

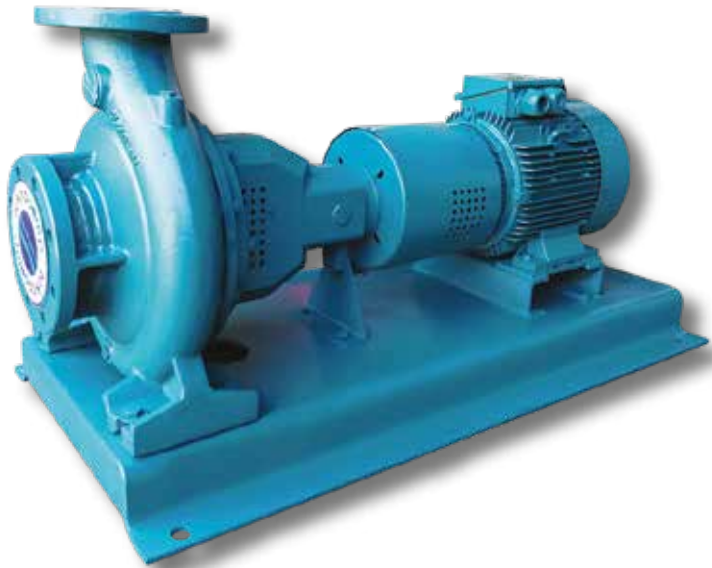


# teknopomp

Pump and Booster Systems

## SERVICE MANUAL FOR TNP SERIES

### INSTRUCTIONS FOR INSTALLATION, OPERATION & MAINTENANCE





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This booklet consists of installation, implantation and maintenance recommendations for Pump Unit with in TEKNOPOMP product range.

Please read this booklet in order to prevent failure of the correctly chosen and used Pumps Unit and provide its operation free of problems and apply all of the warnings. There are information about operational conditions, installation, commissioning, settings and main controllers.

These operation and maintenance instructions include TEKNOPOMP recommendations. In these instructions special information about operating and maintenance had been taken into consideration. These information must only given by production and planning responsible (system manufacturer).

Please refer to operational instructions of system manufacturer.

Please be careful about the warnings given in this booklet and provide this booklet to be read before the installation. TEKNOPOMP will not be held responsible from accidents caused by defects or their results. Please appeal for help from TEKNOPOMP for the questions and problems that you can not find their answers in this booklet. When you appeal for help please notify Pumps Unit tag value and serial number.

Safety instructions given in this booklet include valid national accident protection regulations. In addition to these customer's work, operation and occupational safety precautions must also be applied.

## Signs used in Operational Instructions



Please read these instructions carefully and keep this booklet in order to use when it is necessary.



Warning sign for Electricity Risks



Warning sign for user safety

## 1.IMPORTANT SAFETY MEASURES

Following rules must be applied in order to minimize the occupational risks during connection and start -up.

1. Do not operate before taking necessary precautions about the equipment. Rope, safety line and mask must be used when it is necessary.
2. Be sure that there is enough oxygen in area and there is no poisonous gas.
3. Control the welding and electrical device for blasting risk before using them.
4. In order to prevent risking your health, check the environment hygiene (dust, smoke..).
5. Please do not forget the risk of electrical hazards.
6. Do not lift the Pump Unit before controlling the lifting equipment (crane, rope..)
7. Be sure that you have a by-pass line and your line is open.
8. Use helmet, glasses and protective shoes in order to provide your safety.
9. Mount protective barriers around the Pump Unit at determined safety distance for trip and fall risks
10. Dust, liquid and gas that may cause overheating, short circuit, oxidation and fire must be kept away from the Pump Unit and required safety measures must be taken.
11. Take measures by controlling noise levels (Ref. ISO EN 3744) against the effects, damages and rough running that may damage personnel and environment.

12. Be careful about the carriage and storage direction.
  13. Please close the moving parts properly in order to prevent personnel injuries. Connect the coupling protection before operating the pump.
  14. All electrical and electronic applications must be conducted according to EN60204 -1 and/or local instructions by authorized personnel.
  15. Protect the electrical equipment and engine against the overloading.
  16. Do not expose the pump unit to sudden temperature changes.
  17. When flammable and explosive fluids are pumped, proper grounding must be provided against static electricity.
- Apply all other health and safety instructions, Law and Regulations.

### **CAUTION** teknopomp

#### 2. General

##### 2.1. Usage Areas of Pump Unit

TNP series pumps are single-stage, volute casing EN 733 centrifugal pumps.

- Water networks and pressurization plants
- Irrigation, sprinkling and water discharge
- Loading and unloading of tanks
- Hot or cold water circulation in heating and cooling systems
- Condensate pump
- Water circulation in swimming pools
- Health and cleaning facilities
- In industrial and social facilities
- For pumping sea water on ships, it can be used to pressurize liquids up to 90°C.

### **CAUTION** teknopomp

For correct selection of the pump type and other elements creating the Pump Unit, chemical and physical properties of the fluid must be taken into consideration. TNP type pumps body with DIN 24255 standard.

#### Technical Specifications

Suction Flange: DN 50 – DN 400

Discharge Flange: DN 32- DN 350

Operating Pressure: 10 Bar

Impeller Nominal Diameter:  $\varnothing 160\text{-}\varnothing 500$

Q (Capacity): 5-2500 m<sup>3</sup> / h

Hm (Head Height): 4-105 m.

Speed: 900 -3600 rpm.

#### 2.2. Performance information

Real performance of the Pump Unit can be taken from catalogue. This information is written on the Pump Unit label.

Performance curves had been drawn for the fluid (water) with density  $\rho=1 \text{ kg/dm}^3$  and  $V=1 \text{ cst}$  kinematic viscosity. For the fluids that their density and kinematic viscosity is different than water are different, so please consult to our firm if it is necessary.

### **CAUTION** teknopomp

Do not operate the pump with a different power engine other than the values given in the catalog and on the label.

#### 2.3. Guarantee Conditions

Products within the scope of our sales program are under the safety and security of our firm and international TEKNOPOMP Company. Guarantee conditions will become valid when installation and start up of the Pump Unit is done according to the warnings given in this booklet.

Repair of the device free of charges within the guarantee period, following conditions must be fulfilled.

- > Comply the conditions about installation and operation that are given in user manual.
- > The warranty period begins on the date of delivery of the products and two years.
- > All parts of the products are guaranteed by our company except electrical engine.
- > If the user uses the product against the manual, the warranty terms are not applied.
- > The product life is 10 years.

#### 2.4. Test

All Pumps Unit are delivered from our factory after performance and pressure test has made. Pump Unit that performance guarantees is given by us are under TEKNOPOMP guarantee for exact operation and suitable material procurement.

#### 2.5. Pressure Limit

The pressure in the outlet flange should not be higher than 10 Bar while the pump is running.

#### 3. Safe Working Conditions

This booklet consists of basic safety instructions for installation, operation and maintenance. This booklet must be read by all personnel before installation and start-up. Personnel must comply the important safety measures given at the first page together with general safety instructions and safety measures repeated in other parts.

##### 3.1. Personnel Training

Operation, maintenance control and installation personnel must have necessary information to satisfy the given duty. Responsibilities,

qualifications and control duties of these personnel must be determined by the customer and personnel must understand the content of the operation instructions. If personnel have not enough information; necessary training must be provided by business manager. There will be training support provided by manufacturer/seller when it is requested.

## **CAUTION** teknopomp

Non-conformity to safety measures and lack of education of the personnel may create risk against the personnel and as well as system and environment. TEKNOPOMP will not be responsible from potential hazards.

3.2. Potential dangers caused because of failure to comply with safety instructions  
In case of failure to comply with safety instructions; It can create risk and damage by keeping people, the environment and the pump in danger.

-Failure to comply the safety measures may cause the following hazards:

Maintenance and service ways may be blocked.

-Human life may be under danger due to electrical, mechanical or chemical effects.

3.3. Safety measures for User/Operator  
Dangerous, hot or cold parts must be protected against accidental contact.

Moving parts (like coupling) must be protected against accidental contact. Protections of these parts mustn't demounted during machine is operating.

3.4. Safety measures for maintenance and mounting

Firm must provide all maintenance, sub-control and installation works completed by authorized and qualified personnel.

Operation on machine must only be made when it is stopped. This operation requires the application of the instructions related with shutting down the machine that explained. Pumps and sets that are pumping unhealthy liquids must be cleaned properly. At the end of the work, all safety and protective equipments must be mounted and made operational. Before setting into operation instructions given in "preparation for operation" must be applied.

3.5. Part replacement

Part replacement and modifications must only be made after negotiating with manufacturer. Replacement parts and accessories approved by manufacturer are important for safety.

NOTE: Usage of non-conforming parts is not under the TEKNOPOMP responsibility

## 4. Technical Information

### 4.1 Structural Design

It is a horizontal, single-stage, single-inlet, horizontal shaft volute pump with closed radial impeller in accordance with DIN 24255 and EN 755, with suction nozzle horizontal axis, discharge nozzle vertical axis.

#### 4.1.1. Volute Body

Suction mouth is horizontal axis, discharge mouth is vertical axis and body is volute type. Suction and Discharge flanges conform to DIN 2533.

#### 4.1.2 Flange Positions - Flanges

Discharge Flanges: DN2533 - PN16

Suction Flanges: DN2533 - PN16

#### 4.1.3 Pump-Engine Connections

The engine is coupled to the pump by means of a rigid coupling using an adapter and flange.

#### 4.1.4 Impeller

The closed radial-type pump impeller is dynamically balanced on the electronic balancing pump.

The axial thrust force is balanced with the wear ring and balance holes.

#### 4.1.5 Shaft

Pump shaft, impeller and other parts can be removed without moving the suction and discharge pipes and pump volute.

Thus, assembly and maintenance operations are much easier.

#### 4.1.6 Bearing and Lubrication

In TN P type pumps, no bearings are used.

The engine bearing is sufficient to accommodate axial and radial loads.

#### 4.1.7 Seal

In standard production, elastomer rooted, spring loaded mechanical seal types are used as sealing elements.

## 4.2 Pump Group Construction

### 4.2.1 Drive

3 phase, fully closed, fan cooled, squirrel cage, IM 3611V 18 type in accordance with DIN IEC, VDE and TSE standards; Electric engine is used to drive at power and speeds according to DIN 42673.

Electric engine;

Insulation class: F

Protection class: IP54-IP55

Frequency: 50 Hz.

Mode of Operation: S1

Starting Form: 3x380V (Star) up to 4 kW

It has 3x380V (Triangle + Star / Triangle) connection for powers larger than 4kW.

### 4.2.2 Shaft Coupling and Coupling Guard

In TN P type pumps, clamp type rigid coupling is used.



The pump should only be operated with the coupling guard according to EN 953.

#### 4.2.3 Base Plate

It is manufacture of steel sheet according to DIN 24529 or NPU profile steel.

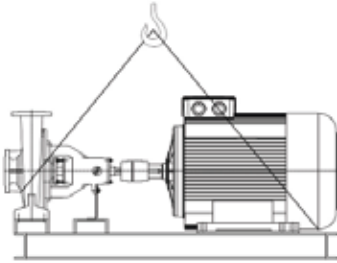
#### 5. Transport and Storage

The pump and pump group should be transported safely to the installation site using lifting equipment.

### CAUTION **teknopomp**

The applicable general lifting safety regulations must be followed.

When lifting and carrying the pump unit, use a hanging system as shown.



Do not use the engine suspension ring when lifting the pump assembly.

It may break due to overload and cause damage. Prefer a braided cloth rope for the hanger.

Wrong transport can cause injury to personnel and damage to the pump unit.

#### 5.1 Storage

Store the unit in a clean and dry area during storage.

In cases where the pump will not be used for a long time, follow the instructions below.

1. Unload the water in the pump.
2. Clean the pump casing and impeller, the suction and discharge line by giving clean water.
3. Unload the pump body, suction and discharge line.
4. If it is impossible to completely empty, add a small amount of anti-freeze antifreeze into the pump body. Provide anti-freeze by driving the shaft manually.
5. Close the suction and discharge outlets with gaskets.
6. Apply a suitable of anti-rust and anti-corrosion agent inside the pump body.
7. Turn the pump by hand to prevent freezing.

#### 6. Installation / Assembly

TN P type pumps are connected to the ground and fixed by the holes on the carrier table.

##### 6.1 Assembly Site

The pump should be easily accessible for inspection and maintenance.

Pump room; it must be suitable for use in lifting vehicles such as cranes forklifts.

In order for the pump suction pressure to be at the highest value, the group should be mounted to the lowest point of the facility as much as possible.

##### 6.1.1 Assembly Site - Ambient Temperature

In cases where the ambient temperature of the pump groups exceeds + 40 °C, a suitable ventilation should be provided that will provide fresh air flow w.

##### 6.2. Connection Style

Connection type depends on pump, engine design type, size and installation conditions. Engine horizontal pumps are placed on the common chassis.

##### 6.3. Steel Framing Base

###### 6.3.1. General

It is mandatory to fill the pump casing with concrete.

Ground concrete should be in the form of a steel frame.

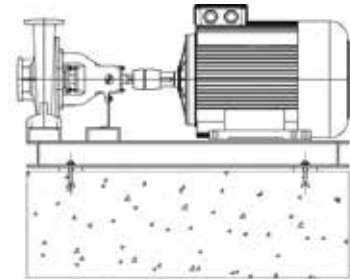
###### 6.3.2. Steel Frame Main Properties

The base plate with steel frame should be in contact with the whole area to be bolted or welded to the ground.

If the baseplate is only supported at four points, the pump assembly will remain in the middle, causing the coupling adjustment to deteriorate and increase the volume.

###### 6.3.3 Base Properties

###### Sample Concrete Base Layout



Base; be horizontal, clean and capable of carrying the weight.

###### 6.3.4. Fixing the Pump Group

Mutual fixing bolts should be tightened evenly.

## 6.4. Coupling Setting

### 6.4.1. General

For a pump group to work properly, the coupling setting must be done well. Problems such as vibration, noise bearing overheating, overload are caused by incorrect axis setting or wrong coupling selection.



The elastic coupling does not correct axing errors between the engine and pump axes, but allows errors to appear. Coupling setting errors must be eliminated and checked frequently to avoid overheating, vibration, noise and wear problems in the bearings.

### 6.4.2. Making Coupling Setting

For coupling setting, at least two pieces of metal with sufficient straight edges (steel scale, gauge) and a calibrated precision caliper are required.

Common setting errors in a coupling are;

#### 1. Parallel Axial Shift Error.

To check the parallelism error, the straight edge gauge is pressed parallel to the axis on the high part of the coupling. The condition of the gauge relative to the other part is checked. The gauge must touch both parts at the same time. This should be done in four different directions, above, below, right and left of the coupling. Coupling was achieved in parallel when appropriate results were observed in all directions.

#### 2. Angular Error

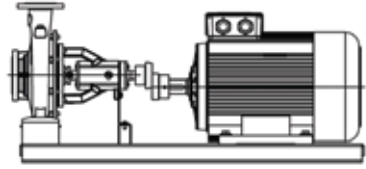
To check the angular error, the distance between the two halves of the coupling is measured mutually in the horizontal and vertical plane. The measurements taken at four points should be equal.

Adjustment errors are in the horizontal or vertical plane.

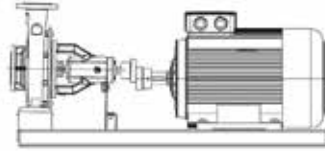
Errors in the horizontal plane can be corrected by placing thin pieces of sheet metal under the pump or engine feet. The errors in the vertical plane; It is corrected by sliding the pump or engine through the connection holes in the horizontal plane.



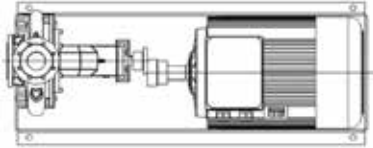
If you are sure that the pump group couplings are on the same axis, install the coupling guard.



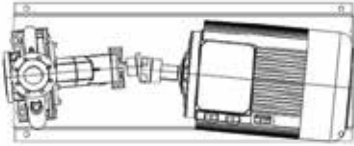
Parallel Shift Error in the Vertical Plane



Angular Error in the Vertical Plane



Parallel Shift Error in the Horizontal Plane



Angular Error in the Horizontal Plane

### 6.4.3. Pump and Engine Installation

If the pump is collected at the installation site, the coupling must be installed as follows.

1. Coat the pump and end of the engine shaft with a layer of molybdenum disulfide and install the wedge.
2. Push the coupling parts into the pump and motor shafts using a push device until the end of the shaft fits into the hub of the pin. If you do not have a tow, heating the coupling parts to about 100 °C makes pushing easier. Avoid axial thrust on pump and motor parts during coupling installation. When installing the coupling parts, support the pump shaft by the impeller and the motor shaft by the impeller. If necessary, remove the fan head.
3. Tighten the screws on both coupling hubs.
4. When connecting the pump and engine, make sure that the proper gap remains between the coupling parts.
5. Install the coupling guard.



According to accident prevention regulations, All guards and protective devices of rotating parts must be in place and functional.

## 6.5 Piping

### 6.5.1 General

Do not use the pump as a carrier or support point for piping.

Ensure that the weight of the pipes and parts are carried by placing enough supports under the pipe system.

Prevent the pipe system from loading on the pump by placing flexible parts (compensator) at the inlet and outlet of the pump.

Place these carrier flexible parts in the direction of the pump flange axis (usually in the vertical direction).

The suction pipe should be on a rising slope towards the pump, and the air in the pipe should be directed towards the pump.

It is important that the discharge pipeline is on a slope that rises from the pump to the tank or outlet point and does not rise or fall in a way that makes it an air pocket. Parts suitable for air discharge, such as suction caps, should be placed at the points that can make air pockets. It is important that the pipe diameter and the parts used are at least as large as the pump nozzle diameter or preferably one or two sizes larger.

Parts smaller than the pump nozzle diameter should never be used.

In systems working with hot liquids, thermal expansions should be calculated, compensators should be placed in such a way that they are suitable for this expansion and do not impose any load on the pump.

### 6.5.2 Actions to be Taken in Pipe Assembly

#### **CAUTION** teknopomp

Make sure to do the following in pipe installation.

- Remove the protectors with the company's logo on the suction and discharge nozzles.
- Close the suction and discharge nozzles with solid (center hole not opened) rubber or clutch seals.

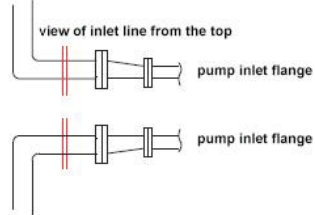
Do not disassemble these seals until assembly is completed.

- Start the pipe installation by the pump. Proceed by assembling and welding the parts.
- Do not forget to replace the carrier support parts during these operations.
- Complete all piping systems.

- After all assembly and welding processes are completed, disassembly all the bolts from the suction tank to the discharge pipe, and disconnect all removable parts.
- Clean these parts and then paint the inside and outside with primer.
- Reconnect the parts, but this time start from the discharge line and proceed towards the pump. Do not forget to check the flange gaskets at this time. Replace if necessary.
- When the pump flange is reached, if there is an axis or hole misalignment between the pump flange and the last flange of the piping system at this suffix, the lever, etc. to eliminate this misalignment, etc. Do not force the system using. You can cause errors that cannot be easily fixed.
- If there is any misalignment between the pump flange and the pipe flange due to welding pulls or other reasons, cut the pipe from a suitable place to correct it. Part on the pump side to the pump. Combine parts with welding again by making the correction where you cut.

- Disassemble and clean the last welded part and reassemble it.
- After all processes are finished, remove the gaskets you put on the pump inlet and outlet. Replace it by opening its holes or using another suitable gasket.

### 6.5.3 Processes after pipe assembly and Pipe Equipment



Example piping is shown in the Figure. 6.6 Engine Connection

The engine must be connected by the electrician in accordance with the wiring diagram. Local electricity rules and applicable regulations must be followed.

- Electrical connections should be made by authorized electricians.



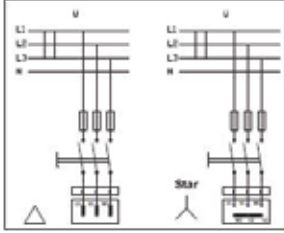
Make sure that electricity is cut off without removing the engine cover during pump installation.

- Use an electrical connection suitable for your engine.



## 6.6.1 Engine Connection Scheme

- Do not connect pump engines (star -delta) that require high torque at take -off.
- Frequency controlled engines; they require proper cooling at high torque and low speeds at take -off. Provide the necessary cooling for these engines.



## 6.6.2 Engine Protection

- Three -phase engine must be connected to the power supply.
- After a thermally protected engine is cut out due to heat, wait for the engine to cool down and make sure that the engine will not start automatically until it cools down completely.
- Use thermal or thermal -magnetic relay to protect the engine against overload and short circuits. Adjust this role according to the current drawn by the engine.



Elements of electrical equipment, terminals and control systems can always carry current. It can cause fatal and serious injury and material damage

## 7. Start -up / Stop

### 7.1 Preparations Before Start -up

- Before starting, make sure that the pump and suction pipe are filled with water. There is no problem for self -priming pumps. If there is a suction valve, the air plugs are loosened and the air is discharged and the pump is filled with water.
- In pumps with bottom flap, the pump filling plug is opened and filled with water, or the pump is filled by bypass ing the check valve with a small valve by using the accumulated water in the unload line.
- In pumps that are started with the vacuum pump, the vacuum pump is operated to increase the water in the suction pipe and then fill the pump.

**CAUTION** teknopomp

Do not run the pump without water.

## 7.2. Rotational Direction Control

- The direction of rotation of the pump is indicated by an arrow on the pump label. Except for special cases, it rotates clockwise when viewed from engine to pump. Press the switch for a very short time to see that the pump rotates in this direction. If turning in the opposite direction, change the location of the two phase connections.
  - If the engine connection is triangular, open the valve slowly on the discharge side.
  - If the engine connection is star -delta, set the time relay to a maximum of 30 seconds. By pressing the start button, watch the transition to the star triangle. When you are sure that it is going into a triangle, open the outlet valve slowly. Open the valve until you read the amperage value on the engine on the panel.
- Pay attention to the direction of rotation and fluid connection. It should always be kept in a visible way.

If you removed the coupling guard for direction of rotation check, do not restart the pump without retaining the guard in reverse.

## 7.3. Starting the Pump

- Check that the suction valve is open and the discharge valve is closed. Turn the switch off and give way to the engine.
- Wait for the engine to reach sufficient speed. (In engines with star -delta c connection, wait for the engine to switch to triangular connection)
- Open the discharge valve slowly by observing the ampere meter on the panel.
- If the pipe is empty during the first start, do not open the valve completely. The value of the current written on the engine label by following the ampere meter. Open it in a controlled way to ensure that it does not pass.
- After opening the valve completely, check the pressure from the manometers at the pump outlet. See that this value is the value on the pump label.
- The value read on the manometer should be the label value.

**CAUTION** teknopomp

If the pump overheats, stop the engine and wait for it to cool down.

Open it carefully after it cools down

## 7.4 Stopping the Pump

In high-flow pumps with long discharge pipes, a pressure reducing valve should be placed in between to prevent water hammer. Otherwise, in the sudden stop, the backward movement of water will cause water hammer and the pump may explode.

Slowly close the discharge valve.

- Turn on the switch, stop the engine. See that the rotor slows down.

- Do not start the engine again before at least a few minutes.
- If the pump will fail for a long time, close the suction valve and auxiliary circuits. If the pump is outside the building and there is a danger of frost, remove all drain plugs and drain the water in the pump completely.

## 8. Maintenance

Maintenance operations should only be carried out by authorized personnel. Protective clothing should be worn at all times. Improve protection against high temperatures, harmful and flammable liquids. Read the manual of authorized personnel.

Regular follow-up and maintenance will increase the life of the pump and engine.

### 8.1 Controls During Operation

- Pump must not be operated without water.
- The pump should not be operated in closed valve position for a long time.
- When the parts of the system or the temperature of the system exceeds 60 °C, measures should be taken against fire. "Hot surface" warning, which means protection, should be placed in the required areas.
- If the pump is with mechanical seal, it does not require much maintenance. Water coming from the mechanical seal indicates that the seal surfaces are worn and need to be replaced.
- If there is a spare pump in your system, run the spare pump once a week and keep it ready for operation. Also check the auxiliary systems of these pumps..

#### 8.1.1 Part Control

The pump must be accessible from all directions to make a visual check. Especially the engine and pump indoor unit should be easily removable.

#### 8.1.1.1 Bearing and Lubrication

Bearings are not used in TN P type pumps. The engine bearing is sufficient to meet axial and radial forces. These bearings are filled with heat-resistant grease that will last a lifetime.

#### 8.1.2. Seal Maintenance

##### 8.1.2.1. Soft Seal

- Before starting the soft seal change, remove the glen, remove the old seals with a pointed tool. Remove the watering ring. Clean the seal box inside, the glen and the watering ring.
- Wrap the proper size seal on the shaft bushing. Check that the ends are fully closed.
- Place the first ring with the joint facing up. Push using glen.

- Push the other rings into place, with the joints on the bottom and up.
- Place the last ring. Replace the glen and tighten it completely.
- Loosen the nuts. Turn the shaft and tighten the nuts slowly.
- After starting the pump, water must come drop by drop in the seals. The amount of drops should not be less than 10 drops per minute and more than 30 drops.
- Ensure proper collection and discharge of water flowing from the seal area. Check the seal temperature after two hours of glen setting. Seal temperature should not exceed 80 °C for the pump.



There are seal cooling applications in pumps that deliver high temperature liquids.

Do not wear loose clothing when tightening Glen nuts. Otherwise, it may cause you to get your arm caught in the rotating shaft and cause injuries.

#### 8.1.2.2. Mechanical Seals

Mechanical seal is used in TN P pumps. Mechanical seal;

1. It provides safe sealing under heavy working conditions.
2. It is easy to assemble and requires less maintenance.
3. It does not create abrasion on the shaft.
4. The operation of the seal does not depend on the shaft surface quality.

Worn rubbers must be replaced.

#### 8.1.3 Drive

See operating instructions of the engine manufacturer.



Ensure personnel and environmental safety in all operations on the area.

#### 8.1.4 Other Elements

Check the pipe connections and gaskets regularly, replace the worn parts.

#### 8.2 Shuttle Service

Our Service Department provides after-sales services and service support. The operator must have the assembly / disassembly done by authorized or trained personnel.

Make sure that the inside of the pump is empty and clean before assembly/disassembly.

### 8.3 Spare Parts

Spare parts of TN P type pumps are guaranteed to be supplied by TEKNOPOMP for 10 YEARS from the date of manufacture. The values written on the label of your pump should be reported when ordering spare parts.

Pump Type and Size  
Engine Power and Speed  
Pump Serial No  
Flow

Discharge head  
If you want to have spare parts in your storehouse, we recommend the table below for two years of operation.

Part Name	Equivalent Number of Pumps in the Facility						
	1-2	3	4	5	6-7	8-9	10+
Shaft(set)	1	1	2	2	2	3	%30
Impeller(set)	1	1	1	2	2	3	%30
Bearings(set)	1	1	2	2	3	4	%50
O-ring for Body	1	1	1	2	2	3	%40
O-ring for Shaft	1	1	2	2	3	4	%50
Soft Seal	2	2	2	3	3	4	%50
Seal Bushing	1	1	1	2	2	3	%30
Coupling Rubber	1	2	2	3	3	4	%50

### 9.Volume And Vibration

The reasons that increase the volume are listed below;

- If the pump is not properly fixed on the floor, the sound level will increase due to vibration.
- If there is no compensator, it makes sound and vibration.
- The wear on the engine bearing increases the sound level.

Engine Power Pn (Kw)	Sound Pressure Level (dB*)	
	Pump with Engine	
	1450 rpm	2900 rpm
<0.55	64	65
0.75	64	68
1.1	66	68
1.5	67	71
2.2	69	72
3	70	74
4	71	75
5.5	73	80
7.5	73	83
11	74	84
15	75	85
18.5	76	86
22	77	93
30	80	94
37	80	94
45	81	96
55	82	96
75	83	96
90	86	97



Check whether there are factors that increase the sound level in the installation.

(\*) Without sound protection screen, sound is measured in the free area above the reflecting surface, 1m from the pump.

The above values are maximum values and are shown as the surface sound pressure level (LPA) in dB (A).

Complies with TS EN ISO 20361

10.Disassembly,Assemble and Repair  
Before working on the pump, disconnect all electrical connections and be sure to take necessary measures to prevent accidental start-up.

### 10.1 Disassembly

**CAUTION** **teknopomp**

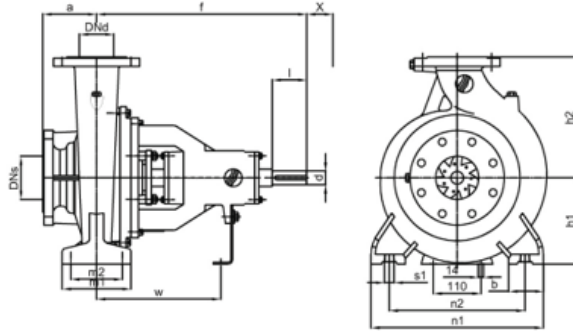
- Close the isolation valves in the suction and discharge lines. Drain the water in the pump.
  - In oil pumps, open the drain plug in the bearing housing and drain the oil.
  - Remove the coupling and other safety guards.
  - If no operate will be taken on the volute body of the pump, it is not necessary to remove the pipe connections.
  - If the volute is to be operated on the body or if it is necessary to move the pump to another location, remove the pump suction, discharge flanges and spare pipe connections. Disconnect the pump from the piping system and chassis.
  - Unscrew the seal box and the screws that attach it to the volute body. Separate the rotor group (Impeller, Shaft, Bearing House, Bearings, Bearing House Covers, Seal, Seal Box etc.) from the volute body.
  - Using a puller, unscrew the coupling and remove the wedge.
  - Unscrew the impeller nut and remove the impeller using a suitable puller. Remove the impeller wedge. Use solvent if necessary.
  - Unscrew the screws that attach the bearing housing to the stuffing box.
  - Unscrew the mechanical seal and the seal box. Separate the seal box from the bearing housing. The mechanical seal will remain on the shaft.
  - Remove the bearing covers.
  - You can remove the bearings by puller or press. Do not use hammer.
- ### 10.2. Pump Installation
- The assembly process is done in reverse order of the disassembly process. The attached cross-sectional picture will help you.

- Before starting the installation, apply lubrication to the contact surfaces and screw surfaces. (Do not use metal lic oil in pumps that pump drinking water.)
- Replace the gasket and O -Rings when you remove them.
- Start the assembly from the bearing house group. Fit the bearings into their places on the shaft by heating or using a press.
- Allow the bearing shaft to cool. Fit it on the bearing housing by the coupling.
- Refit the bearing covers.
- For pumps with mechanical seal, place the mechanical seal cover on the shaft. Then place the rotating part of the mechanical seal in its place on the shaft.
- For soft seal pumps, replace the seal gln. Do not tighten the nuts.
- Connect seal box and bearing housing.
- Install soft seals and seal watering ring.
- Refit the impeller wedge and pump impeller. Tighten the impeller nut.

- Refit the coupling and the coupli ng wedge.
  - In mechanical seal pumps, tighten the mechanical seal cover. Tighten the gln nuts on the soft seal pump. Thus, the assembly of the rotor group is completed.
  - Connect the rotor assembly to the volute body.
  - Check O -Rings and seals during assembly.
  - Place the pump on the chassis. Install the engine. Connect the suction and discharge pipes and spare pipes. Make the engine electrical connections and put the pump into operation according to the rules.
11. Common Failures, Causes And Solutions  
Common errors and solutions are given in the table. If you cannot solve the problem, please contact our company.

Common Failures	Causes	Solutions
Pump provides insufficient flow	-The pump runs at an extremely high outlet pressure. -Extremely high back pressure. -Pump and/or pipe can not blow air,can not suction. -Air pockets formed in the pipe. -The facility's net positive suction head(NPSH) is very low.	-Set the working point again. -Check foreign materials in the facility. -Unload the complete air of the pump and pipe. -Change the way of piping. -Increase the liquid level.
Engine is overloaded	-System Pressure is less than specified in the order value. -Overspeed. -The density or viscosity of the pumped fluid is higher than specified in the order value. -Engine is running in two phases.	-Set the working pressure again. -Speed should be decreased. -Engine power should be increased. -Check the circuit breaker and electrical connections.
Pump's hold-down pressure is high	-System Pressure is less than specified in the order value.	-Set the working pressure again. -Exchange or check the coupling.
There is increase in bearing house temperature	- Coupling worn or misaligned. -Irregular greasing. -Increase in axial thrust	-Change grease, decrease or increase. -Clean pressure balancing hole and exchange wear ring.
There is a leak in the seal	-Glen loose -Wear in the seal area	-Exchange seal. -Exchange seal bushing.
Rough Running	-Engine or pump bearings are worn -Low manometric height - Coupling worn or misaligned. -Flow rate is too much or too little.	-Exchange gln nut. -Turn off the outlet valve. -Exchange coupling or make the setting. - Unload the complete air of the pump and pipe. - Open the valve a little.
Extremely temperature increase inside the pump.	-Pump and/or pipe can not blow air,can not suction. -Flow rate is too little.	- Unload the complete air of the pump and pipe. -Increase the liquid level.
The pump is run vibrating.	-Pump and/or pipe can not blow air,can not suction. -The facility's net positive suction head(NPSH) is very low. -The internal elements of the pump are worn. - System Pressure is less than specified in the order value. -Coupling misaligned. -The rotor is unbalanced. -Faulty bearing house.	-Exchange worn component. -Set the working point again. -Check the coupling. -Chenge grease, decrease or increase. -Exchange bearing house. -Balance impeller after reassembly.

## 12. Pump Size Table and Pump Weight

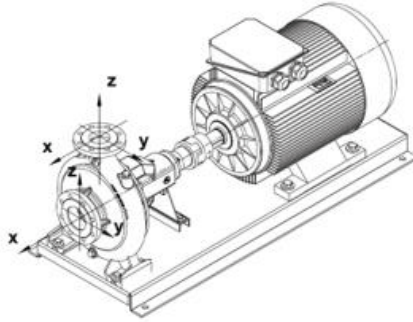


Pump Types		Flange Dimensions		External Dimensions				Pump Feet					Shaft Dimensions			Connection Gap	Weight	
EN 733		DNs	DNd	a (mm.)	f (mm.)	h1 (mm.)	h2 (mm.)	b (mm.)	m1 (mm.)	m2 (mm.)	n1 (mm.)	n2 (mm.)	s1 (mm.)	W (mm.)	d (mm.)	l (mm.)	x (mm.)	(kg.)
32-160		50	32	80	390	132	160	50	100	70	240	190	M12	260	24	50	65	38
32-200				80	390	160	180	50	100	70	240	190	M12	260	24	50	65	41
32-250				100	390	180	225	65	125	95	120	250	M12	260	24	50	80	46
40-160		65	40	80	390	132	160	50	70	70	240	190	M12	260	24	50	75	39
40-200				100	390	160	180	50	70	70	265	212	M12	260	24	50	75	45
40-250				100	390	180	225	65	96	95	120	250	M12	260	24	50	75	54
50-160		65	50	100	390	160	180	50	70	70	265	212	M12	260	24	50	80	42
50-200				100	390	160	200	50	70	70	265	212	M12	260	24	50	85	47
50-250				100	390	180	225	65	95	95	120	250	M12	260	24	50	85	55
		50-315	80	125	470	225	280	65	95	120	360	280	M16	330	32	80	100	103
65-160		80	65	100	390	180	200	65	95	95	280	212	M12	260	24	50	100	44
65-200				100	390	180	225	65	95	95	320	250	M12	260	24	50	100	48
65-250				100	470	200	250	80	120	120	360	280	M16	340	32	80	100	78
65-315				125	470	225	280	80	120	120	400	315	M16	340	32	80	110	93
		65-400	100	125	470	250	355	80	120	120	400	315	M16	340	32	80	110	126
80-160		100	80	125	390	180	225	65	95	95	320	250	M12	260	24	50	110	52
80-200				125	470	180	250	65	95	95	345	280	M12	340	32	80	110	77
80-250				125	470	200	280	80	120	120	400	315	M16	340	32	80	115	94
80-315				125	470	250	315	80	120	120	400	315	M16	340	32	80	120	108
80-400				125	540	280	355	100	150	150	500	400	M20	370	42	110	120	163
100-150		115	100	125	390	200	280	80	150	120	360	280	M16	260	24	50	120	75
100-200				125	470	200	280	80	150	120	360	280	M16	340	32	80	120	84
100-250				140	470	225	280	80	150	120	400	315	M16	340	32	80	130	96
100-315				140	470	250	315	80	150	120	400	315	M16	340	32	80	130	112
100-400				140	530	280	355	100	200	150	500	400	M20	370	42	110	130	170
		125-200	125	140	470	250	315	80	150	120	400	315	M16	340	32	80	130	107
125-250		150	125	140	470	250	355	80	150	120	400	315	M16	340	32	80	140	108
125-315				140	530	280	355	100	200	150	500	400	M20	370	42	110	140	166
125-400				140	530	315	400	100	200	150	500	400	M20	370	42	110	140	192
		150-200	150	160	470	280	355	100	200	150	500	400	M16	340	32	80	170	139
		150-250	200	160	470	280	375	100	200	150	500	400	M16	340	32	80	140	139
150-315				160	530	280	400	100	200	150	550	450	M20	370	42	110	140	184
150-400				160	530	315	450	100	250	200	550	450	M20	370	42	110	140	211

### 13.Tightening Torque

SCREW DIAMETER	MAXIMUM TIGHTENING TORQUE (Nm)	
	CLASS PROPERTY	
	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

## 14.The Force and Moments of Pump Flanges



When all of the applied loads cannot reach maximum values, one of these loads can exceed the normal value by providing the following conditions.

- Any component of a force or moment should be limited to x1.4 of the maximum value.
- The real forces and moments that affect each flange must provide the following formula:

$$\left( \frac{\sum |F|_{\text{calculated}}}{\sum |F|_{\text{permissible}}} \right)^2 + \left( \frac{\sum |M|_{\text{calculated}}}{\sum |M|_{\text{permissible}}} \right)^2 \leq 2$$

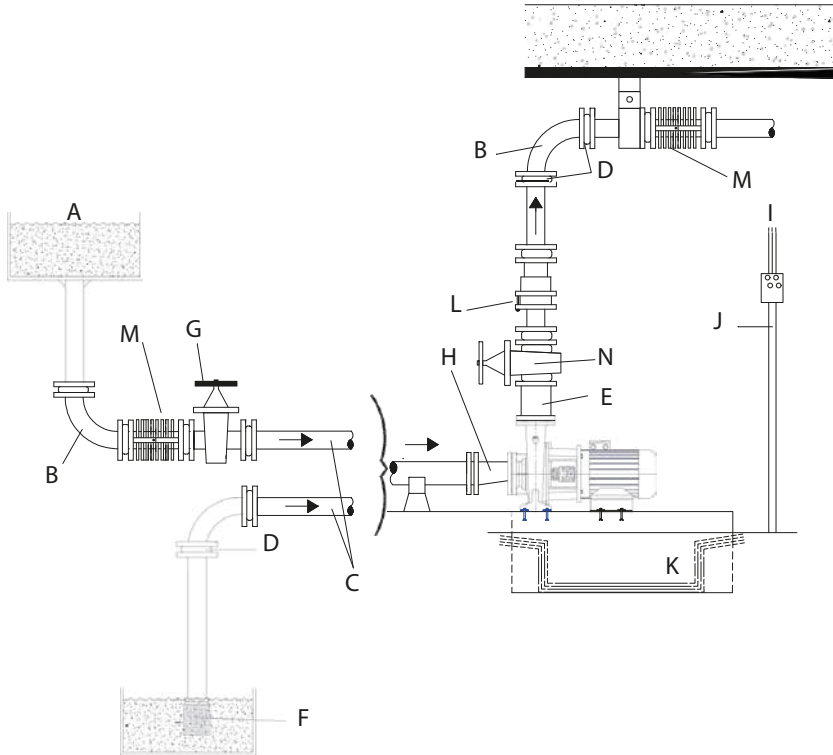
It is the sum of arithmetic loads for each flange (input and output) at the pump level (input flange / output flange), regardless of the algebraic signals of real and normal values.

Pump Type	Flange DN		Forces						Torques					
			N			N			Nm			Nm		
	Suction	Discharge	Suction Flange			Discharge Flange			Suction Flange			Discharge Flange		
			Fy	Fz	Fx	Fy	Fz	Fx	My	Mz	Mx	My	Mz	Mx
TNP 32-250	50	32	500	450	550	283	350	300	333	383	467	250	283	367
TNP 40-250	65	40	617	567	700	333	417	367	367	400	500	300	350	433
TNP 50-250	65	50	617	567	700	450	550	500	367	400	500	333	383	467
TNP 50-315	65	50												
TNP 65-250	80	65	750	683	833	567	700	617	383	433	533	367	400	500
TNP 65-315	80	65												
TNP 80-250	100	65	1000	900	1117	683	833	750	383	433	533	383	433	533
TNP 80-315	100	80												

The forces in the pump flanges are calculated according to TS EN ISO 5199 standards. Calculations apply to cast iron and bronze materials.

If the product is made of stainless material, to the flanges will be approximately double the forces and moments in the table.

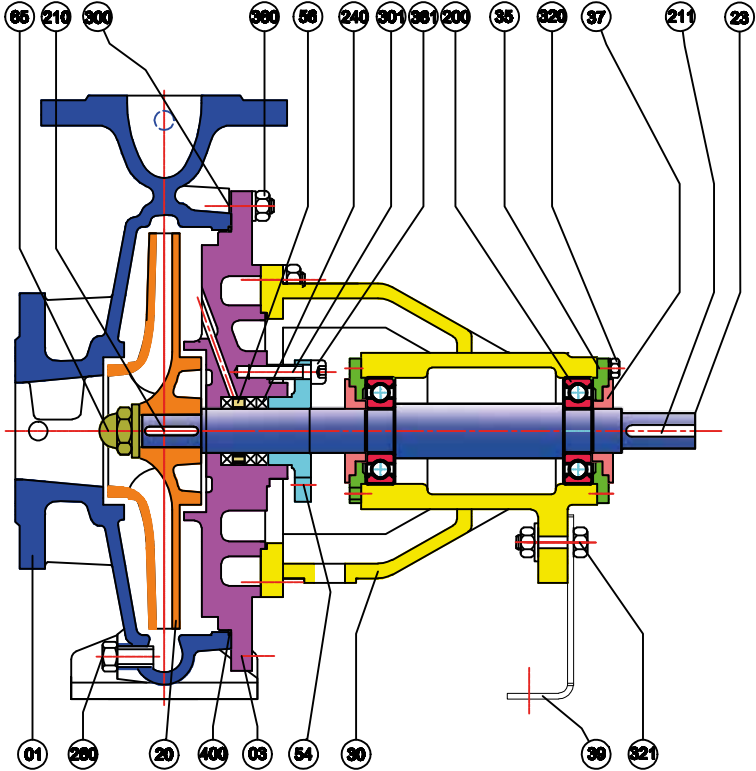
### 15. Sample Piping



- A-Tank
- B-Large Radius Bracket
- C-Min. Slope 2cm/m.
- D-Easy Detachable Connections, Flanges etc.
- E-Check Valve
- F-Strainer and Base Flap
- G-Suction Valve
- H-Eccentric Suction Reduction
- I-Network Connection
- J-Armoured and Airtight Cable
- K-Concrete Block
- L-Compensator
- M-Compensator
- N-Discharge Valve

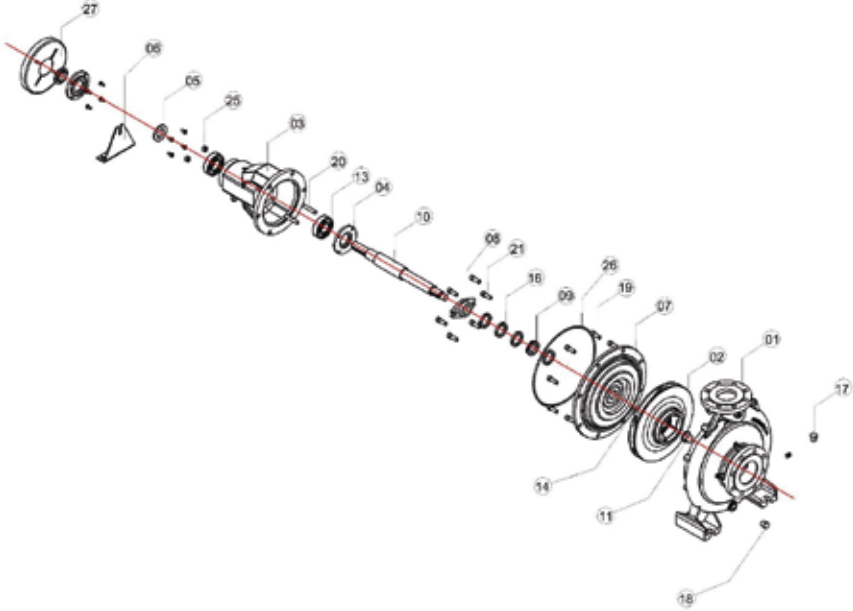


16.TNP Sectional Drawing and Part List



1- Volute Casing	12- Impeller Key
2- Stuffing Box	13- Coupling Key
3- Impeller	14- Stuffing Box Packing
4- Bearing Bracket	15- Plug
5- Bearing Cover	16- Imbus Bolt
6- Water Thrower	17- Gland Stud
7- Pump Support Foot	18- Stuffing Box Bolt
8- Gland	19- Support Foot Bolt
9- Lantern Ring	20- Gland Nut
10- Impeller Nut	21- O Ring
11- Bearing	22- Shaft

## 17. Exploded Picture



Part No	Part Name	Part No	Part Name
01	Volute Body	15	Coupling Wedge
02	Impeller	16	Seal
03	Bearing House	17	Wedge
04	Bearing Cover	18	Wedge
05	Water Shield	19	Body Stud
06	Carrier Console	20	GLEN Stud
07	Seal Box	21	Hex Bolt
08	Seal Glen	21	Hex Bolt
09	Watering Ring	22	Hex Bolt
10	Shaft	24	Nut
11	Impeller Nut	25	GLEN Nut
13	Bearing	26	O-ring
14	Impeller Wedge	27	Coupling Guard

## Warranty Terms & Conditions

- The warranty period begins on the date of delivery of the products and two years.
- All parts of the products are guaranteed by our company except electrical motors.
  - If the user uses the product against the manual, the warranty terms are not applied.

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



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**Tekнопomр Teknolojik Pompa ve Hidrofor Sistemleri Tic. ve San. Ltd. Őti.**

Ramazanođlu Mah. Öğrenci Sk. No: 30 Kurtköy-Pendik/İSTANBUL

Tel: +90 216 378 35 55 (Pbx) Fax: +90 216 378 85 77

info@tekнопomр.com - www.tekнопomр.com