

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

Self-Priming Engine-Driven Centrifugal Pumps

Refer to Specifications Information and Repair Parts Manual for product specific information

Description

These self-priming engine driven pumps are equipped with precision mechanical seals to prevent leakage. Units are coupled to gasoline engines. For use with non-flammable liquids that are compatible with pump component materials.

Safety Guidelines

⚠ DANGER Failure to follow any warnings/ cautions can result in personal injury, pump damage, and/or property damage.

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols:

⚠ DANGER Danger indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠ WARNING Warning indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

⚠ CAUTION Caution indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.

NOTE: Indicates important information that, if not followed, may cause damage to equipment.

Unpacking

After unpacking the unit, inspect carefully for any damage that may have occurred during transit. Make sure to tighten fittings, bolts, etc., before putting unit into service.

⚠ CAUTION Do not operate unit if damaged during shipping, handling or use. Damage may cause injury or property damage.

General Safety Information

1. Know the pump application, limitations, and potential hazards. Read all manuals included with this product carefully. Be thoroughly familiar with the pump and the proper use of the equipment.

⚠ DANGER Do not use to pump flammable or explosive fluids such as gasoline, fuel oil,



kerosene, etc. Do not use in flammable and/or explosive atmospheres. Pump should only be used with liquids compatible with pump component materials. Failure to follow this warning can result in death, serious personal injury

and/or property damage.

2. Make certain that the power source (gas engine) conforms to the requirements of your equipment.
3. Provide adequate protection and guarding around moving parts.
4. Release all pressure within the system before servicing any component.
5. Drain all liquids from the system before servicing.
6. Secure the discharge line before starting the pump. An unsecured discharge line will whip, possibly causing personal injury and/or property damage.
7. Check hoses for weak or worn condition before each use, making certain that all connections are secure.
8. Periodically inspect pump and system components. Perform routine maintenance as required (See Maintenance section).
9. Provide a means of pressure relief for pumps whose discharge line can be shut-off or obstructed.
10. **Personal Safety:**
 - a. Wear safety glasses at all times when working with pumps.
 - b. Wear a face shield and proper apparel when pumping hazardous chemicals.
 - c. Keep work area clean,

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General Safety Information (continued)

uncluttered and properly lighted; replace all unused tools and equipment.

- d. Keep visitors at a safe distance from the work area.
 - e. Make workshop child-proof – with padlocks, master switches, and by removing starter keys.
11. Carefully read instruction manuals supplied by engine manufacturer before attempting to assemble, operate, or service the engine or any part. The WARNING statements indicate potentially hazardous conditions for operator or equipment. TAKE NECESSARY STEPS TO PROTECT PERSONNEL AND EQUIPMENT.

⚠ WARNING

Gasoline is a highly combustible fuel. The improper use, handling, or storage of gasoline can be dangerous. Prevent accidents by following these safety rules:

- a. Use gasoline only as fuel, never as a cleaning fluid.
- b. Use only an approved container to hold or store gasoline. Never store gasoline in familiar containers such as milk containers or soda pop bottles.
- c. Store gasoline in a cool location, out of reach of children. Never store gasoline near heat or an open flame.

- d. Add gasoline to a cool engine only. Spilled gasoline on a hot engine may cause fire or an explosion. Fill gasoline tank out-of-doors and wipe up any spills.
- e. Provide a fire extinguisher nearby when working with gasoline. Be sure extinguisher is in operating condition – check the pressure gauge or indicator. Be familiar with its proper use. Consult local fire department for the correct type of extinguisher for your application. Extinguishers rated ABC by the National Fire Protection Association are appropriate for most applications.

IMPORTANT: Positively no smoking!

12. DO NOT RUN THE ENGINE IN AN ENCLOSED AREA!! Exhaust fumes contain carbon monoxide which is an odorless and poisonous gas. If equipment is located in an enclosed area, use an exhaust line to the outside and regularly check the exhaust system for leaks. Be sure the area is well ventilated.
13. Check engine oil and fuel levels before initial start up each day. Stay away from moving parts. Avoid wearing loose jackets, shirts, and ties. Make sure all nuts and bolts are secure. Keep power shields and guards in place. If adjustments must be made while the unit is

running, use extreme caution around hot manifolds, moving parts, etc.

14. Do not operate this equipment when mentally or physically fatigued.

⚠ CAUTION

Be careful not to touch the exterior of the engine, especially the muffler and the surrounding area. The engine is hot enough to be painful or cause injury!

15. Prevent accidental starting by always removing spark plug or by disconnecting and grounding spark plug wire before working on engine or the equipment driven by engine.
16. Familiarize yourself with all controls. Learn how to stop an engine quickly in an emergency.
17. Keep the equipment and surrounding area clean. Remove all oil deposits from equipment and surrounding area. Accumulations of grease and oil may present a fire hazard and can cause engine damage. Cleaning rags and other flammable waste materials must be stored in approved metal containers.
18. All visitors should be kept at a safe distance from the working area. Keep children away from power equipment. Keep work area clean. Cluttered areas invite accidents.
19. When shutting off a gasoline engine, be sure it is completely stopped before leaving the work area.

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Installation

IMPORTANT: For installations where property damage might result from an inoperative or leaking pump due to power outages, discharge line blockage or any other reason, a back-up system(s) and/or warning system(s) should be used.

1. Locate pump as close to the fluid source as possible, making the suction line as short and direct as possible.

CAUTION *The unit should be placed where the pump/engine is protected from the weather and extremes of heat, cold and humidity.*

2. Mount the unit on a solid foundation. On fixed installation, install both a union and a gate valve (not furnished) on the discharge side of the pump for service convenience.

CAUTION *Do not use a globe or other restricting type of valve at the discharge, as this would seriously restrict the capacity of the pump.*

3. Attach suction line piping to the suction inlet and discharge line piping to the discharge outlet. The suction line should be positioned such that there is a continual upward slope from the fluid source to the pump. Avoid using loops or sections of pipe or fittings which might permit air to become trapped.

IMPORTANT: If plastic or fabric hose is used for the suction piping, it should be of a reinforced type so as not to collapse under suction. The discharge piping should be at least the same size as the discharge connection. Suction piping should be the same size as the discharge piping or one size larger. Unless long horizontal runs are involved, discharge piping should not be larger than suction piping. Avoid using looped sections of pipe which might permit air to become entrapped. Assure air-tight pipe connections with the use of a pipe joint sealant.

4. A foot-valve may be used on the suction line to assist in faster pumping. The foot-valve should be installed when the suction lift is over 10 feet or when the suction line is over 10 feet long.
5. A suitable suction strainer should be attached to the suction line so that large pieces of foreign material are not drawn into the pump. The maximum opening in the suction strainer should not be greater than 25% of the suction inlet size for solid handling pumps and 50% of the suction inlet size for trash pumps.

Operation

1. **4 CYCLE:** Fill the engine crankcase with oil as specified in the engine manual. If the engine has no dip-

stick, then fill the crankcase with oil until the oil overflows (starts spilling out of the crankcase). Periodically check oil level thereafter.

2 CYCLE: Mix 2 cycle oil with gasoline as specified by the manufacturer. Refer to mixing instructions provided in the engine instruction booklet and plates on the engines.

2. Fill the gasoline tank as required for 4 cycle or 2 cycle engines. Refer to engine instruction booklet.

WARNING *Never add gasoline to a hot engine! See General Safety Information for proper handling of gasoline.*

3. Fill the pump with liquid through the pump discharge or the priming port supplied with these units. It may be convenient to screw in a service tee or a tee with a nipple into the discharge, so that the pump can be filled (using the upper leg of the tee) without disconnecting the discharge hose or pipe. The vertical leg must be closed with a pipe plug during pumping. Remember, the pump is self-priming only when the pump casing has been filled. The pump should prime and re-prime without refilling. Refilling is necessary occasionally if an unusual siphoning has occurred, if the fluid has been lost by evaporation, and when the unit is moved to a new location.

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Operation (continued)

⚠ CAUTION *Do not run pump dry, as permanent damage to the mechanical seal will result.*

4. Start the engine, following instructions in the engine manual.
5. With a suction lift of 5 to 10 feet, the pump should discharge liquid within one or two minutes. A suction lift of 20 feet can take 5 minutes running time to pick up a prime. If pumping does not start within this time, shut off the engine, let unit cool down about 5 minutes, refill pump casing and retry. If engine does not start, refer to Engine Manual. If pump does not prime after 2 tries, refer to "Troubleshooting Chart" in this manual.
6. Properly fueled and lubricated, the pump/engine

unit will run automatically without attention to the controls. The gasoline engine has a built-in governor and will adjust the speed of the engine automatically depending on the volume of water being delivered.

⚠ WARNING *Even though this unit will operate with minimal supervision, it should not be left operating by itself. Depending on the application and area unit is operating (high traffic, people in area, etc.) will dictate the necessity of having someone watching over the unit.*

Maintenance

1. If the pump is located in an area subject to freezing temperature, the pump should be drained when not in operation. Also, the pump should be flushed after each use.
2. Clean the suction line

strainer at regular intervals.

3. If the gas engine is equipped with a spark arrestor screen in the muffler, it should be inspected for wear periodically, and replaced when necessary.

NOTE: For information pertaining to the engine and engine parts, consult the Engine Manual or contact the nearest authorized service representative or the manufacturer.

4. Periodically check nuts and bolts on engine, mounting frame and pump. Since this is a gas engine pump, vibration levels tend to loosen nuts and bolts faster than normal. Use Loctite (thread sealant) on threads or lockwashers if necessary.

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Troubleshooting Chart

Symptom	Possible Cause(s)	Corrective Action
Little or no discharge and unit will not prime	1. Casing not filled with water	1. Fill pump casing. Using a foot-valve will extend pump life and facilitate immediate priming.
	2. Total head too high.	2. Shorten suction lift and/or discharge head
	3. Suction head exceeds that for which pump is designed	3. Shorten suction line and/or vertical distance from liquid to pump, install foot-valve and prime
	4. Impeller partially or completely plugged	4. Disassemble pump and clean out impeller
	5. Hole or air leak in suction line	5. Repair or replace suction line
	6. Foot-valve too small	6. Match foot-valve to piping or install one size larger foot-valve
	7. Impeller damaged	7. Disassemble pump and replace impeller
	8. Foot-valve or suction line not submerged deep enough in water, pulling air	8. Submerge lower in water
	9. Insufficient inlet pressure or suction head	9. Increase outlet pressure by adding more water to tank or increasing back pressure by turning gate-valve on discharge line to partially closed position
	10. Suction piping too small	10. Increase pipe size to pump inlet size or larger
	11. Casing gasket leaking	11. Replace
	12. Suction or discharge line valves closed	12. Open
Loss of suction after satisfactory operation	1. Air leak in suction line	1. Repair or replace suction line
	2. When unit was last turned off, water syphoned out of pump casing	2. Refill (reprime) pump casing before restarting

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Troubleshooting Chart (continued)

Symptom	Possible Cause(s)	Corrective Action
Loss of suction after satisfactory operation (continued)	3. Suction head exceeds that for which pump was designed	3. Shorten suction line and/or vertical distance from liquid to pump, install foot-valve and prime
	4. Insufficient inlet pressure or suction head	4. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position
	5. Clogged foot-valve, strainer or pump	5. Unclog, clean or replace as necessary
Pump overloads driver (gas engine shuts off before complete hose fill)	1. Total head lower than pump rating. Unit delivering too much water	1. Increase back pressure on pump by turning gate valve on discharge line to partially closed position that will not overload motor
	2. Specific gravity and viscosity of liquid being pumped different than the pump rating	2. Pump is designed for water, use only for liquids which have similar characteristics.
	3. Speed too high	3. Check and correct, lower speed
Pump vibrates and/or makes excessive noise	1. Mounting plate or foundation not rigid enough	1. Reinforce
	2. Foreign matter in pump causing unbalance	2. Disassemble pump and remove
	3. Impeller bent	3. Replace impeller
	4. Cavitation present	4. Check suction line for proper size and check valve in suction line if completely open, remove any sharp bends before pump and shorten suction line

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Troubleshooting Chart (continued)

Symptom	Possible Cause(s)	Corrective Action
Pump runs but no fluid	1. Faulty suction piping (air leak)	1. Replace
	2. Pump located too far from fluid source	2. Relocate
	3. Gate valve closed	3. Open
	4. Clogged strainer	4. Clean or replace
	5. Fouled foot-valve	5. Clean or replace
	6. Discharge height too great	6. Lower the height
Pump Leaks at shaft	Worn mechanical seal	Replace
Engine will not start or run (or when you pull rope to start, it will not move)	1. Stone or foreign object lodged in impeller	1. Disassemble pump and remove stone or foreign object
	2. No oil in crank case	2. Fill oil to overflowing, or check dipstick. See engine manual

