

# OPERATION MANUAL



## **MODEL QP2B CENTRIFUGAL PUMP (VANGUARD 200 6.5 HP GASOLINE ENGINE)**

Revision #0 (04/06/23)

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**THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.**

## PROPOSITION 65 WARNING

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**QP2B Centrifugal Pump**

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**NOTICE**

Specifications 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 or 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** 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 a 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

- **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

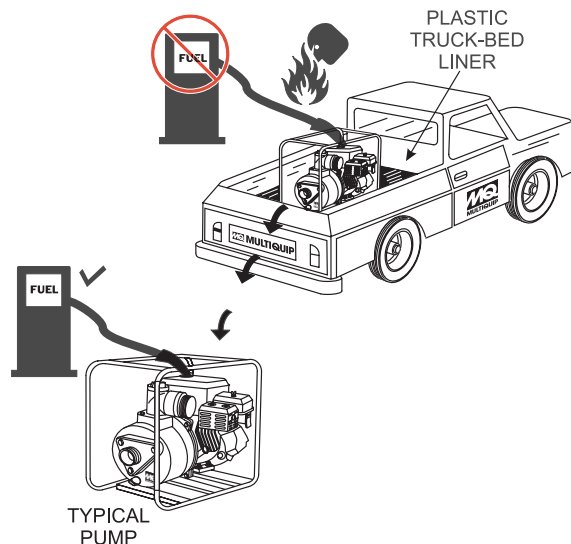
- **NEVER** run the engine without an air filter or with a dirty air filter. Severe engine damage may occur. Service the air filter frequently to prevent engine malfunction.
- **NEVER** tamper with the factory settings of the engine or engine governor. Damage to the engine or equipment can result if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



### FUEL SAFETY

#### DANGER

- **DO NOT** add fuel to equipment if it is placed inside a 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 the tank, as spilled fuel can 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 or 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. 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 the equipment parts (hook and vibration insulator) are not damaged and screws are not loose or missing.
- Always make sure the crane or lifting device has been properly secured to the lifting bail (hook) of the equipment.
- **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 adequate lifting cable (wire or rope) of sufficient strength.
- Use a one-point suspension hook and lift straight upwards.



- **DO NOT** lift the machine to unnecessary heights.

# SAFETY INFORMATION

- **ALWAYS** tie down equipment during transport by securing the equipment with rope.

## 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 the 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 a 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 the battery and bring it to an 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 gasoline engine used in this equipment has been designed to reduce harmful levels of carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NOx) contained in gasoline exhaust emissions.

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

Attempts 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 your authorized engine distributor.

## SPECIFICATIONS

Table 1. Pump Specifications	
Model	QP2B
Type	Self-priming, centrifugal pump
Suction Size	2.0 in. (51 mm)
Discharge Size	2.0 in. (51 mm)
Maximum Pumping Capacity	158 gallons/minute (600 liters/minute)
Maximum Suction Lift	25 ft. (7.6 m)
Maximum Head	115 ft. (35.0 m)
Dry Net Weight	65.0 lb. (29.5 kg)

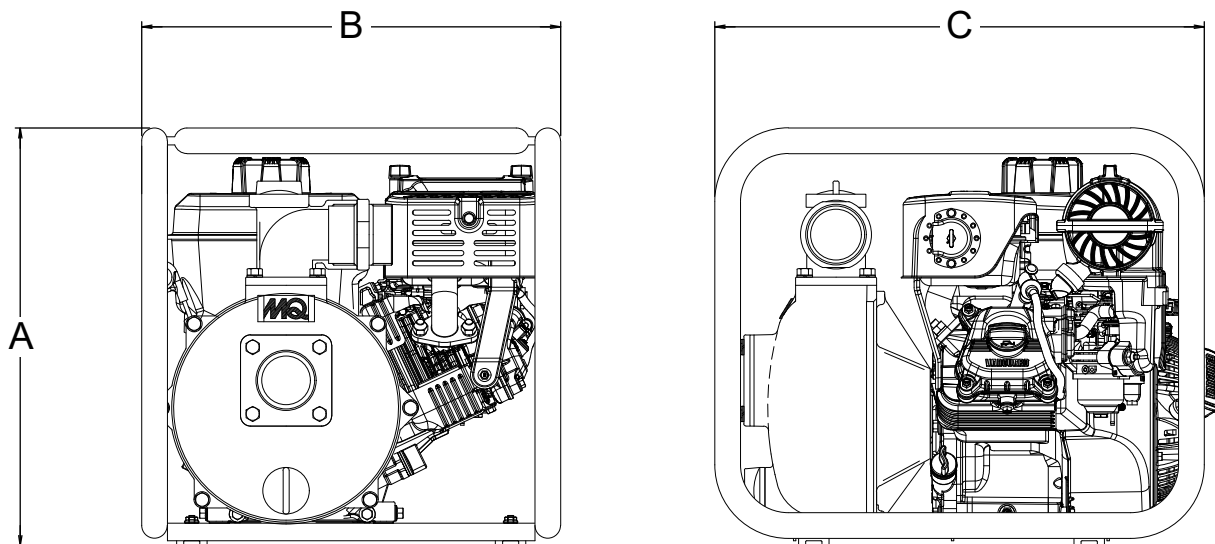


Figure 1. QP2B Dimensions

Table 2. QP2B Dimensions	
Reference Letter	Dimension in. (mm)
A	16.26 (413)
B	16.30 (414)
C	19.02 (483)

# SPECIFICATIONS

Table 3. Engine Specifications	
Model	Vanguard 200 12V3
Type	Air-cooled, four-stroke, single-cylinder, OHV, horizontal shaft, gasoline engine
Bore × Stroke	2.68 in. × 2.2 in. (68 mm × 56 mm)
Displacement	203 cc (12.39 cu. in.)
Gross Power	6.5 hp (4.8 kW) @ 3,600 rpm
Fuel Tank Capacity	Approx. 0.82 gallons (3.1 liters)
Fuel Type	Unleaded automobile gasoline
Lube Oil Capacity	0.63 quarts (0.6 liters)
Starting Method	Recoil start
Dimensions (L × W × H)	12.64 × 14.78 × 14.22 in. (321 × 375 × 361 mm)
Dry Net Weight	39.5 lb. (17.9 kg)

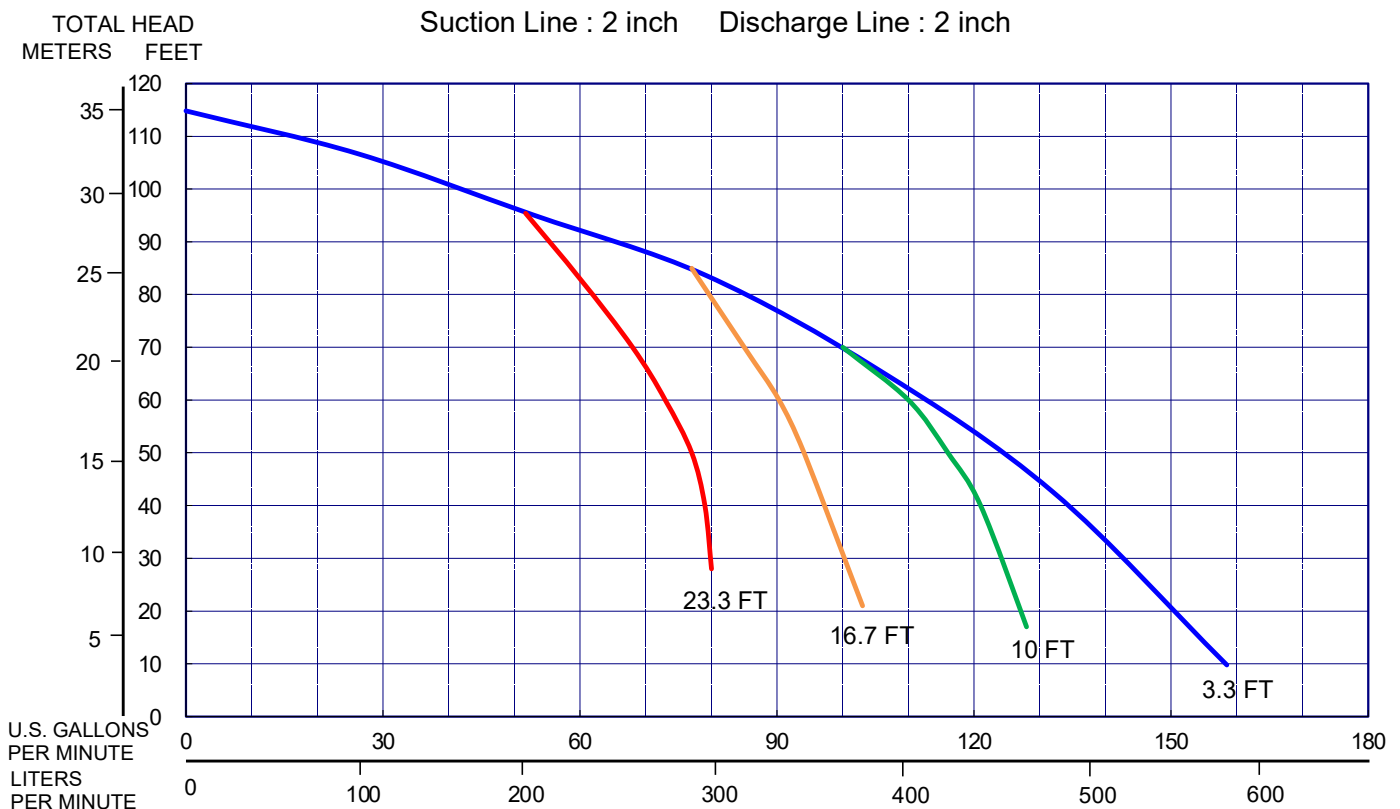


Figure 2. QP2B Performance Curve



# GENERAL INFORMATION

## INTRODUCTION

The QP2B centrifugal pump is a self-priming pump designed to handle all types of clear-water applications. It is ideal for residential use such as dewatering basements and swimming pools.

The pump's suction and discharge ports are two inches in diameter, enabling a discharge rate of approximately 158 gallons per minute (gpm) / 600 liters per minute (lpm).

## ENGINE

The QP2B is powered by a 6.5-horsepower, air-cooled, four-stroke, single-cylinder, Vanguard 200 gasoline engine.

## CENTRIFUGAL PUMPS

Standard centrifugal pumps provide an economical choice for general purpose dewatering. These types of pumps should only be used in clear-water applications (agricultural, industrial, residential), as they have a limited solid-handling capability of only 10% by volume.

## PUMP PRIMING

The pump is **self-priming**, therefore **the pump casing must be filled with water before the pump is operated**.

The engine drives a rotating impeller that creates a partial vacuum (low pressure) within the pump. The reduced internal air pressure causes water to flow continuously into the pump through the suction line, and the centrifugal force of the impeller expels the water from the pump through the discharge ports.

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

## SUCTION LIFT

The QP2B centrifugal 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).

Table 4 shows the difference in suction lift at various elevations.

Table 4. Suction Lift At Various Elevations				
Altitude In Feet (Meters)	Suction Lift In Feet (Meters)			
Sea Level	10 (3.0)	15 (4.6)	20 (6.1)	25 (7.6)
2,000 (609.6)	8.8 (2.7)	13.2 (4.0)	17.6 (5.4)	22 (6.7)
4,000 (1,219.2)	7.8 (2.4)	11.7 (3.6)	15.6 (4.8)	19.5 (5.9)
6,000 (1,828.8)	6.9 (2.1)	10.4 (3.2)	13.8 (4.2)	17.3 (5.3)
8,000 (2,438.4)	6.2 (1.9)	9.3 (2.8)	12.4 (3.8)	15.5 (4.7)
10,000 (3,048)	5.7 (1.7)	8.6 (2.6)	11.4 (3.5)	14.3 (4.4)

Table 5 shows the loss of performance as elevation increases.

Table 5. Performance Loss At Various Elevations		
Altitude In Feet (Meters)	Discharge Flow	Discharge Head
Sea level	100%	100%
2,000 (609.6)	97%	95%
4,000 (1,219.2)	95%	91%
6,000 (1,828.8)	93%	87%
8,000 (2,438.4)	91%	83%
10,000 (3,048)	88%	78%

## ACCESSORIES

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

Figure 3 shows a typical QP2B centrifugal pump application. The main pump components are listed below.



This pump is intended for the removal of **clean** water.



## COMPONENTS (PUMP)

1. **Fill Cap** — Remove the fill cap to add water to the pump. **The pump casing must be filled with water prior to operation!** 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.
9. **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.

### **WARNING**

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

### **NOTICE**

Running the pump for sustained periods with the strainer above the water surface can damage the pump.

2. **Discharge Port** — Two-inch, male, NPT-threaded discharge port accommodates threaded hoses or pipes. Make sure hose lays flat and is not kinked. Use only the recommended type of discharge hose. Contact the Multiquip Parts Department for ordering information.
3. **Worm Clamps** — Worm clamps secure the hoses to the inlet and outlet ports on the pump. Use two worm clamps to secure a hose to the suction port.
4. **Engine** — A 6.5-horsepower, air-cooled, four-stroke, single-cylinder, Vanguard 200 gasoline engine. Refer to the **Components (Engine)** section of this manual for more information.
5. **Discharge Hose** — Discharge hoses are usually collapsible (thin-walled) hoses. However, if a thin-walled discharge hose is not available, a rigid suction hose may be substituted. **MAKE SURE** hoses lay flat and remain unkinked. Contact the Multiquip Parts Department for ordering information.
6. **Drain Plug** — Remove the drain plug to drain water from the pump casing.
7. **Suction Port** — Two-inch, male, NPT-threaded suction port accommodates threaded hoses or pipes. Make sure hose lays flat and is not kinked. Use only the recommended type of suction hose. Contact the Multiquip Parts Department for ordering information.
8. **Suction Hose** — 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 unkinked. Contact the Multiquip Parts Department for ordering information.

## COMPONENTS (ENGINE)

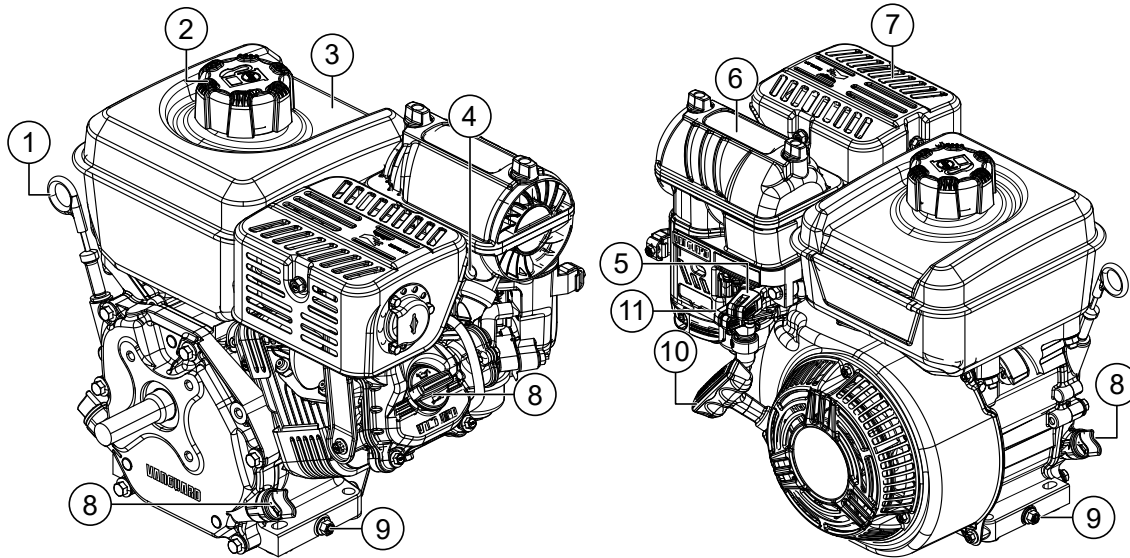


Figure 4. Basic Engine Components

### 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 detailed operation and service instructions.

1. **Engine Oil Dipstick** — Remove to determine if engine oil is low.
2. **Fuel Filler Cap** — Remove to add unleaded gasoline to the fuel tank. Make sure the cap is tightened securely. **NEVER** overfill.

#### DANGER



**NEVER** fill the fuel tank while the engine is running or hot. In the event of a fuel spill, **DO NOT** start the engine until all fuel residue has been wiped up and the area surrounding the engine is dry. Fuel is **extremely flammable** and can ignite if it comes into contact with hot engine parts or sparks from the ignition system.

3. **Fuel Tank** — Holds up to 3.2 quarts (3.1 liters) of unleaded gasoline.
4. **Spark Plug** — Provides spark to the ignition system. Set the spark plug gap according to the engine manufacturer's instructions, and clean the spark plug once a week.
5. **Throttle Lever** — Adjusts engine speed (RPM). Also acts as the engine stop. Place the throttle lever in the **OFF** position to close the fuel valve and stop the engine.

6. **Air Cleaner** — Prevents dirt and other debris from entering the fuel system.

#### NOTICE

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

7. **Muffler** — Reduces noise and emissions. **DO NOT** touch the muffler while it is hot.

#### WARNING



Engine components can generate extreme heat. To prevent burns, **DO NOT** touch these areas while the engine is running or immediately after operating. **DO NOT** operate the engine with the muffler removed.

8. **Oil Filler Cap (3)** — Add engine oil through this port as recommended in Table 6.
9. **Oil Drain Bolt (2)** — Remove to drain oil from the engine crankcase.
10. **Recoil Starter** — Manual starting mechanism. Pull the starter grip slowly until resistance is felt, then pull briskly and smoothly to start the engine.
11. **Choke Lever** — Aids in starting a cold engine or starting in cold weather conditions. The choke enriches the fuel mixture.

## CAUTION



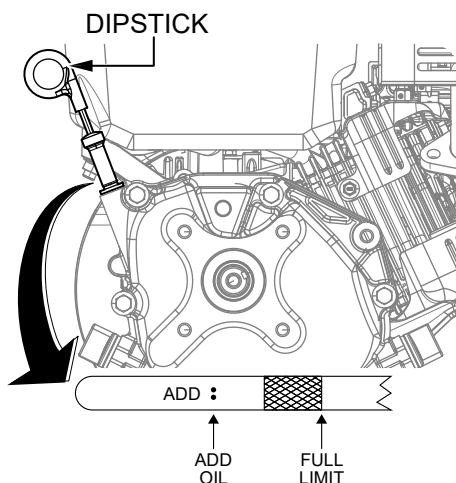
**DO NOT** attempt to operate the pump until the **Safety Information**, **General Information**, and **Inspection** sections of this manual have been thoroughly read and understood.

## BEFORE STARTING

1. Read the safety instructions at the beginning of this manual.
2. Clean the pump, particularly the engine cooling air inlet. Remove all dirt and dust.
3. Inspect the air cleaner for dirt and dust. If the air cleaner is dirty, replace the filter with a new one as required.
4. Inspect the carburetor for external dirt and dust. Clean with dry compressed air as needed.
5. Inspect all fastening nuts and bolts for tightness.

## ENGINE OIL CHECK

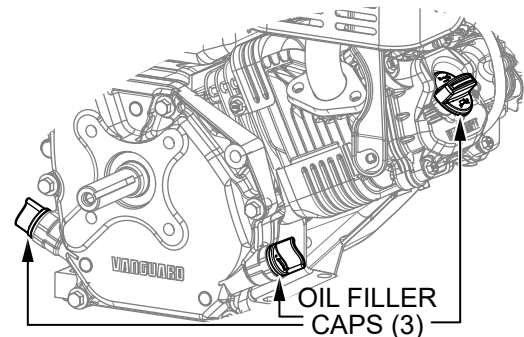
1. Place the pump on secure, level ground with the engine **OFF**.
2. Remove the **dipstick** (Figure 5) from the engine oil filler hole and wipe it clean.



**Figure 5. Engine Oil Dipstick**

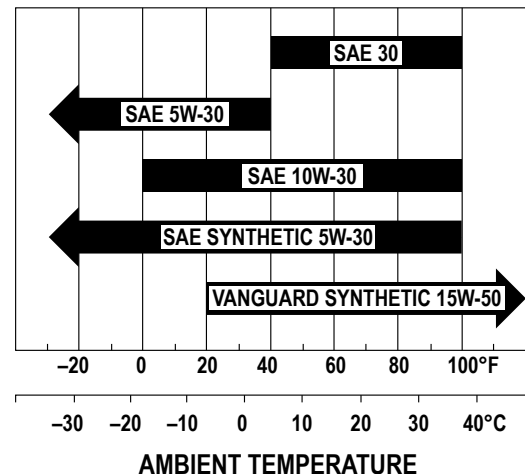
3. Reinsert the dipstick, then remove it again and check the oil level shown on the dipstick (Figure 5). The correct oil level is at the top of the full indicator on the dipstick.

4. If the oil level is low, remove one of the oil filler caps (Figure 6) and fill with the recommended oil type listed in Table 6. **DO NOT** overfill. Refer to Table 3 for maximum engine oil capacity.



**Figure 6. Oil Filler Caps**

**Table 6. Recommended Oil Viscosity Grades**



## FUEL CHECK

Remove the fuel filler cap and inspect the fuel level in the tank. If fuel is low, replenish with 87 octane or higher unleaded gasoline. Maximum fuel capacity is 0.82 gallons (3.1 liters).

## DANGER



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

## WARNING

**ALWAYS** use a strainer for filtration while refueling. **NEVER** top off fuel. **ALWAYS** wipe up any spilled fuel immediately.

## SETUP

Pump performance (flow, head, velocity and pressure) is determined by multiple factors, including operating altitude, suction lift, the length and diameter of the hoses, friction loss, the specific gravity and temperature of the fluid being pumped, and total discharge head. Set up the pump as follows to achieve optimal pump performance.

1. Place the pump on a solid, level operating surface as close as possible to the water source. The most critical factor for successful pump operation is the total suction lift, which should not exceed 25 feet (7.6 meters) at sea level. See Figure 7.
2. Initialize self-priming of the pump by removing the fill cap and filling the pump casing with water.

### NOTICE

**THE PUMP CASING MUST BE FILLED WITH WATER PRIOR TO OPERATION.** Self-priming of the pump will not take place unless the pump casing is filled with water.

### NOTICE

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 can damage the mechanical seal.

3. Check for water leakage between the pump and the engine, which may indicate that the seal inside the pump is worn or damaged. Continued operation of the pump in this condition is **not recommended**, and can cause **severe water damage to the engine**.

4. Connect suitable hoses to the suction and discharge ports. **MAKE SURE** the hoses are tightly secured to their respective ports, have O-rings in place, and are free of any kinks, cracks, gouges, or holes. Using **two** hose clamps to secure the suction hose to the suction port is **recommended**.

### NOTICE

Suction and discharge hoses are available from Multiquip. Contact your local MQ dealer for more information.

5. **MAKE SURE** the strainer is clean and securely attached to the water end of the suction hose. Position the strainer so it will remain **completely underwater**, but is not buried in any underlying sand or silt.

### NOTICE

Sustained pump operation with the strainer above the water surface can damage the pump.

6. **MAKE SURE** the discharge hoses lay as straight as possible and remain unrestricted. Remove any twists, kinks, or sharp bends which may impede the flow of water.

### NOTICE

Discharge hoses are usually collapsible (thin-walled) hoses. However, if thin-walled discharge hoses are not available, rigid suction hoses may be substituted. PVC pipe or concrete pipe can also be connected to the discharge ports.

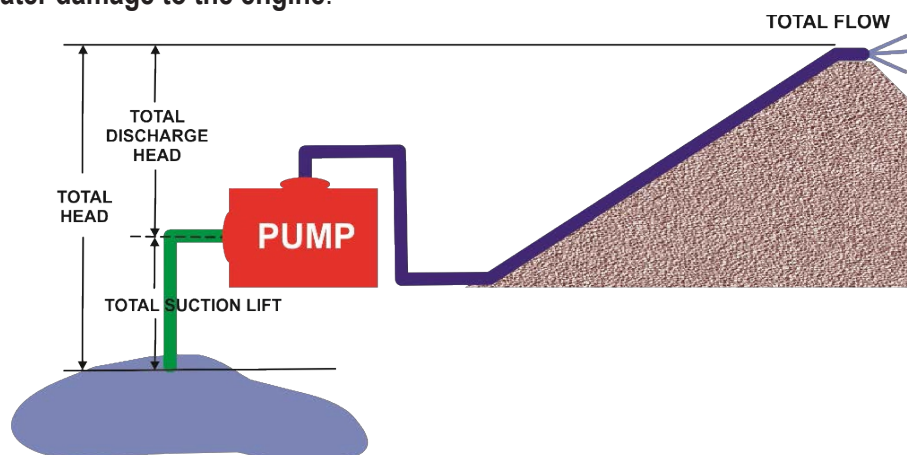


Figure 7. Pump Setup

## 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 thoroughly read and 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 will occur** to the pump's mechanical seal if the pump has not been primed.

## STARTING THE ENGINE

1. Move the **engine throttle lever** (Figure 8) to the **IDLE** position (away from the **OFF** position, about 1/3 of the way toward the **RUN** position).

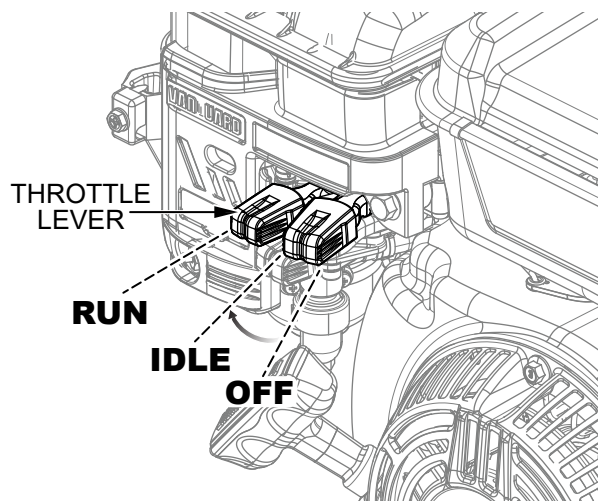


Figure 8. Throttle Lever (Idle)

2. If starting a cold engine, place the **engine choke lever** in the **CLOSED** position (Figure 9).

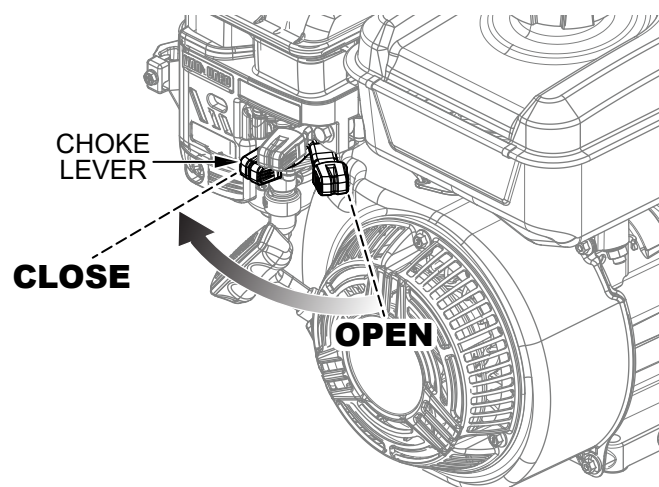


Figure 9. Choke Lever (Closed)



## OPERATION

3. If starting a warm engine, place the **engine choke lever** in the **OPEN** position (Figure 10).

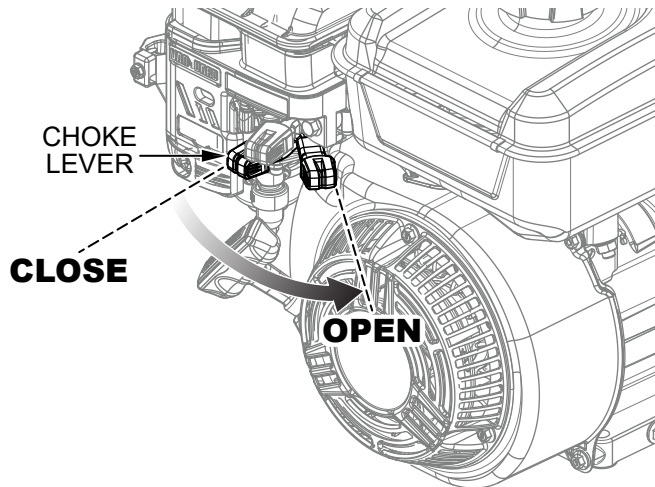


Figure 10. Choke Lever (Open)

4. Slowly pull the **starter grip** (Figure 11) until resistance is felt, then pull briskly and smoothly to start the engine. Gently return the starter grip to its original position.

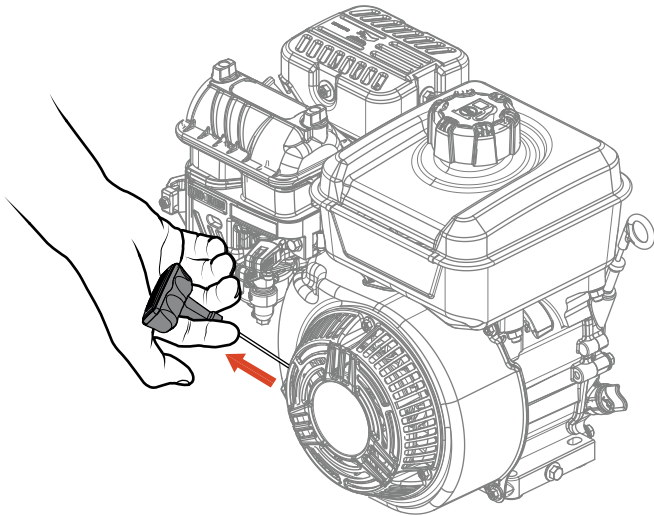


Figure 11. Starter Grip

5. If the engine has started, slowly return the choke lever to the **OPEN** position (Figure 10) as the engine warms. If the engine has not started, repeat steps 1–5.
6. Run the engine at idle for several minutes and check for any abnormal conditions such as extreme vibration, loose components, or fluid leaks.

7. To begin pumping, place the **engine throttle lever** (Figure 12) in the **RUN** position.

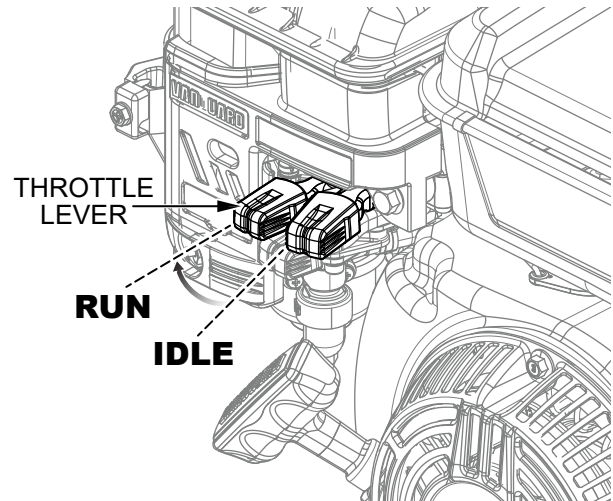


Figure 12. Throttle Lever (Run)

### **WARNING**

Water must always be flowing through the pump casing while the engine is running. Loss of flow may be the result of a loss of prime, restricted water flow, or a dead-head situation. Please note that in such a condition, water in the pump can reach temperatures of 150–200°F in 15–20 minutes. This can cause serious burns if this hot water comes into contact with unprotected skin.

Before touching or opening the fill plug or drain plug, first turn off the engine and allow the pump casing to cool to the touch, then open the pump carefully. Be cautious of any built-up water pressure.

### **CAUTION**

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

## STOPPING THE ENGINE

### Normal Shutdown

1. Place the **engine throttle lever** in the **IDLE** position (Figure 13), and run the engine for three minutes at low speed.

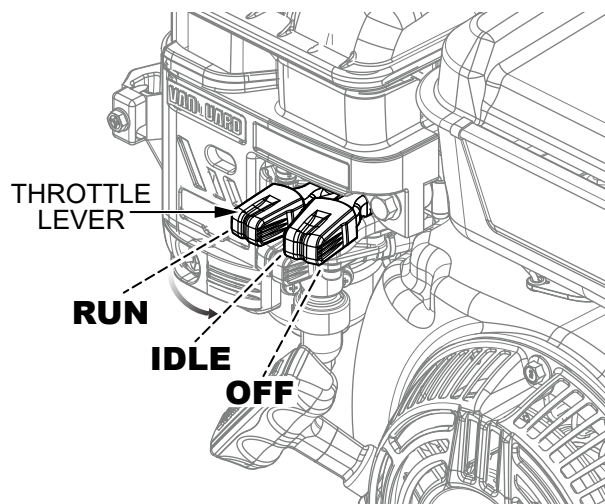


Figure 13. Throttle Lever (Idle)

2. After the engine has cooled, place the engine throttle lever in the **OFF** position (Figure 14). This action will also turn off the engine fuel valve.

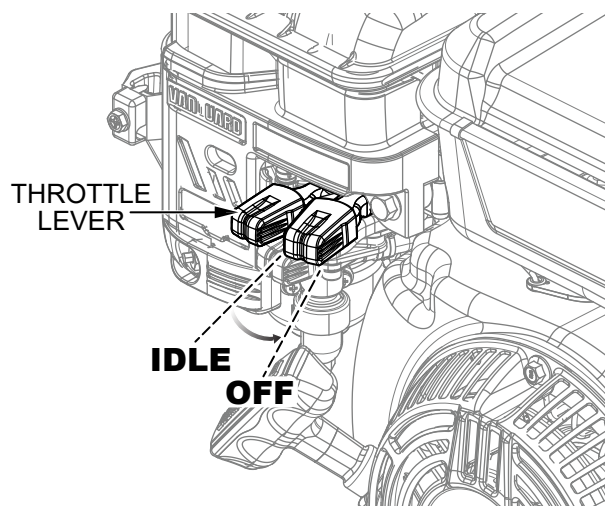


Figure 14. Engine Throttle Lever (OFF)

### NOTICE

When transporting the pump, **ALWAYS** turn off the engine fuel valve by placing the engine throttle lever in the **OFF** position.

### Emergency Shutdown

Move the **engine throttle lever** quickly to the **OFF** position (Figure 15).

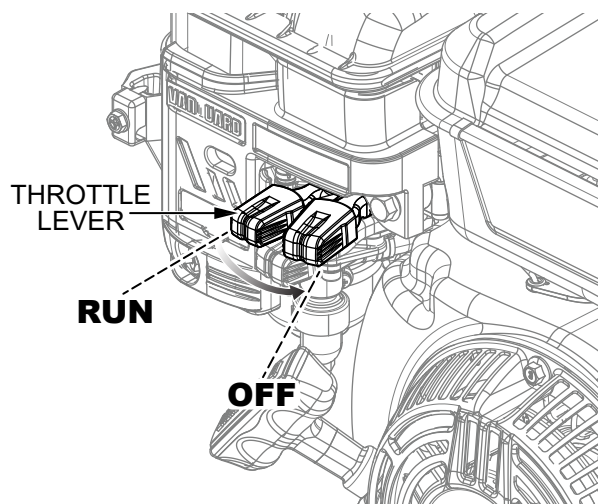


Figure 15. Emergency Shutdown

# MAINTENANCE (ENGINE)

## ENGINE MAINTENANCE

Perform engine maintenance procedures according to Table 7 below:

Table 7. Engine Maintenance Schedule							
Description <sup>(3)</sup>	Operation	First 5 Hours	Every 8 Hours or Daily	Every 100 Hours or Annually	Every 200 Hours or Annually	Annually	Every 600 Hours or 3 Years
Engine Oil	Check		X				
	Change	X			X		
Fuel System	Service					X	
Area Around Muffler and Controls	Clean		X				
Spark Plug	Replace					X	
Air Intake Grille	Clean		X				
Exhaust System	Service			X			
Air Filter	Clean				X <sup>(1)</sup>		
	Replace						X
Cooling System	Service					X <sup>(1)</sup>	
Valve Clearance	Check					X <sup>(2)</sup>	

(1) In dusty conditions or when airborne debris is present, clean more often.

(2) Not required unless engine performance problems are noted.

(3) For commercial use, log hours of operation to determine proper maintenance intervals.



## MAINTENANCE (ENGINE)

### DANGER



**DO NOT** use gasoline or low flash point solvents to clean the engine or any of its components. The possibility exists of **fire** or **explosion** which can damage the equipment and cause **severe bodily harm** or even **DEATH**.

### WARNING



Some maintenance operations may require a running engine. **ALWAYS** make sure the maintenance area is well ventilated. Gasoline engine exhaust contains **poisonous carbon monoxide gas** that can result in **unconsciousness** and/or **DEATH** when inhaled.

### CAUTION



**ALWAYS** allow the engine to cool before servicing. **NEVER** attempt to service a **hot** engine.

### CAUTION

**ALWAYS** disconnect the spark plug wire from the spark plug and secure it **away** from the engine before performing pump maintenance or adjustments.

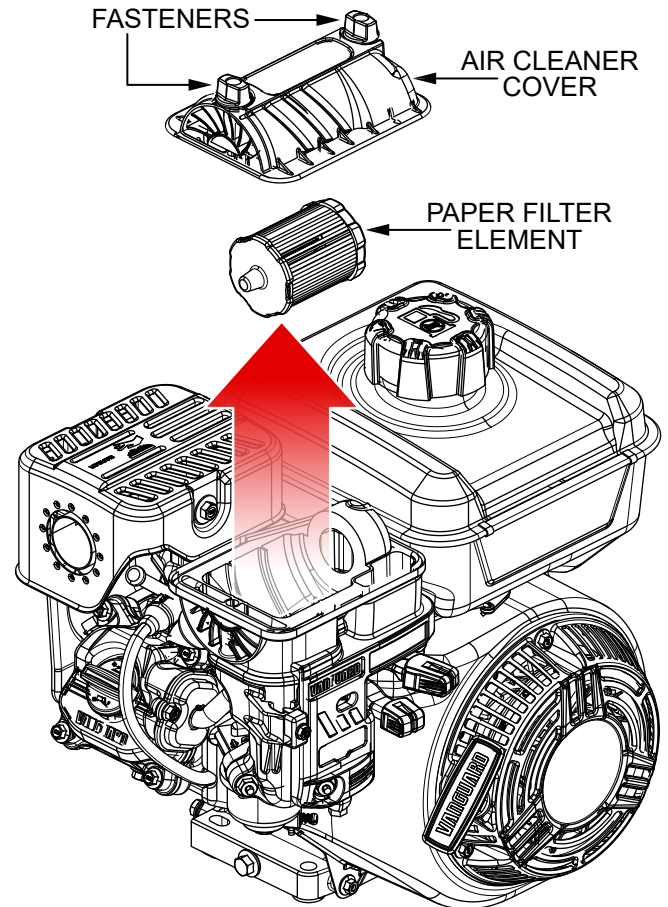
### NOTICE

Refer to the manufacturer's engine manual supplied with your pump for more detailed information about engine maintenance and troubleshooting.

Inspect the engine daily for cleanliness, oil or fuel leakage, and loose fasteners.

## AIR CLEANER

The **engine air cleaner** is equipped with a replaceable, high-density, paper element. Refer to Figure 16 for air cleaner maintenance.



**Figure 16. Engine Air Cleaner Components**

1. Loosen the **fasteners** and remove the **air cleaner cover** and **paper filter element**.
2. To remove dirt, gently tap the paper filter element several times on a hard surface. Replace the paper filter element if it is excessively dirty.

### NOTICE

**DO NOT** use pressurized air or solvents to clean the air filter. Pressurized air can damage the filter and solvents will dissolve the filter.

3. Reinstall the paper air filter and the air cleaner cover. Secure the cover with the fasteners and make sure the fasteners are tight.

### NOTICE

Operating the engine with loose or damaged air cleaner components can allow unfiltered air into the engine, causing premature wear and failure.

## MAINTENANCE (ENGINE)

### ENGINE OIL

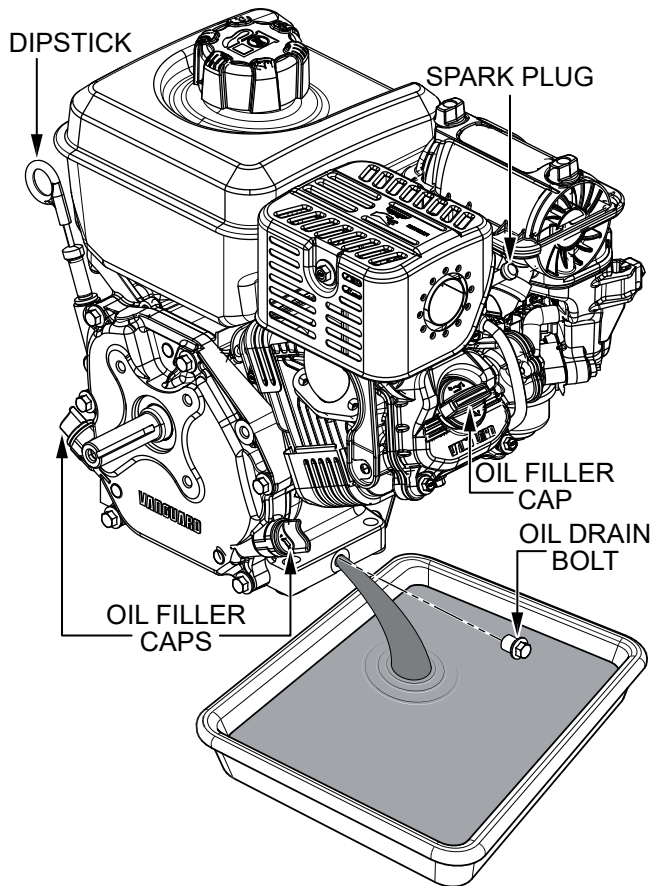


Figure 17. Draining Engine Oil

#### NOTICE

**ALWAYS** drain the engine oil while the oil is **warm**.

1. With the engine **OFF** but still warm, disconnect the spark plug wire and keep it away from the **spark plug** (Figure 17).
2. Remove the **engine oil dipstick** (Figure 17).
3. Remove one of the **oil drain bolts** (Figure 17) and allow the engine oil to drain into a suitable container.
4. After the oil has drained, reinstall and tighten the oil drain bolt.
5. Remove one of the **oil filler caps** (Figure 17) and fill with the recommended oil type listed in Table 6. Maximum engine oil capacity is 0.63 quarts (0.6 liters). **DO NOT** overfill.
6. After adding oil, wait one minute and then check the oil level.

7. Reinstall the oil filler cap and the dipstick and reconnect the spark plug wire to the spark plug.

### SPARK PLUG

1. Remove the **spark plug** (Figure 18) and clean it with a wire brush if it is to be reused. Replace the spark plug if the insulator is cracked or chipped.

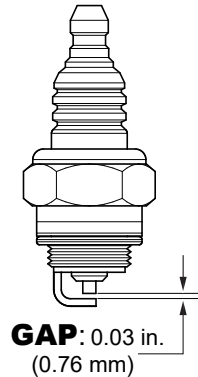


Figure 18. Spark Plug

2. Using a feeler gauge, adjust the **spark plug gap** (Figure 18). The gap should measure 0.03 inch (0.76 mm).
3. To prevent cross-threading, thread the spark plug into the cylinder hole first by hand, then torque to 180 lbf-in (20 Nm).

## NOTES

[illegible]

## MAINTENANCE (PUMP)

### PUMP VACUUM TEST

#### NOTICE

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

Perform the following procedure to test the pump vacuum. Refer to Figure 19.

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 one of the discharge ports, and turn on the water. The flow of water into the discharge port will prevent the pump from running dry.
4. Place the pump vacuum tester (P/N 7000030) 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 20–25 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 CLEARANCE ADJUSTMENT

Every six months, inspect the impeller, shaft seal, and shaft sleeve for wear, and check the clearance between the impeller and the volute. The impeller should be as close to the volute as possible without touching it.

1. Adjust the clearance between the impeller and the volute by adding or 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.

2. Slowly pull the starter grip to rotate the impeller just a bit. Repeat this a few times while checking the clearance between the impeller and the volute.

If it becomes necessary to replace the impeller or the volute, make sure the clearance between the impeller and the volute is adjusted correctly.

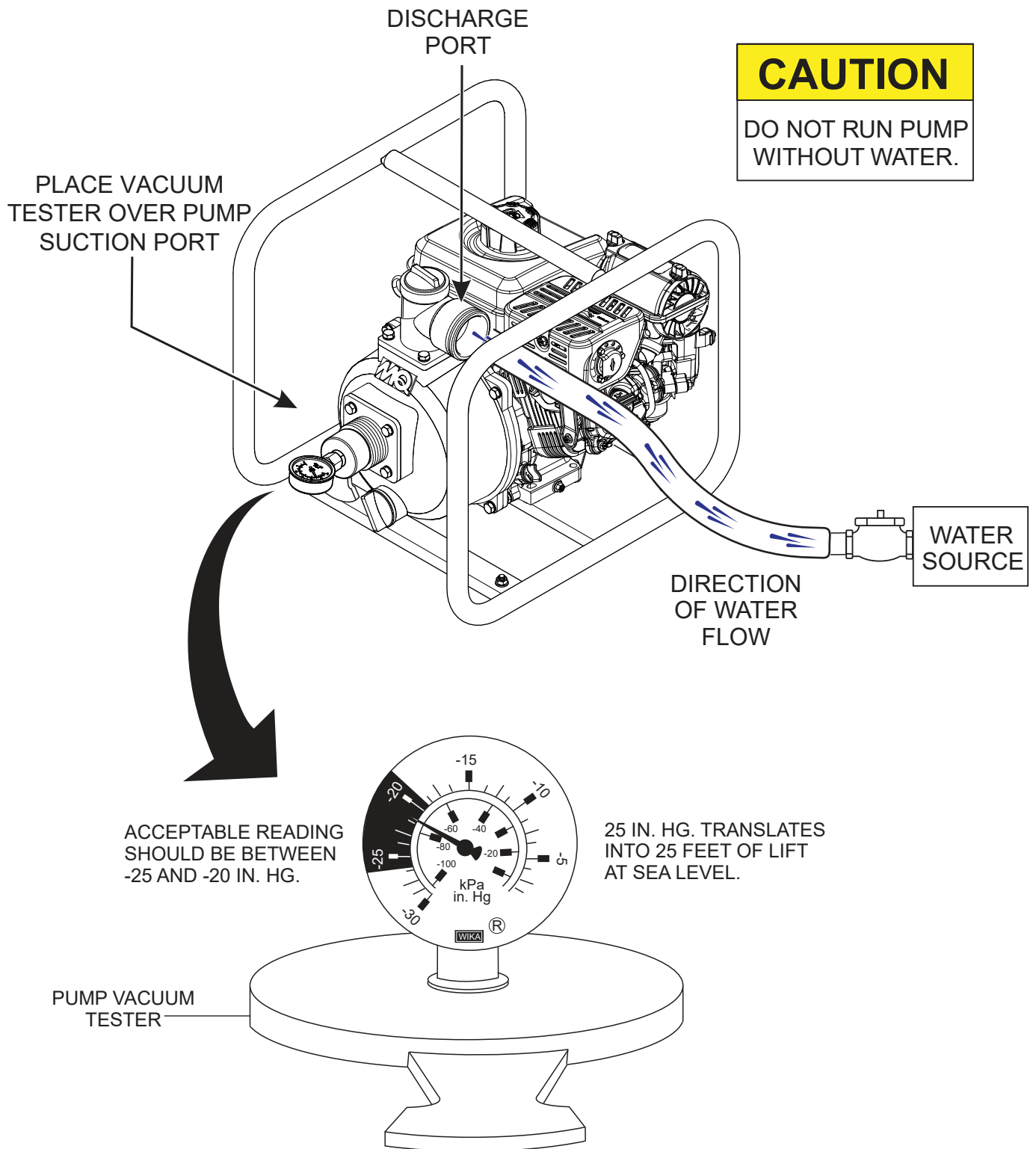


Figure 19. Pump Vacuum Test

### 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.
- 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.
- 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.

# TROUBLESHOOTING (ENGINE)

**Table 8. Engine Troubleshooting**

Symptom	Possible Problem	Solution
<b>Difficult to start</b>		
Fuel is available but spark plug will not ignite (power available at high-tension cable).	Bridged spark plug gap?	Check ignition system.
	Carbon deposit at ignition?	Clean or replace ignition.
	Short circuit due to defective insulators?	Replace insulators.
	Improper spark gap?	Set spark plug gap to the correct distance.
Fuel is available but spark plug will not ignite (power <b>NOT</b> available at high-tension cable).	Short circuit at stop switch?	Check stop switch circuit. Replace stop switch if defective.
	Defective ignition coil?	Replace ignition coil.
Fuel is available and spark plug ignites (compression <b>normal</b> ).	Muffler clogged with carbon deposits?	Clean or replace muffler.
	Mixed fuel quality inadequate?	Check fuel to oil mixture.
	Fuel in use inadequate (water, dust)?	Flush fuel system and replace with fresh fuel.
	Air cleaner clogged?	Clean or replace air cleaner.
Fuel is available and spark plug ignites (compression <b>low</b> ).	Defective cylinder head gasket?	Tighten cylinder head bolts or replace head gasket.
	Worn cylinder?	Replace cylinder.
	Loose spark plug?	Tighten spark plug.
<b>Operation not satisfactory</b>		
Not enough power available (compression normal, no misfiring).	Clogged air cleaner?	Clean or replace air cleaner.
	Air in fuel line?	Bleed (remove air) from fuel line.
	Improper fuel level in carburetor float chamber?	Adjust carburetor float.
	Carbon deposits in cylinder?	Clean or replace cylinder.
Not enough power available (compression normal, misfiring).	Defective ignition coil?	Flush fuel system and replace with fresh fuel.
	Ignition plug often shorts?	Replace ignition wires, clean ignition.
	Fuel in use inadequate (water, dust)?	Flush fuel system and replace with fresh fuel.
Engine overheats.	Excessive carbon deposition in combustion chamber?	Clean or replace crankcase.
	Exhaust or muffler clogged with carbon?	Clean or replace muffler.
	Incorrect spark plug heat value?	Replace spark plug with correct spark plug type.
Rotational speed fluctuates.	Improper governor adjustment?	Adjust governor to correct lever.
	Defective governor spring?	Clean or replace ignition.
	Erratic fuel flow?	Check fuel line.
	Air taken in through suction line?	Check suction line.
Recoil starter not working properly.	Dust in rotating part?	Clean recoil starter assembly.
	Spring failure?	Replace spiral spring.

## TROUBLESHOOTING (PUMP)

**Table 9. Pump Troubleshooting**

Symptom	Possible Problem	Solution
Pump does not take on water.	Not enough priming water in the housing?	Add water.
	Low engine speed?	Increase throttle.
	Plugged strainer?	Clean strainer.
	Damaged suction hose?	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?	Adjust clearance by adding shims (Min. 0.006" – Max. 0.020"), or replace impeller.
	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.	Low engine speed?	Increase throttle speed.
	Partially plugged suction strainer?	Clean strainer.
	Worn impeller/volute?	Adjust clearance by adding shims or replace impeller/volute.
Suction hose leaks at inlet.	Fittings/clamps not sealed properly?	Tighten, replace, or add clamp. (Keep extra seals on pump.)
	Hose diameter 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?	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.



## NOTES

[illegible]

# OPERATION MANUAL

## HERE'S HOW TO GET HELP

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

### United States

#### ***Multiquip Inc.***

(310) 537- 3700  
6141 Katella Avenue Suite 200  
Cypress, CA 90630  
E-MAIL: [mq@multiquip.com](mailto:mq@multiquip.com)  
WEBSITE: [www.multiquip.com](http://www.multiquip.com)

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### Canada

#### ***Multiquip***

(450) 625-2244  
4110 Industriel Boul.  
Laval, Quebec, Canada H7L 6V3  
E-MAIL: [infocanada@multiquip.com](mailto:infocanada@multiquip.com)

### United Kingdom

#### ***Multiquip (UK) Limited Head Office***

0161 339 2223  
Unit 2, Northpoint Industrial Estate, Globe Lane,  
Dukinfield, Cheshire SK16 4UJ  
E-MAIL: [sales@multiquip.co.uk](mailto:sales@multiquip.co.uk)

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