

Variable Speed Size 2A Hydroconstant® Fluid Drives Types M, MO, MP and MX

Instructions

- Installation
- Operation
- Maintenance

Read this entire book

before attempting to install, operate or repair this drive. Properly installed, your Peerless Pump Company variable speed drive will give you satisfactory, dependable service. We urge that you read carefully these step-by-step instructions, to simplify any problems of installation, operation or repair.

Failure to read and comply with installation and operating instructions will void the responsibility of the manufacturer and may also result in bodily injury as well as property damage. This book is intended to be a permanent part of your drive installation and should be preserved in a convenient location for ready reference. If these instructions should become soiled obtain a new copy from Peerless Pump. Include drive size, and/or serial number with your request.

WARRANTY

New equipment manufactured by Seller is warranted to be free from defects in material and workmanship under normal use and service for a period of one year from date of shipment; Seller's obligation under this warranty being limited to repairing or replacing at its option any part found to its satisfaction to be so defective provided that such part is, upon request, returned to Seller's factory from which it was shipped, transportation prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, accident, neglect, or from improper operation, maintenance, installation, modification or adjustment. This warranty does not cover parts repaired outside the Seller's factory without prior written approval. Seller makes no warranty as to starting equipment, electrical apparatus or other material not of its manufacture, since the same are usually covered by warranties of the respective manufacturers thereof.

In the event, notwithstanding the terms of this agreement, it is determined by a court of competent jurisdiction that an express warranty has been given by Seller to Purchaser with respect to the head, capacity or other like performance characteristics of said equipment, Seller's liability for breach of the same shall be limited to accepting return of such equipment ex-works. plant of manufacture, refunding any amount paid thereon by Purchaser (less depreciation at the rate of 15% per year if Purchaser has used the equipment for more than thirty (30) days) and canceling any balance still owing on the equipment.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND SELLER SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.



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Rev 1-79

IMPORTANT SAFETY PRECAUTIONS

Pump parts, Hydroconstant drives, and the tools and rigging equipment used in installation are heavy and may easily cause personal injury if dropped or carelessly handled. The normal precautions and safety rules associated with the erection of heavy machinery, in regard to manual lifting, use of power equipment, and handling of tools, must be observed in the installation of this drive.

Petroleum-base cleaning solvents are flammable. Open flame or smoking by personnel in the vicinity of these solvents is extremely hazardous and must not be permitted.

Do not work under a heavy suspended object unless there is a positive support under it to stop its fall in

event of sling or hoist failure. Disregard of this warning could result in grave personal injury.

Before opening the conduit box of an electric motor, be certain that the current to the motor is shut off. An electrical shock from contact with live motor leads can be fatal.

Before attempting repairs to drive or pump open the disconnect switch to electric motor. This prevents accidental running of pump motor. Starting motor during pump repair activities could damage pump and may cause personal injury.

INTRODUCTION

WARNING

The drives described in this bulletin must not be installed in any manner except as specified herein, and must not be operated at speeds, horsepower loads, or temperatures other than those specified when the drive was assembled by the factory. Failure to limit operation of the drives to the conditions specified could damage the drives and may cause malfunction or damage to interconnected equipment. Violation of this warning will void the warranty and may result in serious property damage or grave personal injury.

and carefully manufactured unit. It should be given the same attention accorded to any precision machine.

The satisfactory operation of a pump and drive depends to a large extent upon proper installation. These instructions cannot answer every question that may arise as each installation will be different. The installer and the operator of this equipment must use good judgment to adapt these procedures to the installation.

DESCRIPTION: The 2A Hydroconstant drive consists of a fluid coupling which is designed to allow continuous, smooth variance of output shaft speed in direct response to a fluid pressure signal as may be generated by a centrifugal pump connected to the coupling. The coupling input shaft rotates at the

Allowable Horsepower Loads

Hydraulic Coupling Size	Speed Rpm, Max	Horsepower Max
9A	1750	15
11A	1750	50
9A	3500	100

UPON RECEIPT OF HYDROCONSTANT DRIVE:

Check carefully to see that all of the equipment has been received. Report immediately any shortages or damages to the transportation company handling the shipment, noting the extent of the damage or shortage on the freight bill and bill of lading.

Do not leave the unit exposed to weather or construction hazards. The drive may become mechanically damaged. This drive is a well designed

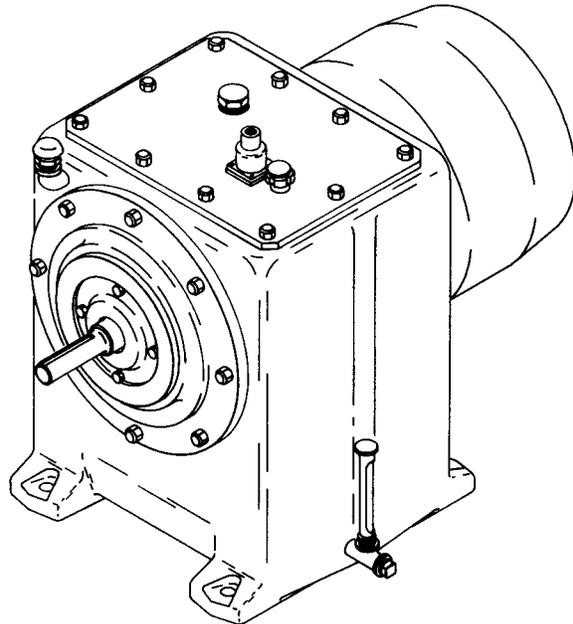


Figure 1. Hydroconstant, Size 2A, Type M

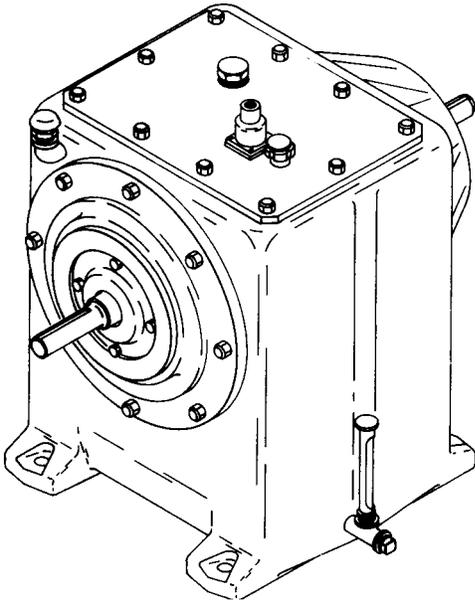


Figure 2. Hydroconstant, Size 2A, Type MO

relatively constant speed of an electric motor. The basic operating sequence is described as follows: Fluid pressure acts through the control mechanism to regulate the coupling output speed. The control mechanism varies the amount of oil, supplied by a gear pump, admitted to the coupling. As the oil

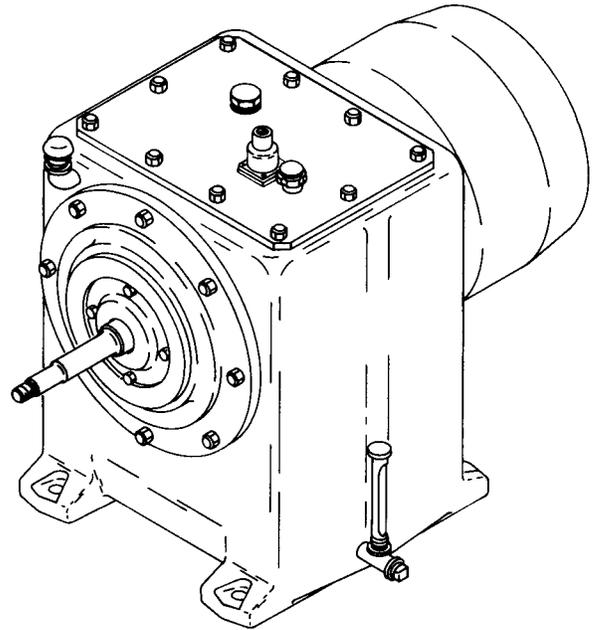


Figure 3. Hydroconstant, Size 2A, Type MP

continuously flows from the coupling through fixed orifices, admission of more oil increases output shaft speed, less oil reduces output shaft speed. Stabilizing the pressure signal to the control mechanism will fix the output shaft speed at a pre-selected ratio (always less than one) of the input speed.

INSTALLATION

WARNING Do not work under a heavy, suspended object unless there is a positive support under it to stop its fall in event of sling or hoist failure. Disregard of this warning could result in grave, personal injury.

LOCATION :The Hydroconstant unit should be installed in a clean, well-drained and ventilated area, and be accessible for inspection and proper care. Ample room should be provided for installation and removal. Be sure the space is vented to the outside atmosphere to avoid a rise of ambient temperature and collection of any oil vapor. Refer to bulletin furnished with pump for instructions for base mounted units installation.

These cover the following:

- (A) Foundation
- (B) Mounting
- (C) Alignment (piping, and flexible coupling if used) (0)
- Grouting
- (E) Piping

If a close coupled Type MP unit without base is used, a firm, level location with suitable anchor bolts for the drive feet and the external heat exchanger is required. All instructions on proper piping practice found in the pump bulletin are applicable.

WATER PIPING: Connect a 1/2-inch control pressure sensing line between the pump discharge outlet (manifold on downstream side of check valve) and

the pressure control (1, figure 4). Provide water supply (80°F (27°C) maximum temperature) and drain lines for the heat exchanger. Use pipe size adequate to provide 1 gpm of cooling water for each 10 hp of motor rating. The supply pressure must never exceed 125 psig on standard installations. If cooling water supply is taken from pump discharge, connection must be separate from control pressure sensing line connection. It is recommended that the suction and discharge lines for the pump be connected with flexible sections of piping. See applicable typical installation diagram, figures 5A and 5B. (Only the items listed in job order are furnished by Peerless Pump.)

WARNING Before making electrical connection to control panel, be certain that the power supply is turned off and that the disconnect switch is open. Disregard of this warning could result in fatal electrical shock.

ELECTRICAL CONNECTIONS: Select a convenient location and hang or foot mount the electrical panel. Connect power supply to the panel, and make interconnections between panel and motor in accordance with the schematic wiring diagrams supplied with the unit. All work must conform with national and local codes. Line voltage and wire capacity must match the ratings stamped on the electrical panel nameplate.

OPERATION

BEFORE STARTING HYDROCONSTANT: Check the following;

- (A) Coupling alignment (if flexible coupling is used) (8)
- Tightness of piping connections.
- (C) Turn pump shaft by hand to make sure that parts do not bind.
- (D) Oil level is 2.5 inches above bottom of oil sight gauge on side of housing.
- (E) Close the pump discharge valve.
- (F) Prime the pump. Refer to bulletin furnished with pump for methods of priming.
- (G) Turn on power supply.

Start as follows:

1. Momentarily energize motor and observe motor shaft (remove outboard bearing housing plug from motor) for proper rotation. If in wrong direction, and motor is three-phase type, interchange any two of the three power supply leads to the motor (at the electrical panel). If motor is single phase, follow motor manufacturer's wiring diagram to change the rotation.
2. Open the suction valve (if used) and needle valve in sensing line to pressure control.
3. Turn on water supply to heat exchanger.
4. Place Hand-Off-Automatic switch on Automatic.

If water pressure in control line is below setting of control mechanism, motor should start and reach operating speed very quickly. Pump will come up to speed somewhat slower.

AFTER STARTING:

1. When pump reaches nearly steady speed, open discharge valve part way to permit partial delivery to system.
2. As pump discharge pressure becomes steady, carefully bleed air from the control line. Make several trials to be sure line is properly bled of all air bubbles.
3. Observe pressure gauge. Discharge pressure should become steady after a few minutes.
4. Open discharge valve completely. Watch pressure gauge and note response time (time for pressure to return to desired value after falling when valve opens).
5. Carefully inspect unit for water or oil leaks. Unit should operate automatically to maintain pressure. Change the setting to suit operating condition by turning pressure adjusting knob.

DISCHARGE PRESSURE ADJUSTMENT: Turn pressure control knob on top plate clockwise to increase system pressure, counterclockwise to decrease. Change the adjustment in small amounts and wait several seconds to observe effect on pressure before another trial.

PERFORMANCE CHECK: After starting allow unit to warm up to an oil temperature of 130° to 150°F (54° to 65°C). Adjust temperature control knob on valve in heat exchanger line so that oil temperature does not exceed 150°F (65°C). If unit fails to reach required speed, or will not slow down when necessary, proceed as follows:

1. Turn off the Hydroconstant unit and check the oil level. Level should be 2.5 inches above the bottom of the sight gauge glass. Add oil if necessary. (See list at end of bulletin for proper oils.)
2. Remove top plate (13, figure 4) from housing.
3. Check that two bleed orifices (21, figure 6) are not clogged. Using pins carefully determine that diameters are as follows:

Hydraulic Coupling Size	Speed Rpm	Orifice Dia In.
9A	1750	0.125
11A	1750	0.116
9A	3500	0.091

4. Manually spin input in normal direction and observe that oil drips slowly from the exit hole (22, figure 6) in the output end bell. If oil flows from exit hole, proceed to step 6.
5. If oil does not flow from exit hole, proceed as follows:
 - a. Check all oil hose connections. Tighten as required.
 - b. Check the oil pump chain for proper tension (see figure 9).
 - c. Make sure the oil pump sprocket setscrew is tight.
 - d. Determine that oil pump suction and discharge lines are correctly connected. For units driven by clockwise rotation motors, oil discharge line should be attached to the top of the pump; counterclockwise rotation units should have the oil discharge line attached at the bottom of the pump.

1. Pressure control
2. Machine screw
3. Lock washer
4. Flat washer
5. Pressure control pointer
6. Spacer
7. Jam nut
8. Diaphragm
9. Pressure knob
10. Retaining ring
11. "O"-Ring
12. Adjusting screw
13. Top plate
14. Top plate gasket
15. Oil filler cap
16. "O"-Ring
17. Pivot block
18. Roller Bearing
19. Dowel pin
20. Splitter arm assembly
21. Set Screw
22. Cone point set screw
23. Spring
24. Spring retainer
25. Nut
26. Machine screw
27. Lock washer
28. Splitter
29. Cap screw
30. Nut

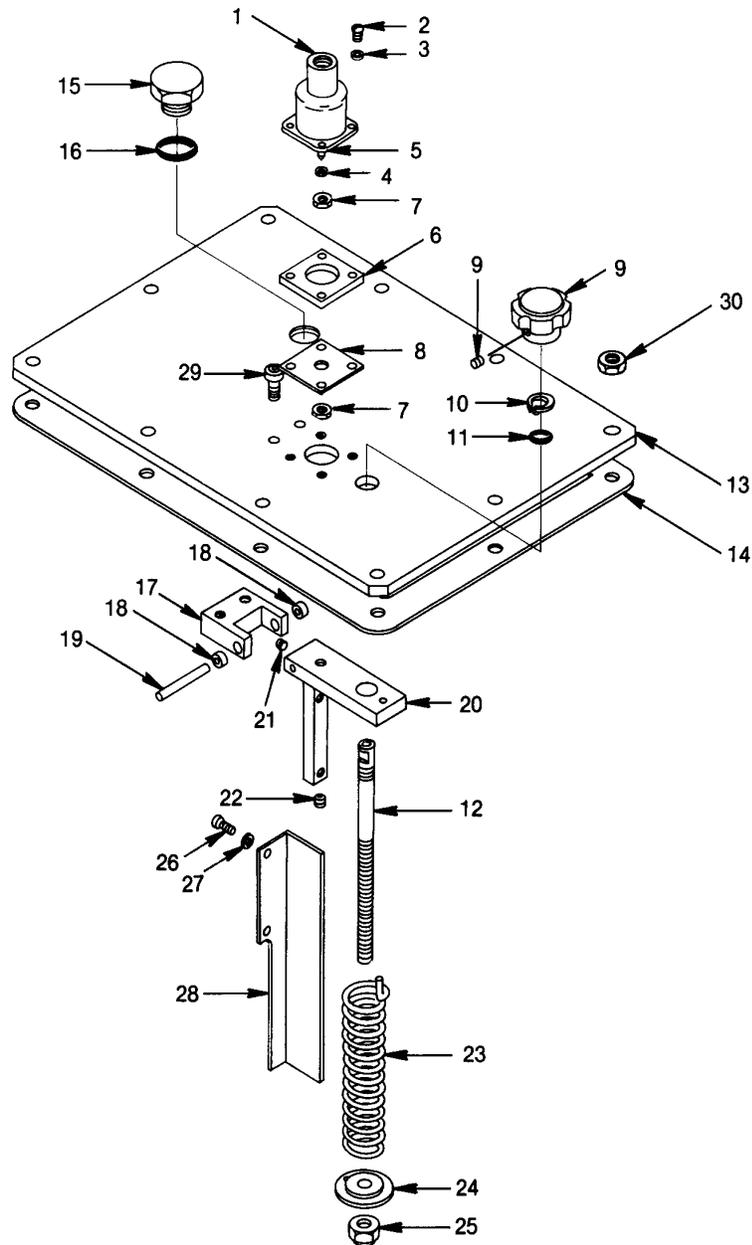


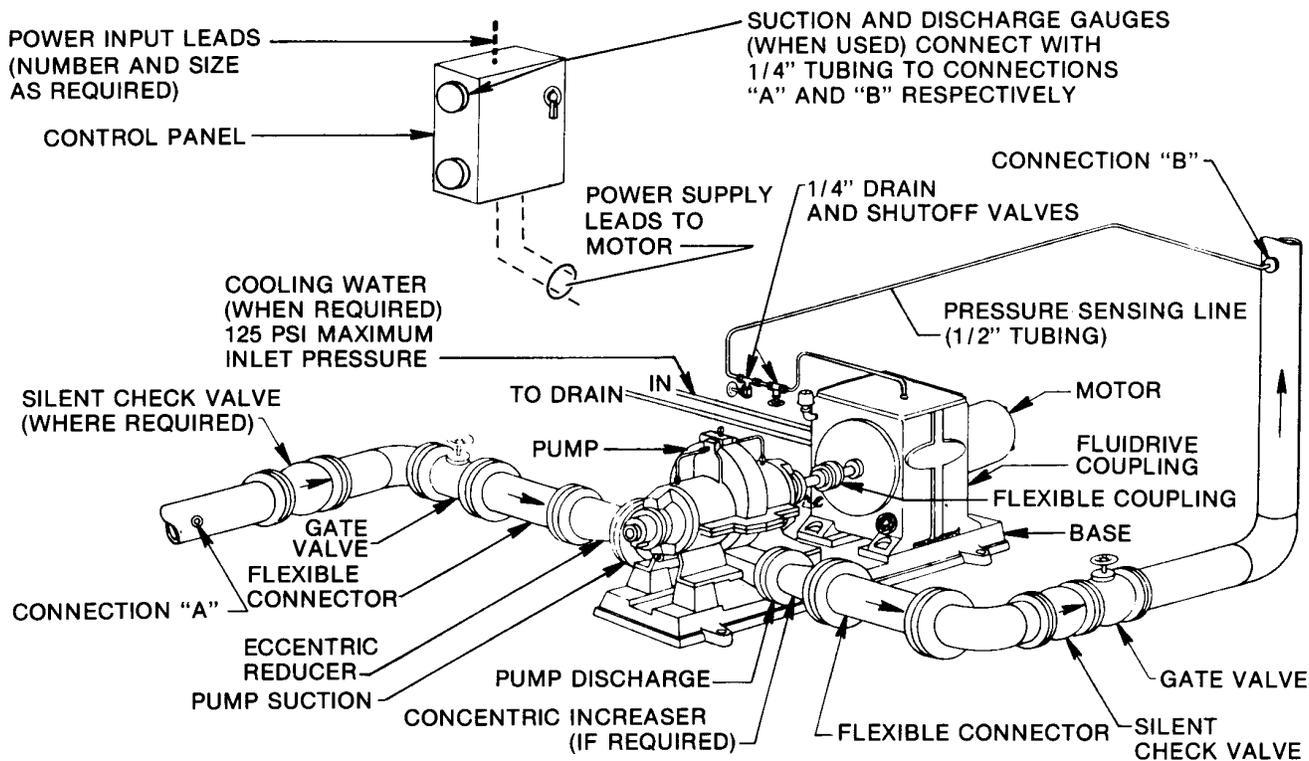
Figure 4. Top Plate and Controls

6. Check position of splitter adjustment set screw (22, figure 4). The end of this set screw provides a cone-shaped seat for the pressure control pointer (5). If the pointer is not resting in the center of the set screw cone, reposition the pointer.

7. If the pointer is centered in the cone and the drive does not perform properly, the high and low speed limits may be restricted by the mechanical limits of

the pressure control pointer movement. To increase maximum speed, rotate the set screw counterclockwise; to decrease minimum speed rotate the set screw clockwise. Rotate one full turn in the desired direction, reassemble, start the unit and compare performance with that desired.

8. Repeat step 7 as often as necessary to obtain proper performance.



1/2" PIPE CONNECTION FOR PRESSURE-ACTUATED DEVICES: "A" FOR SUCTION, "B" FOR DISCHARGE (AS REQUIRED). LOCATION TO BE MIDWAY ON A STRAIGHT, NO SHORTER THAN 12 DIAMETERS RUN OF PIPE. WIRE TO CONTROL PANEL AS REQUIRED.

Figure SA. Typical Installation, Single Pump

MAINTENANCE

WARNING Before starting any repairs requiring dismantling of the Hydroconstant unit, open the disconnect switch to cut off power to the motor. Temporarily secure the switch so it cannot be closed. Attach note "Do not close switch - pump repair in process." Starting the motor during removal of the Hydroconstant unit could cause material damage and personal injury.

WARNING Repair of some Hydroconstant parts requires the use of power lifting equipment. Do not work under a heavy suspended object unless there is a positive support under it to stop its fall in the event of a sling or hoist failure. Disregard of this warning could result in grave personal injury.

PERIODIC INSPECTION: At regular intervals inspect the unit as follows:

1. Check Hydroconstant oil level to be 2.5 inches above bottom of sight gauge glass on side of housing. Add high quality, non detergent, straight HVI mineral oil with viscosity of 300 SSU at 100°F as required. Fill when not running.

2. Check for leaks at all pressure points; oil, around drain plugs, end flanges, and sight glass; water, control pressure line, pump shaft packing gland.

WARNING Before working on electrical equipment, insure that power to the electrical control panel is disconnected. Failure to do this may result in a fatal electrical shock.

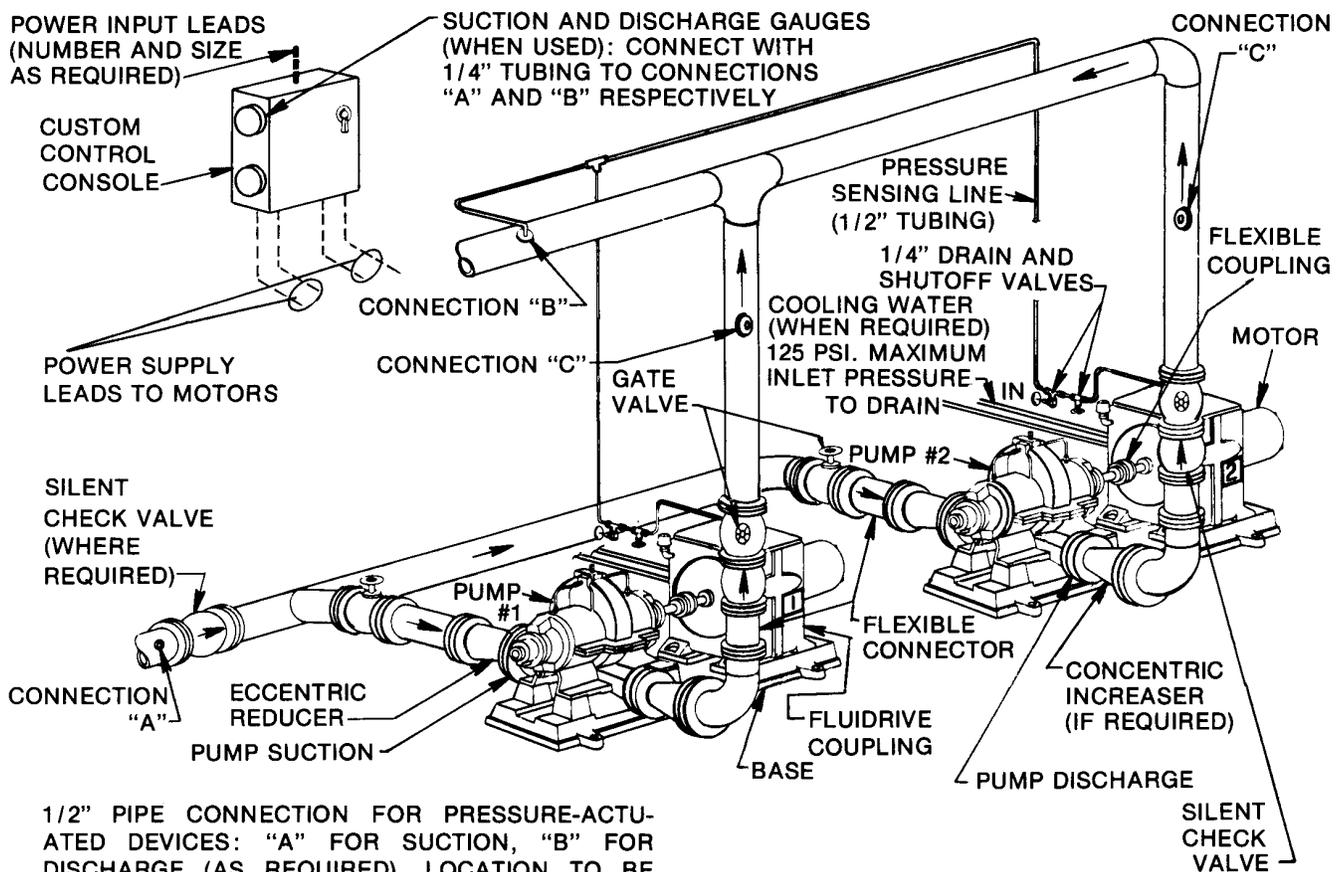
3. Check mechanical operation of controls on electrical panel.

4. Check the inlet strainer in cooling water line for accumulation of sediment. Clean as necessary to avoid cooling

OIL CHANGE. When run continuously, oil should be drained from the Hydroconstant drive once each year. After shut down, remove the drain plug and drain oil into suitable container. Replace drain plug. Fill with new, clean oil to proper level. Approximate capacity of unit is 13 quarts.

water stoppage.

LUBRICATION. The internal parts are splash lubricated by the coupling oil. Follow motor manufacturer's



1/2" PIPE CONNECTION FOR PRESSURE-ACTUATED DEVICES: "A" FOR SUCTION, "B" FOR DISCHARGE (AS REQUIRED). LOCATION TO BE MIDWAY ON A STRAIGHT, NO SHORTER THAN 12 DIAMETERS RUN OF PIPE. WIRE TO CONTROL PANEL AS REQUIRED.

Figure 58. Typical Installation, Two Pump System

instructions to lubricate motor bearings. Lubricate pump bearings, if used, as instructed in bulletin furnished with equipment.

REPAIR: Normal repair of the drive is limited to the replacement of shaft bearings and seals, when required. If the pump requires repair, refer to the applicable bulletin supplied with the equipment. Motor repair should only be made by a repair shop authorized by the specific motor manufacturer noted on the motor nameplate.

WARNING Cleaning solvents are flammable. Open flame or smoking by personnel in the vicinity of these solvents is extremely hazardous and must not be permitted.

4. Carefully tap sharp cape chisel to catch in 00 of seal housing and pry chisel against end bell to force the seal out. Work in this manner at least 4 places around the seal. When seal is free of end bell, slide along shaft and remove. Be careful not to damage or mar shaft 00.

The heat exchanger may require periodic cleaning.

The water side of the heat exchanger can be cleaned with water softeners or by removing the cast iron headers at the ends of the heat exchanger and routing out the water tubes with rods or brushes. The oil side can be cleaned using a methylene chloride compound.

SHAFT SEAL REPLACEMENT, TYPE MO UNIT ONLY:

1. Loosen shaft coupling halves between motor and drive input shaft.
2. Unscrew bolts from motor feet and remove motor from base.
3. Slide shaft coupling half from Hydroconstant drive shaft.
5. Oil entire length of shaft and inside of new seal. (Never install a used or defective seal.) Install over end of shaft, with seal lip facing toward end bell, using care not to damage lip of seal.
6. Slide seal along shaft to end bell, checking that lip does not buckle or curl under. Start seal housing squarely into end bell. Seat completely by lightly

tapping outer face with plastic hammer. Tap all around seal housing to avoid cocking. If desired, a brass half-cylinder fitting the shaft may be held against seal housing, tapping against brass cylinder. Move cylinder around shaft as seal is driven into end bell.

7. Rotate shaft by hand to check that no binding or scraping occurs. If noted, remove seal and install another new seal. Never Install a used or defective seal.

8. Replace shaft coupling half on Hydroconstant shaft, and mount motor on base.

9. Realign motor and Hydroconstant shafts. Tighten motor mounting bolts. Reposition shaft coupling halves and tighten set screws. Rotate shaft by hand to check for free running.

BEARING REPLACEMENT: The output end bell with the output fluid coupling half must be removed in order to replace bearings in the fluid drive. For the MP unit, the pump must be taken apart as the drive is disassembled.

OUTPUT DISASSEMBLY: To replace bearings dismantle drive unit as follows:

WARNING Hydroconstant drives and pumps weigh several hundred pounds. Do not work under a heavy, suspended object unless there is a positive support under it to stop its fall in the event of sling or hoist failure. Disregard of this warning could result in grave personal injury.

1. For all units, disconnect pressure line at pressure control, water piping for heat exchanger, and electrical lines at control and motor. Use support under motor to prevent over-turning of M or MP units.

2. For the M and MO units, disconnect shaft couplings, remove bolts from housing feet and move Hydroconstant drive to a convenient work area.

3. For the MP unit, disconnect suction and discharge lines from pump. If location is not suitable for disassembly of fluid drive, remove bolts from housing feet and move to convenient work area.

4. For all units, remove 10 nuts (30, figure 4) and lift off top plate (13). Disconnect oil line at top of output end bell.

5. Remove 12 each socket head cap screws and lock washers from circumference of aluminum fluid coupling.

6. For the MP unit only, disassemble pump parts as directed in pump instructions bulletin 4846187. The output end bell of the drive has the same mounting configuration as a NEMA C frame motor. Therefore,

the words "Hydroconstant output end bell" can be substituted for the word "motor" in references to pump mounting on the "motor" in the pump instructions bulletin.

WARNING The input and output end bell assemblies weigh about 75 pounds. These should be lifted with the aid of a hoist to prevent personal injury.

7. For all units, remove 8 nuts (1, figure 6) holding output end bell (20) to main housing and withdraw entire rotating element from housing.

8. Remove hex. stop nut (10) and plain washer (11) from shaft (19). Pull output hub (12) with output coupling half (8) and coupling cover (9) from shaft. Remove square key (13) and rubber deflector (14).

9. Remove 4 each hex. head cap screws (3) and lock washers (4) and withdraw bearing cap (5) from end bell.

10. Press output shaft with bearings (16 and 18) from end bell. Clamp outboard end of shaft in smooth-jaw vise to loosen selflocking nut (17). Remove retaining ring (15) and bearings from shaft.

INPUT DISASSEMBLY:

NOTE: If output has been disassembled, disregard step 1 .

1. Remove top plate (13, figure 4) and 12 each screws (19, figure 7) and lock washers (20) around circumference of fluid coupling. Proceed as follows:

2. Remove drain plug and drain oil from housing.

3. Loosen nuts on oil pump bracket and shift pump to relax chain. Disengage chain from oil pump sprocket. Hang chain over drive hub (6).

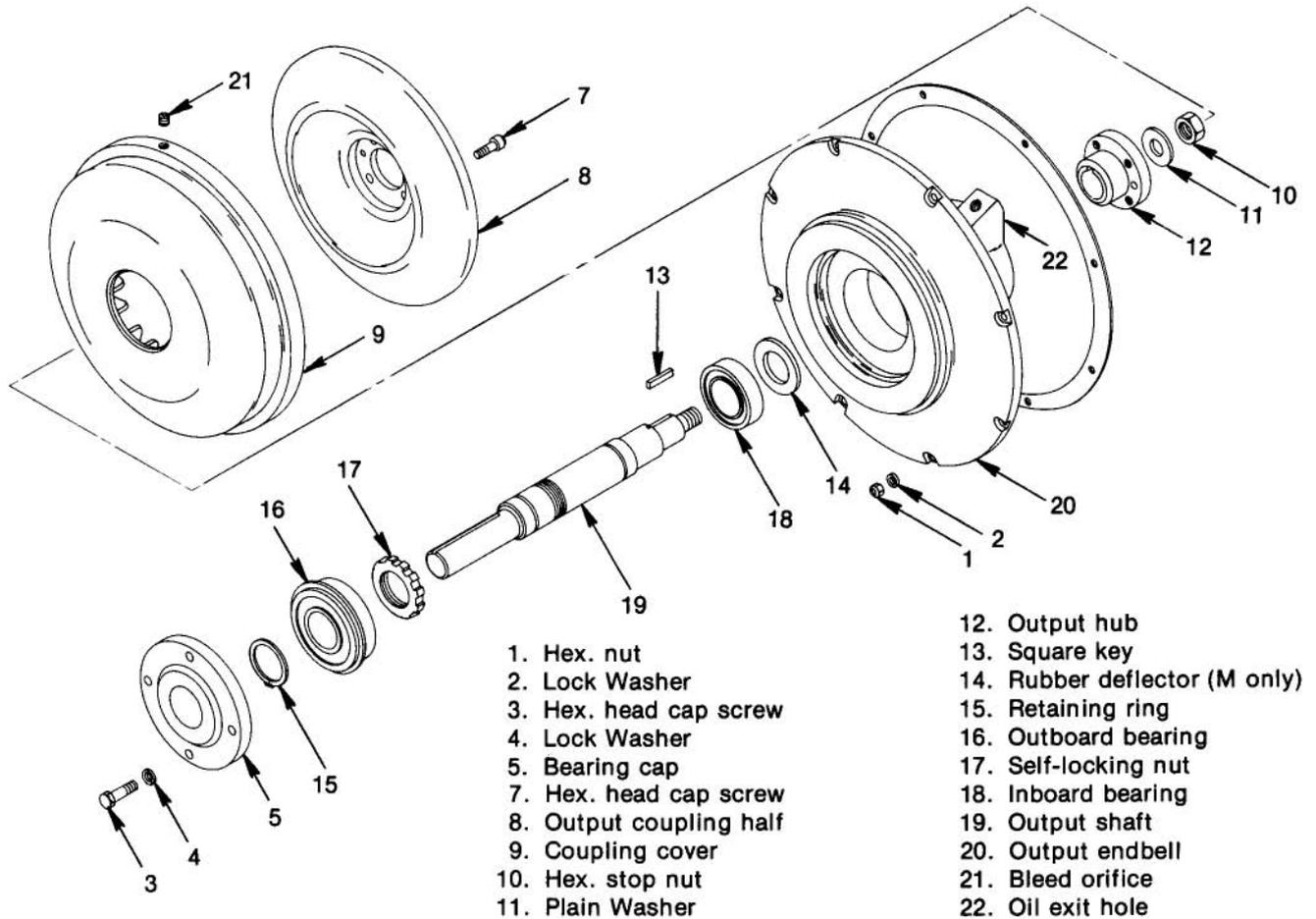
4. For MO units only, loosen shaft coupling halves between motor and drive input shaft. Unscrew bolts from motor feet and remove motor from base.

5. For all units, remove 8 each nuts (1) and lock washers (2) and withdraw motor-flange assembly (M and MP), or input end bell assembly (MO), from housing. Remove chain from hub.

6. Remove 4 cap screws (3) to remove input coupling half (4) from drive hub (6).

7. Measure and record dimension A (see figure 8) before removing drive hub. Loosen the 2 set screws in hub (6, figure 7). Wipe oil from the hub.

CAUTION Use care when heating hub to avoid direct impingement of flame on sprocket teeth. The aluminum internal baffle used on M and MP units may be warped while heating the hub. Protect the hands against burns. Use cotton and welding gloves for handling hot parts.



Index No.6 not used

Figure 6. Output End bell

8. Heat the hub to 450°F. (232°C.) with a torch. Check the temperature by intermittently applying a 450°F thermo-melt pencil. Avoid directing torch flame on or near sprocket teeth.

9. While hub is hot, install a gear puller and pull hub from the shaft (15). Allow parts to cool; cooling may be speeded by directing air flow from a circulating fan or blower across the hot parts.

10. Remove key (7) from shaft slot. Remove upset in shaft, from setscrew, with a fine file followed by a fine stone. Avoid flattening shaft surface. Remove Loctite residue from shaft and hub bore with a hard, fiber scraper.

11. For M or MP units, remove hex. head cap screws and lock washers to remove the mounting flange from the motor. If required to replace motor bearings, take the motor to an authorized motor repair shop.

12. For MO units, remove 4 socket head cap screws (8) and remove bearing cap (9). Withdraw shaft and bearings assembly (10 thru 15) from input end bell (18).

13. Remove retaining ring (16) and drive or press oil seal (17) from end bell.

14. Straighten tabs of bearing lock washer (11). Clamp shaft in smooth-jaw vise to loosen bearing lock nut (10). Support bearings (12 and 14) on inner races and press out shaft (15). Remove shaft collars (13).

CLEANING:

WARNING Petroleum-base cleaning solvents are flammable. Smoking or open flames in the vicinity of these solvents is extremely hazardous and must not be permitted. Disregard of this warning could result in grave personal injury.

Do not attempt to clean drive hub or related parts while still hot from heating during disassembly.

CAUTION Clean all metal parts (except bearings) with a solvent. Use a bristle brush (NOT metal or wire) to remove tightly adhering deposits. A fiber scraper may be used to remove gaskets from flanges.

1. Blow dry with clean, dry compressed air.
2. For MO units input shaft bearings only, clean ball bearings in the following manner:
 - a. Place bearings in a wire basket so there is space for the solvent to reach all parts.
 - b. Immerse in clean Stoddard solvent. Agitate basket until sludge is thoroughly loosened and can be flushed out.
 - c. Place bearing on a screened surface.
 - d. Using a spray gun with air filter and clean Stoddard solvent, flush each bearing until oil and sludge are removed.

WARNING Never spin bearings. Spinning a dry bearing can cause damage. Spinning any bearing by an air blast can cause bearing to fly apart resulting in possible fatal injury.

- e. Blow solvent out of bearings with dry filtered air.
 - f. Lubricate bearings immediately after cleaning with light spindle oil and place in a covered container.
3. For MO units input shaft bearings only, bearings not removed from shaft may be cleaned in the following manner:

- a. Flush with clean Stoddard solvent until all old oil and sludge are removed. Rotate bearings slowly (by hand) while flushing. Do not use kerosene or fuel oil for flushing.
- b. Re-lubricate as in paragraph 2, step f, and cover to protect from dirt.

INSPECTION: Visually inspect parts for damage affecting serviceability or sealing. Emphasize inspection of parts having relative motion - seal contact area on input shaft 00 must be smooth and free from any defect.

1. Replace damaged parts unless minor repair (removal of burrs, or scratches in non-critical surfaces) will restore to serviceability.
2. Replace bearings that bind, stick, are rough or noisy, or have flat spots.

ORDERING REPAIR PARTS: When ordering spares or asking for information on a particular drive, always specify the serial number, which is stamped on the drive nameplate. When ordering parts, give the item number, and name of the particular part desired (see figures 4, 6 or 7). This procedure will insure prompt and accurate service.

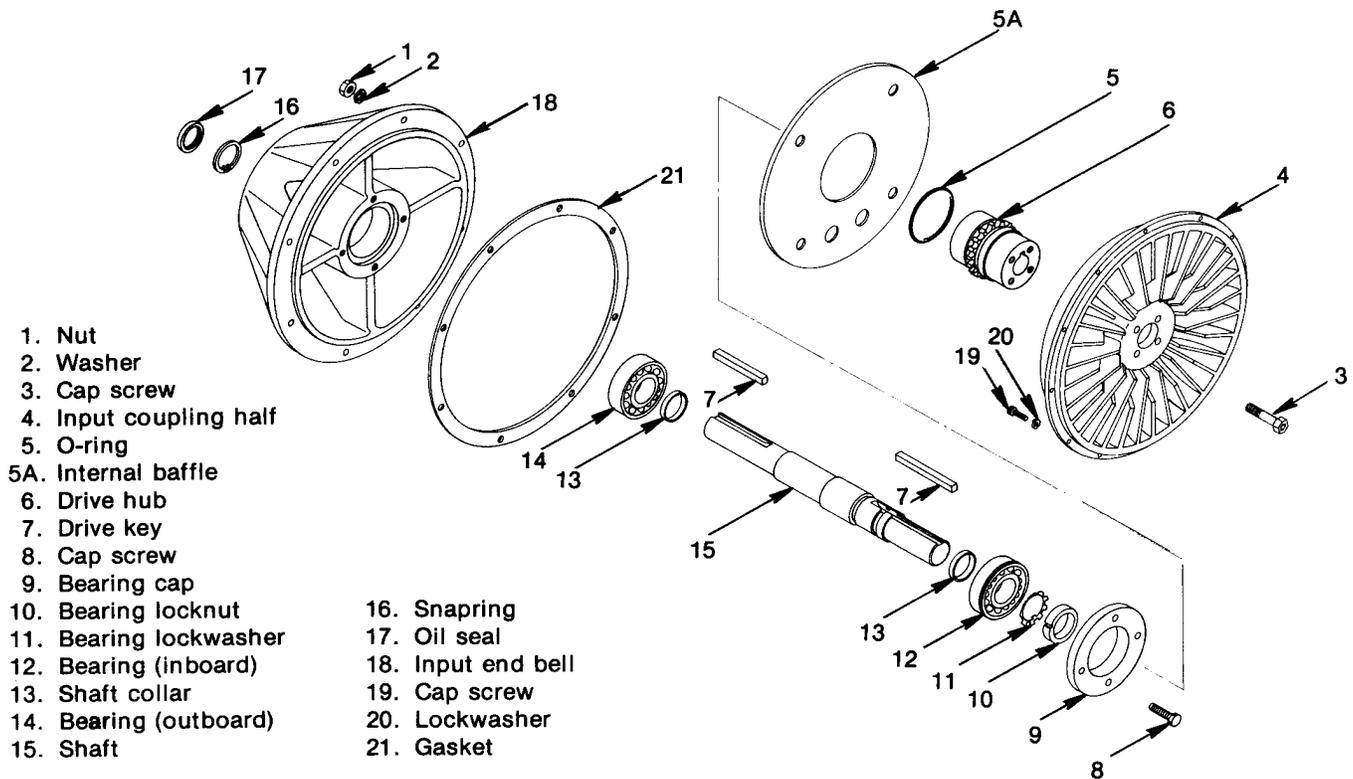


Figure 7. Input End bell

INPUT REASSEMBLY: For MO units, proceed as follows:

1. Install shaft collars (13, figure 7) on shaft (15). Press bearings (12 and 14) on shaft, applying force only to inner races.
2. Clamp shaft in smooth-jaw vise. Install bearing lock washer (11) and bearing lock nut (10). Securely tighten locknut, then bend tabs. of lock washer tightly against lock nut.
3. Install snap ring (16) in input end bell (18) and insert shaft bearing assembly in end bell.
4. Install bearing cap (9) and attach with 4 cap screws (8). Tighten screws evenly.
5. Install a new oil seal (17) as directed for Seal Replacement, steps 5 thru 7.

For M and MP units, proceed as follows:

1. Install new O-Ring (5) on motor end of drive hub (6). Slide internal baffle (5A) on hub against O-ring. (If 2 O-rings were removed during disassembly, install second O-ring on hub so that baffle will be between the two.

For all units, proceed as follows:

CAUTION The location of the drive hub relative to the end of input shaft governs the running clearance of rotating element of fluid coupling. To avoid possible interference, the same hub and shaft should be reassembled, and, in all cases, the same assembly dimension A [see figure 8] [recorded at disassembly] must be used when the drive is reassembled.

NOTE: Hardening time for Loctite is short. No adjustment of drive hub can be made after hardening.

1. Apply Loctite No. 601, or equivalent, to bore of drive hub and OD of motor shaft. Insert key (7) in shaft slot and install hub on shaft so that dimension A, figure 8, is the same as recorded at disassembly. Firmly tighten two set screws in hub and recheck dimension A.

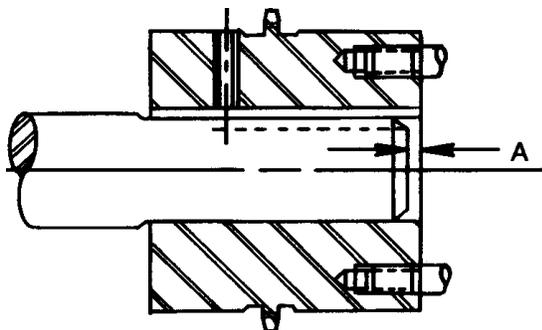


Figure 8. Drive Hub Location

2. For the M and MP units attach the motor mounting flange to the motor, making sure the internal baffle (5A, figure 7) is secured under the washers and bolt heads. Make certain that O-ring (5) is against baffle. (If 2 O-rings are used, carefully move baffle into position so that O-ring between baffle and motor remains in contact with baffle.)

3. Hang chain on drive hub and attach input coupling half (4) to drive hub with 4 cap screws (3). Tighten each screw alternately several times so that the coupling half is not cocked on the drive hub.

4. Install the motor-flange assembly (M, MP) or input end bell assembly (MO) on the housing using a new gasket (21). Make certain that large rectangular hole in end bell bore is at the bottom. Attach with washers (2) and nuts (1), cross-tightening uniformly and securely.

5. Install chain over sprockets of drive hub and oil pump. Shift pump to provide correct chain tension (see figure 9) and tighten nuts on pump bracket. Recheck chain tension and alignment. If alignment and tension are not correct, life of chain or sprockets will be reduced.

6. If output has not been disassembled, rotate input by hand to be sure there is no interference. If free, align input coupling half and coupling cover and install 12 each lock washers (20) and cap screws (19). Cross-tighten screws uniformly and securely.

OUTPUT ASSEMBLY: Proceed as follows (see figure 6):

1. Install self-locking nut (17) on output shaft (19), allowing small clearance to install bearing (16).

2. Press bearings (16 and 18) on output shaft, applying force only on inner races. Inboard bearing (18) must bottom against shaft shoulder; outboard bearing (16) should go on just far enough to permit installing retaining ring (15). Install retaining ring.

3. Clamp shaft in smooth-jaw vise and tighten self-locking nut (17) securely against bearing and so that bearing is tight against retaining ring (1,5).

4. Apply Loctite 222, or equivalent, to the OD of bearing (16) and to the mating ID of output end bell (20).

5. Install shaft-bearings assembly in output bell. Use an arbor press, or tap lightly with a rubber hammer, to seat flange of bearing (16) against end bell. Install bearing cap (5), securing with 4 each lock washers (4) and hex. head cap screws (3). Tighten screws uniformly.

6. Install rubber deflector (14) over coupling end of shaft and slide to bearing (18).

**INSTRUCTIONS FOR ADJUSTMENT OF
ROLLER CHAIN TENSION**

USE VERY LIGHT ("ONE POUND") FORCE TO DEPRESS CHAIN AT THE MIDSPAN WHILE MEASURING DEFLECTION. RE-POSITION THE OIL PUMP IF DEFLECTION IS NOT AS SHOWN.

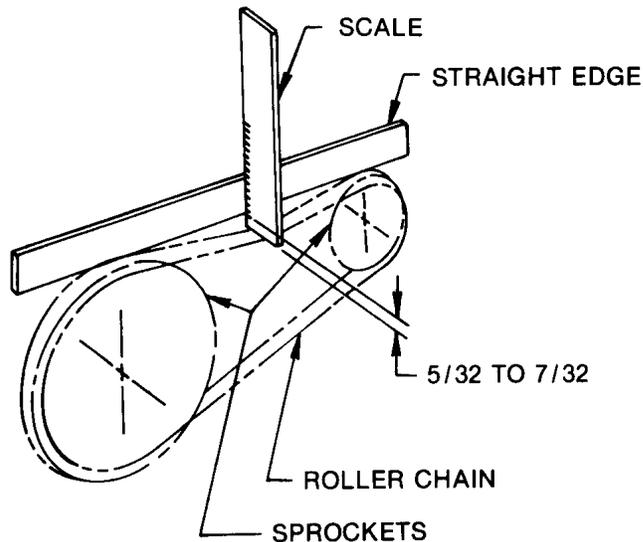


Figure 9. Chain Tension Adjustment

7. Insert square key (13) in shaft key way and install output hub (12). Secure with plain washer (11) and hex. stop nut. Tighten nut securely.

8. Nest output coupling half (8) in coupling cover (9). Align coupling half with output hub and attach with 4 hex. head cap screws (7). Tighten screws securely.

9. Locate a new gasket (same as item 21, figure 7) on end bell and install end bell-coupling assembly on housing. Attach with 8 each lock washers (2, figure 6) and hex. nuts (1), cross-tightening uniformly.

10. Align coupling cover with input coupling half and attach with 12 each lock washers (20, figure 7) and cap screws (19). Tighten screws uniformly and securely.

11. Connect oil line at top of output end bell. Replace top plate (13, figure 4) and attach 10 nuts (30). Tighten nuts securely.

12. Fill with recommended oil, or equivalent, to a level of 2.5 inches above bottom of sight gauge glass.

13. Rotate output shaft by hand to check for free running--no binding, scraping or sticking.

14. For MP unit, reassemble pump parts as directed in pump bulletin 4846187.

15. Allow two hours for Loctite to dry. Reinstall unit as directed in Installation at beginning of this bulletin.

Acceptable Oils for Hydroconstant Fluid Drive Use

Supplier	Product Name
Amoco	American Industrial 68
Atlantic Richfield	Duro AW S315
Shell Oil Co	Tellus 68
Exxon	Terresstic 68
Standard Oil (Ohio)	Factovis 52
Sun Oil Co.	Sunvis 931
Texaco	Rando H.D. 68
Union Oil Co.	Unax RX 315



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Notice: Materials of construction, specifications, dimensions, design features, and application information, where shown in this bulletin, are subject to change and! or modification without notice by Peerless Pump Company at their option.