

**GEMAS "PUMPEX CAST IRON POOL PUMPS"
SNM/SNM-V MONOBLOK PUMPS**



INSTALLATION AND MAINTENANCE MANUAL
KURULUM VE BAKIM TALIMATI

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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.



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 temperatures higher than 80 °C. 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.

A- GENERAL

A1- Pump Description

- SNM, SNM-V series pumps are radially split volute casing, single stage, end suction close-coupled centrifugal pumps with closed impeller and mechanical seals.
- Main dimension of casing complies with EN 733/DIN 24255.

A2- Applications

SNM, SNM-V 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

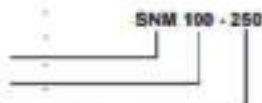
- Water supply, water treatment and irrigation systems,
- Warm water heating, chilled and cooling water systems.
- Water systems for industrial uses,
- Industrial circulating systems,
- Fire fighting
- Power Plants

A3- Pump Designation

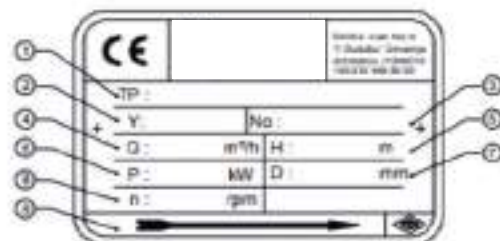
Pump type

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 150 mm
Suction and discharge Flanges	: ISO 7005 - 2 / PN 16
Operating Temperature	: -10° C up to 110° C
Ambient Temperature (max)	: 40° C
Casing Pressure (max)	: 10 bar
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, scratches 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. 7 to avoid any distortion (especially do not use the motor eyebolt for carrying the complete unit).

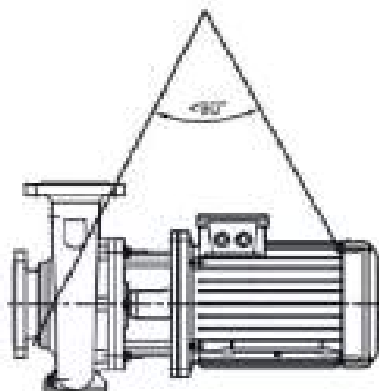


Fig. 7a. SHM Bare shaft pump

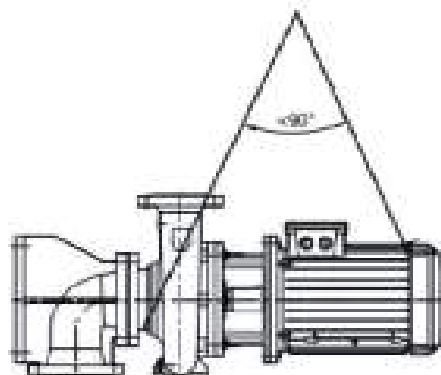


Fig. 7b. SHM-V Bare shaft pump

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, levelled 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.

C2.1- Foundation

- 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.

C2.2- installation

- Place the pumpset on the concrete and by adding or removing shims under the baseplate align the discharge flange horizontally by using a spirit level on it as shown on Fig.2 Make sure it is completely horizontal.
- Slightly tighten the anchor bolts.
- Check the coupling alignment as explained in section C4.
- Fill in the baseplate with concrete. Make no air left in it and the baseplate is well integrated with concrete foundation.
- Wait until the concrete firmly set (minimum 3 days).
- Tighten the anchor bolts. **CHECK THE COUPLING ALIGNMENT AGAIN**

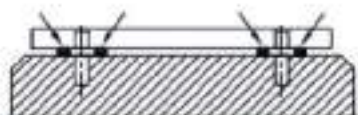


Fig. 2. Foundation, baseplate and fitting the shims

ATTENTION The pump set is mounted to the baseplate either by pump feet or motor feet. You can find the correct way in Section K, depending on pump and motor sizes (P: Pump feet mounted; M: Motor feet

C3.3- 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.

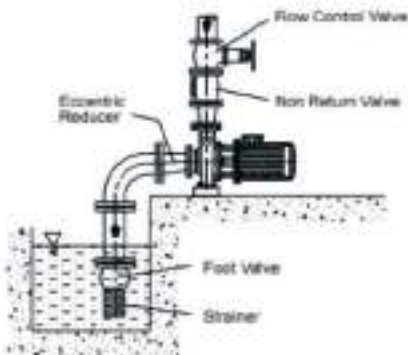


Fig. 4a. Suction Lift

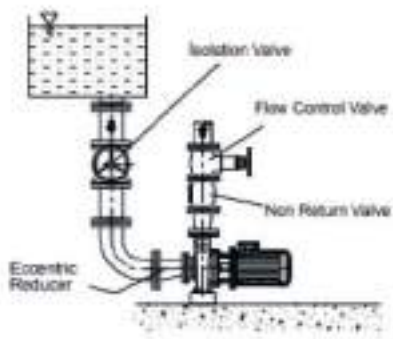


Fig. 4b. Suction Head

C3.4- 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 the operating conditions (pressure gages, temperature gages etc.) may be made up and laid.
- 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 gages (Fig. 5).
- Every pump is fitted with connections on the pump casing to drain the pump and on the bearing bracket to evacuate the seal leakage from the stuffing box (Fig. 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.

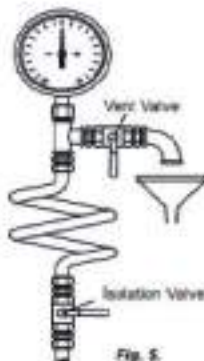


Fig. 5.

- d1 : Pressure gauge (discharge)
- d2 : Pressure gauge (suction)
- d3 : Filling or venting
- d4 : Drain
- d5 : Seal leakage drain

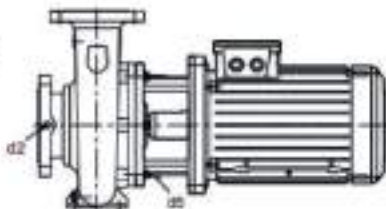


Fig. 6.

C5.5- 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 CN 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)

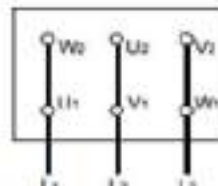


Fig. 7a. Δ - connection

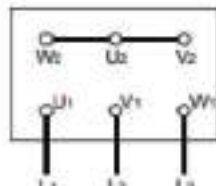


Fig. 7b. Y - connection

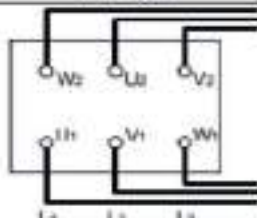


Fig. 7c. Y / Δ - start

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. There is no problem for the pumps which have positive suction head. If there is a valve on suction line, it must be opened and air taps are loosened to enable the water replaces air in the pump, until it is completely full with water.
- If there is a foot valve for the pump, which has suction lift, pump is filled up with water through the filling tap at the highest point of the pump and the air is emptied out.
- 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

SNM, SNM-Y type pumps rotate in clockwise when it is locked from coupling 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 coupling 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.
- 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.

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 50° C. But must never rise above 80° 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 50° C. But never rise above 80° C.
- Do not reuse the bearings following disassembly for maintenance purposes.

F- DISASSEMBLY, REPAIR AND REASSEMBLY



- 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 "safety instructions".

F1- Disassembly

- Close all valves in the suction and discharge lines, and drain the pump by opening the drain plug (230).
- Remove the safety guard. (See section N 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 seal cover (046) (Be careful to keep the seal cover (046) in place to avoid any mechanical seal (405) trouble).
- Unscrew the end nuts (065) of the impeller and take out the impeller (060) 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 (405) from the seal cover (046).
- Dismantle the motor pedestal (012).
- Unscrew the set-screws (380) of the pump shaft (060), or allens of the rigid coupling (095) depending on connection type.
- Pull off the pump shaft (060) from the motor (800) 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 seals 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 the 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 L**. ("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 for 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.
- Slip the rotating part of the mechanical seal onto the pump shaft (060) and place the spacer sleeve (057).
- 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).
- Place the pump set on the baseplate. Connect suction and discharge pipes. Take the unit into operation as it was indicated in **section D**.

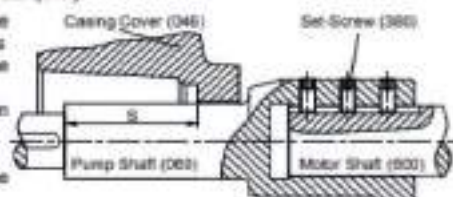


Fig. 8

B- For motor frame size above 200 (See the 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 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).
- Assemble the motor pedestal (012) to the motor (600).
- 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 (057).
- 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).
- Place the pump set on the baseplate. Connect suction and discharge pipes. Take the unit into operation as it was indicated in section D.

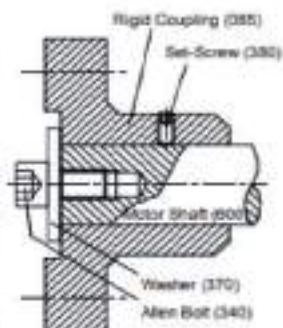


Fig. 9

F3- Shaft Seal

SNM 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 \varnothing
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 SNM type pumps for 10 years. You can provide any spare parts easily.
- Let's us know the following details on the name-plate, when you order spare parts.

Pump Type and Size	: (SNM 125-315)
Motor Power and Speed	: (30 kW – 1450 rpm)
Prod. Year and Serial Number	: (2010 – 1010410)
Capacity and Head	: (200 m ³ /h – 30m)

- If you prefer to have spare parts in your stock, we recommend 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+
050	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 geodesic 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 dogged partially.	Clean the impeller or strainer.
15	Partially clogged impeller.	Clean the impeller.
16	Worn out and deflected 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

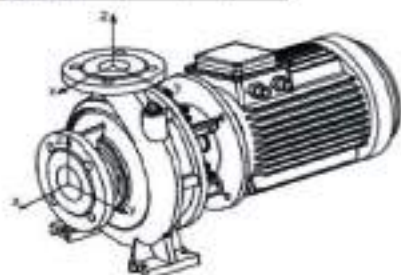
Power of Motor P_e (kW)	Sound pressure level (dB _A) * (Pump with motor)	
	1450 rpm	2900 rpm
< 0.55	60	64
0.75	60	66
1.1	62	66
1.5	63	68
2.2	64	69
3	65	70
4	66	71
5.5	67	73
7.5	69	74
11	70	76
15	72	77
18.5	73	78
22	74	79
30	75	81
37	75	82
45	76	82
55	77	84

(*) 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	F _V	F _H	ΣF	ΣM ₀
32-160	1300	900	1600	180
32-200				
40-200				
40-250				
50-160	1500	1100	1800	280
60-200				
60-250				
60-315				
65-160				
65-180				
65-200	1800	1300	2200	450
65-250				
65-315				
80-200				
80-250				
80-315				
80-400	2300	1500	2700	600
100-200				
100-250				
100-315				
100-400				
100-400				
100-200	3100	1900	3600	900
100-250				
100-315				
100-400				

Type	F _V	F _H	ΣF	ΣM ₀
125-200	4200	2900	4900	1400
125-250				
125-315				
125-400				
150-200	5000	3300	5000	1800
150-250				
150-315				
150-400				
150-400				
150-400				



* Forces in Newton [N], moments in Newton x Meter [N.m].

** Values are applicable for casting 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 satisfied following equations:

$$|F_{x \text{ inlet}}| + |F_{x \text{ outlet}}| \leq F_V$$

$$[(F_{x \text{ inlet}})^2 + (F_{y \text{ inlet}})^2]^{1/2} + [(F_{x \text{ outlet}})^2 + (F_{y \text{ outlet}})^2]^{1/2} \leq F_H$$

$$[(M_{x \text{ inlet}})^2 + (M_{y \text{ inlet}})^2 + (M_{z \text{ inlet}})^2]^{1/2} + [(M_{x \text{ outlet}})^2 + (M_{y \text{ outlet}})^2 + (M_{z \text{ outlet}})^2]^{1/2} \leq M_0$$

$$\left[\frac{\sum |F_x|}{F_{V \text{ max}}} \right]^2 + \left[\frac{\sum |F_y|}{F_{H \text{ max}}} \right]^2 + \left[\frac{\sum |M_z|}{M_{0 \text{ max}}} \right]^2 \leq 1$$

Example: Calculations of forces and moments on flanges

Pump Type	Inlet Flange (DN)	Outlet Flange (DN)
SNM 100-250	125	100

Let the forces and moments be given as follows;

Inlet			Outlet			Inlet			Outlet		
F _x (N)	F _y (N)	F _z (N)	F _x (N)	F _y (N)	F _z (N)	M _x (Nm)	M _y (Nm)	M _z (Nm)	M _x (Nm)	M _y (Nm)	M _z (Nm)
200	400	-500	250	0	400	90	100	-170	100	0	85

$$|-500| + |400| = 900 \leq 2200 \text{ N}$$

$$[200^2 + 400^2]^{1/2} + [250^2 + 0^2]^{1/2} = 697 \leq 1300 \text{ N}$$

$$[90^2 + 100^2 + (-170)^2]^{1/2} + [100^2 + 0^2 + 85^2]^{1/2} = 348 \leq 650 \text{ Nm}$$

$$[900 / 2200]^2 + [697 / 1300]^2 + [348 / 650]^2 = 0.74 \leq 1$$

L- PUMP DIMENSION GROUPS AND WEIGHTS

1450 RPM

Pump Type	Motor		Horizontal Inst. Form	Dimension Group	S mm	Weight	
	kW	IEC				Horizon. inst. kg	Vertical inst. kg
32-125	0.25	71W	P	A	80	39	87
	0.37	71W				40	88
	0.55	71W				44	92
32-160	0.55	80W	P	A	80	46	74
	0.75	80W				47	75
	0.90	80W				53	81
32-200	0.75	80W	P	A	80	54	82
	1.1	90S				55	84
	1.1	90S				55	84
32-250	1.4	90L	P	A	80	58	90
	2.2	100L				75	104
	3	100L				79	107
40-125	0.25	71W	P	A	80	44	75
	0.37	71W				45	75
	0.55	80W				47	78
40-160	0.65	80W	P	A	80	48	75
	0.75	80W				49	81
	1.1	90S				61	92
40-200	0.75	80W	P	A	80	57	88
	1.1	90S				59	90
	1.5	90L				61	92
40-250	2.2	100L	P	A	80	69	100
	3	100L				72	103
	3	100L				74	105
40-315	2.2	100L	P	A	80	82	112
	3	100L				85	116
	4	112W				91	122
50-125	5	100L	P	A	80	94	125
	5.5	132S				101	132
	7.5	132S				111	142
50-160	0.37	71W	P	A	80	48	77
	0.55	80W				48	75
	0.75	80W				49	81
50-200	0.75	80W	P	A	80	52	83
	1.1	90S				54	85
	1.5	90L				58	87
50-250	1.1	90S	P	A	80	62	91
	1.5	90L				64	95
	2.2	100L				72	103
50-315	3	100L	P	A	80	75	106
	3	100L				85	116
	4	112W				95	119
50-400	4	112W	P	A	80	95	126
	5.5	132S				105	136
	7.5	132W				119	157
50-515	5.5	132S	P	B	85	120	167
	7.5	132W				150	188
	11	160W				175	213
65-125	0.55	80W	P	A	80	50	83
	0.75	80W				55	94
	1.1	90S				58	90
65-160	1.1	90S	P	A	80	58	95
	1.4	90L				60	95
	2.2	100L				68	100
65-200	1.5	90L	P	A	80	70	108
	2.2	100L				78	116
	3	100L				81	119
65-250	4	112W	P	A	80	98	126
	5.5	132S				160	138
	7.5	132W				187	165
65-315	5.5	132S	P	B	85	117	155
	7.5	132W				138	176
	11	160W				177	185
65-400	7.5	132W	P	B	85	138	176
	11	160W				183	201
	15	180L				177	218
65-515	11	160W	P	B	85	208	-
	15	180L				222	-
	22	200L				251	-
65-630	22	200L	P	B	85	259	-
	30	250L				311	-

1450 RPM

Pump Type	Motor		Horizontal Inst. Form	Dimension Group	S mm	Weight	
	kW	IEC				Horizon. Inst. kg	Vertical Inst. kg
80-160	1.5	10L	P	A	50	87	110
	2.2	132L				75	118
	3	150L				80	125
80-200	3	150L	P	B	55	87	140
	4	112M				104	147
	5.5	132S				114	157
80-250	4	112M	P	B	55	118	151
	5.5	132S				128	171
	7.5	132M				149	192
80-315	11	160M	P	B	55	174	217
	15	190L				175	218
	19	160M				200	243
80-400	37	225S	P	C	60	214	257
	45	225M				243	286
	55	250M				274	-
100-160	3	150L	P	B	55	103	157
	4	112M				110	174
	5.5	132S				120	194
100-200	3	150L	P	B	55	111	175
	4	112M				118	192
	5.5	132S				128	192
100-250	7.5	132M	P	B	55	149	213
	11	160M				137	201
	15	190L				158	222
100-315	11	160M	P	B	55	183	247
	15	190L				197	251
	19	160M				207	277
100-400	37	225S	P	C	60	221	286
	45	225M				250	314
	55	250M				268	322
125-200	30	200L	P	B	55	310	374
	37	225S				306	-
	45	225M				358	-
125-250	45	225M	P	B	55	408	-
	55	250M				445	-
	7.5	132M				470	-
125-315	11	160M	P	B	55	187	237
	15	190L				183	262
	19	160M				198	278
125-400	37	225S	P	C	60	212	292
	45	225M				241	321
	55	250M				249	329
150-200	11	160M	P	B	55	249	329
	15	190L				278	358
	19	160M				286	366
150-250	22	190L	P	B	55	338	418
	30	200L				388	468
	37	225S				413	-
150-315	45	225M	P	C	60	450	-
	55	250M				475	-
	7.5	132M				221	336
150-400	11	160M	P	B	55	235	350
	15	190L				264	379
	19	160M				265	380
150-250	37	225S	P	B	55	294	369
	45	225M				302	417
	55	250M				354	469
150-315	22	190L	P	C	60	306	421
	30	200L				358	473
	37	225S				408	523
150-400	45	225M	P	C	60	446	560
	55	250M				472	-
	7.5	132M				497	-

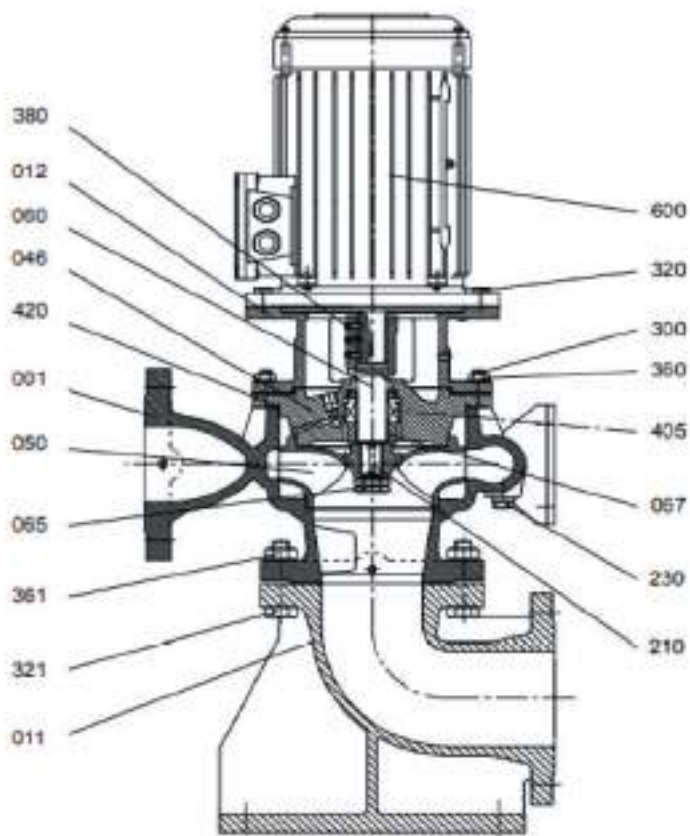
2900 RPM

Pump Type	Motor		Horizontal Inst. Form	Dimension Group	S mm	Weight	
	LW	ICG				Horizon. Inst. kg	Vertical Inst. kg
32-125	1.1	80M	P	A	50	43	71
	1.5	90M				46	74
	2.2	100M				48	76
	3	100M				50	83
32-160	3	100M	P	50	59	87	
	4	112M			67	95	
	5.5	132M			69	102	
32-200	7.5	132M	P	50	74	102	
	11	132M			76	104	
	15	132M			81	109	
32-250	11	160M	M	50	124	163	
	15	160M			91	118	
	2.2	90M			135	163	
40-125	3	100M	P	50	60	91	
	4	112M			66	99	
	5.5	132M			70	101	
40-160	4	112M	P	50	69	100	
	5.5	132M			71	102	
	7.5	132M			76	107	
40-200	11	160M	M	50	120	161	
	15	160M			84	116	
	22	180M			128	169	
40-250	11	160M	P	50	135	166	
	15	160M			141	172	
	18.5	160M			148	179	
50-125	18.5	160M	M	50	163	194	
	22	180M			186	217	
	30	200M			223	254	
50-160	3	100M	P	50	61	92	
	4	112M			69	100	
	5.5	132M			71	102	
50-200	7.5	132M	P	50	76	107	
	11	132M			74	105	
	15	132M			75	110	
50-250	11	160M	M	50	122	164	
	15	160M			151	193	
	18.5	160M			138	169	
60-250	18.5	160M	P	60	153	184	
	22	180M			172	207	
	30	200M			196	237	
65-125	22	180M	M	60	182	220	
	30	200M			222	267	
	37	200M			242	276	
65-160	4	112M	P	60	76	114	
	5.5	132M			78	116	
	7.5	132M			83	121	
65-200	11	160M	M	60	103	165	
	15	160M			127	165	
	18.5	160M			134	172	
65-250	18.5	160M	P	60	145	187	
	22	180M			155	197	
	30	200M			162	220	
80-200	30	200M	M	80	212	267	
	22	180M			201	259	
	37	200M			238	276	
80-250	37	200M	M	80	267	328	
	45	220M			298	337	
	55	250M			333	371	
80-160	11	100M	P	50	124	177	
	15	100M			141	184	
	18.5	160M			168	200	
80-200	22	180M	M	55	179	222	
	30	200M			198	-	
	37	200M			235	-	
80-250	37	200M	M	55	264	-	
	45	220M			295	-	
	55	250M			325	-	

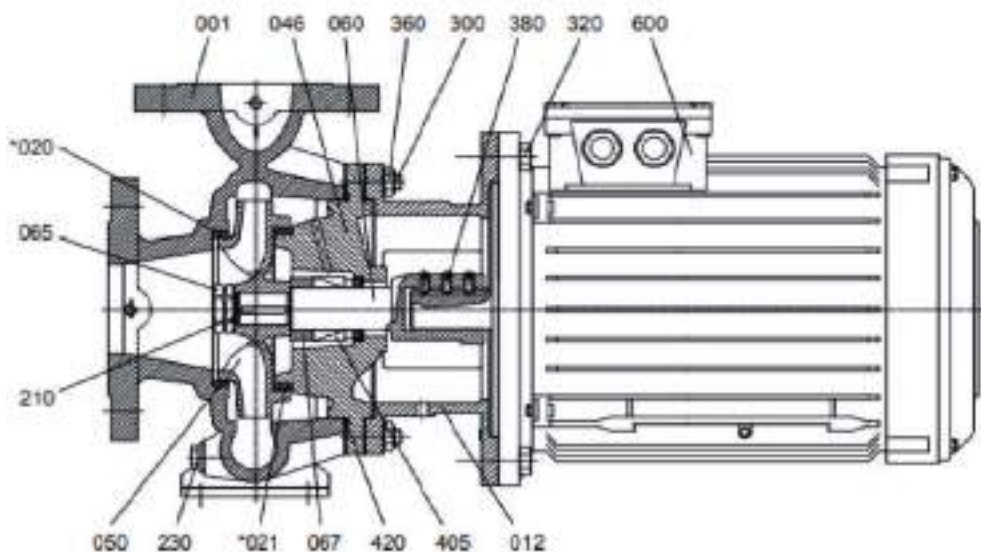
2900 RPM

Pump Type	Motor		Horizontal Inst. Form	Dimension Group	S mm	Weight	
	kW	IEC				Horizon. Inst. kg	Vertical Inst. kg
80-250	37	200L	M	B	55	268	-
	45	225M				319	-
	55	250M				344	-
100-160	30	200L	M		55	241	-
	37	225M				260	-
	45	225M				302	-
100-200	30	200L	M		55	249	-
	37	200L				268	-
	45	225M				319	-
	55	250M		344		-	
100-250	45	225M	M	55	319	-	
	55	250M			353	-	

M1- SECTIONAL DRAWINGS (VERTICAL INSTALLATION)



M2- SECTIONAL DRAWINGS (FOR MOTOR FRAME SIZE UP TO 200)

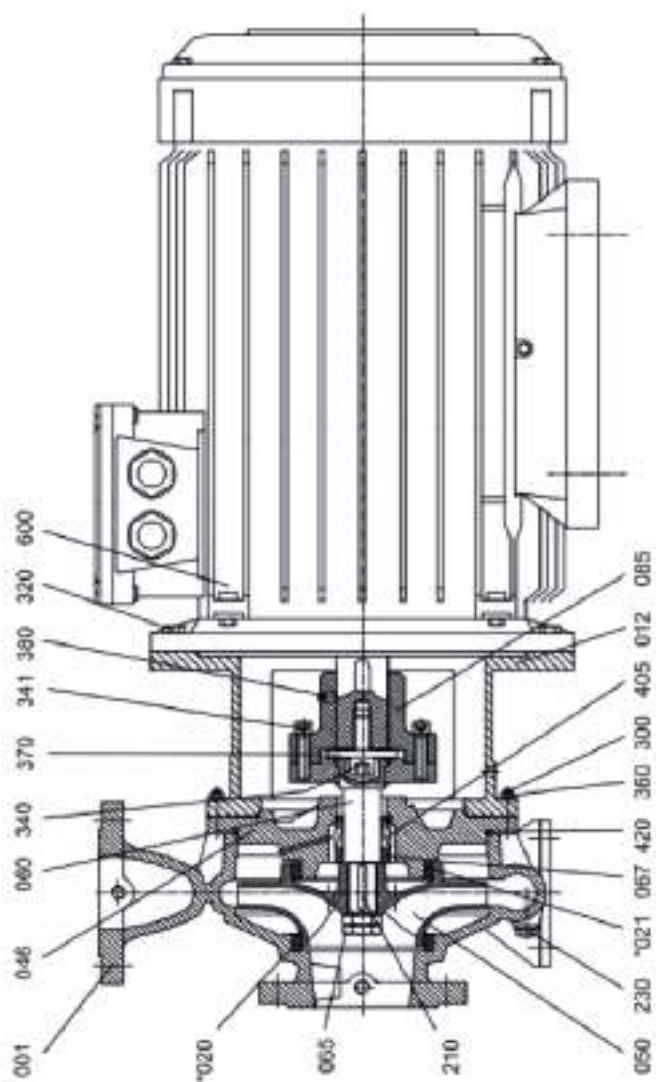


PARTS LIST

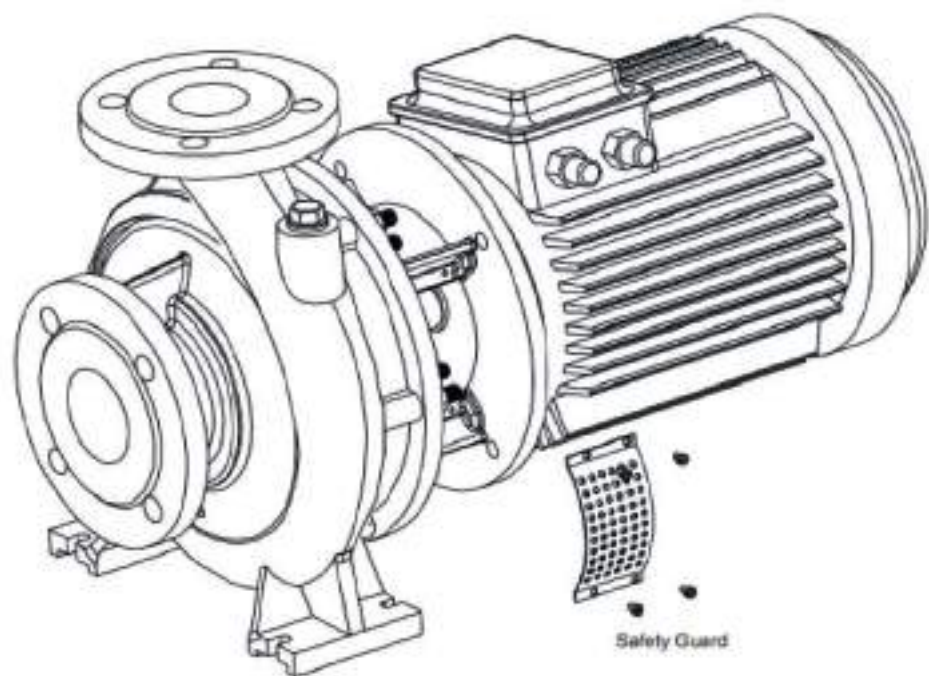
001	Volute Casing	300	Stud
011	Suction Elbow	320	Hex. Head Bolt
012	Motor Pedestal	321	Hex. Head Bolt
*020	Wear Ring (Casing)	340	Allen Bolt
*021	Wear Ring (Casing Cover)	341	Allen Bolt
046	Casing Cover	360	Hex. Nut
050	Impeller	361	Hex. Nut
060	Pump Shaft	370	Washer
065	Impeller Nut	380	Set-Screw
067	Sepecer Sleeve	405	Mechanical Seal
085	Rigid Coupling	420	O-Ring
210	Impeller Key	600	Electric Motor
230	Drain Plug		

* Optional

M3- SECTIONAL DRAWINGS (FOR MOTOR FRAME ABOVE 200)



N- COUPLING GUARD AND SAFETY GUARD



Note: All guards are conforming to EN 294.

EC DECLARATION OF CONFORMITY

Products: Pumps of type **SNM** with motor

Manufacturer: GEMAS GENEL MÜHENDİSLİK VE MAKİNA San. Tic. A.Ş
ITOB Organize Sanayi Bölgesi 10001 Sokak No:28 Tekeli-Menderes / İZMİR

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 12100-1
- EN ISO 14121-1 - EN ISO 12100-2
- EN 60204-1

MANUFACTURER DECLARATION OF CONFORMITY

Products: Pumps of type **SNM** with motor

Manufacturer: GEMAS GENEL MÜHENDİSLİK VE MAKİNA San. Tic. A.Ş
ITOB Organize Sanayi Bölgesi 10001 Sokak No:28 Tekeli-Menderes / İZMİR

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 12100-1
- EN ISO 14121-1 - EN ISO 12100-2

