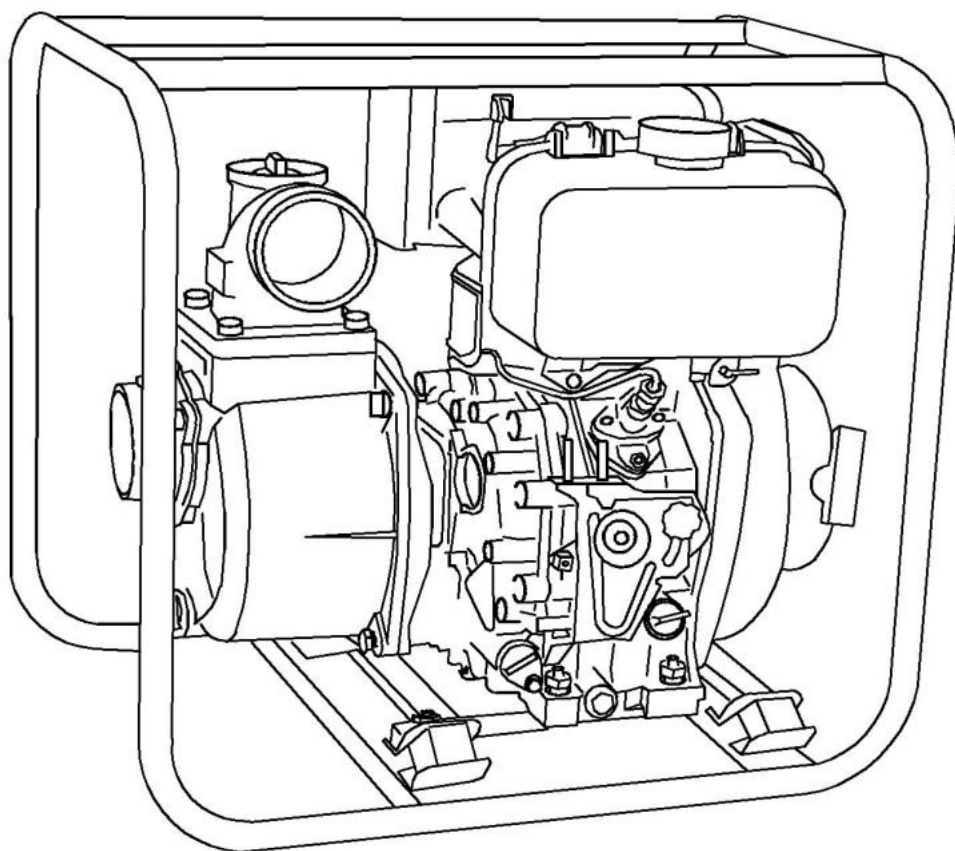


**JOSEF[®]
STEINER**

Manual

Diesel displacement pump 10 PS

We congratulate you on purchasing this Diesel displacement pump.
You have chosen a high quality product.



PREFACE

This manual is only a guide to assist you and is not a complete or comprehensive manual of all aspects of maintaining and repairing your engine. The equipment you have purchased is a complex piece of machinery. We recommend that you consult with a dealer if you have doubts or concerns as to your experience or ability to properly maintain or repair your engine. You will save time and the inconvenience of having to go back to the store if you choose to write or call US concerning missing parts, service questions, operating advice, and/or assembly questions. Our diesel powered displacement pumps have some of the following features:

- Lightweight construction
- High pressure aluminum alloy construction
- Hard working four-stroke diesel internal combustion engine
- Large fuel tank
- High quality mechanical seals
- Self-priming structure

The air-cooled diesel displacement pumps are self-priming single-stage centrifugal water pumps. The bodies of the water pumps are constructed of high quality die-cast aluminum alloy. The internal rotating rings are constructed of ceramics and the stationary rings are constructed of graphite. The displacement pumps are widely used in fieldwork and on construction sites. Our water pumps provide a portable mobile solution in pumping liquids from one place to another.

This manual will explain how to operate and service your engine.

If you have any questions or suggestions about this manual, please contact your local dealer or us. ***Consumers should notice that this manual might differ slightly from the actual product as more improvements are made to our products. Some of the pictures in this manual may differ slightly from the actual product as well. We reserve the right to make changes at any time without notice and without incurring any obligation.***

OVERVIEW OF VARIOUS MODELS OF WATER PUMPS



TECHNICAL SPECIFICATIONS

Table 1. Specifications

| | Model | WZ-WP900 |
|--------|-----------------------------|--------------|
| Pump | Suction port diameter(mm) | 100 (4inch) |
| | Discharge port diameter(mm) | 50 |
| | Max suction head(m) | 8 |
| | Total head(m) | 26 |
| | Max flow rate(L/min) | 600 |
| Engine | Engine type | JD186 |
| | Speed(rpm) | 3600 |
| | Displacement(cc) | 418 |
| | Max. Output (kW) | 10/3600 |
| | Cooling system | Air cooling |
| | Lubrication oil | SAE10W/30 |
| | Starting system | Recoil Start |
| Unit | Length×Width×Height (mm) | 665*525*640 |
| | Net Weight (kg) | 68 |
| | Gross weight (kg) | 70 |

SAFETY PRECAUTIONS

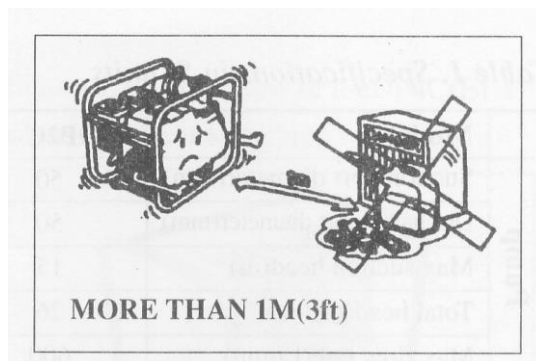
- Do not smoke or allow flames or sparks to get near fuel. Always refuel your engine in a well-ventilated place. Do not overfill the tank and always close the filler cap securely.



- Never run the pump indoors as the engine emits poisonous carbon monoxide.

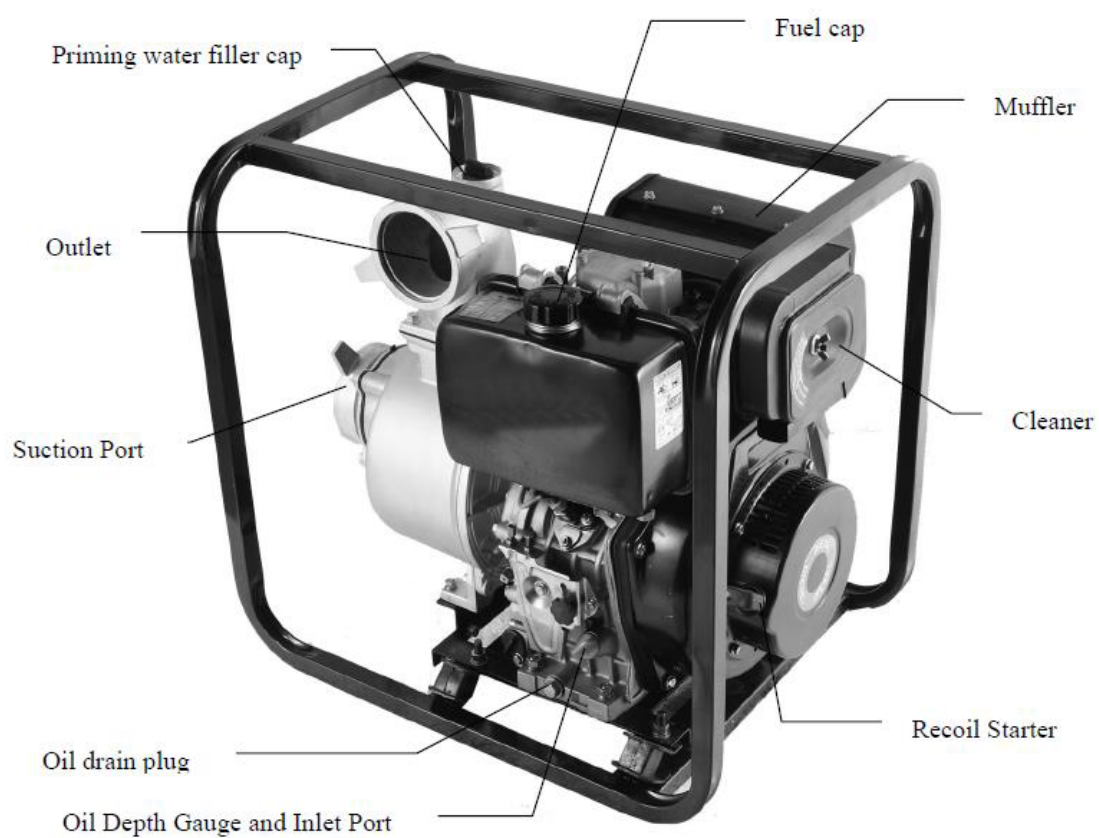


- Do not touch the muffler during or just after operation; as the engine and muffler get hot. Always let the engine fully cool before touching and storing the pump indoors.
- Always keep the pump at least 1 meter (3 feet) away from buildings and other equipment during operation. Do not place flammable objects or liquids close to the pump.



- Before operating your displacement pump, please check your local laws and regulations before operating your pump. It is illegal in some areas to operate an engine without a spark arrester; therefore, a spark arrester is available as an optional part for this pump.
- Know all the pump's controls and know how to stop the pump quickly in the event of an emergency. Do not let anyone without proper instructions operate the pump.
- Always keep children and pets away from the pump.
- Do not pump flammable or corrosive liquids such as gasoline or acid. In order to prolong the life of your pump, avoid pumping corrosive liquids such as seawater, chemical solutions, used oil, or acidic liquids.
- Always operate your pump on a level surface. If the pump is tilted, fuel may spill and rapid wear might occur as a result of inadequate lubrication.

KNOWING YOUR DIESEL DISPLACEMENT PUMP



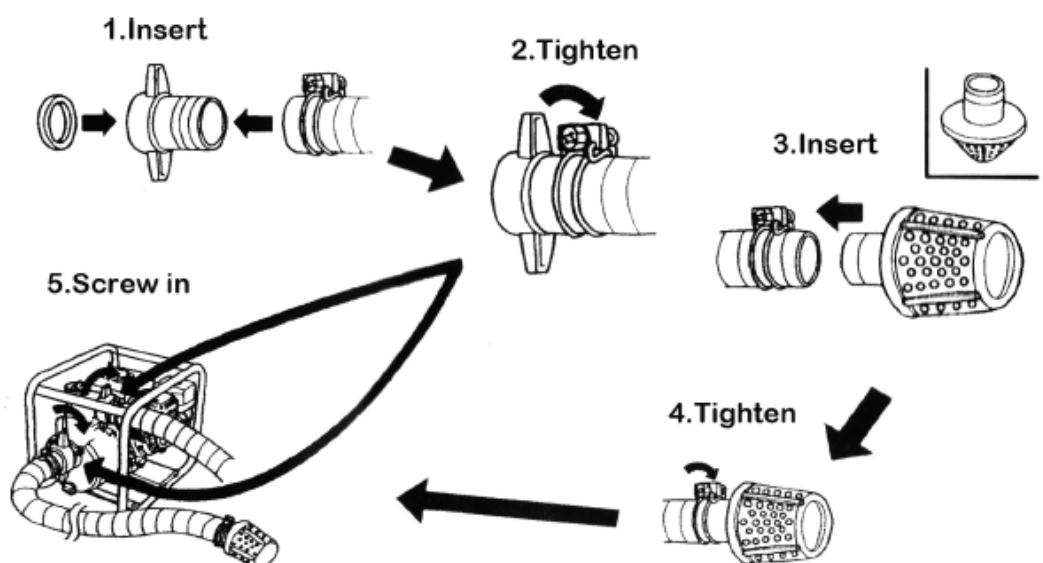
PER-OPERATION PREPARATION

Suction Hose

The first step in preparing the pump for operation is to install the suction hose. For the suction hose, use a reinforced-wall or wire braided hose to prevent suction collapse. A short hose is recommended over a long hose. The pumps have standard National Pipe Threads on them; therefore, any standard hose set will fit with the pump. If your hoses are metric threads or any other standard, please give our company a call we carry a full line of adapters or provide you with a possible solution.

NOTE: Always install the provided strainer on the end of the suction hose before pumping. If gravel or debris enters the pump, the impeller can be seriously damaged.

Shown below is the pump hose utilizing a barbed connection and hose clamp. If you already have specialized hose, disregard the following diagram. When using the barbed connection setup, make sure to use a hose clamp to properly secure the hose to the barbed connector.



Discharge hose

The second step is to install the discharge hose. The discharge hose can be fabric, just make sure to use a hose clamp to secure the hose to the barb. This will prevent the hose from disconnecting under high pressure.

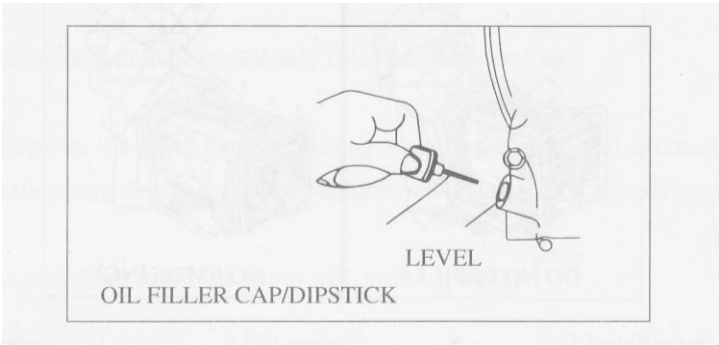
Note: A short and large-diameter hose is preferred over any other. A short and large diameter will provide lower fluid friction and improve efficiency.

Engine oil

Engine oil is an important factor in determining the performance and life of your engine. Always make sure the oil level is within the upper and lower limits specified on the oil dipstick. Make sure to check the engine oil on a level surface or incorrect readings will result.

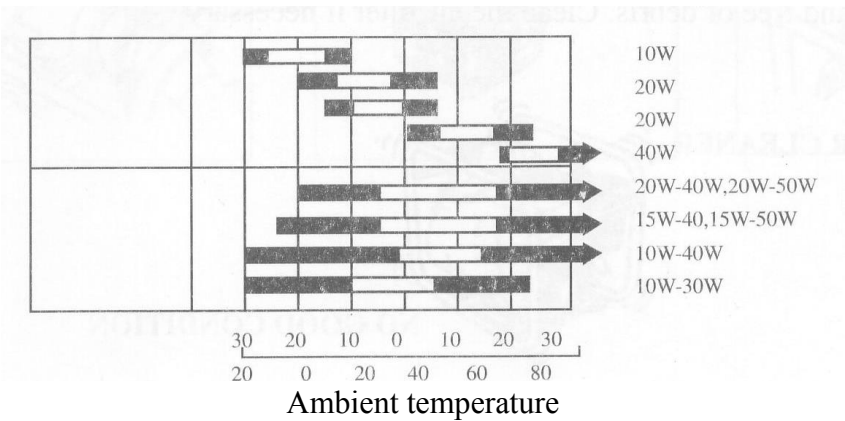
- To check the engine oil, first, remove the oil dipstick by turning counterclockwise.
- Wipe the dipstick clean and insert the dipstick back into the oil filler neck. Do not screw it in. Please refer to Fig 2-1.
- If the level is low, fill engine oil to the top of the oil filler neck with the recommended oil below.

Fig 2-1. Illustration of checking the engine oil



Below is a table of recommended oil grades for the engine in various weather conditions. Please use the proper oil according to the Table 2-1.

Table 2-1. Ambient temperature versus oil grades



Note: For diesel engines, we highly recommend the use of 15W-40 engine oil. Some other grades are comparable, but 15W-40 is the preferred oil grade.

Fuel

Remove the fuel cap and fill the fuel tank with diesel fuel. The preferred fuel for diesel engines is diesel number 2, which can be easily obtained from a gas station. Do not use other fuels until consulting with your local dealer or our company.

The capacity of your fuel tank is 3.3 US gallons.

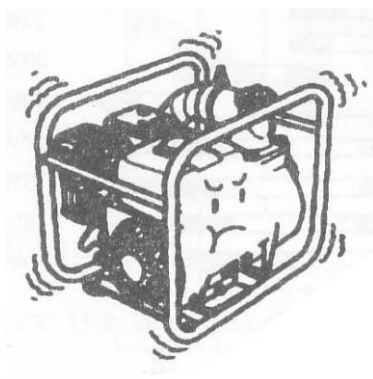
Do not smoke or allow flames or sparks to get near fuel. Always refuel your engine in a well-ventilated place. Do not overfill the tank and always close the filler cap securely.



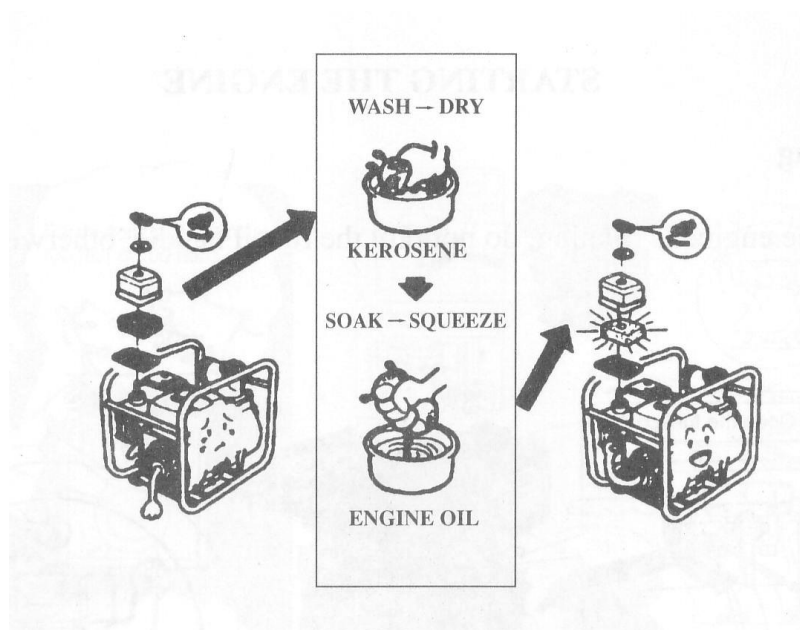
Air Cleaner

Before starting your displacement pump, remove your air cleaner cover and verify that the air filter is clean and free of debris. Clean the air filter if necessary.

AIR CLEANER



NO GOOD CONDITION



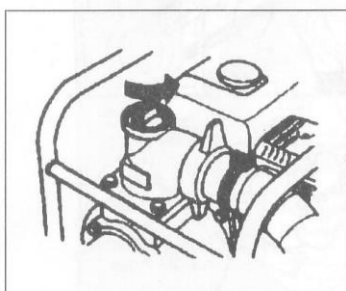
Priming water

The pump chamber should be completely filled before operating.

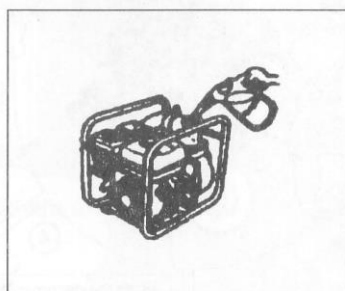
Note: Never operate the pump without priming water or the pump will overheat. Prolonged operation of the pump under these dry conditions will damage and destroy the seal.

Follow these guidelines to fill the pump with priming water.

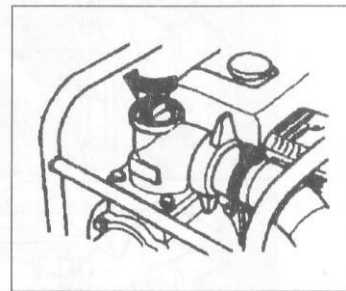
1. Remove plug



2. Fill water



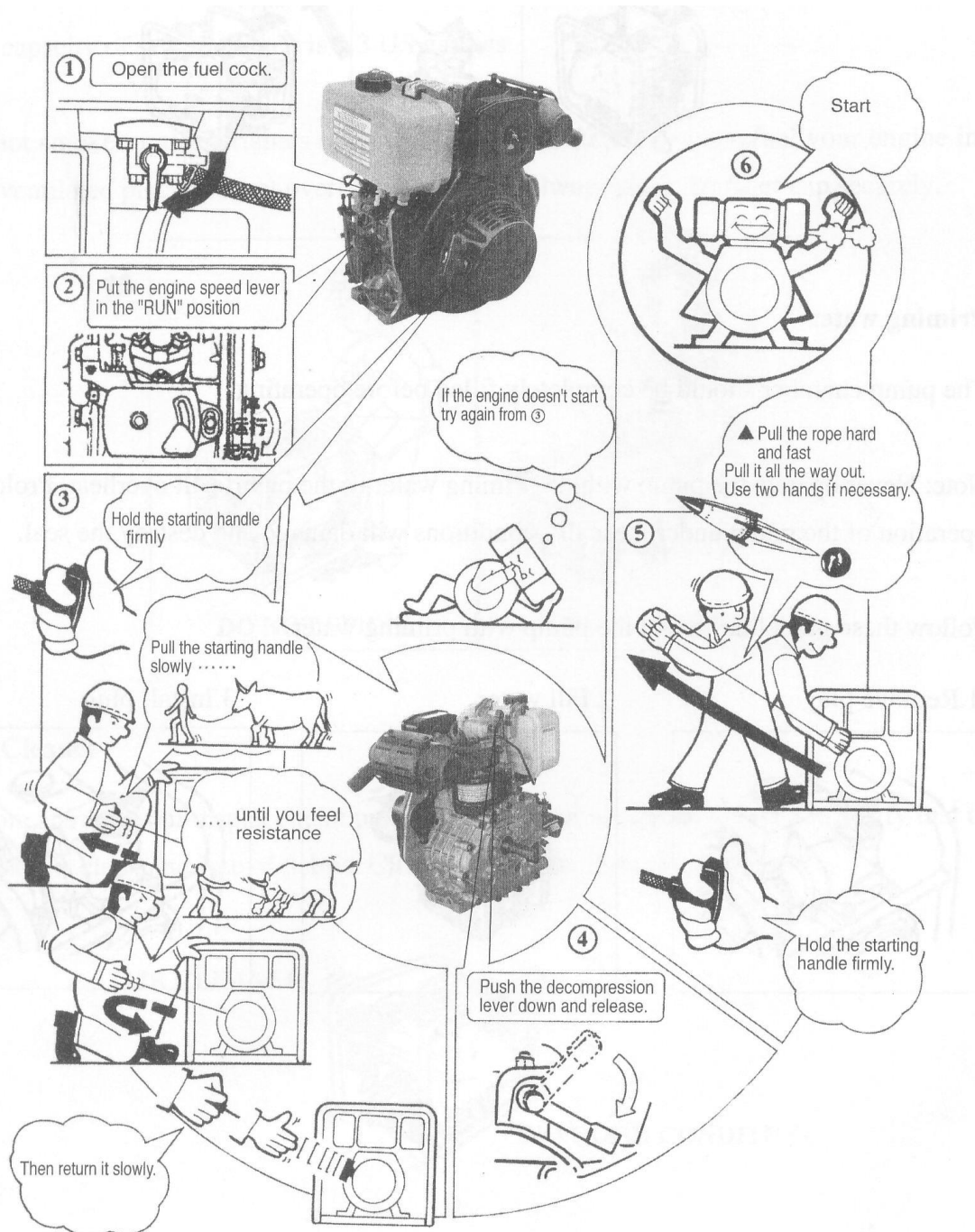
3. Install plug

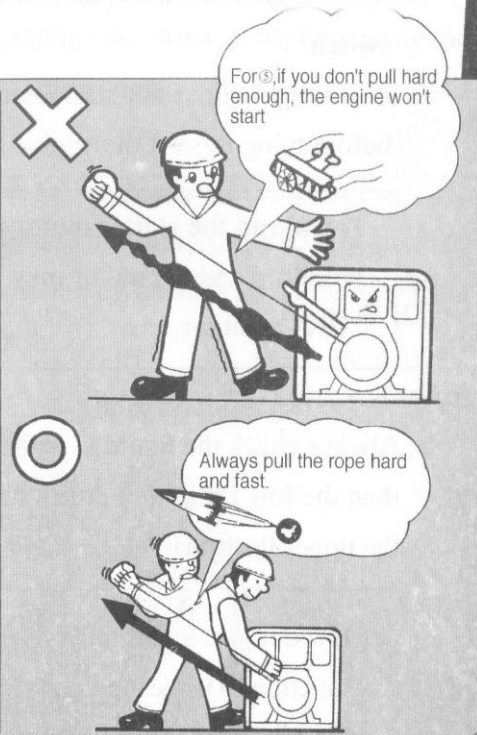
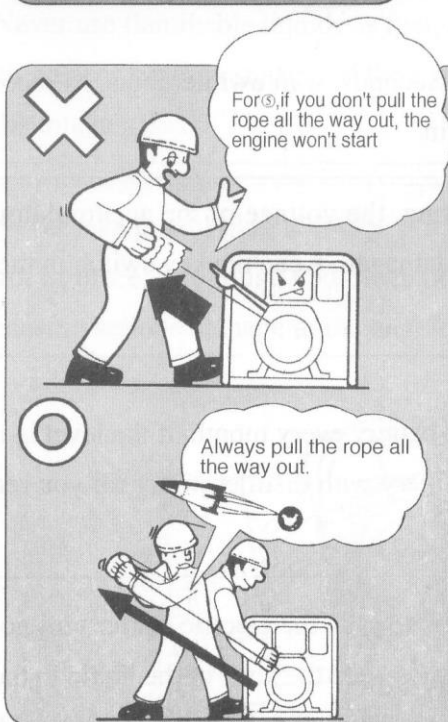
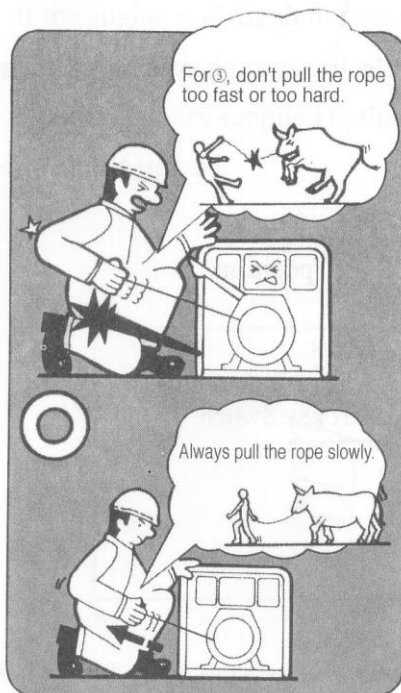


STARTING THE ENGINE

Recoil Starting

Note: When the engine is running, do not pull the recoil handle, otherwise the engine may be damaged.



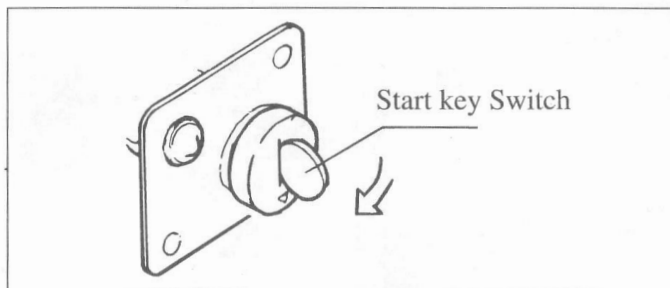


Diesel engine with electric starter system

Starting

The preparation of the diesel engine for the electric starting system is the same as the manual recoil type.

- a. Open the fuel cock.
- b. Set the speed governor lever to the start position.
- c. Turn the start switch clockwise to the “Start” position.



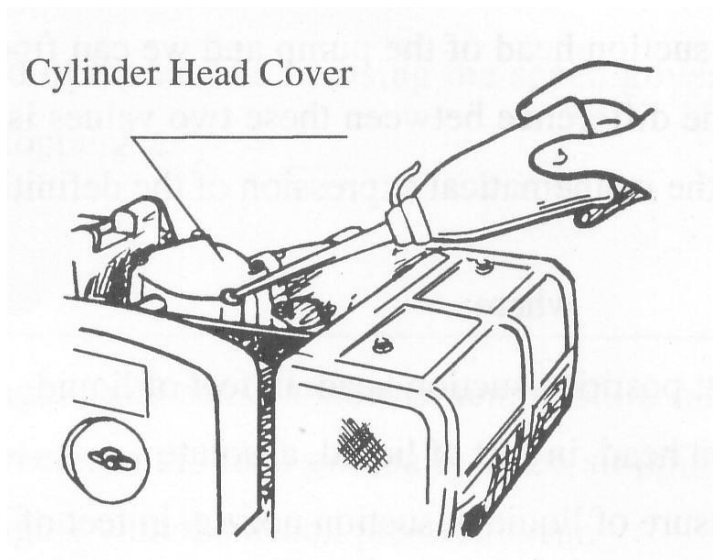
- d. If the engine is started, immediately remove your hand away from the key switch.
- e. If the engine does not start after 10 seconds, wait awhile (about 15 seconds) before trying to start the engine again.

If you run the starter motor too long, the voltage of the accumulator will drop and the motor may be damaged. Keep the key switch in the “ON” position

Cold starting

If the engine is difficult to start in winter, take off the rubber seal plug and put 2cc of machine oil into the hole.

Notice: Engines supplied to the Torrid Zone will not contain the rubber plug. A solid plug is provided instead.



Warning

Never use flammable liquids as fuel, as gasoline etc. Also, never take away the air cleaner for easy starting of the engine doing so may cause explosions from the intake gases.

Never take the oil plug unless you're planning on filling the oil. If the plug is not in place, rain, dust, and other impurities may be sucked into the engine causing serious damage to the engine parts.

Oiling screw plug



4-4 Operating conditions

The displacement pumps operating range should be based upon the NPSH(net positive SUC-tion head). A more precise definition of available NPSH is “the difference between the total suction head and the vapor pressure of the liquid, in feet of liquid, at the suction flang” . We can measure the total suction head of the pump and we can find vapor pressure from the liquid temperature. The difference between these two values is the available NPSH. The following equation is the mathematical expression of the definition for available NPSH:

$$h_{sv}=h_{sa}-h_{vpa}$$

where:

h_{sv} =available net positive suction head, in feet of liquid

h_{sa} =total suction head, in feet of liquid, absolute

h_{vpa} =vapor pressure of liquid at suction nozzle, in feet of liquid, absolute

The approximation will be based at an altitude less than 250 meters or 820 feet. Subtracting 10 meters or 32.8 feet from the net positive suction head can approximate the suction head of the pump. When increasing the altitude of operation, the atmosphere should be decreased as well as the suction head of the pump. The amount of decrease can be estimated by subtracting 10 meters from the local atmosphere value. If you are using your pump at high altitudes and having difficulty obtaining NPSH values, please consult your local power equipment dealer.

It is better to use a straight and short pipeline when operating the displacement pump. A short and straight pipeline will minimize the frictional losses in the pipeline. The pipeline should be fixed to something to avoid vibrations. Before operating the pump, you must check the connections between the pump and pipelines to verify that everything is installed properly and that there are no leaks of any kind.

The filter net should be kept at a certain distance between the river surface, river bottom, and riverbank. The net must also be submerged at least 3 meters or 1 foot below the water surface to avoid sucking air into the pipeline. The net must also be 2 meters or 7 feet above the river bottom or riverbank to avoid sucking stones or weeds into the pipeline.

If the gap between the impeller and flow guidance surface is over 1 mm, an adjustment shim can be added on the shaft shoulder to reduce the gap. This will permit continuous use of the water pump. Please refer to figure 2-2 for a diagram of the water pump and a listing of the components.

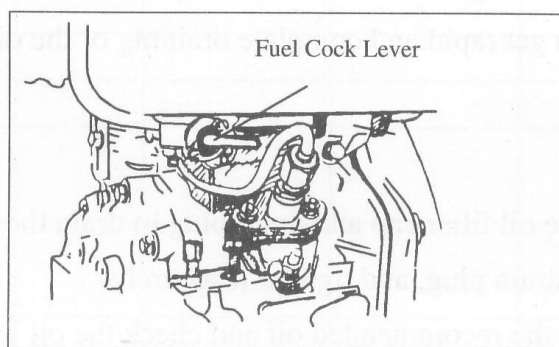
Stopping the pump

First, bring down the speed of the engine by using the speed governor. Let it run for 3 minutes at no load before stopping it.

Then stop the engine.

Sudden stops to the engine will cause abnormal temperature increases in the block of the engine. Decrease the load gradually when stopping the engine. Also, never stop the engine with the decompression lever.

Set the fuel cock at “S” (stop position)



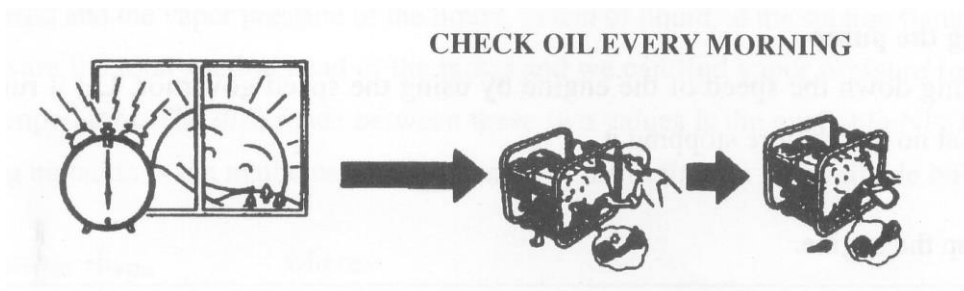
If the engine comes with an electric starter, turn the starting switch to the “Off” position.

Pull the recoil handle slowly until pressure is felt by your hand, this means the piston is on the compression stroke; where the intake and exhaust valves are closed and then let the handle recoil back into the engine. This natural position will prevent rust from occurring when the engine is being stored for long periods of time. Perform these steps only when the engine is off; doing so otherwise will damage the engine.

MAINTENANCE

Oil check

During operation, it is a good idea to check the oil every morning to ensure the engine has sufficient oil.



Oil change

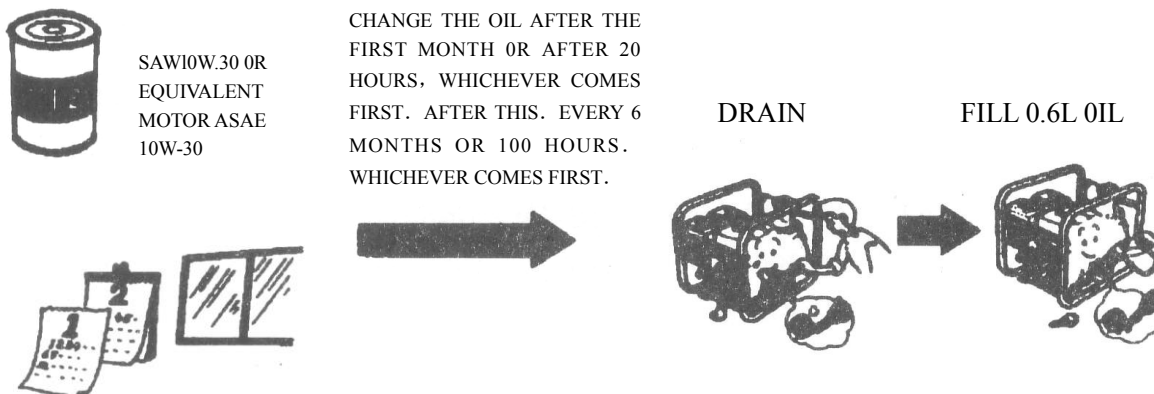
Engine oil is a critical factor in determining the life of your engine. Change the engine oil on time. Change the engine oil more frequently if the engine is used in dusty areas.

Changing the oil while the engine is still warm will yield best results for the engine. When the oil is still warm, you get rapid and complete draining of the oil.

Oil change procedures

- Remove the oil filler cap and drain plug to drain the oil
- Install the drain plug, and tighten it securely.
- Refill with the recommended oil and check the oil level.
- Install the oil filler cap.

The engine oil capacity is .60 liters or .63 US quarts



Note: Do not touch motor oil for long periods of time. Used motor oil can cause skin cancer if it comes in contact with the skin for prolonged periods of time. Getting cancer from used motor oil is unlikely unless you handle used motor oil on a daily basis. To be safe always wash your hands thoroughly with soap and water as soon as possible after handling used oil.

Below a maintenance schedule table is provided.

| Item \ Time | Daily | After 20 hours or 1 month | 100 Hours or Every 3 month | 500 Hours Every 6 month | 1000 Hours or Every year |
|-------------------------------------|-------------|--|-------------------------------|----------------------------|-----------------------------|
| Check and tighten the nut and screw | ○ | | | | |
| Check and fill machine oil | ○ | | | | |
| Change machine oil | | (First time) | (Second time and later) | | |
| Clean and change oil filter | | | | ○ | ● (Change) |
| Check oil-leakage | ○ | | | | |
| Change the core of air filter | | Cycle of check and main-tenance will be shoened at dusty place. | | ○ | |
| Cleanfuel tank | Every month | | | | |
| Clean or change fuel filter | | | | ○ (Clean) | ○ (Change) |
| Check nozzle | | | | ● | |
| Check injection pump | | | | ● | |
| Check pipeline of fuel | | | | ○ (Change if | |

| | | | | | |
|---|------------|---|--|------------|---|
| | | | | necessary) | |
| Adjust valve clearance of inlet and exhaust | | ● (First time) | | ● | |
| Grind valve holder Of inlet and exhaust | | | | | ● |
| Change piston ring | | | | | ● |
| Check accumulator liquid | each month | | | | |
| Clean the core of air filter | | ○ (Clean) every month or 50 hours | | | |

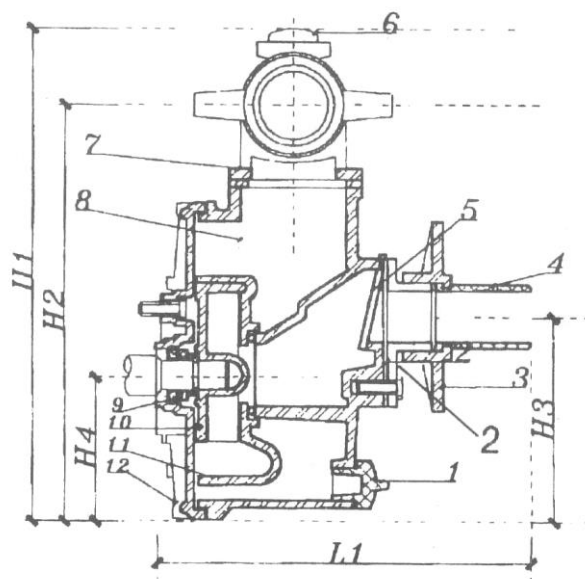
Note: “●” mark indicates that it needs special wrench, please contact with dealer.

Air filter service

Always keep the air filter clean or replace if necessary. Also, if the air filter is dirty or clogged, the performance of the engine goes down. If operating the engine in a dusty area, service the air filter more frequently as dust particles will clog the filter at a faster rate. Never run the engine without an air filter, dust particles may get into the intake system and damage the engine. Rapid engine wear will occur if the engine is run without the air filter. Do not wash the air filter if it is the paper type. Also, never use gasoline to wash air filter elements because gasoline is highly flammable and dangerous. A fire or explosion could occur.

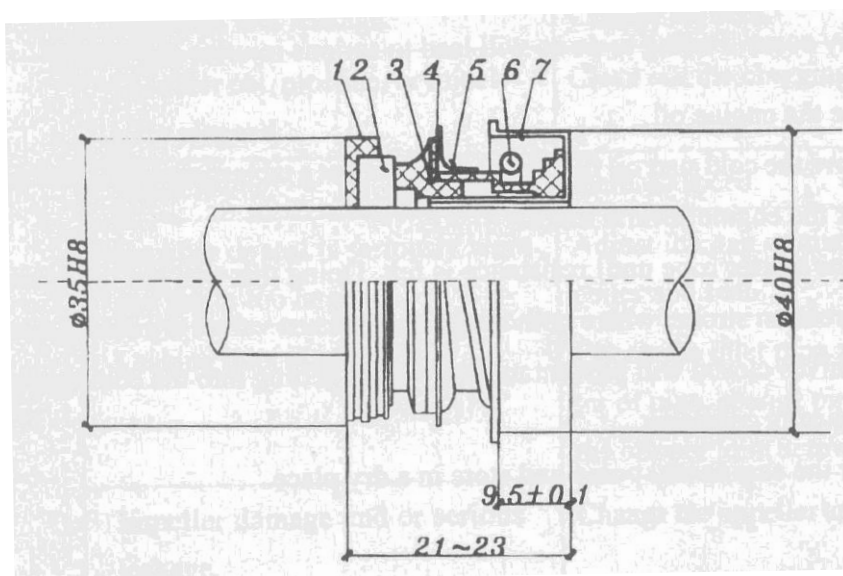
Instructions on changing the air filter.

- Take the wing nut off and remove the air filter cover. Remove the elements and separate them. Check the elements for tears and holes. If holes or tears are present, replace the air filter elements.
- The foam element can be washed. Warm water and household detergent will work fine for washing the foam filter element. After washing, rinse it thoroughly with water and allow the element to dry. Soak the element in clean engine oil and squeeze the oil out. If there is too much oil left in foam element, the engine will smoke during startup. Tap lightly several times on a hard surface to remove excess dirt from the paper filter.
- Never brush on the paper element as this just forces more dirt into the paper element. Use compressed air to blow from the inside out to remove the excess dirt.



- | | |
|-------------------------|-------------------|
| 1. Drain screw | 7. Outlet elbow |
| 2. Inlet pipe connector | 8. Pump case |
| 3. Tightening flange | 9. Shaft seal |
| 4. Inlet pipe | 10. Impeller |
| 5. Door valve | 11. Flow guidance |
| 6. Water addition port | 12. Pump cover |

Note: When changing the seal on the pump, be sure to apply adhesive to the seal and the pump housing. This will prevent future leaks. Also while installing the seal, do not hit or apply force, as this will damage the seal. Slowly ease the seal into place. Please refer to Figure 2-3 for a cross sectional view of the housing and shaft.



1. Sealing ring
2. Ceramic ring
3. Fixed graphite ring
4. Corrugated pipe
5. Washer

Note: After operation of the pump during winter, be sure to drain all the liquid out of the pump to prevent damage to the pump. The pump may be damaged if left over liquid in the pump freezes.

TRANSPORTING AND STORAGE

A few guidelines need to be followed before transporting the pump. Below is a list of instructions to be followed during transportation.

- When transporting the pump, turn the fuel valve off and keep the pump on a level surface to prevent fuel spillage.
- Secure the pump unit to a fixed object when transporting to prevent the pump from bouncing around. Continuous bouncing around can damage the pump's internals.

Before storing the pump for long periods of time, please follow the guidelines below.

- Clean the pump interior before stopping the pump. Remove the pump drain plug and empty all fluids from the pump. Leaving fluid in the pump will cause rapid corrosion to the impeller.
- Turn the fuel valve to the "Off" position and empty all of the fuel out of the gas tank.

Note: While dealing with diesel, do not smoke or allow flames to come near the fuel as accidents may occur. Failing to do so will lead to serious injuries and death.

- Change the engine oil
- Remove the cold start oil fill plug and pour about a tablespoon of oil into the cylinder. Crank the engine several times.
- Pull the starter rope until resistance is felt. Doing this will put the cylinder on the compression stroke; where both intake and exhaust valves are closed. Having these two valves closed will prevent moisture from getting into the combustion chamber and causing corrosion.
- Cover the engine and pump and store in a dry place.

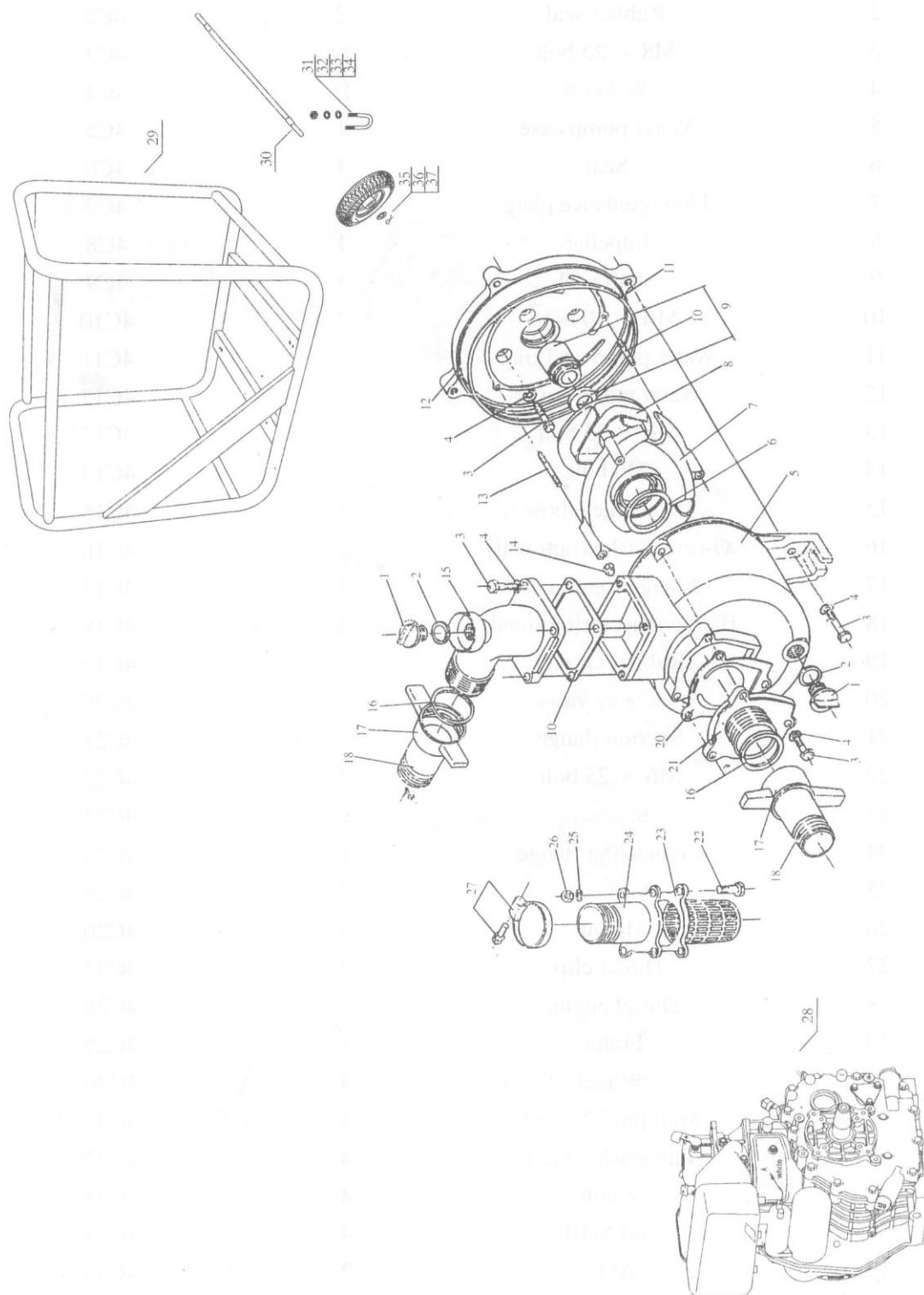
TROUBLESHOOTING

| Problem | Cause | Remedy |
|---|--|--|
| Pump not pumping liquid | Not enough fill water. | Refill the pump with water. |
| | Leaking inlet pipe. | Check the inlet pipe and connector of pipe, change pipe or tighten the clipper joint screw. |
| | Low pump speed. | Adjust the engine speed accordingly or find cause within the engine |
| | The filter net is clogged. | Check and clean the filter net. |
| | Capacity of the pump has been exceeded. | Check the position of the pump and fix the operating conditions as specified. |
| | Seal wear and leakage. | Change the seal. |
| Not enough water flow | The filter net, pipeline, or impeller is clogged. | Clean out the clogging matter. |
| | Speed is low. | Increase speed. |
| | Impeller or seal is seriously worn and gap is too large. | Adjust the gap or change the impeller and seal. |
| | Leaking inlet pipe. | Check the inlet pipe and connector of pipe, change pipe or tighten the clipper joint screw. |
| | Impeller damage or serious leakage. | Change the impeller to a new one. |
| Flow of water is not steady or constant | The total lift is too high. | Check for the cause of the problem and adjust if necessary. |
| | There is air in the pump or the inlet pipe and seal are leaking. | Take the air drain cap off and release the air. Check the pipeline and or change the pump seals. |
| | Engine speed is not stable or constant | Adjust the speed of the engine |

| Problem | Cause | Remedy |
|--|--|--|
| Power consumption of pump is too large | The impeller and flow guidance are rubbing each other. | Listen to the sound of the pump carefully. If there are rubbing noises, adjust the impeller until the noise is gone. |
| | The impeller is clogged with weeds or foreign matter. | Check and clean the pump. |
| No flow suddenly | The connector of the inlet pipe is loose or is leaking. | Check the inlet pipeline and fix accordingly. |
| | Suction head has been exceeded. | Check the suction head and lower the position of the pump. |
| Vibrational noises | Suction head is too high and causing cavitation. | Check the suction head and lower the position of the pump. |
| | Large water output. | Decrease the output of the water. |
| | Inlet pipe is clogged with foreign matter, so the resistance is too large. | Check the inlet pipe and filter net and clean if necessary. |
| | Rotary part is loose. | Listen carefully and inspect the part that causes the noise then stop the machine and adjust as necessary. |
| | Pump unit is loose or not installed properly. | Stop the machine and adjust the pump and engine. |
| | Air inside the pump unit or air inside the pipeline. | Remove the air drain screw and eliminate the air. |
| | Impeller damaged | Stop the machine and replace the impeller. |

PAKT LISTINGS

DTP100



| No. | Description | Qty. |
|-----|--------------------------|------|
| 1 | Drain Plug | 2 |
| 2 | Rubber seal | 2 |
| 3 | M8×25 bolt | 15 |
| 4 | Wsher 8 | 16 |
| 5 | Waterpump case | 1 |
| 6 | Seal | 1 |
| 7 | Flow guidance plate | 1 |
| 8 | Impeller | 1 |
| 9 | Shaft seal | 1 |
| 10 | M6×50 bolt | 2 |
| 11 | Water pump seal ring | 1 |
| 12 | Water pump cover | 1 |
| 13 | M6×55 bolt | 1 |
| 14 | M6 bolt | 3 |
| 15 | Discharge elbow | 1 |
| 16 | O-ring Gasket(optional) | 2 |
| 17 | Flange(optional) | 2 |
| 18 | Barb connector(optional) | 2 |
| 19 | Rubber Gasket | 1 |
| 20 | One way valve | 1 |
| 21 | Suction flange | 1 |
| 22 | M6×25 bolt | 4 |
| 23 | Strainer | 1 |
| 24 | Connecting flange | 1 |
| 25 | Washer 6 | 4 |
| 26 | M6 nut | 4 |
| 27 | Throat clip | 3 |
| 28 | Diesel engine | 1 |
| 29 | Frame | 1 |
| 30 | Wheel | 4 |
| 31 | Split pin 32×32 | 4 |
| 32 | Flat washer 020 | 4 |
| 33 | V bolt | 4 |
| 34 | Nut M10 | 4 |
| 35 | Axle | 2 |