

OPERATION MANUAL



MODEL QP4TK TRASH PUMP (KUBOTA OC95-E4 DIESEL ENGINE)

Revision # 3 (05/21/20)



THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

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PROPOSITION 65 WARNING



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NOTICE

Specifications and part numbers are subject to change without notice.

SAFETY INFORMATION

Do not operate or service the equipment before reading the entire manual. Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the safety messages and operating instructions could result in injury to yourself and others.



SAFETY MESSAGES

The four safety messages shown below will inform you about potential hazards that could injure you or others. The safety messages specifically address the level of exposure to the operator and are preceded by one of four words: **DANGER**, **WARNING**, **CAUTION** or **NOTICE**.

SAFETY SYMBOLS

! DANGER

Indicates a hazardous situation which, if not avoided, **WILL** result in **DEATH** or **SERIOUS INJURY**.

! WARNING

Indicates a hazardous situation which, if not avoided, **COULD** result in **DEATH** or **SERIOUS INJURY**.

! CAUTION

Indicates a hazardous situation which, if not avoided, **COULD** result in **MINOR** or **MODERATE INJURY**.

NOTICE

Addresses practices not related to personal injury.

Potential hazards associated with the operation of this equipment will be referenced with hazard symbols which may appear throughout this manual in conjunction with safety messages.

Symbol	Safety Hazard
	Lethal exhaust gas hazards
	Explosion hazards
	Burn hazards
	Pressurized fluid hazards
	Battery acid hazards
	Eye safety hazards

SAFETY INFORMATION

GENERAL SAFETY

CAUTION

- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, respiratory protection, hearing protection, steel-toed boots and other protective devices required by the job or city and state regulations.



- **NEVER** operate this equipment when not feeling well due to fatigue, illness or when under medication.



- **NEVER** operate this equipment under the influence of drugs or alcohol.



NOTICE

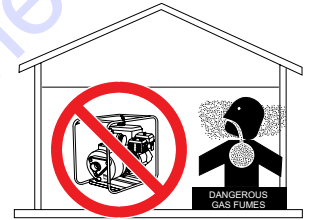
- This equipment should only be operated by trained and qualified personnel 18 years of age and older.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.
- **NEVER** use accessories or attachments that are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.
- **ALWAYS** know the location of the nearest fire extinguisher.
- **ALWAYS** know the location of the nearest first aid kit.
- **ALWAYS** know the location of the nearest phone or **keep a phone on the job site**. Also, know the phone numbers of the nearest ambulance, doctor and fire department. This information will be invaluable in the case of an emergency.



PUMP SAFETY

DANGER

- **NEVER** pump volatile, explosive, flammable or low flash point fluids. These fluids could ignite or explode.
- The engine fuel exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled.
- The engine of this equipment requires an adequate free flow of cooling air. **NEVER** operate this equipment in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause injury to people and property and serious damage to the equipment or engine.



- **NEVER** operate the equipment in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe bodily harm or even death.



WARNING

- **NEVER** pump corrosive chemicals or water containing toxic substances. These fluids could create serious health and environmental hazards. Contact local authorities for assistance.
- **NEVER** open the priming plug when pump is hot. Hot water inside could be pressurized much like the radiator of an automobile. Allow pump to cool to the touch before loosening plug. The possibility exists of scalding, resulting in severe bodily harm.
- **NEVER** disconnect any emergency or safety devices. These devices are intended for operator safety. Disconnection of these devices can cause severe injury, bodily harm or even death. Disconnection of any of these devices will void all warranties.



SAFETY INFORMATION

CAUTION

- **NEVER** lubricate components or attempt service on a running machine.
- **NEVER** block or restrict flow from discharge hose. Remove kinks from discharge line before starting pump. Operation with a blocked discharge line can cause water inside pump to overheat.

NOTICE

- **ALWAYS** fill the pump casing with water before starting the engine. Failure to maintain water inside the pump housing will cause severe damage to the pump and mechanical seal.
- In winter drain water from pump housing to prevent freezing.
- **NEVER** start the pump with the clean-out cover removed. The rotating impeller inside the pump can cut or sever objects caught in it. Before starting the pump, check that the clean-out cover is securely fastened.
- **ALWAYS** keep the machine in proper running condition.
- **ALWAYS** ensure pump is on level ground before use.
- Fix damage to machine and replace any broken parts immediately.
- **ALWAYS** store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children and unauthorized personnel.

ENGINE SAFETY

WARNING

- **NEVER** operate the engine with heat shields or guards removed.
- **DO NOT** remove the engine oil drain plug while the engine is hot. Hot oil will gush out of the oil tank and severely scald any persons in the general area of the pump.



CAUTION

- **NEVER** touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing equipment.



NOTICE

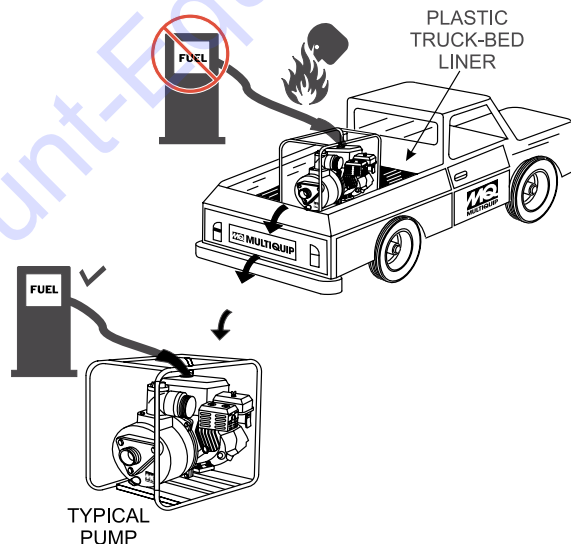
- **NEVER** run engine without an air filter or with a dirty air filter. Severe engine damage may occur. Service air filter frequently to prevent engine malfunction.
- **NEVER** tamper with the factory settings of the engine or engine governor. Damage to the engine or equipment can result if operating in speed ranges above the maximum allowable.



FUEL SAFETY


DANGER

- **DO NOT** add fuel to equipment if it is placed inside truck bed with plastic liner. Possibility exists of explosion or fire due to static electricity.




- **DO NOT** start the engine near spilled fuel or combustible fluids. Fuel is extremely flammable and its vapors can cause an explosion if ignited.
- **ALWAYS** refuel in a well-ventilated area, away from sparks and open flames.
- **ALWAYS** use extreme caution when working with flammable liquids.
- **DO NOT** fill the fuel tank while the engine is running or hot.
- **DO NOT** overfill tank, since spilled fuel could ignite if it comes into contact with hot engine parts or sparks from the ignition system.

SAFETY INFORMATION


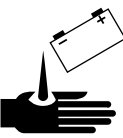
- Store fuel in appropriate containers, in well-ventilated areas and away from sparks and flames.
- **NEVER** use fuel as a cleaning agent.
- **DO NOT** smoke around or near the equipment. Fire or explosion could result from fuel vapors or if fuel is spilled on a hot engine. 

BATTERY SAFETY (ELECTRIC START ONLY)

DANGER

- **DO NOT** drop the battery. There is a possibility that the battery will explode.
- **DO NOT** expose the battery to open flames, sparks, cigarettes, etc. The battery contains combustible gases and liquids. If these gases and liquids come into contact with a flame or spark, an explosion could occur. 

WARNING

- **ALWAYS** wear safety glasses when handling the battery to avoid eye irritation. The battery contains acids that can cause injury to the eyes and skin. 
- Use well-insulated gloves when picking up the battery.
- **ALWAYS** keep the battery charged. If the battery is not charged, combustible gas will build up.
- **DO NOT** charge battery if frozen. Battery can explode. When frozen, warm the battery to at least 61°F (16°C).
- **ALWAYS** recharge the battery in a well-ventilated environment to avoid the risk of a dangerous concentration of combustible gases.
- If the battery liquid (dilute sulfuric acid) comes into contact with **clothing or skin**, rinse skin or clothing immediately with plenty of water. 
- If the battery liquid (dilute sulfuric acid) comes into contact with **eyes**, rinse eyes immediately with plenty of water and contact the nearest doctor or hospital to seek medical attention.

CAUTION

- **ALWAYS** disconnect the **NEGATIVE battery terminal** before performing service on the equipment.
- **ALWAYS** keep battery cables in good working condition. Repair or replace all worn cables.

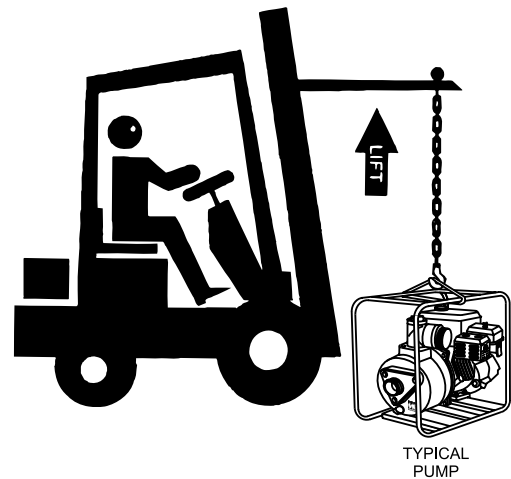
TRANSPORTING SAFETY

CAUTION

- **NEVER** allow any person or animal to stand underneath the equipment while lifting.

NOTICE

- Before lifting, make sure that the equipment parts (hook and vibration insulator) are not damaged and screws are not loose or missing.
- Always make sure crane or lifting device has been properly secured to the lifting bail (hook) of the equipment.
- **ALWAYS** shutdown engine before transporting.
- **NEVER** lift the equipment while the engine is running.
- Tighten fuel tank cap securely and close fuel cock to prevent fuel from spilling.
- Use adequate lifting cable (wire or rope) of sufficient strength.
- Use one point suspension hook and lift straight upwards.



- **DO NOT** lift machine to unnecessary heights.
- **ALWAYS** tie down equipment during transport by securing the equipment with rope.

SAFETY INFORMATION

ENVIRONMENTAL SAFETY/DECOMMISSIONING

NOTICE

Decommissioning is a controlled process used to safely retire a piece of equipment that is no longer serviceable. If the equipment poses an unacceptable and unrepairable safety risk due to wear or damage or is no longer cost effective to maintain (beyond life-cycle reliability) and is to be decommissioned (demolition and dismantlement), be sure to follow rules below.

- **DO NOT** pour waste or oil directly onto the ground, down a drain or into any water source.
- Contact your country's Department of Public Works or recycling agency in your area and arrange for proper disposal of any electrical components, waste or oil associated with this equipment.
- When the life cycle of this equipment is over, remove battery and bring to appropriate facility for lead reclamation. Use safety precautions when handling batteries that contain sulfuric acid.
- When the life cycle of this equipment is over, it is recommended that the trowel frame and all other metal parts be sent to a recycling center.



Metal recycling involves the collection of metal from discarded products and its transformation into raw materials to use in manufacturing a new product.

Recyclers and manufacturers alike promote the process of recycling metal. Using a metal recycling center promotes energy cost savings.

EMISSIONS INFORMATION

NOTICE

The diesel engine used in this equipment has been designed to reduce harmful levels of carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NOx) contained in diesel exhaust emissions.

This engine has been certified to meet US EPA Evaporative emissions requirements in the installed configuration.

Attempting to modify or make adjustments to the engine emission system by unauthorized personnel without proper training could damage the equipment or create an unsafe condition.

Additionally, modifying the fuel system may adversely affect evaporative emissions, resulting in fines or other penalties.

Emission Control Label

The emission control label is an integral part of the emission system and is strictly controlled by regulation(s).

The label must remain with the engine for its entire life.

If a replacement emission label is needed, please contact Discount-equipment.

SPECIFICATIONS (PUMP)

Table 1. Specifications (Pump)		
Pump	Model	QP4TK
	Type	Trash Pump
	Suction	4.0 in. (101.6 mm.)
	Discharge Size	4.0 in. (101.6 mm.)
	Maximum Pumping Capacity	475 gallons/minute (1,798 liters/minute)
	Max. Solids Diameter	2.0 in. (50.8 mm)
	Max. Head	85 ft. (26.0 m)
	Max. Suction Lift	25 ft. (7.62 m)
	Max. Pressure	37.7 psi (260 kPa)
Dry Net Weight		286 lbs. (130 Kg.)

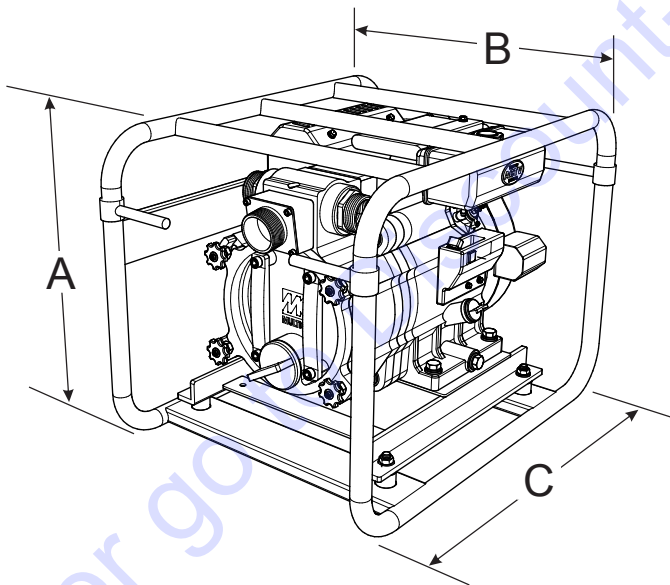


Figure 1. Dimensions

Table 2. Dimensions	
Reference Letter	Dimension in. (mm)
A	28.3 (719)
B	24.4 (620)
C	30.3 (770)

SPECIFICATIONS (ENGINE)

Table 3. Specifications (Engine)	
Model	KUBOTA OC95-E4
Type	Oil-Cooled and Forced Air-Cooling Diesel Engine
Displacement	25.3 in ³ (0.416 liters)
Horsepower	9.4 HP (7 kW) @ 3,600 RPM
Idle Speed	1,300 R.P.M.
Fuel Type	Diesel Fuel
Fuel Capacity	1.45 (US) Gal. (5.5 Liters)
Fuel Consumption	.63 (US) Gal./Hr. (2.38 Liters/Hr.)
Fuel Type	No. 2 Diesel Fuel, ATSM D975
Lube Oil Capacity	1.8 quarts (1.7 liters)
Engine Oil Type	API Service CF-class (SEA #30, 20, 10W30)
Starting Method	Electric Start
Air Cleaner Type	Dry Element
Battery Type	12V, 36AH
Battery Tray Dimensions (L x W x H)	10.1 x 7.0 x 1.2 in. (256.5 x 178 x 30.5 mm)
Weight	124 lbs (56 Kg.)

Performance Curves Self-Priming Trash Pump

Pump Model : **QP4TK** Engine : KUBOTA/ Diesel OC95 Power : 9.4 HP

Suction Line : 4 inch Discharge Line : 4 inch

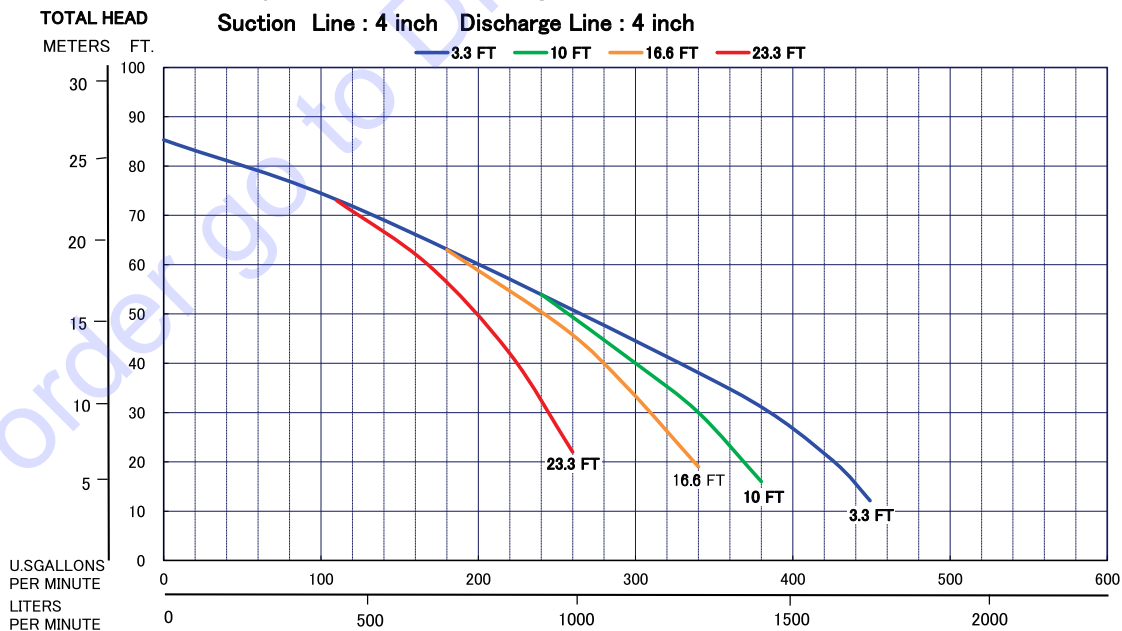


Figure 2. QP4TK Performance Curve

GENERAL INFORMATION

APPLICATION

The **QP4TK Trash Pump** is designed for dewatering applications. Both the suction and discharge ports on the this trash pump use a 4-inch diameter opening, which allows the pump to pump at a rate of approximately 475 gallons/minute (gpm) or 1,798 liters/minute (lpm).

This Wet Primed pump requires that the pump casing is first filled with water to assist with initial self-priming operations. Once a partial vacuum is created within the unit, the reduced atmospheric pressure allows water to flow through the suction line and the centrifugal force of the impeller/volute assembly permits water to be expelled from the discharge ports.

ENGINE

This trash pump is powered by a 9.4 HP, oil and air-cooled **KUBOTA** diesel engine.

TRASH PUMP

Trash pumps derive their name from their ability to handle a greater amount of debris and solids than standard centrifugal pumps. This pump generally handles solids up to 1/2 the size of the discharge opening making them less likely to clog. Also trash pumps are capable of handling water with 25% solids by weight.

The advantage of using a trash pump is that it can be quickly and easily disassembled in the field **“without tools”** and easily cleaned when clogged.

SUCTION LIFT

This pump is intended to be used for dewatering applications and is capable of suction lifts up to 25 feet at sea level. For optimal suction lift performance, keep the suction hose or line as short as possible. In general, always place the pump as close to the water as possible.

PUMP SUPPORT

The pump should always be placed on **solid stationary ground** in a level position.

NEVER place the pump on **soft soil**. The suction hose or pipe connection should always be checked for tightness and leaks. A small suction leak in the hose or fittings could prevent the pump from priming.

ELEVATION

Higher elevations will effect the performance of the pump. Due to less atmospheric pressure at higher altitudes, pumps **DO NOT** have the priming ability that they have at sea level. This is due to the “thinner air” or lack of oxygen at higher altitudes.

A general rule of thumb is that for every 1,000 feet of elevation above sea level a pump will lose one foot of priming ability.

For example, in Flagstaff, Arizona where the elevation is approximately 7,000 feet, the pump would have a suction lift of only 18 feet rather than the 25 feet at sea level. Table 4 shows suction lift at various elevations.

Altitude Feet (Meters)	Suction Lift in Feet (Meters)			
Sea Level	10.0 (3.048)	15.0 (4.572)	20.0 (6.096)	25.0 (7.620)
2,000 (610)	8.80 (2.680)	13.2 (4.023)	17.6 (5.364)	22.0 (6.705)
4,000 (1,219)	7.80 (2.377)	11.7 (3.566)	15.6 (4.754)	19.5 (5.943)
6,000 (1,829)	6.90 (2.103)	10.4 (3.169)	13.8 (4.206)	17.3 (5.273)
8,000 (2,438)	6.20 (1.889)	9.30 (2.834)	12.4 (3.779)	15.5 (4.724)
10,000 (3,048)	5.70 (1.737)	8.60 (2.621)	11.4 (3.474)	14.3 (4.358)

Table 5 shows percentage drops in performance as elevation increases.

Altitude Feet (Meters)	Discharge Flow	Discharge Head
Sea Level	100%	100%
2,000 (610)	97%	95%
4,000 (1,219)	95%	91%
6,000 (1,829)	93%	87%
8,000 (2,438)	91%	83%
10,000 (3,048)	88%	78%

PUMP COMPONENTS

Figure 3 shows key component areas of the QP4TK.

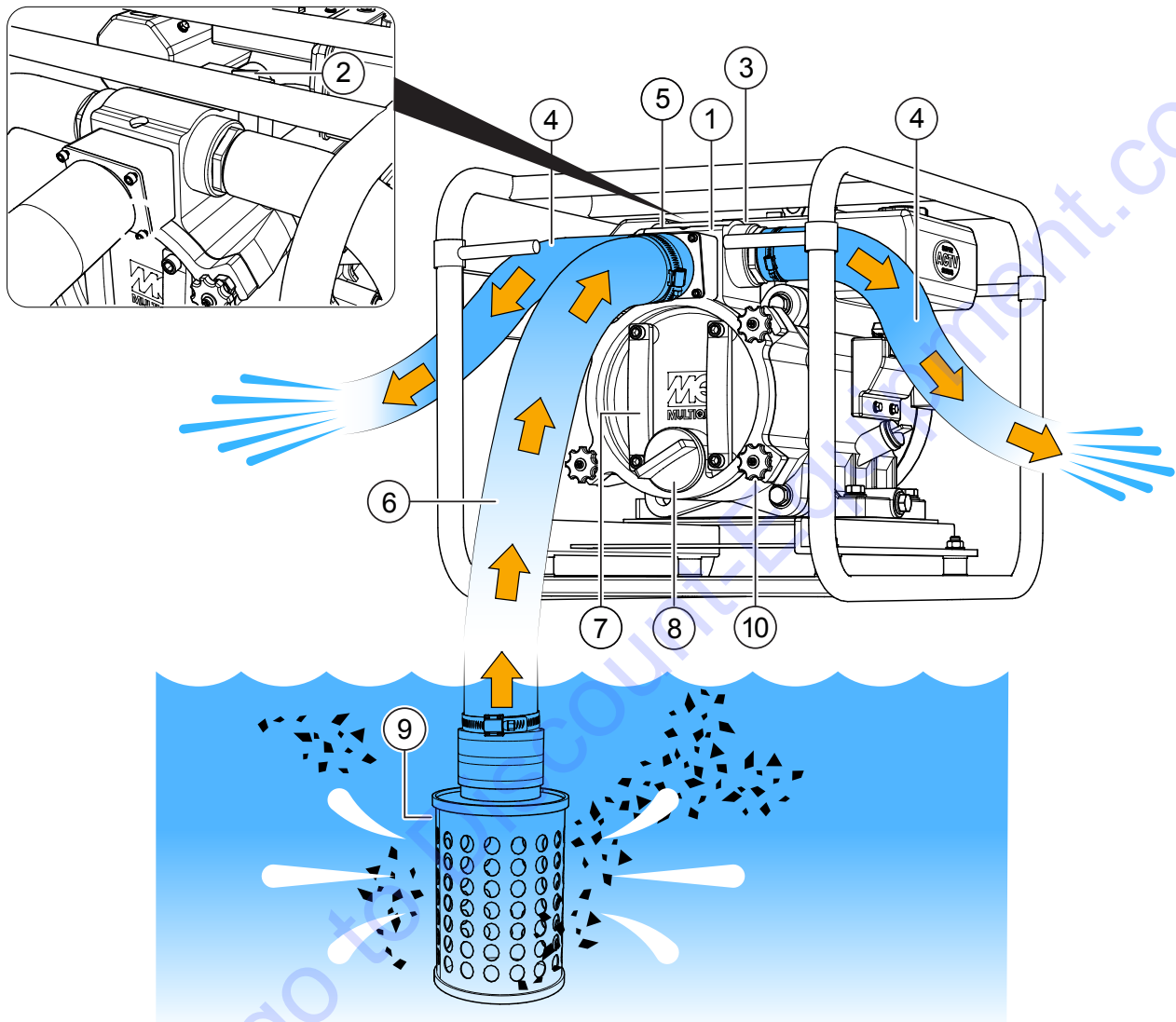


Figure 3. QP4TK Key Component Callouts

PUMP COMPONENTS

1. **Pump** — The model QP4TK is a 4-inch trash pump used in general dewatering applications. Typical dewatering applications consist of: manholes, septic tanks, ponds, ditch water, silt water, muddy water, and water with debris.

2. **Fill Cap** — Prior to operations, the pump casing **MUST** be filled with water. Remove this cap to add water to the pump. After the initial prime, a sufficient amount of water will be retained in the casing so that the operator will not need to re-prime later.

If the casing is dry or has insufficient water, the pump will have difficulty in priming which could lead to premature mechanical seal wear thus causing damage to the pump.

3. **Discharge Port** — The pump is equipped with left and right side discharge ports. These ports are 4" male NPT thread and can accommodate discharge hose or pipe. Quick disconnect (Cam and Groove lock) hoses can be fitted onto the discharge ports with an optional coupler (A400A).

4. **Discharge Hose** — This pump is fitted with 4" male NPT thread discharge ports and can accommodate either threaded discharge hose or pipe. Quick disconnect (Cam and Groove lock) hoses can be fitted onto the discharge ports with an optional coupler (A400A). Make sure hoses lay flat and are not kinked. Contact Discount-equipment for ordering information.

5. **Suction Port** — This pump is fitted with a 4" male NPT thread suction port and can accommodate either a threaded or quick disconnect (Cam and Groove lock) hose. For quick disconnect connections, an optional coupler (A400A) is necessary. Contact Discount-equipment for ordering assistance.

6. **Suction Hose** — Use only recommended suction hoses. This pump is fitted with a 4" male NPT thread suction port and can accommodate threaded or quick disconnect (Cam and Groove lock) suction hose. Cam and Groove lock hose can be fitted onto the suction port with an optional coupler (A400A). Make sure the suction hose is not kinked. Contact Discount-equipment for ordering information.

7. **Clean-Out Cover** — When the pump is subjected to applications where large quantity of debris is present, it may be necessary to clean out the casing cavity of large rocks and such that have not passed through the pump.

8. **Drain Plug** — After usage, and for storage, remove this plug and drain all water from the pump casing.

9. **Strainer** — Always attach a strainer to bottom side of the suction hose to prevent large objects and debris from entering the pump. Strainer should be positioned so that it will remain completely under water. Running the pump with the strainer above water for long periods can damage pump.

10. **Locking Knobs** — To open and gain access to the pump's clean-out cavity, loosen the four **locking knobs**. Turn counter-clockwise to loosen. Grip the cover handles and twist counter-clockwise. Once the cover is clear of the four knob fasteners, pull the cover out towards you.

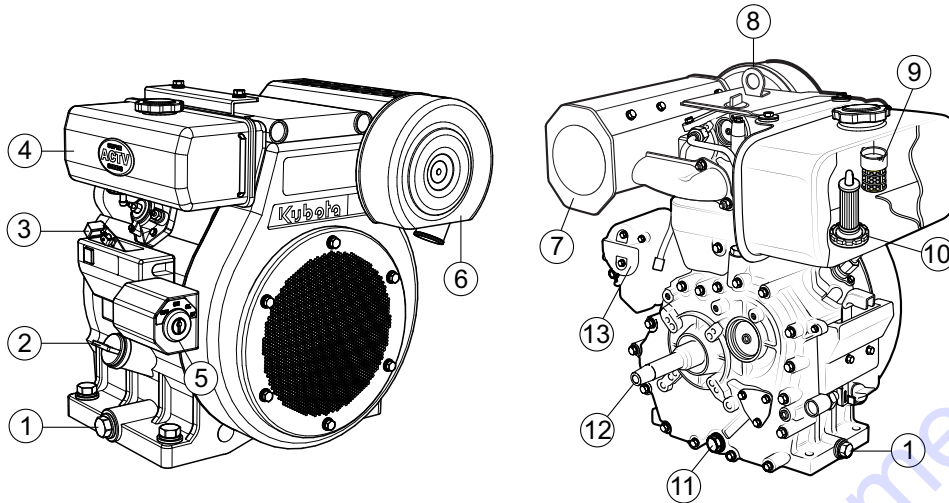



Figure 4. Engine Controls and Components

INITIAL SERVICING

The engine (Figure 4) must be checked for proper lubrication and filled with fuel prior to operation. Refer to the manufacturer's Engine manual for operating and servicing information.

1. **Oil Drain Plugs** — There are two oil drain plugs, one on each side of the engine. Remove either plug to drain engine oil from the engine crankcase.
2. **Dipstick** — Remove dipstick to determine if the engine oil level is low. If low, add oil as specified.
3. **Engine Speed Control Lever** — This lever is connected to the throttle control which is located on the side of the engine. Use this lever to control engine speed.
4. **Fuel Filler Cap/Fuel Tank** — Remove this cap to add **diesel** fuel to the tank. After refueling, always make sure the fuel cap is properly tighten. **DO NOT** over fill. For additional information refer to engine owner's manual.

! DANGER




Adding fuel to the tank should be done only when the engine is stopped and has had an opportunity to cool down. In the event of a fuel spill, **DO NOT** attempt to start the engine until the fuel residue has been completely wiped up, and the area surrounding the engine is dry.

5. **Ignition Switch** — With ignition key inserted, turn key clockwise to start engine.

6. **Air Cleaner/Cover** — Prevents dirt and other debris from entering the fuel system. Remove wing-nut on top of air filter cover to gain access to filter element.

! WARNING



Engine components can generate extreme heat. To prevent burns, **DO NOT** touch these areas while the engine is running or immediately after operating. **NEVER** operate the engine with the muffler removed.

7. **Muffler** — Used to reduce noise and emissions.
8. **Engine Lifting Hook** — Attach a suitable strap or chain to this hook when lifting of the engine is required
9. **Fuel Strainer** — Prevents dirt and debris from entering the fuel injection system.
10. **Fuel Filter** — Prevents dirt and debris from entering the fuel injection system.
11. **Oil Filter** — Remove this bolt to gain access (internal) to the engine oil filter. Service the oil filter as recommended in the maintenance section of this manual.
12. **Crankshaft** — Connect this shaft to the pump engine coupling.
13. **Electric Starter** — Starts engine when ignition key is rotated to the "START" position.

INSPECTION (ENGINE)

CAUTION



DO NOT attempt to operate the pump until the Safety Information, General Information and Inspection sections of this manual have been read and thoroughly understood.

Engine Oil Check

1. To check the engine oil level, place the pump on secure level ground with the engine stopped.
2. Remove the filler dipstick from the engine oil filler hole (See Figure 5) and wipe clean.

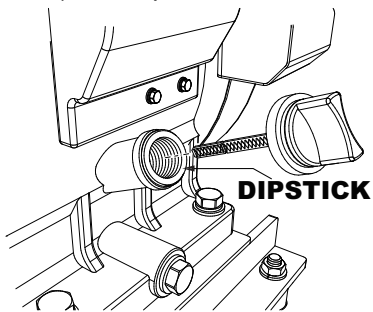


Figure 5. Engine Oil Dipstick (Removal)

3. Insert and remove the dipstick without screwing it into the filler neck. Check the oil level shown on the dipstick.
4. If the oil level is low (See Figure 6), fill to the edge of the oil filler hole with the recommended oil type (Table 3 and Table 6). Maximum oil capacity is 1.80 quarts(1.7 liters).

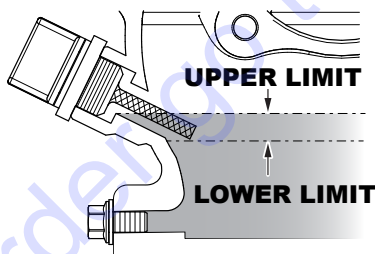


Figure 6. Engine Oil DipStick (Oil Level)

CAUTION



You **must** frequently check the oil level of the engine. There is no low oil shutoff feature for protection and operating the pump with low oil levels will cause severe damage to the engine.

Table 6. Oil Type

Season	Temperature	Oil Type
Summer	25°C or Higher	SAE 10W-30
Spring/Fall	25°C~10°C	SAE 10W-30/20
Winter	0°C or Lower	SAE 10W-10

Fuel Check

DANGER



Motor fuels are highly flammable and can be dangerous if mishandled. **DO NOT** smoke while refueling. **DO NOT** attempt to refuel the pump if the engine is **hot!** or **running**.

1. Remove the fuel cap (Figure 7) located on top of fuel tank.

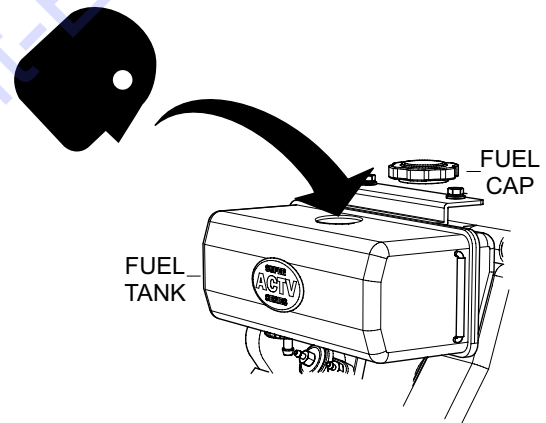


Figure 7. Fuel Check

2. Visually inspect the fuel level. The recommended fuel to use is diesel fuel No. 2-D (ASTM D975).
3. When refueling, **DO NOT** top-off the tank, and wipe up any spilled fuel **immediately!**

1. It is advantageous to place the pump as close as possible to the water source (Figure 8) on a solid, level operating surface. The most critical factor for successful pump operations is not to exceed 25 feet (7.62 meters) total suction lift (at sea level).
2. Ensure that the pump has the proper level of engine oil.
3. Initially prime the pump by removing the fill cap (see Figure 3) and filling the casing with water. If the pump casing is not filled with water prior to operations, it will not be able to start the pumping process and you risk overheating the mechanical seal assembly.
4. Attach the proper suction and discharge hoses to the pump ports. Ensure that the hoses O-rings are in place, and that hoses do not show any cracks, gouges, or holes. The hoses should not be kinked, and must be secured tightly to their respective ports.
5. A proper suction hose is commonly reinforced with rigid PVC helix and is specifically designed to safeguard against collapsing during pumping operations. It is essential that the pump utilize a suction hose with the same diameter as the suction port.
6. Ensure that the strainer is placed on the end of the suction hose, and that the hose is placed in the water source in such a manner as not to bury the strainer into the sand or silt.

⚠ CAUTION

The strainer should be positioned so it will remain completely **under water**. Running the pump with the strainer above water for long periods can damage the pump.

7. The discharge side may utilize proper discharge hoses, PVC pipe, or concrete pipe.
8. Check that discharge hoses lay flat and as straight as possible. Remove any sharp bends or kinks from the hose so the water flow cannot be blocked.
9. Once the engine is started; and depending on the application set-up, the priming process will take a few moments before water begins to flow.
10. The performance of the pump (Flow, Head, Water Velocity, and Pressure) is dependent on the many factors that surround the application. These factors include, but are not limited to: operating altitude, suction lift, discharge and suction hose diameter and length, overall friction loss coefficients, the specific gravity of the fluid to be pumped, the fluid temperature, and total discharge head.

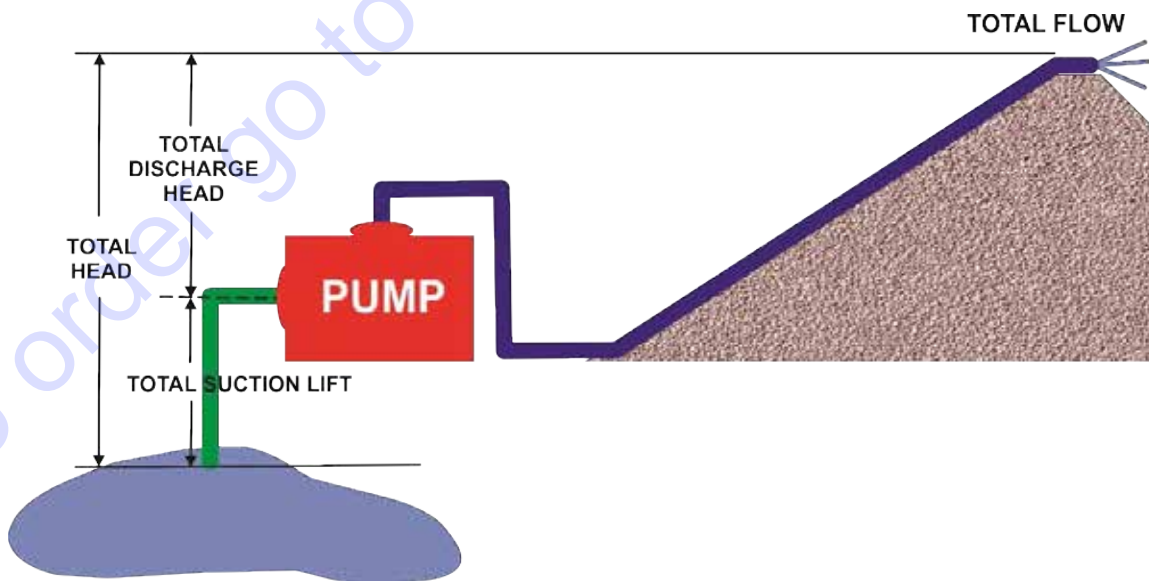


Figure 8. Pump Placement

CAUTION

DO NOT attempt to operate the pump until the Safety, General Information and Inspection sections of this manual have been *read and thoroughly understood*.

CAUTION

DO NOT pump flammable fluids, corrosive chemicals or fluids containing toxic substances. These fluids can create potentially dangerous health and environmental hazards. Contact local authorities for assistance.

CAUTION

This pump uses a water-cooled **mechanical seal** to prevent water from seeping into the engine. The passage of water through the pump casing lubricates the seal and prevents it from overheating. **NEVER** operate the pump without water in the casing as this will cause damage to the mechanical seal.

BEFORE STARTING

1. Clean the unit, removing dirt and dust, particularly the engine cooling air inlet, and air filter.
2. Check the air filter for dirt and dust. If air filter is dirty, replace air filter with a new one as required.
3. Check fastening nuts and bolts for tightness.
4. The QP4TK utilizes a battery for electric start operations. Check the security, connections, and integrity of the battery. The battery tray measures 10" x 7" x 12" and will accept any quality 12V "C" post 12N24-3A type battery (ex. Interstate, YUASA, and Champion).

STARTING THE ENGINE

1. Move the engine speed control lever to the **START** position (Figure 9).

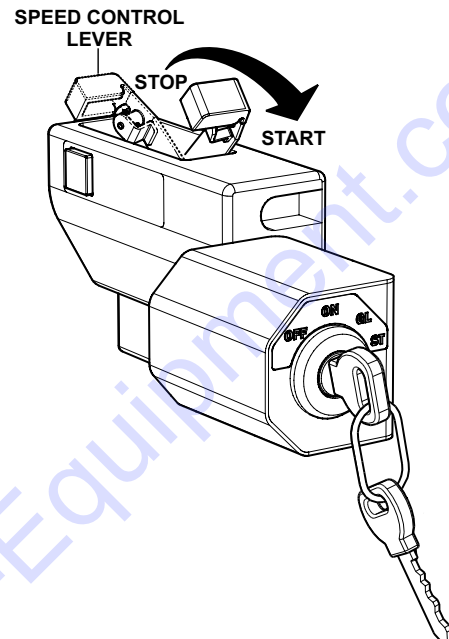


Figure 9. Engine Speed Lever (START Position)

2. Place the ignition key in the start position (Figure 10). Release key when engine starts.

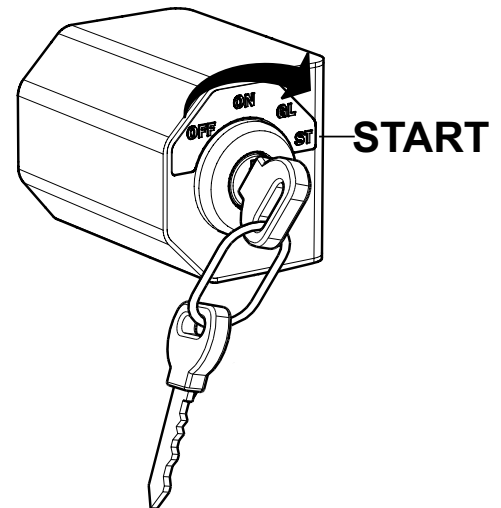


Figure 10. Ignition Switch (Start Position)

3. Before the pump is placed into full operations, run the engine (at low RPM) for several minutes and check for any abnormal conditions such as extreme vibrations, loose components, and fluid leaks.
4. Begin pumping.

⚠ CAUTION

ALWAYS run engine at **full speed** while pumping.

STOPPING THE ENGINE

Normal Shutdown

1. Place the engine speed control lever in the **low speed** position and run the engine for about three minutes with no load.
2. Place the ignition switch key in the **OFF** position.
3. Place the engine speed control lever in the **STOP** position.
4. Remove all hoses from the pump.

⚠ CAUTION

When stopping the engine, reduce the load slowly. **DO NOT** stop engine suddenly since it may cause the temperature to rise abnormally.

Emergency Shutdown

1. To stop engine immediately, quickly place the ignition key in the **OFF** position.

MAINTENANCE (PUMP)

PUMP VACUUM TEST

CAUTION

DO NOT attempt to start the engine unless the pump has previously been **primed** with water. Severe pump damage will occur if pump has not been primed.

To perform the pump vacuum test do the following:

1. Remove the pump fill cap (See Figure 3), and fill the pump with water.
2. Start the engine as outlined in the initial start-up section, and wait for the pump to begin pumping.
3. As shown in Figure 11, place a water hose inside the discharge opening of the pump, and turn on the water. This flow of water into the discharge opening will **prevent** the pump from running dry.
4. Place the Pump Vacuum Tester (P/N 7000030) over the pump suction (inlet) opening (See Figure 11) with the vacuum gauge facing upwards. It may be necessary to apply a small amount of water around the rubber seal of the vacuum tester to make a good suction fit.
5. Check and make sure that there are no air leaks between the vacuum tester and the inlet port on the pump. If air leaks are present reseal vacuum tester.
6. Run the pump for a few minutes while monitoring the vacuum gauge. If the gauge indicates a reading between -25 and -20 in. Hg. (inches of mercury) then it can be assumed that the pump is working correctly.

NOTICE

25 in. Hg (inches of mercury) translates into 25 feet of lift at **sea level**.

7. If the vacuum tester gauge indicates a reading below -20 in. Hg, it can then be assumed that the pump is not functioning correctly, and corrective action needs to be taken.
8. To test the flapper valve, shutdown the engine. The vacuum tester should remain attached to the pump suction inlet port by vacuum. This indicates the pump's flapper valve is seating properly to hold water in the suction hose when the engine is stopped. This prevents backflow and allows for faster priming when the engine is restarted.

ADJUSTING IMPELLER CLEARANCE

1. If it is necessary to replace impeller or volute, be sure clearance between impeller and volute is adjusted.
2. The impeller should be as close to the volute as possible without rubbing against it. Clearance is adjusted by adding or removing shims from behind the impeller.
3. Check clearance between impeller and insert by slowly pulling starter rope to turn impeller.

NOTICE

It is important not to remove too many shims or the clearance between the impeller and volute will become **too wide** and pump performance will be reduced. Remember as the impeller wears down, additional shims may be required to maintain the clearance between the impeller and insert.

4. Check the impeller every six months for wear, and for clearance between the impeller face and the volute. Also check the shaft seal for wear, as well as the shaft sleeve.

PUMP CLEANING

After pumping water containing large amounts of dirt and debris, perform the following:

1. Remove the drain plug from the pump housing (Figure 3) and drain any water left in the pump.
2. Refer to the **Pump Components** section, item 7 for pump cleaning procedures.
3. Clean and remove dirt, debris from pump casing. Inspect impeller and volute for wear. Replace any damaged or worn parts.

CAUTION

The impeller may develop sharp edges. Use extreme care when cleaning around the impeller to prevent being cut.

MAINTENANCE (PUMP)

CAUTION

DO NOT RUN PUMP WITHOUT WATER.

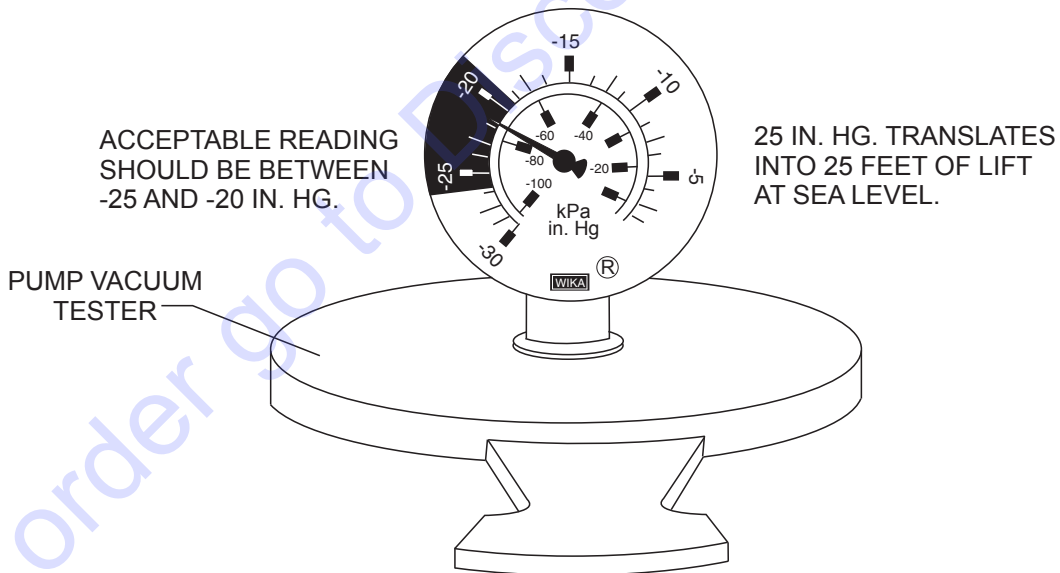
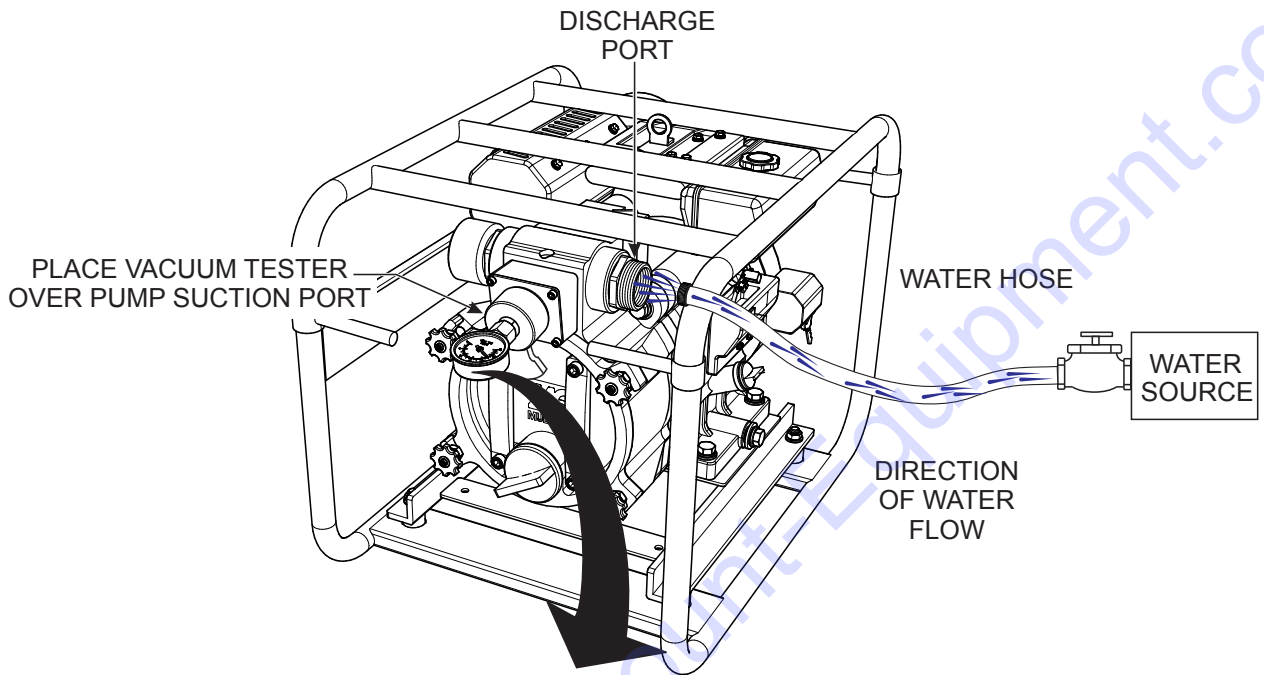


Figure 11. Pump Vacuum Tester

MAINTENANCE (ENGINE)

ENGINE MAINTENANCE

Perform engine maintenance procedures as referenced by Table 7 below:

Description (3)	Operation	Before	First Month or 10 hrs	Every 3 Months or 25 hrs	Every 6 Months or 50 hrs	Every Year or 100 hrs	Every 2 Years or 200 hrs
Engine Oil	CHECK	X					
	CHANGE		X				
Air Cleaner	CHECK	X					
	CHANGE			X (1)			
All Nuts and Bolts	Re-tighten If Necessary	X					
Cooling Fins	CHECK				X		
Spark Arrester	CLEAN					X	
Fuel Tank	CLEAN					X	
Fuel Filter	CHECK					X	
Idle Speed	CHECK-ADJUST					X (2)	
Valve Clearance	CHECK-ADJUST						X (2)
Fuel lines	CHECK	Every 2 years (replace if necessary) (2)					

1. Service more frequently when used in **DUSTY** areas.
2. These items should be serviced by your service dealer, unless you have the proper tools and are mechanically proficient. Refer to the **KUBOTA** shop Manual for service procedures.
3. For commercial use, log hours of operation to determine proper maintenance intervals.

NOTICE

Refer to manufacturer engine manual for specific servicing instructions.

MAINTENANCE (ENGINE)

DAILY

Thoroughly remove dirt and debris from the engine and pump. Inspect or replace the air cleaner elements as necessary. Check and retighten all fasteners as necessary.

ENGINE OIL

1. Drain the engine oil when the oil is **warm** as shown in Figure 12.
2. Unscrew the oil filler dipstick from its holder.
3. Next, remove oil drain bolt and sealing washer and allow the oil to drain into a suitable container.
4. Replace engine oil with recommended type oil as listed in Table 6. Engine oil capacity is 1.8 quarts (1.7 liters). **DO NOT** over fill.
5. Install drain bolt with sealing washer and tighten securely.

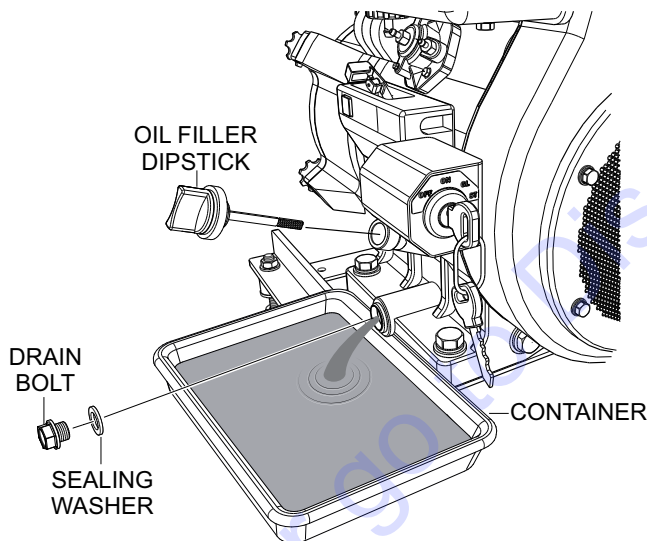


Figure 12. Engine Oil (Draining)

! DANGER



DO NOT use gasoline as a cleaning solvent, because that would create a risk of fire or explosion.

ENGINE AIR CLEANER

NOTICE

Operating the engine without an air filter, with a damaged air filter, or a filter in need of replacement will allow dirt to enter the engine, causing rapid engine wear.

1. Loosen the wing nut and detach the cover of the air cleaner shown in Figure 13.
2. Tap the element (Figure 13) several times on a hard surface to remove dirt, or blow compressed air [not exceeding 30 psi (207 kPa, 2.1 kgf/cm²)] through the element.

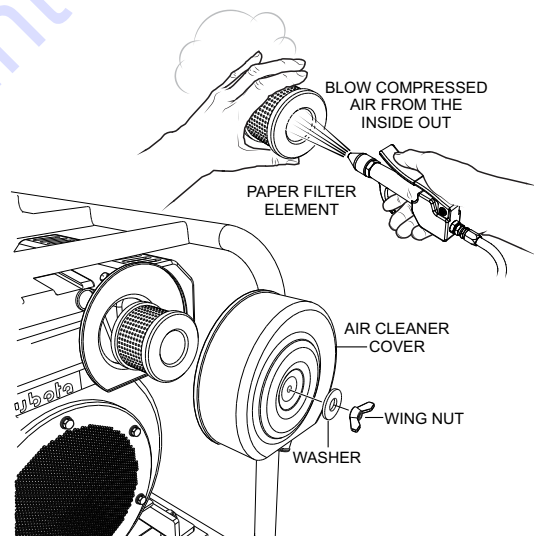


Figure 13. Engine Air Cleaner

! CAUTION



You **must** frequently check the oil level of the engine. There is no low oil shutoff feature for protection and operating the pump with low oil levels will cause severe damage to the engine.

PUMP STORAGE

For storage of the pump for over 30 days, the following is required:

- Drain the fuel tank completely.
- Run the engine for about 3 minutes and then stop engine.
- With the engine off, drain the engine crankcase oil while the engine is still warm. Fill engine crankcase with fresh oil.
- Wipe any oil or dirt that may have accumulated on the engine.
- Remove the drain plug from the pump and drain out any water left in the housing.
- Remove the pump cover and clean the inside of pump housing. Coat the inside of pump housing with a light film of oil to reduce corrosion. A spray can of oil works well for this application.
- Cover suction and discharge ports with duct tape to prevent any foreign matter from falling into pump.
- Cover pump and engine with plastic covering or equivalent and store in a clean, dry place.
- To protect the water cooled-seals, place one-half pint of lubricating oil (new or used) through the discharge opening on the pump and crank the engine several times. This will prevent excessive corrosion and also keep the mechanical seal lubricated.
- Disconnect the battery cables from the battery.

TROUBLESHOOTING (ENGINE)

Troubleshooting (Engine)		
Symptom	Possible Problem	Solution
Engine will not start or start is delayed, although engine can be turned over.	No Fuel reaching injection pump?	Add fuel. Check entire fuel system.
	Defective fuel pump?	Replace fuel pump.
	Fuel filter clogged?	Replace fuel filter and clean tank.
	Faulty fuel supply line?	Replace or repair fuel line.
	Compression too low?	Check piston, cylinder and valves. Adjust or repair per engine repair manual.
	Fuel pump not working correctly?	Repair or replace fuel pump.
	Oil pressure too low?	Check engine oil pressure.
	Low starting temperature limit exceeded?	Comply with cold starting instructions and proper oil viscosity.
	Defective battery?	Charge or replace battery.
	Air or water mixed in fuel system?	Check carefully for loosened fuel line coupling, loose cap nut, etc.
At low temperatures engine will not start.	Engine oil too thick?	Refill engine crankcase with correct type of oil for winter environment.
	Defective battery?	Replace battery.
Engine fires but stops soon as starter is switched off.	Fuel filter blocked?	Replace fuel filter.
	Fuel supply blocked?	Check the entire fuel system.
	Defective fuel pump?	Replace fuel pump.
Engine stops by itself during normal operation.	Fuel tank empty?	Add fuel.
	Fuel filter blocked?	Replace fuel filter.
	Defective fuel pump?	Replace fuel pump.
	Mechanical oil pressure shutdown sensor stops the engine due to low oil?	Add oil. Replace low oil shutdown sensor if necessary.
Low engine power, output and speed.	Fuel tank empty?	Replace fuel filter.
	Fuel filter clogged?	Replace fuel filter.
	Fuel tank venting is inadequate?	Ensure that tank is adequately vented.
	Leaks at pipe unions?	Check threaded pipe unions tape and tighten unions as required.
	Speed control lever does not remain in selected position?	See engine manual for corrective action.
	Engine oil level too full?	Correct engine oil level.
	Injection pump wear?	Use No. 2-D diesel fuel only. Check the fuel injection pump element and delivery valve assembly and replace as necessary.

TROUBLESHOOTING (ENGINE/PUMP)

Troubleshooting (Engine) - continued		
Symptom	Possible Problem	Solution
Low engine power output and low speed, black exhaust smoke.	Air filter blocked?	Clean or replace air filter.
	Incorrect valve clearances?	Adjust valves per engine specification.
	Malfunction at injector?	See engine manual.
Engine overheats.	Too much oil in engine crankcase?	Drain off engine oil down to uppermark on dipstick.
	Entire cooling air system contaminated/ blocked?	Clean cooling air system and cooling fin areas.
	Fan belt broken or elongated?	Change belt or adjust belt tension.
	Coolant insufficient?	Replenish coolant.
	Radiator net or radiator fin clogged with dust?	Clean net or fin carefully.
	Fan, radiator, or radiator cap defective?	Replace defective part.
	Thermostat defective?	Check thermostat and replace if necessary.
	Head gasket defective or water leakage?	Replace parts.
Troubleshooting (Trash Pump)		
Symptom	Possible Problem	Solution
Pump does not take on water.	Not enough priming water in the housing?	Add water.
	Engine speed too low?	Increase throttle.
	Strainer plugged?	Clean strainer.
	Suction hose damaged?	Replace or repair hose, and clamps.
	Air leak at suction port?	Check that fittings are tight and properly sealed.
	Pump is located too high above water line?	Move pump closer to water.
	Debris collecting in pump housing?	Clean pump housing.
	Too much distance between impeller and volute?	Adjust clearance by adding shims or replace impeller. Min. .006 inch - Max. .020 inch
	Water leaking out weep hole between pump and engine?	Check condition of mechanical seal and gaskets, between pump end and engine housing.
Pump takes in water, little or no discharge.	Engine speed too low?	Increase throttle speed.
	Suction strainer partially plugged?	Clean strainer.
	Impeller/Volute worn?	Adjust clearance by adding shims or replace impeller/volute.
Suction hose leaks at inlet.	Fittings/clamps are not sealed properly?	Tighten, replace or add clamp. (Keep extra seals on pump).
	Hose diameter is too large?	Use smaller diameter hose or replace hose.
Discharge does not stay on coupling.	Pressure too high?	Check pressure, add additional clamp.
	Hose kinked or end blocked?	Check hose.
Impeller does not turn, pump is hard to start.	Impeller jammed or blocked?	Open pump cover and clean dirt and debris from inside housing.
	Impeller and volute binding?	Adjust clearance by removing shim from behind impeller.
	Defective engine?	See Engine Owner's Manual.

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