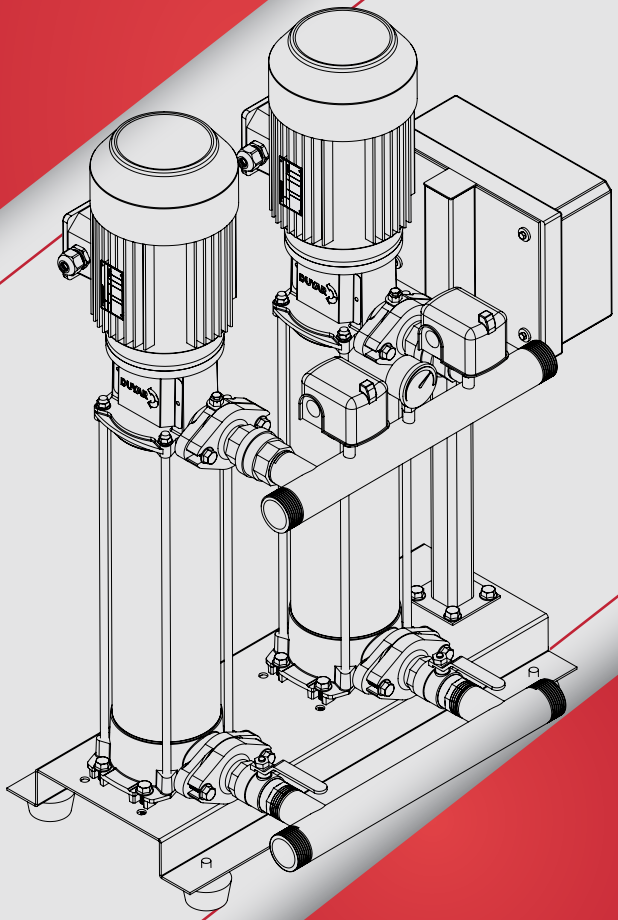
DMVP SERIES

VERTICAL NATIONAL STAGE HYDROPHORES

INSTALLATION, OPERATION, MAINTENANCE,
and REPAIR GUIDE



DUYAR


DUYAR

CONTENTS

PURPOSE OF USER MANUAL

- To convey the instructions regarding the pump's installation, maintenance, and repair.
- To explain the pump's starting, operating, and stopping methods

SAFETY SIGNS

Safety measures that can cause life-threatening if not implemented

Warnings on electric current

CAUTION Safety instructions, which, if not followed, may damage the machine and its operation.

NOTE Notes or instructions make work easier and ensure reliable operation

GENERAL INSTRUCTIONS

►This manual should be kept in have a safe place, easily accessible for qualified personnel responsible for the safe operation and maintenance of the pump.

►Responsible personnel should be experienced and have knowledgeable about safety-related standard

►To prevent misuse of the pump, the instructions given in this manual should be carefully studied and strictly followed at every stage of the pump's assembly and operation.

►The user is responsible for the control and assembly to be carried out by authorized and qualified personnel who have thoroughly studied this manual.

►The pump should never be operated outside the operating conditions given in the purchase order. Because the operating conditions given in the purchase order were taken into account in the selection of the pump material and the testing of the pump.

►If the pump needs to be operated outside of the conditions specified in the purchase order, please contact with DUYAR POMPA. **DYAR POMPA does not accept any responsibility for the damages that may arise from the operation of the pump outside the specified conditions without written approval.**

►If the dispatched pump is not to be installed immediately, it should be stored in a clean, dry place where the ambient temperature does not change much. Extremely low or high temperatures can cause serious damage to the pump if proper precautions are not taken.

►DUYAR PUMP does not accept warranty responsibilities for repairs or changes made by the user or other unauthorized persons.

►This manual does not cover the safety rules applicable at the place of use.

SAFETY INSTRUCTIONS

To avoid damage to body and/or material damage, strictly follow the instructions below.

►Operate the pump only under the specified operating conditions.

►The tension, contraction and weights in the pipe system should never be transferred to the pump.

►Electrical connections related to the motor and auxiliary elements must be made strictly in accordance with local rules and by authorized .

►No work should be done on the pump without stopping the pump group completely.

►Before doing any work on the pump, always disconnect the power from the motor and make sure that no accidental connection is made.

►Any work on the pump must always be carried out by at least two personnel.

►The clothes of the personnel who will work on the pump must always be suitable for the work they will do and/or the person must use the necessary safety equipment.

►**Never work on** the pump when it is hot.

Never touch with pumps and pipes hotter than 80 °C. Do not touch with bare hands. Appropriate precautions should be taken to warn user elements (eg, using warning signs, barricades).

►Always exercise caution when working on pumps that pump hazardous liquids (such as acids or hazardous fluids).

►**Never work on the pump** while the pump and the pipes connected to the pump are under pressure.

►When works on the pump are completed, put all the previously removed safety guards back in **their** places.

►**Never run the** pump in reverse direction.

►Do not place hands or fingers into the holes or cavities of the pump.

►Do not **walk** on the pump and/or pipes connected to the pump.

1. GENERAL DESCRIPTION OF THE PUMP

1.1- Description of the Pump

- **DMVP** series pumps are centrifugal pumps with vertical shaft, radial split body, multistage, closed impeller and diffuser.

1.2 Application Areas

DMVP series pumps are suitable for pumping clean or slightly polluted (max. 20 mg/dm3) liquids with low viscosity and fluid temperature up to 120°C. Among others, the main application areas are:

- Water supply, irrigation and sprinkler systems,
- Pressurized water supply and booster systems,
- Boiler feeding and condensate,
- Heating and ventilation systems,
- Industrial applications,
- Fire extinguishing systems,
- Power stations.

1.3 Nomenclature of the Pump

DMVP XX-XX

- XX → Number of pump stages
- XX → TYPE OF PUMP

Speed	: up to 3600 rpm.
Compression Flange	: DN 32 ..... DN 65 mm
Suction Flanges	: TS ISO 7005-2/PN 16
Compression Flanges	: TS ISO 7005-2/PN 40
Operating Temperature	: -10°C to 120°C
Ambient Temperature (max.)	: 40°C
Body Pressure (max.)	: 30 bar (40 bar)
Pumpable Liquids	: See Section 1.2
Insulation Class	: F
Protection Class	: IP 55
Electrical Connection	: 3 Faz / 400V - 50 Hz
Engine Options (optional)	: Special Voltage, Frequency and Exproof

2. MECHANICAL INSTALLATION

2.1 Preparations Before Installation

- The Contractor must inspect whole equipment upon delivery and ensure that it is stored in such a way that it is not subject to corrosion and damage.
- If the equipment shall be operated after 6 months, it may be necessary to apply an anti - corrosive agent to the internal parts of the pump.

ATTENTION Make sure that the substance used will not affect the contacted rubber parts.

ATTENTION Make sure the item can be easily removed

- Do not allow water, dust, etc. to enter into the pump. All openings must be closed until pipes are inserted to prevent foreign particles penetration. The cost of disassembling and reassembling a pump due to a foreign particles can be very high.
- Mechanical seals are precision components. If the mechanical seal of a newly installed pump fails, this is normal for the first few hours of operation. The main cause of such a malfunction is incorrect packing and/or incorrect handling of the pump during installation.

CAUTION During transportation, the pump must be securely fastened to prevent excessive vibration and/or shaft seal damage from falling or impact. The pump must not be removed from the shaft.

2.2 Pump Position

- The pump should be placed in a well-ventilated but frost-free location

When pumping hot liquids, precautions should be taken to prevent people from accidentally contact with the hot surface.

- There must be a suitable opening/hole through which the pump or motor can be removed for inspection and repair.

2.3 Pump Installation

- Pumps with motors up to this capacity, including 4 kW, need a clearance of 300 mm above the motor.
- Pumps with motors of 5.5 kW and above need a clearance of at least 1 meter above the motor to allow the use of lifting equipment. (Figure 1)
- Careful attention should be paid to the preparation of the pump foundation and the assembly of the pump group. Incorrect and careless assembly causes premature wear of pump parts and pump failures.
- The pump foundation must be heavy enough to absorb vibrations and strong enough to prevent bending and misalignment. Prior to the installation of the pump, the base mass concrete must have completely solidified and gained resistance (completed its setting time). The concrete surface must be completely horizontal and very smooth.

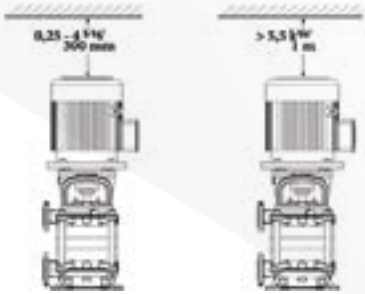


Figure 1
Figure 1. Opening above the engine

2.4 Installation of Centrifugal Vertical Pumps without Base Frame

ATTENTION

Infrastructure/installation must be carried out in accordance with the instructions given below. Incompatibility may result in functional faults which will cause damage to the pump's components!

We recommend mounting the pump on a permanent and rigid heavy concrete foundation supporting the entire pump. The infrastructure must be capable of absorbing any jolt, normal strain or impact. Estimated, the weight of the concrete substructure should be approximately 1.5 times the weight of the pump. The concrete substructure must be completely flat and level with the surface.

Place and connect the pump to the infrastructure. (Figure 2)

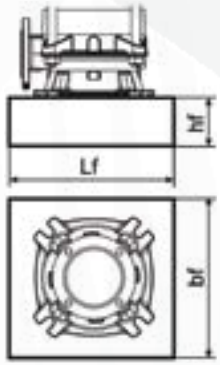


Figure 2

The length and width of the foundation should always be 200 mm greater than the length and width of the pump. The volume of the foundation should be at least 1.5 times the total pump volume. The minimum height (hf) of the foundation can then be calculated:

$$h_f = \frac{m_{pompa} \times 1{,}5}{L_f \times B_f \times \delta_{konsantre}}$$

The density (**δ**) of concrete is generally taken as 2,200 kg/m³. In installations where noise-free operation is particularly important, a substructure with a volume of up to 5 times greater than the pump volume is recommended.

2.5 Installation of DMVP Pumps with Base Frame

This section only applies to 50 Hz pumps as the base frame is not supplied for 60 Hz pumps. We recommend installing the pump on a rigid concrete flat foundation that provides permanent support for the entire pump. The infrastructure must be capable of absorbing any jolt, normal strain or impact. The weight of the concrete substructure should be approximately 1.5 times greater than the weight of the pump.

On all four sides, the substructure must be 100 mm larger than the base frame. (Figure 3)

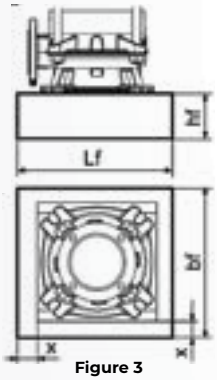


Figure 3
Infrastructure, X= min. 100mm

$$h_f = \frac{m_{pompa} \times 1{,}5}{L_f \times B_f \times \delta_{konsantre}}$$

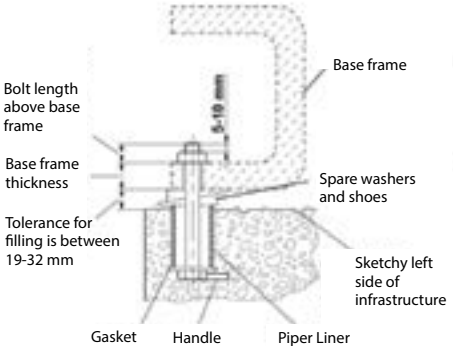
2.6 Placing of concrete for Infrastructure

We recommend to implement the procedure below to ensure a good infrastructure.

1. Use proven, non-shrinking concrete. (Contact your concrete supplier for advice.) Pour concrete to the infrastructure without stopping, not exceeding the final level by 19-32 mm. Use vibrators to spread the concrete evenly.

2. Before the concrete sets, the top surface must be smoothed and grooves must be made. This creates a connecting surface with the filler. Substructure bolts embedded in concrete. Leave enough bolt length to reach the padding, washers, sub-base frame, nuts and gaskets.

3. Allow the base frame to solidify for a few days before placing and leveling the base frame.



3. UNPACKING AND HANDLING/ TRANSPORTATION

3.1 Unpacking

- Check the packaging for damages during transportation.
- Carefully remove the packaged pump and accessories (if any). Check if they are damaged during transportation.
- If there is any damage during transportation, immediately notify DUYAR PUMP SERVICE DEPARTMENT and TRANSPORT COMPANY.
- Check if all materials in the shipping list have been sent. If there is any missing material, notify the DUYAR PUMP SERVICE DEPARTMENT immediately.

3.2 Transportation

3.2.1 General Warnings

- Strictly follow the rules in the workplace in order not to cause accidents.
- Wear gloves, hard-toed shoes, and a helmet during transport work.
- Depending on its volume, weight, and construction, forklifts, cranes or hoists can be used to lower wooden cases, packages, pallets, or boxes.

3.2.2 Uninstallation

- **Before lifting and transporting the pump and motor group on the pump or common chassis, determine the following points**

CAUTION

- ► Total weight and center of gravity,
- ► Largest external dimensions
- ► Locations of lifting points

- The load lifting capacity must be suitable for the weight of the pump or pump group.
- The pump or pump assembly should always be lifted and transported in a horizontal position.
- Never stand under or near the lifted load.
- The load should not be kept lifted for longer than required.
- Acceleration and braking operations during lifting must be done in a way that does not pose a danger to the working elements.

In order not to cause deformation of the pump or pump unit, it should be lifted as shown in Figure 3.2.2 A or Figure 3.2.2 B. (The motor mount ring should never be used when lifting the entire group).

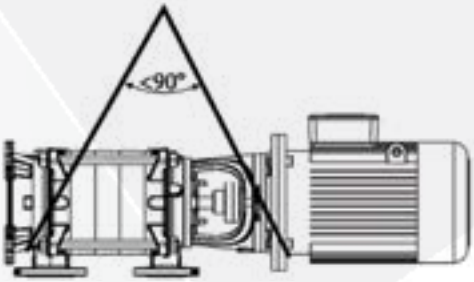


Figure 3.2.2 A
Monoblock Pump

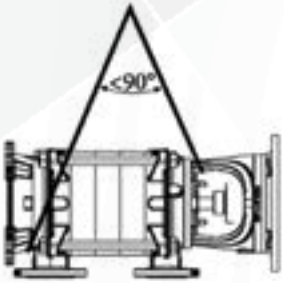


Figure 3.2.2 B
Bare pump

4. ON-SITE INSTALLATION

CAUTION On-site assembly should be done in accordance with the EN 60204 Standard

- Only qualified personnel should assemble, balance, and adjust the pump.
- Incorrect installation may cause malfunctions. These situations are not covered by the warranty.

4.1 Bare Pump

- If the pump is supplied without a motor, the appropriate motor must be selected before assembling the group.
- The following points must be taken into account during motor selection:

  - ► Maximum power consumed by the pump in the entire operating range,
  - ► Operating speed of the pump,
  - ► A current power source (frequency, voltage etc.),
  - ► Engine type (TEFC, Ex-proof etc.),
  - ► Motor connection _ _ shape (footed, flanged, horizontal vertical, etc.).

4.2 Installation of Piping

4.2.1 General

- Never use the pump as a support point or carrier for piping.
- Install the piping in such a way as to avoid airlocks, especially on the suction side of the pump. (Figure 4)

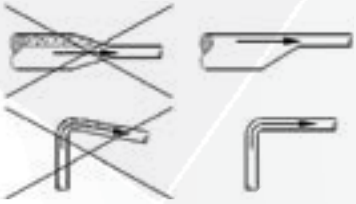


Figure 4

- The piping system must be maintained/supported close to the pump. (Figure 4.2.A, 4.2.B) Check that the stresses and compressions in the piping system and the weight of the system do not affect the operation of the pump. To do this, after completing the installation of the piping equipment, loosen the bolts of the suction and discharge flanges of the pump and check whether the pipe system exerts stress on the pump.

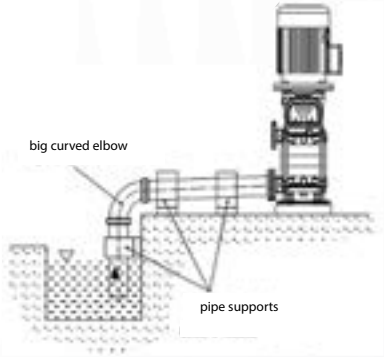


Figure 4.2. A
Suction Depth

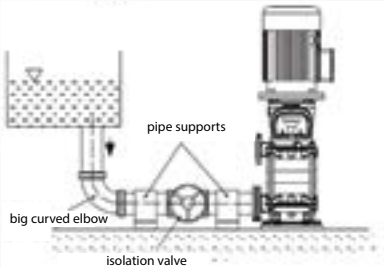


Figure 4.2. B
Suction Height

- The nominal diameters of the suction and discharge flanges of the pump shall not be indicators of the correct size of the suction and delivery pipes. The nominal diameter of the pipes and accessories used must be at least equal to or larger than the pump mouth diameters. Pipes and accessories smaller than the diameter of the pump mouth should never be used. Especially the ones with a large free passage area should be preferred for the elements such as foot flap, strainer, strainer filter, and check valve. Generally, flow rates should not exceed 2m/s in the suction pipe and 3m/s in the delivery pipe. High speeds cause high-pressure drops, which cause cavitation conditions in the suction pipes and excessive friction losses in the delivery pipes.
- Pipe connections must be made with flanges.
- Flange gaskets must be of suitable material and must be of appropriate size. Flange gaskets should be centered between flange bolts in such a way that they do not disrupt the flow section
- In systems operating with excessive vibrations and hot liquids, expansion parts (compensators) should be used that will not transfer the additional forces that may arise from thermal expansions to the pump.
- Substances such as welding burrs, metal particles, sand, and lint that may occur during the manufacture of the pipe hardware may remain in the pipe and damage the pump. In order to prevent such substances from entering the pump during assembly operations, the suction and discharge flanges must be closed with non-perforated gaskets. At the end of the assembly, all pipe parts must be disassembled, cleaned, and reassembled after painting. If a strainer is used on the suction side of the pump, the strainer should be cleaned after the first few days of operation.

4.2.2 Suction Pipe (Fig. 4.2. AB / Fig. 4.2.2 AB)

- The suction pipe must be absolutely leak-proof and must not be arranged in such a way as to cause the formation of air pockets. So, if the pump is fed from a tank higher than itself (suction height/supply installation), the suction pipe should have a slightly descending slope towards the pump, and if the pump is fed from a lower tank (suction depth installation), the suction pipe should have a slightly increasing slope towards the pump.
- In order to keep pipe friction losses as small as possible, sharp bends should not be used, sudden changes in direction and cross-section should be avoided, and the suction pipe should be made as short as possible. If it is necessary to make a cross-section change in a horizontal suction pipe, an eccentric conical spacer with a straight edge at the top should be used.
- If the pump is supplied from a higher tank, there must be an isolation valve in the suction pipe with its axis in the horizontal position. This valve should always be fully open while the pump is running and should never be used as a flow control valve.

CAUTION Turn the valve down may cause cavitation of the pump

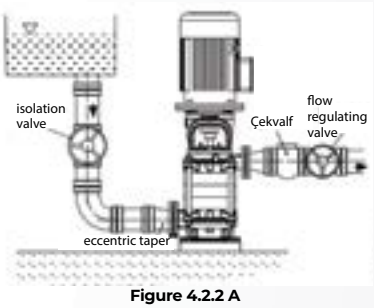


Figure 4.2.2 A
Suction Height

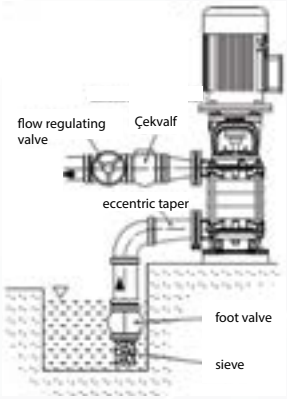


Figure 4.2.2 B
Suction Depth

4.2.3 Delivery pipe (Fig. 4.2.2 A / 4.2.2 B)

- In order to adjust the flow and head, a control valve should be connected to the Delivery pipe as close as possible to the pump. The check valve should be connected on the delivery pipe between the pump and the isolation valve in order to protect the pump against water hammers during standstill and to prevent reverse flow.

4.2.4 Auxiliary Pipe Connections and Accessories

- Depending on the application, auxiliary piping connections (seal/gasket cooling, seal irrigation, seal washing, drainage, etc. required for pump system operation) and/or connection of measuring devices (pressure gauge, temperature gauge) can be used to control working conditions.
- Pressure gauges or vacuum gauges must be connected and securely fastened to the measuring points on the pump flanges or on pipes in close proximity to spiral pipe flanges with a diameter of approximately 8 mm to prevent pressure fluctuations. In order to ensure the safety of the devices, vent valves should be used to avoid isolation and incorrect measurements. (Fig. 4.2.4 A)
- There are connection points in the suction body of each pump to discharge the pump and to remove the seal leaks in the bearing. (Figure 4.2.4 B) If desired, these connections can be connected to a discharge tank. The pipe used to drain the pump must be equipped with a shut-off valve, and both valve and pipe must be rated for the pump's maximum working pressure.
- Auxiliary piping connections must be properly connected to their designated locations. (Fig. 4.2.4 B)

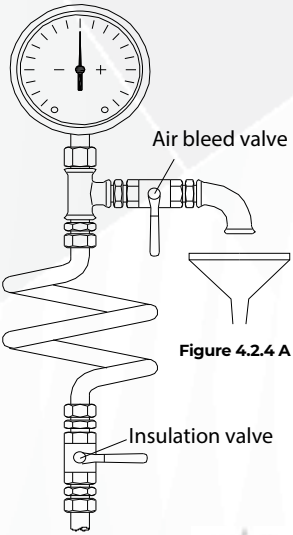


Figure 4.2.4 A

d1 Mechanical seal flushing inlet

d2 Packing leak drain

d3 Discharge

d4 Pressure gauge (Pressure)

d5 Pressure gauge (Suction)

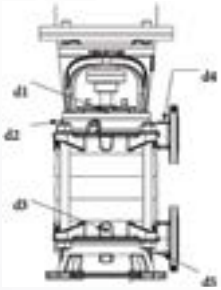


Figure 4.2.4 B

4.3 Minimum Flow

CAUTION

If the pump is likely to operate with the discharge valve completely (i.e. at zero flow) or almost closed (i.e. at very very small flow), a minimum flow valve (by-pass valve) should be used on the outlet flange of the pump or on the delivery pipe immediately after the pump but before the control valve. If such a valve is not used and the pump works with a closed valve for a long time, almost all of the power given by the motor is converted into heat energy and passes into the pumped liquid. This can lead to overheating of the pump and, consequently, to serious malfunctions.

4.4 Electrical Connections

CAUTION

- Electric motors must be manufactured in accordance with EN 60034-1.
- The protection class of the casings of the motor bodies and control systems in the pump group must comply with at least EN 60529 IP 22. However, operating and environmental conditions must be taken into account in determining the protection class of the electric motors or control systems in the pump group.

- Electrical connections should only be made by authorized electricians. The applicable national regulations and the engine manufacturer's instructions must be followed.
- The safety precautions given in the "Safety Instructions" section should be followed.
- All power connections must be disconnected before starting any work.
- Energy cables must be laid in such a way that they do not touch the piping, pump, and motor bodies.
- Check the voltage, phase, and frequency values given on the motor nameplate by comparing them with the network values.
- Electric motors must be protected against overload by circuit breakers and/or fuses. Circuit breakers and fuses should be selected in accordance with the full load current given on the motor nameplate.
- PTC (passive in the engine) thermal control-thermistor) is recommended, but its use is up to the customer's discretion. If PTC is used, its terminals must be connected to the motor terminal box and these must be connected to the thermistor relay in the control panel.
- Before making the electrical connections of the motor, the pump shaft should be rotated by hand to check whether the pump rotor rotates freely.
- Electrical connections should be made in accordance with local electrical codes and motor grounding connections should never be forgotten
- The motor wiring diagram is in the motor terminal box or in the manual.
- The electrical connection type of the motor varies according to the motor power, power source, and connection type. The required connection shapes of the jumpers in the terminal box are given in Table 1 and Figure 4.4 A, 4.4 B, 4.4 C.

Way of stating	Engine Power PN ≤4 kW	Engine Power PN >4 kW
	Power Supply 3 ~ 400V	Power Supply 3 ~ 400V
Direct	Y – connection **(10a)**	– Connection **(10b)**
Y/Δ - start	Impossible	Remove bridges **(10c)**

Table 1

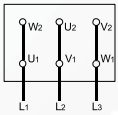


Figure 4.4 A
Δ-link

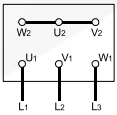


Figure 4.4 B
Y-joint

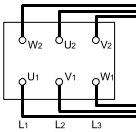


Figure 4.4 C
Y / Δ-connection

ATTENTION The transition time from star to delta must be very short in Star / Delta connection motors.

Long transit time may cause damage to the pump (Table 2).

Motor power	Y-Setting Time
≤30 kW	<3 seconds
>30 kW	>5 seconds

Tablo 2

4.5 Final Checks

- After all the above steps have been completed, the pump rotor should be rotated by hand several times to ensure that it rotates freely.
- All safety guards must be fitted

The pump should never be started before the safety guards are reinstalled. This is a safety and occupational safety rule that must be strictly followed

5. STARTING / STOP

5.1 Preparation

5.1.1 Oil Control

- The rolling bearings of the motor do not require any maintenance as they are of the "lifetime grease-lubricated" type.
- The bearings of the pumps lubricated with grease are shipped from the factory filled with grease enough to last at least one year. Before starting the pump for the first time, it should be checked whether dirt enters the pump bearings during transportation and assembly. If the bearings are dirty, they should be thoroughly cleaned and freshly greased.
- If the pump has been waiting for a long time (more than 6 months) before installation, new grease must be applied to the bearings.
- The bearings of the pumps lubricated with oil are shipped without oil and this is indicated by a warning label. This type of pump bearings must be filled with oil up to the gauge level.
- See Chapter 6 on lubrication.

5.1.2 Seal/Gasket Checking (See Section 7.4)

5.1.3 Deflation and Impregnation of Pump

- Make sure the pump and suction pipe are completely filled with water. This issue is not a problem for forced-fed pumps. If so, the suction valve shall be opened, the air plugs shall be loosened, the air shall be discharged and finally the pump is completely filled.
- If there is a foot valve in deep suction pumps, the pump is filled with water from the filling hole at its highest point and its air is taken.
- If the system has a vacuum pump, it is ensured that the water rises in the suction pipe and fills the pump with a vacuum pump. When the water reaches the highest level, the pump shall be started.

CAUTION Never let the pump run dry.

5.1.4 Direction of Rotation Control

- entrifugal Vertical series pumps rotate clockwise when viewed from the upper side of the motor (motor fan side). This direction of rotation is indicated by an arrow on the pump. The pump should be started for a very short time and then stopped immediately to check that it rotates in the direction of the arrow.

5.2 Starting the Pump

- Check that the suction valve is open and the discharge valve is closed.
- Turn on the switch and start the engine
- Wait for the motor to reach full speed.
- Open the discharge valve slowly by observing the ammeter on the panel (Do not open the valve completely if the Delivery pipe is empty at the first start, open it in a controlled manner so that the value in the ammeter is below the nominal current value of the motor).
- After fully opening the valve, check whether the value read on the manometer is the value at the operating point. If the value on the manometer is less than the value at the operating point, turn the valve down to the value at the operating point. If you read a larger value on the manometer, recheck your installation and especially your static height.

ATTENTION

If any of the following problems are observed while the pump is running at its nominal speed, the pump must be stopped immediately and the problem must be corrected:

- ▶ The pump does not press any water,
- ▶ The pump is not pumping enough water,
- ▶ Flow rate is decreasing,
- ▶ The discharge pressure is not sufficient
- ▶ The motor is overloaded,
- ▶ There is vibration in the pump,
- ▶ Pump too loud working,
- ▶ The beds are excessive it is warming up.

5.3 Stopping the Pump

- Close the discharge valve slowly.
- If there is a water hammer prevention device in the discharge line or if the impact is not dangerous, you can stop the pump without closing the discharge valve.
- Stop the engine. Observe that the pump group is standing smoothly and calmly
- If the packing is externally supplied, turn it off to relieve the pressure in the gasket box.
- If the pump will be out of service for a long time, close the suction valve and auxiliary circuits, if any. If there is a danger of frost and/or if the pump will not be used for a long time, completely empty the water in the pump by opening the drain plugs or take the necessary precautions against the danger of frost.

5.4 Checks During Operation

- The pump should run smoothly, quietly, and without vibration.
- The pump should never be allowed to run without water.
- The pump should never be operated in a closed valve position (zero flow) for a long time.
- Bearing temperatures should never rise more than 50°C above ambient temperature. But it should never exceed 80°C.
- Water must flow drop by drop from the glands of pumps with soft packing. If the amount of water flowing from the shaft seal has increased after a long period of operation, tighten the gland nuts reciprocally and lightly to reduce the leakage to the drip level. Manually check if the gasket box is overheating. If the nuts have reached the end, remove all the old packing rings, clean the gasket box thoroughly and install new packing rings.
- Make sure that the rings are of appropriate size and length and that the joints are offset from each other
- If the pump is mechanically sealed, no maintenance is required. A very small amount of water may also come from the mechanical seal. Leaking water is so small that it is not noticeable. Excessive water coming from the mechanical seal indicates that the seal surfaces are worn and need to be renewed.

ATTENTION

The life of the mechanical seal largely depends on the cleanliness of the pumped water. "NEVER ALLOW MECHANICAL SEAL TO RUN DRY"

- Check the motor current from time to time. If the amperage is higher than usual, the pump may jam or rub. Immediately stop the pump and make the necessary mechanical and electrical checks.
- Keep spare pumps ready for service by running them for a short time at least once a week. Check the ancillary systems of these pumps, if any.

6. LUBRICATION

- The plain bearing in the suction body shall be lubricated by the fluid being pumped. All bearings are maintenance-free, as the motor bearings are also of the "lifetime grease-lubricated" type.

7. DISASSEMBLY, REPAIR and ASSEMBLY

Before starting work on the pump, always disconnect the electrical connections and be sure to take the necessary precautions to prevent accidental start-up.

NOTE

●Strictly follow the instructions given in the "Safety Instructions" section.

7.1 Disassembly of the Pump (Disassembly)

- Close the isolation valves in the suction and discharge lines.
- Remove other safety guards (See Section 14 for guards).
- Remove the coupling bolts. (-32521)
- Separate the electric motor from the motor carrier (-01150-300 or -01150-350).
- Remove the bolts of the pump's suction, discharge flanges and pump feet. Disconnect the pump from the installation.

NOTE

Before starting to disassemble the pump, mark the suction, discharge, and stage bodies and mark their corresponding places for convenience during assembly.

- Place the pump vertically on the ground from the motor carrier (-01150-300 or -01150-350).
- Remove the pump foot (-30160) from the suction body (-11101).
- Remove the lower bearing cover (-28142).
- Unscrew the nuts (-06530) of the body studs and remove the body studs (-05200).
- Take the suction body (-11101).
- Unscrew the lock nuts on the shaft (-15540)
- Take the impellers (-22230), the diffusers (-09121) together with the stage bodies (-23110), the final stage diffuser (-21120), and the impeller wedges (-23592/- 24591) in order.
- Lay the pump on the pressing body (-25100) to remove the remaining parts.
- Remove the mechanical irrigation pipe (-36650).
- Separate the motor carrier (-01150) from the pressing body (-25100).
- For pumps with a mechanical seal, first, remove and separate the mechanical seal cover (-55131) from the pressing body (-25100).
- Remove the shaft and shaft assembly by pulling it over the press body.

7.2 Removing the Shaft Assembly

- Remove the coupling (Pump side) (-21251) grub screws on the shaft. (-29600).
- Take the coupling crescents by pulling the coupling (Pump side) (-21251) downwards on the shaft. (-18280)
- Remove the coupling (Pump side) (-21251) from the shaft using a puller.
- Remove the mechanical cover from the shaft. (-55131)
- Remove the mechanical seal rotating element from the shaft. (-13510)
- Remove the mechanical pressure bush. (-27181)
- Remove the shaft bushing (-26182) and the crescent bushing (-18280).

7.3 Installation of the Pump

Assembly is done in reverse order of disassembly given in Sections 7.1 and 7.2. The attached montage section pictures will help you in this regard.

- Clean all parts, and replace damaged or worn parts.
- Before starting the assembly, apply graphite, silicone, or similar slippery substance to the contact surfaces and screw surfaces. If you cannot find these items, you can use oil (except for drinking water pumps).

CAUTION

Do not reuse the gaskets you removed. Make sure that the new gaskets and O-rings are the same size as the ones removed.

- Perform assembly in reverse order of disassembly.

7.4. Packings

7.4.1 Soft Packed Pumps

- Before starting the soft packing change, thoroughly clean the gasket box, gland, and shaft bushings.
- Cut a sufficient number of pieces of appropriate size from the appropriately sized packing diagonally, wrap it on the shaft bush and see that the ends are fully closed.
- Place the first ring with the joint on top and drive it into the gasket box with the help of a glen.
- Place the second ring with the seam side down this time. Thus, install all the packing rings. If there is a water ring in between, replace it as well.
- Insert the glen and tighten it completely first. Thus, the packing takes the shape of the gasket box.
- Then loosen the glen. Tighten the shaft slightly by turning it and stopping the tightening as soon as the shaft brakes slightly.
- After starting the pump, water should come from the packings drop by drop. The amount of water should not be less than 10 cm3/ min and not more than 20 cm3/ min. Find the appropriate setting by slightly tightening or loosening the glen nuts from each other.
- Check if the temperature of the packing does not increase excessively during the two hours after making the Glen adjustment. The sealing temperature should not exceed 80°C for a pump that delivers ambient temperature water.

7.4.2 Pumps with mechanical seal

- No visible leakage will occur in a properly functioning mechanical seal. Generally, mechanical seals are maintenance-free unless there is a visible leak. However, it is necessary to regularly check the tightness of mechanical seals.
- For pumps using mechanical seals, follow the mechanical seal manufacturers' instructions and never run the mechanical seal dry.
- Soft and mechanical seal dimensions used in centrifugal vertical type pumps are given in (Table 3).

Pump Type	Mechanical Seal Diameter (Ø)
DMVP ATOM	12
DMVP 8	16
DMVP 10	16
DMVP 16	16
DMVP 32	16

Table 3

8. SPARE PARTS

- DUYAR PUMP and HIDROFOR SİSTEMLERİ guarantee to supply spare parts of TH-type pumps for ten years from the date of manufacture. So you can always easily get the spare parts you need.
- When ordering spare parts, inform us of the values below written on your pump's label.

Pump type and size : (DMVP .../...)
Engine power and speed : (..... kW d/dak.)
Year of manufacture and serial No. : ( )
Flow rate and manometric height : (..... m^3/h m)

- If you want to keep spare parts in your warehouse, we recommend the quantities given in Table 4 for two operating years, depending on the number of pumps of the same size.

Track name	Number of Pumps in the System						
	2	3	4	5	6-7	8-9	10+
Shaft (Including Keys)	1	1	2	2	2	3	30 %
Wheel	1xn(*)	1xn	1xn	2xn	2xn	3xn	30 %
Body O-Rings	n+1	n+1	n+1	2n+1	2n+1	3n+1	150 %
Y. Packing (set)	2	2	3	3	3	4	40 %
Mechanical Seal	2	2	3	3	3	4	40 %
Shaft Bushing	2	2	2	3	3	4	50 %

Table 4

9. PUMP ASSEMBLY PICTURE (sectional view)

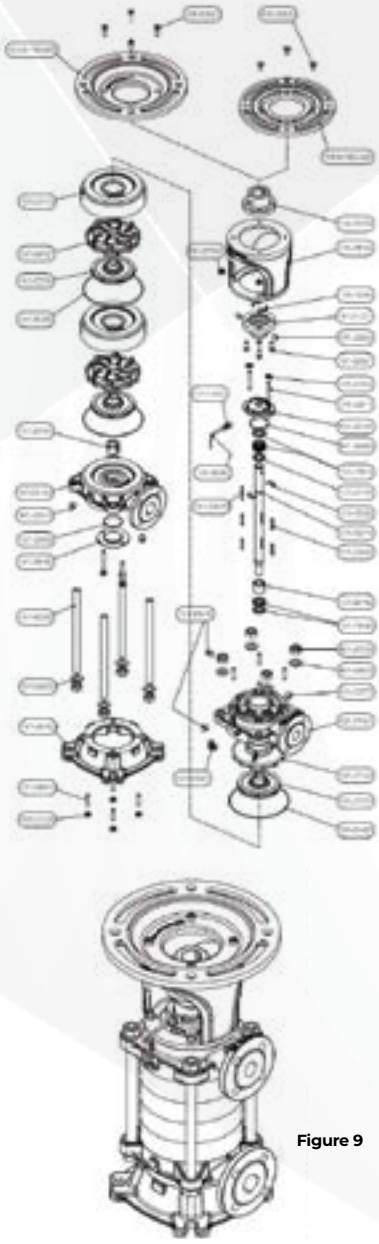


Figure 9

10. FAULTS, CAUSES, AND CORRECTION

In this section, malfunctions that may occur in DMVP type pumps during operation, possible causes (Table 5), and correction methods are given (Table 6 A - Table 6 B).

ATTENTION **Before starting the troubleshooting process, check the accuracy of all measuring instruments used by you.**

Faults	Possible Causes
The pump that is started is not flooding at all	1-5-7-8-9-11
Flow rate decreases or no water is pumped	2-3-12
Engine overloading	10-15-16
Beds are overheating	17
There is vibration in the pump	13-14
The noise level is high	4-6-18

Table 5

	Possible Causes	Solution Methods
1	There may be air in the pump and/or suction line.	Fill the pump and suction pipe completely with liquid and repeat the starting procedure.
2	Air is sucked from the packing, suction pipe, or connections. The pump sucks liquid mixed with air.	Check all connections on the suction pipe. Check the packing, if necessary, feed the packing with pressurized liquid. Check the immersion depth of the suction pipe or the foot valve and increase the immersion depth if necessary.
3	Air pocket in the intake pipe.	Check the slope of the suction line and whether there are parts suitable for the formation of air pockets, make the necessary corrections if any.
4	There is air in the liquid.	Since the immersion depth of the suction pipe is not sufficient, eddies are formed and therefore air is sucked. Check the liquid level in the suction tank or increase the immersion depth of the suction pipe/foot valve.
5	Suction depth too large.	If there are no obstructions in the suction, check the friction losses of the suction line, if necessary, use a larger diameter suction pipe. If the static suction depth is too great, either the liquid level in the suction tank must be increased or the pump must be lowered to a lower level.
6	The pump works with cavitation.	The facility's NPSH is too low. Check the liquid level in the suction tank. Check for excessive friction losses in the suction line. Check whether the isolation valve in the suction line is fully open. If necessary, increase the load on the suction of the pump by lowering the pump to a lower level.
7	The head of the pump is insufficient.	The actual head of the plant is higher than given. Check the total static height and friction losses of the Delivery pipe. Using a larger diameter pipe may be the solution. Check whether the valves are fully open.
8	Pump reverses.	Check whether the direction of rotation of the motor corresponds to the direction of rotation given on the pump body or on the label.

Table 6 A

10. FAULTS, CAUSES AND CORRECTION

In this section, malfunctions that may occur in DMVP type pumps during operation, possible causes (Table 5) and correction methods are given (Table 6 A - Table 6 B).

CAUTION **Before starting the troubleshooting process, check the accuracy of all measuring instruments you use.**

Faults	Possible Causes
The pump that is started is not flooding at all	1-5-7-8-9-11
Flow rate decreases or no water is pumped	2-3-12
Engine overloading	10-15-16
Beds are overheating	17
There is vibration in the pump	13-14
The noise level is high	4-6-18

Table 5

Possible Causes		Solution Methods
9	Speed is low.	Check the voltage and frequency of the mains or whether there is a phase deficiency in the motor. (Service!)
10	Impeller, check valve, or strainer clogged.	If possible, reduce the pump speed or turn the impeller diameter in accordance with the manufacturer's recommendation. (Service!)
11	Çark, çek valf veya süzgeç tıkalı.	Clean the impeller, check-valve, or strainer. (Service!)
12	Impeller or strainer partially clogged.	Clean the impeller or strainer. (Service!)
13	Impeller partially clogged.	Clean the impeller. (Service!)
14	Worn or defective impeller.	Change the impeller. (Service!)
15	Mechanical friction in the pump.	Check for any obstructions or bends in the pump rotor. (Service!)
16	Soft packings/gaskets are over-tightened.	Loosen the packing pressure bush.
17	The flow is less than the minimum required flow of the pump.	Increase the flow. Use bypass valve or line if necessary. (Service!)
18	The pump is operating outside the operating zone.	Check the values of the operating point.
19	The density or viscosity of the pumped liquid is more than given.	Use bigger powerful engine.
20	Engine error.	Check the engine. Check the suitability of the engine due to ventilation. (Service!)

Table 6 B

11. TIGHTENING TORQUE

Screw Diamete	Maximum Tightening Torque (Nm)	
	Qality Class	
	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

Table 7

12. EXPECTED NOISE LEVELS

Engine Power-P_N (kW)	Sound Pressure Level (dB)* (Pump and Motor)	
	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
110	86	95
132	86	95
160	86	96

Table 8

- Values were measured at a distance of 1 m from the pump, in the free field above the sound reflecting surface, without a sound barrier.
- These values are valid if the pump is operating at the ordered operating value and without cavitation.
- If the pump is operating at 60 Hz, the values in the table are 1800 rpm shall be for 1 dB, 3600 rpm. increase by 2 dB.

13. PERMITTED FORCES AND MOMENTS ON PUMP FLANGES

SD	Suction Flange	Compression Flange	Forces		Moments
			FV (N)	FH (N)	Mτ (Nm)
32	40	32	2380	1560	405
40	50	40	2540	1700	460
50	65	50	2620	1785	550
65	80	65	2680	1995	685

Table 9

The following relation should be provided;

$$\Sigma(F_{...}) \quad \Sigma(F_{...}) \quad \Sigma(M_{...})$$

Here, **Σ** (FV), **Σ** (FH) and **Σ** (Mτ) are the sum of the absolute values of the forces and moments applied to the pump flanges.

It is not necessary to take into account the direction of the forces and their distribution on the flanges

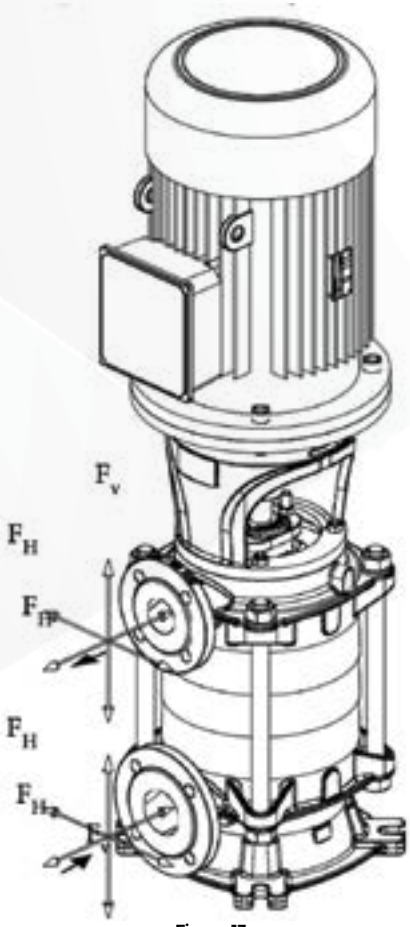


Figure 13

14. SAFETY GUARDS

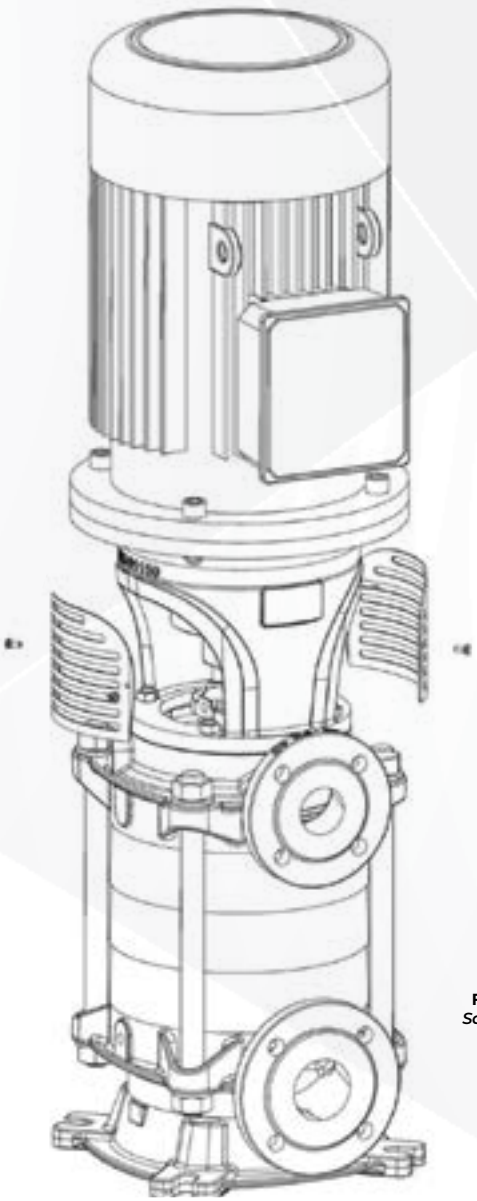


Figure 14
Safety case

NOTE All cases/enclosures conform to EN 294.

15. BOILER GENERAL INSTALLATION SCHEME

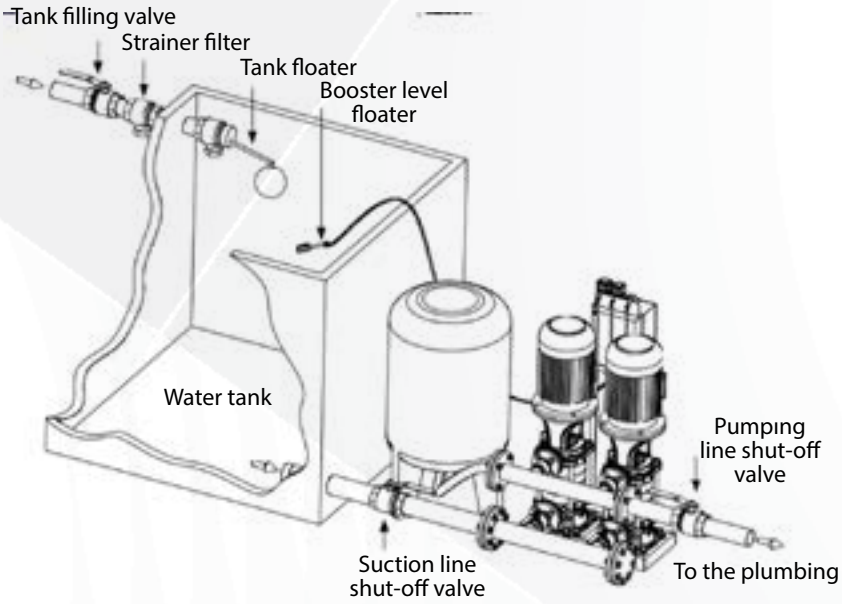


Figure 15

Hydrophore Installation and Usage Instruction

- Install the booster near the water tank.
- Take the necessary precautions to prevent the booster from freezing in cold weather.
- Place the booster away from harmful gases. (Flare, explosion, corrosion, etc.)
- Place the booster so that it does not disturb people in terms of noise.
- Install the booster suction manifold so that it is not higher than the bottom level of the tank.
- Use separate suction pipes and flaps for each pump in suction boosters.
- Make the booster room in a closed, moisture-free and ventilated condition..
- The suction pipe coming from the tank should not be smaller than the diameter of the booster suction collector.
- The booster suction must be connected to the water tank with a valve.
- The water tank filling line should be installed at the distance from the far corner of the booster suction port.
- The booster outlet must be connected to the installation with a valve.
- The strainer filter must be connected to the water tank filling.
- Electric cables must be connected to the panel. In three-phase networks, if the pumps are not working, two of the phase connections must be changed.
- Before the pumps are started, they must be vented.
- The system works fully automatically and supplies water to the installation according to the need.

16. GENERAL INSTALLATION DIAGRAM

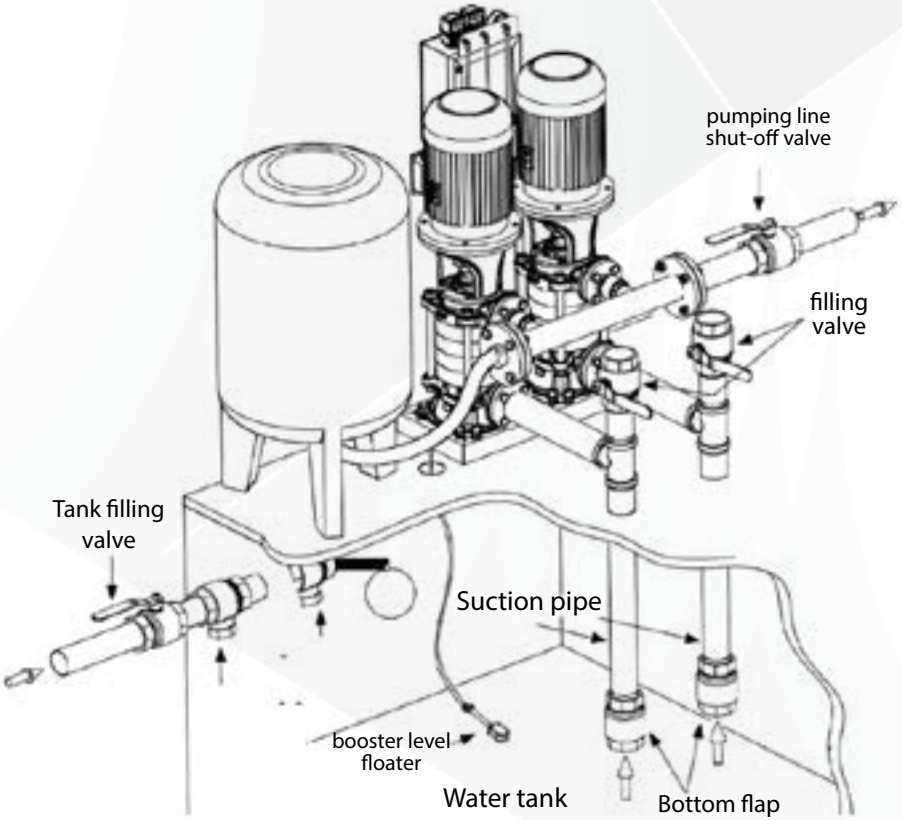


Figure 16

NOTES

STAINLESS
BOOSTER

FIRE
BOOSTER

DMVP VERTICAL SHAFT STEERING BOOSTERS

VERTICAL SHAFT, RADIAL DETACHABLE BODY, CLOSED WHEEL, MULTI-STAGE, DIFFUSER CENTRIFUGAL PUMPS

DUYAR

More Details

DUYAR

WE ARE **SENSIBLE** TO LIVE

+90 (216) 365 70 95

www.duyarpompa.com

Dudullu OSB İMES-101. Sok. No:13
Ümraniye/İstanbul Türkiye