/or highly abrasive medium, high pressure | | | | • |
| Pulp Plant | | | • | |
| Sewage Plant | • | • | | |
| Food industry | | | • | |

Duplex S.S. Has the following advantages:-

| | Character | 1.4460 Duplex S.S. (X3CrNiMoN 27-5-2) | AT099High Wear Res. Duplex S.S. (X2CrNiMoCuN 25-6-3-3) | AS059 | Remark |
|-------------------------|-----------------------------------|---------------------------------------|--|---------------|---|
| Chemical Components [%] | C | < 0.05 | <0.03 | <0.27 | Strictly controlled |
| | Si | <1.00 | <1.00 | <1.00 | |
| | Mn | <2.00 | <1.50 | <1.00 | |
| | S | <0.01 | <0.01 | <0.03 | |
| | P | <0.04 | <0.03 | <0.045 | |
| | Cr | 25.00 - 28.00 | 24.50 - 26.50 | 16.00 - 18.00 | Higher Cr content |
| | Ni | 4.50 - 6.00 | 5.00 - 7.00 | 1.00 - 2.00 | Acid resistance |
| | Mo | 1.60 - 2.00 | 2.50 - 3.50 | 1.0 | Prevents erosion |
| | Ti | 0 | 0 | 0 | |
| | Cu | 0 | 2.75 - 3.50 | 0 | |
| Mechanical Properties | N | 0.05 - 0.20 | 0.12 - 0.22 | 0.03 | |
| | Tensile Strength(σ_{ts}) | 640 - 780 | 650 - 850 | 863 | [N/mm ²] Higher strength |
| | Yield Strength($\sigma_{0.2}$) | > 490 | >490 | 730 | [N/mm ²]Higher yield strength |
| | Hardness(HB) | 190 - 260 | 360 - 400 | 275 | Higher hardness |

4 Installation and connection of pipe work

4.1 Installation

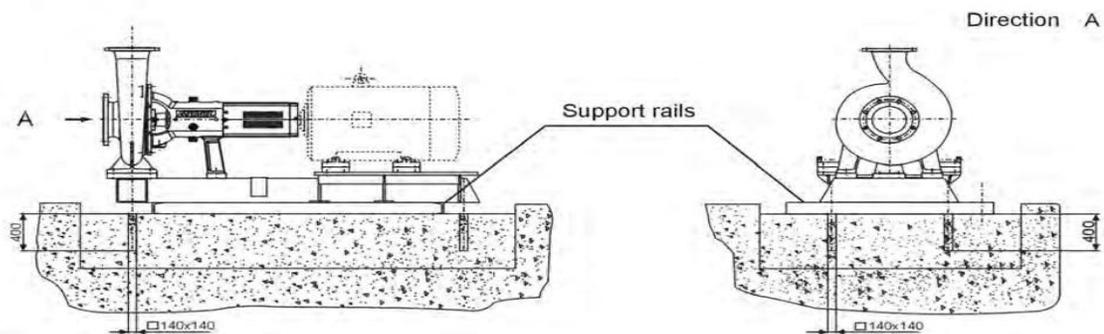


Fig. 8

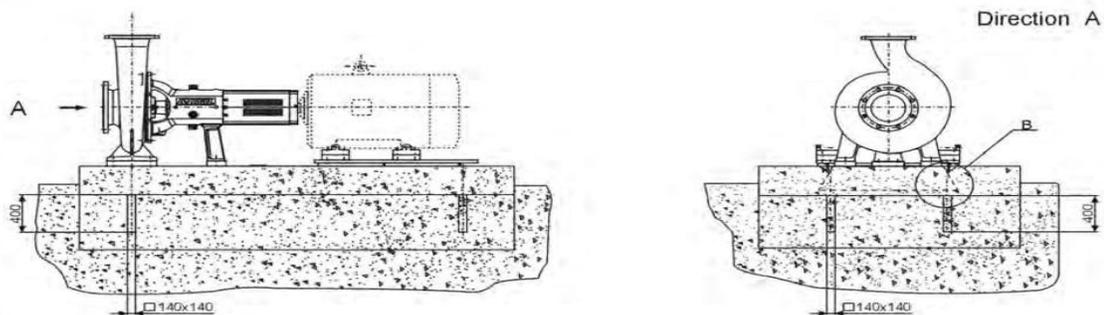


Fig. 9

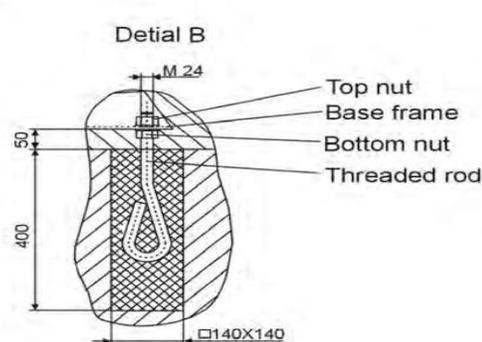


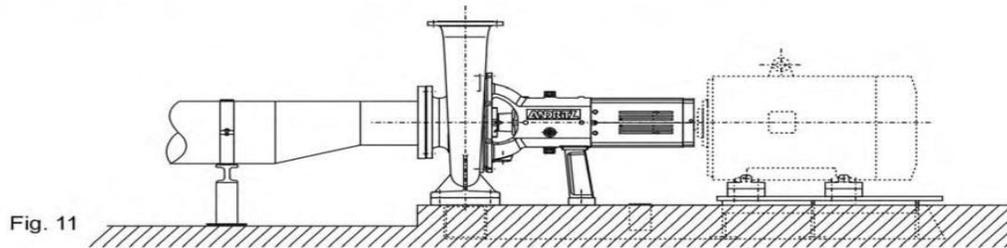
Fig. 10

Erection and alignment of the pump

- Place pump unit on foundation with supporting rails ($h = 50 - 100$ mm). Align the unit with inlet branch and other reference points.
- Spot-drill holes in base frame and insert drilling anchors.
- Insert threaded rod from the top. Place 2 shims and 2 hexagonal nuts between foundation and base frame, and screw threaded rod into drilling anchor. Tighten threaded rod in drilling anchor with retaining nut.
- Lift pump unit with adjusting nut and remove supporting rails.
- Adjust pump unit using the adjusting nut and secure with retaining nut for base frame.
- Cut off the threaded rod leaving an over measure of 5mm and debur.
- Grout in the base frame with concrete and allow setting.
- Installation of motor (if not yet installed). Slip the drilled coupling half on motor shaft and fix with threaded pin on feather key.

4.2 Connection of pipe work

- Support the pipes. The Pump must not carry the weight of the pipes (Fig. 11) .



- The Suction pipe should be either continuously falling or rising, depending on the position of the tank in relation to the pump.
- Abrupt turns, bends and connections in angles $> 90^\circ$ should be avoided.
- The length of the inlet pipe should be kept to a minimum and be free of bends.
- The diameter of In- and Outlet pipe has to be selected according to the flow requirement.

| Material | Suggested flow speed(m/s) |
|-------------------------------------|---------------------------|
| Clean Water | 3-3.5 |
| White Water | 2.5-3 |
| Paper Pulp s Consistency $\leq 3\%$ | 1-2 |
| Paper Pulp s Consistency 3%-5% | 0.5-1 |
| Paper Pulp s Consistency $>5\%$ | <0.5 |
| DIP | <1 |
| TMP | $>0.5 < 0.8$ |
| GWP | $<0.5 < 0.8$ |

- To prevent the accumulation of air in the pipe, the upside of the pipe should be kept levelled.(Fig. 12).

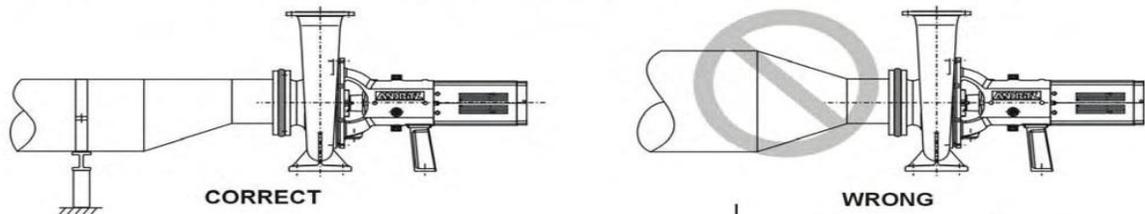


Fig. 12

- If a dilution-water pipe is connected with the inlet pipe, the flow in the medium pipe (V_1) should be bigger or equal than the flow in the water pipe (V_2). The connecting angle between the dilution water inlet and the medium pipe should be smaller or equal than 45° (Fig.13).

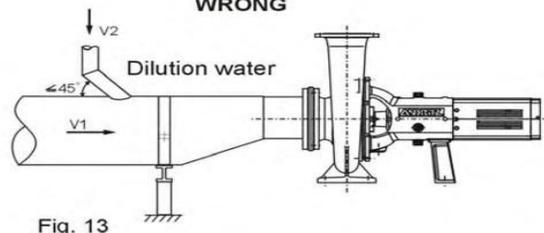


Fig. 13

- The suction direction of the pump should be the same as the flow direction in the tank.(Fig.14)

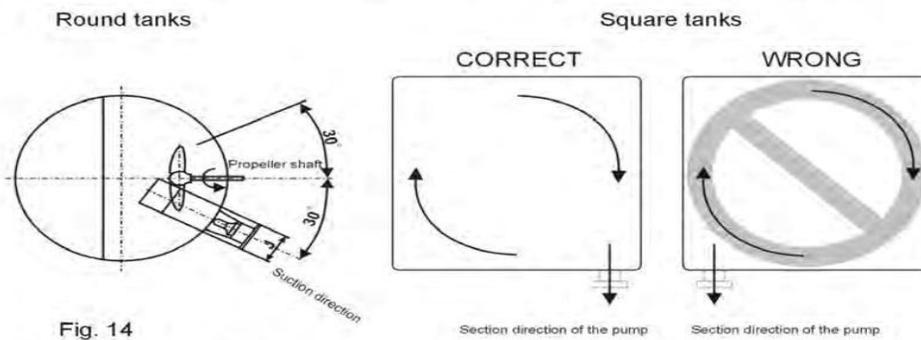


Fig. 14

- To prevent the transfer of vibrations between pump and pipe, compensators should be used to connect in-and outlet pipe to the pump.(Fig.15)

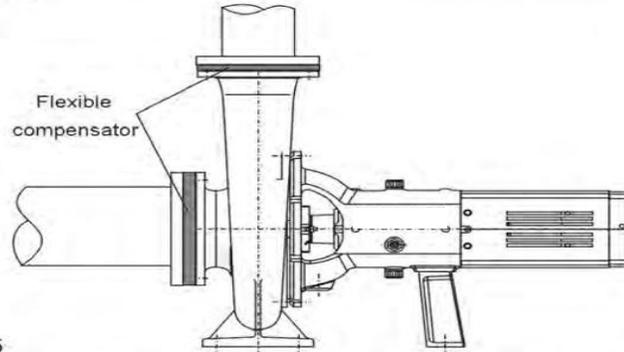


Fig. 15

- If the Pump inlet branches off from a main supply line, the connection point to the main pipe should be below the centre of the main pipe.(Fig.16)

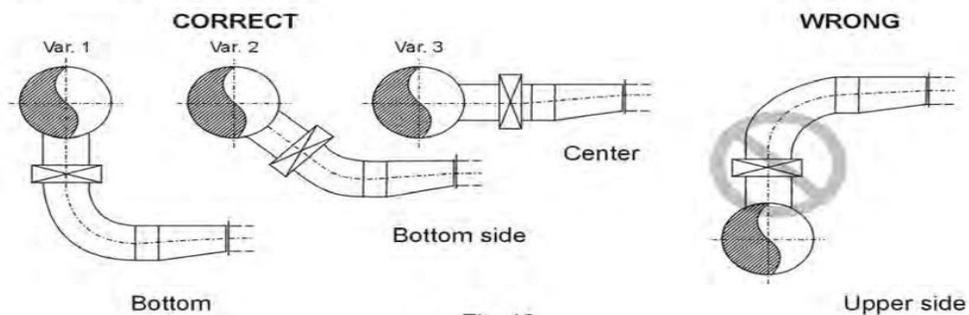


Fig. 16



P Series

4.3 Sealing water

4.3.1 Sealing water connection

Standard Cartridge Single Mechanical Seal(CSMS3)

No need for sealing water. The seal is lubricated and cooled by the medium.

Cartridge Double Mechanical Seal(CDMS3)

High-pressure flush water pipe connection is necessary and clean water must be supplied. In order to control the pressure, a valve has to be mounted in the discharge pipe. The use of a sealing water supervising device flow meter- is suggested to control sealing water flow and pressure.(Fig.17)

Cartridge Single Mechanical--with Wash Water(CSMF3)

High-pressure flush water pipe connection is necessary. (Fig.17)

Single Mechanical Seal(SMS)

No need for sealing water. The seal is lubricated and cooled by the medium.

Stuffing Box Seal(STB)

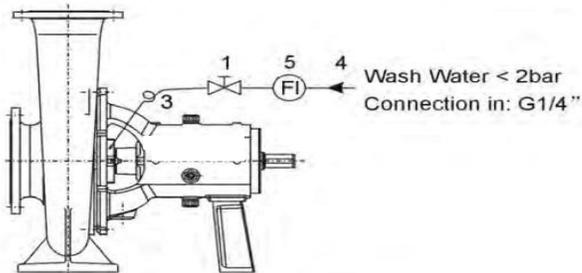
High-pressure flush water pipe connection is necessary (Fig.17)

Dynamic Shaft Seal(DYA)

No need for sealing water connection. At a critical state, special flush water connection can be connected to flush the pump before stopping.

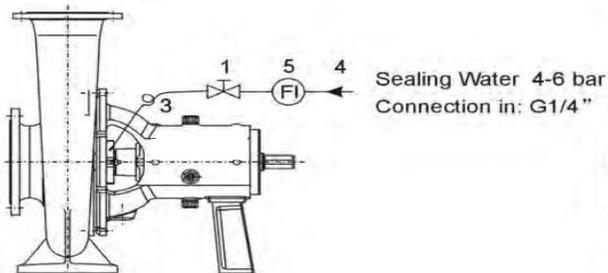


Sealing water supervising device flow meter

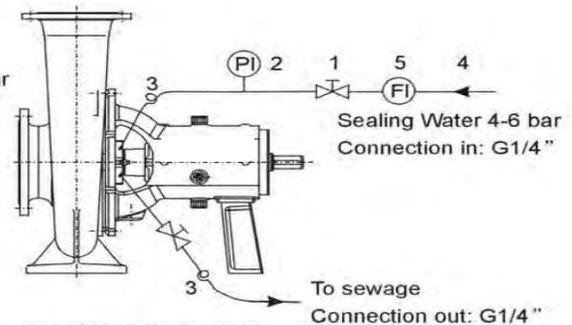


- 1.Ball valve G1/2"
- 2.Manometer
- 3.Hose D_i=10mm
- 4.SS pipe DN=20mm
- 5.Flow meter

Cartridge Single Seal(With Wash Water)



Stuffing Box Gland



Cartridge Double Seal

Fig. 17



4.3.2 Sealing water requirement and pressure

CAUTION

The requirement of the sealing water please see the form 7.

The flux requirement of the mechanical seal please see Fig. 18.

| | |
|-----------------|---|
| Quality | Pollutant less than or equal to 80 micron |
| Temperature | More than 10°C, but less than 30°C |
| Abrasive medium | Less than or equal to 2mg/l |

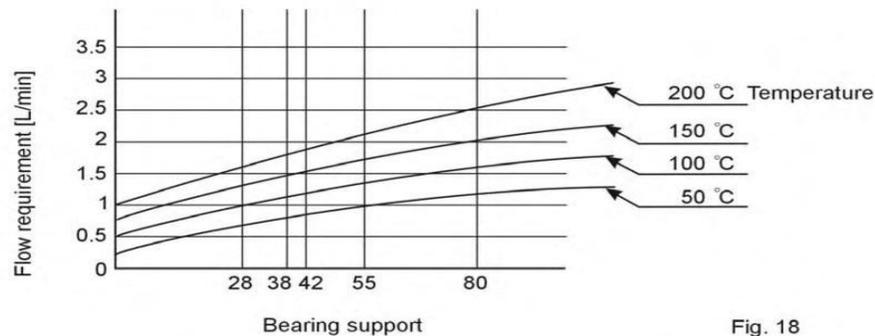


Fig. 18

4.4 Electrical connection of the motor



See operating Instructions of the motor supplier.

5 Start-up and stopping

5.1 Start-up

CAUTION

- Before start-up, in order to prevent damage to shaft seal and impeller, please check for any foreign matters in the pump by turning it manually.
- If your pump is oil lubricated, fill lubricating oil into the bearing support until the oil level reaches the centre of oil sight glass.



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- Check pump visually for any damage that may have occurred during transportation and installation. Please check especially the coupling cover for any deformation.
- If your pumps sealing variant requires Sealing water (tandem-arranged- or double mechanical seal or Gland packing), make sure the sealing water valve is open.
- Check the direction of rotation (**CAUTION:** with standard single mechanical seal risk of running dry)
- Open the suction and pressure valve in order to fill the pump with medium.
- Start the motor

5.2 After start-up

- Check seal for leakage
- Check temperature
- Check for any strange noises
- Check the pipes and pipe -connections
- Check for vibrations

If there is anything unusual, stop immediately and check carefully.

5.3 Stopping

- Switch of motor
- Close suction and delivery valve.
- When stopping for a longer period of time, close sealing water valve and drain pump
- Do not restart the motor when pump is running in reverse direction (back flow of water)!

6 Maintenance



During any maintenance work, measures have to be taken to prevent an unintentional start of the motor. (Removal of main fuse, switching off motor circuit breaker)

6.1 Lubrication

6.1.1 Oil lubrication

The first oil change should be done after 200 operating hours. Further Oil changes should be scheduled according to this table:

| Bearing support surfacer temperature | Lubricating oil replacing cycle | |
|---|---------------------------------|-------------------------|
| | motor speed \leq 1500rpm | motor speed $>$ 1500rpm |
| $\leq 65^{\circ}\text{C}$ | 1 year | 6 months |
| $65^{\circ}\text{C} - 75^{\circ}\text{C}$ | 6 months | 3 months |



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Suitable Oil grades:

| | |
|---------|-----------------------|
| BP | BP Energol HLP-HM 68 |
| Esso | Teresstic 68 |
| Mobil | D.T.E.Heavy Medium |
| Shell | Shell Tellus Oil S 68 |
| Castrol | Hyspin AWS 68 |
| Sinopec | Sinopec L-HM68 |

Required oil quantities:

| Bearing size | Pump type | Oil quantity [l] |
|--------------|-----------|--------------------|
| GR.28- P | P-80-265 | ≈0.95 |
| | P-100-265 | |
| | p.125-265 | |
| GR.38- p | p.100-350 | ≈1.0 |
| | p.125-350 | |
| | p.150-330 | |
| GR.42- p | P-125-400 | ≈1.7 |
| | p.150-400 | |
| | P-200-380 | |
| GR.55- P | p.150-470 | ≈3.0 |
| | P200-470 | |
| | p.250-430 | |
| GR.80- p | p.350-470 | ≈6.3 |
| | p.500-600 | |

6.1.2 Grease lubrication

We recommend the following Lubrication Grease:

| | |
|-------|--------------------|
| Exxon | Exxon Beacon 2 |
| Mobil | Shell Alvania RL 2 |
| Shell | Mobilux EP 2 |
| SKF | SKF LGMT 2 |
| FAG | FAG Arcand L71V |

Recommended Lubrication quantities [g]:

| Bearing size | Initial lubrication(g) | | Re-lubrication(g) | | Recommended Lubrication intervals [h] | | | |
|--------------|------------------------|---------------|-------------------|---------------|---------------------------------------|--------|---------|---------|
| | Impeller side | Coupling side | Impeller side | Coupling side | 740rpm | 980rpm | 1480rpm | 2950rpm |
| Gr.28 | 30 | 50 | 10 | 15 | 16,000 | 12,000 | 8,000 | 3,000 |
| Gr.38 | 55 | 85 | 15 | 25 | 14,000 | 10,000 | 6,500 | 2,500 |
| Gr.42 | 85 | 135 | 20 | 30 | 12,000 | 8,000 | 6,000 | 2,000 |
| Gr.55 | 180 | 300 | 30 | 50 | 10,000 | 7,500 | 5,000 | - |
| Gr.80 | 250 | 420 | 45 | 65 | 8,500 | 6,000 | 3,500 | - |

6.2 Changing of seals

6.2.1 Standard cartridge single mechanical seal (CSMS3) (Fig.19):

Lubrication and cooling by the pumped medium, therefore no extra sealing water is necessary.

- 2300 Impeller
- 1611.1 Casing cover
- 2100 Pump shaft
- 4330.1 Mechanical seal ACS1

| Bearing support | GR.28 | GR.38 | GR.42 | GR.55 | GR.80 |
|-----------------|-------|-------|-------|-------|-------|
| ØD1 | 38 | 48 | 53 | 65 | 90 |

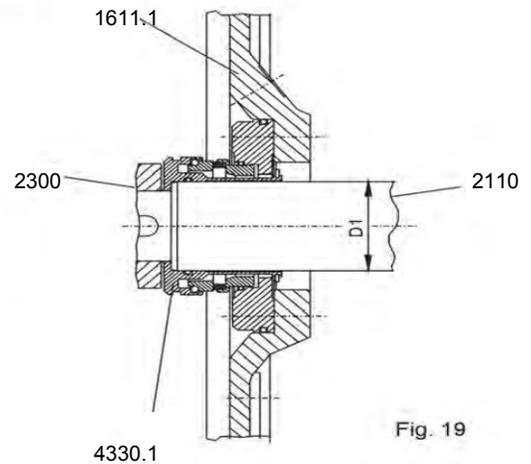


Fig. 19

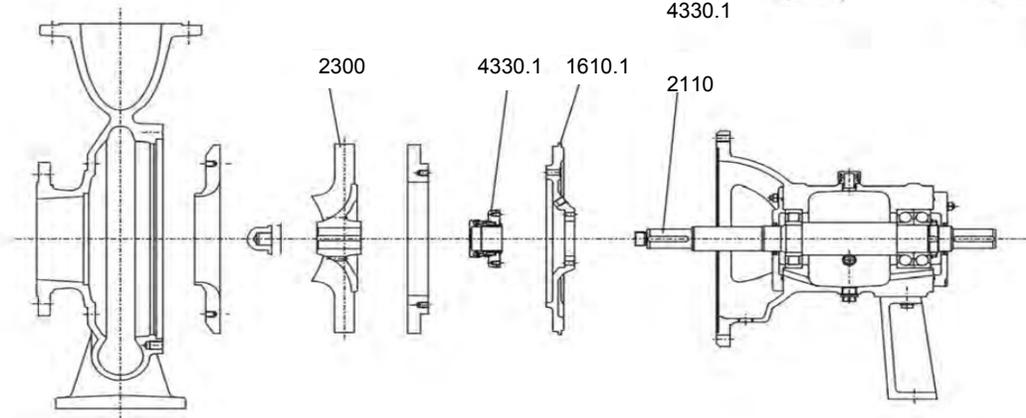


Fig. 20

Changing the cartridge single mechanical seal:

- Dismantle the bearing support
- Remove the impeller
- Replace mechanical seal
- Assemble in reverse order.



6.2.2 Cartridge double mechanical seal (CDMS3) (Fig.21):

For the lubrication of the cartridge double mechanical seal, clean pressurized sealing water has to be supplied

- 2300 IMPELLER
- 1610.2 CASING COVER
- 2110 PUMP SHAFT
- 5040 SPACER
- 4330.2 MECHANICAL SEAL

| Bearing support | GR.28 | GR.38 | GR.42 | GR.55 | GR.80 |
|-----------------|-------|-------|-------|-------|-------|
| ØD1 | 38 | 48 | 53 | 65 | 90 |

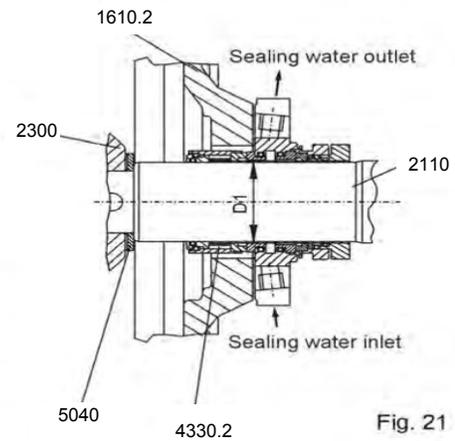


Fig. 21

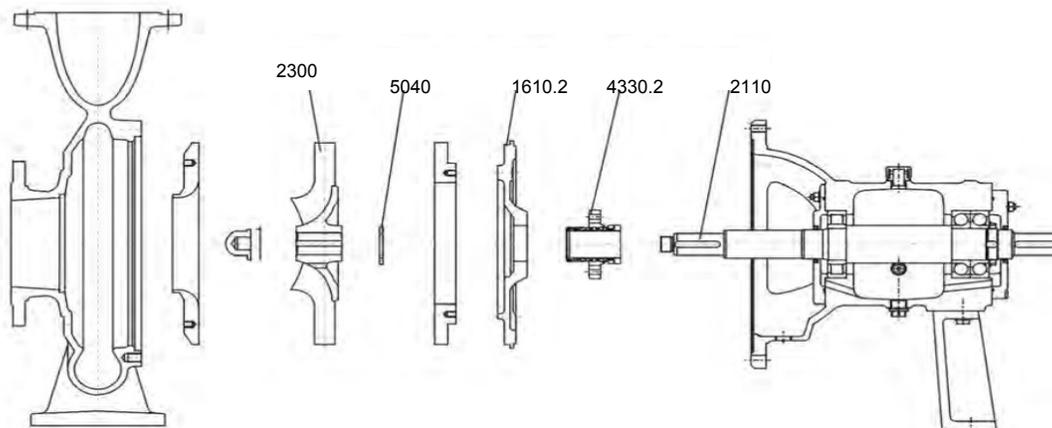


Fig. 22

Changing the cartridge double mechanical seal:

- Fixing the mechanical seal by the retaining plate
 - Dismantle the bearing support
 - Dismantle the impeller and the spacer
 - Loosen the mechanical seal
 - Dismantle the casing cover together with rear lining
 - Replace the mechanical seals
 - Assemble in reverse order
 - Dismantle the retaining plate from mechanical seal
- (Please keep the retaining plate, used for the next time dismantling)



6.2.3 Cartridge single mechanical seal with wash water(Fig.23):

Clean washer water has to be supplied

- 2300 IMPELLER
- 4510 STUFING BOX
- 2110 PUMP SHAFT
- 5240.1 SHAFT SLEEVE
- 4330.2 MECHANICAL SEAL
- 4590 TRANSITION RING

| Bearing support | GR.28 | GR.38 | GR.42 | GR.55 | GR.80 |
|-----------------|-------|-------|-------|-------|-------|
| ØD1 | 38 | 48 | 53 | 65 | 90 |

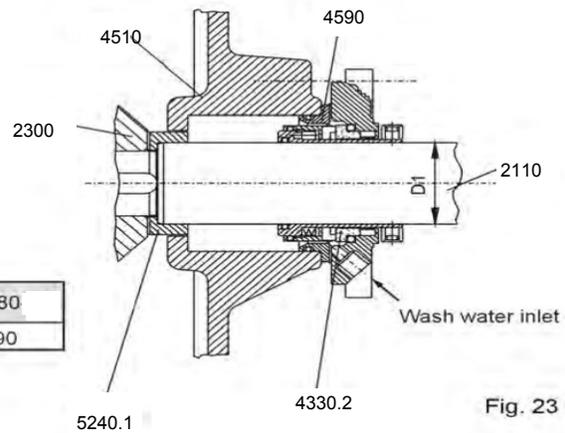


Fig. 23

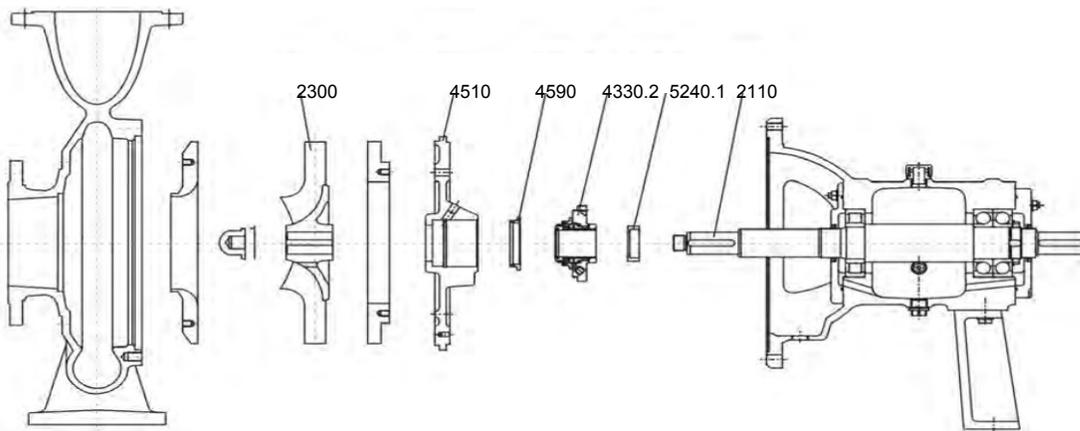


Fig. 24

Changing the cartridge single mechanical seal with washer water:

- Fixing the mechanical seal by the retaining plate
- Dismantle the bearing support
- Dismantle the impeller and the spacer
- Loosen the mechanical seal
- Dismantle the stuffing box body together with rear lining
- Dismantle the transition ring
- Replace the mechanical seals
- Assemble in reverse order
- Dismantle the retaining plate from mechanical seal
(Please keep the retaining plate, used for the next time dismantling)

6.2.4 Single mechanical seal (SMS)(Fig. 25):

Lubrication and cooling by the pumped medium, therefore no extra sealing water is necessary.

2300 IMPELLER
 1610.2 CASING COVER
 2110 PUMP SHAFT
 5040 SPACER
 4330.2 MECHANICAL SEAL MG (SI/SI)

| Bearing support | GR.28 | GR.38 | GR.42 | GR.55 | GR.80 |
|-----------------|-------|-------|-------|-------|-------|
| ØD1 | 38 | 48 | 53 | 65 | 90 |
| L1 | 45 | 45 | 47.5 | 52.5 | 65 |

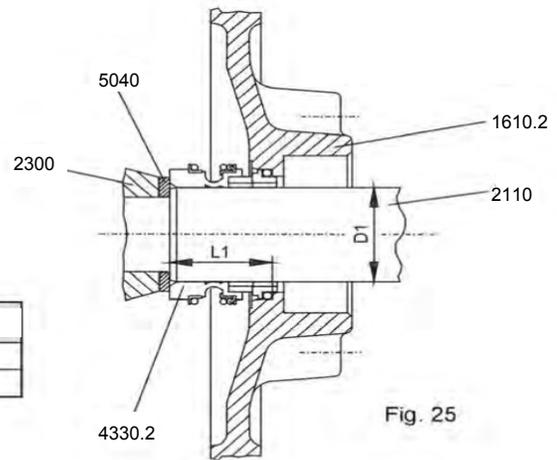


Fig. 25

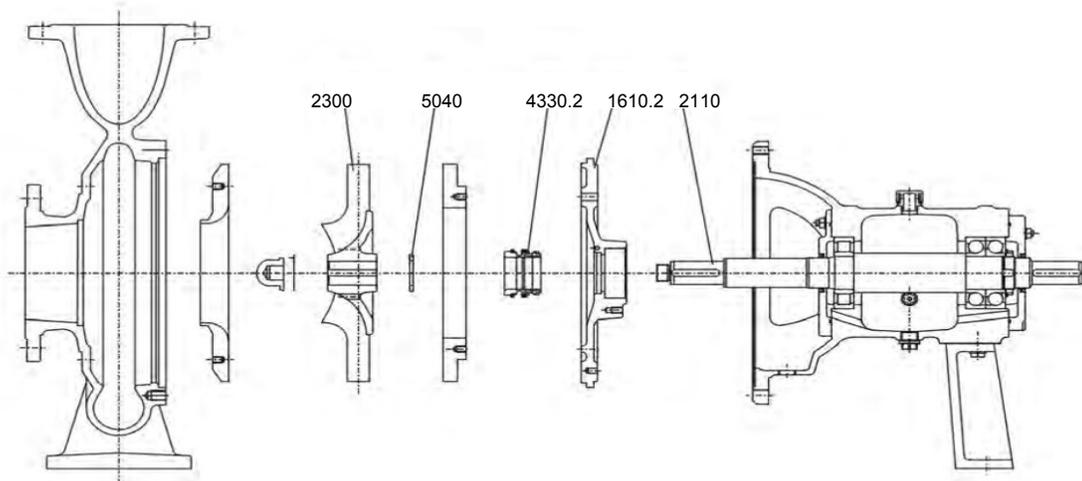


Fig. 26

Changing of the single mechanical seal:

- Dismantle the bearing support
- Remove the impeller
- Replace mechanical seal
- Assemble in reverse order

P Series

6.2.5 Gland packing (STB)(Fig. 23):

For the lubrication of the packing rings, clean sealing water has to be supplied.

2300 Impeller
 4510 Stuffing box body
 4520 stuffing box gland
 2110 pump shaft
 5240 shaft protection sleeve
 4610 stuffing box packing
 4580 sealing water ring

| Bearing support | GR.28- | GR.38 | GR.42 | GR.55 | GR.80 |
|-----------------|----------|----------|----------|----------|------------|
| ØD1 | 38 | 48 | 53 | 65 | 90 |
| T | 36 | 36 | 40 | 40 | 56 |
| Stuffing | 10x10 | 10x10 | 10x10 | 10x10 | 12x12 |
| Packing | 48x68x10 | 60x80x10 | 65x85x10 | 75x95x10 | 105x130x12 |
| Number | 1 + 3 | 1 + 3 | 1 + 3 | 2 + 3 | 2 + 4 |

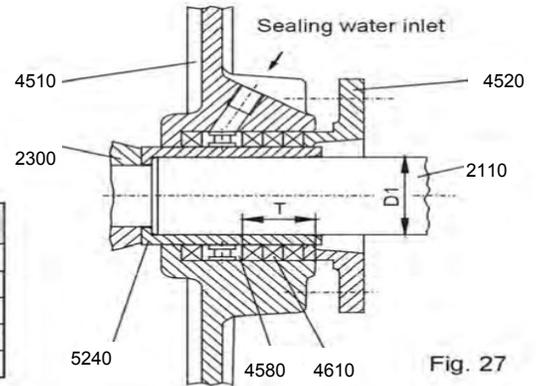


Fig. 27

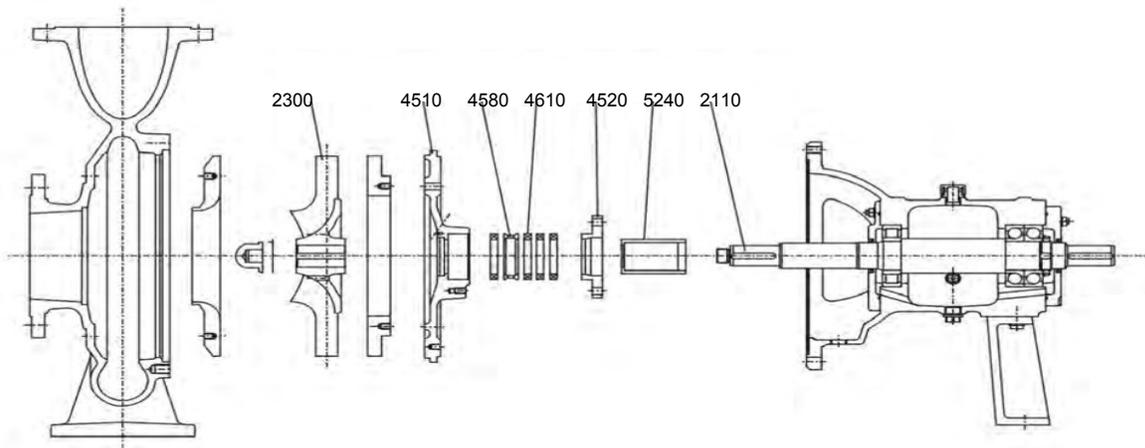


Fig. 28

Changing of packing rings

- Dismantle the bipartite stuffing box body
- Dismantle the air-side packing rings
- Dismantle the sealing water ring (pull out with hooks at borings)
- Dismantle the medium-side packing rings
- Replace the packing rings
- Assemble in reverse order

When assembling or changing the packing rings, check:

- Dimension 'T'
- The joints of the packing rings; should be staggered
- The state of the shaft protection sleeve during revisions and replace if necessary

P Series

6.2.6 Dynamic shaft seal (DYNA)(Fig.29):

No sealing or cooling water is required for the operation of a dynamic seal.

- 2300 Impeller
- 2110 pump shaft
- 1350.3 Rear lining
- 1610.3 Casing cover
- 2350 Wing wheel
- 4100 PTFE-seal ring
- 5000.3 Set collar
- 5110 Support
- 5400 Shaft protection sleeve
- 9320 Locking ring

| Bearing support | GR.28 | GR.38 | GR.42 | GR.55 | GR.80 |
|-----------------|-------|-------|-------|-------|-------|
| Ø D1 | 38 | 48 | 53 | 65 | 90 |
| Ø D2 | 55 | 65 | 70 | 85 | 100 |

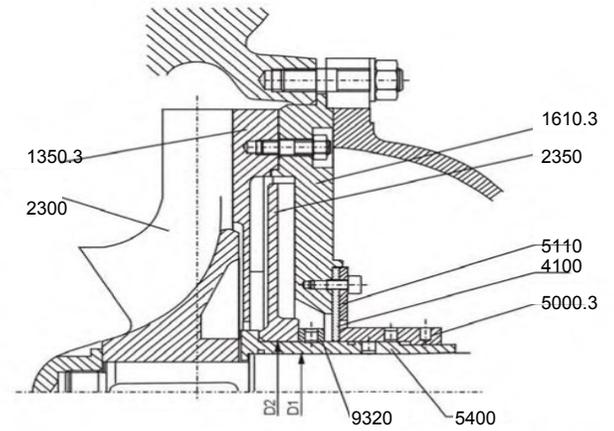


Fig. 29

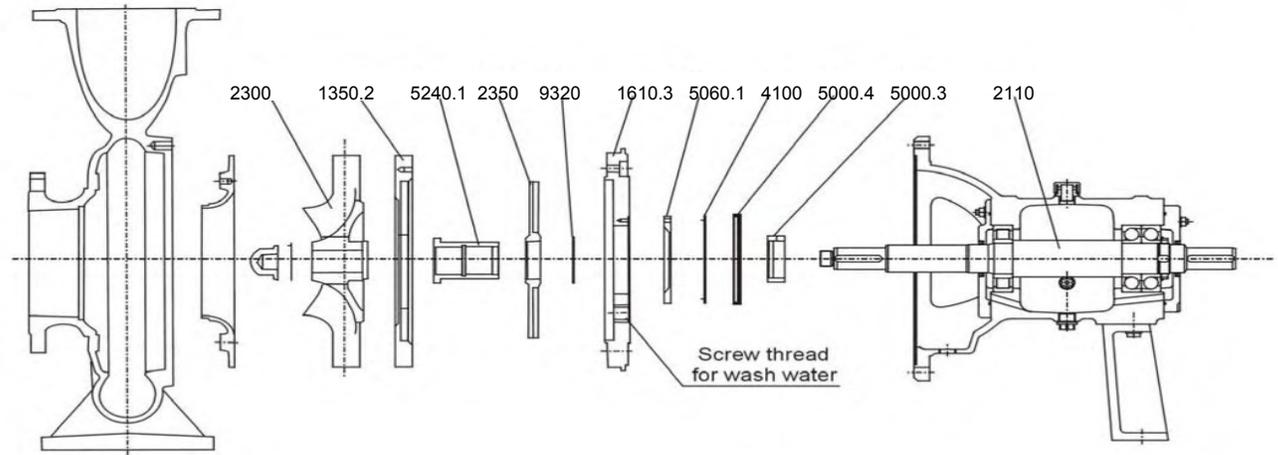


Fig. 30

P Series

Changing PTFE-seal ring:

The PTFE ring can be changed without removing the Pull-out unit .

- Loose the adjustment ring (500.3) and the support ring (511) and move them out of the way.
- Unplug the flush water connection, cut the worn PTFE ring and take it out.
- Take two new PTFE rings, and cut them in different positions, overlap each aperture, draw a line as described under the left picture and cut it off.:

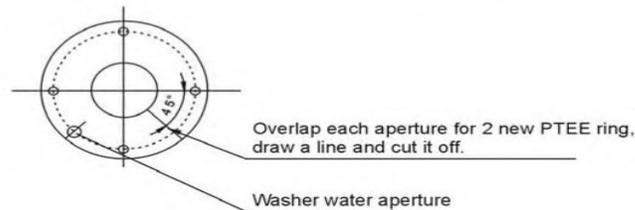


Fig. 31

- Put the 2 PTFE rings through the shaft. Caution: make sure all apertures overlap between 2 rings.

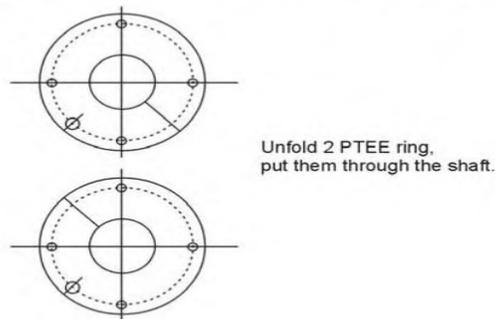


Fig. 32

- Adhibit notches of 2 PTFE ring by glue.
- Adhibit 2 PTFE ring together by glue(see left picture). Caution: make sure the notches are staggered in 180° .

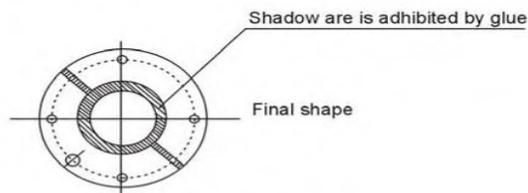


Fig. 33

- Install 2 PTFE ring and screw the wash water block.
- Replace back-up ring and tight screws.
- Replace the adjustment ring. Caution: when it will touch PTFE ring, rotate it slowly; when it touches PTFE ring, stop rotating and tight screws.
- Remove the safety brand and start-up.

P Series

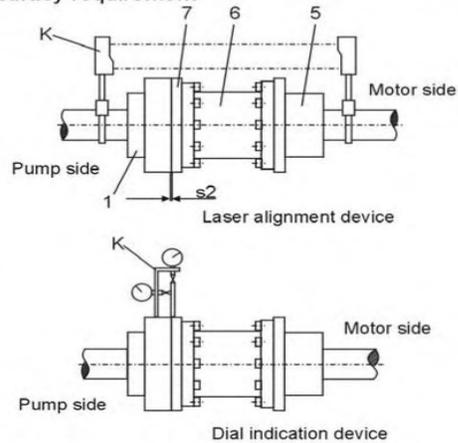
6.3 Coupling alignment

Alignment significantly impacts the life cycle of transmission components. Shaft misalignment produces stress on the couplings and the engine and reduction gear box bearings and shafts, leading to damage. Moreover, the higher the rotational speed, the more stringent the alignment accuracy requirement

6.3.1 Flexible coupling



Fig. 34



A) Alignment by dial indication device

1 Rough alignment. Use a steel ruler on 4 point around the diameter of the coupling (0° , 90° , 180° , 270°), check offset and adjust motor position with shims.

2 Fine alignment. Use two dial indications devices as shown in the picture. Before adjustment, make sure the devices are in working order. Turn the coupling slowly and measure the offset. Thereby the indication device is rotating together with the coupling, therefore staying on the same point of the coupling. Correct the motor position with shims until the offset is within the acceptable tolerance.

B) Alignment by laser

Please check the instruction of the Laser alignment device you are using.

Required alignment tolerances:

| Coupling Type | H | 10 | 16 | 25 | 40 | 63 | 100 | 160 | 200 | 250 |
|---------------------------|---|-----|-----|-----|-----|-----|-----|-----|------|-----|
| s 2 [mm] | | 5-6 | 5-6 | 5-6 | 5-6 | 6-7 | 6-7 | 6-7 | 6-7 | 7-8 |
| Max. angular OffsetK [mm] | | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.25 | 0.3 |
| Max. radial OffsetH [mm] | | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.25 | 0.3 |

P Series

7 Dismantling and assembly

7.1 Dismantling

7.1.1 Removal of the pull-out unit

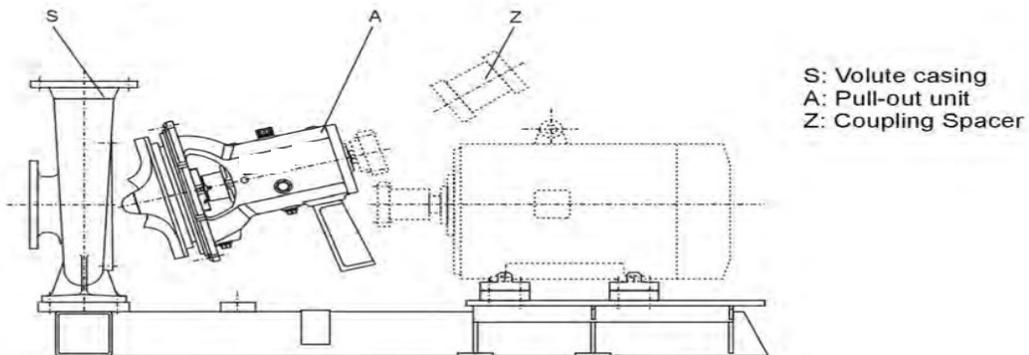


Fig. 39

- Close valves on suction and pressure side
- Dismantle the coupling protection device
- Dismantle the intermediate sleeve of the coupling
- Loosen the sealing water connection
- Remove the fixing bolts of the support leg
- Disconnect the volute casing from bearing support
- Remove the bearing support from the volute casing
- Remove the pull-out unit

7.1.2 Separating the pump parts from the bearing support

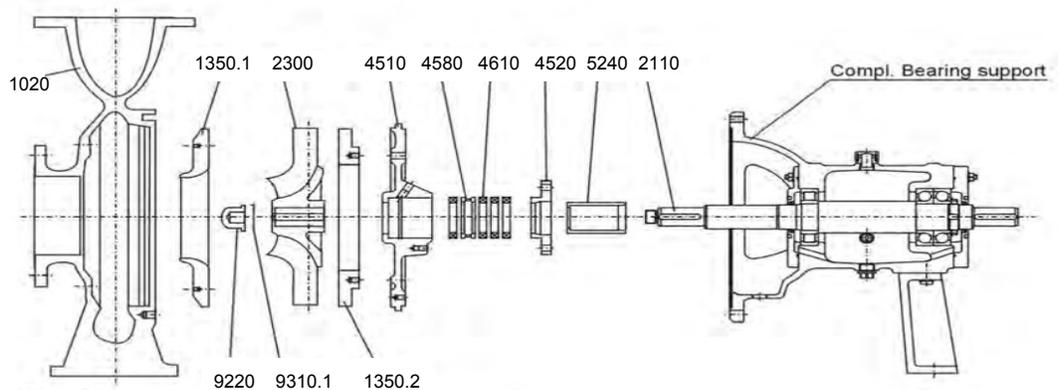


Fig. 40

- Loosen the impeller nut (922)
- Remove the impeller (230)
- Remove and dismantle the sealing (here: Gland packing)
- Remove the stuffing box gland (452)
- Loosen stuffing box body (part 451) together with rear lining (135.2) from the bearing casing
- Dismantle the packing rings (461) and the sealing water ring (458) from the stuffing box body
- Remove the shaft protection sleeve (524) from the shaft (211)
- Dismantle the front lining (135.1) from the volute casing (102)

7.1.3 Dismantling the bearing support

Dismantling the bearing support of oil lubrication

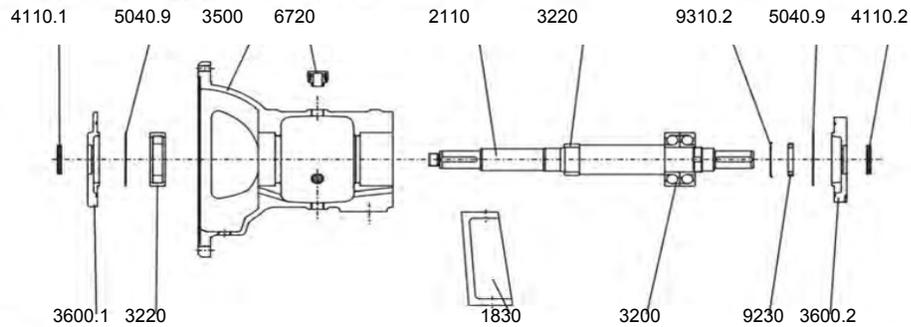
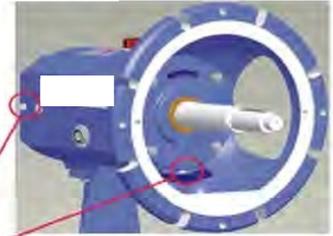


Fig. 41

- * Remove the support leg (1830)
- * Dismantle the coupling end bearing cover (3600.2)
- * Remove the bearing isolator (4110.2)
- * Remove the baffle disc (5040.9)
- * Dismantle the pump shaft(2110) with roller bearing (3200,3220)
- * The outer ring and cage of the roller bearing (3220) remain in the casing (3500)
- * Disconnect the locking Plate (9310.2) and unscrew the shaft nut(9230)from the shaft
- * Heat the roller bearings(part 3200,3220) and pull them of from the shaft
- * Dismantle pump-end bearing end cover (3600.1)
- * Remove the bearing isolator(4110.1)
- * Remove the baffle disc(5040.9)
- * Remove the outer ring with cage of the roller bearing(3220)from the casing (3500)



Please pay attention to the assemble position of the plug

Dismantling the bearing support of oil lubrication

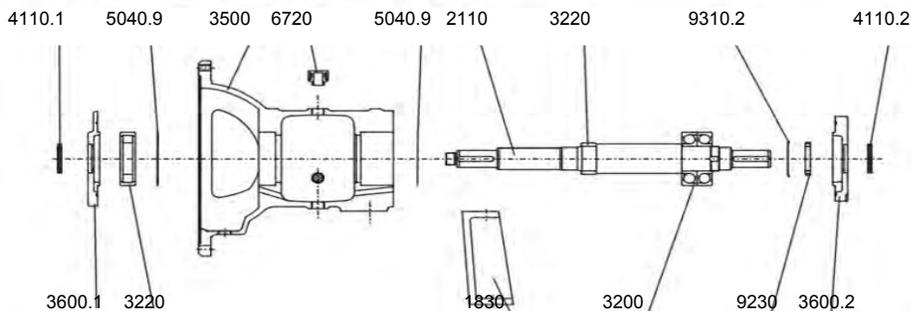
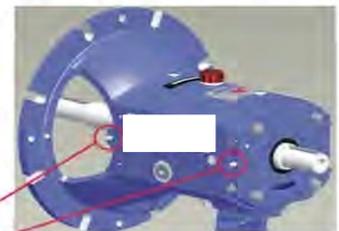


Fig. 42

- * Remove the support leg (1830)
- * Dismatle the coupling end bearing cover (3600.2)
- * Remove the radial seal ring(4110.2)
- * Dismantle the pump shaft (2110)with roller bearing (3200, 3220)
- * Remove the baffle disc (5040.9)
- * The outer ring and cage of the roller bearing (3220) remain in the casing (3500)
- * Disconnect the locking Plate (9310.2) and unscrew the shaft nut(9230)from the shaft
- * Heat the roller bearings(part 3200,3220) and pull them of from the shaft
- * Dismantle pump-end bearing end cover (3600.1)
- * Remove the radial seal ring(4110.1)
- * Remove the baffle disc(5040.9)
- * Remove the outer ring with cage of the roller bearing(3220)from the casing (3500)



Please pay attention to the assemble position of the grease nipple

P Series

7.2 Assembly

Assembly is carried out in reverse order to dismantling.

CAUTION If the impeller and the linings are exchanged, check the clearance between impeller and linings when mounting the new parts. The clearance between the impeller and the rear lining should be s mm as the under table. This is ensured by adding or reducing sealing ring to size. The clearance between the impeller and the front lining should also be s mm. This is ensured by seals between the volute casing and the front lining. In dynamic seal, the clearance between the vice impeller and rear ling should be a mm, between the vice impeller and casing cover should be b mm. This is ensured by adding or reducing sealing ring to size. For measurements see the under table and pictures. After assembly, the exact alignment of the unit has to be as described in Chapter 6.3.

| Pump Type | P | P' | S | a | b |
|-----------|-------|-------|-----|-----|-----|
| P-80-265 | 63 | 62.5 | 0.5 | 1.0 | 1.0 |
| P-100-265 | 70 | 69.5 | 0.5 | 1.0 | 1.0 |
| P-125-265 | 77.5 | 77 | 0.5 | 1.0 | 1.0 |
| P-100-350 | 75 | 74.5 | 0.5 | 2.0 | 1.0 |
| P-125-350 | 81 | 80.5 | 0.5 | 2.0 | 1.0 |
| P-150-330 | 88 | 87.5 | 0.5 | 2.0 | 1.0 |
| P-125-400 | 80.5 | 80 | 0.5 | 2.0 | 1.0 |
| P-150-400 | 89.5 | 89 | 0.5 | 2.0 | 1.0 |
| P-200-380 | 99.5 | 99 | 0.5 | 2.0 | 1.0 |
| P-150-470 | 105.5 | 105 | 0.5 | 2.0 | 1.0 |
| P-200-470 | 115.5 | 115 | 0.5 | 2.0 | 1.0 |
| P-250-430 | 121 | 120.5 | 0.5 | 2.0 | 1.0 |
| P-350-470 | 139.5 | 139 | 0.5 | 2.0 | 1.0 |
| P-500-600 | 156.2 | 155.5 | 0.7 | 2.0 | 1.0 |

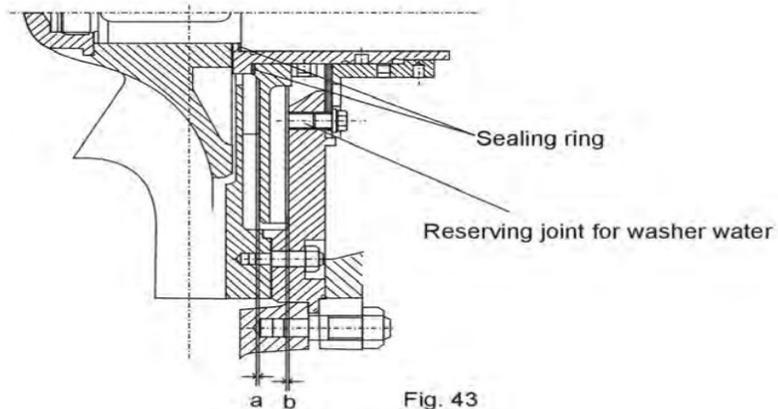
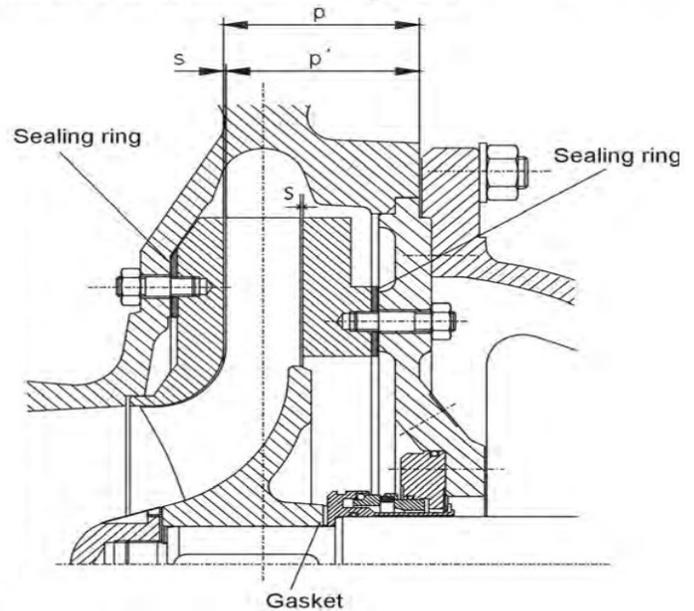


Fig. 43



P Series

8 Spare parts

If spare parts are to be ordered, please indicate the following:

- Designation and part number according to main section (see below)
- Pump type with fabrication number of the pump (see datasheet)
- Material of the part (see data sheet)

8.1 Bearing type:

| Bearing support | Pump type | Qty | Pump-end bearing | Qty | Coupling-end bearing |
|-----------------|-----------|-----|------------------|-----|----------------------|
| GR.28- | P-80-265 | 1 | NU 308 ECP/C3 | 2 | 7308 BECBP |
| | P-100-265 | | | | |
| | P-125-265 | | | | |
| GR.38- | P-100-350 | 1 | NU 310 ECP/C3 | 2 | 7310 BECBP |
| | P-125-350 | | | | |
| | P-150-330 | | | | |
| GR.42- | P-125-400 | 1 | NU 312 ECP/C3 | 2 | 7312 BECBP |
| | P-150-400 | | | | |
| | P-200-380 | | | | |
| GR.55- | P-150-470 | 1 | NU 316 ECP/C3 | 2 | 7316 BECBP |
| | P-200-470 | | | | |
| | P-250-430 | | | | |
| GR.80- | P-350-470 | 1 | NU 320 ECP/C3 | 2 | 7320 BECBP |
| | P-500-600 | | | | |

8.2 Rotary shaft lip seals:

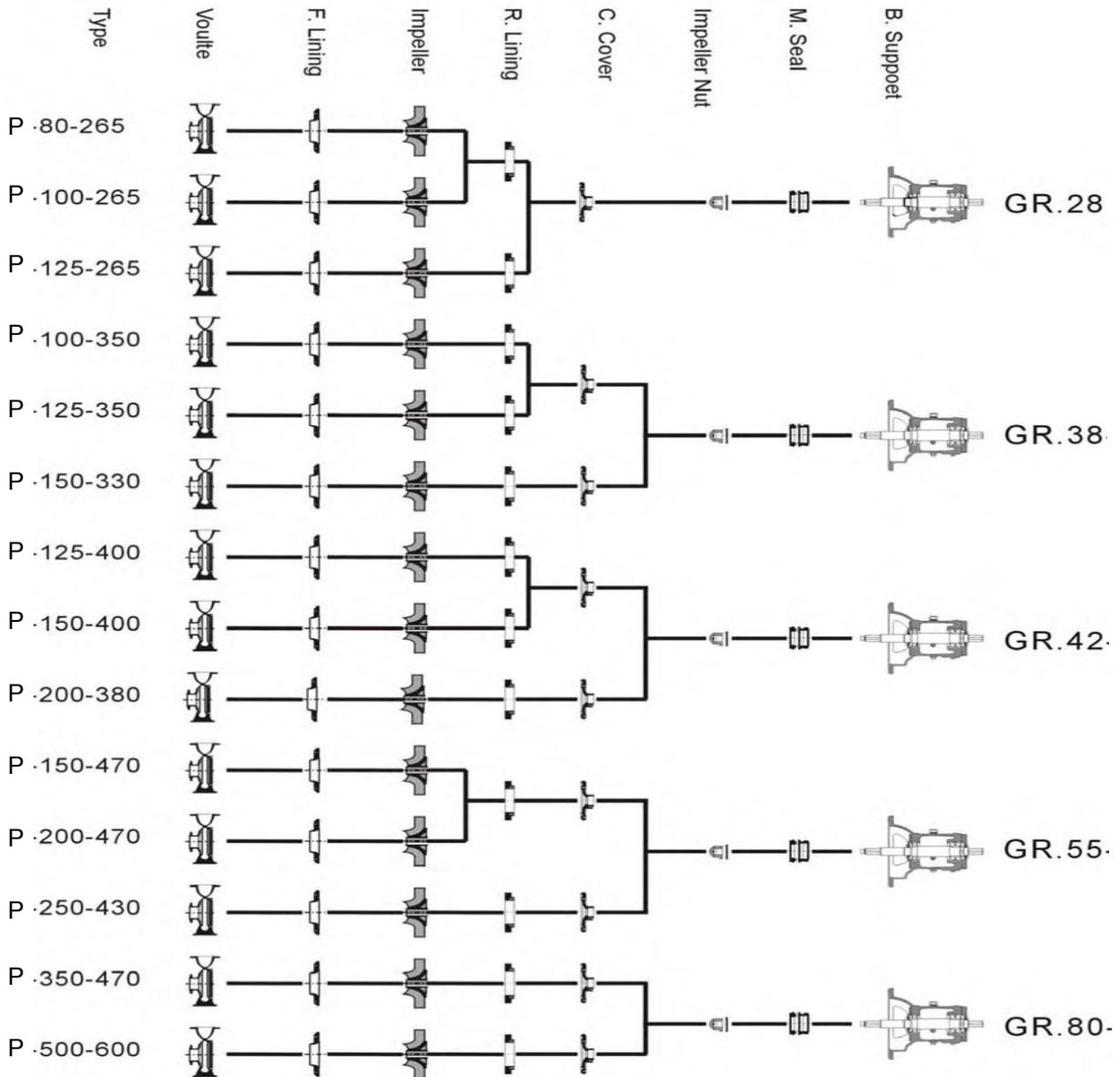
| Bearing support | Pump type | Oil lubrication pump-end | Oil lubrication coupling-end | Grease lubrication pump-end | Grease lubrication coupling-end |
|-----------------|-----------|--------------------------|------------------------------|-----------------------------|---------------------------------|
| GR.28- | P-80-265 | VMC 38X58X10 | VMC 35X55X10 | A 38X58X7 | A 35X55X7 |
| | P-100-265 | | | | |
| | P-125-265 | | | | |
| GR.38- | P-100-350 | VMC 48X68X10 | VMC 45X65X10 | A 48X68X8 | A 45X65X8 |
| | P-125-350 | | | | |
| | P-150-330 | | | | |
| GR.42- | P-125-400 | VMC 55X75X10 | VMC 55X75X10 | A 55X75X8 | A 55X75X8 |
| | P-150-400 | | | | |
| | P-200-380 | | | | |
| GR.55- | P-150-470 | VMC 70X90X12 | VMC 70X90X12 | A 70X90X10 | A 70X90X10 |
| | P-200-470 | | | | |
| | P-250-430 | | | | |
| GR.80- | P-350-470 | VMC 90X120X12 | VMC 90X120X12 | A 95X120X12 | A 95X120X12 |
| | P-500-600 | | | | |

8.3 Pump seals:

| Bearing support | Pump type | Cartridge single mechanical seal | | Cartridge double mechanical seal | Single mechanical seal | Stuffing box seal | Dynamical seal (PTFE-ring) |
|-----------------|-----------|----------------------------------|-----------------|----------------------------------|------------------------|-------------------|----------------------------|
| | | without wash water | with wash water | | | | |
| GR.28- | P-80-265 | ACS1/38 | ACS3/38 | ACS2/38 | MG12S14/38 | 48/68X 10 | 165/55X 4 |
| | P-100-265 | | | | | | |
| | P-125-265 | | | | | | |
| GR.38- | P-100-350 | ACS1/48 | ACS3/48 | ACS2/48 | MG12S14/48 | 60/80X 10 | 165/66X 4 |
| | P-125-350 | | | | | | |
| | P-150-330 | | | | | | |
| GR.42- | P-125-400 | ACS1/53 | ACS3/53 | ACS2/53 | MG12S14/53 | 65/85X 10 | 175/71X 4 |
| | P-150-400 | | | | | | |
| | P-200-380 | | | | | | |
| GR.55- | P-150-470 | ACS1/65 | ACS3/65 | ACS2/65 | MG12S14/65 | 75/95X 10 | 215/85X 4 |
| | P-200-470 | | | | | | |
| | P-250-430 | | | | | | |
| GR.80- | P-350-470 | ACS1/90 | ACS3/90 | ACS2/90 | MG12S14/90 | 105/130X 12 | 215/106X 4 |
| | P-500-600 | | | | | | |

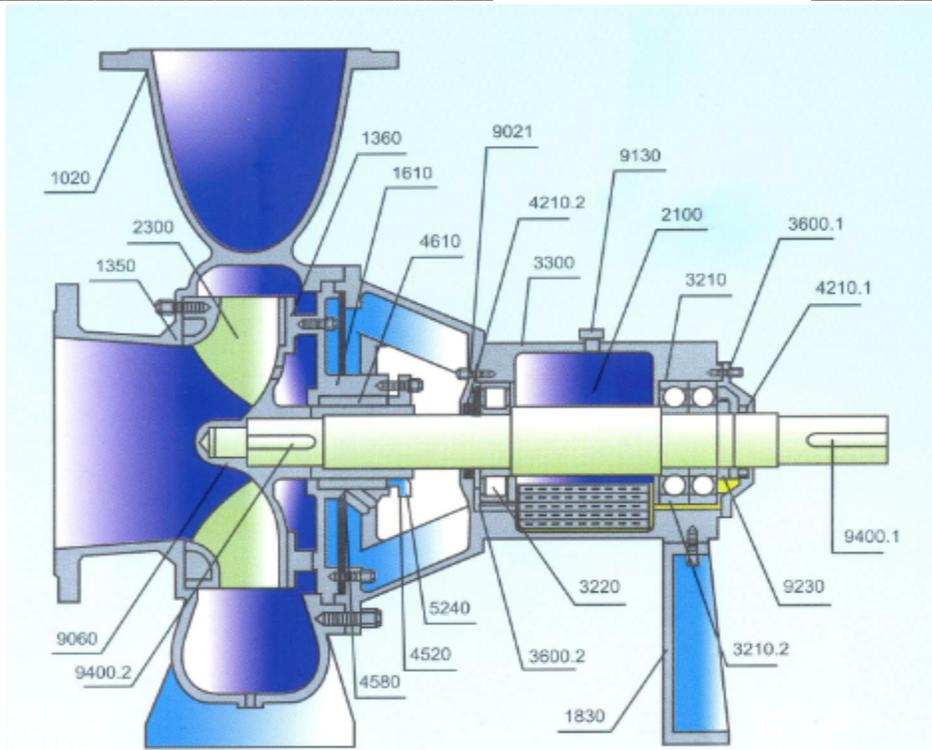
P Series

8.4 Centrifugal pumps spare parts list

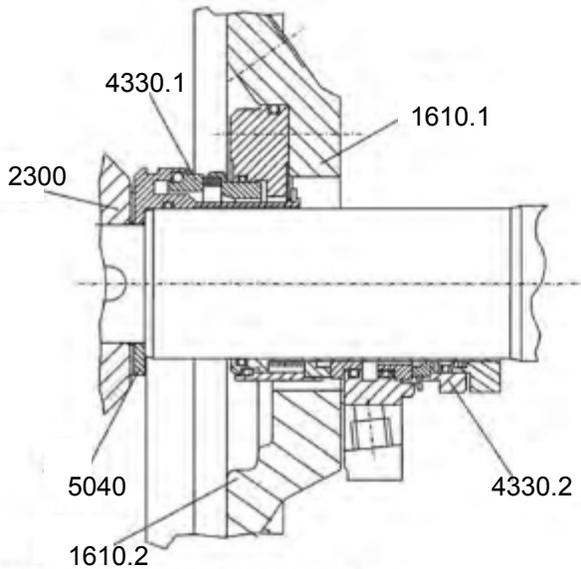


The advantages of modularized-design spare parts are reducing storage and expense.

P Series

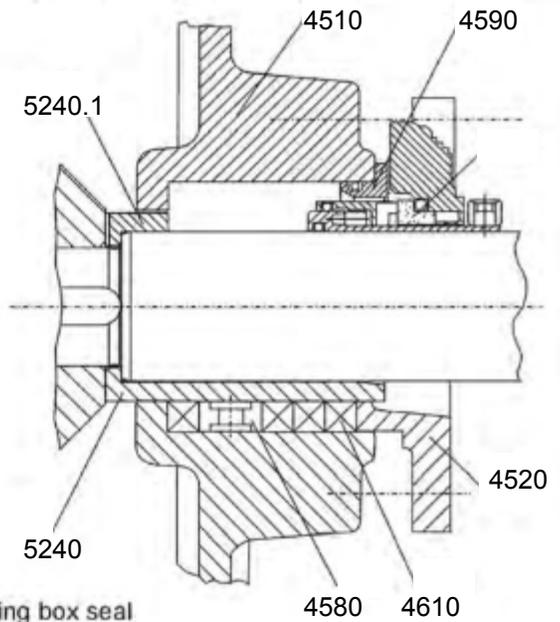


A) Standard cartridge single mechanical seal



B) Cartridge double mechanical seal

C) Cartridge single mechanical seal with washer water

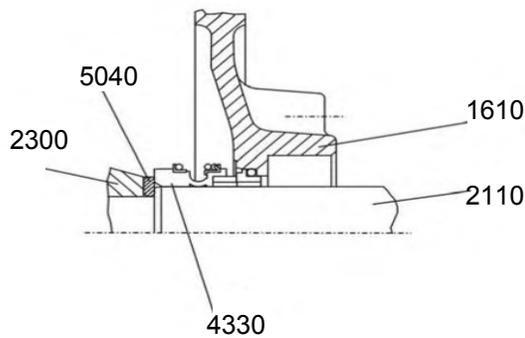


D) Stuffing box seal

Fig. 44

P Series

E) Single mechanical seal



F) Dynamic seal

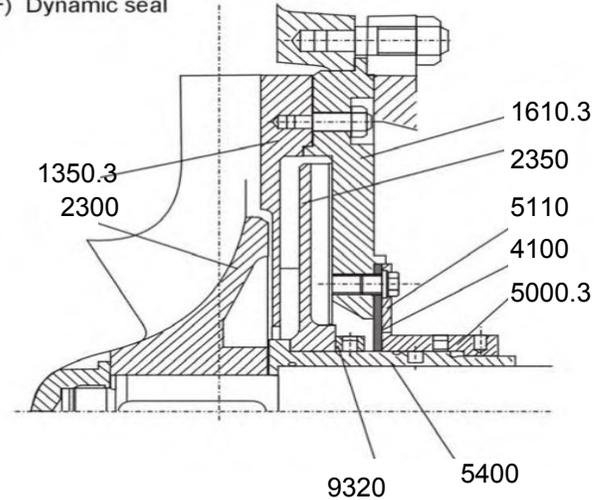


Fig. 44 continued

| Item | Qty | Description | Item | Qty | Description |
|--------|-----|--------------------------------|--------|------|--------------------------------|
| 1020 | 1 | Volute casing | 4330.3 | 1 | Cartridge mechanical seal-ACS3 |
| 1350.1 | 1 | Front lining | 4510 | 1 | Stuffing box body (STB) |
| 1350.2 | 1 | Rear lining | 4520 | 1 | Stuffing box gland |
| 1350.3 | 1 | Rear lining for dynamic seal | 4580 | 1 | Sealing water ring |
| 1610 | 1 | Casing cover (SMS) | 4590 | 1 | Transition ring |
| 1610.1 | 1 | Casing cover (ACS1) | 4610 | 4(5) | Stuffing box packing |
| 1610.2 | 1 | Casing cover (ACS2) | 5000.3 | 1 | Adjusting ring |
| 1610.3 | 1 | Casing cover (DYA) | 5110 | 1 | Back-up ring for dynamic seal |
| 1830 | 1 | Support leg | 5040 | 1 | Spacer |
| 2110 | 1 | Pump shaft | 5240 | 1 | Shaft protection sleeve (STB) |
| 2300 | 1 | Impeller | 5240.1 | 1 | Shaft sleeve(ACS3) |
| 2350 | 1 | Wing wheel | 5400 | 1 | Shaft sleeve for dynamic seal |
| 3200 | 2 | Roller bearing | 5990 | 2 | Sealing guard |
| 3220 | 1 | Cylindrical roller bearing | 6420 | 2 | Oil sight glass |
| 3500 | 1 | Bearing housing | 6720 | 1 | Vent valve |
| 3600.1 | 1 | Bearing cover, pump end | 9030 | 1 | Oil-draining plug |
| 3600.2 | 1 | Bearing cover, coupling end | 9220 | 1 | Impeller nut |
| 4100 | 1 | PTFE seal ring | 9230 | 1 | Shaft nut |
| 4110.1 | 1 | Bearing isolator | 9310.1 | 1 | Locking plate |
| 4110.2 | 1 | Bearing isolator | 9310.2 | 1 | Locking plate |
| 4330 | 1 | Mechanical seal-MG (si/si) | 9320 | 1 | Lock washer |
| 4330.1 | 1 | Cartridge mechanical seal-ACS1 | 9400.1 | 1 | Key (pump end) |
| 4330.2 | 1 | Cartridge mechanical seal-ACS2 | 9400.2 | 1 | Key (coupling end) |

P Series

9 Dimensional drawing

9.1 Pump dimensional drawing

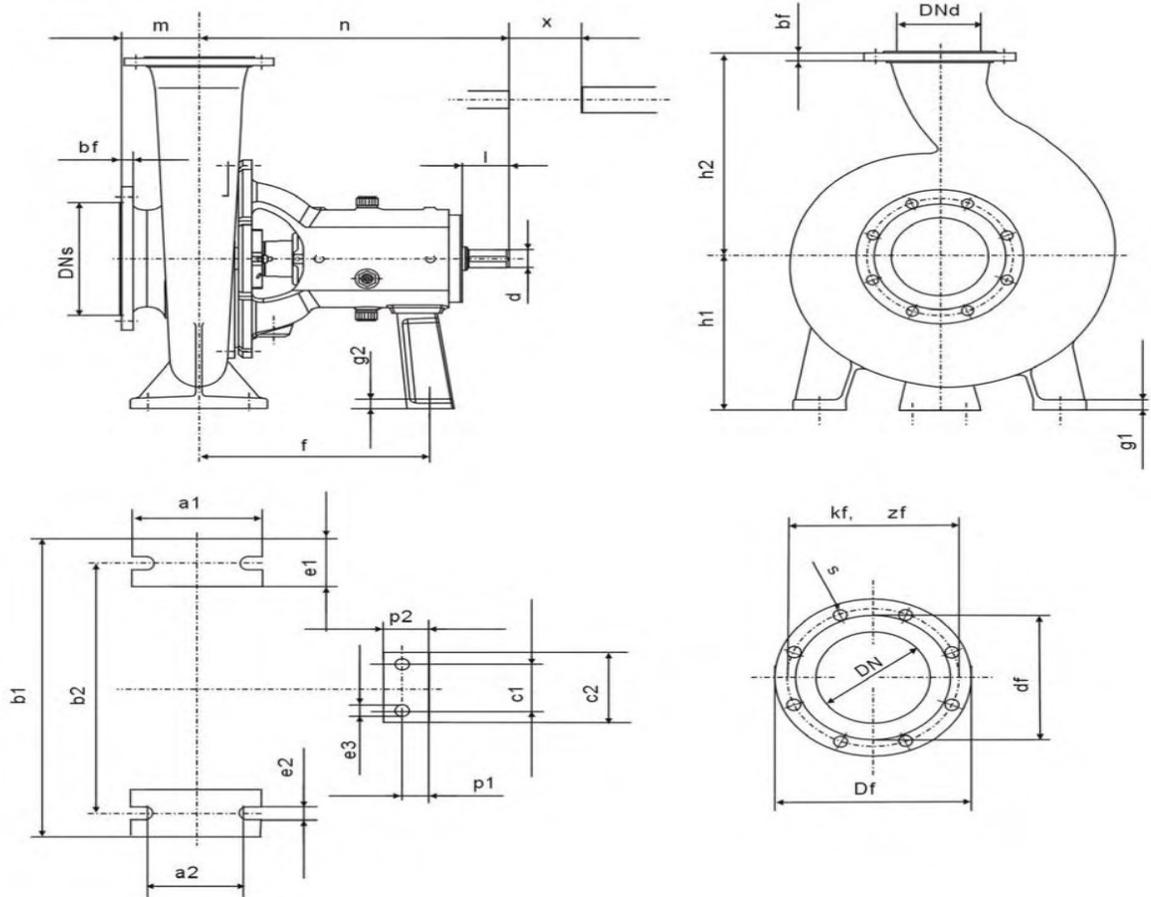


Fig. 45

Flange connection dimension (reference DIN 2501):

| DN | PN | Df(mm) | kf(mm) | df(mm) | s(mm) | zf | bf(mm) |
|-----|---------|--------|--------|--------|-------|----|--------|
| 80 | 10 / 16 | 200 | 160 | 138 | 19 | 8 | 23 |
| 100 | 10 / 16 | 220 | 180 | 158 | 19 | 8 | 24 |
| 125 | 10 / 16 | 250 | 210 | 188 | 19 | 8 | 26 |
| 150 | 10 / 16 | 285 | 240 | 212 | 24 | 8 | 26 |
| 200 | 10 | 340 | 295 | 268 | 24 | 8 | 26 |
| 250 | 10 | 395 | 350 | 320 | 24 | 12 | 26 |
| 300 | 10 | 445 | 400 | 370 | 24 | 12 | 28 |
| 350 | 10 | 505 | 460 | 430 | 24 | 16 | 28 |
| 500 | 10 | 670 | 620 | 585 | 26 | 20 | 34 |



WEL-TECH EQUIPMENTS PVT.LTD

MFR.OF INDUSTRIAL CENTRIFUGAL PUMPS

P Series

Unit: mm

| Bearing support | d | l | e1 | e2 | e3 | g1 | g2 | p1 | p2 |
|-----------------|----|-----|-----|----|----|----|----|----|-----|
| Gr.28- | 28 | 60 | 80 | 19 | 19 | 16 | 10 | 31 | 50 |
| Gr.38- | 38 | 72 | 100 | 24 | 24 | 21 | 10 | 48 | 70 |
| Gr.42- | 42 | 80 | 100 | 28 | 28 | 26 | 10 | 45 | 70 |
| Gr.55- | 55 | 100 | 125 | 28 | 28 | 26 | 10 | 60 | 95 |
| Gr.80- | 80 | 140 | 125 | 32 | 32 | 29 | 12 | 88 | 115 |

Unit: mm

| Pump type | Bearing support | DNs | DNd | m | n | x | h1 | h2 | a1 | a2 | b1 | b2 | c1 | c2 | f |
|-----------|-----------------|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| P.80-265 | Gr.28- | 100 | 80 | 130 | 480 | 100 | 240 | 300 | 160 | 112 | 400 | 315 | 80 | 130 | 370 |
| P.100-265 | | 125 | 100 | 130 | 480 | 100 | 240 | 300 | 160 | 112 | 400 | 315 | 80 | 130 | 370 |
| P.125-265 | | 150 | 125 | 130 | 480 | 100 | 240 | 300 | 160 | 112 | 400 | 315 | 80 | 130 | 370 |
| P.100-350 | Gr.38- | 125 | 100 | 130 | 555 | 140 | 315 | 400 | 200 | 142 | 500 | 400 | 100 | 150 | 414 |
| P.125-350 | | 150 | 125 | 130 | 555 | 140 | 315 | 400 | 200 | 142 | 500 | 400 | 100 | 150 | 414 |
| P.150-330 | | 200 | 150 | 130 | 555 | 140 | 315 | 400 | 200 | 142 | 500 | 400 | 100 | 150 | 414 |
| P.125-400 | Gr.42- | 150 | 125 | 150 | 590 | 140 | 355 | 480 | 260 | 192 | 550 | 450 | 100 | 150 | 440 |
| P.150-400 | | 200 | 150 | 150 | 590 | 140 | 355 | 480 | 260 | 192 | 550 | 450 | 100 | 150 | 440 |
| P.200-380 | | 250 | 200 | 150 | 590 | 140 | 355 | 480 | 260 | 192 | 550 | 450 | 100 | 150 | 440 |
| P.150-470 | Gr.55- | 200 | 150 | 160 | 720 | 180 | 410 | 550 | 270 | 202 | 650 | 550 | 120 | 180 | 530 |
| P.200-470 | | 250 | 200 | 160 | 720 | 180 | 410 | 550 | 270 | 202 | 650 | 550 | 120 | 180 | 530 |
| P.250-430 | | 300 | 250 | 160 | 720 | 180 | 410 | 550 | 270 | 202 | 650 | 550 | 120 | 180 | 530 |
| P.350-470 | Gr.80- | 350 | 350 | 180 | 1055 | 180 | 500 | 700 | 320 | 230 | 770 | 650 | 180 | 240 | 780 |
| P.500-600 | | 500 | 500 | 340 | 1072 | 250 | 605 | 895 | 400 | 310 | 960 | 840 | 180 | 240 | 794 |

P Series

9.2 Pump dimensional drawing with motor installation

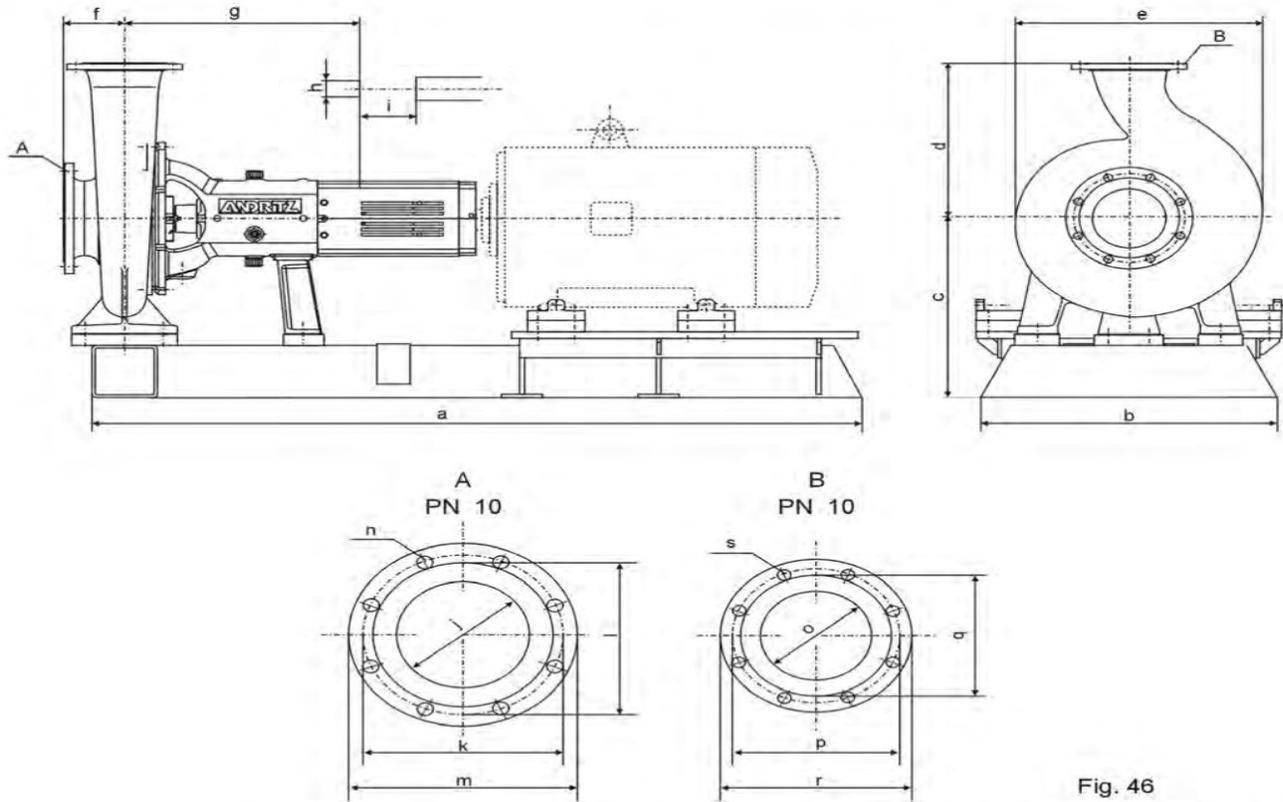


Fig. 46

| Pump type | a | | b | | c | | d | e | f | g | h | i | j | k | l | m | n | o | p | q | r | s |
|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-----|------|-----|------|----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|----|
| | Small motor | Big motor | Small motor | Big motor | Small motor | Big motor | | | | | | | | | | | | | | | | |
| 80-265 | 1075 | 1360 | 560 | 560 | 378 | 400 | 300 | 412 | 130 | 480 | 28 | 100 | 100 | 180 | 158 | 220 | 19 | 80 | 160 | 138 | 200 | 19 |
| 100-265 | 1075 | 1360 | 560 | 560 | 378 | 400 | 300 | 435 | 130 | 480 | 28 | 100 | 125 | 210 | 188 | 250 | 19 | 100 | 180 | 158 | 220 | 19 |
| 125-265 | 1075 | 1360 | 560 | 560 | 378 | 400 | 300 | 455 | 130 | 480 | 28 | 100 | 150 | 240 | 212 | 285 | 24 | 125 | 210 | 188 | 250 | 19 |
| 100-350 | 1460 | 1685 | 670 | 670 | 455 | 477 | 400 | 511 | 130 | 555 | 38 | 140 | 125 | 210 | 188 | 250 | 19 | 100 | 180 | 158 | 220 | 19 |
| 125-350 | 1460 | 1685 | 670 | 670 | 455 | 477 | 400 | 540 | 130 | 555 | 38 | 140 | 150 | 240 | 212 | 285 | 24 | 125 | 210 | 188 | 250 | 19 |
| 150-330 | 1460 | 1685 | 670 | 670 | 455 | 477 | 400 | 570 | 130 | 555 | 38 | 140 | 200 | 295 | 268 | 340 | 24 | 150 | 240 | 212 | 285 | 19 |
| 125-400 | 1550 | 1890 | 730 | 730 | 519 | 549 | 480 | 574 | 150 | 590 | 42 | 140 | 150 | 240 | 212 | 285 | 22 | 125 | 210 | 188 | 250 | 19 |
| 150-400 | 1550 | 1890 | 730 | 730 | 519 | 549 | 480 | 625 | 150 | 590 | 42 | 140 | 200 | 295 | 268 | 340 | 24 | 150 | 240 | 212 | 285 | 24 |
| 200-380 | 1550 | 1890 | 730 | 730 | 519 | 549 | 480 | 680 | 150 | 590 | 42 | 140 | 250 | 350 | 320 | 395 | 24 | 200 | 295 | 268 | 340 | 24 |
| 150-470 | 1909 | 2160 | 845 | 845 | 595 | 615 | 550 | 681 | 160 | 720 | 55 | 180 | 200 | 295 | 268 | 340 | 24 | 150 | 240 | 212 | 285 | 24 |
| 200-470 | 1909 | 2160 | 845 | 845 | 595 | 615 | 550 | 740 | 160 | 720 | 55 | 180 | 250 | 350 | 320 | 395 | 24 | 200 | 295 | 268 | 340 | 24 |
| 250-430 | 1909 | 2160 | 845 | 845 | 595 | 615 | 550 | 800 | 160 | 720 | 55 | 180 | 300 | 400 | 370 | 445 | 24 | 250 | 350 | 320 | 395 | 24 |
| 350-470 | 2220 | 2500 | 970 | 980 | 705 | 725 | 700 | 950 | 180 | 1055 | 80 | 180 | 350 | 460 | 430 | 505 | 24 | 350 | 460 | 430 | 505 | 24 |
| 350-470HV | 1240 | | 1020 | | 755 | | 700 | 950 | 180 | 1055 | 80 | 180 | 350 | 460 | 430 | 505 | 24 | 350 | 460 | 430 | 505 | 24 |
| 500-600 | 2655 | | 1140 | | 855 | | 895 | 1195 | 340 | 1072 | 80 | 250 | 500 | 620 | 585 | 670 | 26 | 500 | 620 | 585 | 670 | 26 |
| 500-600HV | 1080 | | 1220 | | 860 | | 895 | 1195 | 340 | 1072 | 80 | 250 | 500 | 620 | 585 | 670 | 26 | 500 | 620 | 585 | 670 | 26 |

P Series

10 Torques and forces

In principle, outlet and inlet pipe couldn't bear overpressure, but it is inevitable to generate torques and forces. It is suggest that check the torques and forces for initial start-up.

The details for max. torques and forces allowed are as follows:

| Pump type | Forces(N) | | Torques(NM) | |
|-----------|-----------|-------|-------------|---------|
| | Fy | Fx=Fz | Myz | Mzx=Mxy |
| -80-265 | 8500 | 2800 | 650 | 400 |
| 100-265 | | | | |
| 125-265 | | | | |
| 100-350 | 10500 | 3500 | 850 | 550 |
| 125-350 | | | | |
| 150-330 | | | | |
| 125-400 | 12500 | 4000 | 1200 | 650 |
| 150-400 | | | | |
| 200-380 | | | | |
| 150-470 | 14000 | 4500 | 1600 | 850 |
| 200-470 | | | | |
| 250-430 | | | | |
| 350-470 | 15000 | 4800 | 2100 | 1100 |
| 500-600 | 17000 | 5100 | 3000 | 1500 |

Drawings for torques and forces born by outlet and inlet pipe:

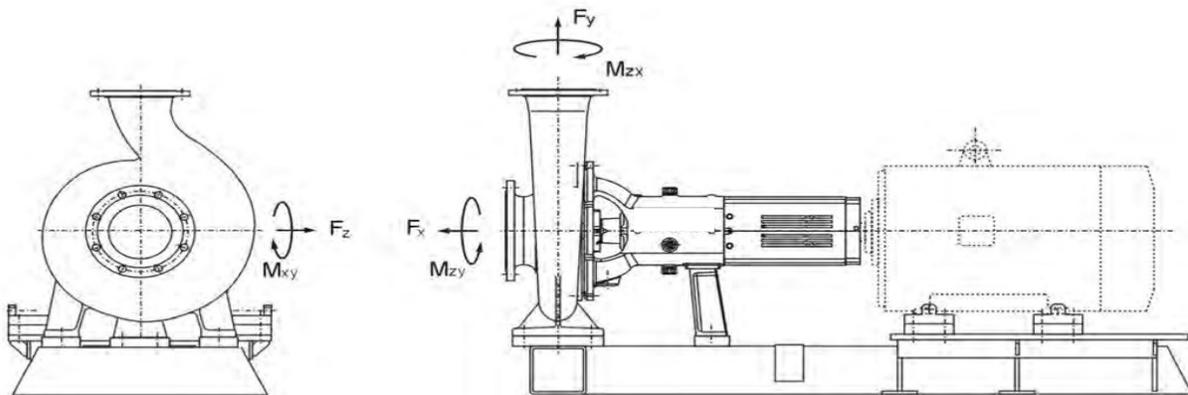


Fig. 47



11 Malfunction and solution

| Malfunction | Possible reason | Solution |
|--|---|--|
| The motor stops | No electric power | Check the electric power supply. If any repair at the power supply is necessary, let only a skilled electrician do the repair. |
| | Pump is jammed with pulp | Take the pulp out. |
| | Motor defect | Check motor, if necessary, change motor. |
| | Control pad trouble | Check and repair control pad. |
| | Impeller is blocked with lining | Adjust the gap between impeller and lining. See chapter 6.2.3 for the correct dimension of the gap. |
| Power consumption is too high, motor brake jumps | Impeller hits the liner | Adjust the gap between impeller and lining. See chapter 6.2.3 for the correct dimension of the gap. |
| | Flow is larger than the designed flow | Reduce the flow. |
| | Motor power is too small | Change to a larger motor. |
| | Bearing is damaged | Change the bearing. |
| | Coupling is badly or not adjusted | Readjust the coupling. |
| Actual flow is lower than the designed flow | Outlet valve is opened too small | Enlarge the outlet valve opening. |
| | Pump jammed | Take out the sundries. |
| | Gap between impeller and liner too large | Adjust the gap between impeller and lining. See chapter 6.2.3 for the correct dimension of the gap. |
| | Impeller and liner is worn and torn | Change the impeller and liner. |
| | Motor rating speed | Check the motor speed and the power supply. |
| | Pump is sucking air | Check the pipe and the seal for leaks. |
| | Air erosion | Please call our specialist. |
| | Designed head of the pump is not enough | Please call our specialist to discuss the extension of the head. |
| Actual head is lower than the designed head | Pump is jammed | Take out the sundries. |
| | Outlet valve is opened too much | Reduce the opening of the valve. |
| | Impeller erosion | Change the impeller. |
| | Pump is sucking air | Check the seal and the pipe for leaks. |
| | Pulp temperature is too high | Reduce the pulp temperature. |
| | incorrect motor speed | Check the motor and the power supply. If necessary, change the motor. |
| | Air erosion | Please call our specialist. |
| High consistency pulp can not be delivered | Designed head of the pump is too small | Please call our specialist to discuss the extension of the head. |
| | Pump is jammed | Please call our specialist and add block method. |
| Strong vibration and/or big noise | Coupling is badly or not adjusted | Readjust the coupling. |
| | Pipe is vibrating | Add pipe support. |
| | Pump foundation is not solid, or wrong grouting | Reconstruct the foundation. |
| | Bearing is damaged | Change the bearing. |
| | The outgoing flow is too small | Adjust the outlet valve to defined flow. |
| | The outgoing flow is too big | Adjust the outlet valve to smaller flow. |
| | The inlet takes in air into the pump | Check and repair the inlet pipe. |
| | The impeller is jammed | Take out the sundries. |
| Bearing temperature too high | Lubrication medium is not enough | Add lubrication. See the table in page 19 for required lubrication amount. |
| | Lubrication is too much | Take off extra lubrication. See the table in page 19 for required lubrication amount. |
| | Lubrication medium is wrong | Change the lubrication medium. See the table in page 19 for recommended lubrication media. |
| | Lubrication medium is too dirty or deteriorate | Change the lubrication medium. See the table in page 19 for recommended lubrication media. |
| | Vibration is too strong | See "Strong Vibration and/or big noise" and adjust. |
| | Bearing is damaged | Change the bearing. |
| Mechanical seal is leaking | Incorrect installation of the mechanical seal | Check the mechanical seal and correct the installation. |
| | Too much vibration | Find out the reason for the vibration and adjust. |
| | Wrong seal type | Contact our specialist and change the type of the mechanical sealing. |
| Air erosion in pump | Material of the pipe is wrong | Contact our specialist and change the type of the pipe. |
| | NPSH of the pump is too high | Contact our specialist to find a solution. |
| | Absorption height is too high | Contact our specialist. |
| | Pulp temperature is too high | Reduce the pulp temperature. |

12 Frequently asked questions

- 1. THE CHARACTERISTIC CURVES OF YOUR PUMPS YOU SHOW US ARE FOR WATER, NOW WE WANT TO PUMP STOCK OF 5% PULP. CAN WE SELECT THE PUMP USING THE SAME CURVES?**

Since the design of modern pumps is adapted to the flow, the characteristic curves for water and the usual pulps are identically up to a consistency of about 6%(depending on the pump size and the kind of stock).
- 2. WHY DON'T YOUR PUMPS NEED ANY SEALING WATER?**

Only the pumps with a single mechanical seal do not need any additionally sealing water. The seal is lubricated by the pumped medium. The pumps with different seal types still need a sealing water connection.
- 3. HOW CAN IT BE THAT THERE IS NO MAINTENANCE NEEDED FOR HE DYNAMIC SEAL?**

The dynamical seal let the sealing water flow in the opposite direction to the medium in the sealing area, where it creates a counter-pressure. Since there is no mechanical contact between the different pump parts, there is no mechanical wear. Because the dynamical seal is only working during operation, there is an additionally standstill seal needed.
- 4. WHAT IS THE LIFETIME OF A MECHANICAL SEAL?**

The lifetime of a mechanical is mainly influenced by the quality of the stock and how smooth the shaft is running. With a properly aligned coupling and a stock of good quality, a mechanical seal can last up to fine years, while the average lifetime is about two year.
- 5. WHAT IS THE LIFETIME OF A BEARING?**

As the mechanical seal, the lifetime of the bearing depends on how smooth the shaft is running. As we use well-known international brands SKF, with a good aligned coupling, the lifetime of the bearing is about five years.
- 6. WHAT CONSISTENCY OF PULP IS YOUR PUMPS APPLICABLE FOR?**

Our normal stock pumps are designed for a consistency up to 5%, in special cases up to 7%. Our medium-consistency pumps are designed for a consistency from 0 ~ 17%.
- 7. WHAT IS THE ADVANTAGE OF A FULLY OPEN IMPELLER, COMPARED TO A CLOSED OR SEMI-OPEN IMPELLER?**
 - Only an open impeller makes it available to pump a stock with air content, since in aLL stock pumps the air content can be up to 4%.
 - No axial thrust compensation is necessary. The axial thrust on the backside of the impeller is very small and compensated by the bearing. It is also almost constant and independent of the open impeller.
 - Medium in the back of fully open impeller flow adequately, it make mechanical seal without sealing water is possible..
- 8. WHAT SPECIAL ATTENTIONS SHALL WE PAY DURING THE FIRST START OF A NEW INSTALLED PUMP?**

Please follow exact the startup procedure described in the manual. Especially with standard-type mechanical seal risk of dry running!
- 9. THE BASE FRAME OF THE PUMP IS MADE OF CARBON STEEL. IS IT STRONG ENOUGH?**

Yes, the design of our base frames is tested and approved. Our pumps are running in many paper mills, supported by these base frames without any problems. Caution: use the correct way to grouting (see chapter 4).
- 10.AFTER A CERTAIN PERIOD OF APPLICATION, THE MEASURED PUMP HEAD IS LOWER THAN MEASURED AFTER THE FIRST STARTUP. WHAT IS THE REASON AND HOW TO ADJUST IT?**

The reason can be wear at the impeller and the wear liner. To improve the head, readjust the gap between the impeller and the liner. If the wear is too strong, these parts may need to be exchanged.
- 11.WHILE STARTING THE PUMP, WE OBSERVE SOME NOISE. WHERE DOES IT COME FROM AND HOW TO AVOID IT?**

Check the pipe support. If the pipe is loose, it can give some rattling noise.



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