

OPERATION MANUAL



MODEL MQ6TKT TRASH PUMP (KUBOTA D1105-E4B DIESEL ENGINE)

Revision #0 (09/11/26)

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www.multiquip.com



THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

PROPOSITION 65 WARNING



REPORTING SAFETY DEFECTS

If you believe that your vehicle has a defect that could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Multiquip Inc. at 1-800-421-1244.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Multiquip Inc.

To contact NHTSA, you may either call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153), go to <http://www.safercar.gov>, or write to:

Administrator
NHTSA
1200 New Jersey Avenue, SE
Washington, DC 20590

You can also obtain information about motor vehicle safety from <http://www.safercar.gov>.

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TRAINING CHECKLIST

Training Checklist			
No.	Description	OK?	Date
1	Read operation manual completely		
2	Machine layout, location of components, engine check		
3	Fuel system, refueling procedure		
4	Pump priming procedure		
5	Emergency stop procedure		
6	Engine startup procedure		
7	Lifting of machine (lifting bail)		
8	Pump applications (lift, uses, etc.)		
9	Suction strainer placement		
10	Hose connections		
11	Pump placement		
12	Vacuum test procedure		
13	Machine transport and storage		
14	Pump cavity clean-out procedure		

DAILY PRE-OPERATION CHECKLIST

Daily Pre-Operation Checklist		✓	✓	✓	✓	✓	✓
1	Check engine oil level						
2	Fuel level and clean fuel check						
3	Check cooling fins and air flow						
4	Check engine battery and cable connections						
5	Hardware and damage check						
6	Check vacuum pump seal oil						
7	Check bearing housing oil level						
8	Check pump seal						

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.



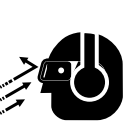
SAFETY MESSAGES

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
	Explosive fuel hazards
	Burn hazards
	Respiratory hazards
	Accidental starting hazards
	Eye and hearing 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 on 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 to 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 the 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 the pump is hot. Hot water inside could be pressurized much like the radiator of an automobile. Allow the pump to cool to the touch before loosening the plug. The possibility exists of scalding, resulting in severe bodily harm.
- **NEVER** operate the pump with a closed discharge hose. The liquid could reach boiling temperatures, build pressure, and cause the casing to rupture or explode.
- **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 the discharge hose. Remove kinks from the discharge line before starting the pump. Operation with a blocked discharge line can cause water inside the 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 the 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 the pump is on level ground before use.
- Fix damage to the 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

- **DO NOT** place hands or fingers inside the engine compartment while the engine is running.
- **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 the equipment.



NOTICE

- **NEVER** run the engine without an air filter or with a dirty air filter. Severe engine damage may occur. Service the 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** 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 the tank, as spilled fuel can ignite if it comes into contact with hot engine parts or sparks from the ignition system.
- 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.



SAFETY INFORMATION

BATTERY SAFETY

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 the battery if frozen. The 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 are not damaged and screws are not loose or missing.
- For safe lifting and placement of the pump, utilize the lifting bail.
- **ALWAYS** shut down the engine before transporting.
- **NEVER** lift the equipment while the engine is running.
- Tighten the fuel tank cap securely and close the fuel cock to prevent fuel from spilling.
- Use one point suspension hook and lift straight upwards.
- **DO NOT** lift the machine to unnecessary heights.
- **ALWAYS** tie down equipment during transport by securing the equipment with rope.

SAFETY INFORMATION

TOWING SAFETY

CAUTION

- Check with your local county or state safety towing regulations, in addition to meeting **Department of Transportation (DOT) safety towing regulations**, before towing your equipment. 
- Refer to the MQ Power trailer manual for additional safety information.
- In order to reduce the possibility of an accident while transporting the equipment on public roads, **ALWAYS** make sure the trailer that supports the equipment and the towing vehicle are mechanically sound and in good operating condition.
- **ALWAYS** shut down the engine before towing.
- Make sure the hitch and coupling of the towing vehicle are rated equal to or greater than the trailer gross vehicle weight rating.
- **ALWAYS** inspect the hitch and coupling for wear. **NEVER** tow a trailer with defective hitches, couplings, chains, etc.
- Check the tire air pressure on both towing vehicle and trailer. **Trailer tires should be inflated to 50 psi cold.** Also check the tire tread wear on both vehicles.
- **ALWAYS** make sure the trailer is equipped with a **safety chain**.
- **ALWAYS** properly attach trailer's safety chains to towing vehicle.
- **ALWAYS** make sure the vehicle and trailer directional, backup, brake and trailer lights are connected and working properly.
- DOT requirements (if applicable) include the following:
 - Connect and test electric brake operation.
 - Secure portable power cables in cable tray with tie wraps.
- The maximum speed for highway towing is **55 mph** unless posted otherwise. Recommended off-road towing is not to exceed **15 mph** or less depending on type of terrain.

- Avoid sudden stops and starts. This can cause skidding or jack-knifing. Smooth, gradual starts and stops will improve towing.
- Avoid sharp turns to prevent rolling.
- The trailer should be adjusted to a level position at all times when towing.
- Raise and lock the trailer wheel stand in the up position when towing.
- Place **chock blocks** underneath the wheels to prevent **rolling** while parked.
- Place **support blocks** underneath the trailer's bumper to prevent **tipping** while parked.
- Use the trailer's swivel jack to adjust the trailer height to a level position while parked.

ENVIRONMENTAL SAFETY

NOTICE

- Dispose of hazardous waste properly. Examples of potentially hazardous waste are used motor oil, fuel, and fuel filters. 
- **DO NOT** use food or plastic containers to dispose of hazardous waste.
- **DO NOT** pour waste, oil or fuel directly onto the ground, down a drain, or into any water source.

SPECIFICATIONS

Table 1. Pump Specifications

Impeller Type	Semi-open
Maximum Pumping Capacity	1,110 gpm (4,202 lpm)
Maximum Suction Lift*	25 ft. (7.62 m)
Maximum Total Head	115 ft. (35 m)
Maximum Pressure	49.8 psi (343 kPa)
Maximum Solids	3 in. (76 mm)
Maximum Fluid Temperature	104°F (40°C)
Suction and Discharge Diameter	6 in. (150 mm)
Thread Type	NPT (male)
Strainer Size	6 in. (150 mm) NPT
Strainer Inlet Size	1.5 in. (38.1 mm)
Dry Net Weight**	1,805 lb. (819 kg)

* Based on pump operation at sea level. Maximum suction lift will be reduced at higher altitudes.

** Trailer-mounted.

Table 2. Engine Specifications

Engine Make	Kubota
Engine Model	D1105-E4B
Engine Type	Vertical, water-cooled, 4-cycle, diesel engine
Number of Cylinders	3
Displacement	68.53 in. ³ (1,123 cm ³)
Bore × Stroke	3.07 in. × 3.09 in. (78 mm × 78.4 mm)
Rated Output	24.8 hp (18.5 kW) @ 3,000 rpm
Maximum Torque	52.7 lbf-ft (71.5 N·m) @ 2,200 rpm
Oil Type	SAE 15W-40
Oil Capacity	5.4 quarts (5.1 liters)
Lubricating System	Forced by trochoid oil pump
Coolant Capacity	3.3 quarts (3.1 liters)
Fuel Type	No.2-D (ASTM D975)*
Fuel Capacity	28 gal. (106 liters)
Starting Method	Electric start
Battery	12V Group 24 550 CCA
Dimensions (L × W × H)	19.6 in. × 15.6 in. × 23.7 in. (498 mm × 396 mm × 602 mm)
Dry Net Weight	205 lb. (93 kg)

* Use ultra-low sulfur diesel fuel

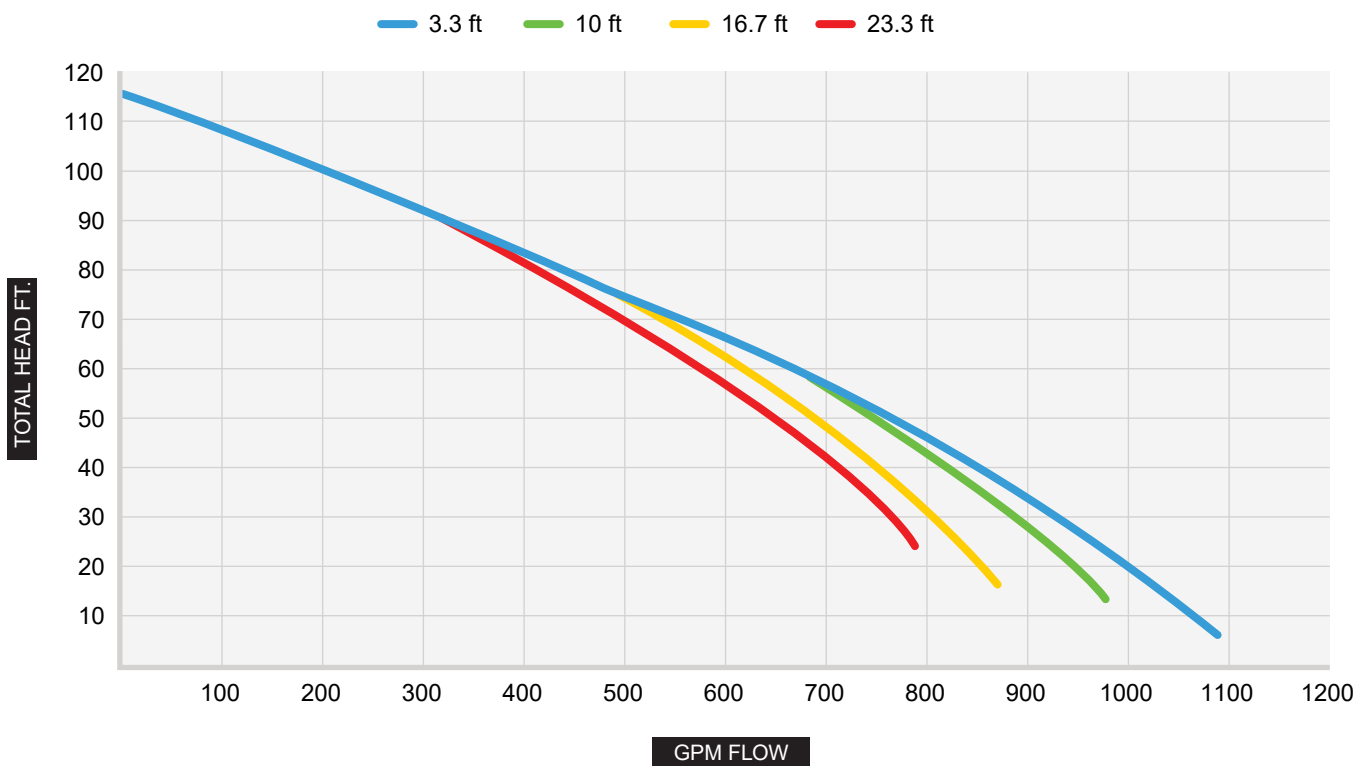


Figure 1. MQ6TKT Performance Curve

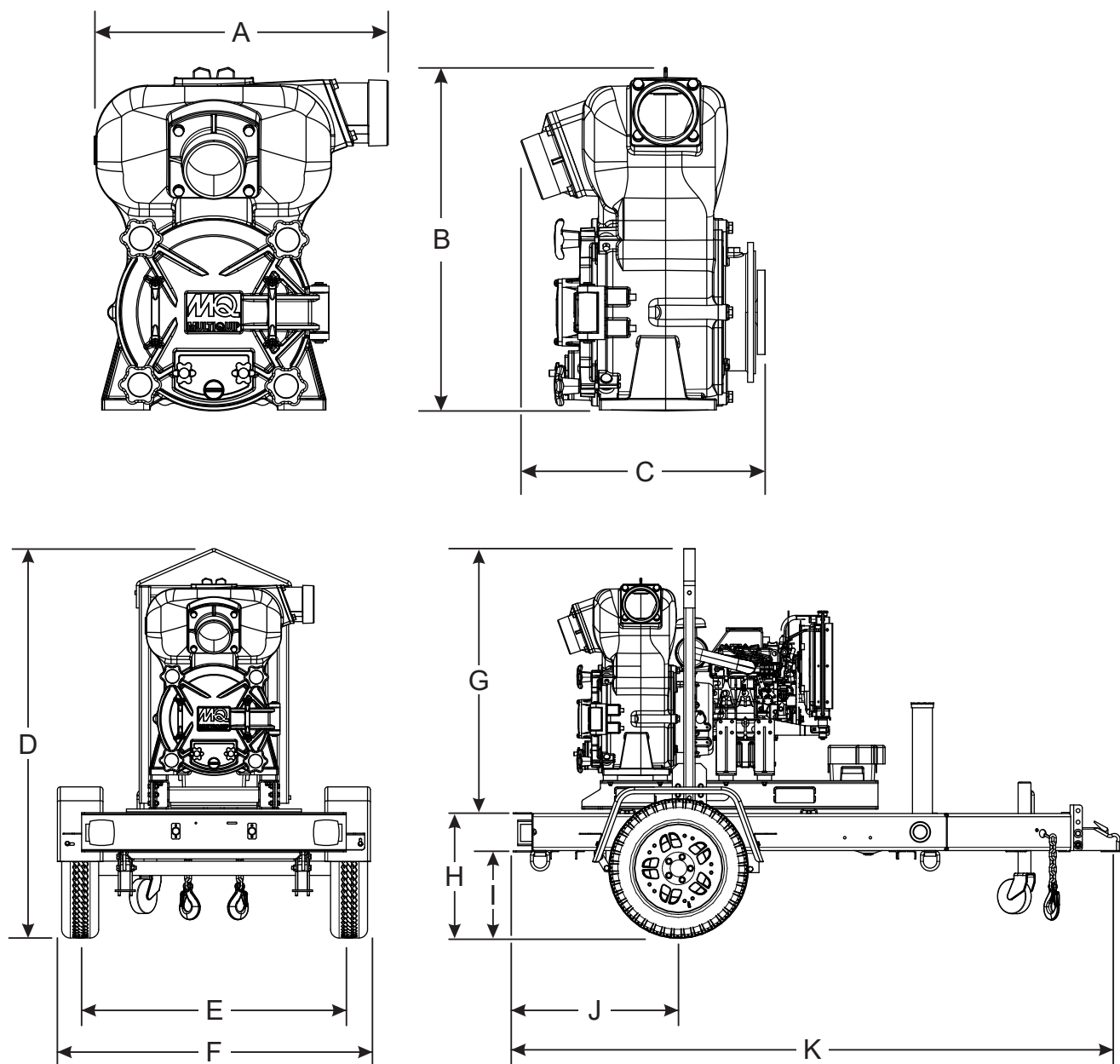


Figure 2. Pump And Trailer Dimensions

Table 3. Pump And Trailer Dimensions			
Reference Letter	Dimension in. (mm)	Reference Letter	Dimension in. (mm)
A	29.5 (749)	G	46.9 (1,192)
B	34.5 (876)	H	22 (560)
C	19.8 (502)	I	15.2 (385)
D	69 (1,751)	J	29.1 (738)
E	46.5 (1,181)	K	105.6 (2,682)
F	55 (1,397)		

GENERAL INFORMATION

The MQ6TKT trash pump is a self-priming pump powered by a 24.8-horsepower, water-cooled, 4-cycle, Kubota diesel engine. The pump's suction and discharge ports are six inches in diameter, enabling a discharge rate of approximately 1,110 gpm (4,202 lpm). The MQ6TKT is mounted on a multipurpose trailer with a 28-gallon fuel tank.

TRASH PUMPS

Trash pumps derive their name from their ability to handle a greater amount of solid debris than standard centrifugal pumps. Trash pumps are unlikely to clog, as they can handle water containing 25% solids by weight, and can accommodate solids up to one-half the size of the discharge opening. If the pump does become clogged, it can be disassembled quickly without the use of tools to allow for debris removal.

APPROVED TYPES OF FLUID TO PUMP

The MQ6TKT is approved for use with fresh water fluids that may contain certain levels of debris. **The pump is not intended to pump salt water, strong alkalines, or low PH level fluids** that can cause premature failure to internal components.

PUMP PRIMING

This wet-primed pump requires that the pump casing is first filled with water to assist with initial self-priming. 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 causes water to be expelled from the discharge ports.

NEVER attempt to operate the pump without first filling the main pump casing with clean water.

PUMP PLACEMENT

ALWAYS place the pump in a level position on solid, stationary ground. Place blocks under the trailer's bumper to prevent the trailer from tipping, and place chock blocks behind each wheel to prevent the trailer from rolling.

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

SUCTION LIFT

The MQ6TKT trash pump has a maximum suction lift of 25 feet (7.6 meters) at sea level. To obtain the optimum suction lift, **ALWAYS** place the pump as close to the water as possible and use the shortest possible suction line.

ELEVATION

The elevation at which the pump is operated impacts its performance. Due to decreased atmospheric pressure at higher altitudes, the pump's priming ability is reduced as elevation increases.

Pumps generally lose one foot of priming ability for every 1,000 feet (305 meters) of elevation above sea level.

For example, in Flagstaff, Arizona, where the elevation is approximately 7,000 feet (2,134 meters) above sea level, a pump with a suction lift of 25 feet (7.6 meters) at sea level will have a suction lift of only 18 feet (5.5 meters).

MECHANICAL SEAL LUBRICATION

An oil-lubricated mechanical seal prevents water from seeping into the engine. The oil in the seal chamber lubricates the seal and prevents it from overheating. **NEVER** operate the pump without water in the casing as this may cause the seal to fail. See the **Maintenance** section of this manual for more information.

ACCESSORIES

Multiquip offers a complete line of fittings, hoses, and couplers for various pump applications. Contact the Multiquip Parts Department for more information.

PUMP COMPONENTS

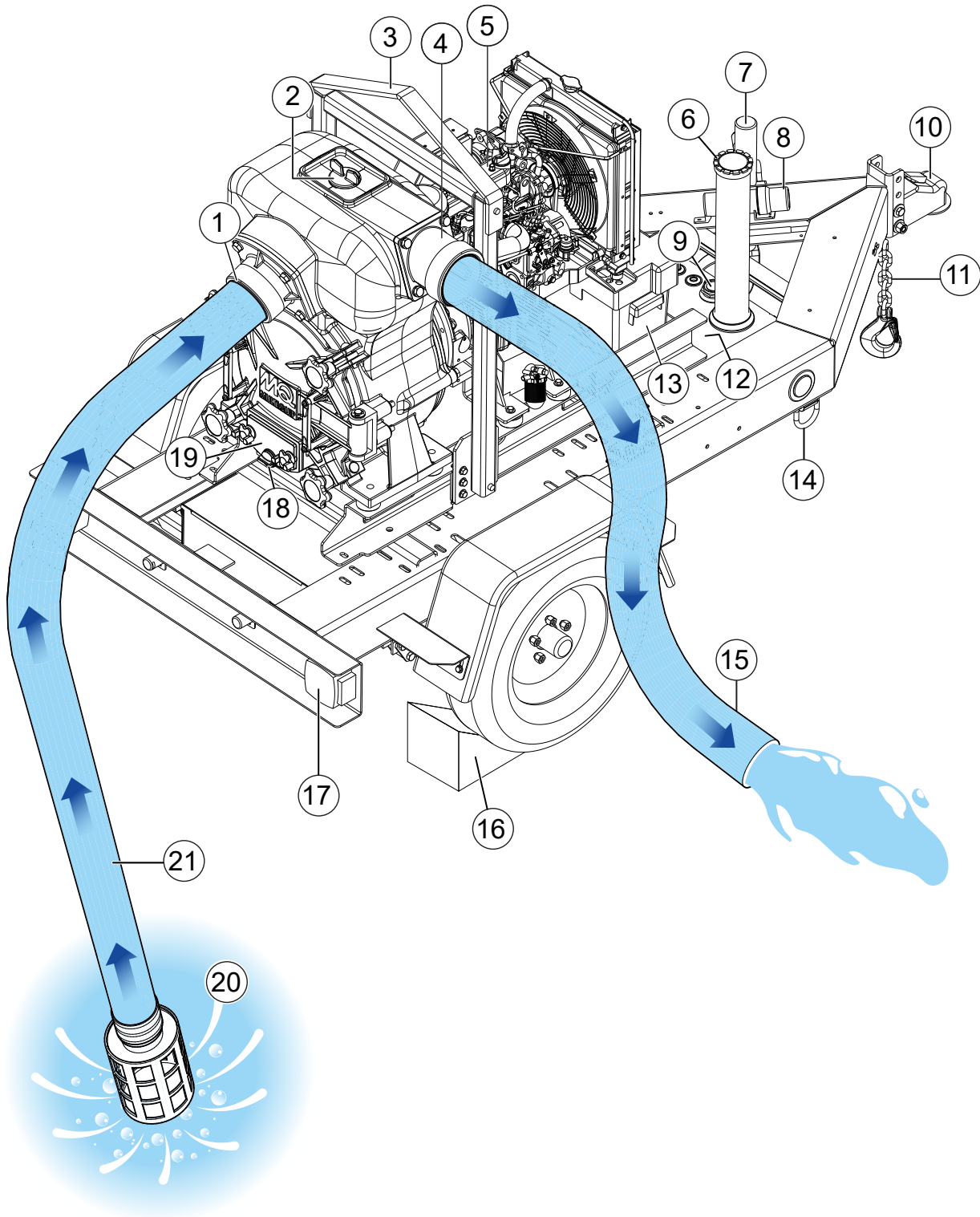


Figure 3. Pump Components

PUMP COMPONENTS

Figure 3 shows a typical MQ62TK series trash pump application. The main pump components are listed below.

1. **Suction Port** — Water enters the pump through this 6-inch, male, NPT-threaded suction port. Connect a suitable suction hose or pipe here.
2. **Fill Cap** — The pump casing must be filled with water prior to operation! Remove the fill cap to add water to the pump.



WARNING

NEVER remove the fill cap while the pump is **hot**. Pressurized water inside can cause **serious injury**.

3. **Lifting Bail** — Use the lifting bail to lift the pump with a crane or forklift..

NOTICE

The lifting bail is located at the center of gravity for a fully configured pump assembly. Removal of any pump or trailer components will unbalance the load.

4. **Discharge Port** — Water and debris exit the pump through this 6-inch, male, NPT-threaded discharge port. Connect a suitable discharge hose or pipe here.
5. **Diesel Engine** — A liquid-cooled, 3-cylinder, Kubota diesel engine. Refer to the **Engine Components** section of this manual for more information.
6. **Fuel Cap** — Remove the fuel cap and fill the fuel tank through this port. See Table 2 for recommended fuel type. **DO NOT** top off fuel. **ALWAYS** wipe up any spilled fuel **immediately**.
7. **Jack Stand with Caster Wheel** — Use the jack to raise or lower the pump when connecting to or disconnecting from a tow hitch. Use the jack stand and caster wheel to position and level the pump prior to operation.
8. **Manual Holder** — Store pump, engine, and trailer documentation here.
9. **Fuel Gauge** — Displays the engine fuel level. If the fuel level is low, replenish with diesel fuel. See Table 2 for recommended fuel type.
10. **Tow Hitch Coupler** — The trailer-mounted pump comes standard with a 2-inch ball hitch. To order optional ball or loop hitches, contact the MQ sales department.
11. **Safety Chains (2)** — When towing the pump, **ALWAYS** attach the safety chains to the towing vehicle. **NEVER** tow the pump with the safety chains unattached.
12. **Fuel Tank** — Trailer fuel tank capacity is 28 gallons.
13. **Tie-Downs (4)** — When loading the pump assembly onto a flatbed truck for transport, secure the trailer to the flatbed at these tie-down points.
14. **Battery** — +12 VDC battery starts the engine when the ignition key is turned.
15. **Discharge Hose (Accessory)** — Discharge hoses are usually thin-walled, collapsible hoses. However, if a thin-walled discharge hose is not available, a rigid suction hose may be substituted. **MAKE SURE** the discharge hose lays flat and remains unkninked.
16. **Chock Blocks** — Place these blocks (not included as part of the trash pump package) under each trailer wheel to prevent rolling.
17. **Trailer Lights (2)** — **ALWAYS** verify that **both** trailer lights are functioning properly before towing the pump. **DO NOT** tow the pump if these lights are not working.
18. **Drain Plug** — Remove this plug to drain water from the pump.
19. **Clean-Out Cover** — Opens to allow removal of debris from inside the pump. To open the cover, loosen the four locking knobs, grip the cover handles, and turn the cover counterclockwise. Once the cover is clear of the four knob fasteners, pull it outward to open.
20. **Strainer** — **ALWAYS** attach the strainer to the bottom end of the suction hose to prevent large objects and debris from entering the pump. Position the strainer so that it remains completely underwater.
21. **Suction Hose (Accessory)** — Suction hoses are commonly reinforced with rigid PVC helix and are specifically designed to prevent collapse during operation. Use recommended suction hoses **only**. **MAKE SURE** the suction hose remains unkninked.

ENGINE COMPONENTS

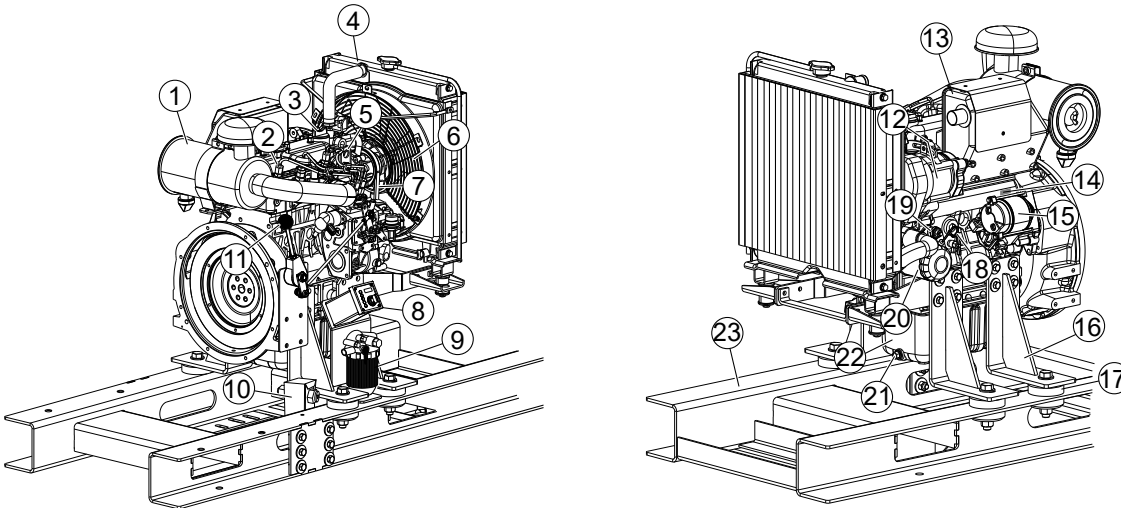


Figure 4. Engine Components

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 operation and maintenance information.

1. **Air Cleaner** — Prevents dirt and debris from entering the fuel system. Open the air cleaner cover to access the filter element.
2. **Glow Plugs (3)** — Glow plugs help start the engine in cold weather conditions. Allow the glow plugs to preheat before starting the engine in cold weather.
3. **Oil Filler Cap** — Remove to add engine oil as recommended in Table 2.
4. **Radiator** — Coolant capacity is 3.3 quarts (3.1 liters). Use recommended coolant only.
5. **Lifting Eye (2)** — When lifting of the engine is required, attach a strap or chain of adequate lifting capacity to these lifting points.
6. **Fan Guard** — Protects personnel from rotating fan blades.
7. **V-Belt** — **ALWAYS** make sure the V-belt is properly tensioned. A loose or defective V-belt can adversely affect engine performance.
8. **Control Panel** — Includes ignition switch, hour meter and engine warning status indicators. Refer to the **Control Panel Components** section of this manual for more information.
9. **Fuel Filter** — Filters fuel contaminants.
10. **Fuel Pump** — Requires +12 VDC to operate. Pumps fuel to the injector rail.
11. **Engine Throttle Lever** — Regulates engine speed (RPM). **ALWAYS** run the engine at full speed when operating the pump.
12. **Alternator** — Provides power to the engine 12-volt electrical system. Replace with manufacturer's recommended type alternator only.
13. **Muffler** — Reduces noise and emissions.
14. **Engine Nameplate** — Provides engine model identification and information.
15. **Starter** — Starts the engine when the ignition key is turned to the **START** position.
16. **Engine Mounts** — Supports engine to frame.
17. **Rubber Shock Absorbers** — Helps reduce engine vibrations.
18. **Oil Dipstick** — Remove to determine engine oil level.
19. **Oil Pressure Sensor** — Monitors engine oil pressure. The engine will shut down when oil pressure is low.
20. **Oil Filter** — Spin-on type, filters oil contaminants.
21. **Oil Drain Bolt** — Remove to drain oil from the crankcase. **ALWAYS** dispose of used oil and oil filters in an environmentally safe manner. **DO NOT** allow used oil to drain onto the ground or into a water runoff drain.
22. **Oil Pan** — Holds a maximum of 5.4 quarts (5.1 liters) of motor oil.
23. **Frame** — Supports engine and pump.

CONTROL PANEL COMPONENTS

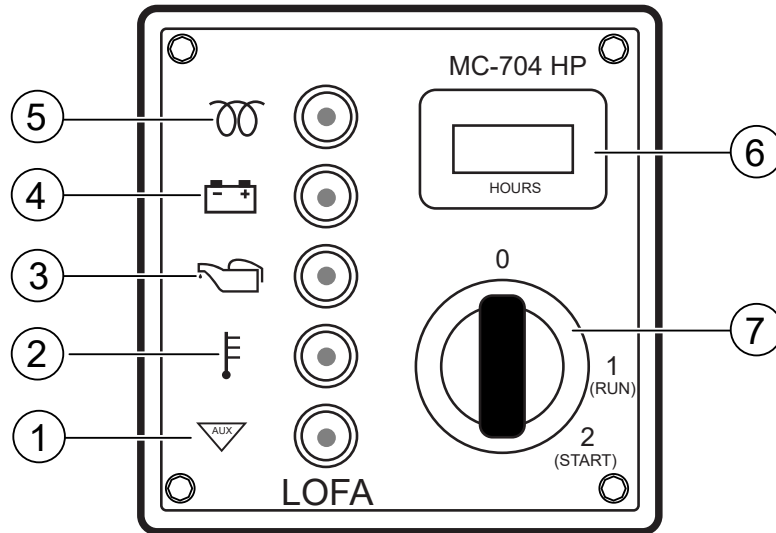


Figure 5. LOFA MC-704 HP Control Panel

Figure 5 shows the control panel components. The function of each component is described below:

1. **Auxiliary Status Indicator** — User defined. Solid **RED** led indicates that an engine failure has occurred.
2. **Coolant Temperature Status Indicator** — Solid **RED** led indicates coolant temperature has exceeded its limit. This condition will cause the engine to shut down.
3. **Oil Pressure Status Indicator** — Solid **RED** led indicates coolant temperature has exceeded its limit. Oil pressure is not within specified limits. This condition will cause the engine to shut down.
4. **Charge Indicator** — Solid **RED** led indicates the charging system is not working properly. This condition will cause the engine to shut down.
5. **Preheat Status Indicator** — Flashing **GREEN** led indicates glow plugs are being preheated. When this LED turns solid **GREEN**, preheating is complete and the engine may be started.
6. **Hour Meter** — Displays the number of hours the machine has been in use.
7. **Ignition Switch** — To start the engine, insert the ignition key here and turn **counterclockwise** to the **START** position. To shut down the engine, turn the key **counterclockwise** to the **OFF** position.

BATTERY

⚠ WARNING



ALWAYS wear appropriate personal protective equipment and clothing, including a face shield and rubber gloves, while handling the battery. Failure to do so can result in **serious injury**.

The **12-volt DC battery** (Figure 6) is shipped wet and ready to use. The battery type used with this pump is BCI Group 24 (CCA: 550).

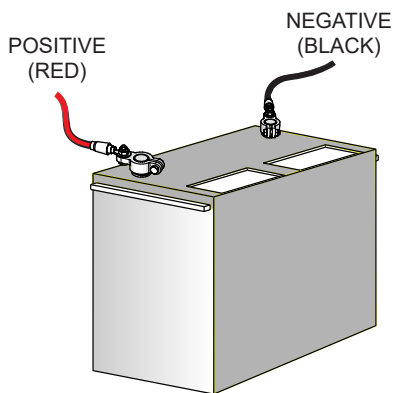


Figure 6. Battery Connections

1. **ALWAYS** make sure the battery is well seated in the battery box.
2. **ALWAYS** make sure the battery cables are properly connected to the battery terminals as shown in Figure 6.
3. The **RED** cable is connected to the positive (+) terminal of the battery, and the **BLACK** cable is connected to the negative (-) terminal of the battery. This unit is of negative ground, **DO NOT** connect in reverse.

⚠ CAUTION

ALWAYS disconnect the negative terminal **FIRST** and reconnect the negative terminal **LAST**.

⚠ WARNING



While connecting the positive battery cable, **DO NOT** allow a wrench or any other metallic object to make contact with the battery's negative terminal post. This can result in an **electrical short circuit or an explosion**.

4. Check the battery cable connections. Poor contact can result in malfunctions or poor starting. **ALWAYS** keep the battery terminals firmly tightened.
5. The battery is sufficiently charged if the specific gravity of the battery fluid is 1.28 at 68°F. A specific gravity of 1.245 or lower indicates the battery is dead and must be recharged or replaced. **ALWAYS** disconnect the battery cables before charging the battery with an external electrical source.

⚠ WARNING



Electrolyte is an acid and must be handled with caution. **ALWAYS** follow servicing instructions from the electrolyte manufacturer to ensure safety. **Serious injury can result** from careless handling or noncompliance with safety handling instructions.

PRE-INSPECTION

1. Clean the entire unit, removing dirt and dust, particularly the engine cooling air inlet.
2. Check fastening nuts and bolts for tightness.

ENGINE OIL

1. Place the unit on secure, level ground with the engine turned **OFF**.
2. Remove the **engine oil dipstick** (Figure 7) from its holder and wipe it clean.

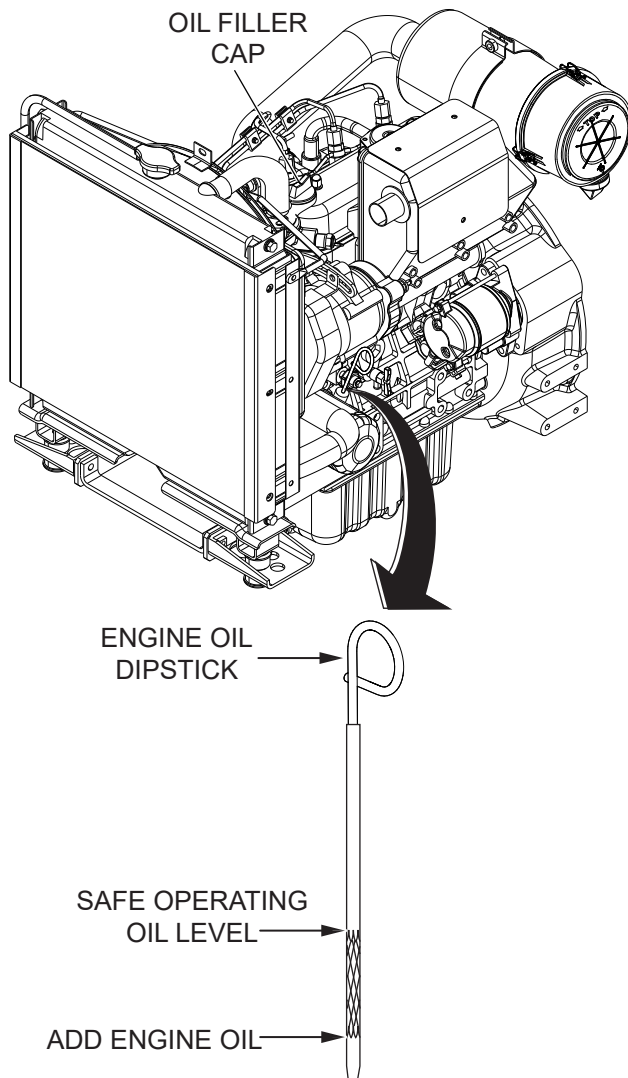


Figure 7. Engine Oil Inspection

3. Reinsert the dipstick into its holder, then remove it again.
4. Check the oil level (Figure 7) on the dipstick. If the oil level is low, remove the **oil filler cap** and fill to a safe operating level (max) as indicated by the dipstick. Fill with the recommended oil type (Table 4). Maximum oil capacity is 5.4 quarts (5.1 liters). **DO NOT** overfill.

Table 4. Recommended Motor Oil

Ambient Temperature	Oil Type
Above 77°F (25°C)	10W-30, 10W-40, or 15W-40
14°F to 77°F (-10°C to 25°C)	
Below 14°F (-10°C)	10W-30 or 10W-40

NOTICE

The engine oil used should be MIL-L-2104C or have properties of American Petroleum Institute (API) classification CF or higher.

NOTICE

When using oil different from the previous one, drain all the previous oil before adding the new engine oil.

NOTICE

Use of oil with a viscosity higher than 10W-30, or any other oil not recommended by Kubota, prevents the engine from performing well in low temperatures until it warms up sufficiently, and may also lead to excessive engine wear or engine seizure.

COOLANT (ANTIFREEZE/SUMMER COOLANT/WATER)

Kubota recommends ethylene glycol (EG) type long-life coolant for use in their engines, which can be purchased in concentrate (and mixed with 50% demineralized water) or pre-diluted. See the Kubota engine owner's manual for further details.

WARNING



When adding coolant/antifreeze mix to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. The possibility of **hot coolant** exists which can cause **severe burns**.

Day-to-day addition of coolant is performed at the reserve tank. When adding coolant to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. See Table 5 for engine and radiator coolant capacities.

Table 5. Coolant Capacity

Engine/Radiator	3.3 quarts (3.1 liters)
Reserve Tank	See markings

NOTICE

Check the coolant level **daily**. Normally, only the coolant level in the reserve tank needs to be checked. However, the radiator cap should be opened once a week to verify that coolant is visible (full) inside the radiator.

Verify that the coolant level in the **coolant reserve tank** (Figure 8) is between the **LOW** and **FULL** markings on the tank.

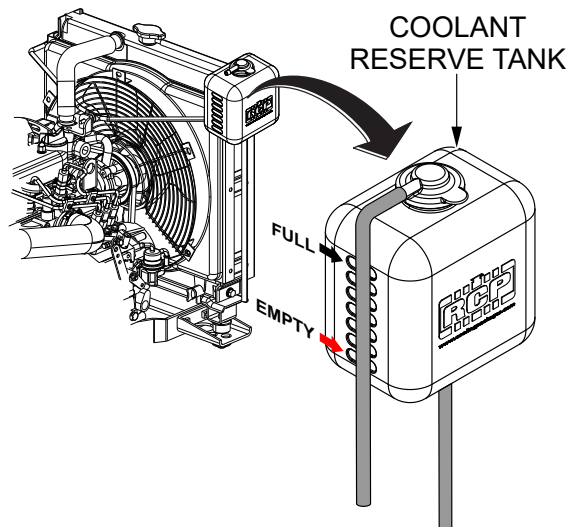


Figure 8. Coolant Reserve Tank

Operation In Freezing Weather

When operating in freezing weather, be certain that the proper amount of antifreeze (Table 6) has been added.

**Table 6. Anti-Freeze
Operating Temperatures**

Vol % Antifreeze	Freezing Point	
	°C	°F
50	-37	-34

ENGINE AIR CLEANER

Check for and remove any dust in the **air cleaner dust cup** (Figure 9) each day prior to operation.

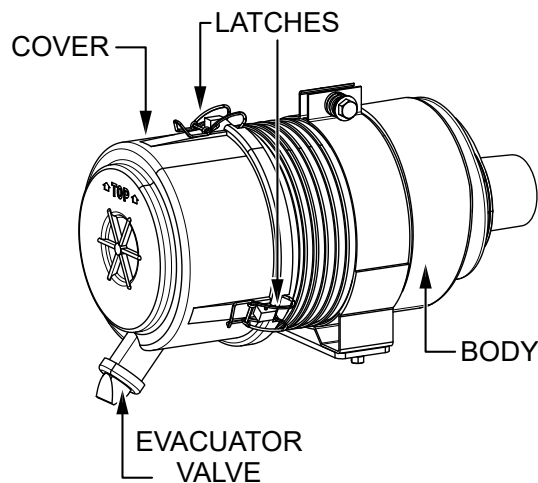


Figure 9. Engine Air Cleaner

Periodic cleaning/replacement of the engine air cleaner filter is necessary. Inspect and service the air cleaner as described in the Kubota engine owner's manual or the **Maintenance** section of this manual.

FUEL

! DANGER

ALWAYS handle fuel **safely**. Motor fuels are **highly flammable** and can be dangerous if mishandled. **NEVER** smoke while refueling. **NEVER** attempt to refuel while the engine is hot or running. **ALWAYS** wipe up any spilled fuel **immediately**.

! CAUTION

ALWAYS fill the fuel tank with clean, fresh, diesel fuel. **NEVER** fill the fuel tank beyond its capacity. **DO NOT TOP OFF.**

1. Read the **fuel gauge** located at the front of the trailer (Figure 10) to determine the engine fuel level. If the fuel level is low, remove the fuel cap and fill with the recommended diesel fuel shown in Table 2. **DO NOT** overfill.

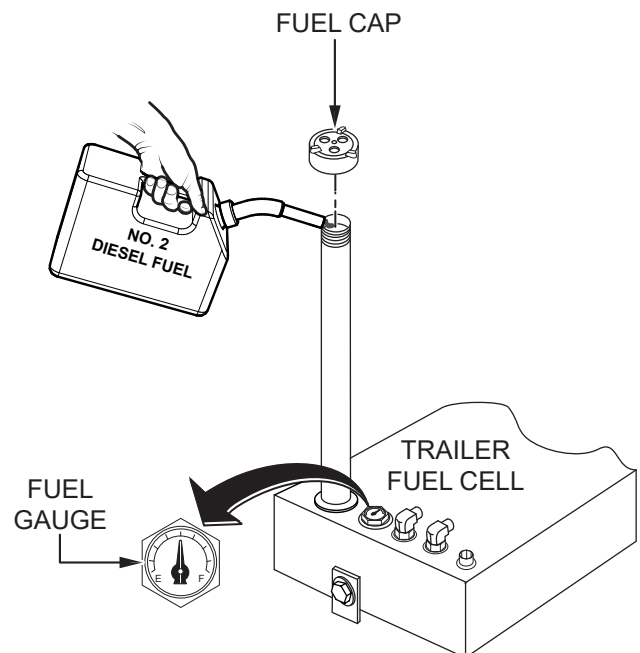


Figure 10. Fuel Inspection

PUMP SETUP

The MQ6TKT trash pump is intended for the removal of clean water or water containing some debris and solids. Maximum size of solids should not exceed 3 inches (76 mm) in diameter. Figure 11 below shows a typical trash pump application.

1. It is advantageous to place the pump as close as possible to the water source on a solid, level operating surface. The most critical factor for successful pump operation is to not 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 and filling the casing with water. If the pump casing is not filled with water prior to operation, 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 all hose O-rings are in place, and that the 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 to not bury the strainer in the sand or silt.

CAUTION

The strainer should be positioned so it will remain completely **underwater**. 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 the discharge hose lays 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 setup, 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 the total discharge head.

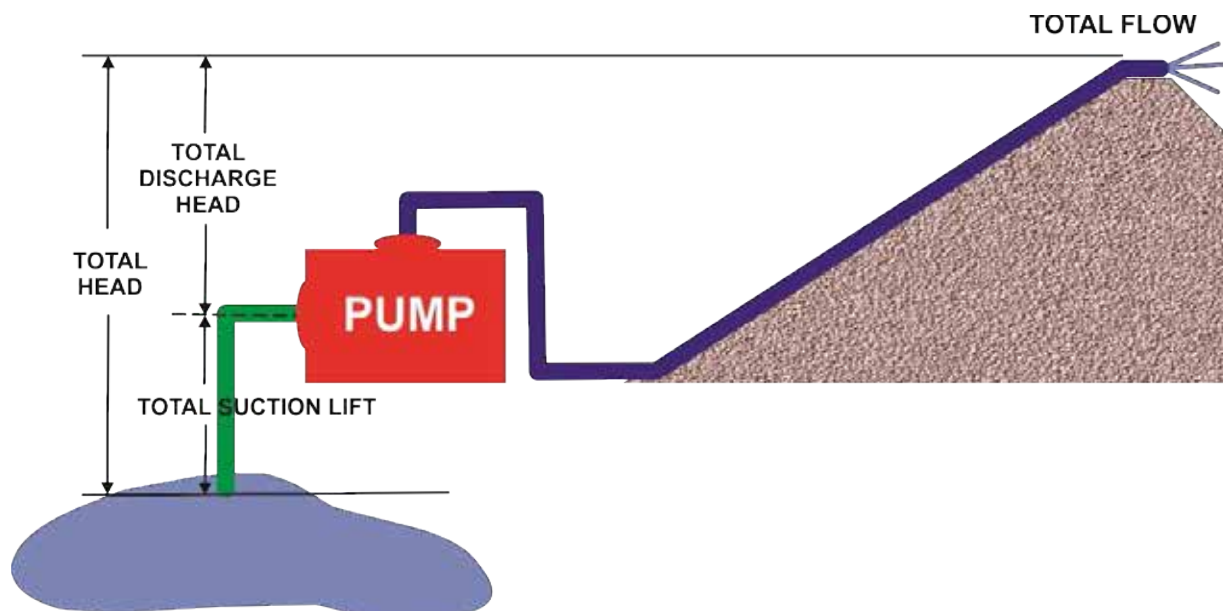


Figure 11. Pump Placement

DANGER



NEVER operate the pump in a confined area or enclosed structure that does not provide an ample free flow of air.

WARNING

NEVER 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



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.

CAUTION



ALWAYS wear approved eye and hearing protection while operating the pump.

NOTICE

NEVER attempt to start the engine unless the pump has first been primed with water. **Severe damage can occur** to the pump's mechanical seal if the pump has not been primed.

STARTING THE ENGINE

NOTICE

In warm weather conditions pre-heating of the glow plugs will not be required. The preheating is dependent on the temperature of the cooling water. If the temperature of the cooling water is high enough, the preheat LED will be solid **GREEN**.

NOTICE

In cold weather conditions pre-heating of the glow plugs will be required. When the ignition key is placed in position 2 (**RUN**) the preheat LED will **flash** indicating that the pre-heating process has started. When the LED turns solid **GREEN**, preheating is complete and the engine will start automatically.

1. Move the engine throttle lever to the **midway** point between the **idle** speed and **full** positions. See Figure 12.

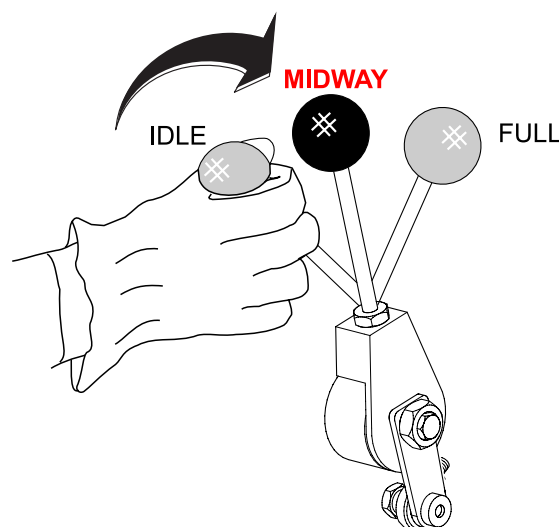


Figure 12. Engine Throttle Lever (Half Speed)

2. If starting the engine in **cold weather conditions** pre-heating of the glow plugs will be required. Insert the ignition key (Figure 13) into the **starter switch** and turn the key clockwise to position 2 (**START**).

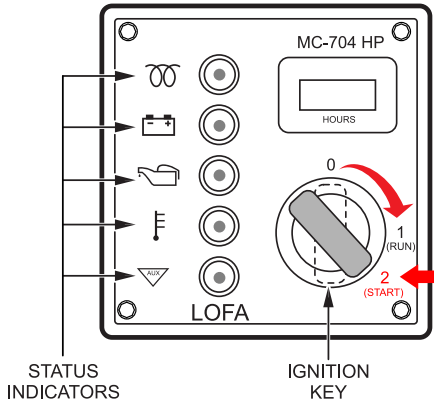


Figure 13. Ignition Switch Position 2 (Start)

3. Verify that the preheat LED (Figure 14) is flashing. This will indicate that the preheating process is underway. **Hold** the ignition key in position 2 until the preheating process is complete (LED is solid **GREEN**).
4. If starting the engine in a warm climate, warming of the glow plugs is not required. Simply turn the ignition key clockwise to position 2 (**START**) listen for the engine to crank and release ignition key. Key will automatically return to position 1 (**RUN**).

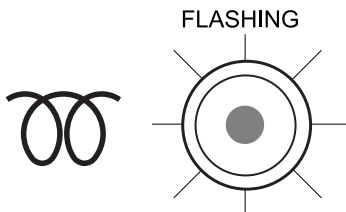


Figure 14. Preheat LED (Flashing)

5. Once the preheat LED turns solid **GREEN** the engine will start automatically. Release ignition key. The key will automatically return to position 1 (**RUN**).

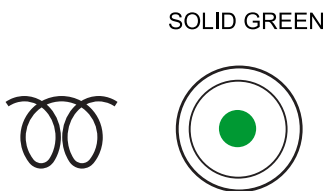


Figure 15. Preheat LED (Solid Green)

NOTICE

The engine can only be started if the preheat LED is solid **GREEN**.

6. Make sure the status indicator LEDs on the control panel are **OFF** (Figure 13). If the charge indicator LED remains lit after the engine has started, increase engine speed until the LED turns off.

OPERATION

1. With the engine running, move the engine throttle lever to the **FULL** speed position. See Figure 16.

NOTICE

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

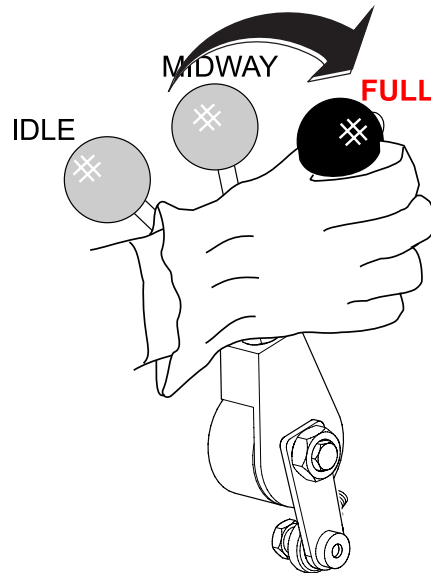


Figure 16. Engine Throttle Lever (Full Speed)

2. The pump should begin pumping water within a few minutes. The amount of time will vary depending on the suction lift and length of the suction hose.

STOPPING THE ENGINE

Normal Shutdown

1. Move the **engine throttle lever** to the **IDLE** position (Figure 17) and run the engine for three minutes with no load.

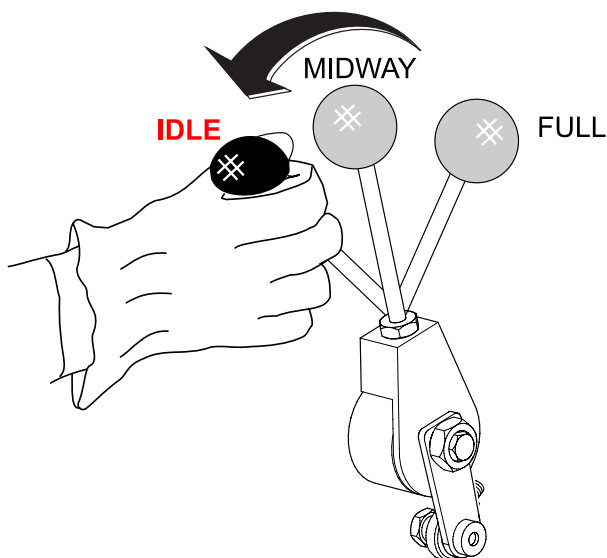


Figure 17. Engine Throttle Lever (Idle Speed)

2. Turn the **ignition key** (Figure 18) counterclockwise to position 0 (OFF).

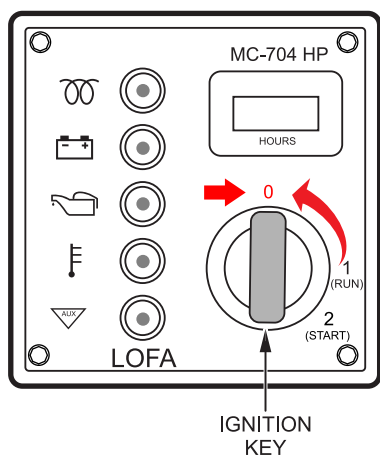


Figure 18. Ignition Switch Position 0 (OFF)

Emergency Shutdown

To stop the engine **immediately**, quickly turn the ignition key to the position 0 (OFF).

MAINTENANCE

Table 7. Engine Maintenance Schedule

Item	Maintenance Interval											
	Daily	After first 50 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every 400 hours	Every 500 hours	Every 800 hours	Every 1,500 hours	Every 3,000 hours	Every year	Every 2 years
Engine Maintenance												
Check engine oil level	X											
Check fuel level and refuel as necessary	X											
Check coolant level	X											
Check fan belt	X											
Clean evacuator valve	X											
Clean dust cup equipped air cleaner	X											
Change engine oil		X			X							
Replace oil filter cartridge		X			X							
Check fuel pipes and clamp bands			X									
Clean fuel filter pot				X								
Clean air cleaner element* ¹				X								
Check fan belt tension				X								
Drain water separator				X								
Check intake air line					X							
Check radiator hoses and clamp bands	Every 200 hours or every 6 months											
Replace fuel filter cartridge* ²						X						
Clean water separator						X						
Remove sediment in fuel tank* ³							X					
Clean radiator core (inside)							X					
Clean radiator inside							X					
Replace fan belt* ³							X					
Replace air cleaner element* ⁴											X	
Check valve clearance* ³								X				
Check fuel injector* ³									X			
Check injection pump* ³										X		
Replace radiator hoses and clamp bands* ³												X
Replace fuel pipes and clamp bands* ^{2,*3}												X
Change radiator coolant (LLC)												X
Replace intake air line* ⁵												X

*¹ The air cleaner should be cleaned more often in dusty conditions than in normal conditions.

*² When using biodiesel fuel, replace the fuel filter cartridge, fuel hoses, and clamp bands with new ones at half intervals.

*³ Consult your local Kubota dealer for this service.

*⁴ Replace every year or after 6 cleanings, whichever comes first.

*⁵ Replace only if necessary.

CAUTION

Certain maintenance operations or machine adjustments require specialized knowledge and skill. Attempting to perform maintenance operations or adjustments without the proper knowledge, skills, or training could result in equipment damage or injury to personnel. When in doubt, consult your dealer.

Use Table 7 as a general maintenance guideline. For more detailed engine maintenance instructions, refer to the Kubota engine owner's manual.

DAILY ENGINE MAINTENANCE

DANGER



To prevent a possible fire or explosion, **NEVER** use fuel as a cleaning solvent.

- Thoroughly clean dirt and debris from the pump and engine.
- Check the engine oil level and add oil as recommended in Table 4 if needed.
- Inspect the air cleaner element and replace it if necessary.
- Check all fasteners and retighten as necessary.

REPLACING ENGINE OIL AND FILTER

1. Make sure the engine is **OFF** and has had sufficient time to cool.
2. Remove the engine oil dipstick.
3. Remove the **oil drain plug** (Figure 19) and allow the oil to drain into a suitable container.

NOTICE

Engine oil will drain more easily when the oil is **warm**.

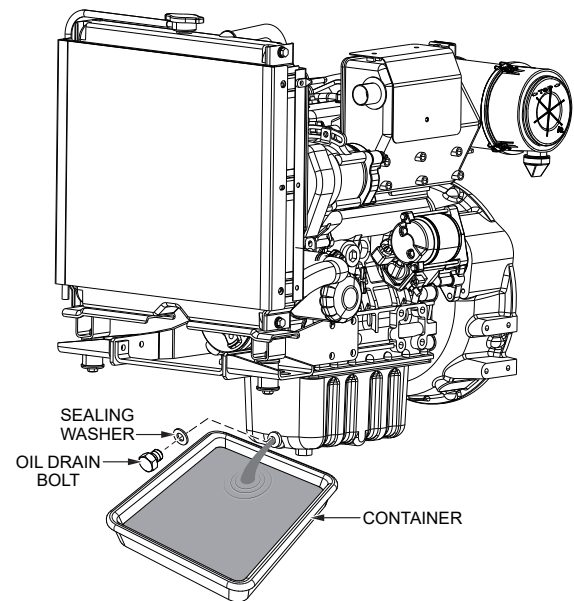


Figure 19. Draining The Engine Oil

4. After the oil has fully drained, reinstall the oil drain plug and tighten securely.
5. Remove the **oil filler plug** (Figure 7) and refill the engine oil as recommended in Table 4. **DO NOT** overfill. See Table 2 for engine oil capacity.
6. Replace the oil filler plug and make sure the dipstick is fully inserted.
7. Using a filter wrench (Figure 20), remove the **engine oil filter**.

ENGINE AIR CLEANER

NOTICE

NEVER run the engine with the air cleaner removed.

NOTICE

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

The **engine air cleaner** (Figure 21) is equipped with a dry-type filter element. Never apply oil to the air cleaner.

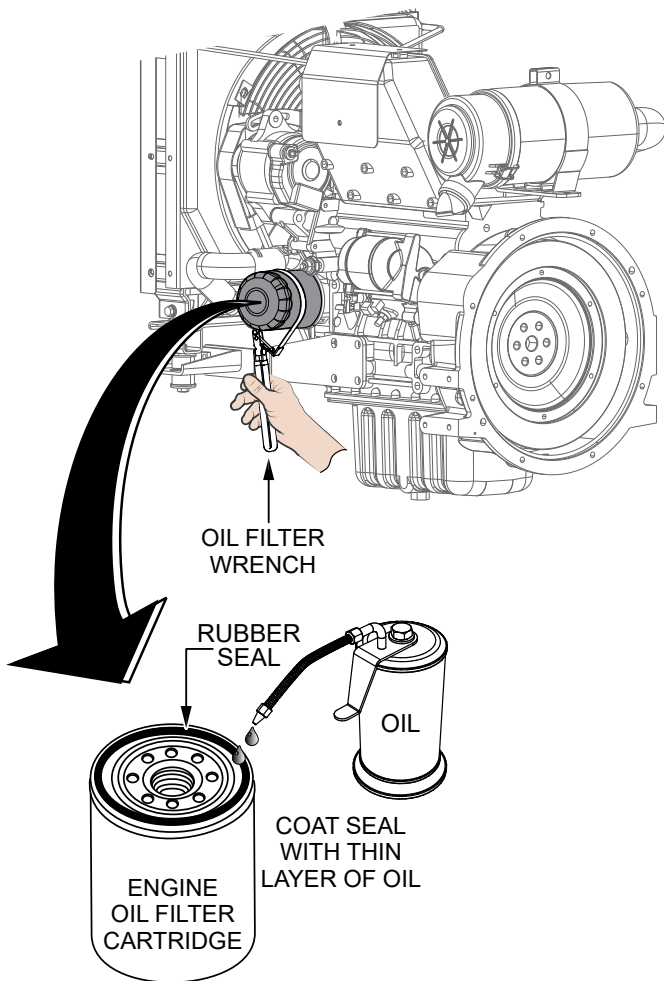


Figure 20. Oil Filter Removal

8. Clean the sealing surface where the filter mounts onto the engine.
9. Lightly coat the **gasket** of the new oil filter (Figure 20) with clean engine oil.
10. Install the new filter and tighten it sufficiently by hand. **DO NOT** use a filter wrench or any other tool to tighten the filter.
11. After the oil filter has been replaced, the engine oil level normally decreases a little. Therefore, run the engine for awhile and check for oil leaks through the seal before rechecking the engine oil level. Add oil if necessary.

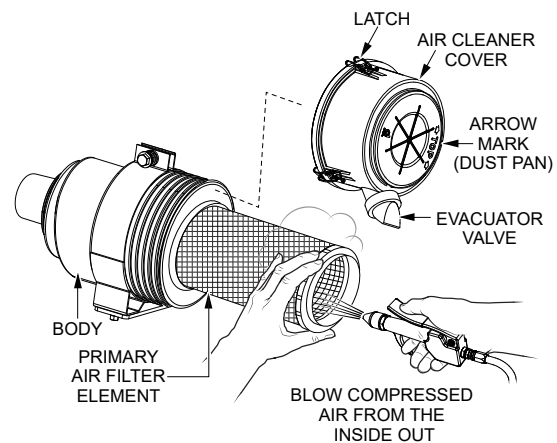


Figure 21. Engine Air Cleaner

1. To remove large dust and dirt particles, open the **evacuator valve** (Figure 21) once a week under ordinary conditions, or daily when used in dusty conditions.
2. Release the **latches** (Figure 21) on the air cleaner cover and inspect the air cleaner element. Clean or replace the element if it is dirty. Avoid touching the element except when cleaning. Replace the element if it is damaged.
3. When dry dust adheres to the filter element, blow clean, dry compressed air through the element from the inside out. Compressed air pressure must be less than 30 psi (2.1 kgf/cm², 205 kPa). Maintain a reasonable distance between the nozzle and the filter.
4. Replace the filter element every year or every 6 cleanings, whichever comes first.
5. Replace the filter element if it is excessively dirty (heavily stained).
6. If the inside of the **air cleaner body** (Figure 21) is dirty or wet, wipe it clean with a dry cloth.

FUEL FILTER/WATER SEPARATOR

Fuel flow to the engine becomes restricted as the filter gradually clogs up with contaminants, resulting in noticeable power loss and/or difficulty starting. Adhere to the following servicing guidelines:

1. Clean **fuel water separator** every 100 hours of operation or once a month to remove dust or water.
2. Place fuel water separator lever (Figure 22) in the **CLOSED** position.

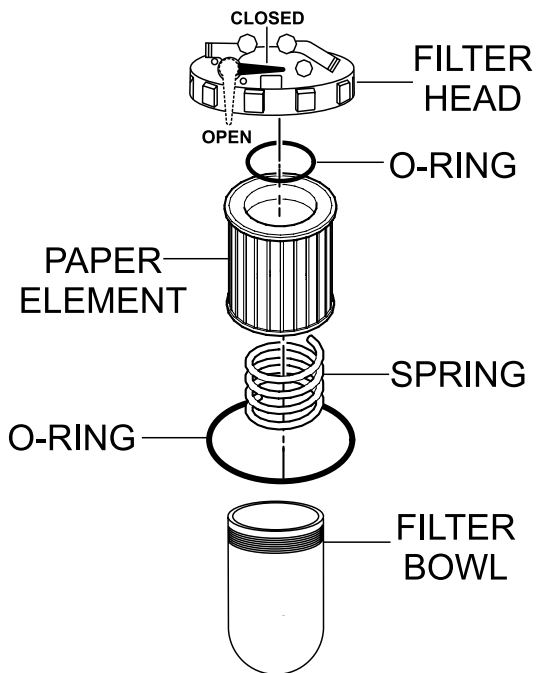


Figure 22. Fuel Filter/Water Separator

3. Wipe the inside of the fuel filter bowl with a clean cloth to remove any foreign matter or debris that may have accumulated. Rinse with diesel fuel.
4. Remove fuel filter paper element, and rinse with diesel fuel.
5. Reinstall filter bowl and paper element back onto the filter head. Hand-tighten retaining ring.
6. Return fuel water separator lever (Figure 22) back to the **OPEN** position.

7. As a guideline, change the filter every 500 hours, every other engine oil change, or at the first indication of power loss or difficulty starting the engine. Filter replacement frequency is determined by the contamination levels in the fuel and may vary depending on the integrity of the fuel being used.

FAN BELT TENSION

A slack fan belt may contribute to overheating or to insufficient charging of the battery. Inspect the fan belt for damage or wear and adjust it in accordance with the Kubota engine owner's manual.

The fan belt tension is proper if the fan belt bends approximately 0.4 inches (10 mm) when pressed with the thumb using moderate pressure (22 lb./10 kgf) as shown in Figure 23.

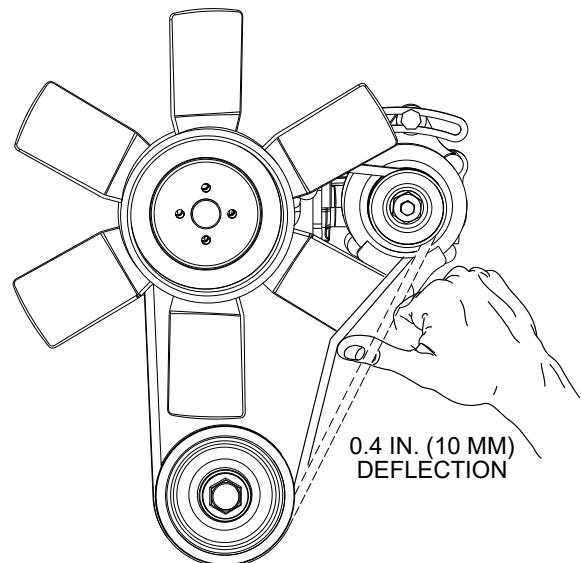


Figure 23. Fan Belt Tension

CAUTION



NEVER place hands near the belts or fan while the equipment is running.

CAUTION

ALWAYS reinstall the detached safety shield after maintenance or checking.

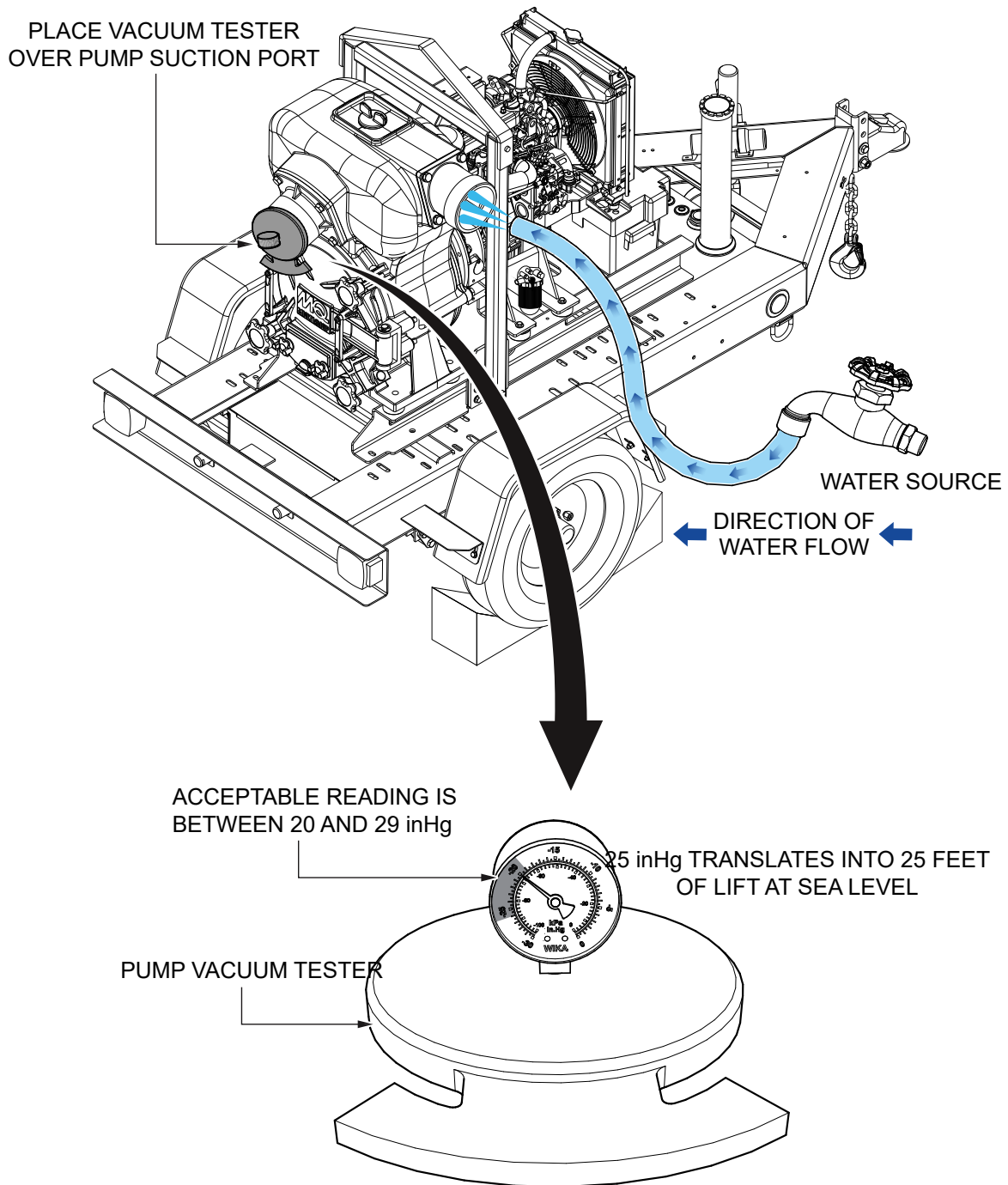


Figure 24. Pump Vacuum Test

DAILY PUMP MAINTENANCE

- Inspect the pump for signs of wear or damage. Replace any worn or damaged components as needed.
- Open the pump clean-out cover and remove any debris that has accumulated.
- Inspect all hoses, fittings, and clamps. Replace any defective components immediately.

PUMP VACUUM TEST

Perform the following procedure to test the pump vacuum. Refer to Figure 24.

1. Remove the pump fill cap and fill the pump casing with water.

WARNING

NEVER remove the fill cap while the pump is **hot**. Water inside may be **under pressure**.

2. Start the engine as described in the **Operation** section, and wait for the pump to begin pumping.
3. Place a water hose inside the discharge port, and turn on the water. The flow of water into the discharge port will prevent the pump from running dry.
4. Place pump vacuum tester over the suction port with the vacuum gauge facing **upward**. It may be necessary to apply a small amount of water around the rubber seal of the vacuum tester to create a proper seal.
5. Make sure there are no air leaks between the vacuum tester and the suction port. If air leaks are present, reset the vacuum tester.
6. Run the pump for a few minutes while monitoring the vacuum gauge. A gauge reading of 20–29 inHg (inches of mercury) indicates that the pump is working properly. A gauge reading below 20 inHg indicates that the pump is not working properly.

NOTICE

25 inHg (inches of mercury) translates into 25 feet of suction lift at sea level.

7. To test the flapper valve, shut down the engine. The vacuum tester should remain attached to the suction port by vacuum, indicating that the flapper valve is seating properly and holding water in the suction hose when the engine is stopped. This prevents backflow and allows for faster priming when the engine is restarted.

IMPELLER ADJUSTMENT

To ensure optimum pump priming and performance standards, the proper clearance between the impeller and the volute must be maintained. Every six months, or after prolonged dewatering operations, check the clearance between the impeller vanes and the outer volute surfaces. The impeller should be as close as possible to the volute without touching it.

For optimal performance, the recommended clearance between the impeller and the volute is 0.10 ~ 0.20 inches (2.5 ~ 5.1 mm). The clearance can be inspected by utilizing a feeler gauge and accessing the area via the discharge or fill port.

Adjust the clearance between the impeller and the volute by adding/removing shims behind the impeller.

NOTICE

Removing too many shims will create excessive clearance between the impeller and the volute, resulting in reduced pump performance.

As the impeller wears down over time, additional shims may be required to maintain minimal clearance between the impeller and the volute.

MECHANICAL SEAL LUBRICATION

The MQ6TKT pump utilizes an oil-bathed mechanical seal system. The oil in the seal chamber lubricates the mechanical seal and suppresses overheating. **NEVER** operate the pump without water in the casing as this may cause the seal to fail. **NEVER** pump salt water or chemicals that will lead to premature component failure.

The mechanical seal chamber comes fully serviced. It holds 1-¾ cups of 30 SAE non-detergent oil. Frequently check the level of mechanical seal oil by removing the mechanical seal bolt (Figure 25) and visually inspecting the level. **DO NOT** over lubricate. Under normal conditions, drain and refill the mechanical seal chamber once a year.

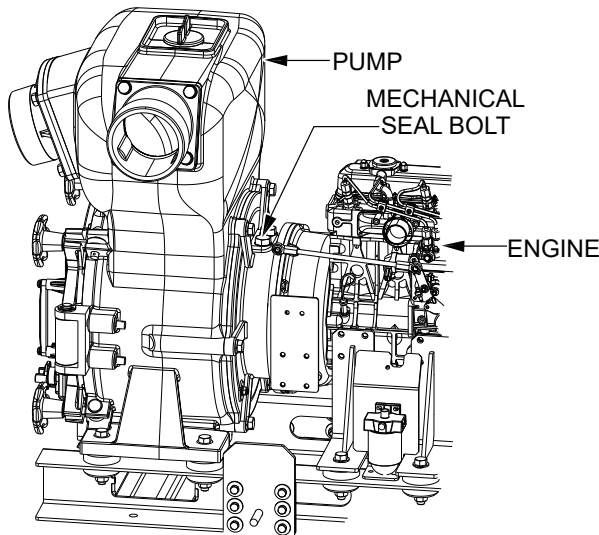


Figure 25. Mechanical Seal Bolt

PUMP CLEANING

All safety precautions must be observed to avoid injury. Before servicing this equipment, read and understand the **Safety Information** and **Operation** sections of this manual. Prepare the equipment for servicing as follows:

After pumping water with a large quantity of dirt and debris, perform the following procedure to clean the pump:

1. Make sure the engine is turned **OFF** and allow the pump and engine to cool.
2. Remove the drain plug from the pump housing to drain any water remaining in the pump.

3. Loosen the four locking knobs by turning them counterclockwise. Grip the clean-out cover handles, twist counterclockwise, and pull outward to open the clean-out cover.
4. Clean inside the pump casing and remove all dirt and debris. Inspect the impeller and volute for wear. Replace any damaged or worn parts.



CAUTION

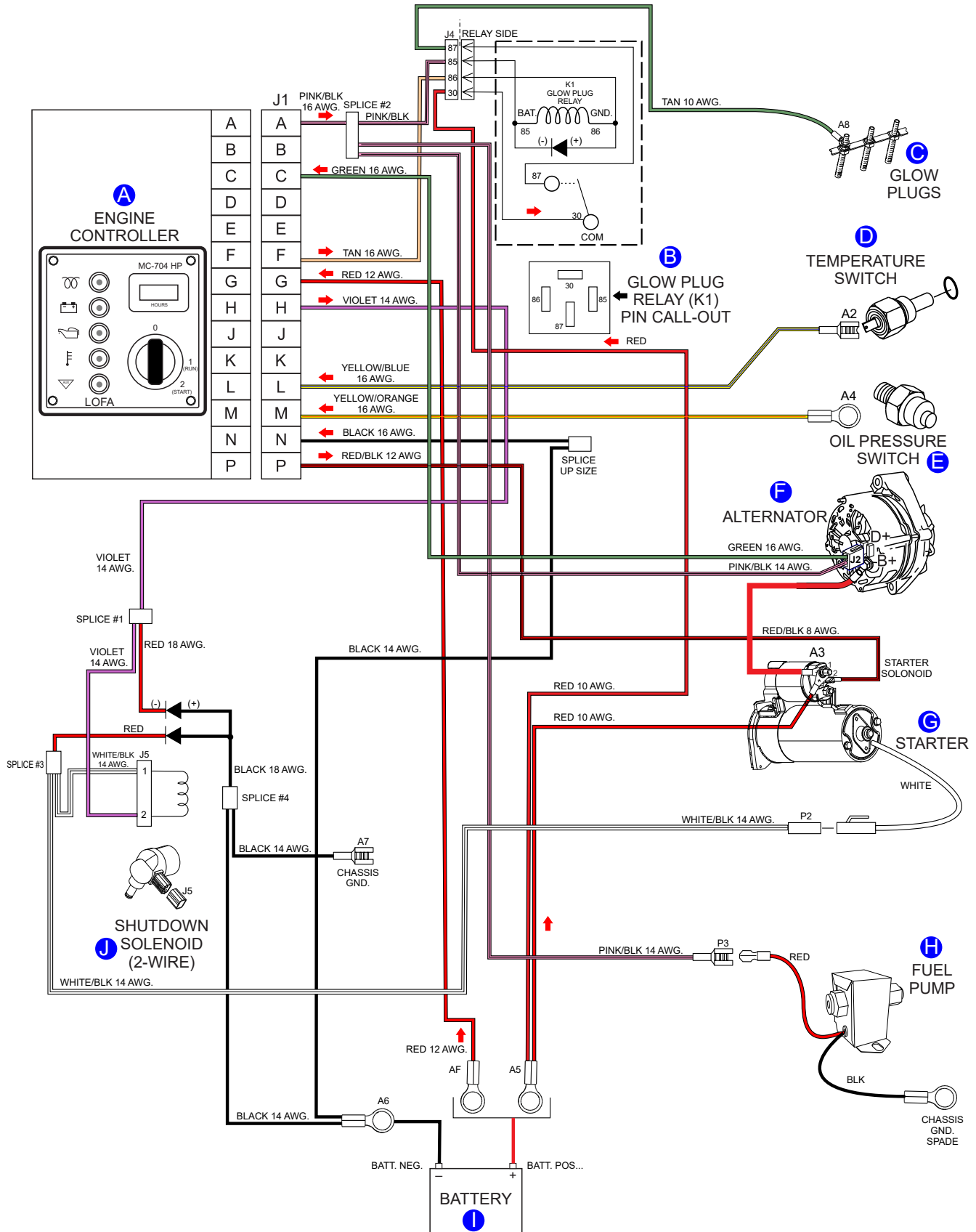
The impeller can develop sharp edges. **BE CAREFUL** when cleaning around the impeller to prevent injury.

LONG-TERM STORAGE

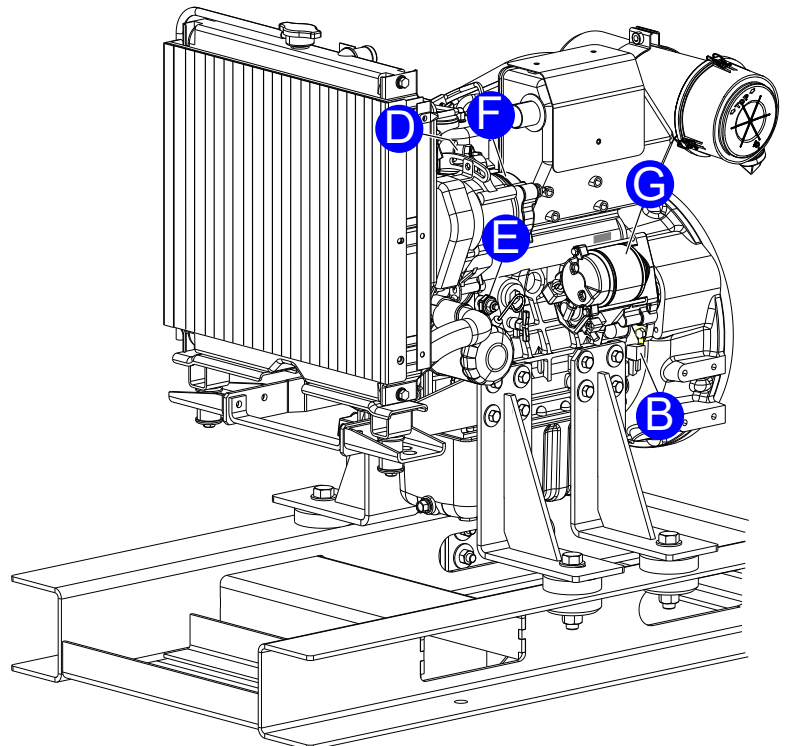
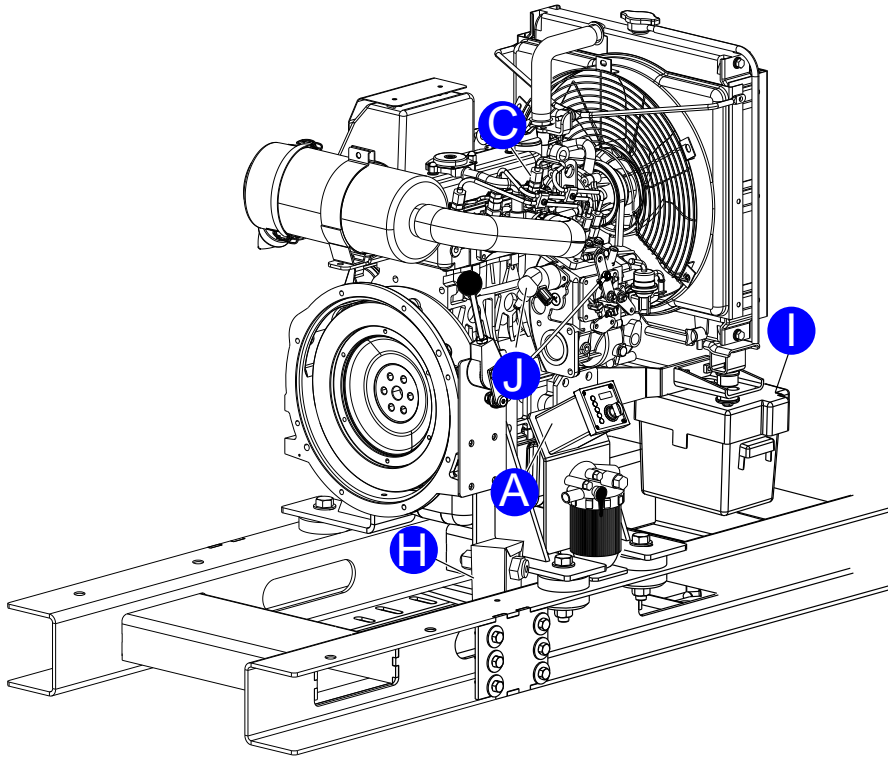
Prepare the pump for long-term storage (more than 30 days) as follows.

- Run the engine for about three minutes, then stop the engine.
- While the engine is off but still warm, drain the engine oil. Fill the engine crankcase with fresh oil.
- Drain the fuel tank completely.
- Wipe off any oil or dirt that has accumulated on the engine.
- Remove the drain plug from the pump and completely drain any water left in the pump housing.
- Open the pump cover and clean the interior of the pump casing. Coat the interior of the pump casing with a light film of oil to reduce corrosion. A spray can of oil works well for this application.
- To protect the water-cooled seals, pour a half-pint of lubricating oil through the discharge opening on the pump and crank the engine several times. This will keep the mechanical seal lubricated and prevent excessive corrosion.
- Cover the suction and discharge ports with duct tape to prevent any foreign matter from entering the pump.
- Disconnect the battery cables.
- Cover the pump and engine with a plastic sheet and store them out of direct sunlight, in a location that is free of moisture and dust.
- Check the battery charge level each month to maintain the performance of the battery.

ELECTRICAL WIRING DIAGRAM



ELECTRICAL COMPONENT LOCATOR



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 as 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?	Add fuel.
	Fuel filter clogged?	Replace fuel filter.
	Fuel tank venting is inadequate?	Ensure 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)

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 upper mark on dipstick.
	Entire cooling air system contaminated or 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 (PUMP)

Troubleshooting (Trash Pump)		
Symptom	Possible Problem	Solution
Pump does not prime.	Not enough water in the housing?	Add water.
	Engine speed too low?	Increase engine RPM to full speed.
	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 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?	Replace impeller or adjust clearance by adding shims. 0.10 – 0.20 inch (2.5 – 5.1 mm)
	Water leaking out of sight glass?	Check condition of mechanical seal.
Pump takes in water, little or no discharge.	Engine speed too low?	Increase engine RPM to full speed.
	Suction strainer partially plugged?	Clean strainer.
	Worn impeller or volute?	Adjust clearance 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 too large?	Use correct diameter hose.
Discharge does not stay on coupling.	Pressure too high?	Check pressure, add additional clamp.
	Hose kinked or end blocked?	Check hose.
Engine is locked or slow to start.	Impeller jammed or blocked?	Open pump cover and clean dirt and debris from inside housing.
	Impeller and wear plate binding?	Inspect for clearance 0.01 – 0.02 inch (2.5 – 5.1 mm). Add or remove shims.
	Defective engine?	See engine owner's manual.
	Impeller binding to rear adaptor plate?	Adjust clearance by adding or removing shims 0.025 – 0.040 inch (0.64 – 1.02 mm)

OPERATION MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL
NUMBER ON-HAND WHEN CALLING

UNITED STATES

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