

In Line Type Centrifugal Fire Pumps

YPH SERIES



OPERATING MANUAL





EC DECLARATION OF CONFORMITY

AT UYGUNLUK BEYANI

Manufacturer / İmalatçı : MAS DAF MAKİNA SANAYİ A.Ş.

Address / Adres : Aydınlı Mah. Birlik OSB. 1.No'lu Cadde No:17 Tuzla - İSTANBUL / TÜRKİYE

Name and address of the person authorised to compile the technical file Vahdettin YIRTMAÇ
Aydınlı Mah. Birlik OSB. 1.No'lu Cadde No:17
Teknik Dosyayı Derleyen Yetkili Kişi ve Adresi Tuzla - İSTANBUL / TÜRKİYE

The undersigned Company certifies under its sole responsibility that the item of equipment specified below satisfies the requirements of the mainly Machinery Directive 2006/42/EC which is apply to it.

The item of equipment identified below has been subject to internal manufacturing checks with monitoring of the final assessment by **MAS DAF MAKİNA SANAYİ A.Ş.**

Aşağıda tanımlanmış olan ürünler için Makine Emniyeti yönetmeliği 2006 / 42 / AT' nin uygulanabilen gerekliliklerinin yerine getirildiğini ve sorumluluğun alınmış olduğunu beyan ederiz.

Aşağıda tanımlanan ürünler içüretim kontrollerine bağlı olarak MAS DAF MAKİNA SANAYİ A.Ş. tarafından kontrol edilmiştir.

Equipment / Ürün : In Line Type Centrifugal Fire Pumps / *Hat Tipi Santrifuj Yangın Pompaları*

Seri / Model-Tip : YPH Series - *YPH Serisi*

For pumps supplied with drivers/ Elektrikli Pompa Üniteleri

Related Directives / Yönetmelikler

2006/42/EC Machinery Directive / 2006/42/AT Makine Emniyeti Yönetmeliği

2014/35/EU Low Voltage Directive / 2014/35/AB Alçak Gerilim Yönetmeliği

2014/30/EU Electromagnetic Compatibility Directive / 2014/30/AB Elektromanyetik Uyumluluk Yönetmeliği

EUP 2009/ 125 /EC Electric Used Products Directive/ Elektrik Kullanan Ekipmanlar Direktifi (EUP)

Regulations applied acc. to harmonize standards / Uygulanan Uyumlaştırılmış Standartlar

TS EN ISO 12100:2010, TS EN 809+A1, TS EN 60204-1:2011.

We hereby declare that this equipment is intended to be incorporated into, or assembled with other machinery to constitute relevant machinery to comply with essential health and safety requirements of Directive The machinery covered by this declaration must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity with provisions of the directive.

Ekipman, uygun bir makina oluşturmak amacıyla diğer ekipmanlar ile birleştirilirken ya da monte edilirken gerekli sağlık ve güvenlik yönetmeliklerine uyulması gerekmektedir.

Bu bildiri kapsamında yönetmelikte belirtilen bütün hükümler yerine getirilmeden makinanın devreye alınmaması gerekmektedir.

Place and date of issue / Yer ve Tarih : İstanbul, 02.06.2014

Name and position of authorized person : Vahdettin YIRTMAÇ
Yetkili Kişinin Adı ve Görevi : General Manager / Genel Müdür

Signature of authorized person :

Yetkili Kişinin İmzası

TABLE OF CONTENTS	Page No
Introduction	1
1.Important Safety Precautions	1
2.General	1
3.Safe Working Conditions	2
4.Technical Information	2
5.Transport and Storage	3
6.Assembly/Installation	3
6.1. Location of Installation	3
6.2. Coupling Alignment	3
6.3. Piping	3
6.4. Motor connection	4
7.Commissioning, Start up and Operating	4
7.1. Prestart-up check list	4
7.2. Checking rotation direction	5
7.3. Start-up procedure	5
7.4. Shut down procedure	5
8.Maintenance	5
8.1. The Checks during the Operation	5
8.2. Service	6
8.3. Spare parts	6
9.Noise Level and Vibration	6
10. Disassembly, Repair and Reassembly	7
11. Possible Failures, Causes, Solutions	8
12. Tightening Torques	9
13. Forces and Moments At The Pump Flanges	9
14. Typical Piping	9
15. YPH Sectional Drawing and Spare Part List	10
16. YPH Exploded View	11

INTRODUCTION

- This manual contains instructions for the installation, operation and maintenance of the YPH type non-self priming in-line centrifugal pumps of **MAS DAF MAKINA SANAYI A.Ş.**
- Please read carefully this manual and apply all the instructions to operate pumps without problems. Pumps shall be used for their intended duties. In this manual, there are information on operating conditions, installation, starting-up, settings and main controls of pumps.
- These operating and maintenance instructions contain **MAS DAF MAKINA SANAYI A.Ş.**'s suggestions. The special operating and maintenance information of the plumbing that a pump is fitted to is not considered in these instructions. This information must be given by plumbing constructors only.
- **Please refer to instructions of plumbing constructors.**
- Please pay attention to the warnings in this manual and ensure that it is read before the installation-start up process. **MAS DAF MAKINA SANAYI A.Ş.** is not responsible for the accidents resulting from negligence.
- If you cannot find an answer to your questions in this manual, it is suggested that you contact MAS DAF MAKINA SANAYI A.Ş. Please inform us about the rated value and especially the serial number of the pump when you get in contact for help.
- The safety instructions in this manual cover the current national accident protection regulations. Beside all of these, an operation, work and safety measure imposed by the costumer has to be applied.

The Signs Used in This Operating Manual



Read the instructions carefully in this operating manual and keep it for your future reference.



Warning sign against the electrical risks.



Sign for the operator's safety.

1. IMPORTANT SAFETY PRECAUTIONS

In order to minimize the accidents during the mounting and putting into service of the pump, the following rules have to be applied:

1. Do not work without taking safety measures relevant to equipment. Cable, mask and safety band must be used when necessary.
2. Be sure there is adequate amount of oxygen and there is no toxic gaseous around.
3. Before using welding or any electrical equipment make sure that there is no risk of explosion.
4. Check the cleanliness of the area to take care of your health. (Dust, smoke, etc.)
5. Do keep in mind that there is a risk of having accidents related to electricity
6. Do not lift the pump before you check the transport equipment.
7. Be sure you have a by-pass line.
8. Use helmet, eye glasses and protective shoes for your safety.
9. Place a protective barrier around the pump within the necessary safety area.
10. Dust, liquids and gaseous that may cause overheating, short circuit, corrosion and fire must be kept away from the pump unit.
11. By checking the noise level of the pump unit, take necessary measures to avoid noisy operation of the pump that can have harmful effects on the personnel and environment.
12. Be careful about the direction of transport and storage.
13. Cover appropriately the moving parts to avoid possible injury of the personnel. Mount the coupling guard and belting before starting-up the pump.
14. All the electrical and electronic applications must be performed by authorized person conforming EN 60204-1 and/or domestic instructions.
15. Protect the electrical equipment and motor against overloading.
16. If flammable and explosive liquids are pumped, ground connection of electricity should be carried out properly.
17. Do not expose the pump unit to sudden temperature variations.
18. All personnel who work with the waste water system need to be vaccinated in case of contagious diseases.
19. If the pump contains hazardous liquids, one must use protective helmet against the risk of splatter. One also must accumulate the liquid in a proper container against any risk of leakage.

All Other Health and Safety Rules, Laws and Regulations Must Be Applied

2. GENERAL

2.1. Definition of Pump and Usage Areas

YPH series pumps are single stage, in-line volute type pumps. They are used in

- Hospitals
- Offices
- Airports
- Power plants
- Schools
- Storehouse

Applications:

- Sprinkler Systems
- Hydrant Systems
- Flood systems
- Monitor systems

CAUTION

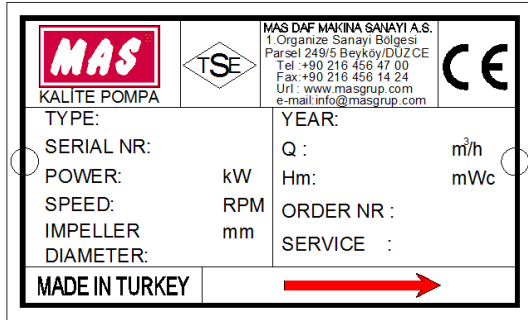
Please contact MAS DAF MAKINA SANAYI A.Ş. for liquids that have different chemical and physical specifications.

YPH pumps comply with DIN 24255 standards within nominal capacity range.

Technical specifications of YPH type pumps

Suction Flange	DN80-DN150
Discharge Flange	DN65-DN100
Capacity	5-370 m ³ /h
Head	35 - 105 m
Speed	2900-3600 d/d

Pump Label



2.2. Performance Information

Actual performance of the pump can be obtained from the order page and/or from the test report. This information is given on the pump label. The performance curves given in the catalog are valid for water whose density and viscosity are $\rho=1 \text{ kg/dm}^3$ and $\nu=1 \text{ cst.}$ respectively. For those liquids whose densities and viscosities are different from those of water, please consult with MAS DAF MAKINA SANAYI A.Ş. since the performance curves vary with density and viscosity.



Do not operate the pump with a motor that has a different power except for the given catalog and label values.

2.3. Warranty Conditions

The entire products in our selling program are warranted by **MAS DAF MAKINA SANAYI A.Ş.**

The warranty conditions will only be valid when all the instructions about installation and start-up operations of the pump unit are taken into account.

2.4. Test

All Pumps are dispatched for sale when all the performance and pressure tests are completed. Proper assurance of material and fault-free operation of pumps whose performance tests are made is under the warranty of **MAS DAF MAKINA SANAYI A.Ş.**

2.5. Pressure Limit



Pressure at the discharge flange must not exceed 10 bar. A special order is necessary for applications with higher pressures.

3. SAFE WORKING CONDITIONS

This manual contains main safety instructions for the installation, operation and maintenance. It must be read by the personnel who are responsible for installation and operation. This manual should always be kept near the installation location. It is important to comply with safety precautions stated in page 1 along with the general safety instructions as well as preventive measures repeated in other sections of this manual.

3.1. Training of Personnel

Installation, operation and maintenance personnel must have necessary knowledge in order to accomplish the given job. The responsibility, adequacies and controlling duties of such personnel must be determined

by the costumer. It has to be certain that these personnel comprehend totally the content of the operating manual. If the personnel do not have enough knowledge, required training must be given by the costumer. If training support is needed by the costumer, it will be provided by the manufacturer/seller.



Untrained personnel and unwillingness to comply with safety instructions may be risky for both machine and environment. **MAS DAF MAKINA SANAYI A.Ş.** is not responsible for this kind of damages.

3.2. Hazardous Conditions that may Occur When One does not Comply with The Safety Instructions

Incompliance with safety regulations may put the personnel, the environment and the machine in danger and thus may cause damages. Incompliance with safety regulations may give rise to situations listed below:

Important operational functions of the factory may stop

Maintenance may get difficult.

One may get injured by electrical, mechanical or chemical hazards.

3.3. Safety Measures for Operator.

Dangerous, hot or cold components in the pump area must be covered so that one cannot touch them.

Moving components of the pump (such as rigid coupling) must be covered so that one cannot touch them. Those covers must not be dismantled while the pump is running. Dangers that results from electrical connections must be removed. To get more information about this subject, you can refer to VDE and domestic electrical instructions.

3.4. Safety Measures for Maintenance and Installation

The costumer must assure that all maintenance, check and installment tasks are performed by qualified personnel. Repair work must only be performed while the machine is not running.

The pump and its auxiliary system must be cleaned thoroughly if it contains hazardous liquids. At the end of the repair work, all safety and protective equipment must be re-installed.

3.5. Spare Parts Replacement

Replacement of spare parts and all modifications must be done after contacting with the manufacturer. Spare parts and accessories certified by the manufacturer are important for the safe operation of the system.

Notice: MAS DAF MAKINA SANAYI A.Ş. is not responsible from the usage of improper spare parts.

4. TECHNICAL INFORMATION

4.1. Design

Single stage, non-self priming in-line centrifugal pumps are furnished with standard pumps and mechanical seals.

4.1.1. Locations of Flange – Flanges

Discharge Flanges	: DIN 2533-PN 16
Suction Flanges	: DIN 2533-PN 16

4.1.2. Connection of Pump and Motor

Motor is close coupled to the pump with a rigid coupling using an adapter and flange. In this way, the shafts of the motor and pump constitute a complete unit.

4.1.3. Impeller

The closed radial type impeller of the pump is balanced dynamically in an electronic balance machine. The thrust (axial force) is balanced with the back wear ring and balance holes.

4.1.4. Shaft

The shaft, impeller and other parts of the pump is designed to be dismantable without moving (dislodge) the suction and discharge pipes

and volute of the pump. In this way, the installation and maintenance operations can be performed very easily.

4.1.5. Bearing and Lubrication

YPH type pump has ball bearing and gress is used for lubrication.

4.1.6. Seals

Packing is used at YPH pumps to provide NFPA standards.

4.2. Construction of Pump Group

4.2.1. Drive

TEFC (Totally Enclosed Fan Cooled) 3 phase, squirrel caged, IM 3611 V 18 type electrical motor which complies with DIN EN 60034-1, IEC, VDE and standards is used to drive the pump in proper speed and power.

Specifications of electrical motor

Isolation class	: F
Protection class	: IP 54-IP 55
Frequency	: 50 Hz.
Running type	: S1
Start up type	: 3x380 V(Y) up to 4 kW More than 4 kW, 3x380(Δ) + (Y/ Δ)

4.2.2. Coupling and Coupling Guard

In YPH type pumps, a clamped type rigid coupling is used. A coupling guard is provided in accordance with EN 294 in the rigid coupling area.



Pump can only be run with a coupling guard in accordance with EN 294 according to the safety instructions.

5. TRANSPORT AND STORAGE

5.1. Transport

Pump and pump group must be carried safely to the installation location by lifting equipments.



Current general lifting safety instructions must be applied. Please use a suspension system shown in figure while you are carrying and lifting the pump unit. The suspension rings may be broken because of the excessive load and may result in a damage of the pump. Prefer fabric cable for suspension.

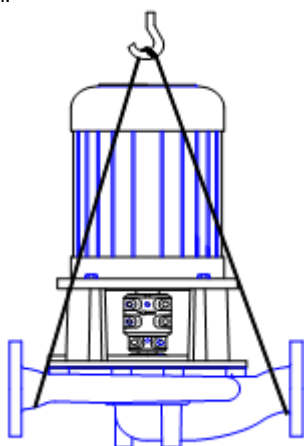


Figure 1: Transport of pump group

Incorrect lifting may damage the pump unit and cause injuries

Damages caused in transport.

Check the pump when it is delivered to you. Please let us know if there is any damage.

5.2. Storage

Please keep the unit clean and dry area during storage.

If the pump is out of use for a long time, please consider the instructions below.

- 1.If there is water inside the pump, drain it.
- 2.Clean the pump casing and impeller by jetting clean water for a short time.
- 3.Empty water inside the pump casing, suction line and discharge line.
- 4.Add small amount of antifreeze inside the pump casing if it is not possible to empty it completely. Rotate the pump shaft by hand to mix the antifreeze.
- 5.Close the suction and discharge exits with gasket.
- 6.Spray an anti-corrosive into the pump casing.
- 7.Rotate the pump shaft by hand once in every month, in order to protect it from freezing and to lubricate the bearings.

6. ASSEMBLY/INSTALLATION

YPH type close coupled pumps are mounted to the ground by foots of the.

6.1. Location of Installation

Pump shall be installed in a location where the control and the maintenance of the pump are easily made. The pump room shall be suitable for operation of lifting systems such as freight elevator, forklift, etc.

The pump group should be installed in the lowest possible location of the pumping system in order to achieve the highest suction pressure.

6.1.1. Location of Installation- Local Ambient Temperature

When the local ambient room temperature exceeds +40 °C in a pumping system, suitable ventilation should be provided in order to remove the heat dissipated to the environment and supply fresh air.

6.2. Coupling Alignment

6.2.1. General

Since YPH type pumps are close coupled, they are provided mostly with a motor. The shafts of the motor and the pump are coupled with a rigid coupling and all of the necessary alignments are performed at the factory. Therefore, the coupling alignment is not necessary for YPH pumps provided with a motor. However, if for any reason the pump and the motor are separated (i.e., rigid coupling is dismantled), it is necessary to re-align the coupling in installation.

6.3. Piping

6.3.1. General

- Do not use the pump as the hinged support for the piping system.
- Put enough supports under the piping system in order to carry the weight of the pipe and fittings.
- Avoid piping system loads on pump by installing flexible components (compensator) to suction and discharge of the pump.
- By mounting flexible supporting items, take into consideration the fact that these items may elongate under the pressure. Especially, the supporting items shall be placed in the direction of discharge flange axis of the pump (generally in vertical direction).
- Suction pipe shall be in a constantly increasing slope to the pump. Air in the suction pipe shall be arranged to move into the pump.
- Discharge piping shall be in a constantly increasing slope to the reservoir or discharge point, without up and downs which can cause air pockets in the piping system. At locations where forming of air pockets is possible, special items like air valve and air cock are mounted to evacuate the trapped air.
- It is important that pipe diameter and fittings are at least as much as the pump opening diameter or preferable one or two size higher. One should never use fittings with smaller diameters than the pump exit diameter. In particular, preferred fittings like foot valve, strainer, filter, check valves and valves shall have large free passing area, and low friction loss coefficient.
- For piping systems with hot liquids, thermal expansions are to be taken into account and compensators shall be mounted in accordance with these expansions. Caution shall be exercised to avoid the loading of pump in this installation.

6.3.2. Specification of Work in Piping Installation



In installation of pipes, follow the procedures below certainly.

- Take out the guards (placed by the manufacturer) from suction and discharge openings of the pump.
- Close the suction and discharge flanges with rubber gaskets. This precaution is important to avoid the undesired substances (weld crust, weld slag, sand, stone, wood piece etc.) get into the pump. Do not take off this gasket until the installation is completed.
- Start the installation of piping from the pump side. Do the necessary assembling and welding of the parts in a successive order.
- In these operations, do not neglect to put the necessary supports in their respected locations.
- Following above procedure, complete all piping system at suction side up to the suction tank (or foot valve if available), at discharge side up to do discharge collector and discharge pipe.
- When all installation and welding process is done and the heat dissipated by welding is removed, dismantle all the bolted connections from the suction tank to discharge pipe. Take out all demountable parts.
- Clean these parts and then paint body coat completely inside and outside.
- Mount the parts again in their intended places. However, this time start from the discharge line and move downward to the pump. In this instance, do not forget to check the flange gaskets. If needed, (for example deformation during welding) replace them.
- Concerning the connection of the pump flanges to piping, in case of misalignment of axis and flange holes, do not force the system to eliminate the misalignment. Forcing the system may cause difficult-to-correct problems.
- If there is an axial misalignment between the flanges of the pump and the pipe, due to the welding or any other reasons, cut the pipe from a suitable location in order to fix the problem. Connect the pipe (pump side) to the pump. After carrying out the necessary correction, connect the parts again by welding.
- Dismantle and clean the last welded part. Repaint again and mount on its place.
- After all these processes are accomplished, remove the rubber gasket from the suction and discharge openings. Open their holes and mount them again on their intended place.

6.3.3. Specification of work after installation of piping and piping system

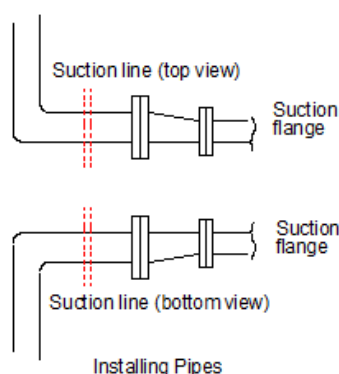


Figure 5: Piping system

An illustrative piping system is shown in Figure 8.



Complete the auxiliary pipe connections in piping system if exist (cooling to bearing housing, and stuffing box (seal), relief pipe, oil pipe etc.). Appropriate manometers shall be mounted on suction and discharge pipe lines.

6.4. Motor Connection

Motor shall be connected by an electrical technician according to the connection (switch) diagram. Local electricity policies and current VDE regulations have to be applied.



- Electrical connections have to be made by authorized electricians.
- In dismantling the pump, make sure the electricity is cut off before taking the motor cover out.
- Use the appropriate electrical connection to the motor.



In environments where there is a risk of explosion, prescribed protective law and regulations shall be applied by competent authorities.

6.4.1. Motor Connection Diagram

- Motors requiring high moments at start up shall not be connected star-delta
- Frequency controlled motors, require high moment at start up and have to be cooled properly at low speeds. Provide the necessary cooling for the motors.

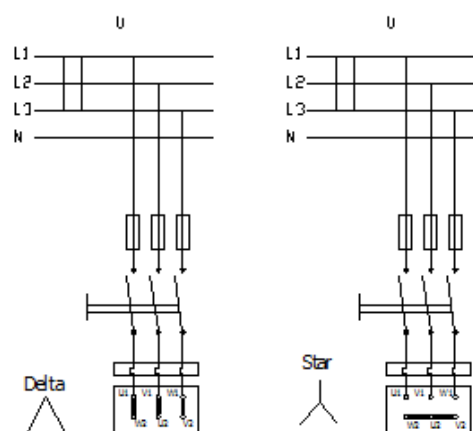


Figure 6: Electric Connection Diagram

Electrical circuit	Motor	
U (Volt)	230/400V	400V
3 x 230V	Delta	-
3 x 400V	Star	Delta

6.4.2. Motor Protection

- Three phased-motor shall be connected to power supply.
- Wait the motor to cool down when thermic protected motor breaks in circuit due to the overheating. Make sure the motor does not start automatically until it cools completely.
- In order to protect the motor from overcharging and short circuit use a thermic or thermic-magnetic relay. Adjust this relay to the nominal current of the motor.

Electrical equipments, terminals and the components of the control systems may carry electric current even though they are not operating. They may cause deadly and serious injuries or irreparable material damages.

7. COMMISSIONING, START UP AND OPERATING

7.1. Prestart-up Check List

- Make sure that the pump and the suction pipe is completely filled with water before the starting. If the pump operates on a positive suction head, no problem will be encountered. Suction valve is opened and air drains are un-tightened.
- Pumps with foot valve are filled with water by opening the pump filling tap or, one takes advantage of the water accumulated in the discharge pipe and by using a small valve the check valve is bypassed and the pump is filled.

- In vacuum pump driven pumps, by operating the vacuum pump one achieves to fill the pump via increasing the water level in the suction pipe.



Do not start your pump dry.

- Do not start up the motor at least before 1 to 2 minutes.
- If the pump will be out of use for a long time, close the suction valve and auxiliary circuits. If the pump is outside and if there exists a danger of frost, remove all drain taps and empty all the water inside the pump. (5.2. Storage)



If the pump is outside and if there exists a danger of frost, remove all drain taps and empty all the water inside the pump.

7.2. Checking Rotation Direction



- The direction of rotation is indicated on the pump label with an arrow. Apart from special cases, it is clockwise direction when looking from the motor end. Observe if the pump is rotating in the expected sense by starting the motor for a very short instant. If it is turning in the opposite sense, interchange any of two motor leads.
- If the motor connection is delta, open the discharge valve slowly.
- If the motor connection is star-delta, set the time relay to maximum 5 seconds. Monitor the passage from star to delta by pressing the start button. As soon as you are assured that the connection is delta, open the discharge valve slowly. Continue opening the valve until you read the amperage on the electrical panel.

One should always check the labels which show the direction of rotation and the direction of fluid flow. If you dismount the coupling guard to monitor the direction of rotation, do not restart the engine before remounting the guard.

7.3. Start-up Procedure

- Check if the suction valve is open and the discharge valve is closed. Start the motor.
- Wait until the motor reaches sufficient speed. (In Star-delta connections, wait until the engine passes to delta connection.)
- Keeping an eye on the amperage shown on the panel, open the discharge valve slowly.
- In the primary operation, if the discharge pipe is empty, do not open the valve completely. By keeping an eye on the amperage, open the valve with care regarding that it should not exceed the value indicated on pump's label.
- After opening the valve completely, check the pressure from the pump exit manometer and make sure that this value is the pump operating pressure value and is indicated on pump's label.
- If the value one reads is less than the pump label value when the valve is completely open, it means that the height is miscalculated. Increase the value by narrowing the valve and bring it to pump's label value.
- If the value one reads is greater than the pump label value when the valve is completely open, it means that the height is calculated less than what it should be in reality. The device is pumping less than what is requested. Check the installation and the calculations.
- Minimum flow rate: If the pump is working with zero flow rates (closed valve) from time to time during its operation, the water inside the pump may endanger the pump by getting warmed up. In such cases, a minimum flow valve must be connected to the pump exit.



Stop the motor if the pump gets too hot. Wait until it gets cold. Then start the system up again carefully.

7.4. Shut Down Procedure



During sudden start ups and stops, a pressure reducing valve must be placed at the exit section of high flow rate pumps whose discharge pipelines are long, in order to reduce water hammer effect. Water hammer may explode the pump.

In normal conditions (apart from sudden power shut down, etc), stop the pump as below:

- Close the discharge valve slowly
- Switch the power off, stop the motor. Notice that the rotor slows down.

8. MAINTENANCE



- Maintenance operations must be done by authorized personnel with protective clothing only. The personnel must also beware of high temperatures and harmful and/or caustic liquids. Make sure that the personnel read carefully the manual.
- The instructions in Safety Precautions must be executed during maintenance and repair
- Continuous monitoring and maintenance will increase the engine's and pump's lives.

8.1. The Checks During the Operation

- Pump must never be operated without water.
- Pump must not be operated for a long time with the discharge valve closed (zero capacity).
- Precautions must be taken against flare up when the component temperatures are over 60°C. "Hot Surface" warnings must be placed over necessary areas.
- All the auxiliary systems must be in use while the pump is operating.
- If the pump has mechanical sealing, there is no need for excessive maintenance. Water leakage from the mechanical sealing indicates the fact that the sealing is worn out and therefore needs to be replaced.
- If the system consists of a substitute pump, keep it ready by operating it once a week. Check also the auxiliary systems of the substitute pump.

8.1.1. Component Check



To make possible the visual control, one must be able to reach the pump from any direction. Especially, to be able to dismount the internal units of the pump and the engine, sufficient free space must be created around them for maintenance and repair. Furthermore, one must make sure that the piping system can easily be dismantled.

8.1.1. Bearing and Lubrication

Rolling bearings are used in YPH type pumps.

8.1.2. Mechanical Seals

Mechanical seals are used in YPH type pumps. Mechanical Seals are absolutely leak-proof and needs less maintenance than soft packing.

Mechanical seal;

1. Provides leak-proof operation in heavy operating conditions (in waste water pumps, chemical process and refinery pumps).
2. Easily mountable and needs less maintenance.
3. Does not cause wearing on the shaft
4. Sealing operation does not depend on the quality of shaft finishing.

8.1.3. Drive

Apply to the operating instructions of the motor manufacturer.

8.1.4. Auxiliary Components

Check regularly the fittings and the gaskets, and replace the worn out pieces.

8.2. Service

Our Customer Service Department offers after-sale service. Manager should employ authorized and trained personnel for mounting/dismounting procedures. Before these procedures, one must make sure that pump interior is clean and empty. This criterion is also valid for the pumps which are sent to our factory or to our service points



Maintain the safety of the personnel and the environment in every field procedure..

8.3. Spare Parts

The spare parts of YPH type pumps are guaranteed for 10 years by **MAS DAF MAKINA SANAYI A.Ş.**

In your spare parts requests, please indicate the below listed values that are indicated on your pump's label.

Pump type and size:

Motor power and speed:
Pump serial number:
Capacity and head:

If you wish to keep spare parts in store, depending on the number of same type of pumps, for two operation years, the quantities which are listed in the table below are recommended.

Component name	The number of equivalent pumps in the installation						
	1-2	3	4	5	6-7	8-9	10 +
Shaft (key included) quantity	1	1	2	2	2	3	% 30
Impeller (quantity)	1	1	1	2	2	3	% 30
Wear ring	1	1	1	2	2	3	% 50
Rigid clamped coupling	1	2	2	3	3	4	% 50

9. NOISE LEVEL AND VIBRATION

The reasons to increase the noise level are indicated below:

- Noise level increases due to the fact that the pump is not founded properly (Vibration)
- If the installation does not have compensator noise and vibration increases.
- Wearing in ball bearing also increases noise level.



Check if there is any noise increasing elements in your installation.

9.1. Expected Noise Values

Power of Motor PN (KW)	Sound Pressure Level (dB) *	
	1450 rpm	2900 rpm
< 0.55	63	64
0.75	63	67
1.1	65	67
1.5	66	70
2.2	68	71
3	70	74
4	71	75
5.5	72	83
7.5	73	83
11	74	84
15	75	85
18.5	76	85
22	77	85
30	80	93
37	80	93
45	80	93
55	82	95
75	83	95
90	85	95

(*) 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.

The above values are maximum values. The surface noise pressure level at dB(A) unit is shown as (L_{pA}).

This complies with TS EN ISO 20361.

10.2. Reassembly
10. DISASSEMBLY, REPAIR AND REASSEMBLY


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

10.1. Disassembly

- Close all valves in the suctions and discharge lines.
- Remove the safety guard.
- Thanks to "Back Pull Out Design"; the impeller, shaft and other rotating parts being removable no need to disconnect the suction and delivery pipes.
- If to take out the complete pump is necessary, disconnect pump from the driver , suction and discharge pipes and detach the base plate (if any)
- Unscrew fixing bolts (323) and nuts (361) then Dismantle the motor
- Dismantle the rotor group from the volute casing by unscrewing bolts no (321)
- Unscrew the end nuts (65) of the impeller and take out the impeller (20) and impeller key (210). Use rust remover solvent if necessary during dismantling.
- Dismantle bearing cover (35) and take out the pump shaft with ball bearing (200).
- Unscrew Gland nuts (360) and pull out soft packing (240) and lantern ring (56).

- Reassembly proceeds in reverse sequence to disassembly as described in section F1. You may find the attached drawings useful.
- 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.
- Place ball bearing (200) on its place on the shaft (60) by slightly heating or by using press.
- Put the shaft and ball the bearing to the "flange for motor" (16). Mount bearing cover (35)
- Mount the adaptor (12) to the flange for motor (16)
- Place the seal packing (240) , lantern ring (56) and gland (54) to their place on the adaptor (12)
- Slip the rotating part of the mechanical seal onto the pump shaft (61)
- Place the impeller key (210) into keyway, slide the impeller (20) onto the shaft (60) and screw the impeller nut (65).
- Now reassembly of the rotor group is completed.
- Mount rotor assembly to the volute casing. (In the repair shop or on site.)
- Finally put the shaft key (211) and mount the motor
- Make sure the gaskets and o-rings are evenly placed without sliding and not damaged or not squeezed at all.
- Place the pump on the base plate, couple the motor. Connect suction and discharge pipes as well as auxiliary pipes. Take the unit into operation as it was indicated in section 7.
- Slip the pump shaft (60) onto the motor shaft, fix the set screws.

11. POSSIBLE FAILURES, CAUSES, SOLUTIONS

Possible failures and solution strategies are listed in the table below. Please apply to the Customers' Service

Department of our company when a generic solution is not found to your problem.



While the failures are repaired the pump must always be dry and un-pressurized.

POSSIBLE FAILURE	CAUSES	SOLUTIONS
1) The pump delivers insufficient capacity	<ul style="list-style-type: none"> Discharge head too high Very high counter pressure Pump and/or pipe cannot discharge air, cannot suck Occurrence of air pockets inside the pipe NPSH is too low 	<ul style="list-style-type: none"> Readjust the operating point See if there is any undesired material inside the pipe Vent completely the pump and the pipe Change the piping configuration Increase the liquid level
2) Motor overload	<ul style="list-style-type: none"> System pressure is lower than the requested pressure level Speed too high Liquid pumped of different specific gravity and viscosity than that for which pump is rated Engine works at two phases 	<ul style="list-style-type: none"> Adjust the operating pressure to the label value Decrease the speed Increase the engine power Replace the fuse and control the electrical connections
3) Pump head is too high	<ul style="list-style-type: none"> System pressure is higher than the requested pressure level 	<ul style="list-style-type: none"> Set the operating pressure to the label value
4) Bearing temperatures are high	<ul style="list-style-type: none"> Worn out coupling Too much, too little or improper lubrication Increase in axial forcing 	<ul style="list-style-type: none"> Replace the coupling Change the oil, decrease or increase its quantity Clean the balance holes on the impeller disc
5) Excessive leakage from the stuffing box	<ul style="list-style-type: none"> Worn out gland Loose gland 	<ul style="list-style-type: none"> Use brand new gland Change the stuffing bush Tighten the gland nuts
6) Noisy operation	<ul style="list-style-type: none"> Worn out motor or pump ball bearings Cavitation Worn out or misaligned coupling Operation in the far left or right of the performance curve 	<ul style="list-style-type: none"> Replace Close the delivery partially in order to reduce the capacity. Replace the coupling or align it Operate the pump at its label setting
7) Excessive increase in pump temperature	<ul style="list-style-type: none"> Pump and/or pipe can neither discharge, nor aspirate air Too low capacity 	<ul style="list-style-type: none"> Bleed completely the pump and the pipe Open more the valve
8) Vibration	<ul style="list-style-type: none"> Pump and/or pipe can neither discharge, nor aspirate air NPSH is too low Internal components of the pump are worn out System pressure is lower than the requested pressure level Coupling is misaligned Too much, too little or improper lubrication Rotor unbalanced Improper bearings 	<ul style="list-style-type: none"> Bleed completely the pump and the pipe Increase the liquid level Replace the worn out components Adjust the operating pressure to the label value Align the coupling In case of continuous overload, decrease the impeller diameter Change the oil, decrease or increase its quantity Balance the impeller again Use new bearings

TIGHTENING TORQUES

Thread Diameter	Tightening Torque Max (Nm)	
	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

12. FORCES AND MOMENTS AT THE PUMP FLANGES

All of the applied loads if not reached the maximum allowable value, to provide that the following additional conditions, one of these loads may exceed the normal limit:

- Any component of a force or a moment, must be limited 1.4 times of the maximum allowable value,
- The actual force and moments acting on each flange, should provide the following formula:

$$\left(\frac{\sum |F|_{\text{actual}}}{\sum |F|_{\text{maximum allowable}}} \right)^2 + \left(\frac{\sum |M|_{\text{actual}}}{\sum |M|_{\text{maximum allowable}}} \right)^2 \leq 2$$

In here, $\sum |F|$ and $\sum |M|$ are arithmetic sum of the loads for each flange at the pump level, without regard of the algebraic signs of the actual and maximum allowable values.

Pump Type	Forces And Moments						
	Suction and Discharge Flange			Suction and Discharge Flange			
	mm	N			Nm		
		F _y	F _z	F _x	M _y	M _z	M _x
YPH 65-240	65	1000	809,5	880,97	523,82	571,44	714,3
YPH 65-280	65	1000	809,5	880,97	523,82	571,44	714,3
YPH 80-280	80	1191	976,2	1071,45	547,63	619,06	761,92
YPH 100-280	100	1595	1286	1428,6	595,25	690,49	833,35

Forces at the pump flanges were calculated according to TS EN ISO 5199 standard. The calculations are valid for the materials of cast iron and bronze. Forces and moments at the flanges that made of stainless material will be approximately twice as moments in the table.

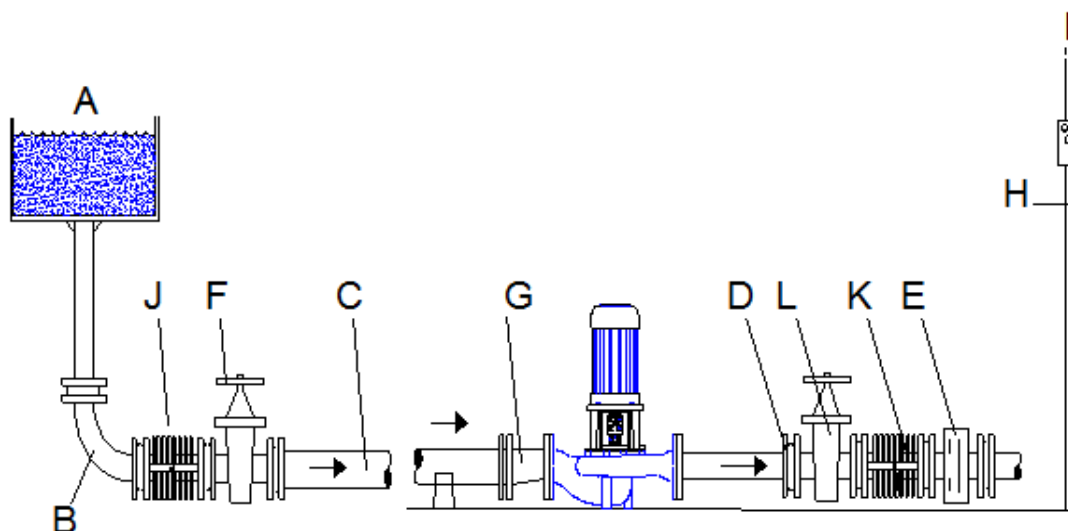
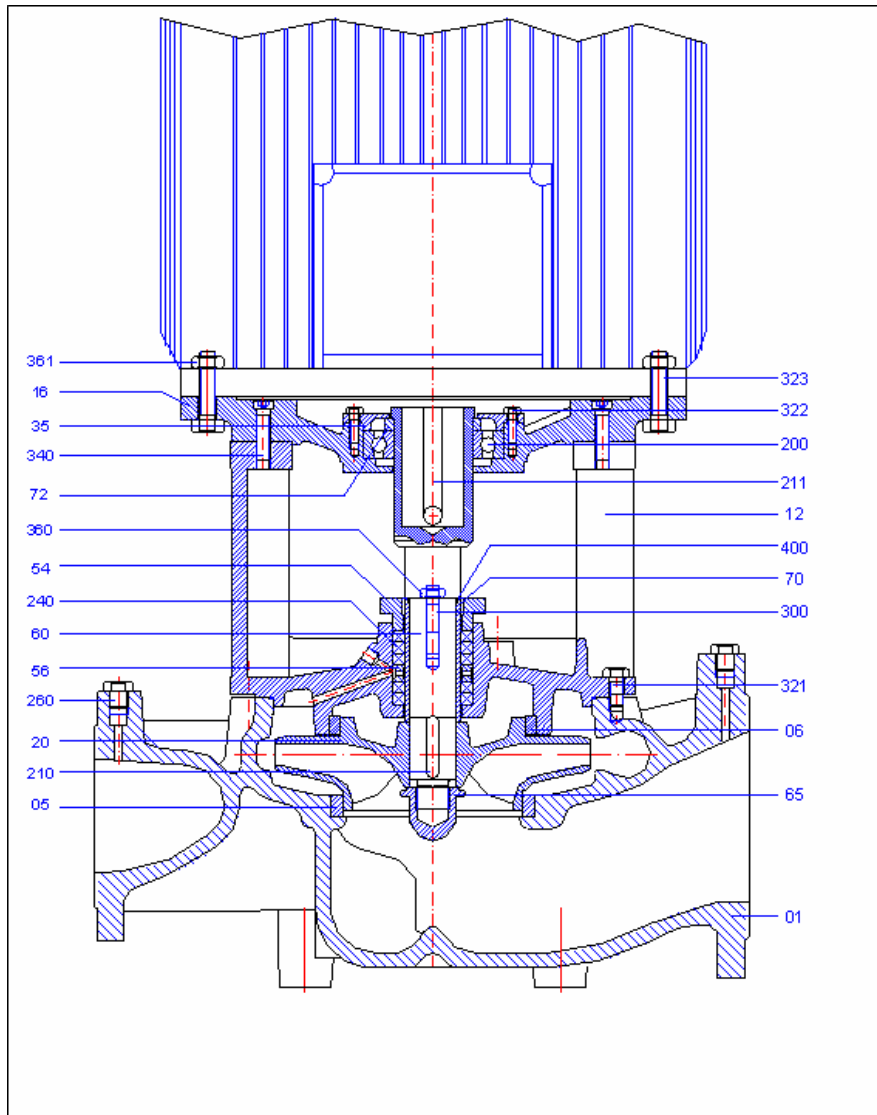
13. TYPICAL PIPING


Figure 7: A Typical Piping

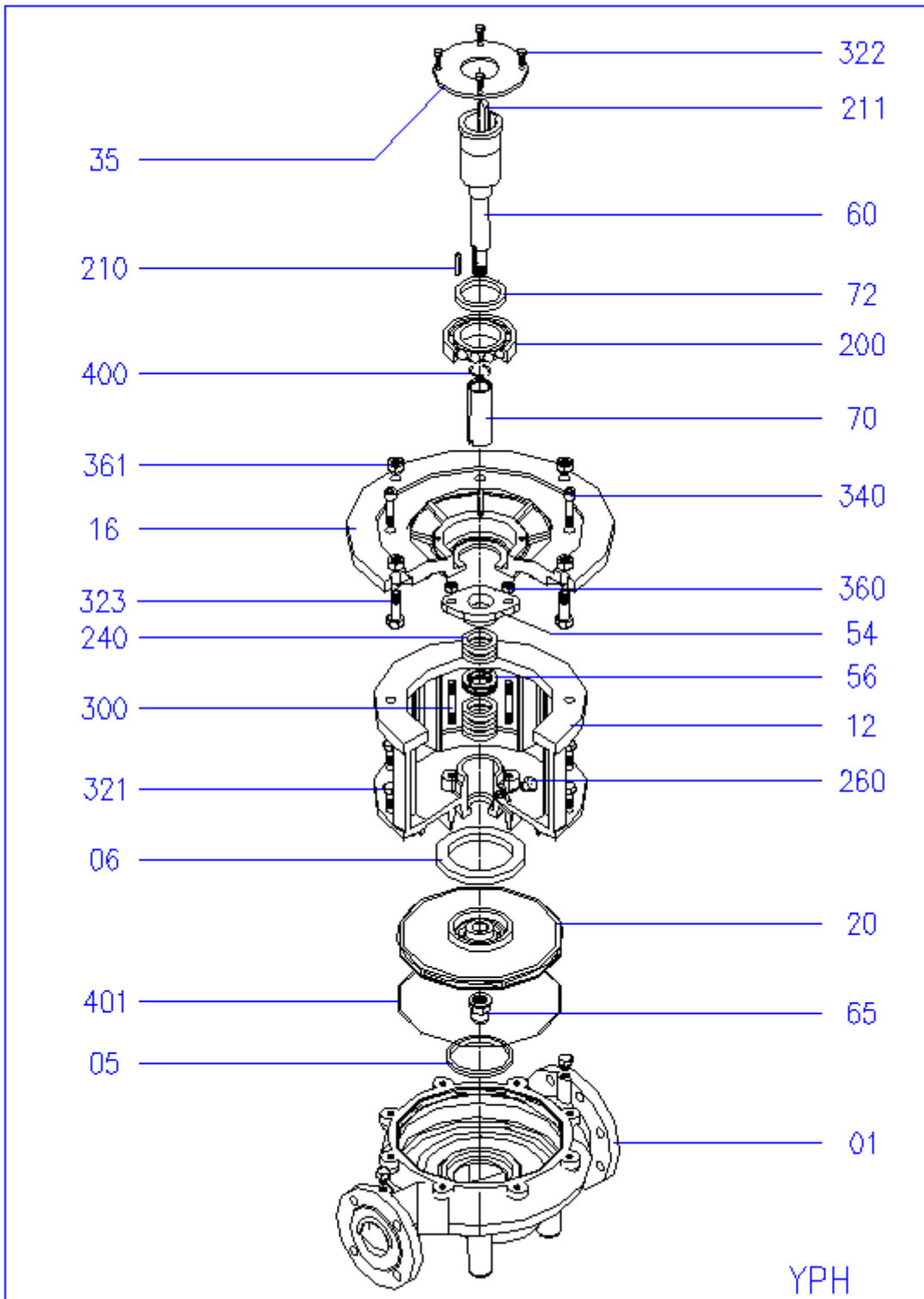
- A. Tank
- B. Large radius elbow
- C. Minimum slope is 2 cm/m
- D. Fittings, flanges etc.
- E. Non-return valve
- F. Suction valve
- G. Reducer
- H. Electrical connection
- I. Insulated cable
- J. Compensator

- K. Compensator
- L. Discharge valve

14. YPH SECTIONAL DRAWING AND SPARE PART LIST


NO	PART LIST	NO	PART LIST
210	KEY FOR IMPELLER	401	O-RING (CASING)
200	BALL BEARING	400	O-RING (SHAFT SLEEVE)
72	SPACER RING	361	NUT FOR (FLANGE)
70	SHAFT SLEEVE	360	NUT FOR GLAND
65	IMPELLER NUT	340	BOLT FOR (FLANGE)
60	SHAFT	323	BOLT FOR ADAPTER
56	LANTERN RING	322	BOLT FOR BEARING COVER
54	GLAND	321	BOLT FOR CASING
35	BEARING COVER	300	STUD FOR GLAND
20	IMPELLER	260	PLUG
16	FLANGE FOR MOTOR	240	SOFT PACKING
12	ADAPTER	211	KEY FOR SHAFT
06	WEAR RING (ADAPTER)		
05	WEAR RING (CASING)		
01	CASING		

15. YPH EXPLODED VIEW





Mas Grup

Head Office / Center Service:

Aydınlı Mah. Birlik OSB. 1.No'lu Cadde No:17 Tuzla - İSTANBUL / TURKEY
Tel: +90 (216) 456 47 00 pbx Fax: +90 (216) 455 14 24

Ankara Regional Directorate:

Aşağı Öveçler Mah. 1329 Sok. No:6/9 Öveçler ANKARA / TURKEY
Tel: +90 (312) 472 81 60-67 Fax: +90 (312) 472 82 51

Factory:

1. Organize Sanayi Bölgesi Parsel 249/5 Beyköy - DÜZCE / TURKEY
Tel: +90 (380) 553 73 88 Fax: +90 (380) 553 71 29