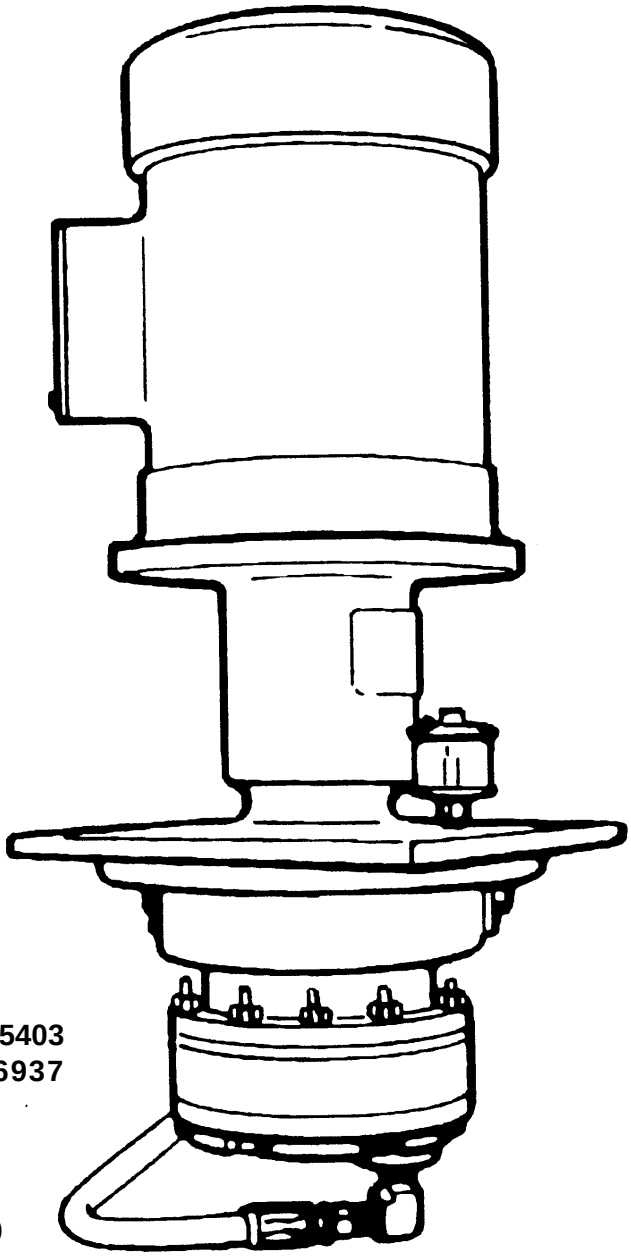
HOME

INSTALLATION & SERVICE

Hydra-Cell®

INDUSTRIAL PUMPS

MODELS: D-12
G-12



WANNER ENGINEERING, INC.

1204 Chestnut Avenue, Minneapolis, MN 55403
TEL: (612) 332-5681 FAX: (612) 332-6937
TOLL-FREE FAX [US only]: (800) 332-6812

www.hydra-cell.com
email: sales@wannereng.com
Document Fax Back System (510) 745-0440

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Installation

Location

The D-12 and G-12 pumps are designed to run vertically with the head submersed in the fluid being pumped. The pump/motor can be hinged to a horizontal position, as shown below, for maintenance and for changing the oil. Allow enough space for the unit to be switched to either position.

Pump Motors

The pump shaft can rotate in either direction.

Determine motor size by consulting the Pump Specifications Manual; use the Flow Rate performance chart and apply the formula given to determine either the motor electric BHP or KW required.

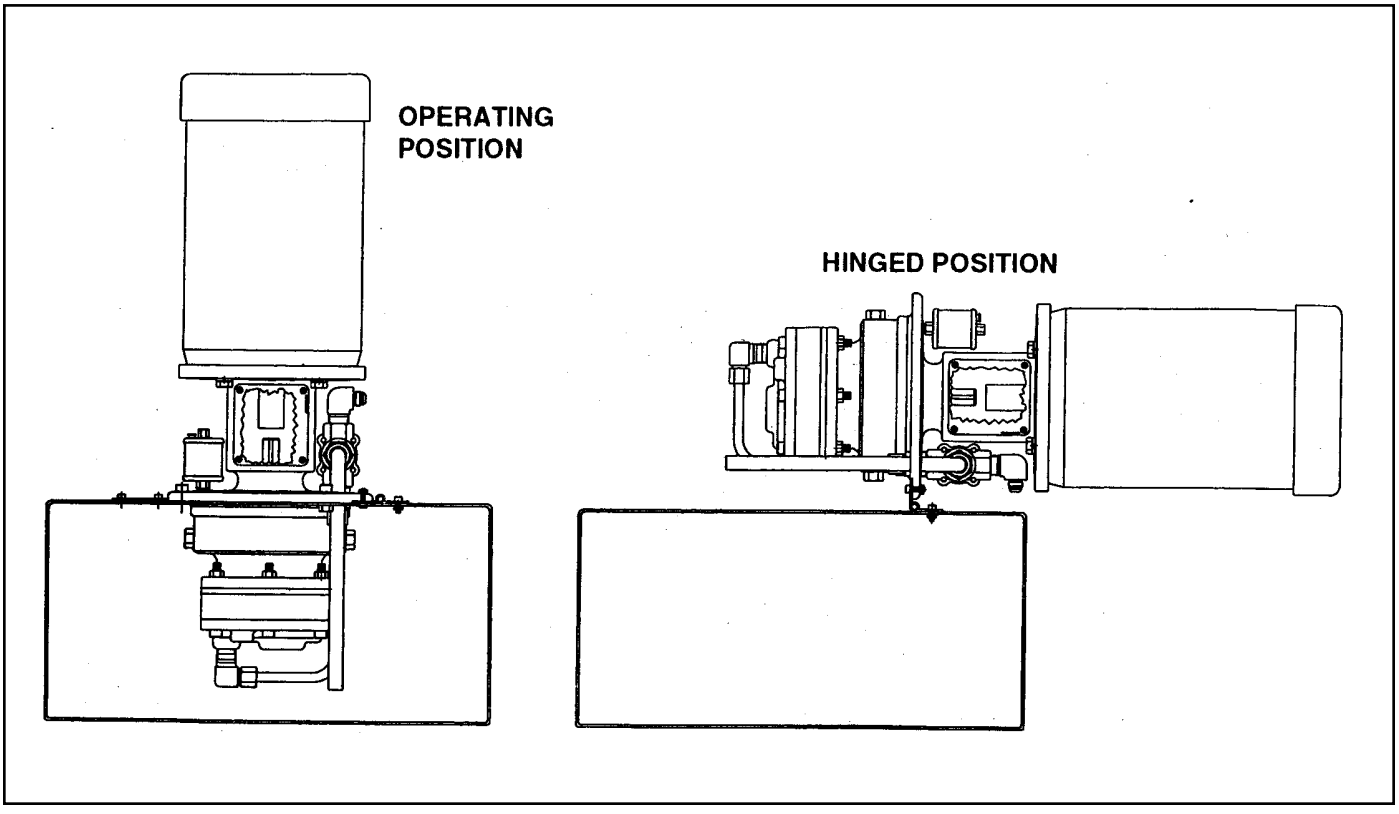
- The Model D-12 pump housing is designed to use a NEMA-frame, 182TC to 215TC, C-face motor without feet.
- The Model G-12 pump housing is designed to use an IEC-frame, type MT100LA, MT100LB, or MBT112M motor with a type D flange at the drive end and without feet.

Constructing the Tank

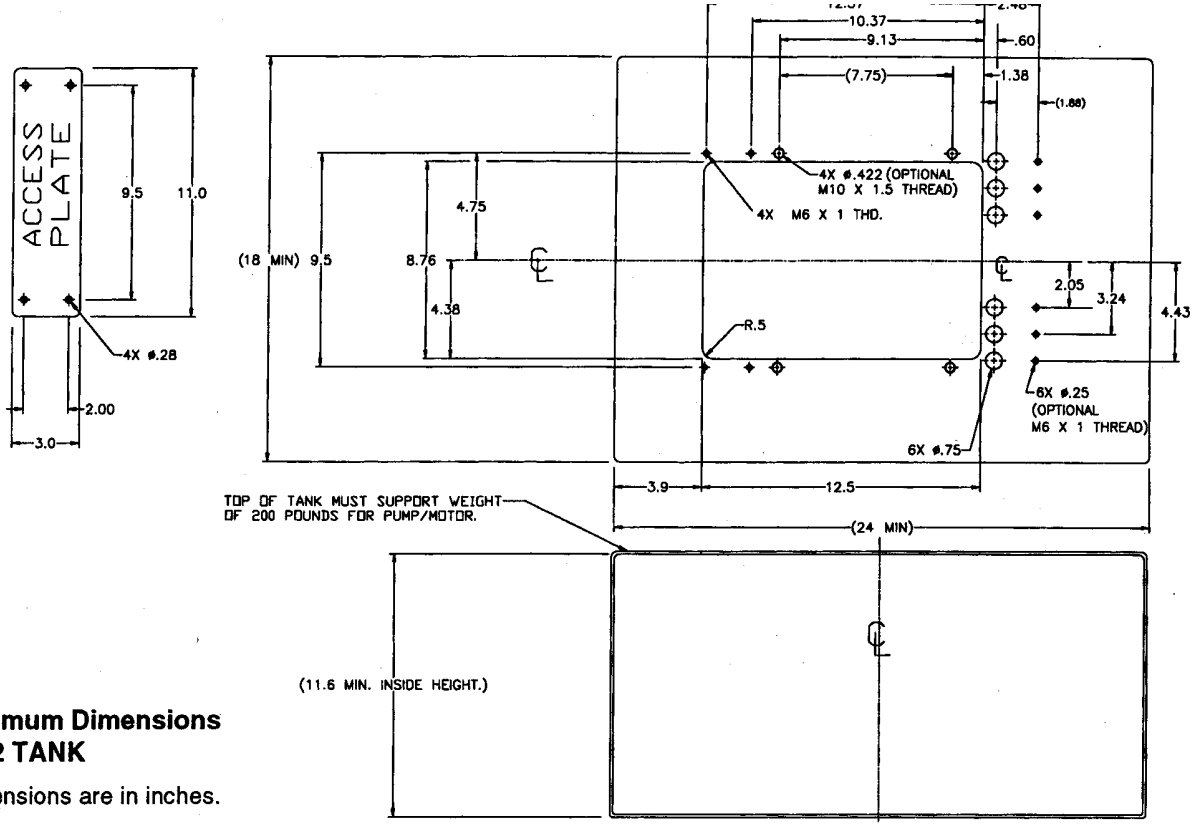
The illustrations on page 3 show the minimum inside height, top cutout, access plate size, and hole size and locations required to mount the pump and hinges.

Construct the tank so it will support the weight of the pump/motor, approximately 200 lbs (90 kg). It must not tip in normal operation, or when the pump/motor is hinged for maintenance.

The tank should be large enough to avoid aerating the fluid.

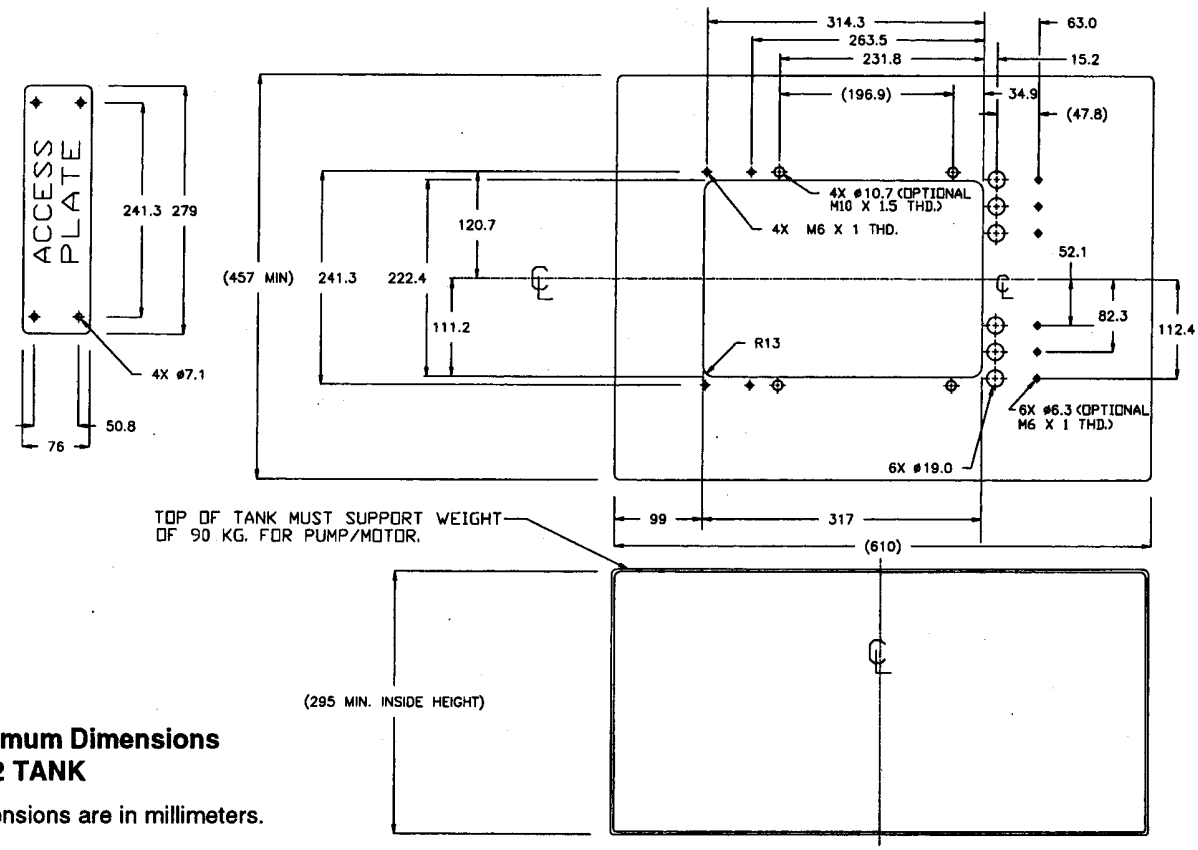


Installation



Minimum Dimensions
D-12 TANK

Dimensions are in inches.



Minimum Dimensions
G-12 TANK

Dimensions are in millimeters.

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Installation

Mounting the Pump

Refer to page 3 for illustrations that show the tank top cutout, access plate, and hole sizes and locations. The cutout is larger than the pump housing base to allow for hinging the complete pump and motor assembly. Install the access plate after the pump is mounted vertically, to cover the remaining opening. The access plate must be removed before the pump/motor can be hinged horizontally for maintenance.

Isolate the tank from the system with flexible hose for the piping and flexible wiring to the motor. Allow long-enough flexible hose and wiring for hinging the pump/motor, or attach "quick-connect" fittings for easy maintenance.

With the unit vertical, fasten the pump housing to the tank using four 3/8-in. or 10-mm bolts into the holes in the square mounting base of the housing. Use six 1/4-in. or 6-mm bolts to fasten the two hinges to the tank.

Inlet Piping

Before entering the section of the tank where the pump inlet is submersed, the fluid being pumped should be prefiltered to one size smaller than the smallest nozzle or tool orifice in the system. Set up baffling in the tank that will allow large particles and chips to settle out before they get close to the pump inlet. Also, install at least two stages of filtering to ensure an adequate supply of fluid to the pump inlet; a coarse mesh followed by a fine mesh to section off the tank closest to the pump. Install the filters in the tank where they can be checked and cleaned regularly; plugged filters can result in pump cavitation, drop in volume or pressure output, and damage to the pump.

If the fluid being pumped gets too hot, a chiller may be required. If pumping machine-tool coolant, operate below the manufacturer's maximum temperature rating for the coolant.

Discharge Piping

Hose Size and Routing

Use the shortest, most-direct route for the discharge line.

Select pipe or hose that meets the pressure requirements of the system (working pressure of the hose should not exceed 1/4 of the bursting pressure).

Use flexible hose between the pump and rigid piping to isolate the pump/motor/tank from the system.

Pressure Regulation

Install a pressure regulator in the discharge line.

There is an accessory kit that allows a Hydra-Cell C-22 Regulating Valve to be mounted on the pump housing, so the bypass fluid goes back to the tank. Bypass pressure must not exceed the pressure limit of the pump, 1000 psi (69 bar).

If the pump may be run for a long time with the discharge closed and fluid bypassing, the fluid in the tank will heat up. If the fluid gets too hot, a heat exchanger or chiller may be required.

Caution: *Never* install shutoff valves in the bypass line or between the pump outlet and pressure regulator.

Provide for permanent or temporary installation of a pressure gauge to monitor the discharge pressure at the pump.

For additional system protection, install a "pop-off" safety relief valve in the discharge line, downstream from the pressure regulator.

Before Initial Start-Up

Before you start the pump, be sure that:

- The pipe plug on the pump housing has been removed and the oil reservoir has been installed. The reservoir allows for oil expansion during pump operation. At startup, there is normally no oil in the reservoir; during operation, oil rises in the reservoir (the level will depend on operating conditions).
- All shut-off valves are open, and the pump has an adequate supply of fluid.
- All connections are right.
- The pressure regulator on the pump outlet is adjusted so the pump starts under minimum pressure. This allows air in the system to be expelled easily, and fluid to enter the pump and system.
- The coupler that connects the pump and motor has been sized and installed correctly.
- All guards and safety covers have been installed.
- All electrical wiring has been done correctly to electrical codes.

Important Precautions

Adequate Fluid Supply. The avoid cavitation and premature pump failure, be sure that the pump will have an adequate fluid supply and that the inlet line will not be obstructed. See "Inlet Piping".

Shut-Off Valves. Never install shut-off valves between the pump outlet and discharge pressure regulator, or in the regulator bypass line.

Freezing Conditions. Protect the pump from freezing. See also the Maintenance Section.

Initial Start-Up Procedure

1. Turn on power to the pump motor.
2. Listen for any erratic noise, and look for unsteady flow.
3. Adjust the discharge pressure regulator to the desired operating and bypass pressures.
4. After the pressure regulator is adjusted, set the "pop-off" safety relief valve at 100 psi (7 bar) higher than the desired operating pressure.

Maintenance

Daily

Check the oil level and the condition of the oil. When the pump is operating, the oil in the pump housing gets warm and expands, filling into the oil reservoir. Depending on the type of oil and the operating temperature of the system, the oil level will vary in the reservoir. If there is no oil in the reservoir when the system has reached operating temperature, add oil through the fill cap on the reservoir. Fill the reservoir about 25% full.

If the pump is too full of oil, it will overflow the reservoir and reach equilibrium. This is no cause for concern. When the unit is shut down and the oil has cooled, the oil will drain out of the reservoir and back into the pump housing.

Use the appropriate Wanner Hydra-Oil brand motor oil for the application (contact Wanner Engineering if in doubt).

Caution: If you are losing oil but don't see any external leakage, or if the oil becomes discolored and contaminated, one of the diaphragms (20) may be damaged. Refer to the Service Section. Do not operate the pump with a damaged diaphragm.

Caution: Do not leave contaminated oil in the pump housing or leave the housing empty. Remove contaminated oil as soon as discovered, and replace it with clean oil. This will help prevent corrosion of internal pump components.

Periodically

Change the oil after the first 100 hours of operation, and every 1000 operating hours thereafter. To change the oil:

1. Disconnect or lock out the electrical power to the pump motor.

2. Remove the access plate on the tank, so there is room to hinge the pump/motor to the horizontal position (see the illustration on page 2).

3. Remove the four bolts that hold the pump base to the tank.

4. Hinge the pump/motor to the horizontal position, and support it in that position.

5. Place a pan under the pump oil drain. Remove the drain plug (30) and fill plug (28) from the pump housing. The drain plug is magnetic — clean any metal from the magnet on the plug.

Caution: Do not turn the drive shaft while the oil reservoir is empty.

6. When the oil has drained, reinstall the drain plug (30). Refill with the appropriate oil, and install the fill plug (28). Tighten to 25 ft/lbs (30 N-m).

7. Hinge the pump/motor back to the vertical position. Reinstall the four bolts that held the pump base to the tank, and reinstall the access plate.

8. Restore the electrical power.

9. Follow the "Initial Startup Procedures", page 5.

Caution: Protect the pump from freezing. Refer also to the "Shutdown Procedure".

Shutdown Procedure

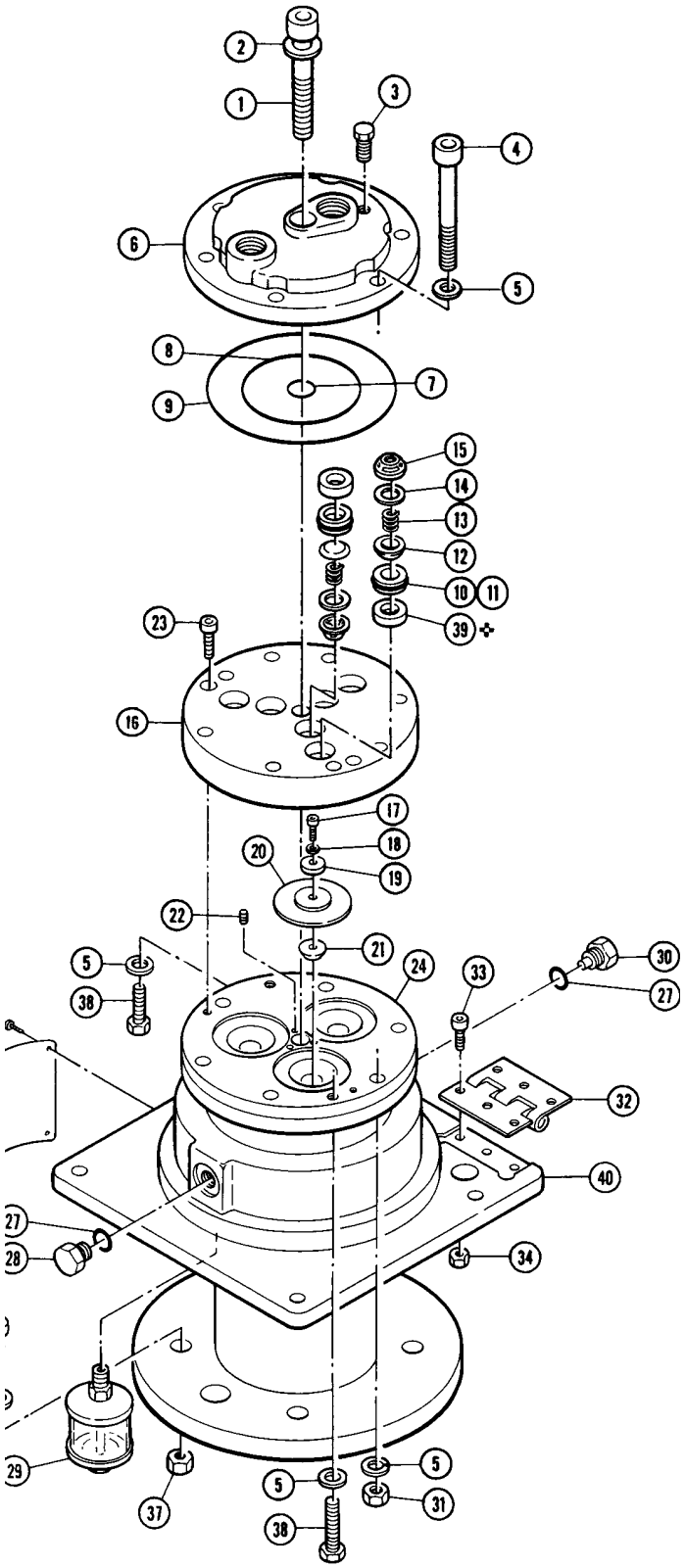
During Freezing Temperatures

1. Disconnect the inlet and outlet piping from the pump.
2. Remove the drain plug (3) at the bottom center of the manifold.
3. Open any draincocks in the piping.
4. Start the pump, and allow it to run until all fluid is removed from the pump head.
5. Stop the pump, and reinstall the drain plug.
6. Fill the pump with antifreeze.

When you put the pump back into service, thoroughly flush the antifreeze.

Service (Fluid End)

MODELS D-12/G-12
WITH STANDARD
VALVE ASSEMBLIES



Service (Fluid End)

This section explains how to disassemble and inspect all easily-serviceable parts of the pump. Repair procedures for the hydraulic end (oil reservoir) of the pump are included in a later section of the manual.

Caution: Always disconnect power from the motor before doing maintenance on the pump or motor.

Caution: Do not disassemble the hydraulic end unless you are a skilled mechanic. For assistance, contact Wanner Engineering (Tel 612-332-5681 or Fax 612-332-6937) or the distributor in your area.

Caution: The two bolts (38) that screw through the back of the housing into the cylinder casting hold the casting over the hydraulic end of the pump. Do not remove them except when repairing the hydraulic end.

1. Hinge Pump to Horizontal Position

2. Disconnect all Electrical Connections (or lock out power to the unit)

3. Remove Manifold (6), Valve Plate (16)

a. Remove all nuts (31), bolts (4), and washers (5) around the manifold. Do not remove the two bolts (38) that are installed through the back of the pump housing.

b. Use a 10-mm hex Allen wrench to remove the pump centerbolt (1) and its washer (2) in the center of the manifold.

Caution: Do not turn the pump drive shaft while the manifold and valve plate are off the pump, except when removing diaphragms or repriming the hydraulic cells.

c. Remove the manifold (6). The valve plate (16) will remain on the cylinder housing (24).

d. Inspect the manifold for warping or wear around the inlet and outlet ports. If wear is excessive, replace the manifold or return it to Wanner Engineering for resurfacing.

To check if the manifold is warped, remove the O-rings and place a straightedge across it. A warped manifold should be replaced.

4. Inspect Valves (10-15)

The three inlet and three outlet valve assemblies are identical (but face in opposite directions). Inspect each valve as follows:

a. Check the spring retainer (15), and replace if worn.

b. Check the valve spring (13). If it is shorter than a new spring, replace it (don't just stretch the old spring).

c. Check the valve poppet (12). If worn excessively, replace it.

Note: If your pump has plastic spring retainers, there is a tetra seal (flat O-ring, 14) between the retainer (15) and valve seat (11).

d. Remove the valve seat (11). A seat remover is included in the Wanner Tool Kit. Inspect the valve seat for wear, and replace it if necessary.

e. Reinstall the valve assemblies:

• Clean the valve ports and shoulders with emery cloth, and lubricate them with lubricating gel or petroleum jelly.

• Install the O-ring (10) on the valve seat (11).

• **Inlet (3 center valves)**. Insert the spring retainer (15) into the valve plate, then insert the spring, valve, and valve seat (11,12,13). If the pump has **plastic** spring retainers, install a flat O-ring (14) between the retainer and seat. On **abrasive-duty** pumps, install a dampening washer (39) on top of the seat.

• **Outlet (3 outer valves)**. Insert the valve seat, valve, and spring, then the retainer. If the pump has **metal** spring retainers in the outlet valves, position them so a leg does not point toward the center of the pump (refer to the illustration). On **abrasive-duty** pumps, install a dampening washer (39) into the valve plate before installing the other parts.

Service (Fluid End)

5. Inspect and Replace Diaphragms (20)

If it is necessary to service the diaphragms, use a 5-mm Allen wrench to remove the two Allen-head bolts (23) that secure the valve plate (16) to the cylinder housing (24). Inspect the valve plate as you did the manifold.

a. Lift the diaphragm by one edge, and turn the pump shaft until the diaphragm pulls up. This will expose machined cross-holes in the plunger shaft behind the diaphragm.

   To turn the pump over, turn the motor shaft over by turning the motor fan. The fan guard on the motor may have to be removed to allow you to turn the shaft. Reattach the fan guard to the motor when done with maintenance.

   Note: Alternatively, remove the coupler access plate and rotate the coupler by hand.

b. Insert an Allen wrench through one of the cross-holes in the plunger shaft, to hold the diaphragm up. The proper size tool is included in the Wanner A03-200-1101 Tool Kit.

c. Remove the screw (17), O-ring (18), and follower (19) in the center of the diaphragm.

d. Remove the diaphragm, and inspect it carefully. A ruptured diaphragm generally indicates a pumping system problem, and replacing only the diaphragm will not solve the larger problem. Inspect the diaphragm for the following:

   • **Half-moon marks**. Usually caused by cavitation of the pump (refer to “Troubleshooting”).

   • **Concentric circular marks**. Usually caused by cavitation of the pump (refer to “Troubleshooting”).

   • **Small puncture**. Usually caused by a sharp foreign object in the fluid, or by an ice particle.

   • **Diaphragm pulled away** from the center screw, or from the cylinder casting or casting sides. Usually caused by fluid being frozen in the pump, or by overpressurization of the pump.

   • **Diaphragm becoming stiff** and losing flexibility. Usually caused by pumping a fluid that is incompatible with the diaphragm material.

   • **Slice in ridge of diaphragm**. Occurs when a Viton diaphragm is operated at cold temperatures.

   • **Diaphragm edge chewed away**. Usually caused by overpressurizing the system.

e. Inspect the plunger (21) for any rough surfaces or edges. **Do not** remove the plunger from the plunger shaft. Smooth the surfaces and edges as necessary with emery cloth or a fine file.

   Caution: If a diaphragm has ruptured and foreign material or water has entered the oil reservoir, do not operate the pump. Check all diaphragms, then flush the reservoir completely (as outlined below) and refill it with fresh oil. Never let the pump stand with foreign material or water in the reservoir, or with the reservoir empty.

f. Install a new diaphragm, ridge side out.

g. Clean the screw (17) and remove any oil from it. Apply medium-strength threadlocker to the screw. Reinstall the screw and follower (19), and a new O-ring (18). Tighten to 18 in.-lbs (2.0 N-m).

h. Repeat the above inspection procedure (and replacement, if necessary) with the other two diaphragms.

6. Flush Contaminant from Hydraulic End (only if a diaphragm has ruptured)

a. Remove the oil drain cap (30) and allow all oil and contaminant to drain out. Dispose of it properly.

b. Fill the reservoir with kerosene or solvent, manually turn the pump shaft to circulate the kerosene, and drain.

   Caution: If you have EPDM diaphragms, or if food-grade oil is in the reservoir, do not use kerosene or solvents. Instead, flush with the same lubricant that is in the reservoir. Pumps with EPDM diaphragms have an “E” as the 7th digit of the Model No.

c. Repeat the flushing procedure (step b).

d. Fill the reservoir with fresh oil, manually turn the pump shaft to circulate the oil, and drain once again.

e. Refill the reservoir. If the oil appears milky, there is still contaminant in the reservoir. Repeat the flushing procedure until the oil appears clean.

Service (Fluid End)

7. Prime the Hydraulic Cells

a. With the pump **horizontal and the fluid-end head removed**, fill the reservoir with the appropriate Hydra-Oil brand motor oil for the application).

b. All air in the oil within the hydraulic cell (behind the diaphragms) must be forced out by turning the shaft (and thus pumping oil into the piston). If the motor is connected to the pump, rotate the shaft by rotating the motor fan blade. If the motor and coupler have been removed from the pump, use the shaft rotator that is included in the Wanner Tool Kit. Turn the shaft until a **bubble-free** flow of oil comes from behind all the diaphragms. Watch the oil level in the reservoir; if it gets too low during priming, air will be drawn into the pistons (inside the hydraulic end) and will cause the pump to run rough.

c. Wipe excess oil from the cylinder casting and diaphragms.

8. Reinstall Valve Plate (16), Manifold (6)

a. Reinstall the valve plate (16), with the valve assemblies installed as outlined above, onto the cylinder casting. Using a 5-mm hex Allen wrench, install the two socket-head capscrews (23) and secure the valve plate to the cylinder housing.

b. Reinstall the O-rings (7,8,9) on the rear side of the manifold. Use petroleum jelly or lubricating gel to hold them in place.

c. Reinstall the manifold onto the valve plate. Be sure the drain plug (3) is at the bottom of the manifold.

d. Insert all six bolts (4) around the edge of the manifold. Reinstall the pump centerbolt (1) with its washer (2).

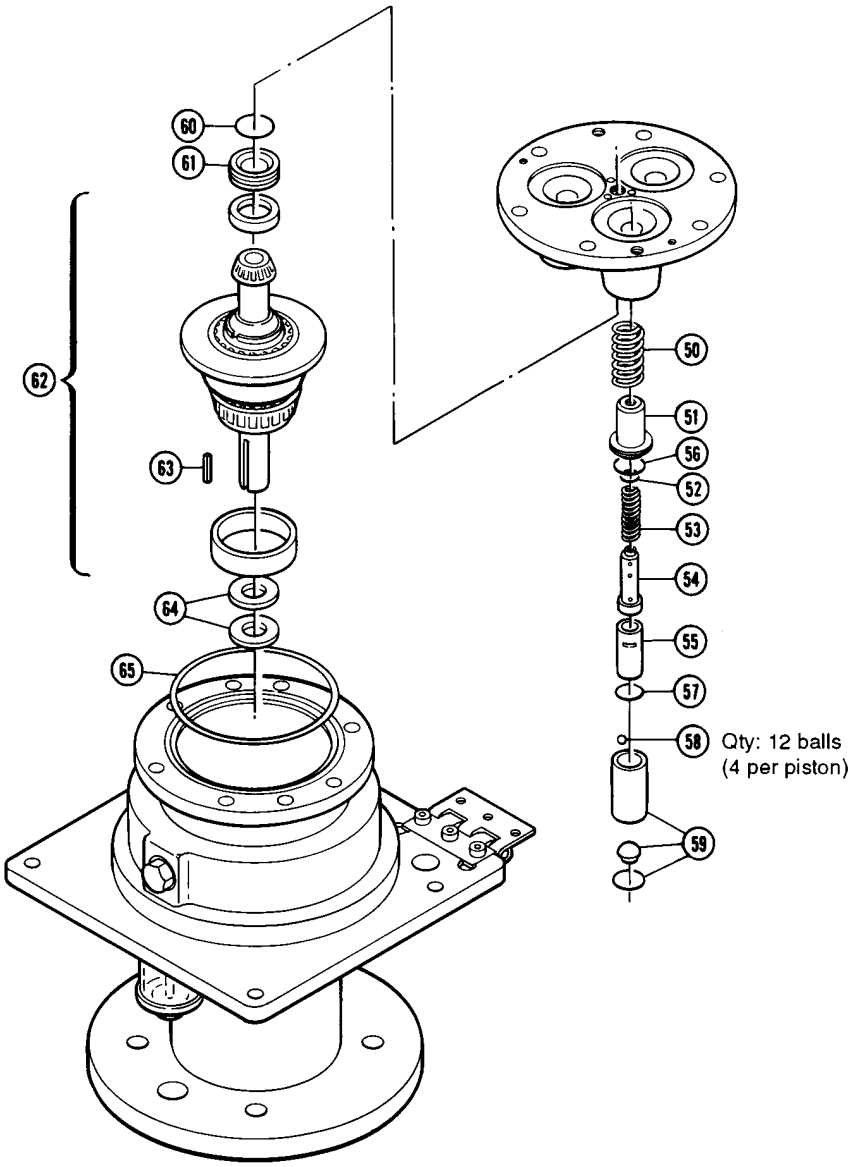
e. Alternately tighten the perimeter bolts until all are secure. Torque to 45 ft-lbs (54 N-m).

f. Tighten the pump centerbolt. Torque to 45 ft-lbs (54 N-m).

g. Recheck all bolts for tightness.

9. Reconnect Electrical Power to Motor (or remove lock-out from power source)

Service (Hydraulic End)



Caution: Do not disassemble the hydraulic end of the pump unless you are a skilled mechanic. For assistance, contact Wanner Engineering (Tel 612-332-5681 or Fax 612-332-6937) or the distributor in your area.

Caution: The two bolts (38) that screw through the back of the pump housing (40) into the cylinder casting (24) hold the casting to the pump housing. Do not remove them except when repairing the hydraulic end.

Note: The following service procedures refer several times to the Wanner Tool Kit. We strongly urge you not to try to repair the hydraulic end of the pump without using the tools in this kit, Part No. A03-200-1101 (available from Wanner or your local distributor).

1. Remove Motor and Coupler from Pump

2. Disconnect all Electrical Connections (or lock out power to the unit)

3. Remove Pump Housing

a. Remove the head of the pump, and the diaphragms, as outlined in the Fluid End Service Section.

b. Drain the oil from the pump housing by removing the drain plug (30).

c. Stand the hydraulic end of the pump face-down on the cylinder casting (24).

d. Check the shaft for sharp burrs. Smooth any burrs, to prevent scarring the housing seals (64) when you disassemble the pump.

e. Remove the bolts (38) that secure the housing to the cylinder casting. The piston return springs (50) will force the cylinder casting and housing apart.
f. Lift off the housing (40).
g. Inspect the cam and bearings (62), and the bearing race in the rear of the housing. If the bearings are pitted or binding, or if the housing race is worn, contact Wanner Engineering.

4. Disassemble Pistons

a. With the pump housing removed (see above), turn the unit over and set it on a flat surface, piston side down.
b. With the diaphragms removed (see the Fluid End Service Section), reinsert a follower screw (17) into the hole in one of the valve plungers (54). Tap the screw lightly with a hammer; the plunger (21) should slip off the valve plunger (54).

   The hydraulic piston assembly (50-59) can now be disassembled. Inspect all parts, and replace all O-rings and any other parts which are worn or damaged.
c. Repeat step “b” for the remaining pistons.

   Note: When you reassemble the hydraulic piston, use new plungers (21). They are press-fit onto the valve plungers (54) and are not reusable.

5. Reassemble Pistons

a. Drop a ball (58) into each opening in the bottom of a piston assembly (59).
b. Insert a retaining washer (57) and O-ring (56) to hold the ball in place.
c. Insert a valve plunger (54) into a valve cylinder (55). Slide a spring (53) over the plunger, inside the valve cylinder.
d. Insert an O-ring (52) into a spring retainer (51).
e. Slide the assembled valve cylinder, plunger, and spring (53-55) into the spring retainer (51).
f. Slide the complete cylinder-and-retainer assembly (51-55) into the piston assembly (59).
g. Insert a return spring (50) into the piston assembly, wide end first. This is a tight fit, and can best be done by “screwing” the spring in counterclockwise.
h. Repeat the above procedure for the other two pistons.

6. Reassemble Housing and Casting

Note: Inspect the shaft seals (64) before continuing. If they look damaged in any way, replace them (remove by pounding them out from inside the pump housing). Both seals should be replaced at the same time. Be careful not to damage the seal bore.

a. Place the cylinder casting (24) face-down on a flat surface.
b. Insert the assembled pistons (50-59) into the cylinder casting.
c. Note the location of the outer ring of holes in the cylinder casting and in the pump housing flange (in particular, the holes where bolts (38) will be installed).
d. Stand the camshaft assembly (62) on the cylinder casting (24).

   Caution: The pilot bearing must be properly nested in the bearing race (62) during assembly. If misaligned, the bearing will be damaged and the pump will fail within the first hours of operation.
e. Install the O-ring (65) and slide the housing (40) down over the shaft and onto the threaded studs (from step c). Be sure the holes in the housing and the cylinder casting are properly aligned.
f. Using the two threaded studs in the Wanner Tool Kit, put a nut on the studs. Thread the nut down on the stud so the threaded end of the stud can be put through one of the bolt holes in the cylinder casting and through the housing casting. Start another nut on this end of the stud.

   Now put the other stud through the hole on the other side of the cylinder casting and through the housing. Start this nut.

   Using both studs and the nuts, tighten evenly to draw the cylinder casting tight to the housing. Be sure the O-ring (65) stays in place when pulling the two parts together.

   When tight, install the bolts (38) and washer into the cylinder casting to hold it to the housing. Remove the two studs and nuts that were part of the Wanner Tool Kit.
g. Turn the shaft again to check its alignment.

7. Replace Shaft Seals

a. Apply a thin film of grease on the seal protector tool (part of the Wanner Tool Kit). Slide both seals onto the tool, with the spring side of the seals toward the open end of the tool.

   Apply a heavier coat of grease between the seals and press them together.
b. Apply a coating of Loctite® 601 or equivalent locking compound to the outside surface of both seals and the inside surface of the opening in the pump housing where the seal will rest.
c. Apply a light film of grease to the drive shaft.. Slide the seal protector tool (with the two seals) over the end of the shaft.
d. Slide the seal inserter tool (from the Wanner Tool Kit) over the seal protector tool, and press the seals completely into place. Tap the tool with a soft mallet to firmly seat the seals.

Service (Hydraulic End)

8. Adjust Camshaft Endplay

a. If the three set screws (22) are in the cylinder casting (24), remove and clean them.
b. Insert the centerbolt (1) into the hole in the center of the cylinder casting. Turn it in to move the bearing adjusting plate (61) and cup tight against the bearing cone.
c. Back out the centerbolt two full turns, then turn it back in again until it is tight against the adjusting plate (61).
d. Back out the centerbolt or set screw **exactly 1/4** of a turn.
e. With a plastic mallet (or a regular mallet and wooden board) to prevent damage to the shaft, rap the end of the shaft 3 or 4 times. This will provide about .006 in. (0.15 mm) endplay in the shaft.
f. Apply removable threadlocker to the threads of the three cleaned set screws (22).
   Screw the three set screws (22) into the cylinder casting until they contact the bearing adjusting plate (61).
g. Remove the centerbolt (1).

9. Reinstall Plungers

Note: If the plungers (21) have been removed from the valve plungers (54), do not reuse them. Install new ones instead.

a. Place a plunger on the screw end of the plunger guide tool from the Wanner Tool Kit. The flat side of the plunger should face the tool.
b. Screw the guide (with the plunger) into the valve plunger (54) until tight.
c. Hold the stud with a wrench, and tighten the nut against the plunger guide. This will press-fit the plunger onto the valve plunger. ***Never*** **reinstall used plungers** (21).
   Note: Do not remove the plunger guide until the diaphragm is installed (see below).
d. Install the diaphragm as outlined below, then repeat the procedure (steps 9a - 9c) for the other two plungers and diaphragms.

10. Reinstall Diaphragms

a. With the plunger guide tool still screwed into the valve plunger (54), pull the valve plunger up until the cross-holes in the valve plunger are exposed.
b. Insert a diaphragm Allen wrench (from the Wanner Tool Kit), or similar dowel-type object, through the holes — to hold the plunger (21) away from the cylinder casting, and to keep the valve plunger from turning when the diaphragm is being installed.
c. Place the diaphragm (20) onto the plunger (21), ridge-side out.
d. Center the diaphragm follower (19) on the diaphragm.
e. Place the O-ring (18) onto the follower screw (17).
f. Apply a small amount of Loctite 242 threadlocker to the threads of the follower screw.
g. Insert the follower screw (with O-ring) through the diaphragm follower (19) and diaphragm (20), and screw it into the valve plunger (54).
h. Hold the diaphragm Allen wrench, and tighten the follower screw to 18 in.-lbs (2.0 N-m) of torque.
i. Repeat the above procedure for the plungers and diaphragms of the other two cylinders.
j. Fill the reservoir with fresh oil and prime the pump, as outlined in the Fluid End Service Section.

11. Reassemble Pump Head

Reassemble the pump head as outlined in the Fluid End Service Section.

12. Reconnect Electrical Power to Motor (or remove lock-out from power source)

Troubleshooting

Cavitation

- Inadequate fluid supply because:
  - — Inlet line collapsed or clogged
  - — Clogged line strainer
  - — Inlet line too small or too long
  - — Air leak in inlet line
  - — Worn or damaged inlet hose
  - — Suction line too long
  - — Too many valves and elbows in inlet line
- Fluid too hot for inlet suction piping system.
- Air entrained in fluid piping system.
- Aeration and turbulence in supply tank.
- Inlet vacuum too high

Symptoms of Cavitation

- Excessive pump valve noise
- Premature failure of spring or retainer
- Volume or pressure drop
- Rough-running pump
- Premature failure of diaphragms
- Piston return spring failure (insed hydraulic end)

Drop in Volume or Pressure

A drop in volume or pressure can be caused by one or more of the following:

- Air leak in suction piping
- Clogged suction line or suction strainer
- Suction line inlet above fluid level in tank
- Inadequate fluid supply
- Pump not operating at proper RPM
- Relief valve bypassing fluid
- Worn pump valve parts
- Foreign material in inlet or outlet valves
- Loss of oil prime in cells because of low oil level
- Ruptured diaphragm
- Cavitation
- Warped manifold from overpressurized system
- O-rings forced out of their grooves from overpressurization
- Air leak in suction line strainer or gasket
- Cracked suction hose.
- Empty supply tank
- Excessive aeration and turbulence in supply tank
- Worn and slipping drive belt(s)
- Worn spray nozzle(s)
- Cracked cylinder casting

Pump Runs Rough

- Worn pump valves
- Airlock in outlet system
- Oil level low
- Wrong weight of oil for cold operating temperatures (change to lighter weight)
- Cavitation
- Air in suction line
- Restriction in inlet/suction line
- Hydraulic cells not primed after changing diaphragm
- Foreign material in inlet or outlet valve
- Damaged diaphragm
- Fatigued or broken valve spring
- Brocken piston return spring (insed hydraulic end)

Premature Failure of Diaphragm

- Frozen pump
- Puncture by a foreign object
- Elastomer incompatible with fluid being pumped
- Pump running too fast
- Excess pressure
- Cavitation
- Broken piston return spring (50)

Water (or Process Fluid) in Oil Reservoir

- Condensation
- Ruptured diaphragm
- Hydraulic cell not properly primed after diaphragm replacement
- Frozen pump
- Diapragm screw O-ring (18) missing or cracked
- Cracked cylinder casting

Strong Water (or Process Fluid) Pulsations

NOTE: Small pulsations are normal in single-acting pumps with multiple pumping chambers.

- Foreign object lodged in pump valve
- Loss of prime in hydraulic cell because of low oil level
- Air in suction line
- Valve spring (13) broken
- Cavitation
- Aeration or turbulence in supply tank

Troubleshooting

Valve Wear

- Normal wear from high-speed operation
- Cavitation
- Abrasives in the fluid
- Valve incompatible with corrosives in the fluid
- Pump running too fast

Loss of Oil

- External seepage
- Rupture of diaphragm
- Frozen pump
- Diapragm screw O-ring (18) missing or cracked
- Worn shaft seal
- Oil drain piping or fill cap loose.
- Valve plate and manifold bolts loose

Premature Failure of Valve Spring or Retainer

- Cavitation
- Foreign object in the pump
- Pump running too fast
- Spring/retainer material incompatible with fluid being pumped
- Excessive inlet pressure.

Limited Warranty

Wanner Engineering, Inc. extends to the original purchaser of equipment manufacturerd by it and bearing its name, a limited one-year warranty from the date of purchase against defects in material or workmanship, provided that the equipment is installed and operated in accordance with the recommendations and instructions of Wanner Engineering, Inc. Wanner Engineering, Inc. will repair or replace, at its option, defective parts without charge if such parts are returned with transportation charges prepaid to Wanner Engineering, Inc., 1204 Chestnut Avenue, Minneapolis, Minnesota 55403.

This warranty does not cover:

1. The electric motors (if any), which are covered by the separate warranties of the manufacturers of these components.

2. Normal wear and/or damage caused by or related to abrasion, corrosion, abuse, negligence, accident, faulty installation or tampering in a manner which impairs normal operation.

3. Transportation costs.

This limited warranty is exclusive, and is in lieu of any other warranties (express or implied) including warranty of merchantability or warranty of fitness for a particular purpose and of any noncontractual liabilities including product liabilities based on negligence or strict liability. Every form of liability for direct, special, incidental or consequential damages or loss is expressly excluded and denied.

WANNER ENGINEERING, INC.

1204 Chestnut Avenue, Minneapolis, MN 55403
TEL: (612) 332-5681 FAX: (612) 332-6937
TOLL-FREE FAX [US only]: (800) 332-6812

www.hydra-cell.com
email: sales@wannereng.com
Document Fax Back System (510) 745-0440

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