



Instruction for Operation and Maintenance



SCP-HT

SINGLE STAGE HOT WATER PUMPS

yaşamı koru! save life!

Instructions for Installation, Operation and Maintenance

Standart Pompa ve Makina San. Tic. A.Ş.

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1. GENERAL

The objective of this manual is to:

- Instruct the users on installation, dismantling, maintenance and repair of the pump, and
- Describe methods of start-up, operation and stop of the pump.

1.1 Safety Signs



General Risk

Signifies safety precautions which if not applied may cause vital.



Electrical Risk

Warnings about the electrical current



Warning

Safety instructions that if not applied may cause damage to the machine or operation.

1.2 General Instructions



This manual should be made available at a safety place easily accessible by personnel responsible for safe operation and maintenance of the pump the qualified

- The authorized personnel should be experienced and well - informed about the related standards.
- The instructions given in this manual should be carefully read and applied at any phase of the installation and operating process of the pump.
- The user is responsible to ensure that the inspection and installation are performed by the authorized and qualified personnel, who read this manual thoroughly.
- The pump should never be operated beyond the operating conditions set forth in the purchase order. The reason is that the operating conditions set forth in the purchase order have been taken into consideration in the selection of the pump material and trial of the pump.
- If the pump is required to be operated apart from the conditions set forth in the purchase order, please contact with **STANDART POMPA**. Standart Pompa does not assume any responsibility for any damages that may arise from operation of the pump beyond the specified conditions without written consent.
- If the pump will not be installed at its place immediately after delivery, it should be stored at a clean and dry place where the ambient temperature does not change excessively. If the proper precautions are not taken, excessively low or high temperatures may cause serious damages to the pump.
- **Standart Pompa** does not accept any responsibility under warranty for any repair or replacement performed by the user or any other unauthorized persons.
- This manual does not include safety rules applicable at the place of use.

1.3 Safety Instructions



Always observe the following instructions to prevent any physical and/or property damages.

- Operate the pump only under the specified pump.
- Any tension, contraction and strain on the piping system should never transfer to the pump.
- Electric wiring of the engine and auxiliary components should definitely comply with the local rules and be performed by the authorized personnel.
- Never perform any work on the pump before the pump set is stopped completely.



Always disconnect power connection with the engine before you perform any work on the pump and make sure that no connection is made accidentally.

- Any work on the pump should always be performed by at least two workers.
- Clothing of the personnel to work on the pump should always be suitable for the works they **will** perform and/or the personnel should use necessary safety equipment.
- Never perform any work on the pump when it is hot.
- Never touch the hot pump and pipes by naked hand. The user personnel should take necessary warning precautions (e.g. warning signs, barricades, etc.).
- Always be careful when working on the pumps delivering hazardous liquids (e.g. acid or hazardous fluids).
- When the pump and pipes connected to the pump are under pressure, do not perform any work on the pump definitely.
- Once the work on the pump is over, put in place all safety shields previously removed.
- Never operate the pump in reverse direction.
- Never insert your hands and fingers into any hole or openings of the pump.
- Do not trace on the pump and/or pipes connected to the pump.

1.3.1 CE signs and approvals

It is a legal requirement that machinery and equipment put into service within certain regions of the world shall conform with the applicable CE Marking Directives covering Machinery and, where applicable, Low Voltage Equipment, Electromagnetic Compatibility (EMC), Pressure Equipment Directive (PED) and Equipment for Potentially Explosive Atmospheres (ATEX).

Where applicable, the Directives and any additional Approvals, cover important safety aspects relating to machinery and equipment and the satisfactory provision of technical documents and safety instructions. Where applicable this document incorporates information relevant to these Directives and Approvals. To confirm the Approvals applying and if the product is CE marked, check the serial number plate markings and the Certification, see the last page of this document.

1.3.2 Monitoring



Pump and/or pumpset should be operated according to duty point and the limit described in nameplate.

The technical personnel should operate the pump within these limits and the status monitoring system should be used for the pump set.

Use of the monitoring system is important especially for the following areas of the pump:

- Temperature values on the pump casing
- Temperature values in the sealing area

In the systems where buffer liquid is supplied or double mechanical seal is available the buffer liquid should be observed.

- Temperature values in the bearing area

For proper operation of the bearings, it would also be useful to monitor vibration and temperature values in the roller bearing.

- The pump should be operated according to ordered duty point.

1.3.3 Constructional requirements

When explosive fluid is pumped, all parts under pressure should be made of ductile material.

Coupling protection housings should be made of non-sparking materials.

Mechanical seals should never be operated dry. The sealing area should be filled with liquid completely as long as the pump operates. If you are not sure that the sealing area is filled with liquid, then the buffer liquid may be applied.

Frame of the pump and/or pump set should always be earthed.

1.3.4 Personnel qualification and training

All personnel involved in the operation, installation, inspection and maintenance of the unit must be qualified to carry out the work involved. If the personnel in question do not already possess the necessary knowledge and skill, appropriate training and instruction must be provided. If required the operator may commission the manufacturer / supplier to provide applicable training.

Always co-ordinate repair activity with operations and health and safety personnel, and follow all plant safety requirements and applicable safety and health laws and regulations.

1.4 Recycling

For products and parts which will not be used and scrapped, use the local or private waste collection services. If it is not possible, consult the nearest authorized service centre of STANDART POMPA.

3- UNPACKING, HANDLING and STORAGE

3.1- Unpacking

- Check whether the package has been damaged during transportation.
- Remove unpackaged pump and accessories (if any) carefully. Check whether they have been damaged during transportation.
- If any damage has occurred during transportation, notify SERVICE DEPARTMENT, **STANDART POMPA** and SHIPPING COMPANY about it immediately.
- Check whether all materials in the shipping list have been delivered. If there is any missing article, advise SERVICE DEPARTMENT, **STANDART POMPA**.
- Remove the liquid inside the pump, for preventing corrosion due to transportation.

3.2- Handling

3.2.1- General warnings



- Follow the rules at work to prevent occurrence of any accidents.
- Wear gloves, steel-tooled shoes and helmet during handling.
- You may use forklift, crane or hoisting ropes to lower wooden crates, packages, pallets or boxes depending on volume, weight and construction of them.

3.2.2- Lifting operation



ATTENTION

- Determine the following points prior to lifting and handling the pump or pump and motor group on the joint frame.

- Total weight and centre of gravity,
- The largest outer dimensions, and
- Location of the lifting points.
- The load lifting capacity should comply with the weight of the pump or pump group.
- The pump or pump group should always be lifted and handled horizontally.
- Never stand under or near the load being lifted.
- Do not keep the load lifted longer than necessary.
- Accelerating and braking operations during the hoisting should not be performed in such a way that may be dangerous for the working personnel.

The pump or pump group should be hoisted as shown in the Figure 1a or Figure 1b in order to avoid from any deformation. (When the group is hoisted as a whole, never use the suspension hook of the electric motor.

3.3- Storage

- If the pump will not be installed in place immediately, it should be stored at a clean and dry place free of any frost hazard without excessive change in the ambient temperature.
- If the pump bearings are of grease-applied ones, extra grease should be applied to the bearings to prevent moisture ingress around the shaft.
- Necessary precautions should be taken to protect the pump against humidity, dust, dirt and foreign materials.
- The pump should be rotated manually by some turns occasionally (e.g. once in a week) to prevent pitting on the bearing surfaces and sticking of the pump.

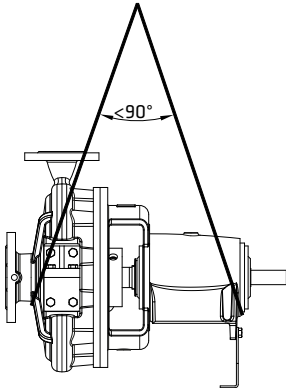


Figure 1a. Bare shaft pump

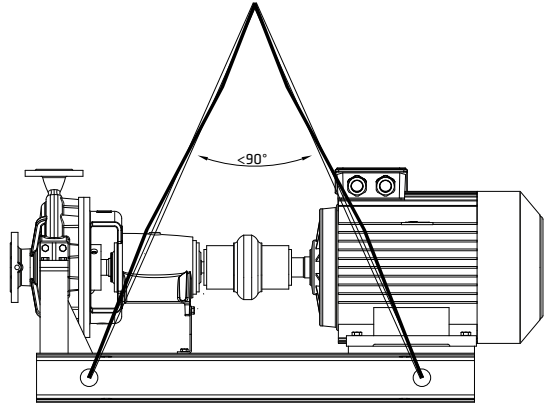


Figure 1b. Pump and motor on a common baseplate

4- INSTALLATION ON SITE

ATTENTION Installation on site should be performed as per EN 60204-1 standard.

Installation of the pump on site and levelling and adjustments of it should be performed only by qualified personnel. Improper installation or pump base (foundation) may cause failure. Such situations are excluded from warranty.

4.1- Bare Shaft Pump

- If the pump is purchased as bare shaft pump, then first a proper baseplate should be constructed to connect the pump and motor group. The baseplate should be designed and manufactured in such a way that it will have resistance to prevent vibration and deformation.
- If the pump is supplied without motor, proper motor and coupling should be selected before the group is installed.
- Following points should be taken into consideration when selecting motor:
 - Maximum power drawn by the pump along the entire operating range,
 - Running speed of the pump,
 - Applicable power supply (frequency, voltage, etc.),
 - Motor type (TEFC, Exproof, etc.),
 - Motor connection form (pedestal, flanged, horizontal, vertical, etc.), and
- Rated motor power, rpm and type of drive should be taken into consideration when selecting coupling.

4.2- Preparation for Installation

Prior to installation of the pump in place:

- Suction and delivery flanges should be cleaned thoroughly.
- Protective film on the pump shaft should be removed.
- If the pump has been stored temporarily, the liquid oil in the bearings should be drained completely (in case of pumps manufactured with liquid oil) and the bearings should be cleaned by a proper cleaning agent and then oiled again. This operation is not required for the pumps lubricated by grease and for the pumps using enclosed type of ball bearing.

4.3- Installation Site

ATTENTION • The pump should be installed at a well-ventilated place free of freezing and explosion risk.

- There should be sufficient space around the pump being installed to allow easy access for maintenance of the pump as well as sufficient space above the pump to hoist it when required.
- Suction pipe of the pump should be short as far as possible.

4.3.1- General characteristics of the pump foundation (baseplate)

You should work carefully for preparation of the pump base and installation of the pump group in place. Improper and careless installation may cause excessive vibration and premature wear of the pump equipment as well as pump failure.

ATTENTION

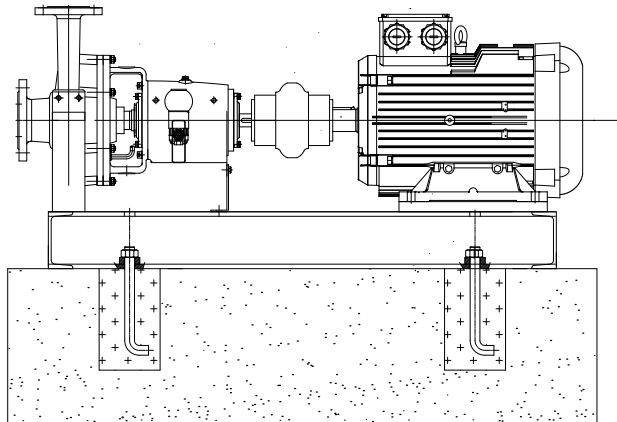


Figure 2a. Foundation, baseplate and anchor bolt

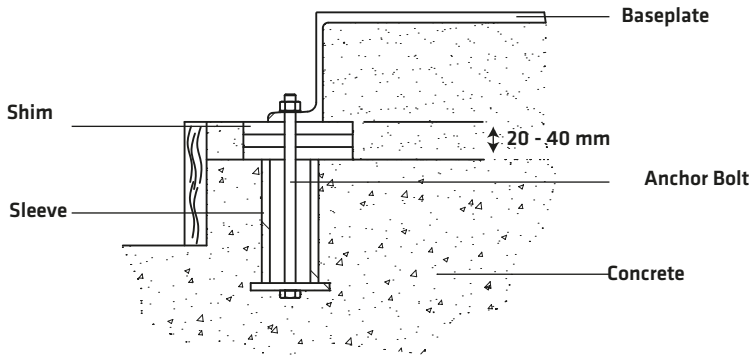


Figure 2b. Foundation, baseplate and anchor bolt

- Sizes of the foundation concrete should be determined on basis of minimum 10% excess of the frame dimensions.
- Pump foundation should be independent of other foundation and platforms.
- Pump foundation should be capable to absorb vibrations and bear the loads to apply on the pump unit during operation.
- Place and dimension of the anchor bolts should be determined according to the hole dimensions of the pump unit.
- Washer should be used to prevent tension and distortion when tightening the foundation bolts.
- In order that the foundation bolts should align with the connection holes of the frame exactly and to allow for minor adjustments, the bolts are inserted into the bushings. The bushings should be place in such a way that they will not exceed top surface of the foundation concrete.

4.3.2- Placement of the Pump Group

- Preparation and pour of the foundation concrete mass.
 - The concrete mass is formed according to its dimensions.
 - The locations of the anchor bolts are measured and marked carefully and Styrofoam is cut to the dimension, placed and fixed.
 - The concrete is poured
 - Volume ratio: Cement 1: sand 2: gravel 4
 - Concrete hardens within 7 days (hardening may be shortened by use of special cement).
 - Upon hardening of the concrete, the Styrofoam is burned and removed. Locations of anchor bolts appear in the concrete.
 - Top surface of the concrete and holes of the anchor bolts are cleaned.
- Placement of the frame on the foundation concrete mass. (first adjustment)
 - Anchor bolts are mounted on the frame.
 - The frame is placed on the flattening chocks and the anchor bolts remain suspended in the holes. Make sure that the anchor bolts remain vertical.
 - Levelness of the frame is controlled in both directions from the pump and engine placement location by use of precise spirit level $0,25 \div 0,40$ mm/m is acceptable.
 - Anchor holes are filled with concrete. Anchor bolts are thus fixed.
 - Volume ratio: Cement 1 : sand 1.5: gravel 3
 - Concrete hardens within 7 days (hardening time may be shortened by use of special cement).

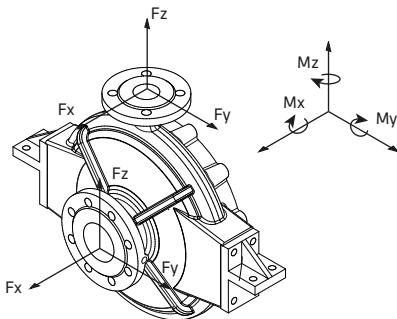
- Fixing of the frame on the foundation concrete mass exactly by adjustment.
 - The area about 30mm between the foundation concrete mass and frame is formed and concrete is poured through the holes in the frame.
 - Volume ratio: Cement 1: sand 2
 - Concrete hardens within 2 days.
 - Frame remains adjusted and fixed on the foundation concrete.

4.4- Installation of the Piping System

4.4.1- General Warning

ATTENTION • Never use the pump as a point of support or bearer for the piping system.

- The piping system should be supported at points near to the pump. For this purpose, after completion of the installation of the piping system, loosen the bolts of the suction and delivery flanges and control whether the piping system applies any tension on the pump. The maximum allowable forces and moments on the flanges are given in **Table 2**.
- Rated diameter of the suction and delivery flanges of the pump are not indicator of the correct sizes of the suction and delivery pipes at all. The rated diameter of the pipes and accessories used should be equal to or larger than the inlet diameters of the pump at least. Never use pipes and accessories having smaller diameter than the inlet diameters of the pump. Especially components such as bottom valve, strainer, dirt-retaining filter and check valves with larger free passage area should be preferred. In general, flow rates should not exceed 2m/s for the suction pipe and 3m/s for the delivery pipe. High speeds cause high pressure reduction and it, in turn, cause cavitation conditions on the suction pipe and loss arising from excessive friction on the delivery pipes.
- Pipe connections should be made with the flanges. Flange bolts should be made of proper material and in proper size. The flange bolts should be inserted between the flange bolts and centred in such way that it would not impair flow section.
- In case of excessive vibrations and systems operating with hot liquids, expansion parts should be used in order that any extra forces that may arise from thermal expansion are not transferred to the pump.
- Materials such as welding burrs, metal particles, sand and oakum arising from production of the piping system may remain in the pump and give damage to the pump. The suction and delivery flanges should be sealed blind washers in order to prevent such materials from entering into the pump during the assembly operations. After assembly, all pipe parts should be removed, cleaned, painted and reassembled. If dirt-retainer is used on the suction side of the pump, the dirt-retainer should be cleaned after working for several days.



Pump Type	Suction Flange									Discharge Flange								
	DN	Fx [N]	Fy [N]	Fz [N]	ΣF [N]	Mx [Nm]	My [Nm]	Mz [Nm]	ΣM [Nm]	DN	Fx [N]	Fy [N]	Fz [N]	ΣF [N]	Mx [Nm]	My [Nm]	Mz [Nm]	ΣM [Nm]
32-125																		
32-160	50	1150	1050	930	1810	990	690	790	1440	32	630	590	730	1130	770	520	590	1100
32-200																		
32-250																		
40-200																		
40-250	65	1470	1290	1190	2290	1050	770	830	1550	40	770	700	870	1360	910	630	730	1320
50-160																		
50-200																		
50-250	80	1750	1570	1430	2750	1110	790	910	1640	50	1050	930	1150	1810	990	690	790	1140
50-315																		
65-160																		
65-200																		
65-250	100	2350	2090	1890	3670	1230	870	1010	1810	65	1290	1190	1470	2290	1050	770	830	1550
65-315																		
80-200																		
80-250										80	1570	1430	1750	2750	1110	790	910	1640
80-315																		
80-400	125	2760	2490	2230	4320	1470	1050	1330	2240									
100-200																		
100-250										100	2090	1890	2350	3670	1230	870	1010	1810
100-315																		
100-400																		
125-200																		
125-250																		
125-315	150	3490	3150	2800	5470	1750	1210	1430	2560	125	2490	2230	2760	4320	1470	1050	1330	2240
125-400																		
150-200																		
150-250																		
150-315	200	4690	4190	3780	7300	2270	1590	1850	3300	150	3150	2800	3490	5470	1750	1210	1430	2560
150-400																		
150-500																		
200-260																		
200-315	250	5850	5210	4720	9130	3110	2200	2550	4580	200	4200	3780	4690	7310	2270	1610	1850	3360
200-400																		
200-500																		
250-315																		
250-400	300	7000	6260	5630	10950	4230	3010	3460	6230	250	5210	4720	5840	9130	3110	2200	2550	4580
250-500																		

Table 2

**Note: Above values are for GS-C 25 material.
Please contact our company for other material options.**

4.4.2- Suction pipe

• The suction pipe should be definitely watertight and should not be arranged in a way to cause formation of air pockets. These pumps are always installed under a reservoir. Suction pipe should be gradually inclined slightly towards the pump. **Figure 3**

• In order to keep the loss from friction, sharp elbows should not be used; and abrupt change of direction and section should be avoided and suction pipe should be made short as far as possible. If it is required to make change of section on a horizontal suction pipe, an eccentric conical spacer with its flat side on the top should be used.

• An insulation valve should be used to keep the axis on the suction pipe horizontally.

ATTENTION

This valve should always be open when the pump operates and it should never be used as flow rate adjusting valve.

(Caution: Throttle of the valve may cause the pump to operate with cavitation).

4.4.3- Delivery pipe

• A flow control valve should be connected on the delivery pipe, near the pump as far as possible in order to adjust the flow rate and delivery head.

• If the delivery head of the pump is more than 10 m or the delivery line is quite long, a check valve should be connected between the pump and flow rate adjusting valve on the delivery pipe in order to protect the pump against water hammers when stopping the pump or prevent backflow.

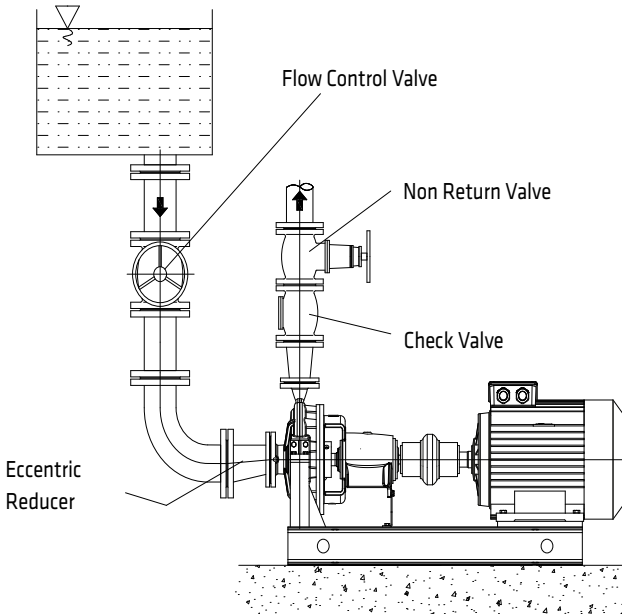


Figure 3. Suction Flooded

DIKKAT

After installation of piping system, coupling alignment should be checked and if necessary it should be adjusted again.

4.4.4- Auxiliary pipe connections and accessories

- Depending on the application auxiliary pipe connections (for cooling, sealing and flushing of seal, drainage etc. necessary for the pumping system) and/or accessories to check operating conditions (pressure gauges, temperature gauges etc.) may be made up and lail.

- Pressure and vacuum gauges must be properly anchored and connected at the measuring points located on the pump flanges by means of or on the pipes close to the flanges approximately 8 mm diameter tubing with pig tail configuration to lessen pressure fluctuation. For safety purposes isolating and vent valves should be fitted before the gauges (**Figure 4**).

- Every pump is fitted with connections on the pump casing to drain the pump and the bearing bracket to evacuate the seal leakage from the stuffing box (**Figure 5,6**). If required the pump drain and seal leakage can be piped to a suitable reservoir. The pump draining piping must be fitted with an isolating valve and both must be suitable for the maximum operating pressure of the pump.

- Cooling, sealing and flushing of seal piping must be connected only to the designated connections located on the pump (**Figure 7,8**).

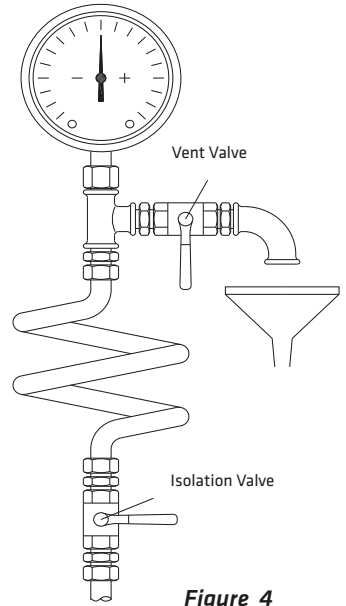


Figure 4

- d1** : Pressure gauge (discharge)
- d2** : Pressure gauge (suction)
- d3** : Filling or vent
- d4** : Drain
- d5** : Oil Filling (if applicable)
- d6** : Oil Drain (if applicable)
- d7** : Oil Level Indicator (if applicable)
- d8** : Seal Water Drain

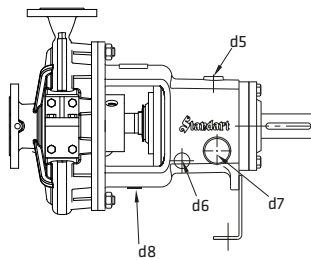


Figure 5

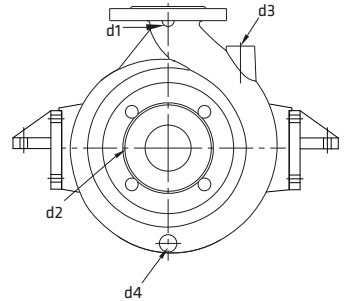


Figure 6

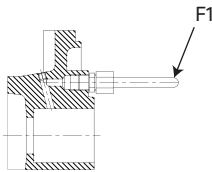


Figure 7

F1 : Seal flushing liquid inlet from external source

Q1: Mechanical seal quench liquid inlet from external source.
Q2: Mechanical seal quench liquid outlet.

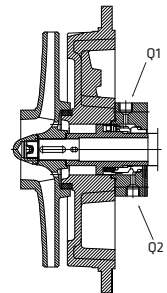


Figure 8

SCP-HT PUMPS

2- GENERAL PUMP DESCRIPTION

2.1- Pump Description

• SCP-HT pumps are defined as horizontal, center line mounted, radially split case, end suction, single stage, back pull-out design pumps with end closed impeller.

2.2- Application Area

SCP-HT series pumps are designed for clean hot water (max. 20 mg/dm³) with temperature between 100-230 °C. General application areas are as below:

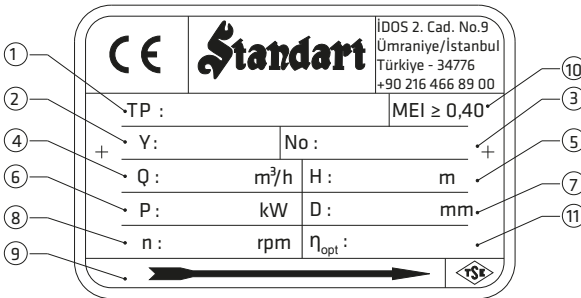
- Geothermal power plant,
- Heating facilities,
- Power station,
- Chemical and petrolchemical industries.

2.3- Pump Designation

SCP-HT 50 - 315

Pump Type _____
 Discharge Nozzle (DN-mm) _____
 Nominal Impeller Diameter (mm) _____

2.5 Pump Nameplate



- 1- Pump Type and Size
- 2- Production Year
- 3- Serial No
- 4- Capacity
- 5- Head
- 6- Motor Power
- 7- Impeller Diameter
- 8- Speed
- 9- Direction of Rotation
- 10- Minimum efficiency index
- 11- Efficiency

2.6- Technical Information

Discharge Nozzle : DN 32 ... DN 250 mm
 Operation Temperature : 100 °C - 230°C with cooled soft packing
 100 °C - 230 °C with cooled mechanical seal *
 Casing Pressure (max) : 25 bar (40 bar)*
 Permissible Liquids : See Section 2.2

The service life of this product as determined and announced by the Ministry is 10 years.

(*) Note: Contact our company for more detail.

4.5- Coupling Adjustment

ATTENTION After installation of the baseplate and system connections, the coupling adjustment should be controlled finally. The reason that proper adjustment of the entire system is responsibility of the purchaser.

ATTENTION “Coupling Adjustment” is to ensure that the rotation axes of the motor and pump should be on the same plane. If ECO SNT type pumps are ordered with motor and baseplate, it is delivered with the coupling adjustments made at the factory. However, this adjustment may be easily impaired during transportation, handling, installation on site and installation of the system. For this reason, the coupling adjustment should be performed again after installation of the group on site, disregarding the adjustment made at the factory.

- The most important factor for problem-free operation of the pump group is correct coupling adjustment. The basic reason of a number of problems such as vibration, noise, bearing heating and overload is a coupling unadjusted or improperly adjusted. For this reason, coupling adjustment should be performed very well and controlled frequently.

- Elastic coupling should not be regarded as a component to correct an improper adjustment. Elastic coupling does not correct a poor axial adjustment between the pump and motor and does not remove excessively poor adjustments.

- A metal part (steel ruler or gauge, etc.) and a precise caliper are required to perform coupling adjustment (special equipment should be used for very fine and precise adjustment). Axial run-out of the coupling (see Figure 9) should not exceed 0.1 mm.

- There may be two types of adjusting mistakes on the coupling:

- a) Angular mistake
- b) Parallel displacement mistake

- In order to control the angular mistake, the distance between two parts of the coupling should be measured mutually on horizontal and vertical planes. The clearances measured at these four points should be equal (Figure 10a,10b).

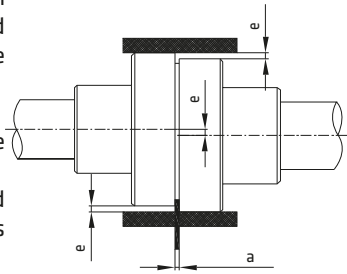


Figure 9. Aligning a flexible coupling

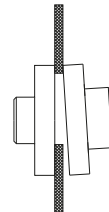


Figure 10a. Angle error in horizontal plane and adjustment

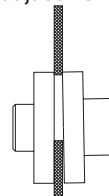


Figure 10b. Angle error in vertical plane and adjustment

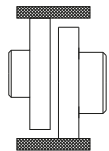


Figure 10c. Parallel sliding error in horizontal plane and adjustment.

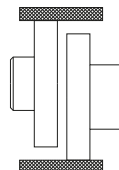


Figure 10d. Parallel sliding error in vertical plane and adjustment.

• In order to control the parallelism mistake, a gauge with straight edge is pressed on a part of the coupling in parallel to the axis and the position of the gauge related to other part is observed. The gauge should contact with both two parts simultaneously and along its entire edge. This process should be performed at two opposite places on the horizontal and vertical plane (Figure 10c, 10d).yerde yapılmalıdır (Şekil 10c, 10d).

• Adjustment mistakes may be on the horizontal and/or vertical plane. Mistakes on the vertical plane may be made by putting thin metal sheets under the pump or motor mounts and the mistakes on the horizontal plane by benefiting from the gaps in the connection holes or sliding the engine on the horizontal plane. Manner and order of the coupling adjustment is shown in the Figures 10a, 10b, 10c and 10d, respectively.

4.6- Minimum Flow



If there is possibility of the pump operating with its delivery valve is closed completely (that is, at zero flow rate) or almost closed (that is, at very little rate), a by-pass valve should be used on the outlet flange of the pump or on the delivery pipe just after the pump, but in advance of the control valve should be used. If such a valve is not used and the pump operates for a long time, almost all power given by the engine converts to thermal energy and transfers to the delivered liquid. This situation may cause overheating and, consequently, cause significant failures.

4.7- Electrical Connections



**• The electrical motors have to be built in accordance with EN 60034-1.
• Enclosures of electrical motors and control systems on the pump unit shall as a minimum have protection in accordance with EN 60529 IP22. But in determining the degree of protection of enclosures of electrical motors and control systems on the pump unit the operating and environmental conditions must be taken into consideration.**

- Electrical connection should be done by a qualified electrician. Current national regulation and motor manufacturer's instructions must be observed.
- Take all safety precautions listed in "Safety instructions". Disconnect all power supplies prior to doing any work.
- The supply cable must be laid in such a way that it never touches the pipework, pump and motor casing.
- Check voltage, phase and frequency on motor nameplate with the mains.
- The electric motor must be protected against overloading by means of circuit breakers and/or fuses. Circuit breakers and fuses must be selected in accordance with full load amperage of the motor appearing on the motor rating plate.
- It is recommended to use PTC (passive thermal control) on motor, but this is optional depending on customer requirement. In case of using PTC, these should be connected via corresponding terminals in the terminal box and the PTC should be connected to the thermal trip mechanism.
- Prior to connection the electrical wiring rotate the pump shaft by hand to make sure rotor rotates easily.
- Connect the electrical wiring in accordance with local electrical codes and make sure to ground the motor.
- The connection diagram can be found in the terminal box of the motor or in the instruction manual.
- The mains connection on the terminal box depends on the nominal power of the motor, the power supply and the type of connection. The necessary connection of the bridges in the terminal box is shown in the following (Table 3 ve Figure 11a, 11b, 11c).

Type of switch	Motor Power $P_N \leq 4 \text{ kW}$	Motor Power $P_N > 4 \text{ kW}$
	Power Supply 3 ~ 400 V	Power Supply 3 ~ 400 V
direct	Y - connection (11b)	Δ - connection (11a)
Y / Δ - start	Impossible	Remove connection bridges (11c)

Table 3

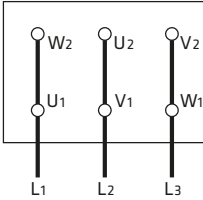


Figure 11a. Δ - connection

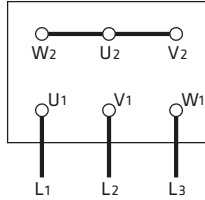


Figure 11b. Y - connection

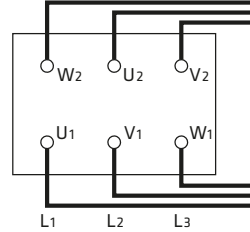


Figure 11c. Y / Δ - connection

ATTENTION In the case of three-phase induction motors with Y - Δ connection it must be ensured that the change-over points between star and delta follow on from one another very quickly. Longer change-over times may result in pump damage (Table 4).

Motor Power	Y - set time
$\leq 30 \text{ kW}$	< 3 second
> 30 kW	> 5 second

Table 4

4.8- Final Controls

- After all operations given above are completed, the coupling adjustment should be controlled once more in accordance with the section 4.5. And if it is incorrect, it should be corrected.
- The pump rotor should be rotated several times manually to make sure it rotates easily.
- All security guards should be put in place.
- And the pump group should be operated and you should allow until the operating and heating conditions are reached.
- At the end of this term, the pump is stopped and thin metal sheets are put under the motor mounts only to perform coupling adjustment for the last time.
- Final coupling adjustment is especially recommended to be performed at the operating temperature.



- The pump should never be operated before the safety guards are put in place. This is a security and safety rule at workplace which should be definitely observed.

5- START-UP / STOP

5.1- Preliminary Preparation

5.1.1- Oil control

• Bearings of the pumps which are lubricated by liquid oil are shipped oilless and this point is specified by a warning label. The pump bearings should be filled with liquid oil up to the indication level (see Figure 13).

ATTENTION • The oil lubricated bearing housing is delivered without oil and on it, there is a warning symbol for indication. The housing should be filled with oil until the oil comes on the middle (see. Figure 12 and 13).

5.1.2- Air venting and suction of the pump

• Make sure that the pump and suction pipe is completely full. It doesn't matter for the forced supply pumps. The suction valve, if any, is opened and the air plugs are loosened to bleed air and fill the pump completely.

ATTENTION Never allow dry operation of the pump.

5.1.3- Control for Direction of Rotation

• SCP-HT type pumps rotate clockwise when viewed from the engine to the pump. This direction is shown by an arrow on the pump and pump label. The pump should be operated for a very short time and stopped immediately to control whether it rotates in direction of the arrow. If the safety guard has been removed when performing this operation, it should be put in place again.

5.2- Start Up The Pump

- Check if the shut off valve in the suction line is open and the shut off valve in discharge line is closed.
- Switch on the circuit breaker and run the motor.
- Wait until the motor reaches the full speed (on star-delta running motors wait until it switches on delta).
- Open the discharge valve slowly while watching the ampermeter on the control panel (if the discharge line is empty do not turn on the valve fully open on first start up. Turn it on slowly to maintain the value on the ampermeter is under the rated current value of the motor).
- When the valve is if fully open, check the pressure on the manometer and see it is the same with the duty point pressure. If the pressure on the pressure gauge is lower than duty point pressure brings them to the duty point value by slightly closing the valve. If it is higher value, check your installation, especially geometric height again.

ATTENTION The pump should be shut down at once and the trouble should be corrected if the pump is running at its rated speed and found any of the following faults:

- Pump doesn't deliver any water,
- Pump doesn't deliver enough water,
- Flow is going down,
- Discharge pressure is not enough,
- Driver overloaded,
- Vibration on pump,
- High noise level,
- Bearing overheating.

5.3- Shut Down The Pump

- Slowly close the shut-off valve in the discharge line.
- You may shut down pump without closing the shut-off valve if there is a device for water hammer protection on the discharge line or the water hammer is not a considerable level.
- Switch off the drive. Ensure the pump set runs down smoothly and quietly to a standstill.
- Shut off external sealing liquid supply, if supplied to relieve stuffing box pressure.
- If the set is to remain out of services for a long time close the shut-off valve in the suction pipe. Close off the auxiliary connections. In the event of frost and/or prolonged standstill, drain the pump or otherwise protect against freezing.

5.4- Checks to be Made While The Pump is Running

ATTENTION

- **The pump must never run dry.**
- **Never run the pump for along period against a closed discharge valve (at zero flow)**

- The bearing temperature may exceed the ambient temperature by up to 50 °C. But must never rise above 80 °C.
- The valves in the auxiliary lines must remain open while the pump is running.
- If the pump has soft packing type stuffing boxes, these should drip during operation. The gland nuts should only be lightly tightened. In case of excessive leakage from the stuffing box tighten the gland nuts slowly and evenly until the leakage is reduced to the dripping state. Check the stuffing box for overheating by hand. If the gland nuts can not be tightened any further remove the old packing rings. Make sure that each packing ring is cut of correct size. The joint in successive ring should be offset to each other.
- If the pump has a mechanical seal, experience only minor leakage or no visible leakage during operation. It is maintenance free. If there is considerable leakage from the seal, that means the seal surfaces are worn-out and it needs to be replaced. The operation life of the mechanical seal highly depends on the purity of the liquid.
- The flexible coupling elements should be regularly checked and replaced as soon as they are shown signs of wear.
- Occasionally check the motor current. Stop motor if the amperage is higher than usual; there may be jamming or friction in the pump. Make the necessary mechanical and electrical checks.
- Stand-By pumps should be run for a short time at least once a week to ensure they are in constant readiness for operation. Check the integrity of auxiliary connections.

6- LUBRICATION

ATTENTION

It must be ensured that the bearings are lubricated constantly. Dry operating bearings may cause overheating, spark and permanent damage.

SCP-HT type pumps are always oil lubricated.

Oil Changing Periot

- For the first start-up, after 200 hours running time, it is recommended to change the oil.
- For 2900 rpm pumps, after 1500 hours running time.
- For 1450 rpm pumps, after 3000 hours running time, oil must be change.
- If running times are lower than specified above, every one year oil must be change.

When adding oil to the bearing, use proper oil of high quality. For example:

- You may use SHELL TELLUS 46 cSt viscosity for 2900 rpm pumps.
- You may use SHELL TELLUS 68 cSt viscosity for 1450 rpm pumps.
- According to pump dimension group, bearing types and required oil amount is shown below.

Table 3

Table 3

Pump Dimension Group *	Shaft and Dia \varnothing	Bearing Type	Oil Amount (lt)
A	24	2 x 7307 - 1 x NU307 (6307 **)	0,75
B	32	2 x 7309 - 1 x NU309 (6309 **)	1,5
C	42	2 x 7311 - 1 x NU311 (6311 **)	1,75
D	48	2 x 7313 - 1 x NU313 (6313 **)	2,75
E	55	2 x 7312 - 1 x NU312 (6312 **)	2
F	70	2 x 7315 - 1 x NU315 (6315 **)	3

* Refer to section 7.4.2 for pump dimension group.

** If used.

- The oil reservoir must be checked frequently. It must be completed when decreased. The used oil must be drained, the oil reservoir must be cleaned and a suitable oil must be filled up to the gauge level at least once a year. The oil must be replaced within this period, if it is contaminated.

ATTENTION The bearing temperature must never exceed the ambient temperature by maximum 50 °C. Also, it must not exceed 80 °C under no circumstances.

- Do not used old bearings during maintenance.

In order to add oil:

- Open the Air plug (260).
- Add oil from air plug opening.
- Continue to add oil until oil level reaches the center position of oil leve gauge (234)

ATTENTION

The oil level must be monitored. The bearing temperatures may increase if the oil level exceeds the recommended level. The bearings are not lubricated sufficiently and failures may occur if the oil level is low.

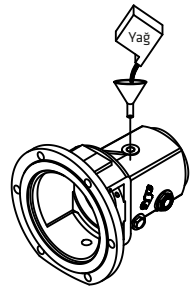


Figure 12. Adding Oil

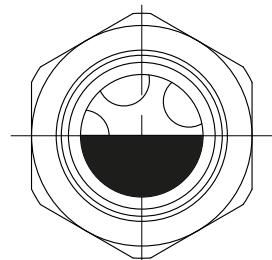


Figure 13. Oil sight glass

7- DEMONTAJ ve MONTAJ



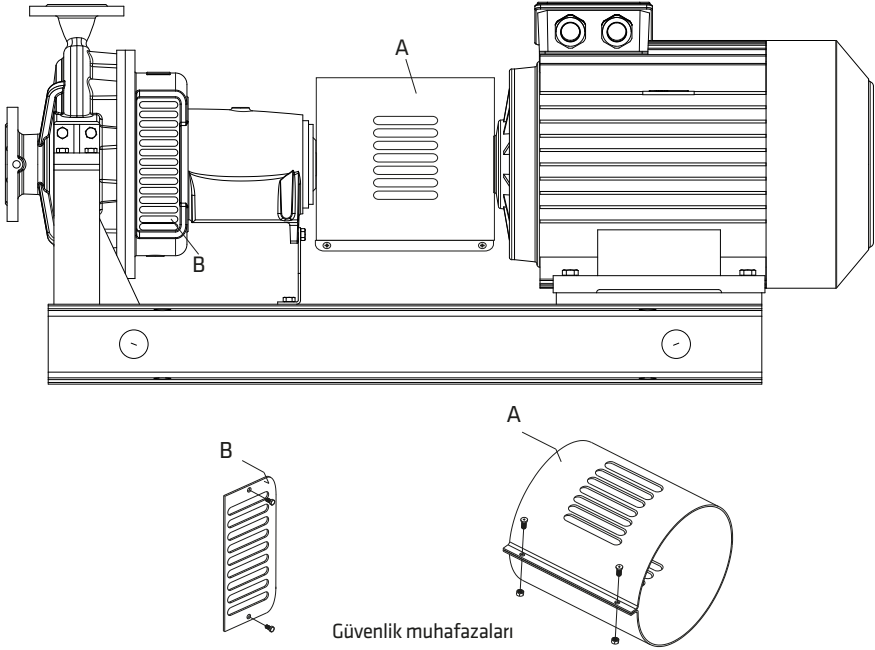
Before working on the pump, always disconnect the electrical connections and ensure that you take all the necessary actions to prevent undesired operation.



Strictly follow the instructions given in “Safety Instructions” section.

7.1- Disassembling the Pump

- Shut off the isolation valves on the suction and delivery line. Open the blind plug and drain the water inside the pump.
- Dismantle the safety guards.



Şekil 14

- Drain the oil by opening the oil drain plug on the bearing housing (030).

ATTENTION

Analyze the drained oil. It can be used, if suitable; if not do not use it again and do not discharge it; send it to recycle.

- Disconnect the pump from the piping system by removing the suction and delivery flanges of the pump and auxiliary pipe connections. This procedure is not necessary for the pumps using coupling with spacer. The pump rotor can be removed without disconnecting the volute casing (001) from the piping systems in the pumps using such type of coupling.

Drain the cooling/heating jacket (if any)

- Disconnect the motor from the pump.

- It is not necessary in spacer coupling applications.

- Remove the rotor section of the pump by demounting it from the baseplate.

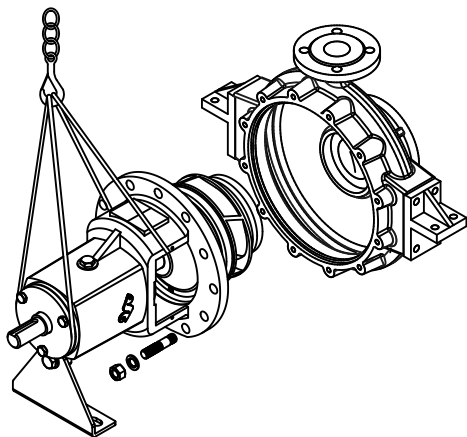


Figure 15. Demounting the pump rotor group

- Disconnect the bearing bracket lantern (031) from the volute casing (001) by removing the stud nuts (300)
- Tighten the rope by tying the ropes connected to the lever to the bearing housing.
- Remove the bearing housing from the volute casing (001)
- Remove the spacer coupling on pumps using couplings with spacers.
- Remove the coupling part on the pump shaft (060) with the help of a puller.
- Remove the coupling key (211).
- Remove the impeller nut (065).

ATTENTION The sharp areas on the impeller edges can injure. Use protective gloves.

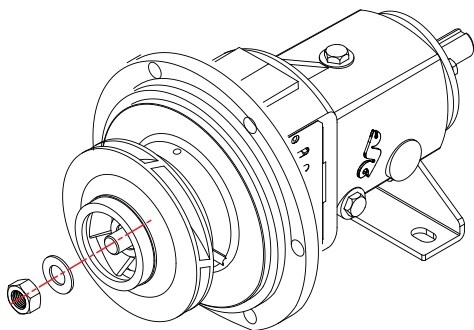


Figure 16. Disassembly of impeller

- Remove the gasket (426) under the impeller nut.
- Remove the impeller (050) with lever or screwdriver and etc.
- Remove the impeller key (210). Use rust remover solvent, if necessary.
- Remove the gasket (425). Remove the casing gasket (423)

ATTENTION The O-rings used after dismantling the pump must always be replaced.

Pumps with Soft Packing:

- Remove the shaft sleeve (070) from the shaft.
- Remove the shaft sleeve key (212)
- Remove the soft packing seal cover (003).
- Remove the gland studs and take the gland.
- Remove the soft packing (400) and lantern ring (044) respectively.

- Remove the bearing cover (034 or 035).
- Remove the circlip(391) from their slots.
- Remove the shaft (060) from the bearing housing (030) by hitting it from the coupling side.
- Remove the bearings (200) on the shaft with the help of a puller.
- Remove the circlips(220)
- Refer to (Section 7.4.1) for soft packing.

Pumps with Mechanical Seal:

- Take the shaft sleeve (070) and shaft sleeve key (212).
- Remove the mechanical seal (405).



Be careful when removing the mechanical seal. Any potential impact on the stationary element of the mechanical seal may cause the breakdown of the mechanical seal.

- Remove the mechanical seal cover(003).
 - Refer to (Section 7.4.2) for mechanical seal.

 - Remove the bearing bracket lantern (031) from the bearing housing (030). Remove the thrower(088) from the shaft (060).
 - Take out the magnetic seal on the impeller side (411) together with the inboard bearing cover (035).
 - Take out the magnetic seal on the coupling side (410) together with the outboard bearing cover (034).
 - Take out the spacer sleeve (067) from the bearing housing (030). Remove the shaft group together with the bearings out of the bearing housing.
 - Remove cylindrical bearing (202) properly since the outer bracket of the bearing will stay on the bearing housing.
 - Take out the lock washer (392) and shaft nut (391).
- Remove the two pieces of angular contact ball bearing (203) from the shaft.
- Take out the spacer sleeve (068) and two pieces of circlip (220) from the bearing housing.

7.2- Tightening Torques



The following tightening torques must be taken into consideration when tightening the bolts and nuts during installation.

Thread Diameter	Tightening Torques (Nm)
M6	7
M8	20
M10	40
M12	65
M14	100
M16	130
M18	140
M20	140
M22	140
M24	200

7.3- Assembling the Pump

7.3.1- Getting Prepared for Mounting

• **It must be ensured that the parts to be used are clean before starting mounting. Clean the oil, dirt on the parts with a solvent.**

ATTENTION **Be careful with processed surfaces. The defects on the processed surfaces may cause permanent damages.**

- The impeller and the body must be inspected for wear, fraction and breakdown.
- Replacement is necessary if the radial clearances between the impeller and the body exceed **1 mm**.
- It must be ensured that the surfaces of the gaskets and/or bolts are clean.

7.3.2- Mounting

The mounting procedure is the reverse of the demounting procedure. Exploded view or cross sectional view can be referenced during mounting.



Insulated gloves must be used when heating the bearings. Heated bearings may cause physical damages.

- Before starting assembly apply graphite, silicon or similar slippery material on surfaces touching each other and bolt surfaces.
- Start assembly from the bearing group. Heat the bearings (200) up to 95 °C with bearing heating apparatus and place the heated bearings on a shaft (060) in a suitable manner. Place this piece into the bearing housing from the coupling side. Place the bearing covers of two side. Insert the impeller (050) and tighten the impeller nut (065).
- Connect the rotor group with the volute casing (001).

ATTENTION **It must be ensured that the O-rings are seated properly and they are not crushed or compressed during mounting.**

- Insert the pump into the baseplate and couple the motor.
- Connect the suction – delivery and auxiliary pipes.
- Start-up the pump group as described in Section 5.

7.4- Shaft Seal

7.4.1- Pump with soft packing gland

- While starting to change soft packing thoroughly clean the stuffing box and shaft (or shaft sleeve, if used).
- Cut enough number of pieces suitable length diagonally from suitable size of soft packing. Roll it up over the shaft (or shaft sleeve, if used) and see the ends are in full contact.
- Insert the first packing ring as the joint will place up, and press home using the gland cover.
- Place the second ring as joint will place down. Insert all the packing rings in the same way. If there is a lantern ring put into place too.
- Place the gland and fully tighten, thus the packing rings will take the shape of stuffing box, the loosen it. Slightly tighten by turning the shaft and stop tightening when it slightly brakes the shaft.
- After starting operation, it is necessary that water drips from the packing. This dripping shouldn't be less than 10 cm³/min and more than 20 cm³/min. Adjust dripping by uniformly tightening or untightening the gland nuts slightly.
- Check the temperature of soft packing after two hours operation after gland adjustment to avoid overheating.

7.4.2- Pump with mechanical seal

- When operating properly the mechanical seal has no visible leakage. Usually mechanical seals do not require maintenance until leakage is visible but its tightness is to be checked regularly.
- Follow the instructions of mechanical seal manufacturers for the pumps having mechanical seal and NEVER RUN IT DRY!
- The mechanical seal diameter and soft packing cross section of SCP-Ht type pumps are given below Table 7.

Pump Dimension Group	Shaft End Diameter ∅	Mechanical Seal Diameter ∅
A	24	35
B	32	45
C	42	55
D	48	65
E	55	60
F	70	80

Table 7

Note: Different types of mechanical seals with different diameters can be applied for various applications. Please ask STANDART POMPA for more information.

Mechanical Seal Application

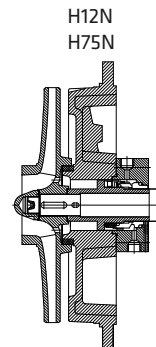


Figure 17

8- SPARE PART

- STANDART POMPA guarantees to supply the spare parts for SCP-HT type pumps for 10 years. You can provide any spare parts easily.
- Lets us know the following details on the name-plate, when you order spare parts.

Pump Type and Size : (SCP-HT 50-315)
 Motor Power and Speed : (45 kW – 2900 d/min)
 Prod. Year and Serial Number : (..... –)
 Capacity and Head : (45 m³/h – 140 m)

- If you prefer to have spare parts in your stock, we recommed you to have the following quantities for two years operation depending on the number of same of pumps (**Table 8**).

Part Number	Part Name	Number of Pumps in the Systems						
		2	3	4	5	6-7	8-9	10+
020*-021*	Wear Rings (set)	1	2	2	3	4	5	50%
050	Impeller (piece)	1	1	2	2	3	4	30%
060	Shaft (incl. keys) (piece)	1	1	2	2	2	3	30%
070*	Shaft Sleeve (piece)	1	1	2	2	2	3	30%
200	Ball Bearings (set)	2	2	3	3	4	5	50%
400	Soft Packing (set)	4	5	6	7	7	8	100%
405*	Mechanical Seal (piece)	1	1	1	2	2	3	30%
406...411	Gasket	4	6	8	8	10	12	150%

(*) optional

Table 8

9- FAULTS, CAUSES AND REMEDIES

In this section you will find operating faults which may arise, and their causes (**Table 9**), and suggested remedies (**Table 10**).

FAULTS	POSSIBLE CAUSES
Pump does not deliver any water after start-up	1-5-7-10-11-13
Flow is going down or no flow at all	1-2-3-4-6-7-8-14
Driver overloaded	9-12-17-18-19-27-28
Bearings overheating	19-20-21-22-24
Vibration on pump	6-9-15-16-19-23-25
Noise level is high	4-6-26

Table 9

	POSSIBLE CAUSES	REMEDY METHODS
1	May be air in the pump and/or suction line	Fill the pump and suction pipe with liquid completely and repeat the start-up operation.
2	Air intake from the seal, suction pipe or connections. Pump intakes liquid mixed with air.	Check all connections on the suction pipe. Check the seal and supply pressurized liquid to the seal, if required. Check immersion depth of the suction pipe or bottom valve and increase the immersion depth, if required.
3	Air pocket in the suction pipe	Check inclination of the suction line and whether there are parts susceptible to formation of air pockets and if there are any necessary corrections.
4	Air in the liquid	Eddies occur due to insufficient immersion depth of the suction pipe causing to air intake. Check liquid level in the suction reservoir or increase immersion depth of the suction pipe / bottom valve.
5	Suction depth too much	If there is no obstacle leading to clogging in the suction, check friction loss on the suction line and use suction pipe with large diameter, if required. If the static suction depth is too much, you should either increase the liquid level in the suction reservoir or move the pump to a lower level.
6	Pump operates with cavitation	NPSH of the plant is very low. Check the liquid level in the suction reservoir. Check whether there is excessive friction loss on the suction line. Check whether the insulation valve on the suction line is completely open. If required, reduce the pump to a lower level and increase load on the pump suction.
7	Delivery head of the pump is insufficient	Actual delivery head of the plant is higher than the specified one. Check the total static height and friction loss of the suction pipe. Use of pipe with larger diameter may act as remedy. Check whether the valves are completely open.
8	Increased delivery head	Check whether the valves are completely open. Check whether there is any obstacle causing clogging in the suction pipe.
9	Pump operates at a lower delivery head.	Actual delivery head of the plant is less than the specified one. Machine the impeller diameter in accordance with the manufacturer's recommendation.
10	Pump returns reverse.	Check whether the engine's direction of rotation complies with the direction of rotation indicated on the pump casing or name plate.

Table 10

	POSSIBLE CAUSES	REMEDY METHODS
11	Low speed	Check mains voltage and frequency or whether there is phase faults in the engine
12	Speed too high	Reduce the pump speed, if possible or machine the impeller diameter according to the manufacturer's recommendation.
13	Impeller, check valve or strainer clogged	Clean the impeller, check valve or strainer.
14	Impeller or strainer partly clogged	Clean the impeller or strainer.
15	Impeller partly clogged.	Clean the impeller.
16	Worn or broken impeller	Replace the impeller
17	Mechanical friction on the pump	Check whether there is obstacle or bending on the pump rotor.
18	Soft seals worn excessively	Loosen pressure bush of the seal
19	Coupling misadjusted	Check coupling rubber and readjust it.
20	Bearing covers too tight	Check the covers and make necessary corrections.
21	Flow rate is less than the required minimum flow rate	Increase the flow rate. Use by-pass valve or line, If required.
22	Too much grease on the bearing	Remove the excess grease.
23	Bent shaft	Check the shaft and replace it, if required.
24	Insufficient lubrication or lubricant contaminated.	Check amount of the lubricant. Clean the bearings and bearing housings and lubricate again.
25	Instable rotating parts	Check stability of the rotating parts.
26	Pump operates beyond the area of operation	Check the values of the area of operation
27	Density or viscosity of the delivered liquid is more than the specified value.	Use engine of higher power.
28	Enging fault	Check the engine. Engine ventilation is not proper due to its position.

Table 10 (continue)

10- EXPECTED NOISE VALUES

Motor Power - P_N (kW)	Sound Pressure level (dBA) * (Pump and Motor)	
	1450 rpm	2900 rpm
<0.55	60	64
0.75	60	66
1.1	62	66
1.5	63	68
2.2	64	69
3	65	70
4	66	71
5.5	67	73
7.5	69	74
11	70	76
15	72	77

Table 11

Motor Power - P_N (kW)	Sound Pressure level (dBA) * (Pump and Motor)	
	1450 rpm	2900 rpm
18.5	73	78
22	74	79
30	75	81
37	75	82
45	76	82
55	77	84
75	78	85
90	79	85
110	80	86
132	80	86
160	80	86

Table 11 (continue)

(*)The values measured at a distance of 1 m from the pump in the free area on the sound reflecting surface without sound curtain

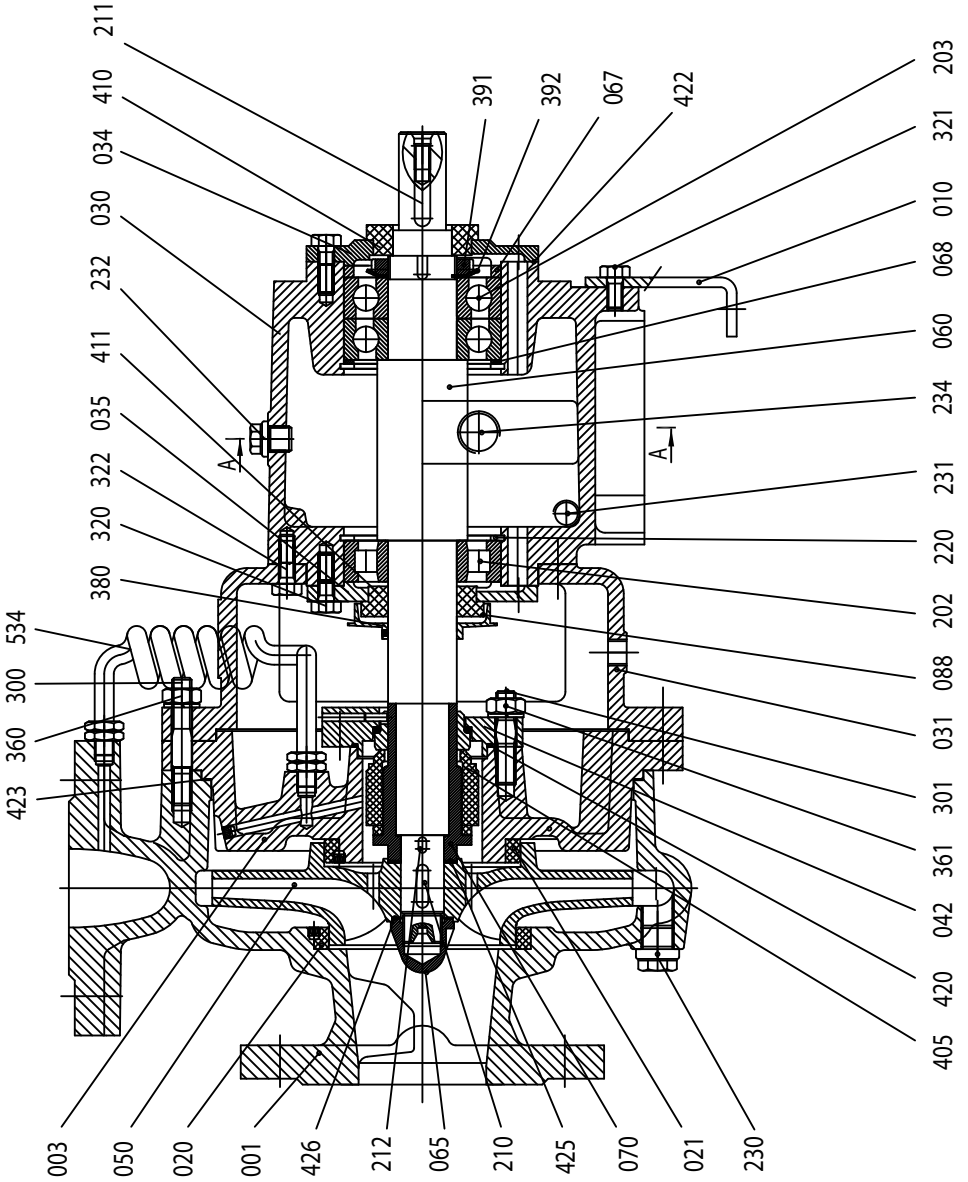
(*)These values apply if the pump is operated in normal ordered operating values without cavitation.

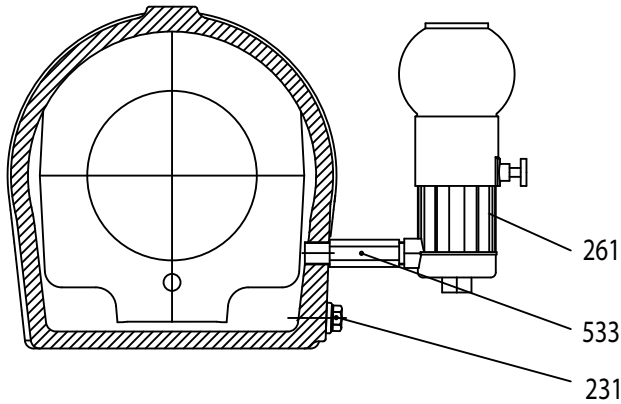
(*)If the pump is operated at 60 Hz; increase the values in the table by 1 dB for 1800 rpm and by 2 dB for 3600 rpm.

11- POMPA BOYUT GRUPLARI

Pump Type	Dimension Group	Characteristic Dimensions Shaft Diameter / f (length)
32-125 32-160 32-200 40-200 50-160 50-200	A	Ø24 / 385
32-250 40-250 50-250 50-315 65-160 65-200 65-250 80-200 80-250 100-200 125-200 150-200	B	Ø32 / 500
		Ø32 / 545
65-315 80-315 80-400 100-250 100-315 100-400 125-250 125-315 125-400 150-250 200-260	C	Ø42 / 530
		Ø42 / 630
150-315 150-400 200-315	D	Ø48 / 670
		Ø48 / 684
150-500 200-400 250-315 250-400	E	Ø55 / 730
		Ø55 / 725
		Ø55 / 740
		Ø55 / 750
200-500 250-500	F	Ø70 / 925
		Ø70 / 940

12- SECTIONAL DRAWINGS





Part List

001	Volute Casing	232	Oil Drain
003	Casing Cover	234	Oil Level Gauge
010	Support Foot	261	Constant Level Oiler
020	Wear Ring (Casing Cover)	300	Stud
021	Wear Ring (Casing)	301	Stud
030	Bearing Bracket	320	Hex. Head Bolt
031	Bearing Bracket Lantern	321	Hex. Head Bolt
034	Bearing Cover (Outboard)	322	Hex. Head Bolt
035	Bearing Cover (Inboard)	360	Nut
042	Mechanical Seal Cover	361	Nut
050	Impeller	390	Setscrew
060	Shaft	391	Shaft and Nut
065	Impeller Nut	392	Lock Washer
067	Spacer Ring (Bearing)	405	Mechanical Seal
068	Spacer Ring (Bearing)	410	Labtecta Seal
070	Shaft Sleeve	411	Labtecta Seal
088	Thrower	420	O-Ring
202	Cylindrical Roller Bearing	422	Gasket
203	Angular Cont. Ball Bearing	423	Spiral Wound Gasket
210	Key (Impeller)	425	Gasket
211	Key (Coupling)	426	Gasket
212	Key (Sleeve)	533	Connector
220	Circlip	534	Flushing Pipe
230	Drain Plug		
231	Drain Plug		

(*) Optional

AT UYGUNLUK BEYANI

İMALATÇI:

Standart Pompa ve Makina San. Tic. A.Ş.

Dudullu Organize San. Bölgesi 2. Cad. No:9 34776 Ümraniye / İSTANBUL

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Aşağıda tanımlanmış olan ekipmanlar için **Makina Emniyeti Yönetmeliği 2006 / 42 / AT** nin uygulanabilen gerekliliklerinin yerine getirildiğini ve sorumluluğun alınmış olduğunu beyan ederiz.

Aşağıda tanımlanan ürünler iç üretim kontrollerine bağlı olarak Firmamız tarafından kontrol edilmiştir. Bu deklarasyon makinanın teslimat durumundaki son şekliyle geçerlidir. Son kullanıcı tarafından ürün üzerinde yapılacak herhangi bir modifikasyonda, bu deklarasyon geçerliliğini yitirmiş olacaktır.

ÜRÜN TANIMI : Santrifüj Pompalar

MODEL/ TİP

: SCP-HT

YÖNETMELİKLER:

Makina Emniyeti Yönetmeliği 2006 / 42 / AT - Alçak Gerilim Yönetmeliği 2014 / 35 / AT

UYGULANAN UYUMLAŞTIRILMIŞ STANDARTLAR:

EN ISO 809:1998+A1:2009, EN ISO 12100:2010, EN 60204-1:2006/AC:2010

TEKNİK DOSYAYI HAZIRLAYAN

Fatih ÇOBAN

16.08.2016

İSTANBUL

İMALATÇI ADINA

Şeref T. ÇELEBİ
Genel Müdür Yrd.



İMALATÇI UYGUNLUK BEYANI

Ürünler: SCP-HT tipi pompa (motorsuz)

Standart Pompa ve Makina San. Tic. A.Ş.

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İmalatçı belirtilen ürünlerin **Makina Emniyeti Yönetmeliği 2006 / 42 / AT** gereksinimlerine uygun olarak imal ettiğini beyan etmektedir.

Sistemin kurulumunu yapan şahıs/firma, devreye alınma işleminden önce, tüm sisteminin ilgili standart ve yönetmeliklere uygunluğunu beyan etmesi gerekmektedir.

Kullanılan uyumlaştırılmış standartlar;

- EN 809

- EN ISO 12100:2010

Şeref T. ÇELEBİ
Genel Müdür Yrd.



Proteggere la vita
Inochi o mamoru
Yaşamı Koru
Protéger la vie
Proteger la vida
Save Life!
Skydda Livet Schützen Sie Leben



Bütün hakları mahfuzdur. Yazılı izin olmaksızın herhangi bir nedenle kopyalanamaz ve çoğaltılamaz.
Kılavuz içerisindeki bilgiler üretici tarafından değiştirilebilir.

Fabrika - Merkez
Servis ve Yedek Parça

STANDART POMPA VE MAKİNA SANAYİ TİC. A.Ş.

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