GENERAL PUMP

HWB

Owner's Manual

- Installation
- Use
- Maintenance



HWB2512
HWB2112
HWB1812
HWB1512

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1. INTRODUCTION

The General Pump HWB series of high pressure plunger pumps have been designed for long life. They will provide a long period of trouble free operation, if they are correctly installed and maintained. Read this manual carefully before using your pump. It contains necessary information for correct installation, use and maintenance, and practical trouble shooting suggestions.

2. GENERAL WARNINGS FOR SAFE OPERATION



WARNING: The misuse of a high pressure water unit and improper pump installation and maintenance increases the risk of personal injury and serious damage to the equipment.



WARNING: High pressure spray can cause serious injury. For professional use only. Observe all warnings.



WARNING: Read and understand all instruction manuals before operating equipment.

2a. Fluid injection hazard

General safety

This pump generates very high fluid pressure. Spray from a gun, leaks or ruptured components can inject fluid through your skin and into your body and cause extremely serious bodily injury including the need for amputation. Also, fluid injected or splashed into the eyes or on the skin can cause serious damage.

- Never point the spray gun or wand at any person or animal or at any part of the body. Never put hand or fingers over the spray tip.
- Always relieve system pressure before cleaning or servicing any part of the system. (See the pressure relief procedure in this section)
- Never try to stop or deflect leaks with your hand or body.
- Be sure all equipment safety devices are operating properly before each use.
- Always install a pressure relief valve sized to discharge (bypass) 110% of the maximum pump flow rate.
- Protect all components from environmental damage and high pressure water spray.
- Always restrict access to the area to properly trained and required personnel.
- Keep the area clear of debris and loose items.
- Always use only genuine General Pump replacement parts when servicing the pump.

Medical treatment

If any fluid appears to penetrate your skin, get EMERGENCY MEDICAL TREATMENT AT ONCE. DO NOT TREAT AS A SIMPLE CUT. Tell the doctor exactly what fluid was injected.

NOTE TO PHYSICIAN: Injection in the skin is a traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream. Consultation with a plastic surgeon or reconstructive hand surgeon may be advisable.

Pressure relief procedure

To reduce the risk of serious bodily injury, including fluid injection and splashing in the eyes or on the skin, always follow this procedure whenever you stop spraying for more than 10 minutes, when shutting down, and before checking or repairing any part of the system.

1. Engage the trigger safety latch.
2. Turn the system off.
3. Disengage the power supply.
4. Shut off the water supply.
5. Disengage the trigger safety latch and trigger the gun to relieve pressure, and then engage the trigger safety latch again.
6. Before long-term (overnight) storage, disconnect the water supply and disconnect the power supply.

Spray gun safety devices

Be sure all gun safety devices are operating properly before each use. Do not remove or modify any part of the gun; this can cause a malfunction and result in serious bodily injury.

Safety latch: Whenever you stop spraying for a moment, always set the gun safety latch in the engaged or "safe" position, making the gun inoperative. Failure to properly set the safety latch can result in accidental triggering of the gun.
Spray tip safety: Use extreme caution when cleaning or changing spray tips. If a spray tip clogs while spraying, engage the gun safety latch immediately. Always relieve system pressure before removing the spray tip to clean it.

2b. Fuel and emission hazards: engine driven products

Never fill the fuel tank while the unit is running or hot. The fuel used in this unit is combustible and when spill on a hot surface can ignite and cause a fire. Always fill tank slowly to avoid spilling.

Never operate the unit in a closed building. The exhaust contains carbon monoxide, a poisonous, odorless, invisible gas which can cause serious injury or death if inhaled.

Never alter the maximum throttle setting, which is factory set. Tampering with this adjustment can damage the hydraulic system and/or pressure washer and will void the warranty.

2c. Grounding instructions: electric motor driven products

This product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. If the equipment is equipped with a cord having an equipment-grounding conductor and a grounding plug, the plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

⚠ DANGER: Improper connection of the equipment-grounding conductor can result in the risk of electrocution. Check with a qualified electrician or service person if you are in doubt as to whether an outlet is properly grounded. Do not modify any plug provided with the product - if it will not fit the outlet, have a proper outlet installed by a qualified electrician.

2d. Extension cords: electric motor driven products

Use only 4-wire extension cords that have 4-prong grounding-type plugs and 4-pole cord connectors that accept the plug from the product. Use only extension cords that are intended for outdoor use. These extension cords are identified by a marking, "Acceptable for use with outdoor appliances; store indoors while not in use" Use only extension cords having an electrical rating not less than the rating of the product. Do not use damaged extension cords. Examine extension cord before using and replace if damaged. Do not abuse extension cord and do not yank or pull on any cord to disconnect. Keep cord away from heat and sharp edges. Always disconnect the extension cord from the receptacle before disconnecting the product from the extension cord.

⚠ WARNING: To reduce the risk of electrocution, keep all connections dry and off the ground. Do not touch plug with wet hands.

2e. Equipment misuse hazard

General safety

Any misuse of the pump or accessories, such as over pressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in fluid injection, splashing in the eyes or on the skin, or other serious bodily injury, fire, explosion or property damage.

Never alter or modify any part of this equipment; doing so could cause it to malfunction. Check all equipment regularly and repair or replace worn or damaged parts immediately.

Always wear protective eyewear, hearing protection and appropriate clothing. If using a chemical, read and follow the chemical manufacturer's literature for recommendations on additional protective equipment, such as a respirator.

System pressure

This pump can develop high operating pressure. Be sure that all equipment and accessories are rated to withstand the maximum working pressure of this system. Do not exceed the maximum working pressure of any component or accessory used in the system.

Chemical compatibility

Be sure that all chemicals used are compatible with the wetted parts.
Always read the chemical manufacturer's literature before using any chemical.

2f. Hose safety

High pressure fluid in the hoses can be very dangerous. If the hose develops a leak, split or rupture due to any kind of wear, damage or misuse, the high pressure spray emitted from it can cause a fluid injection injury or other serious bodily injury or property damage.
ALL FLUID HOSES MUST HAVE STRAIN RELIEFS ON BOTH ENDS. The strain reliefs help protect the hose from kinks or bends at or close to the coupling, which can result in hose rupture.

Tighten all fluid connections securely before each use. High pressure fluid can dislodge a loose coupling or allow high pressure spray to be emitted from the coupling.

Never use a damaged hose. Before each use, check entire hose for cuts, leaks, abrasion, bulging cover, or damage or movement of the hose couplings. If any of these conditions exist, replace the hose immediately. Do not try to recouple high pressure hose or mend it with tape or any other device. A repaired hose cannot contain the high pressure fluid.

HANDLE AND ROUTE HOSES CAREFULLY.

Do not pull on hoses.

Do not use chemicals which are not compatible with the inner tube and cover of the hose.

Do not expose hose to temperatures above 200° F (93° C) or below -40° F (-40° C).

2g. Moving parts hazard

Moving parts can pinch or amputate fingers or other body parts. Keep clear of moving parts when starting or operating the system.
Never operate the system without all guards and interlocks installed and functioning. Always relieve system pressure before cleaning or servicing any part of the system to prevent discharging high pressure fluid from the gun. (See Pressure relief procedure section 2a)

2h. Terms

 WARNING or DANGER: Alerts user to avoid or correct conditions that could cause bodily injury.

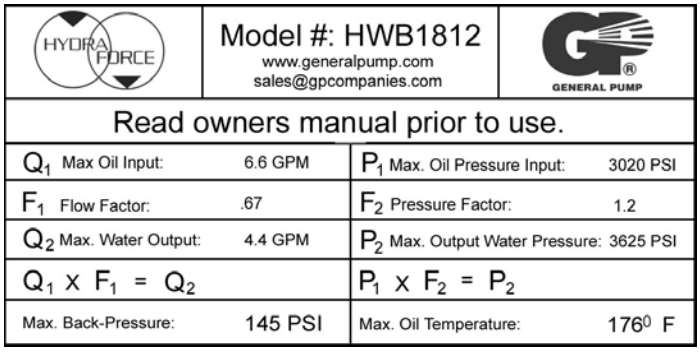
 CAUTION: Alerts user to avoid or correct conditions that could cause damage to the equipment.

 NOTE: Identifies helpful procedures and information.

3. PUMP IDENTIFICATION

Each pump is fitted with a rating plate. The specifications stamped on it are as follows:

- Pump model and version
- Maximum pressure
- Maximum volume
- Maximum temperature
- Flow and pressure factors



The pump model, pump version, and serial number data must be specified when ordering spare parts. If the pump is modified, any change should be mentioned on the rating plate for future reference.

4. TECHNICAL FEATURES

The HWB Series pump features:

- Three hydraulically actuated axial plungers
- Built-in unloader and thermal relief valve
- Double U-shaped pressure packings lubricated by water
- Hydraulically lubricated power mechanism

Pump Performance

Model	HWB2512	HWB2112	HWB1812	HWB1512
Max inlet oil pressure (PSI)	3625	3625	3020	2485
Pressure ratio factor	.6	.8	1.2	1.75
Max discharge pressure (PSI)	2175	2900	3625	4350
Max inlet oil capacity (GPM)	6.6	6.6	6.6	6.6
Flow ratio factor	1.3	1	.67	.5
Max discharge flow (GPM)	8.6	6.6	4.4	3.3

To calculate the performance of your system:

Pressure:

Multiple the available hydraulic pressure by the pressure ratio factor to calculate your discharge pressure.
Ex. Model HWB1812
System PSI x Ratio factor = Discharge pressure
2500 x 1.2 = 3000 psi

Flow:

Multiple the available hydraulic oil volume by the flow ratio factor to calculate your discharge flow.
Ex. Model HWB1812
System oil volume x Ratio factor = Discharge flow
5 x .67 = 3.35 gpm

5. CONSTRUCTION FEATURES

The main components of the pump consist of:
A. Power mechanism
B. Plunger and packing system
C. Manifold

A. POWER MECHANISM

Includes the anodized cast aluminum body containing the drive system components:

- Hardened and tempered alloy valve mounted on axial bearings.
- Hydraulically actuated piston rods with special seals.
- Continuously lubricated by the power system oil.

B. PLUNGER AND PACKING SYSTEM

Primarily composed of solid ceramic plungers and pressure packings with packing supports and cylinders. The pumping system is water lubricated to further improve the life of pressure packings and plungers.

C. MANIFOLD

Contains the inlet and discharge valves, and unloader, made of brass. Valve components come out as a single unit.

6. GENERAL INFORMATION ON PUMP USE

The HWB pump has been designed to pump, at ambient temperature, fresh, filtered water or other liquids of similar viscosity that are compatible with the wetted materials (for questionable liquids contact our Technical Service Department).

6a. Water temperature

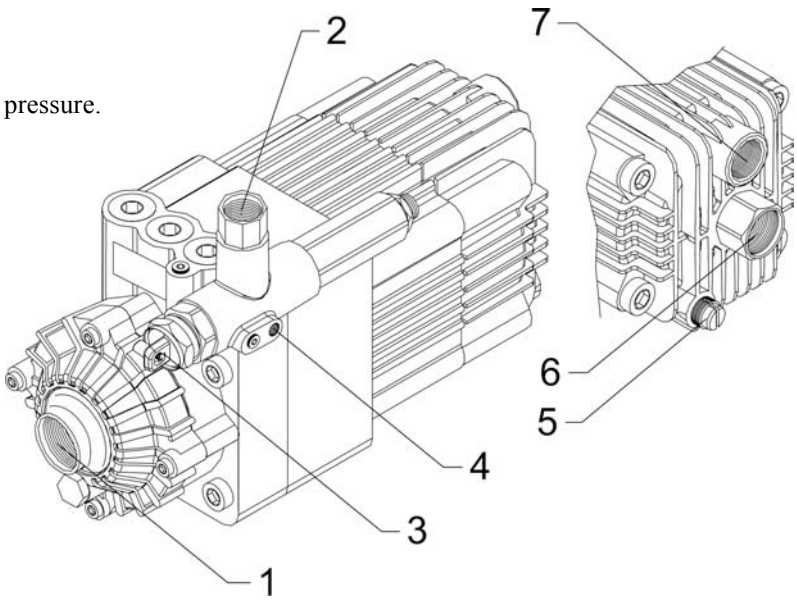
The maximum inlet water temperature is 145° F. Water temperature can be a significant factor in pump life. The higher the water temperature, the more likely it is to create cavitation, resulting in premature seal and valve failures.

For water above 100° F, follow these procedures:

- Feed the plunger pump with a centrifugal pump, supplying at least twice the calculated pump volume at 30 to 45 psi.
- Make the pump run more slowly, de-rating rpm by 30% at least

6b. Pump performance

Never exceed the maximum pump flow rate or pressure.



7. CONNECTIONS AND PLUGS

The HWB series pumps have:

1. 1/4” NPT-F Inlet Port (1) Water
2. 3/8” NPT-F Outlet Port (1) Water
3. 145ºF PTP (Pump Thermal Protector)
4. 1/4” NPT-F Gauge port (1)
5. Oil pressure relief (1)
6. 1/2” BSPP-F Oil Inlet Port (1) Oil
7. 1/2” BSPP-F Oil Return Port (1) Oil

8. PUMP INSTALLATION

8a. Positioning

The HWB pump can be mounted in any orientation. Consider the water supply when installing the pump keeping in mind feed and plumbing requirements (Ref. 8b, 8c, 8d, 8e, 8f).

The pump must be mounted to a rigid and flat base using the four threaded feet in the body.

Never install the pump such that the fluid end rests on the base on which the pump is mounted. The fluid end must be left free and not subject to any force.

8b. Water line connections

In order to isolate any pump vibration, use flexible hoses for both the inlet and discharge lines. The flexible hose must be rigid enough not to collapse during the suction stroke, when a partial vacuum may occur.

8c. Pump feeding

HWB pumps require a positive inlet pressure at the inlet port between. Between 15 psi and 45 psi is recommended. Max inlet pressure is 150 psi.

If it is required a feed pump (centrifugal type), must:
(1) supply at least twice the plunger pump volume at the required pressure,
(2) operate independently and
(3) supply its full rated performance even if the plunger pump is run below its rated performances.

8d. Inlet line

THE INLET LINE MUST HAVE THE FOLLOWING CHARACTERISTICS:

- Minimum internal diameter of 1”.
- No bends or changes in diameter within 12 inches of the suction port.
- It must be airtight.
- Minimize all 90° elbows, diameter reductions, counter slopes and T -connections, and none of these fittings in the inlet piping within 12 inches of the inlet port.
- Be positioned so that it remains filled after the pump stops.

RECOMMENDATIONS:

- Do not use high pressure flexible hose for the inlet line.
- Install an inlet pressure gauge after the filters and as close as possible to the pump inlet port.
- Be sure that the supply tank dimensions and the minimum water level do not create turbulence at the pump inlet port.
- Recommended minimum tank volume is five times discharge flow rate.
- Baffle plates should be inside the tank.
- Before connecting the suction line to the pump inlet port be sure the line is clean inside.

8e. Filtration

HWB pumps require 200 to 360 micron filtration.
The filters should be installed as close as possible to the pump, allow easy inspection and have the following characteristics:

• The capacity of each filter must be at least 3 times the rated pump volume.
• Filter port diameters should not be smaller than the pump inlet ports.

IMPORTANT NOTE: Clean the filters daily, more often in poor water conditions, to prevent premature pump wear and damage.

8f. Discharge line

To ensure the discharge line is correctly installed:

- Install a suitable safety valve on the discharge line.
- Use only high pressure hoses and fittings that exceed the working pressure of the system.
- Use glycerin filled pressure gauges.

9. STARTUP AND RUNNING PROCEDURES

9a. Start-up checks

Before starting the pump, be sure that the following conditions have been met:

- Inlet line must be connected, and tight: the pump must never run dry.
- All ON-OFF valves in between the pump and water supply must be open.
- Be sure water flows into the pump.
- Be sure all connections are tight.
- Set the discharge line into the dump mode, to prime the pump.
- Check oil level.

NOTE: If pump has not been operated for a long period of time, check the inlet and discharge lines for scaling.

9b. Start-up and operation

- Make sure the correct inlet pressure is provided.
- Do not start pump and motor (or engine) under load.
- Set the regulating valve to zero or set the discharge line into the dump mode.
- Be sure that the correct inlet pressure is provided.
- Before putting the pump under pressure, let the pump run for some time until the water flows freely.
- After stopping the pump, relieve the pressure from the system.(See pressure relief procedure in section 2a)

NOTE: In case of feeding by a centrifugal pump, make sure that the plunger pump starts only when the correct inlet pressure is provided.

9c. Cooling

During operation a small amount of water (a few drops a minute) may be released from the pump fluid end. This leakage is designed to provide lubrication for the pressure packings. The leakage is drained out of the pump through a hole in the body. Always leave this hole open. If a steady stream develops maintenance is required.

10. MAINTENANCE INSTRUCTIONS

10a. Power mechanism maintenance

The power end of the HWB does not require any regular maintenance. As part of your start up procedure it is advised to check for leaks at start-up. If a leak develops maintenance is required.

10b. Fluid end maintenance

The fluid end does not require periodic maintenance.

10c. Pressure packings and plungers maintenance

The pressure packings and plunger do not require any regular maintenance. As part of your start up procedure it is advised to check for leaks at start-up. If a leak develops maintenance is required.

11. PUMP STOPPED FOR LONG PERIOD

Before starting the pump after a long period of inactivity: (1) check for correct hydraulic oil level, (2) check the valves as indicated in section 10b, and (3) use the starting procedures indicated in section 9.

When a long period of inactivity is scheduled, drain the entire suction and delivery line and run the pump for a few seconds to drain out all water.

12. FROST PRECAUTIONS

When there is risk of freezing:

- Drain all suction and delivery lines (filter included).
- Run the pump for a few seconds to drain the water collected inside the manifold. Flush the system with a 50-percent solution of anti-freeze until the anti-freeze works throughout the system.

⚠ CAUTION: If a pump is frozen or appears frozen DO NOT OPERATE THE PUMP until the entire system has been thawed.

-End of Manual-

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MAINTENANCE LOG

To the owner / operator:
Keep this booklet and spec sheet with the pump or in an accessible area. Most pump problems are preventable if changes in the systems operation are detected early. GP Companies strongly recommends installing gauges both at the inlet and discharge of the pump. Gauges are your best indication of system performance and health.

Use the table below to record system maintenance.

HOURS & DATE OF MAINTENANCE

Packing Replacement						
Plunger Replacement						
Valve Replacement						

GENERAL PUMP

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