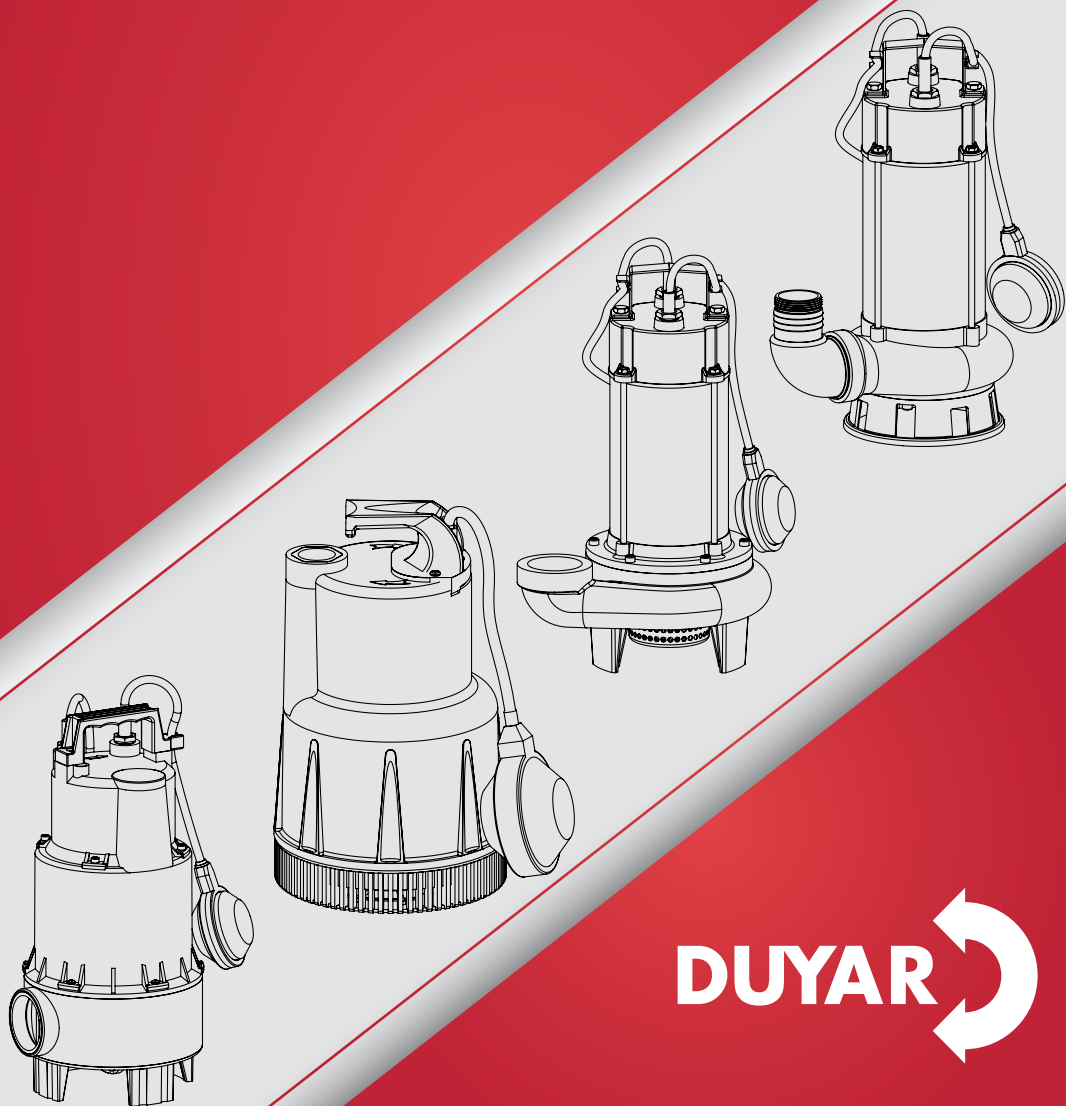


# DWWP

## WASTE WATER PUMPS

INSTALLATION, OPERATION, MAINTENANCE and  
REPAIR GUIDE



**DUYAR** 



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### 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



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

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 PUMP. DUYAR PUMP 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** 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 personnel.
- 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

### 1.1 Description of the Pump

- The monoblock pumps suitable for underwater operation.

### 1.2 Application Areas

Depending on the hydraulic field, the pump is used to deliver the following fluids

- Domestic wastewater
- Muddy and dirty water
- Industrial wastewater
- Rainwater
- Groundwater

### 1.3 Nomenclature of the Pump

Pump Type : DWWP

Impeller Type	: C
Compression Diameter :	50
Impeller Diameter	: 160
Engine Power	: 2,2 kW
Three-phase	: T

### 1.4 Pump Labeling

- Pump information is indicated.

		TIP: DWWP D 10-0.65 KW M	
		IMAL YIL:	2021
NO:		10130112021W	
0.65 KW	0.85 HP	4.3A	220 V (1~)
50 Hz	20 µf / 450 V	cos φ 0.88	5 m
IP 68	isol G=F	2900 d/dk	t <sub>max</sub> 35 °C
H <sub>max</sub> 11 m	Q 84 + 147 l/min	H 9 + 3 m	
		Made in Turkey	12 KG
Cubuklu O18-IMES A Blok 100 SR. No:53 Ömerliye/İSTANBUL Tel: 0216 365 70 95			

The useful life of this product as determined and announced by the Ministry is 10 years.

## 2. UNPACKING, HANDLING AND STORAGE

### 2.1 Unpacking

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

### 2.2 Transport

#### 2.2.1 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.

#### 2.2.2 Lifting operations

- Before lifting and transporting the pump and motor group on the pump or common chassis, determine the following points:
  - ▶ 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 vertical position.
- Never stand under or near the lifted load
- The load should not be kept lifted for longer than required.

TRUE

Wrong

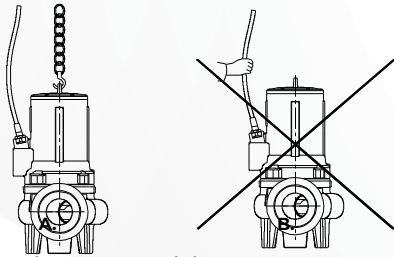


Figure 1. Proper Lifting of the Pump

### 2.3 Storage

- If the pump is not to be installed immediately, it should be stored in a clean, dry place where there is no danger of frost and the ambient temperature does not change much.
- Necessary precautions should be taken to protect the pump from moisture, dust, dirt and foreign substances.

### 3 GENERAL DESIGN

DUYAR DWWP Series pumps are submersible pumps suitable for working underwater, developed for the purpose of pumping liquids containing large solids, especially domestic and industrial wastewater. DWWP Series pumps are specially designed for working underwater. Different types and models of impellers are used in DWWP Series pumps that can pump clean and dirty water, domestic wastes, liquids containing solid and fibrous parts, and sandy or muddy water.

#### 3.1 Engine

Number of rounds	: Up to 2900 rpm (50 Hz) up to 3500 rpm (60 Hz)
Power	: Single phase up to 2.2 kW Three-phase up to 11 kW
Insulation Class	: F (155 °C)
Protection Class	: IP 68
Cooling Method	: External water cooling

#### Beds

Rotor and pump impeller are on a single shaft. The rotor is centered with two heavy-duty bearings. Bearing types do not require any maintenance as they are grease lubricated for life.

#### Sealing

There is an oil reservoir between the motor and the pumped liquid. The high-quality silicon carbide surface mechanical seals are used in the pumped liquid at the bottom of the oil chamber. If for any reason water leaks into the oil chamber, the electrode system in the oil chamber signals and stops the engine. So, damage to the engine is prevented. In our standard production, there are two oil seals between the oil chamber and the motor body. It can be used in mechanical seal instead of oil seal according to customer demand.

#### Engine Temperature Control System

DUYAR submersible motors are manufactured to operate underwater and to be cooled by water. If the body is out of the water, it is natural for the engine to warm up after a while. In this case, thermistors placed on the stator windings protect the motor at 130°C. Water leakage and motor temperature control signals are transmitted to the DUYAR DPKKR-T motor protection and control relay located on the motor control panel on the surface with the auxiliary conductors in the energy cable.

#### Cable Connection

DUYAR submersible motors should start directly. (It is not Star - Triangle.) For this reason, three energy conductors are sufficient for all powers. There are three energy cables in the (U,V,W) single-phase motors, (M1, M2, A). Four conductors with smaller cross-sections are used for protection and control (E - T - T - Mp) ( See p . 6). Motor energy, protection and control cables are connected to the panel cables with sockets or terminal blocks. One end of the panel cable is pressed with a special rubber system to ensure the sealing of the cable entry part of the motor body. This end is compressed with the help of a glen and sealing is provided.

#### 3.2 Pump

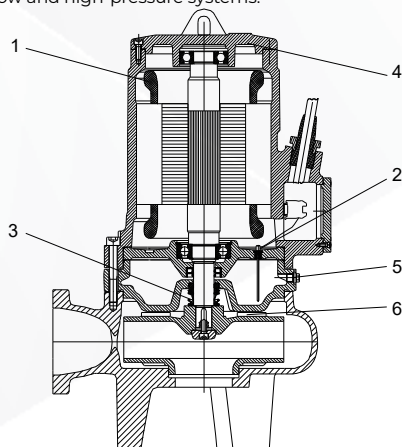
DUYAR DWWP Series submersible pumps consist of DN50, DN80, DN100 mm (2", 3", 4") outlet diameters. Different impellers are used in these models depending on the type, pressure, flow rate and solid particle size of the pumped liquid.

**B-type impeller:** It is a large-channel, large-flow, small-pressure impeller type that can press large solids without clogging. It is mostly applied for four-pole (1450 and 1750 rpm ) motors.

**Type D impeller:** Similar to type B, but suitable for 2-pole (2900 and 3500 rpm ) motors. Solid particle sizes are smaller, pressures are higher, and flow rates are lower.

**Vx type impeller:** Open type free vortex impellers are located at the top of the volute/scroll. The pump can pass solid particles in the diameter of the mouth. Suitable for fibrous liquids.

**F-type impeller:** Impeller with shredder blades. The shredder blade system made of hard and stainless material in front of the pump impeller reduces the soft solid particles in the liquid to dimensions that do not clog the pipe. The impeller of the pump is of the open type. It is suitable for small flow and high-pressure systems.



**Figure 2. Sectional Drawing for Basic Design**

1. Safety for thermistor overheating 130°C in the F-insulated motor winding
2. ELECTRODE that signals when the pumped liquid enters the oil chamber
3. MECHANICAL SEALING that works in the pumped liquid
4. Detachable top cover
5. Oil filler plugs
6. Rear vanes that reduce mechanical seal pressure and reduce the axial load

## 4. INSTALLATION

### 4.1 Mounting Types

DUYAR DWWP Series submersible sewage pumps can be installed in two ways, depending on the purpose and place of use.

When ordering, you must specify the mounting method and purchase the necessary accessories.

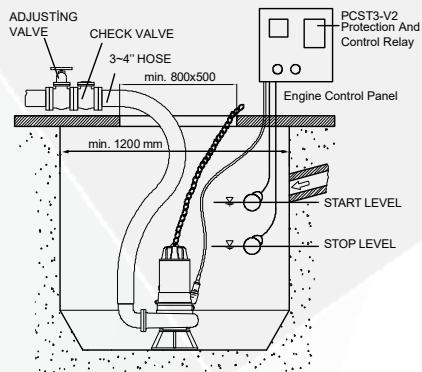
#### 4.1.1 Hose Connection

In this application, the pump sits on the bottom of the waste water tank. The pumped water is removed up to the upper floor by a flexible elastic hose, where it is connected to the pipe system. The pump is lowered into the waste water tank with a carrier chain. A check valve and a control valve must be installed at the start of the discharge pipe in the upper floor. In this application, the bottom of the chamber must be smooth and the ground must be firm (to prevent the pump from sinking and overturning). Auxiliary parts required for this application are: Hose connector, elbow rest and lifting chain.

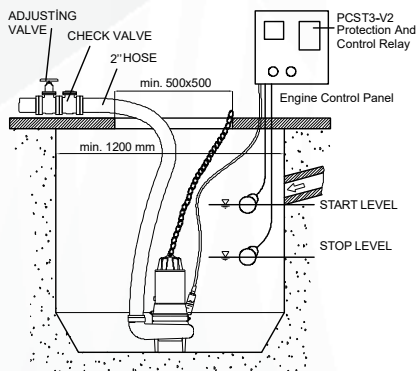
#### 4.1.2 Cradle Connection

This type of connection requires a carrier bracket, clutch system, vertical discharge pipe, guide wire, tensioning device and conveyor chain. The clutch piece on the pump is attached to the guide wire and lowered down by the carrier chain. Guide wires allow the pump to reach the carrier elbow. When the coupling piece on the pump touches the carrier elbow, the pump discharge port is coupled to the elbow and compresses the gasket with its own weight. Skid connection is applied in DN50, DN80, DN100 (2", 3" and 4") pumps. For the sled connection, the carrier bracket and the vertical discharge pipe must be mounted when the bottom of the chamber is dry (during construction). If this process is done later, the system may not be robust enough. Auxiliary parts required for this application:

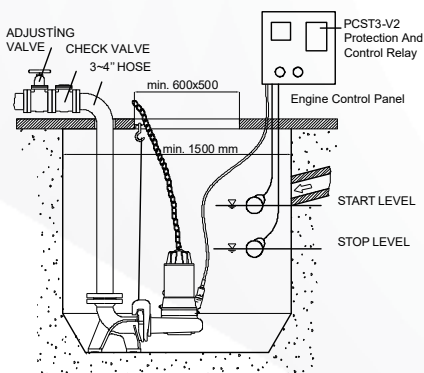
Support bracket, guide wire, tensioning system, vertical discharge pipe of appropriate size and guide wire of sufficient length.



HOSE CONNECTION FOR DN 80 and DN 100 PUMPS



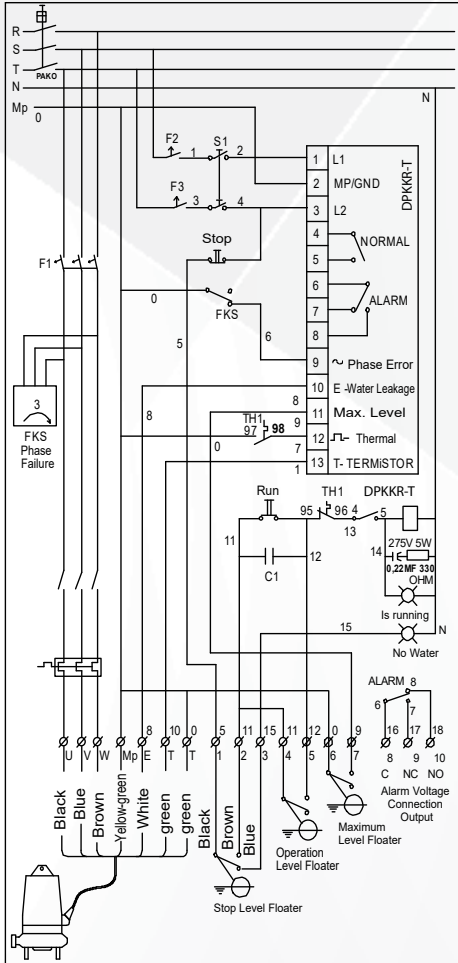
HOSE CONNECTION FOR DN 50 PUMPS



HOSE CONNECTION FOR DN 50, DN 80, DN 100 PUMPS

**Figure 3. Pump Mounting Types**

### ENGINE CONTROL PANEL CIRCUIT DIAGRAM



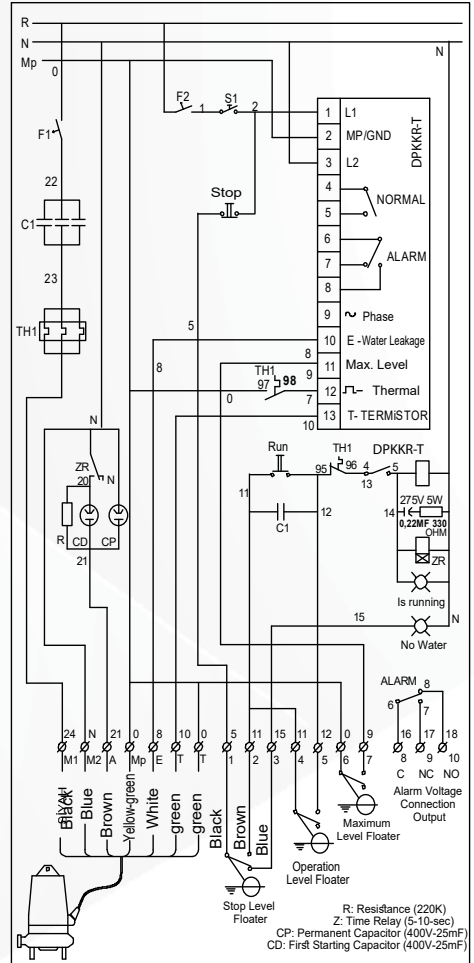
#### THREE-PHASE MOTOR PUMPS

Cable cross-sections used according to Engine Powers

Up to 5.5 kW (4 x 1.5 + 3 x 1.5)

Up to 11 kW (4 x 2.5 + 3 x 1.5)

**NOTE: To operate the system without floaters, bridge the terminals 1 and 2.**



#### SINGLE PHASE MOTOR PUMPS

Cable cross-sections used according to Engine Powers

Up to 2.2 kW (4 x 2.5 + 3 x 1.5)

## 4.2 Pipe Connections

**4.2.1** In the hose connection application, a check valve should be used just after the connection point of the pump outlet hose to the pipe on the floor. If the discharge pipe is long, a control valve should also be used. Hose-discharge pipe connection must be easily detachable.

**4.2.2** In the skid connection application, the carrier elbow, discharge pipe, guidewire and tensioning system must be installed before the construction is completed.

## 4.2.3 General Rules for Pipe Installation

- Horizontal pipes should be inclined to rise towards the flow direction as much as possible.
- Pipe diameters must be at least equal to the pump outlet diameter. The average water velocity within the pipe diameter should be chosen as at least 1.5 m/s in order not to cause precipitation and at most 3 m/s in order not to increase the losses.
- To prevent solid parts to stuck in the piping system and clogging, the appropriate care should be taken to avoid metal protrusions on the walls of rigid bends, pipes in narrow passages, etc.

## 4.3 - Electrical Connections

### 4.3.1 - General warnings



### CAUTION

- All electrical works must be done by authorized and licensed electricians. All main equipment must be grounded. Ignoring this warning can result in fatal accidents.
- Be sure to use the DPKKR-T Protection and Control Relay that you purchased with the pump in the motor control panel. Failures that may occur when the DPKKR-T Protection and Control Relay is not used are not covered by the warranty.
- The motor control panel manufactured in accordance with the attached sample diagram. If you are going to make a different application, your circuit diagram must be approved by the relevant department of DUYAR PUMP.
- Make sure that the contactor, thermal relay and fuse currents and cable cross-sections are in accordance with the nominal currents of the motor.
- Check that the mains voltage corresponds to the voltage on the motor nameplate.
- Make sure that the cable connector on the motor is watertight.
- Make the motor cable connections in accordance with the colors and sections specified in the diagrams.
- Protect the power cable. Take care that the cable does not pass through sharp metal or concrete corners that may damage the tire sheath, and that it is not pinched or crushed in narrow gaps.

### CAUTION

**NEVER use the control and power cable to lift the pump!**

## 4.3.2 DPKKR-T Motor Protection and Control Relay

DUYAR DPKKR-T Motor Protection and Control Relay is an integral part of DWWP Series submersible pumps.

### FUNCTIONS

When electricity is supplied to the device, first all lamps turn on and off in sequence. The device checks itself, if there is no fault, the green normal lamp lights up and informs that the engine is ready to run.



**THERMISTOR:** In case the winding temperature exceeds 130°C, the red lamp lights up and the engine is stopped. The lamp signals by flashing at short intervals. When the engine cools down, it is automatically activated again, but the flashing signal continues until the RESET button is pressed. When the RESET button is pressed, the lamp turns off and the alarm relay is deactivated.

**WATER LEAK:** When water enters the oil reservoir or the body of the engine, the red warning lamp lights up and the engine is stopped by the relay. The lamp flashes at short intervals until the RESET button on the DPKKR-T relay is pressed, and the alarm relay is activated at the same time. In this fault, if the RESET button is not pressed, the motor will not be activated. In this case, it is necessary to remove the pump and perform maintenance and repair the fault that caused the water leakage. The flashing signal continues until the RESET button is pressed. When the RESET button is pressed, the lamp turns off and the alarm relay is deactivated.

**MAX:** When the maximum water level adjusted by a float connected to the DPKKR-T relay input is reached, a signal shall be sent to the DPKKR-T relay from the float. In this case, the yellow MAX lamp lights up and flashes at short intervals. At the same time, the alarm relay is activated. This situation is perceived only as a warning alarm, it has no effect on starting or stopping the engine. The flashing signal continues until the RESET button is pressed. When the RESET button is pressed, the lamp turns off and the alarm relay is deactivated.

**FKS:** For phase failure and phase sequence control, an external phase protection relay in the panel is connected to the input of the DPKKR-T protection and control relay and phase failure control is performed. When there is a problem in the mains voltage or the phase sequence is wrong, the red lamp turns on and the engine is stopped. When the error disappears, the engine starts automatically again, but the flashing signal continues until the RESET button is pressed. When the RESET button is pressed, the lamp turns off and the alarm relay is deactivated.

**THERMAL:** In case of overload, when the current drawn exceeds the thermal relay set value, the motor is stopped. The lamp flashes at short intervals until the RESET button on the DPKKR-T relay is pressed. At the same time, the alarm relay is activated. In this case, after repairing the fault, the RESET button on the DPKKR-T is pressed, the thermal relay is reset, and then the situation returns to normal.

**NORMAL:** When all the red alarm lamps on the DPKKR-T relay are off, which means that they are in their normal position, the green NORMAL lamp lights up and indicates that the engine is ready to run. In case of any malfunction, this lamp goes out and does not allow the engine to start. The engine ready to start when only the green light is on.

**NOTE:** In all kinds of malfunction and warning alarms, normally open and closed dry contact outputs are provided to the outside with a relay in the DPKKR-T relay.

### 5 START - STOP

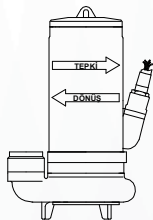
#### 5.1 Checking the Direction of Rotation

All types of DUYAR Submersible Waste Water Pumps rotate clockwise when viewed from above. If all electrical connections are made according to the warnings in section D3, the motor will rotate in the correct direction. However, it is useful to check the direction of rotation before the pump is lowered into place. To control the direction of rotation, the RUN button is pressed while the pump is suspended, and then the STOP button is pressed. Since it is not possible to see the pump impeller, the reaction direction of the body is monitored. There are 3 situations;

- If the initial response of the body is to the left (counterclockwise), the direction of rotation is correct. Electrical connections are made correctly, the pump can be lowered into place.
- If the initial reaction of the body is to the right (clockwise), the direction of rotation is opposite. In this case, the direction of rotation shall be corrected and checked again by relocating two of the ends where the motor cable is connected to the panel.
- If the contactor on the panel does not draw when the RUN button is pressed, the FKS lamp of the DPKKR -T relay is on and the motor does not turn, that means that there is a phase sequence error in the system's connection to the mains or one of the phases is cut. It is necessary to check that there is voltage in all 3 phases. If there is no problem, two phases are swapped from the mains input. The rotation direction shall be checked again and the correct direction shall be found.

#### Pump Reverse Rotation

It causes undesirable situations such as decrease in performance, increase in the power drawn in VX type impellers, loosening of the impeller, body friction or breakage. For this reason, be sure to check the direction of rotation before lowering the pump to its place. In single- phase pumps, the motor does not rotate in the opposite direction.



#### 5.2 Starting

In order to start the pump, the green lamp on the DUYAR DPKKR-T relay on the motor control panel must be on. This indicates that there is no malfunction or wrong electrical connection in the system. The pump will start automatically when the RUN button is pressed or the water level in the chamber reaches the operating (RUN) level.

#### 5.3 Stopping the Pump

You can manually stop the DUYAR DWWP Series Submersible Waste Water Pump by pressing the STOP button on the panel. In automatic operation, the pump will stop automatically when the water in the chamber reaches the level of the STOP float. If you want to make an application other than the one specified here (level controlled automatic operating system), please send your system electrical diagram to DUYAR POMPA and get our company's approval. Otherwise, DUYAR PUMP is not responsible for any damage or defects that may occur.

#### 5.4 Number of Stop-Starts

In order to prevent excessive temperature, rise in the motor and overloading of the motor, seals and rolling bearings, a maximum of 20 evenly spaced stop-start operations per hour are allowed.

### 6 MAINTENANCE and LUBRICATION

When DUYAR DWWP Series submersible sewage pumps are used together with the DUYAR DPKKR-T protection and control relay, it notifies the faults as soon as they occur and stops the motor, but the periodic maintenance is beneficial for the early diagnosis of water leakage into the engine, especially due to mechanical seal wear and other reasons.

#### 6.1 Periodic Controls

If the pump is new or has been disassembled and reassembled due to a major malfunction, it should be checked after one week and one month of work. If no malfunctions are found in these controls, the next controls can be made once a year. If the pump is operating in a very corrosive and intense environment, these checks should be made more frequently.

##### 6.1.1 Checking the Motor Body

- There are three control plugs on each DUYAR submersible motor. Two of them are on the oil chamber, and one of them is on the engine body.
- Check if the plug on the motor body is loosened by forcing it in the tightening direction first. Then remove the plug, tilt the engine with the plug side down and place a container under it and check whether water or oil comes out of the plug hole.
- Water coming out of this plug indicates a gasket leak in the motor body. However, if the water leakage control system is active, this will stop the engine before the relevant lamp goes out.
- If oil comes out of the plug hole, it is understood that the oil seals between the oil chamber and the motor body are worn. Pump to be maintained.

##### 6.1.2 Checking Cable Entry

- DUYAR submersible motor is connected to the power and control cable with a special seven-conductor socket or terminal system. One end of the panel cable is pressed with a special rubber system. This end is compressed with the help of a glen and sealing is provided. So, water entering the engine from here is prevented.
- Before checking the cable connection area, thoroughly clean and dry the motor body and especially the glen area. Then remove the socket by unscrewing the two fastening bolts and check if there is water in it.
- When reinstalling the socket, make sure that the gasket fits well and the bolts are well tightened.

##### 6.1.3 Checking the Mechanical Seal

- Tilt the engine so that one of the two opposite plugs in the oil chamber is at the bottom and the other at the top. 2-3 liters under it. Place a clean container that can absorb oil.
- Unscrew the plugs and pour the oil in the chamber into the container.
- If the oil is clear and clean, the mechanical seal is intact. In this case, you can use the same oil again.
- If the oil has a pale yellow-gray color or if water comes with the oil, there is wear in the mechanical seal. It must be replaced. In this case, the water leakage lamp on the engine control panel will turn on and the engine will not start. If these checks give positive results, you can lower the pump.

#### 6.2 Lubrication and Oil Change

- Motor bearings are shipped from our factory with lifetime grease lubrication.
- The oil filling the oil reservoir must be of SAE 20-30 quality.
- Before changing the oil, make sure that the chamber is cleaned and that there are no solid parts in the chamber that may damage the mechanical



Engine Power (kW)	Rpm/min	Oil Amount ( l )
0.75 - 1.1 - 1.5	1450	0.75
0.75 - 1.1 - 1.5 - 2.2	2900	
2.2 - 3 - 4	1450	1
3 - 4	2900	
5.5	1450	2
5.5 - 7.5	2900	
7.5	1450	2.5

**Table 1.** The amount of oil used by engine type and power

Engine Power (kW)	Rpm/min	Lower Bearing	Upper Bearing	Mechanical Diameters
0.75 - 1.1 - 1.5	1450	6305 C3	6304 C3	ø25
0.75 - 1.1 - 1.5 - 2.2	2900			
2.2 - 3 - 4	1450	6306 C3	6305 C3	ø25
3 - 4	2900			
5.5 - 7.5	1450	6307 C3	6306 C3	ø30
5.5 - 7.5	2900			

## 7 - DISASSEMBLY - REPAIR and ASSEMBLY

In case the DPKKR-T Submersible motor protection and control relay gives a water leakage signal or at the end of a certain operating period, the pump is taken for general maintenance and repair.

### 7.1 Preparations

General maintenance and repair should preferably be done in a workshop. For this, first, turn off the main switch of the panel and take the necessary precautions to prevent accidental energizing. Disconnect the pipe connections of the pump. Separate the power and control cable from the motor by unscrewing the bolts. Clean the motor and the outside of the pump. Send the pump to the workshop where you will make the repair.

### Disassembly of the Submersible Pump

**7.2.1-** Completely drain the oil in the chamber by unscrewing both the oil filler (230) plugs in the engine body (026) and the oil chamber (040).

**7.2.2-** Unscrew the bolts (345,346) connecting the motor body (026) and the oil chamber (040) to the scroll body (001). (For F type pumps, do not forget to remove the shredder blade (057).)

**7.2.3-** Remove the impeller (050) by removing the pump impeller washer (066) and bolt (344). If necessary, use a puller and rust remover solvent for this process.

**7.2.4-** Carefully remove the rotating part of the mechanical seal (405). While doing this, be careful not to use sharp and pointed tools that will tear the rubber bellows of the mechanical seal (405).

**7.2.5-** Remove the engine cover by removing the bolts (340) connecting the engine top cover (029) to the engine body (026). Since the upper bearing (200.2) will stay on the rotor (061) during this process, you will need to open the cover (029) slightly and remove it with the help of two small levers opposite each other.

**7.2.6-** Turn the motor body (026) upside down and place it on a non-rigid plane. Remove the bolts (341, 342) connecting the oil chamber (040) to the motor body. (Pumps with equal scroll and motor diameters have only two countersunk bolts (341), other types have four normal bolts (342).)

**7.2.7-** Separate the oil chamber (040) from the group. Open the bearing housing (031) upwards a little, and disconnect the cable connection of the water leakage warning electrode (049) using a screwdriver.

**7.2.8-** Take the bearing housing (031) and the rotor group (061) together with it, without damaging the stator windings.

**7.2.9-** Remove the bearing seat ring (220) above the lower bearing (200.1) using strong pliers. Strike the rotor assembly (061) against a wooden wedge a few times so that the lower bearing (200.1) comes out of the bearing housing (031).

**7.2.10-** Remove the shaft ring (221) in front of the lower bearing (200.1). Remove the bearings from the rotor assembly.

**7.2.11-** Remove the two oil seals (410) remaining on the bearing housing (031) by using suitable wooden or plastic wedges.

**7.2.12-** So, you have separated all parts of the pump and motor. Clean all parts. After the parts have been cleaned, supply new ones instead of unusable.

**7.2.13-** If the stator is damaged or burned, it may be necessary to rewind the stator windings. This work shall be done by experienced specialists or send the complete motor pump group to DUYAR POMPA maintenance and repair service.

### 7.3 Reassembly of the Pump

**7.3.1-** Before starting the assembly, review all the parts of the pump, especially the following points carefully.

- Mechanical seal (405) contact surfaces should be free of scratches, pits, and wear. In this case, it is absolutely necessary to renew the mechanical seal (405).
- The oil seals (410) should be replaced at every repair.
- All gaskets (430) and O-rings (420...423) must be replaced at every repair.
- After the bearings (200.1,200.2) are cleaned, their clearance should be checked and the worn ones replaced.
- The sealing surfaces of the gasket (430) should be reviewed and the areas of abrasion and crushing should be made leakproof.
- The parts of the shaft (061) that are in contact with the bearing (200.1,200.2), mechanical seal (405) and oil seal (410) should be examined for wear and the wear should be eliminated. If this is not possible, the complete rotor should be replaced.
- The energy and control cable (500) shall be examined for dents, torn, etc. If necessary, the cable should be changed.
- Insulation test should be done by applying 500 V to the stator windings.
- The working part of the pump impeller on the body side should be checked and if the diameter difference is more than 1 mm, the parts should be changed accordingly.

**7.3.2-** The assembly of the motor pump can be done using the general practical technical information and the sectional drawings in this book.

**7.3.3-** Assemble the pump carefully and under control. For disassembly, perform the assembly in the reverse order described above.

**7.3.4-** At the end of the assembly, put oil in the oil chamber (040) according to the table given in Section F2, and tighten the oil plugs (230) well.

**7.3.5-** Check whether the pump impeller rotates by hand. If you feel tightness, repeat disassembly and assembly. If the impeller rotates normally, replace the cable, tighten the bolts, and follow the instructions in section E.

### 8 - FAULTS AND THEIR CAUSES

Duyar Pump guarantees you to supply spare parts of DWWP Series DALGIÇ SEAL WATER Pumps for a period of 10 years from the date of manufacture.

In your spare part orders, please inform us the values below written on the label of your pump.

Pump Type and Size : (C 50 - 200 VX)  
Engine Power and Speed : (4 kW – 2900 d/dak)  
Year of Manufacture and Serial No. : (2010 – 1025452)  
Flow and Max. Load. : (25 m<sup>3</sup>/h - 19 m)

If you want to keep spare parts in your warehouse, you can find the type and number of parts we recommend for two years of operation, depending on the number of pumps of the same type, in the list below.

Part No.	Part Name	Number of Same Type Pumps in the System							
		2	3	4	5	6-7	8-9	+10	
50	Wheel	1	1	2	2	3	4	% 50	
57	Rotary Knife	1	1	2	2	3	4	% 50	
59	Fixed Plate	1	1	2	2	3	4	% 50	
61	Rotor Shaft	-	-	1	1	1	2	% 20	
200.1	Lower Bearing	1	2	2	3	4	5	% 60	
200.2	Upper Bearing	1	2	2	3	4	5	% 60	
405	Mechanical Seal	2	3	4	5	7	9	% 100	
410	Oil seal	4	6	8	10	14	18	% 200	
420	O Ring (Top cover)	2	3	4	5	7	9	% 100	
421	O Ring	4	6	8	10	14	18	% 200	
422	O Ring	2	3	4	5	7	9	% 100	

Faults	Possible Causes	Correction Methods
The engine will not start	No voltage to the switch	Check the electrical input of the panel. Fix the cable connections.
	Fuse blown	Bring the fuse to the working position.
	Cable is broken	Replace the pump power cable.
	The protection circuit (PCST3-V2) has tripped	Identify and correct the fault indicated on the PCST3-V2 relay.
Pump Does Not Flood	The pump impeller is stuck. (Blocked)	Disassemble the pump and clean the inside.
	Discharge pipe clogged	Clean the discharge pipe by removing it.
	Pump manometric height is insufficient.	Check the system design values.
	There is not enough water in the well.	Check the water inlet to the well.
Capacity low	Pump reverses.	Swap any two of the connections of the pump power cable on the panel.
	There is a partial blockage in the discharge pipe.	Clean the discharge pipe by removing it.
	There is a blockage in the impeller or volute.	Disassemble the pump and clean the inside.
	Pump impeller is worn.	Disassemble the pump and replace the impeller.
DPKKR-T Overheat failure	Lower float level too low, engine running dry	Raise the lower float level.
	Manometric height is too low.	Turn the outlet valve down to the head value specified on the pump discharge label.
	The pumped liquid is too dense or the specific gravity is too high.	Turn the outlet valve down to the amperage value specified on the pump pressure label.
DPKKR-T Water leakage failure	There is a tear or hole in the cable.	Replace the pump power cable.
	Mechanical seal failure.	Replacing mechanical seals.
	Damage to the stem O-rings.	Replace O-rings.





[illegible]



**DWWP SS C 15 - 1,5-1,1 kw M**



**DWWP D 13 - 1 Kw M**



**DWWP C 50 - 200-3 kw T**



**DWWP GR 18 - 2-1,35 kw M**



**MORE DETAILS**



**DWWP GR 50 - 160-2,2 Kw T**



**DWWP**  
**WASTE WATER PUMPS**



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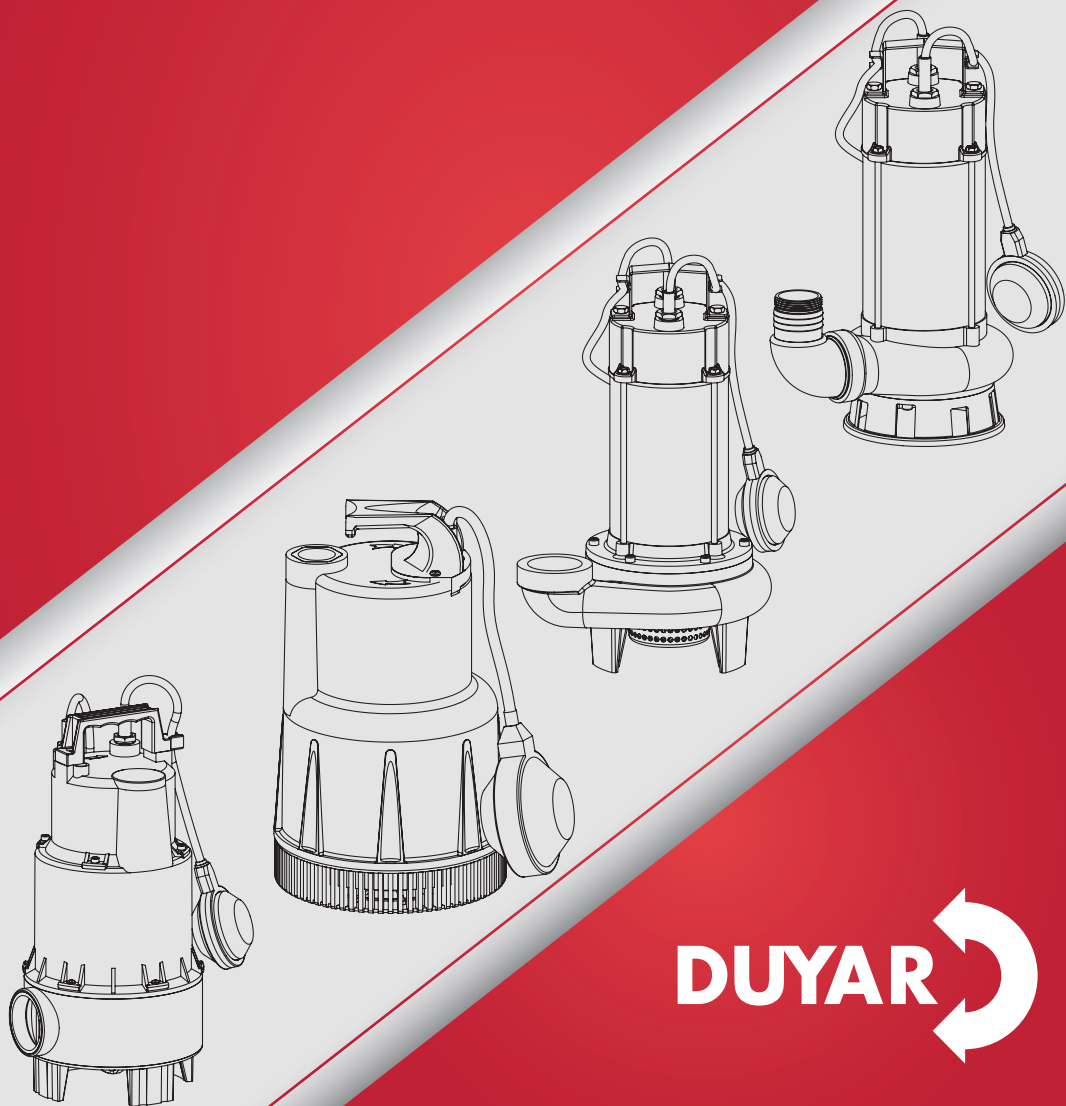


Dudullu OSB İMES-101. Sok. No:13  
Ümraniye/İstanbul Türkiye

# DWWP

## WASTE WATER PUMPS

INSTALLATION, OPERATION, MAINTENANCE AND REPAIR GUIDE



**DUYAR**



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### ENTRANCE

Please read this document carefully before installation. Installation and operation must be carried out in accordance with the applicable safety rules of the country where the product shall be installed. All operations must be performed skillfully. Failure to comply with safety rules will result in injury to persons and damage to equipment, as well as voiding the guaranteed rights. Pay attention to the transportation, usage areas, commissioning instructions and assembly-warning visuals in the user manual for more efficient and longer life of your pump; otherwise, your pump will be out of warranty.

A properly selected and used pump works for a long time without any malfunction or problem. Read the rules and instructions in this manual carefully for the pump to operate without any malfunctions and problems. Keep the user manual as long as you use your pump. Do not operate the pump other than the information we have given when purchasing. Take into account the label values when operating your pump.

Our on-site service is provided by our authorized services only for the DUYAR POMPA certified factory-exported package boosters, fire boosters, mixed mud water submersible pumps, and submersible pumps over 10 Hp. Our after-sales service for our other products is provided at our authorized service centers or central service throughout Turkey. LIFE OF USE IS 5 YEARS

### Operation areas

DWWP D 5-0.37 kW M, DWWP D 10-0.65 kW M, DWWP D 13-1 kW M, DWWP D 15-1.1 kW M, DWWP SS C 15-1.5 -1.1 kW M, DWWP GR 18-2-1,35 kW M, DWWP D 18-2-Y -1,35 kW M series submersible pumps can be used for dirty water supply, for evacuation of water in waterfalls and pools in construction sites.

### TRANSPORTATION

Pumps are shipped from our factory ready to operate.

- Position the pumps properly and in such a way that they will not be damaged while loading and unloading the pumps during transportation.
- Do not drop the pump on the ground or place weights on it when transporting it unpacked or packaged.
- Wear gloves, hard-toed shoes, and a helmet during transportation works.
- Take the necessary safety precautions.
- Attempting to carry heavy loads with your hands may pose a risk of your dorsum and waist injury.
- Lifting and transport operations must be carried out in accordance with the transport instructions and by authorized personnel.



**Do not lift the pump from the power cable during transportation.**

### MATTERS TO BE CONSIDERED IN TAKING THE PUMP TO OPERATION

- 1- The electrical connections of the pump shall be made by an electrical technician or a licensed electrician.
- 2- The working area of the pump should be at least 75x75x75 cm. Pump electrical voltage operating range should be 210-230 V in single-phase models and 380 V in three-phase models.
- 3- These pumps are suitable for less dirty drainage water discharge. It should not be used in other types of liquids such as acid, olive oil, petroleum, and other than its intended purpose.
- 4- While making the electrical connection of the pump, the grounding of the pump must be done (for life safety). The pump must be operated with a residual current fuse of Max.30mA.
- 5- While making the electrical connection of the pump, the grounding of the pump must be done (for life safety). The pump must be operated with a residual current fuse of Max.30mA.
- 6- Assemble your pump according to Page 5 Figure 1.
- 7- If the pump installation will be made with a water pipe or a union, be careful not to crack the pump outlet opening by over-tightening during assembly.
- 8- Never let the pump hang from the power cable, use a suspension rope.
- 9- If the distance between the area where the pump will operate and the power line is far away, or when the power cable needs to be added, you can use the electric cable selection table on page 40 for cable selection (section).
- 10- All pumps should be used according to the protection systems and at an appropriate water level.
- 11- After the pump energy connection, as well as the plumbing connection, is made, it should be fixed with a rope or chain that will carry the weight of the pump and the installation after it descends to the well or the manhole.
- 12- If there is excessive mud in the well or particles that will clog the pump, the pump should be used after the well is rehabilitated.
- 13- Before starting the pump, there are no tears, holes, fragments, etc. in the energy cable. If any, the pump should be used after it has been repaired.
- 14- Do not operate single-phase type pumps by plugging them into the three-phase sockets.
- 15- Laying the energy cable to the main network as wall-mounted as possible.

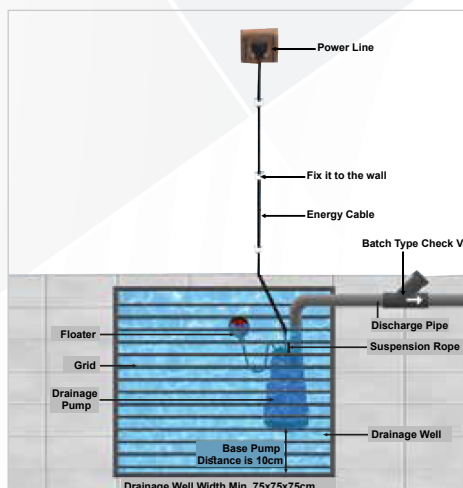


- 16-These pumps can be used to transfer water at max 35°C. With appropriate accessories, the product can be used to empty rooms in case of flooding, as well as to flood water containers, drain water from water tanks, wells, drain the water of boats and yachts and similar purposes. This product is not suitable for long-term circulation applications ( e.g. pond, swimming pool, aquarium). Our pumps are not circulation pumps, do not use them for circulation purposes.
- 17-Do not operate the pump at low voltages.
- 18-Be careful not to break the water hose by 90° while the pump is running.
- 19-Do not touch the pump or water while the pump is running. See Page 39.
- 20-Do not connect the floater (Float) of the pump used in the drainage of the accumulation of water perpendicular to the cable for the purpose of finishing the water. Otherwise, it will cause the engine to burn out. The pump must be completely submerged in water. See images in Figure 5-6 on Page 13, Figure 7 on Page 14.
- 21-Do not operate the pump if the water freezes during the winter months.
- 22-Never operate your pump without water.
- 23-After the pump is lowered into the well and the pump is started, wait a few seconds for the water to rise to the surface.
- 24-Pump vibrations comply with TSE 2782 standard.
- 25-The sound of our pumps is subjected to a noise (decibel) test according to TSE EN ISO 1680 standard.
- 26-In case of malfunction, the environment where the pump is located must be illuminated before the pump is intervened.
- 27-We recommend wearing high-necked boots when it is necessary to enter the area where the pump works in case of malfunction.
- 28-If the area where the pump operates (drainage well) is checked and the dirt is filled, clean the solid dirt at the bottom of the well.
- 29-If the pump frequently fails due to a thermal condition, take the pump to a service center. (Call service.)
- 30-In case of low water, do not cancel the floater and run the pump continuously
- 31-Never make any additions to the energy cable and the floater cable from the part that comes into the water. We do not recommend doing it to the part of the power cable that does not come into the water. However, if it is necessary to make additions in mandatory situations, it should be made by qualified electricians with a professional cable joint socket or waterproof (melting) tape.

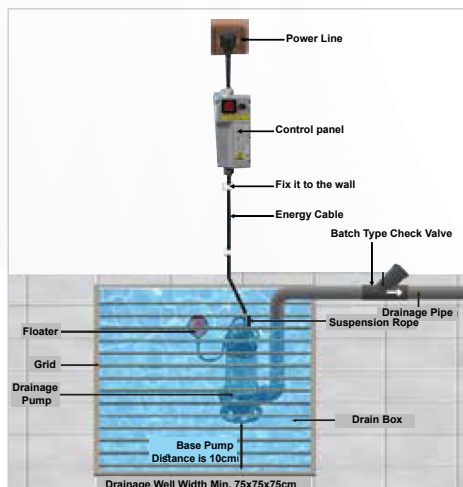
32-For pump usage and installation information during product assembly see Figure 1 on Page 5, Figure 3-4 on Page 12, for operation logic of floaters see Figure 5-6 on Page 13, Figure 7 on Page 14, for electrical connections see Figure 8 on Page 21 and for life safety warnings please pay attention to the images in Figure 9 on Page 39.

33- In case the pump is replaced during operation, it should be washed with clean water after each operation.

34-The bottom of the well should be cleared of mud every 3 months.



**Figure 1. Example Drain Pump Installation Image**



**Figure 2. Example Drain Pump Installation Image**

### BASIC SAFETY RULES

- 1- In the environment where you work, if there is a warning sign, an instruction or special workplace rules, make sure to follow these rules.
- 2- Even if it is not stipulated by the management of your workplace, you must comply with the basic rules of work and worker safety.
- 3- The followings are necessary for your protection: Start working by equipping your personal protective equipment such as a helmet, gloves, armored boots, protective work clothes, protective glasses, and mask.
- 4- Secure your job and your health and safety by contacting your first supervisor/manager in any situation you don't know or are unsure about.

#### ATTENTION

#### Special Safety Instructions for Machines

- 1- Make the utmost effort to understand the safety instructions and take the necessary precautions. While examining the security principles, examine the product promotion pictures together.
- 2- All parts of the engine have only one correct connection feature. Do not change the appropriate connection types during the maintenance, adjustment and assembly of the engine. In the interventions made on the fasteners, make interventions in accordance with the connection types and working principle of the engine.
- 3- The structure and construction of the engine are designed to prevent direct and indirect contact with electrical parts. Do not come into contact with the electrical installation and its parts. Do not attempt to make any changes or adjustments to the electrical system of the engine. Do not remove the motor terminal box cover. Do not leave it open. All electrical faults and adjustments should be made by authorized electricians.
- 4- Electrical connection points are specified with cable coding method for suitable connection types. In electrical maintenance and adjustments, interventions should be made in accordance with the electrical diagram of the motor, the cable coding system and the working principle. Performing different applications may create electrical risks.
- 5- Parts and equipment were selected in accordance with the principles of efficiency and safety in the design and production of the engine. If the need for replacement of defective parts arises in the maintenance, adjustment and assembly of the engine, replace the parts to be replaced with the original parts on the device. The use of different parts and equipment reduces the safety of the machine.
- 6- The noise level caused by the operation of the engine does not reduce the safety of the engine and does not cause any dangerous situation.
- 7- The vibration emission in the air that will occur with the operation of the engine does not reduce the safety of the device and does not cause any other dangerous situation.
- 8- The operating frequency of the motor is 50 Hz. It emits low, high frequency, radio frequency and microwave.

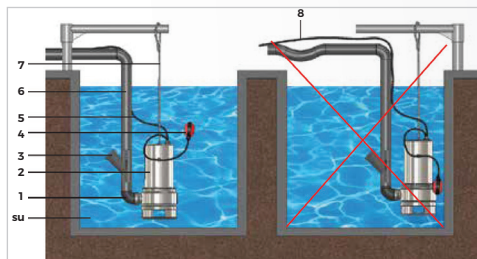
- 9- The design of the engine has been made in a way that minimizes the risks and dangers that may occur due to human error. In possible situations, do not interfere with the engine in a way that does not comply with human logic, do not use the engine for a different purpose than the one produced.
- 10- Secure connection points have been created to fix the engine to the working area in a way that will not be affected by external influences. Use these connection points for mounting and fixing the engine.
- 11- Secure holder connections have been created on the engine for its transportation. Use cranes and similar lifting equipment to transport the engine. Use slings and ropes suitable for the weight and construction structure of the device in the selection of fastening devices.
- 12- In case of fragmentation that may occur during operation, the effects that will create mechanical and electrical risks are confined inside the engine construction structure and are prevented from moving out of the engine cabin. The environment and the user are isolated from such risky events. Do not remove the covers and guards of the engine. Removing these guards and covers may expose you to unexpected risks.

#### Necessary Precautions for Energy Saving and Pump Performance

Energy-saving will be possible with the effort to be spent on the selection and appropriate use of pumps. We should consider that the efficiency of the pumps can be as much as the efficiency of the installation.

- 1- A system requiring 100 mss pump is built to pump a fluid 50 m above. The efficiency of this installation will be 50%.
- 2- Fewer elbows and valves used in the installation make ideal the low KW pump if the choice of pipe for friction loss is made correctly.
- 3- Pumps wear out over time, just like any other machine the pump flow rate and head decrease. In this case, the pump shall be repaired and put back into operation, thus the pump performance is renewed.
- 4- Energy efficiency will increase thanks to the care we will show in pump selection and high-efficiency system design. Control valves and pressure reducers, which we frequently encounter in installations, should be replaced with other solutions that will perform the same function without destroying energy.
- 5- When choosing the installation hose used in the discharge line of submersible pumps, a braided or rigid non-expansion hose should be selected. Otherwise, the efficiency of the pump will decrease. In the systems we design, solutions should be produced by taking into account the operating costs. So, it would be appropriate to turn to methods to reduce CO2 emission in terms of showing environmental sensitivity.

## INSTALLATION METHOD

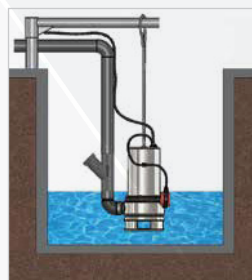


**Figure 3**

**Figure 4**

- |                     |                     |
|---------------------|---------------------|
| 1-Elbow             | 5-Power Cable       |
| 2-Pump              | 6-Installation Pipe |
| 3-Globe Check Valve | 7-Suspension Rope   |
| 4-Floater           | 8-Air Pocket        |

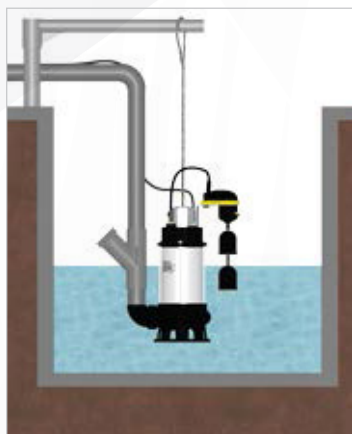
- 1- The electrical installation and electrical connection of your pump shall be made by an electrical technician or a licensed electrician.
- 2- While making the electrical connection of the pump, the pump must be grounded (for life safety).
- 3- Use a hose suitable for the pump outlet. Never narrow the exits.
- 4- When designing the pump installation, pay attention to the absence of air pockets in the installation. Otherwise, the pump will not flood because it cannot take water into it. (Page 9. Figure 4)
- 5- The working area of the pump should be at least 75x75x75 cm.
- 6- The place where your pump operates should be such that the pump does not sink into the base mud. Suspend your pump with a suspension rope so that it remains at least 20 cm above. (Page 9. Figure 3)
- 7- Your pump float is factory set. Do not remove the floater from the adjustment slot.



**Figure 6**

In Figure-6, the floater fell down when there was no water in the well. In this case, the contact ends that come into contact with each other in Figure-5 will turn the circuit open electrically in Figure-6 and stop the pump from operating. The floater will prevent the engine from running without water, preventing it from burning. (Figure-6)

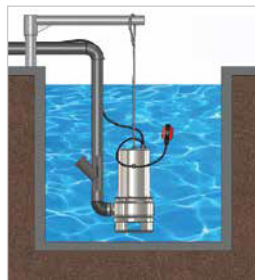
## OPERATION OF LIFT FLOATER



**Figure 7**

- |                     |                      |
|---------------------|----------------------|
| 1- Suspension Rope  | 4- Globe Check Valve |
| 2- Pressing System  | 5- Pump              |
| 3- Elevator Floater |                      |

## OPERATION OF THE FLOATER



**Figure 5**

Figure-5 shows the state of the floater when there is water in the well.

In this case, the floater will be towards the surface of the water as shown in the figure. When the floater is in this position, the electrically open contact ends will come into contact with each other and will ensure the operation of the pump.

In Figure-7, the pump starts when the well is filled to the upper level. The water level starts to drop and the pump stops when it reaches the stop level. Due of StartStop adjustment of the elevator float distance is shorter than other floaters, the well where the pump will be installed, should be at least 75x75x75cm. When installing the pump, a Globe Check Valve must be attached to its outlet. Otherwise, the water that the pump presses into the manhole through the plumbing will come back when the pump stops and fill the well where the pump is located and start the pump. And this will be repeated continuously and cause the pump to malfunction.

For more information, you can visit our website [www.duyarpompa.com](http://www.duyarpompa.com) or contact us at 0 216 365 70 95



The electric panel, which we have supplied from our factory as assembled to M series pumps such a DWWP SS C 15-1.5 -1,1 kW M, DWWP GR 15-2-1,1kw M, DWWP GR 18-2-1,35 kW M, DWWP D 18-2-Y -1,35 kW, prevents the pump motor from burning by opening the thermal inside the panel in case of jamming of the pump.

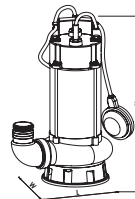
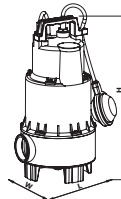
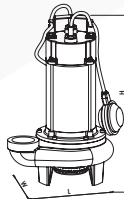
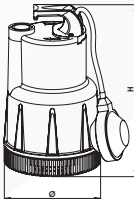
After the problem is resolved, reactivate the pump in the thermally opened position by resetting it thermally .

### Starting the Pump

- The fuse or thermal should be selected with the appropriate Kw. (watt ) for the machine.
- The pump should be operated for a short time and the rotation direction of the pump should be determined.
- After starting the (Three- Phase ) pump, check whether the water flows from the pipe or hose.
- In order not to reduce the efficiency of the pump, check and clean the foreign materials in the well from time to time.
- Never use in explosive and flammable environments and liquids.
- Care should be taken that there are no bends in the pipe, otherwise, the efficiency of the pump will decrease.
- If you are not sure, always call the authorized service or our company.

### Pump Technical Specifications

TYPE	Q (mm)	W (mm)	H (mm)	Entrance Exit	Kg.
DWWP D 5-0,37 kw M	150		248	1"	5.2
DWWP D 10-0,65 Kw M	180		330	1¼"	12
DWWP D 13-1 kw M	180		330	1¼"	12.9
DWWP D 15-1,1 kw M		185	400	2"	13.6
DWWP SS C 15-1,5 -1,1 kw M		185	350	1½"	20.5
DWWP GR 15-2-1,1kw M		185	395	2"	16
DWWP GR 18-2-1,35 kw M		175	410	2"	19.5
DWWP D 18-2-Y-1,35 kw M		200	200	2"	22.5
DWWP GR 19-2-1,35 kw M		175	410	2"	19.5



## USE

### Controls During Operation

- 1- The pump should never be operated without water.
- 2- Outlet valves should be fully open and pump outlet valves should never be operated when fully closed for a long time.
- 3- The discharge line must be equal to the pump outlet.
- 4- If the discharge line is too long or the system is smaller than the pump outlet diameter, it causes the pump flow rate to decrease. The falling flow will cause cavitation in the installation and pump.
- 5- Max. Liquids exceeding the temperature must not be pumped.
- 6- Liquids other than those specified in the operating conditions should not be pumped.
- 7- After the pump is lowered into the well, it must be fixed with a steel rope.
- 8- If your pump is vibrating and making noise, it should not be operated. Service must be called.
- 9- Installation weight should not affect the pump.
- 10- If the motor draws a high current and gets hotter than normal, it should not be started. Service should be called to check the engine and electrical installation.
- 11- If your engine is rotating in the opposite direction, do not start it. Call the service to fix the electrical connection.
- 12- If noise, vibration or higher-than-normal temperature (max. 80°C) is noticed in the bearings, the pump should be stopped. Service should be called for the replacement of wearing parts and removal of imbalances if any.

### Efficient operation

Warnings about getting high efficiency from your pump with low energy consumption;

- 1- While choosing a pump, a pump that meets the purpose of the facility with optimum operating capacity should be selected.
- 2- You should choose a model that will not exceed the maximum number of starts, for which you need to calculate the power required for the unit.
- 3- Installation with a smaller diameter than the pump discharge port will cause the pump to operate at lower performance and consume more energy.
- 4- The plug must be firmly inserted into the socket.
- 5- In case of malfunction, original spare parts should be used in authorized services.

## MAINTENANCE, REPAIR and CLEANING

- 1- Before any maintenance, disconnect the pump from the electricity.
- 2- Maintenance and repair of the pump should only be done by authorized services.
- 3- Every 12 months, it should be checked by an authorized service and periodic maintenance should be done. Worn parts must be replaced.
- 4- Insulation of pump motor and electrical equipment and connections should be checked every month and protected from external conditions (water, humidity, sun and weather conditions).
- 5- If there is a protection panel, contactors, thermals and relays should be checked by authorized services. (It should be protected from water, humidity, sun and weather conditions.)
- 6- While your pump is operating, it should be checked periodically for vibration and noise.
- 7- Globe type check valve should be cleaned every 6 months.

### Monthly Maintenance

- 1- Check for perforation, crushing, fragmentation, tearing, etc. in power cables.
- 2- Check the hose and pipe connections.
- 3- If there is a filter and strainer, clean them once a week.
- 4- Before performing maintenance and repair works, always disconnect the electrical supply cables. Make sure that no connection is made during operation.
- 5- Take all necessary safety precautions before starting maintenance and repair operations. Make safety barriers, warnings and signs.

### Annual Maintenance

- 1- Annual maintenance of the pump should be done by an authorized service.
- 2- Check the bearings by removing the motor.
- 3- Oil seals and mechanical seals need to be checked.
- 4- It is necessary to check the sealing elements of the engine.

### Thermal Protection

Our water-cooled models are thermally protected against overload. In case of overloading, when the motor heats up, the thermal opens and cuts off the electricity and the motor stops. The engine starts to cool. When the engine returns to normal operating temperature, the engine starts again. In such cases, do not intervene without disconnecting the electrical connection of the pump.



Do not panic about thermic protected pumps when the motor stops in case of a rise in mains voltage. Make sure that the thermal does not fail by waiting for a certain period of time.

### PERIODIC MAINTENANCE

#### 1- Control of Electrical Values.

When the pump is put into operation, current, voltage and pressure values should be checked and it should be checked whether these values change over time.

#### 2- Electrical Equipment Control.

Electrical equipment should be checked every 6 months by a qualified electrician or (service).

#### 3- Mechanical Equipment Control;

If the engine will not be used for a long time, the engine should be run for a short time at least once a month.

#### 4- Periodic maintenance of the pump should be done by the authorized service once every 12 months.

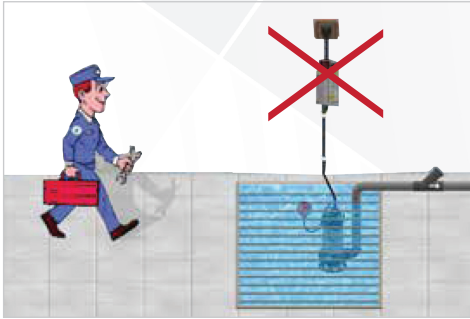


Figure 8



Figure 8

**CAUTION**

**Before any maintenance, disconnect the pump from the electricity.**  
(Disconnect the pump cable from the power line.)





**DWWP SS C 15 - 1,5-1,1 kw M**



**DWWP D 13 - 1 Kw M**



**DWWP C 50 - 200-3 kw T**



**DWWP GR 18 - 2-1,35 kw M**



**MORE DETAILS**



**DWWP GR 50 - 160-2,2 Kw T**



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