Standart

SNL

SNL IN LINE CENTRIFUGAL PUMPS

INSTRUCTION for INSTALLATION, OPERATION & MAINTENANCE

Pump Type	: .....
Serial No	: .....
Capacity	: .....m^3/h
Head	: .....m
Motor Power	: .....kW
Speed	: .....rpm

BK SNL 00 10-12 EN

Instructions for Installation, Operation and Maintenance

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

Contents

This manual is intended to be a reference guide for users of pumps providing information on

- Pump installation and maintenance instructions,
- Pumps start-up, operation and shut - down procedures.

IDENTIFICATION OF SAFETY AND WARNING SYMBOLS

Safety instructions in this manual which could cause danger to life if not observed.

The presence of a dangerous electric current.

ATTENTION Non – observance to this warning could damage the machine or affect its functions.

GENERAL INSTRUCTIONS

- **This manual should be kept in a safe place and ALWAYS be available to the QUALIFIED operating and maintenance personnel responsible for the safe operation and maintenance of the pumps.**
- Qualified personnel should be experienced and knowledgeable of safety standards.
- To avoid faulty operation and malfunctioning of pumps the instructions in this manual are to be CAREFULLY studied and followed at all stages of the pump installation and operating life.
- The user is responsible for ensuring that inspection and installation are carried out by authorized and qualified personnel who have studied this manual carefully.
- The pump should be used ONLY in the operating conditions given on the order for which the pump and materials of the construction have been selected and tested.
- If the pump is to be used for a different application please contact sales office or representative of the manufacturer. STANDART POMPA refuses to assume any responsibility if the pump used for different applications without prior written permission.
- If the pump is not to be installed and operated soon after arrival, it should be stored in a clean and dry place with moderate changes in ambient temperature. Extreme low or high temperatures may severely damage the pump unless suitable precautions are taken. The user is responsible for the verification of the ambient conditions where the pump will be stored or installed.
- STANDART POMPA does not guarantee repairs or alterations done by user or other unauthorized personnel. The use of original spare parts and accessories authorized by manufacturer will ensure safety.
- This manual does not take into account any site safety regulation, which may apply.

SAFETY INSTRUCTIONS

Strictly obey to the following instructions to prevent personal injuries and/or equipment damages:

- Pump should be used only in the specified operating conditions.
- Any weight, stress or strains on the piping system should not be transmitted to the pump.
- Electrical connections on the motor or accessories must always be carried out by authorized personnel and in accordance to the local codes.
- Any work on the pump should be only carried out when the unit has been brought to standstill.

- **Always disconnect the power to the motor and make sure not be switched on accidentally before working on the pump or removing the pump from installation.**
- Any work on the pump should be carried out by at least two persons.
- When approaching the pump always be properly dressed and/or wear safety equipment suitable for the work to be done.
- Do not work on the pump when it is hot.
- Do not touch the pump or piping with high temperature. User must take suitable precaution to warn the persons (e.g. using warning signs, barrier).
- Always be careful when working on pumps that handling dangerous liquids (e.g. acids or hazardous fluids).
- Do not work on the pump when the pump and piping connected to the pump are under pressure.
- After completion of the work always fix the safety guards back in places previously removed.
- Do not run the pump in the wrong direction of rotation.
- Do not insert hands or fingers into the pump openings or holes.
- Do not step on the pump and/or piping connected to the pump.

SNL PUMPS

A- GENERAL

A1- Pump Description

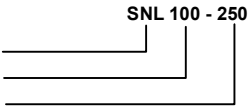
- **SNL** series pumps are radially split volute casing, single stage, close-coupled, in-line centrifugal pumps with closed impeller and mechanical seals.

A2- Applications

SNL series pumps are suitable for clean or slightly contaminated (max. 20 mg/dm³) liquids with low viscosities and temperatures up to 110 ° C. The main application areas, among others, are

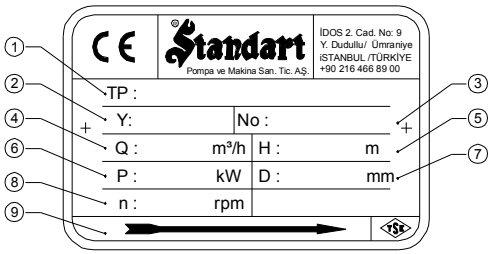
- Water supply systems,
- Warm water heating, chilled and cooling water systems.
- Water systems for industrial uses,
- Industrial circulating systems,
- Fire fighting

A3- Pump Designation



Pump type
Discharge nozzle (DN - mm)
Nominal impeller diameter (mm)

A4- 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

A5- Technical Data

Speed	: up to 3600 rpm
Discharge Nozzle	: DN 32 up to 200 mm
Suction and Discharge Flanges	: EN 1092-2 / PN 16
Operating Temperature	: -10º C up to 110º C
Ambient Temperature (max)	: 40º C
Casing Pressure (max)	: 16 bar (Group A, B)
	10 bar (Group C, D)
Permissible liquids	: See A2

B- UNCRATING, TRANSPORT AND STORAGE

B1- Uncrating

- Upon receipt verify that the goods received are in exact compliance with that listed on the packing list.
- Check that no visible damage exists on the crate that could have occurred during transportation.
- Carefully remove the packaging material and check that pump and accessories (if any) are free from any markings, stretches and damages, which may have occurred during transportation.
- In the event of damage report this immediately to STANDART POMPA's service department and to the transport company.

B2- Transport

B2.1- General recommendations

- Existing regulations for the prevention of accidents must be followed.
- Wearing of gloves, hard-toed boots and hard hats is obligatory for all transport works.
- Wooden cases, crates, pallets or boxes may be unloaded with fork-lift trucks or using hoisting slings, depending on their size, weight and construction.

B2.2- Lifting

- Prior to lifting and moving the pump or pump and motor on a common base plate find out the following:

– Total weight and center of gravity
– Maximum outside dimensions
– Lifting points location

- The load-bearing capacity must be proper to the weight of the pump or the pump set.
- The pump or pump set must always be raised and transported in horizontal position.
- It is absolutely forbidden to stand beneath or nearby a raised load.
- A load should never remain in a raised position for longer than necessary.
- Accelerating and braking during the lifting process must be performed such that there is no danger to persons.

When lifting the pump set lift them as shown in ***Fig.1*** to avoid any distortion (especially do not use the motor eyebolt for carrying the complete unit).

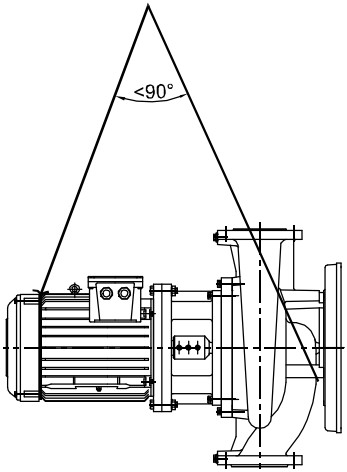


Fig. 1 *Pump set*

B3- Storage

- If the pump is not to be installed and operated soon after arrival, store the pump in a clean, dry and frost-free place with moderate changes in ambient temperature.
- To prevent the pump from moisture, dust, dirt and foreign materials suitable steps should be taken.
- The pump shaft should be revolved periodically (e.g. once a week) to prevent pitting of the bearing surfaces and the pump from seizing up.

C- INSTALLATION ON SITE

ATTENTION **Installation has to be carried out in accordance with EN 60204-1.**
The pump should only be installed, leveled up and aligned by skilled personnel. Incorrect installation or defective foundation could result in troubles. This would not be covered by the warranty.

C1- Preparation for Installation

Before installing the pump clean the suction and discharge flanges thoroughly.

C2- Installation Site

ATTENTION
- The pump must be installed in a frost and dust-free, well-ventilated and non-explosive environment.
- The pump should be installed such that there is space for access, ventilation, maintenance and there is sufficient space above the pump for it to be lifted.
- The suction pipe should be kept as short as possible.

C3- Installation

SNL pump can be installed either pipe-supported on sufficiently anchored pipework or base mounted on a foundation.

C3.1- Pump Installed on Pipe

- SNL pumps can be installed on straight pipes in horizontal or vertical position.
- When pump mounted on a vertical pipe the flow may be from up to down or reverse direction.
- When pump mounted on a horizontal pipe, the motor axis may be horizontal or vertical position but it MUST NEVER fall below the horizontal line.

ATTENTION See ***Fig. 12*** in ***section N*** for permissible installation arrangements.

C3.2- Pump Installed on Foundation

SNL pump can be installed on a foundation with special base plate for vertical mounting on flexible pipes.

ATTENTION
- The greatest care must be taken in preparing the foundation and mounting the pump set. Incorrect installation will result in premature wear of pump components and break down of the pump.
- The foundation should be heavy enough to reduce vibrations and rigid enough to avoid any twisting or misalignment. Make sure the concrete foundation has set firm and solid before mounting the pumpset. The surface of the foundation should be truly horizontal and perfectly flat.
- Place the pumpset on the concrete and by adding or removing shims under the baseplate align the pump flanges vertically a shown on ***Fig.2.***
- Slightly tighten the anchor bolts.
- Wait until the concrete firmly set (minimum 3 days).
- Tighten the anchor bolts.

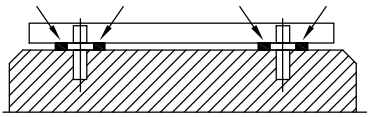


Fig. 2. *Foundation, baseplate and fitting the shims*

C4- Connecting The Piping

C4.1- General

ATTENTION • **Never use the pump as an anchorage point or as a carrier for the piping.**

• The pipes should be supported very near the pump ***(Fig. 3)***. It must be checked that any weight, stress or strains on the piping system should not be transmitted to the pump. Therefore after completing the piping installation, the bolt and connection on the suction and discharge nozzles must be loosened to ensure that there is not any stress on the piping system to the pump.

• **The nominal sizes of the pump suction and discharge nozzles are no guide to the corrects sizes of the suction and discharge piping.** The nominal bores of the pipes should be same as or greater than those of the pump nozzles. Never use pipes or accessories which have smaller bore than the pump nozzles. Particularly foot valves, strainers, filters and non return valves must be preferred with larger free transition areas. In general the flow velocities should not exceed 2 m/s in the suction piping and 3 m/s in the discharge piping. Higher flow velocities will result in higher pressure drops, which could cause cavitation conditions in the suction piping and excessive friction losses in the discharge piping.

• Pipe joints should be by means of flanges with flange gaskets of proper size and material. Flange gasket must be centered between the flange bolts in a such way that there is no interference with the flow of the liquid.

• Thermal expansions of the pipework and excessive vibrations should be accommodated by suitable means so as not to impose any extra load on the pump.

• Prevent impurities such as welding beads, scale, sand and tow might be left in pipes while production of the piping system harms the pump. Seal the pump nozzles by means of blind gasket to stop impurities get in the pump. After assembling the system all the piping parts must be disassembled, thoroughly cleaned, painted and reassembled again. If a strainer is used on the suction side of the pump, it must be cleaned after several days of operation.

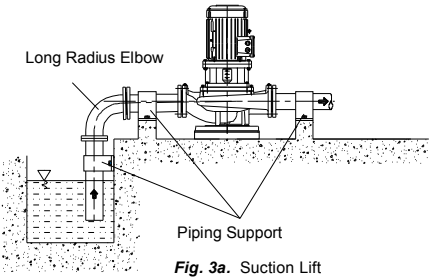


Fig. 3a. Suction Lift

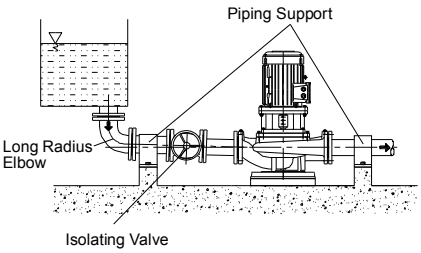


Fig. 3b. Suction Head

C4.2- Suction piping (Fig. 4)

• The suction piping must be absolutely leak-tight and not present any features likely to promote the formation of air pockets. Suction piping therefore should have a slight downward slope towards the pump in the case of suction head installation (e.g. flooded suction) and slight upward slope towards the pump in the case of suction lift installation.

• In order to keep the pipe friction losses as low as possible it is essential to avoid any sharp bends and abrupt changes of direction or cross-section and the suction pipe should be kept as short as possible. If it is necessary to change the cross-section of a piping laid almost horizontal, an eccentric reducer, with top horizontal, should be used.

• A positive suction head piping should incorporate an isolating valve with the valve stem in the horizontal position. This valve should always remain fully open while the pump is running and must not be used to regulate the flow.

C4.3- Discharge piping (Fig. 4)

- A control valve should be installed in the discharge pipe, as close to the pump as possible, to regulate the required flow and head.

- If the total head of the pump exceeds 10 meters or if discharge line is of appreciable length a non return valve should be installed between the pump and isolating valve on the discharge line to protect the pump against water hammer and reverse flow on shut down.

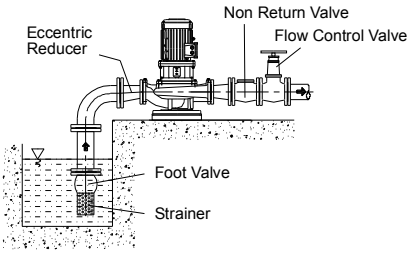


Fig. 4a. Suction Lift

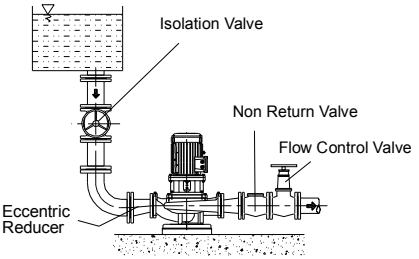


Fig. 4b. Suction Head

C4.4- **Pressure gauge connections**

- Pressure and vacuum gauges must be properly anchored and connected at the measuring points located on the pump flanges ***(Fig. 5)*** 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 gages ***(Fig. 6)***.

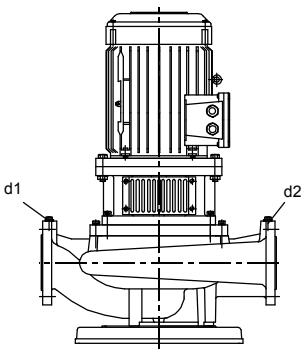


Fig. 5.

d1 : Pressure gauge (suction)

d2 : Pressure gauge (discharge)

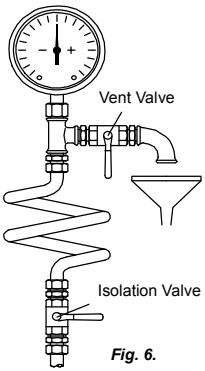


Fig. 6.

C4.5- Minimum flow

If there is a possibility of the pump having to operate at zero flow (against a closed discharge valve) or near the closed valve with almost no flow, then a minimum flow valve (or a by-pass check valve) must be installed on the discharge nozzle or on the discharge piping right after the pump but before the flow regulating valve. In cases where there is no such a valve operating the pump against close valve for a long time causes considerable damage on the pump since almost all the motor power is transformed into thermal energy which is absorbed by the pumped liquid.

C5.6- 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 give 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 connecting 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 tagboard 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 1. and Fig. 7a, 7b, 7c)***.

Table 1

Type of switch	**Motor Power $P_N \leq 4$ kW**	**Motor Power $P_N > 4$ kW**
	power supply 3 ~ 400 V	power supply 3 ~ 400 V
direct	Y – connection (7b)	Δ – connection(7a)
Y / Δ - start	Impossible	Remove connecting bridges (7c)

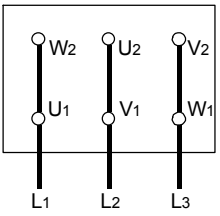


Fig. 7a. *Δ - connection*

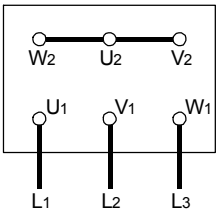


Fig. 7b. *Y – connection*

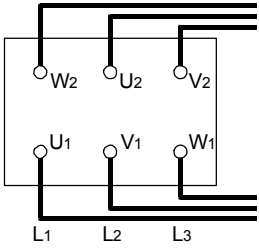


Fig. 7c. *Y / Δ - start*

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 2)***.

Table 2

Motor Power	**Y - set time**
≤ 30 kW	< 3 sec
> 30 kW	> 5 sec

C5.7- Final check

- After completion all the above process rotate the pump rotor several times by hand. Make sure rotor rotates easily.
- Fix the safety guards back in places. Do not operate the pump before doing so. This is a necessity for security and job safety.

D- START UP / SHUT DOWN

D1- Preparation

D1.1- Lubrication control

Since the bearings of motor are life-time lubricated type, they are maintenance free.

D1.2- Check the shaft seal (see F3)

D1.3- Venting and priming

Make sure that the pump and suction pipes are completely filled up with water before the pump is started.

- There is no problem for the pumps which have positive suction head. Close the discharge valve and remove the plug from one of the pump flanges, depending on the pump location, and gradually open the isolating valve in the suction pipe until a steady stream of water run out. Then screw the plug and completely open the isolating valve.
- If there is a foot valve for the pump, which has suction lift, remove the plug from one of the pump flanges and fill up with water through the hole using a funnel, hose or a similar device.
- If the system has a vacuum pump, water is brought up in the rising pipe and filled up the pump through this vacuum pump. When water is risen up to the highest point then the pump is started up

ATTENTION **Make sure the pump never runs dry.**

D1.4- Checking the direction of rotation

SNL type pumps rotate in clockwise when it is looked from motor to the pump. This direction is already indicated on the pump nameplate by an arrow. Check this by switching the pump on, then off again immediately. Fit the safety guard back in place if you took it out.

D2- 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, particularly head 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

D3- Shut Down The Pump

- Slowly close the shut-off valve in the discharge line.
- You may shut down the 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 driver. Ensure the pump set runs down smoothly and quietly to a standstill.
- If the set is to remain out of services for a long time close the shut-off valve in the suction pipe. In the event of frost and/or prolonged standstill, drain the pump or otherwise protect against freezing.

D4- Checks to be Made While The Pump is Running

- The pump must run smoothly, quietly and free from vibration at all times.
- 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 50º C. But must never rise above 80º C.
- The pump has a mechanical seal, these will 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 water.
- 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.

E- LUBRICATION

The bearings of motor are always life-time grease lubricated and then maintenance-free.

ATTENTION • The bearing temperature may exceed the ambient temperature by up to 50º C. But never rise above 80º C.
- Do not reuse the bearings following disassembly for maintenance purposes.

F- DISASEMBLY, REPAIR AND REASSEMBLY

ATTENTION • Before starting work on the pumpset, make sure it is disconnected from the mains and can not be switched on accidentally.
- Follow the safety precaution measures outlined in the "safety instructions" section.

F1- Disassembly

- Close all valves in the suctions and discharge lines.
- Remove the safety guard (See section O for safety guard).
- Detach pump suction and discharge flanges and all auxiliary supply lines (if any), disconnect the pump set from the piping system.
- Dismantle the volute casing (001) from the stuffing box cover (046) (Be careful to keep the stuffing box cover in place to avoid any mechanical seal trouble).
- Unscrew the end nuts (065) of the impeller and take out the impeller (050) and impeller key (210). Use rust remover solvent if necessary during dismantling.
- Take out the spacer sleeve (067).
- Pull out the rotating part of the mechanical seal (405).
- Dismantle the seal cover (046) and take out the stationary part of the mechanical seal from the seal cover.
- Dismantle the motor pedestal (012).
- Unscrew the set-screws (380) of the pump shaft (060), or alliens of the rigid coupling (085) depending on connection type.
- Pull off the pump shaft (060) from the motor shaft.

F2- Reassembly

- Reassembly proceeds in reverse sequence to disassembly as described in section F1. You may find the attached drawings useful (see sectional drawing in section M).
- Coat the seats and screw connections with graphite, silicon or similar slippery substance before reassembly. If you can not find any of the above you may use oil instead (except the pumps for drinking water).
- Never use the old o-rings and make sure the o-rings are the same size as the old ones.

A- For Motor Frame Size up to 200 (See section M1)

- Place the motor (600) vertical as the shaft end comes to the upper side.
- Assemble the motor pedestal (012) to the motor (600).
- Slip the pump shaft (060) onto the motor shaft.
- Place the stuffing box cover (046) onto the motor pedestal (012)
- Make the alignment of the pump shaft's location to provide the length as per the length **"S"** given in **section K.** ("S" is the distance between the shaft shoulder and the end of the mechanical seal chamber. **(See Fig. 8).** Tighten the set-screws (for the shaft consists of 3 set-screws starting from the one in the middle and if or the shaft consists of 2 set-screws start from the one near the motor).
- Place the stationary part of the mechanical seal into the seal chamber.

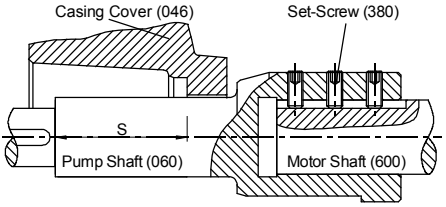


Fig. 8.

- Slip the rotating part of the mechanical seal onto the pump shaft (060) and place the spacer sleeve (067).
- Place the impeller key (210) into keyway, slide the impeller (050) onto the shaft (060) and screw the impeller nuts (065).
- Assemble the volute casing (001).
- Mouth the base plate (011) to the pump (if used).

B- For Motor Frame Size Above 200 (See section M2)

- Place the motor (600) vertical as the shaft end comes to the upper side.
- Slip the rigid coupling (085) onto the motor shaft (060) put the washer (370) on the rigid coupling (085) and tighten by using imbus head bolt (340). So that the shaft end and the coupling end will be on the same plane **(see Fig. 9).**
- Tighten the set-screw (380) over the rigid coupling (085).
- Mount the pump shaft (060) to the rigid coupling (085).
- Place the stuffing box cover (046) onto the motor pedestal (012).
- Place the stationary part of the mechanical seal into the seal chamber.
- Slip the rotating part of the mechanical seal onto the pump shaft (060) and place the spacer sleeve (067).
- Place the impeller key (210) into keyway, slide the impeller (050) onto the shaft (060) and screw the impeller nuts (065).
- Assemble the volute casing (001).
- Mouth the base plate (011) to the pump (if used).

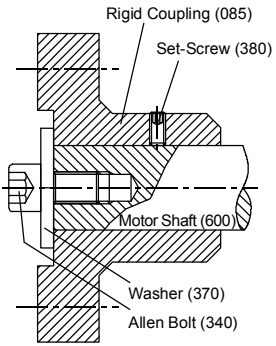


Fig. 9.

Motor Frame size IEC 200 and up 4 poles (1450 rpm or 1750 rpm) Motor Pumps	Motor Frame size IEC 250 and up 2 poles (2900 rpm or 3500 rpm) Motor Pumps
80-400 100-400 125-315 125-400 150-315 150-400	65-250 80-250 100-250

F3- Shaft Seal

SNL type pumps are with mechanical shaft seals.

- 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 seals and NEVER RUN IT DRY!
- Mechanical seal diameters are given in ***Table 3***.

Table 3

Pump Dimension Group	Mechanical Seal Diameter ø
A	30
B	40
C	50

NOTE : See **section L** for pump dimension group

G- SPARE PARTS

- **STANDART POMPA** guarantees to supply the spare parts for SNL 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	**:** (SNL 125-315)
Motor Power and Speed	**:** (30 kW – 1450 rpm)
Prod. Year and Serial Number	**:** (2012 – 1015410)
Capacity and Head	**:** (200 m³/h – 30m)

- If you prefer to have spare parts in your stock, we recommed you to have the following quantities for a two years operation depending on the number of same type of pumps ***(Table 4)***.

Table 4

Part No	Part Name	Number of Pumps in The System						
		2	**3**	**4**	**5**	**6-7**	**8-9**	**10+**
060	Shaft (Incl. keys)	1	1	2	2	2	3	30%
050	Impeller	1	1	1	2	2	3	30%
020 - 021	Wear rings (if any)	2	2	2	4	4	6	50%
420	O-Rings for Casing	4	6	8	8	9	12	150%
405	Mechanical Seal	2	3	4	5	6	7	40%
067	Spacer Sleeve	1	1	1	3	2	2	20%

H- FAULTS, CAUSES AND REMEDIES

In this section you will find operating faults which may arise, and their causes ***(Table 5)***, and suggested remedies ***(Table 6)***.

ATTENTION Before remedying operating faults, check all measuring instruments used for reliability and accuracy.

Table 5

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

Table 6

	POSSIBLE CAUSES	REMEDIES
1	There may be air existing in pump or suction pipe	Fill pump and suction pipe completely with liquid and repeat the priming procedure.
2	Ingress of air through shaft seal, suction pipe or suction port. Pump lifts liquid with air	Check for leaks in suction pipe joints and fittings. Check shaft seal if necessary increase the pressure of sealing liquid. Check the dept of suction pipe or foot valve in the liquid and if necessary increase the depth of them.
3	Air pocket in the suction pipe.	Check the slope of the suction line make sure that there is no reason for formation of air pockets
4	There is air in liquid	Suction pipe is not submerged enough creating vortex. Check liquid level in suction tank or increase the depth of suction pipe or foot valve in the liquid.
5	Too much suction lift	If no obstruction at inlet check the friction losses of suction line, larger piping may correct condition. If static lift is too high, the liquid level in the suction tank must be raised or the pump lowered.
6	Pump is working at cavitation conditions	NPSH available is too low. Check liquid level in suction tank, check suction line for excessive friction losses. Check isolating valve in suction line to make sure it is completely open. If necessary increase suction head on pump by lowering the pump.
7	Insufficient manometric head.	The actual total head is higher than that originally specified. Check the geodetic total head and friction losses in the discharge line. Larger piping may correct the condition. Check that valves are fully open.
8	Increase at total manometric head.	Check that valves are fully open. Check that there is any obstruction in discharge pipe.
9	Pump is operating at lower manometric head.	The actual total head is lower than that originally specified. Machine impeller outer diameter to size advised by supplier.
10	Reverse rotation.	Check motor rotation with directional arrow on pump casing or nameplate.
11	Speed is too low.	Check the supply voltage and frequency or motor may have open phase.
12	Speed is too high.	If possible decrease the pump rotational speed or turn down the impeller outer diameter to size advised by supplier.
13	Impeller or check valve or strainer is clogged.	Clean the impeller or check valve or strainer
14	Impeller or strainer is clogged partially.	Clean the impeller or strainer.
15	Partially clogged impeller.	Clean the impeller.
16	Worn out and defected impeller.	Replace impeller.
17	Mechanical frictions inside the pump.	Check pump rotor for any rotor obstruction or deflection.
18	Excess tightened soft packing.	Loosen the nuts of the packing gland.
19	Bad coupling alignment.	Check the coupling rubber and realign the coupling.
20	Bearing covers are too tight.	Check and make necessary modification on the cover.
21	The pumped flow is less than the minimum flow required.	Increase the flow. If necessary use by-pass recirculating valve or line.
22	Existence of excess grease.	Remove excess grease.
23	Oblique shaft.	Check the shaft and replace it if necessary.
24	Insufficient lubrication or lubricating oil/grease dirty, contaminated.	Check the amount of oil/grease. Clean the bearings and bearing housing and relubricate
25	Unbalanced rotating parts.	Check the balance of the rotating parts.
26	Pump runs out of duty range.	Check the values of operating point.
27	The density or viscosity of the liquid pumped is higher than that originally specified.	Use a more powerful motor.
28	Defects in motor.	Check any motor defects. The motor may not be ventilated properly due to a poor location.

I- TIGHTENING TORQUES

Tightening Torques		
Thread Diameter	Tightening Torque max (N.m)	
	Property Classes	
	8.8	10.9
M4	3.0	4.4
M5	5.9	8.7
M6	10	15
M8	25	36
M10	49	72
M12	85	125
M14	135	200
M16	210	310
M18	300	430
M20	425	610
M22	580	820
M24	730	1050
M27	1100	1550
M30	1450	2100
M33	1970	2770
M36	2530	3560

J- EXPECTED NOISE VALUES

Power of Motor P_N (kW)	Sound pressure level (dB_A) * (Pump with 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
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

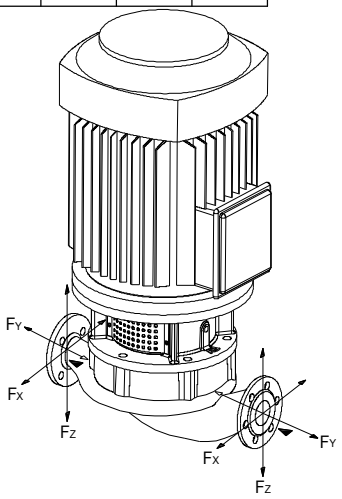
(*) Without protective sound hood, measured at a distance of 1 m directly above the driven pump, in a free space above a sound reflecting surface.

K- PERMISSIBLE FORCES AND MOMENTS AT THE PUMP FLANGES

Type	DN	Fx	Fy	Fz	ΣF^b	Mx	My	Mz	ΣM^b
40-125	40	410	380	470	730	280	400	200	700
40-160									
40-200									
50-125	50	560	510	620	980	330	450	250	780
50-160									
50-200									
50-250									
65-125	65	710	640	790	1200	380	500	300	850
65-160									
65-200									
65-250									
65-315									
80-125	80	840	770	940	1500	400	550	330	930
80-160									
80-200									
80-250									
80-315									
100-160	100	1100	1000	1300	2000	480	630	380	1100
100-200									
100-250									
100-315									
100-400									
125-200	125	1400	1300	1600	2500	630	800	500	1300
125-250									
125-315									
125-400									
125-450									
150-250	150	1700	1500	1900	2900	780	1000	630	1600
150-315									
150-400									
200-315	200	2300	2000	2500	3900	1100	1400	900	2200
200-400									

* Forces in Newton [N], moments in Newton x Meter [N.m].
** Values are applicable for casing material “Grey Cast Iron (EN-JL-250 / GG25)”. Higher values are permissible for steel construction pumps.

ATTENTION The real forces and moments which affects on flanges must be smaller than the values given in the table.



L- PUMP DIMENSION GROUPS AND WEIGHTS

2900 rpm

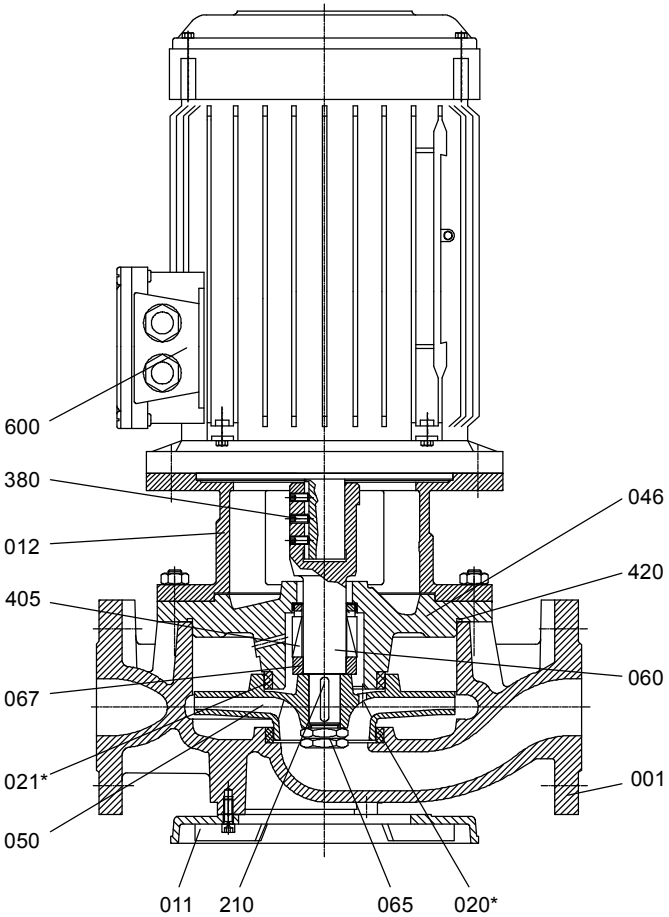
Pump Type	Motor kW	Motor IEC	Dim. Group	S mm	Weight (kg)
40-125	1.1	80M	A	50	36
	1.5	90S			40
	2.2	90L			42
	3	100L			46
40-160	3	100L			48
	4	112M			54
	5.5	132S			67
40-200	4	112M			61
	5.5	132S			81
	7.5	132S			88
	11	160M			92
50-125	1.5	90S			43,5
	2.2	90L			46,5
	3	100L			52
	4	112M			60
	5.5	132S			75
	7.5	132S			81
50-160	3	100L			47,5
	4	112M			57
	5.5	132S			78
	7.5	132S			85
	11	160M			93
50-200	5.5	132S			85
	7.5	132S			92
	11	160M			121
	15	160M			132
50-250	11	160M			135
	15	160M			146
	18.5	160L			155
	22	180M			160
	30	200L			194
65-125	3	100L			52
	4	112M			58
	5.5	132S			79
	7.5	132S			86
65-160	5.5	132S			84
	7.5	132S			91
	11	160M			98
65-200	11	160M			129
	15	160M			140
	18.5	160L			152
	22	180M			181

Pump Type	Motor kW	Motor IEC	Dim. Group	S mm	Weight (kg)
65-250	15	160M	A	50	144
	18.5	160L			160
	22	180M			175
	30	200L			235
	37	200L			295
80-125	4	112M			66
	5.5	132S			83
	7.5	132S			90
	11	160M			100
	15	160M			116
80-160	11	160M			136
	15	160M			148
	18.5	160L			151
80-200	11	160M			136
	15	160M			143
	18.5	160L			159
	22	180M			189
	30	200L			240
	37	200L			290
80-250	22	180M	B	50	190
	30	200L			250
	37	200L			310
	45	225M			320
	55	250M			350
100-160	11	160M			146
	15	160M			185
	18.5	160L			175
	22	180M			201
100-200	22	180M			200
	30	200L			251
	37	200L			305
	45	225M			335
100-250	37	200L			300
	45	225M			326
	55	250M			346
125-200	37	200L			315
	45	225M			345
	55	250M			350
125-250	45	225M			340
	55	250M			360

Pump Type	Motor kW	Motor IEC	Dim. Group	S mm	Weight (kg)
40-125	0.37	71M			31
40-160	0.37	71M			35
	0.55	80M			37
	0.75	80M			38,5
40-200	0.55	80M			39
	0.75	80M			41
	1.1	90S			43,5
50-125	0.37	71M			34
	0.55	80M			38,5
	0.75	80M			40
50-160	0.37	71M			35
	0.55	80M			38
	0.75	80M			39,5
	1.1	90S			43
	1.5	90L			45
50-200	0.75	80M			51
	1.1	90S			53
	1.5	90L	A	50	55
	2.2	100L			57
50-250	1.5	90L			63
	2.2	100L			67
	3	100L			70
65-125	0.37	71M			39
	0.55	80M			41
	0.75	80M			42,5
	1.1	90S			46,5
	1.5	90L			49
65-160	0.75	80M			45
	1.1	90S			49
	1.5	90L			52
65-200	1.1	90S			59
	1.5	90L			61
	2.2	100L			67
	3	100L			70
65-250	2.2	100L			73
	3	100L			76
	4	112M			81
	5.5	132S			102
65-315	3	100L			121
	4	112M			131
	5.5	132S	B	55	138
	7.5	132M			149
	11	160M			160
80-125	0.37	71M			46
	0.55	80M			48
	0.75	80M			49,5
	1.1	90S			54
	1.5	90L			56
80-160	0.55	80M			55
	0.75	80M			57
	1.1	90S	A	50	59
	1.5	90L			61
	2.2	100L			65
80-200	1.1	90S			63
	1.5	90S			66
	2.2	100L			70
	3	100L			73
	4	112M			76
80-250	2.2	100L			88
	3	100L	B	55	91
	4	112M			108
	5.5	132S			128

Pump Type	Motor kW	Motor IEC	Dim. Group	S mm	Weight (kg)
80-315	5.5	132S	B	55	160
	7.5	132M			168
	11	160M			205
	15	160L			245
100-160	1.5	90L		50	65
	2.2	100L			70
	3	100L			73
100-200	3	100L	B	55	92
	4	112M			96
	5.5	132S			121
	7.5	132S			132
100-250	4	112M			120
	5.5	132S			136
	7.5	132M			146
	11	160M			174
100-315	7.5	132M			178
	11	160M			225
	15	160L			240
	18.5	180M			253
100-400	15	160L	A	50	270
	18.5	180M			293
	22	180L			307
	30	200L			356
	37	225S			403
125-200	3	100L	B	55	116
	4	112M			123
	5.5	132S			148
	7.5	132M			159
125-250	5.5	132S			158
	7.5	132M			169
	11	160M			198
	15	160L			213
125-315	11	160M	C	55	241
	15	160L			273
	18.5	180M			273
	22	180L			292
	30	200L			324
125-400	22	180L		60	336
	30	200L			385
	37	225S			432
	45	225M			469
125-450	45	225M			574
	55	250M			594
150-250	11	160M	B	55	262
	15	160L			276
	18.5	180M			294
	22	180L			315
150-315	15	160L	C	60	290
	18.5	180M			319
	22	180L			327
	30	200L			376
	37	225S			423
150-400	37	225S			483
	45	225M			520
	55	250M			540
200-315	18.5	180M			384
	22	180L			392
	30	200L			441
	37	225S			488
	45	225M			522
200-400	37	225S			493
	45	225M			527
	55	250M			550

M1- SECTIONAL DRAWINGS (*FOR MOTOR FRAME SIZE UP TO 200*)

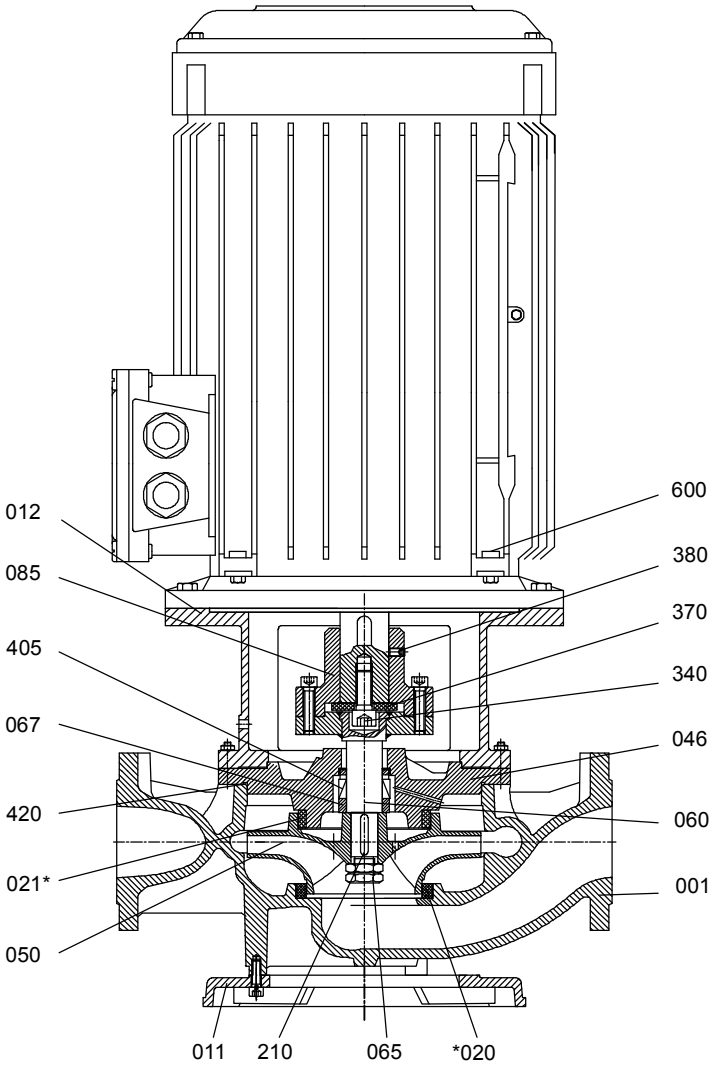


PART LIST

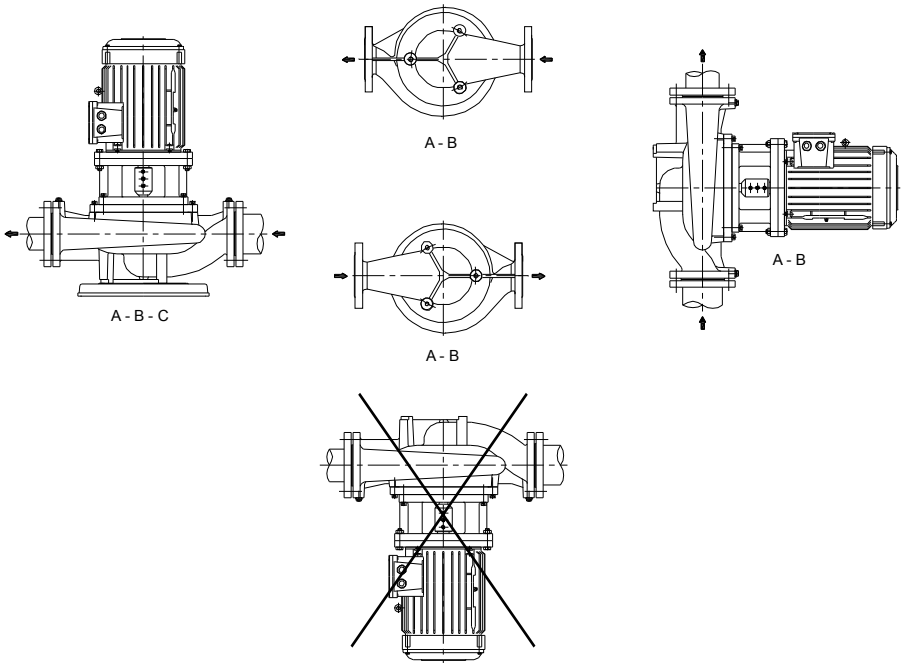
001	Volute Casing	067	Sepecer Sleve
011	Base Plate	085	Rigid Coupling
012	Motor Pedestal	210	Impeller Key
*020	Wear Ring (Casing)	340	Allen Bolt
*021	Wear Ring (Casing Cover)	370	Washer
046	Casing Cover	380	Set-Screw
050	Impeller	405	Mechanical Seal
060	Pump Shaft	420	O-Ring
065	Impeller Nut	600	Electric Motor

* Optional

M2- SECTIONAL DRAWINGS (*FOR MOTOR FRAME ABOVE 200*)



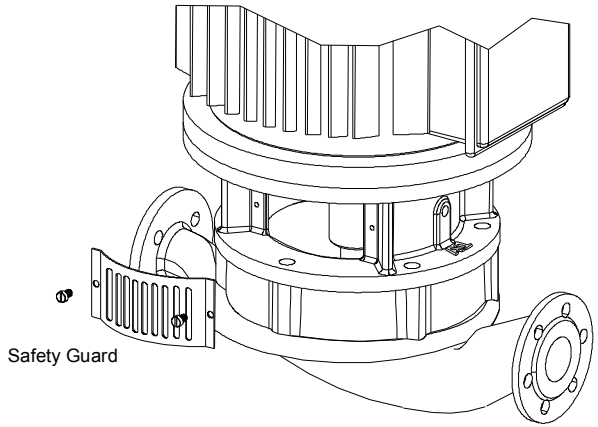
N- PERMISSIBLE INSTALLATION ARRANGEMENTS



Note : Letters A, B and C represent pump dimension groups (See ***section L*** for pump dimension groups).

Fig. 10

O- SAFETY GUARDI



Note: All guards are conforming to EN 294.

EC DECLARATION OF CONFORMITY

Products: Pumps of type **SNL** with motor
Manufacturer:
Standart Pompa ve Makina San. Tic. A.Ş.
Organize San. Bölgesi 2. Cad. No:9
34775 Esenkent / Ümraniye / İSTANBUL / TURKEY
t: +90 216 466 89 00 f: +90 216 499 05 59
www.standartpompa.com / info@standartpompa.com

The manufacturer herewith declares that the described products meet the essential requirements of **Machinery Directive 2006/42/EC and Low Voltage Directive 2006/95/EC.**

Harmonised standards applied are;

- EN 809
- EN ISO 12100:2010
- EN 60204-1

Şeref T. ÇELEBİ
General Vice Manager
İstanbul, 12th January 2012

The product is marked with CE on its name plate.

MANUFACTURER DECLARATION OF CONFORMITY

Products: Pumps of type **SNL** (bareshaft)
Manufacturer:
Standart Pompa ve Makina San. Tic. A.Ş.
Organize San. Bölgesi 2. Cad. No:9
34775 Esenkent / Ümraniye / İSTANBUL / TURKEY
t: +90 216 466 89 00 f: +90 216 499 05 59
www.standartpompa.com / info@standartpompa.com

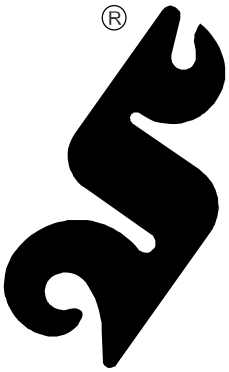
The manufacturer herewith declares that the described products meet the essential requirements of **Machinery Directive 2006/42/EC.**

Before the pump is put into operation, the machinery unit in which the pump is functioning to be declared in conformity to relevant regulations.

Harmonised standards applied are;

- EN 809
- EN ISO 12100:2010

Şeref T. ÇELEBİ
General Vice Manager
İstanbul, 12th January 2012



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