BI005630

Technical Manual

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SAFETY SUGGESTIONS

The operator controls the machine and its usefulness. The crew alone thinks for it. Safety, constantly in mind, prevents accidents. Develop good habits. Everyone has bad habits, but try to erase them quickly. Cleanliness and safety go together. A clean machine is easier to operate, inspect and maintain.

READ and OBSERVE **ALL** warning signs, they're placed for your health and safety.

KNOW the location of fire extinguisher.

DO NOT START machine without a FULL tank of air pressure.

DO NOT LEAVE the controls without pushing the STOP BUTTON marked "EXCITATION", turning BOTH brake switches to "SET" and automatic drill control lever to the center detent position.

DO NOT SERVICE or lube moving parts.

PLEASE READ carefully this Manual and Parts Book.

PLEASE LUBE regularly.

PLEASE CREATE A SYSTEMATIC maintenance procedure and follow it.

PLEASE WATCH clearance when lowering mast.

PLEASE OPERATE machine on as near level ground as possible.

PLEASE KEEP safe operating procedures in mind at **ALL** times.

CAUTION IS THE BY-WORD. Develop a feel for the machine. Try to sense failure before it arrives. Take that extra second to look again at something that seems out of place. A paint chip or bubble may be an early warning. A slight hiss may indicate a growing air leak. It's much easier to tighten a packing nut than shutdown for packing repair.

PROPERLY GROUND the power source.

WATCH AIR system performance.

CHECK pull down chains for early signs of wear or failure that may cause permanent damage.

CHECK LIMIT switches for proper operation.

RUNNING CLEARANCE FOR BRONZE BUSHINGS

Shaft Nom. Diam.	Shaft O.D.	Running Clear-ance	Shaft Nom. Diam.	Shaft O.D.	Running Clear-ance
1	1.000 .999	.006 .010	5	5.000 4.998	.011 .020
1-1/4	1.250 1.249	.005 .010	5-1/4	5.250 5.248	.011 .020
1-1/2	1.500 1.499	.008 .013	5-1/2	5.500 5.498	.012 .020
1-3/4	1.750 1.749	.008 .013	5-3/4	5.750 5.748	.012 .021
2	2.000 1.999	.007 .012	6	6.000 5.998	.012 .021
2-1/4	2.250 2.248	.006 .013	6-1/4	6.250 6.248	.012 .021
2-1/2	2.500 2.498	.006 .013	6-1/2	6.500 6.498	.012 .021
2-3/4	2.750 2.748	.008 .015	6-3/4	6.750 6.748	.013 .022
3	3.000 2.998	.008 .015	7	7.000 6.998	.013 .022
3-1/4	3.250 3.248	.008 .015	7-1/4	7.250 7.248	.013 .022
3-1/2	3.500 3.498	.008 .015	7-1/2	7.500 7.498	.014 .022
3-3/4	3.750 3.748	.011 .019	7-3/4	7.750 7.748	.016 .024
4	4.000 3.998	.011 .011	8	8.000 7.998	.015 .024
4-1/4	4.250 4.248	.010 .019	8-1/4	8.250 8.248	.015 .024
4-1/2	4.500 4.498	.010 .019	8-1/2	8.500 8.498	.016 .025
4-3/4	4.750 4.748	.014 .022	8-3/4	8.750 8.748	.016 .025

COUPLING ALIGNMENT (REPRESENTATIVE READINGS)

(ALL READINGS IN MILS OR THOUSANDTHS OF AN INCH)

Feeler Position	Coupling Position			
	0 Right	0 Top	0 Left	0 Bottom
Right	12	14	13	14
Top	12	13	14	14
Left	13	14	13	15
Bottom	13	13	14	15

Coupling in line. Gradually changing readings indicate coupling is opening slightly with rotation.

Feeler Position	Coupling Position			
	0 Right	0 Top	0 Left	0 Bottom
Right	12*	14*	14*	16*
Top	15	17	17	19
Left	18*	21*	20	23*
Bottom	15	18	17	20

Coupling out of line sideways. Note that right and left readings* show constant difference of 6 to 7 thousandths; top and bottom readings all right.

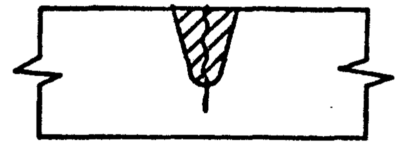
Feeler Position	Coupling Position			
	0 Right	0 Top	0 Left	0 Bottom
Right	14	14	16	17
Top	10*	10*	11*	12*
Left	15	14	17	17
Bottom	19*	19*	22*	22*

Coupling out of line vertically. Note that top and bottom readings* show constant difference of 9 to 10 thousandths; left and right readings all right.

Feeler Position	Coupling Position			
	0 Right	0 Top	0 Left	0 Bottom
Right	14	11*	16	20*
Top	18*	15	11*	16
Left	14	19*	15	12*
Bottom	10*	16	20*	15

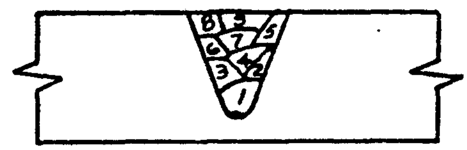
Bad coupling face indicated. Note how tight and loose spots* travel with rotation of coupling. Necessary to remove both rotors and true-up coupling faces.

correctly and brace, clamp, or tack weld to maintain alignment. Use the specified welding preheats for ALL arcing or burning.



Crack not completely removed reappears in repair weld

PREHEAT area adjacent to weld area to specified temperatures. (See Welding Specifications).



Whenever possible make center pass last as shown

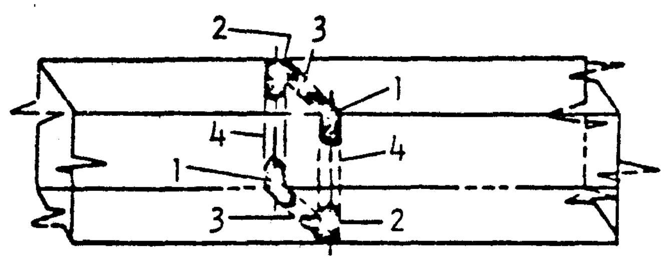
INCREASE preheat temperature 50 degrees F. or 27 degrees C. for material (at weld) 1-1/2 to 2-1/2 inches thick and up to 100 degrees F. or 55 degrees C. for material OVER 2-1/2 inches thick.

MAINTAIN preheat until weld is completed. This is important. Templi-Stiks (from Tempil Corp., N.Y., N.Y.) are helpful for temperature determination.

POSTHEAT area adjacent to weld 100 degrees F. or 55 degrees C., higher than preheat specified. (See Welding Specifications). MAINTAIN postheat for one hour PLUS 1/2 hour for each inch of thickness. CONTROL cooling rate so temperature is about 50 degrees F. or 27 degrees C. per hour until temperature reaches 150 degrees C. (65.5 degrees C.) This is important.

THE ORDER OF WELDING reduces warpage and provides a favorable locked up or residual stress pattern. The use of block welding (short, full size welds) helps reduce warpage. In many cases, V-ing out small areas and rewelding each of these areas; continuing until completing repair eliminates warpage. A favorable locked up or residual stress condition is obtained by making FULL DEPTH welds at the area farthest from the neutral axis first; then making welds closest to this neutral axis last.

To eliminate fusion cracks that persist when welding castings; first deposit a thin layer of weld metal on surfaces for weld, then complete the weld. In box section members this means; first, weld the two diagonal corners; second, the remaining corners; third, the top and bottom; and last, the sides. (See sketch). This procedure creates residual compression at the extreme fibers where it is most beneficial.



Preferred sequence for blocking in butt joint in box section

PEENING often reduces locked up stresses and maintains original dimensions and alignment, as well as, help prevent weld metal cracking in rigid sections. Use a blunt nosed tool. DO NOT peen the first (root or base) pass or cover passes. Avoid EXCESSIVE peening in other passes.

(Section 2 — Lubrication cont.)

HYDROSTATIC DRIVE FLUID

GENERAL – Application of the right hydraulic fluid, properly filtered, at the right time is essential to the successful operation of the Hydrostatic Drive on your Marion machine. The correct hydraulic fluid, properly maintained, is the MOST IMPORTANT PART of maintenance of your hydrostatic drive unit and must be recognized as such. Without the proper hydraulic fluid, vital parts of the hydraulic drive components can quickly wear, resulting in premature failure.

EXTREME OPERATION CONDITIONS – If this machine is to be operated at temperatures below -40°F (-40°C) or above 110°F (43°C), contact the Marion Power Shovel Company, Inc., Marion, Ohio, for special recommendations. Give full particulars concerning your conditions of operation.

NOTE: Unusually dusty or dirty atmosphere, high humidity and/or extreme temperatures can alter the effective life of a hydraulic fluid. Therefore, it shall be the responsibility of the operator and/or owner to determine when the hydraulic fluid needs replacement. Help can be obtained from the supplier of the hydraulic fluid in the event that the machine owner does not have the necessary lab and/or test equipment required.

SELECTION OF HYDRAULIC FLUID – The hydrostatic drive unit on your MARION machine employs hydraulic motors, hydraulic pumps, and high working pressures. These conditions demand that you use only the VERY BEST petroleum base hydraulic fluids available; fluids having stable anti-wear additives, good oxidation life, and the ability to perform well in the hydrostatic drive unit under the extremes of temperatures that will be encountered. In addition to these requirements, the required VISCOSITY of the fluid must be met and maintained. The VISCOSITY level is perhaps the MOST IMPORTANT requirement of the hydraulic fluid. This does not mean that other areas of the specification can be "waived" or considered unimportant. It does mean, however, that if a certain hydraulic oil meets all the requirements except viscosity, that hydraulic oil is NOT ACCEPTABLE as the viscosity requirements cannot be compromised with incurring wear to the hydraulic components in the system.

From the above discussion, several facts are apparent:

1. The hydrostatic drive system demands a premium grade oil-base hydraulic fluid. Such fluids cost much more than regular hydraulic oils.

2. Fire resistant hydraulic fluids cannot be used without system modifications. They lack the anti-wear qualities and viscosity requirements of the system and would cause extremely short component life.

SEMI-AUTOMATIC LUBRICATION FOR DRILL—The automatic lubrication system is furnished as optional equipment. The system provides lubrication to all sleeve bearings on crawlers, including front roller shaft, load rollers and sprocket shaft; also two places on the axle connections.

The control panel, grease pump and 120 pound drum are located at right, front of machinery compartment. Air pressure to actuate grease pump is furnished by the auxiliary air compressor. On the panel is an air unit including a pressure regulator, filter and lubricator. The panel also has a globe valve, vent valve, gage and pushbutton.

Set the air pressure regulator at 70 psi. Set the pressure switch located at left side of compartment at 2,500 psi. Set the time delay relay for 50 seconds.

The system is semi-automatic. To actuate system, press pushbutton in operator's station or on control panel. Press button at start of propel and every 5 minutes during propel.

If the system does not complete one cycle in 50 seconds a red lamp lights and an alarm sounds indicating:

1. Lubricant supply exhausted
2. Broken line to injector
3. Clogged or damaged injector
4. Fault in air supply

REPLACEMENT OF AUTO-LUBE COMPONENTS—If it is necessary to replace lube lines or injectors in the lubrication system (bearing grease), follow procedure outlined below before start-up.

1. Disconnect all bearing lines at bearings only. Remove cap on face of each Lincoln injector revealing a lubrication fitting. Pump lubricant into this fitting until lubricant flows steadily out the end of the bearing line (at the bearing). Connect line to bearing and replace cap on injector. Repeat this procedure for each injector and bearing line until all have been fulled.

2. Remove all plugs on main supply lines one at a time (including plugs at end of all injector blocks). Pump lubricant into system until ALL air is forced out and lubricant flows out opening. Replace plug and tighten. Repeat this procedure until plugs have been removed and replaced. The system is now bled and should be free of air.

3. Check system by operation to be sure lubricant is delivered to EACH BEARING. In cases where it is not possible to see the lubricant delivered, disconnect line at bearing to be sure lubricant is pumped. Reconnect line and pump again to check for leaks.

To obtain prescribed clamping force required, the method of tightening "TURN OF THE NUT" as described is required.

1. Install sufficient number of fasteners to bring ALL parts of joint into firm contact. Use Class "B" flat washers under nut. All surfaces must be dry, clean and free of scale, etc.

2. Install all remaining fasteners, tighten fastener to "snug fit." "Snug fit" is described as tight as a man can turn nut with hand erecting tool, or 50 pounds force on a 24" wrench. Or when using an impact wrench, the drive ceases to turn free and ratcheting action begins.

3. With crayon, chalk or paint; make a reference mark along side nut and clamped surface indicating nut position at "snug fit." (Mark impact drive socket when used.)

4. Hold bolt head with a wrench, a heavy duty impact wrench or any feasible method. Advance nut, 1/2 turn. Tighten nuts progressively; from fixed edge toward free edge. This achieves 70% minimum tension and prevents loosening of fastener under most severe conditions.

TREAD BELT—The crawler tread belt for each crawler consists of forty-three (43) separate links. The links connect with two, hardened steel pins; each locked in place by a bolt through the tread link web.

Periodically check crawler tread pin lock bolts. Replace missing bolts at once. Propelling without lock bolts causes the tread pins to work out and separates the belt.

ADJUSTMENT OF TREAD BELT—The tread belt adjusts by moving the front roller assembly forward to tighten belt, or to rear to loosen belt.

The tread belt, in proper adjustment, when, shows bottom of belt straight and tight, with six to eight inches of sag in belt top strand between front roller and center tread support roller. A tread belt too tight causes loss of power. A tread belt too loose results in serious damage as the belt may climb the drive sprocket.

The front roller mounts on two adjusting blocks fitted into rectangular openings at each side of the crawler side frame. Two shoulder pins install through the adjusting blocks and roller shaft, and extend through rear wall of openings. These pins lock roller assembly in place and facilitate moving assembly for adjustment.

Run gearbox to mast top and down again. Then recheck sprocket pin clearance.

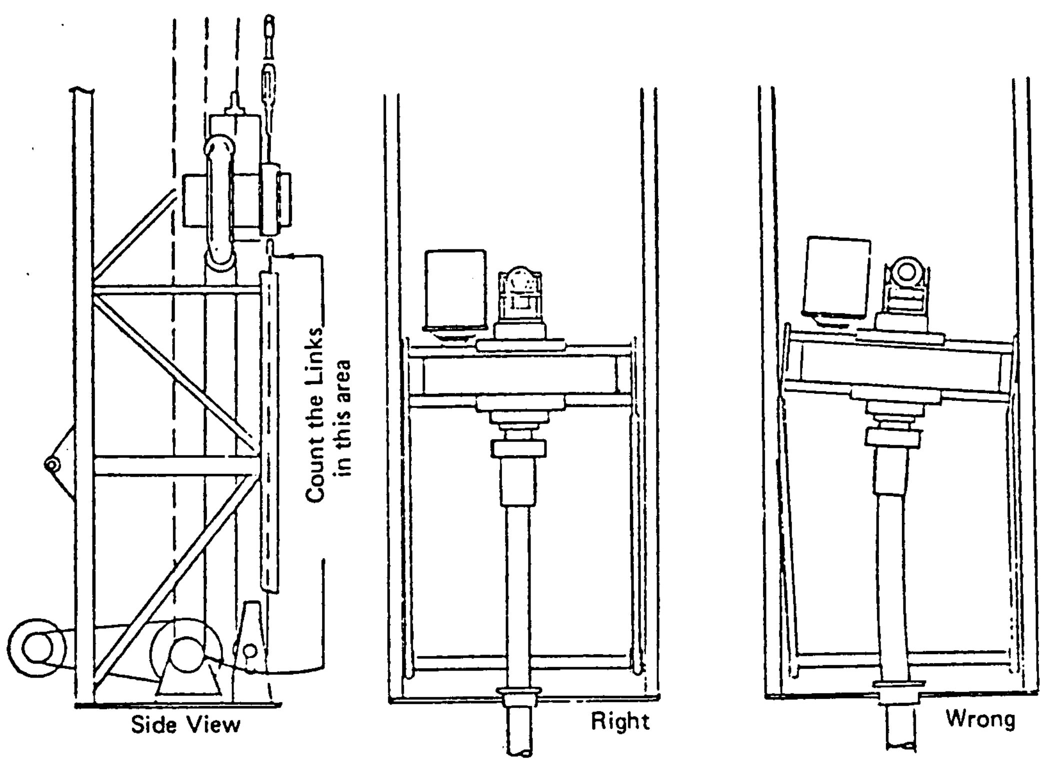
Do not shorten chain to the point where BOTH springs (top and bottom) completely compress.

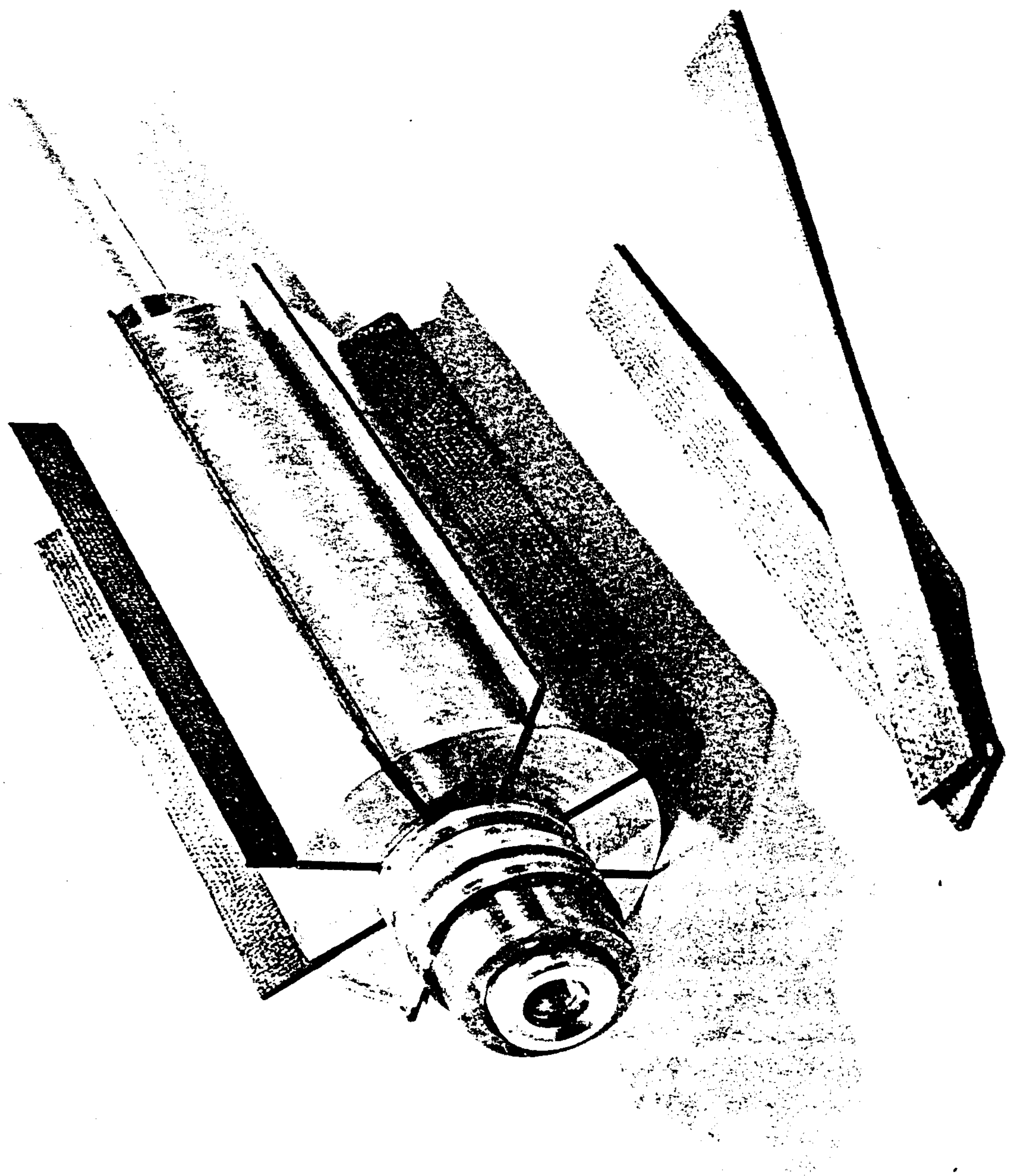
With pull down tension adjusted, lower rotary gearbox as near as possible to drill table. The turnbuckle changes chain tension between pull down shaft sprocket and top anchor turnbuckle ONLY.

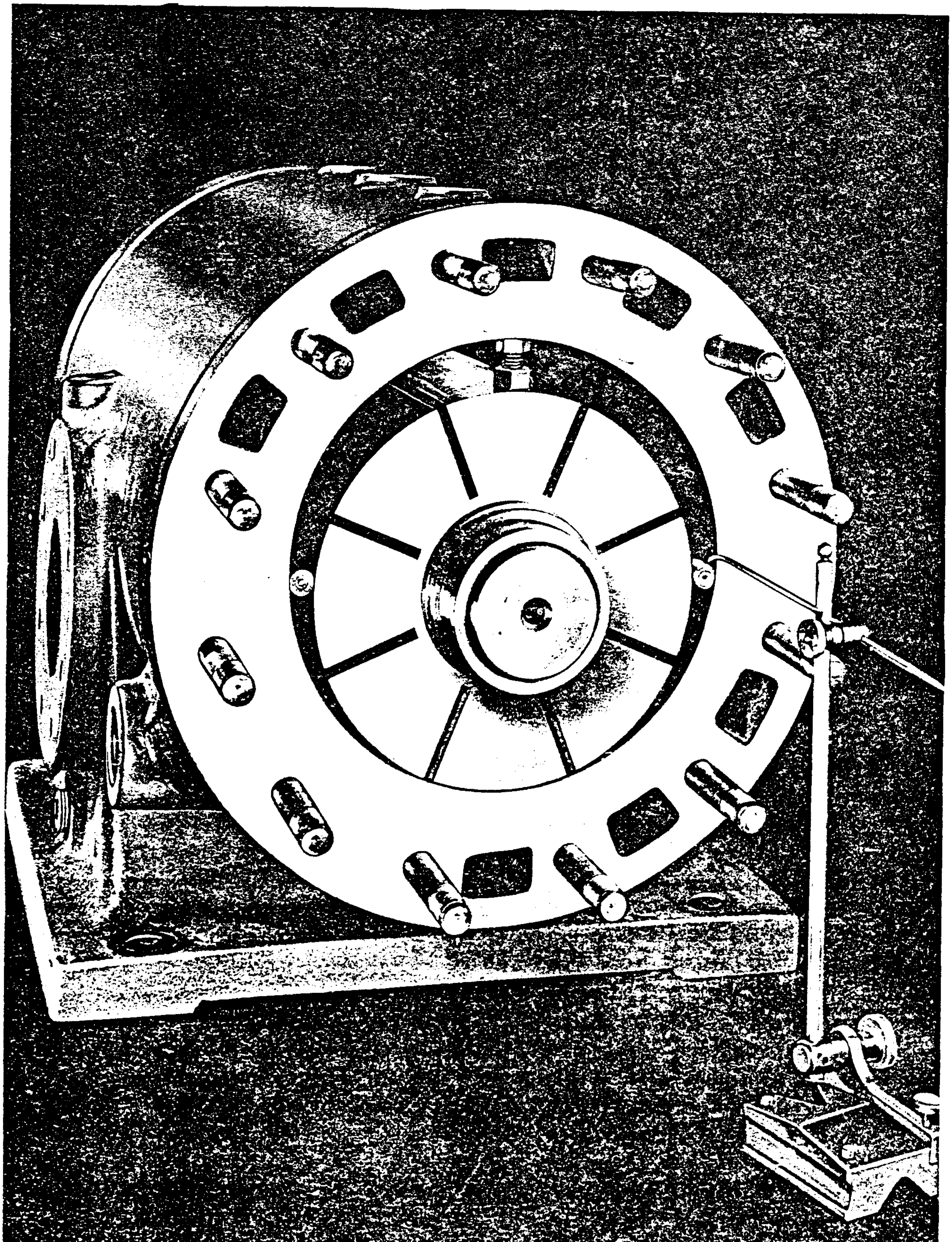
Furthermore, the NUMBER OF LINKS in chain section between bottom chain (swivel) anchor on rotary gearbox and chain sprockets on pull down drive shaft MUST BE THE SAME.

In hoist mode, or at rest, the spring loaded deflector sprocket at drill table compensates for any difference in chain length and gearbox appears to be level. However, in pull down mode, the spring loaded deflector sprocket bottoms and any difference in number of links causes gearbox to be pulled down, out-of-level. This can cause damage to the stem, guide roller or mast.

If for any reason a link must be removed from one of the chains, remove a corresponding link from the other chain.







PHASE MONITOR SETTINGS

Master Feeder Face Value	Counts Per Pint
24	600
28	515
32	450
36	400
40	360
44	325
48	300
52	275
56	257
60	240
64	221
68	210
72	200
76	189
80	180
84	170
88	160
92	153
96	150
100	140
104	138
108	130
112	127
116	122
120	120
124	115
128	112
132	110
136	105
140	102
144	100
148	97
152	95
156	93
160	90

MDV Feeder Value	Counts Per Pint
2A	360
3A	360
4A	360
3B	480
3C	480
4B	480

To Determine Counts Per Pint:

1. Total Master Feeder Face Values:

8T
12S
24T
32S
32T

Total 108

2. Locate Sum in left column, read counts per pint in right column.

To Determine Flow Rate

1. Total Master Feeder Face Values:

8T
12S
24T
32S
32T

Total 108

2. Time the counter on the face of the Phase Monitor for the movement of one complete digit. (ie. - from 3 to 4).

3. Apply the following formula: $Q = \frac{(6)\ (m)}{T}$

where: Q = flow rate (pints per day)
m = face value of master feeder
T = cycle time (in seconds)

Using the above values: $\frac{(6)\ (108)}{9 \text{ seconds}} = \frac{648}{9} = 72$ pints per day.

REMEMBER

safety

PAYS

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For general maintenance, every 100 operational hours, tighten motor mounting bolts and replace broken bolts.

Every 400 operational hours, tighten front cover plate, cap screws. A frequently loose cover plate cap screw indicates to tighten the mounting bolts more frequently.

Fill any motor held in storage for standby with oil.

HYDRAULIC FILTERS—The main hydraulic system uses four filters. Two side mount suction line filters, located at bottom of main tank, and two vertical in line filters, mounted at side of pump module.

The main suction filters, equipped with a 10 micron throw away type element, is furnished with a vacuum gauge dirt alarm. Replace element when the alarm gauge indicates red zone. To change elements, place a pan under head and filter; remove the four cap screws on inner bolt circle and pull two elements from enclosure. As the two elements withdraw, a flapper valve closes the suction opening. The filter element can be changed without draining the tank. Replace element and tighten cap screws, the valve automatically opens.

The two, main hydraulic system in the line filter; located at front of the pump module; each contain two 10 micron, K-10 throw away filter elements. To replace the filter shut down (pump motor stoped) system. With a spanner across the dowels on unit top, unscrew the internal plug cap and lift out the two elements from filter enclosure. Replace the two K-10 filter elements, replace cap and tighten cap securely (J-10 can be used).

The in line filters are furnished with a lever dirt indicator alarm. Replace the element when registers in the red zone.

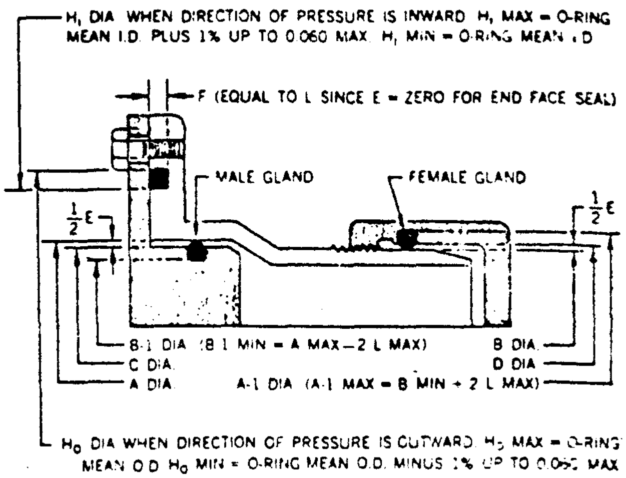
The suction filter and in line filter enclosures each contain a bypass valve with 20 psi setting for cold weather start up. Bleed off air thru valve at filter top.

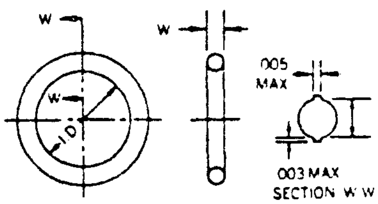
The auxiliary hydraulic system uses one in line filter. This filter, like the main line filter, is located at front of pump module. The type is same except the filter is slightly smaller and element is different, J-10. Use same procedure for changing element.

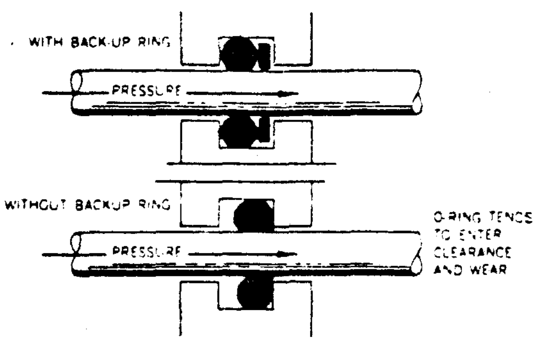
On the suction of the auxiliary gear type pump, a suction separator consists of four magnetic rings within a perforated metal enclosure. This device cleans metal (ferrous) particles from oil.

To replace separator; remove cap screws from suction line, anchor plate and separate suction line pipe union. Pull suction line from reservoir and remove separator from suction line. Replace old separator element with a new, separator element. Inspect separator initially at 500 hours, thereafter, every 1,200 hours.

Check condition of ALL filters at least once a week.







Static seal use is generally simple. Three common types are shown at left.

When pressure exceeds 1500 psi, the backup ring is used. In static face seals, backup rings may not be needed.

MOST O-RING PROBLEMS return to three factors:

1. Size: Using incorrect size causes ineffective or totally destroyed function.

2. Compatibility: O-ring material must be compatible with the chemical, thermal and mechanical surroundings.

3. Installation: Improper handling during assembly causes a great deal of grief.

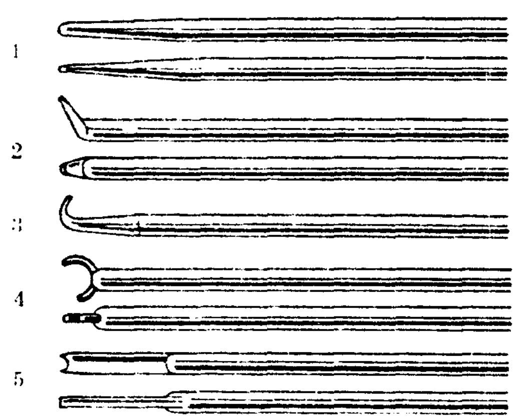
Size cannot be picked out by color code. Exact replacements are found ONLY by part number. DO NOT ATTEMPT matching size by feeling and comparing the new with the old. One other detail here: Do not open package until O-ring is needed for installation. This prevents mixing, rolling on floor, dropping in sewer; among other disasters.

POOR INSTALLATION may begin with the removal of the old seal.

Some points on removal:

Removal involves parts with close tolerance surface finishes.

In critical surface areas; scratches, abrasions, dents, and other surface mars cause faulty seals. This results in component failure.



Servo motors and valves, safety circuits and high reliability circuits have still higher needs. Usually oil in Class 4 is needed here and dirt of only 2.5 grams per barrel contaminates at Class 4.

Removing all contaminant certainly would maximize contaminant related reliability. Under normal operating conditions this is impractical, but under closely controlled conditions it proves very worthwhile.

Filters with a low micron rating have a short life and a small amount of dirt expires them. Replacement costs of these elements may rise into hundreds of dollars, hence no realistic solution to the typical problem.

The filter objective is to clear dirty fluids to a realistic level where components operate reliably. No sensible reason to "over-clean" a fluid exists, it merely costs more for nothing.

Contamination (dirt) is stopped in the filter by the filter media. With this continual process, an increased pressure drop across the filter occurs due to dirt build up in the media. A wide variety of filter medias exist in major use today. Two general categories to know are the depth media and surface media types. No exact "line of separation" exists as to where a depth filter and surface filter begins and ends.

Media refers to the actual material(s) (wire screen, paper, etc.) used to catch the dirt. This material, usually formed into a filter element, is placed into a filter housing.

Depth filter types force fluids to pass thru quite a media thickness in layers. This traps dirt in passages within the media and on the media surface.

Paper is widely used; but synthetic fiber mats, sintered metal and cylinderical wrapped also exist.

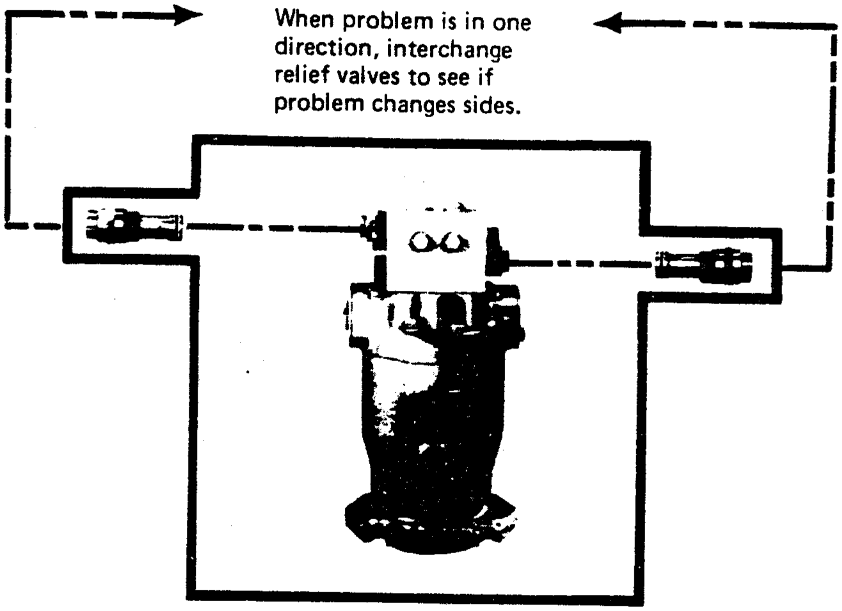
Obviously, a multitude of various sized holes exist. A pore (hole) size called the "mean flow pore size" is the average pore size. Half the flow passes thru pores of equal or smaller size while the other flow half passes thru pores larger than mean flow pore size.

Since no one consistant pore size exists in a depth filter element it is usually given a nominal rating are proportunate. This only shows that in the nominally rated (or depth filter element) the nominal rating shows in some arbitrary way to types and sizes of pores in the media, but not to the size of contaminant (dirt) trapped.

Surface elements use a single layer of filter material in construction. Dirt stops in the media surface. Woven fiber (woven wire cloth) is most common here. Weaving this material is a precise operation, hence pore size may be closely controlled.

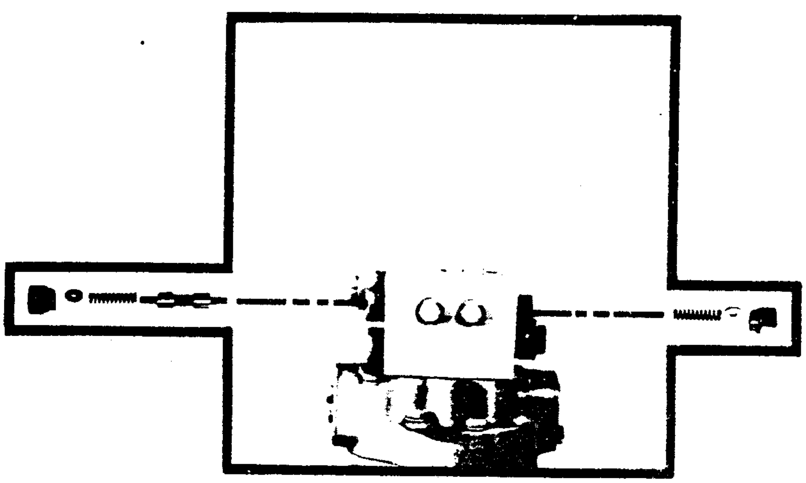
INSPECT SYSTEM RELIEF VALVES

When problem is in one direction, interchange relief valves to see if problem changes sides.



Inspect for proper setting. First two (2) digits of setting are stamped on end of valve. Example: 30 for 3000 psi

INSPECT SHUTTLE VALVE



Spool must move smoothly in bore. Inspect for worn, galled or broken parts. Spool & manifold are matched & must be replaced as a set.

TROUBLESHOOTING

When a system malfunction occurs, it is not always obvious which system component is causing a problem. The following guide is provided for assistance in determining which system component is responsible for the malfunction.

All tests should be performed with machine in neutral if possible. Specific parts of the valve are identified in Figure 8.

MOTOR WILL NOT OPERATE–

A few types of transmission failures appear to be valve failures because the motor will not run. In these cases, the shuttle or relief valve of the hydrostatic transmission motor may be stuck. Another symptom might be a lack of charge pressure in the pump. Check to see if these conditions exist before replacing the valve.

One cause of transmission failure may be a loss of electrical power, such as a broken leadwire. Check voltage across the valve terminals. If none exists, check wiring to the valve. If a voltmeter is not available, a small spark can usually be drawn at the valve terminal. ***(Do not short to ground!)*** With voltage at the valve terminals, a lead to the valve coil may be broken, or the coil may have an internally broken wire.

This type of failure may be checked with a volt-ohm-meter (VOM) by checking coil resistance. Be sure to disconnect the valve from the power leads. The ohmmeter should read approximately 33 ohms. If a VOM is not available, attach the +12 volt d-c lead to one of the valve terminals. Intermittent grounding of the other terminal through a leadwire should draw a spark, which indicates a good coil. It should be possible to hear the torque motor operate at 12 volts, dc (hits stop).

If the coil and power source check out correctly, the valve spool could be stuck or jammed. This problem could be the result of an uneven mounting surface, causing binding of the spool. Check by reducing the mounting bolt torque.

If spool cannot be freed by manual or electrical operation of the valve, or if coil is open, the valve must be replaced.

MOTOR ROTATES IN ONE DIRECTION ONLY–

Vary voltage to valve by varying the command potentiometer or other command source. Reverse polarity of excitation to valve terminals, and repeat polarity reversals. If valve does not respond, operate with manual operator if so equipped. If valve does not respond to manual operator, check flow to motor. The spool of the V7058A may be jammed.

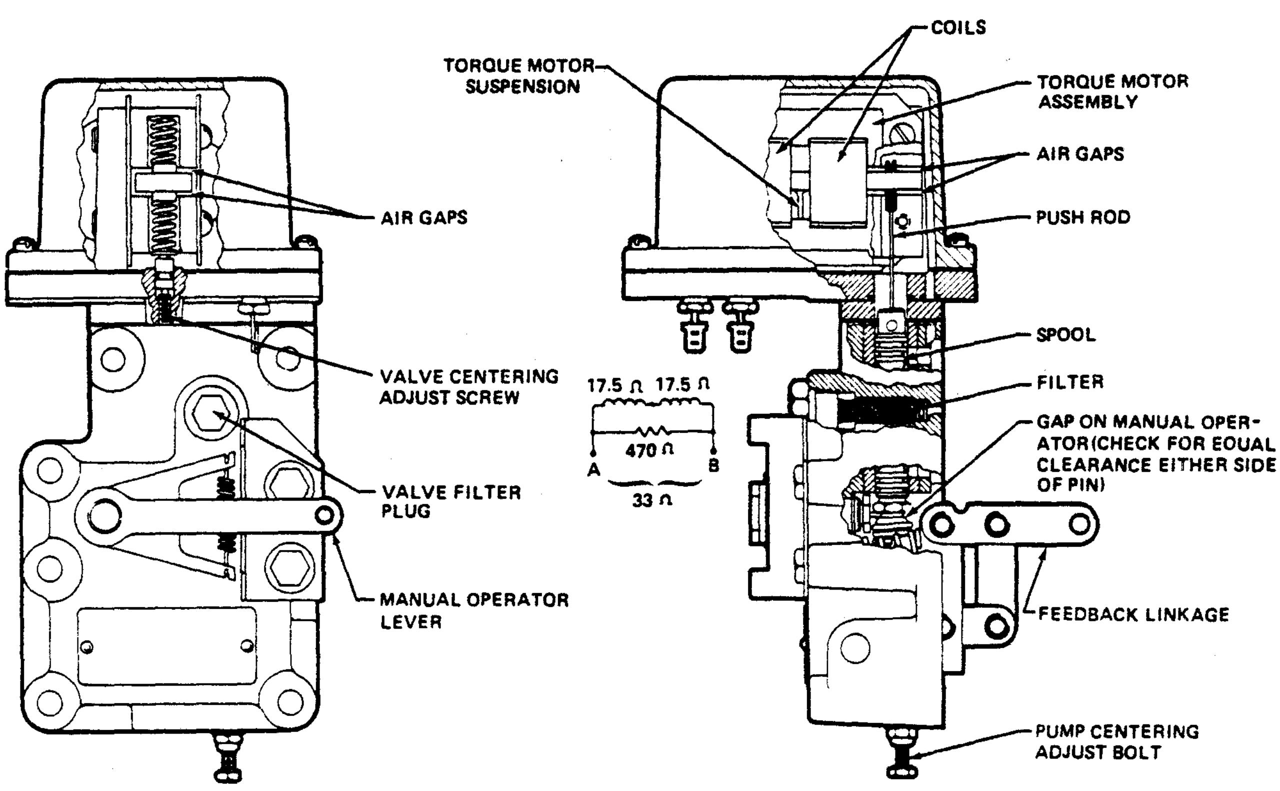


Figure 8–V7058A Cutaway View.

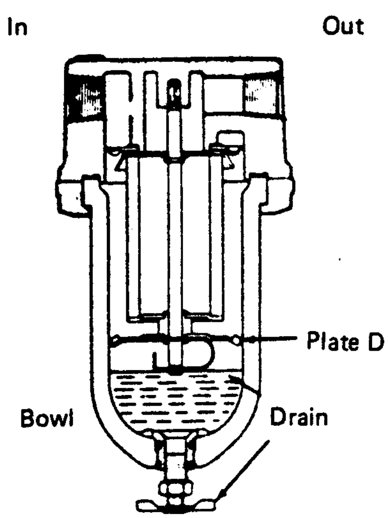
ANTI-FREEZER ADJUSTMENT—In severe weather, lower sleeve to maximum depth, leaving wick completely exposed in vapor chamber. As the temperature moderates, raise sleeve to reduce amount of wick exposed, thus vaporizing less alcohol. With temperature above freezing, raise sleeve up all the way, to cut off alcohol supply.

Refilling frequency depends on weather conditions and drill operating hours.

To fill, use one (1) quart of METHYL alcohol. DO NOT use ETHYL alcohol or radiator anti-freezer.

OIL FOG LUBRICATOR—A continuous air stream entering lubricator bowl forces lubricant up the siphon tube and into a reservoir in lubricator top.

The oil then releases into air stream thru a drip gland. The gland adjusts by turning a needle valve located atop lubricator. Make adjustment from one drop per minute to a full stream of oil if needed.



AIR FILTER

After air stream entry, oil carries to the pneumatic device as a fine mist or OIL FOG.

OIL FOG LUBRICATOR ADJUSTMENT—Adjust valve for normal operation, to 20 drops per minute.

The **AIR FILTER** installs in air line between tank and micro-fog lubricator. The filter purpose prevents moisture, fine solid particles and contaminates from entering air system.

Open the filter bowl bottom pet cock several times each day to blow out accumulated moisture. Every 30 days clean filter element.

FILTER CLEANING—The filter removal from the system: unnecessary to clean.

1. Shut off air compressor and exhaust system pressure.

2. Separate the filter.

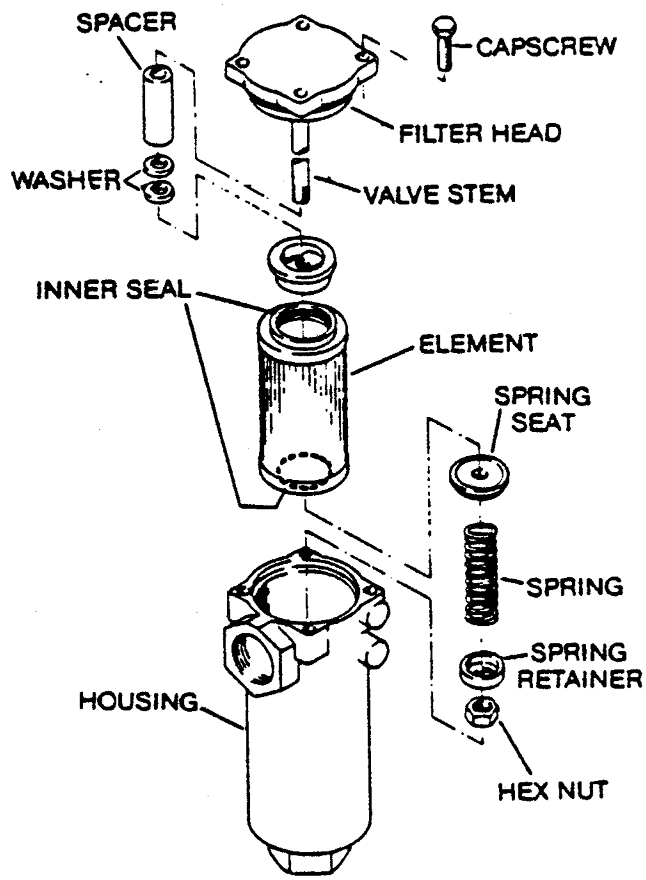
2. Remove the hex nut (located inside the element) from the valve stem.

3. At this time, pull the element, spring, spring seat and spring retainer from the valve stem.

4. Remove the inner seals of the element and the filter head seal and discard.

5. Clean all parts of the filter thoroughly including the housing.

FIGURE 5-2 MAIN FILTER



REASSEMBLY

1. Lubricate the new inner seals and install in the ends of the clean element.

2. Place the filter element, spring seat, spring and spring retainer over the valve stem and secure with the hex nut.

3. Lubricate and install the new filter seal.

4. Install the filter head and element (as an assembly) in the filter housing. The element is to slide over the housing sleeve when properly installed.

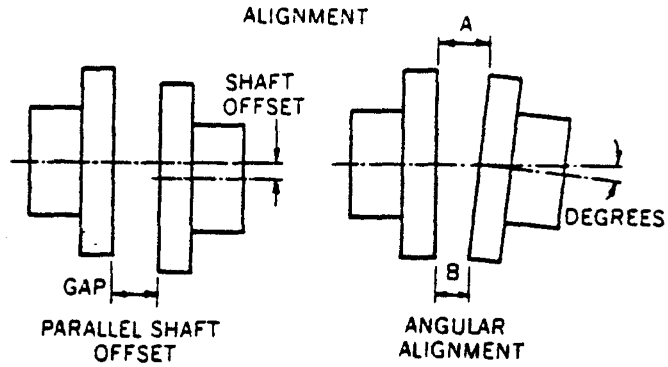
5. Secure the filter head with four (4) capscrews.

AIR FILTER MAINTENANCE

Air filter maintenance should be performed when the maintenance indicator shows red. The air filter supplied with your machine has a cleanable-type element.

in position being sure that the end of the key is flush with the end of the shaft. Position the hubs to establish the proper hub spacing as specified in Table 1 and secure each hub with a set screw.

FIGURE 5-8 DRIVE COUPLING SHAFT ALIGNMENT



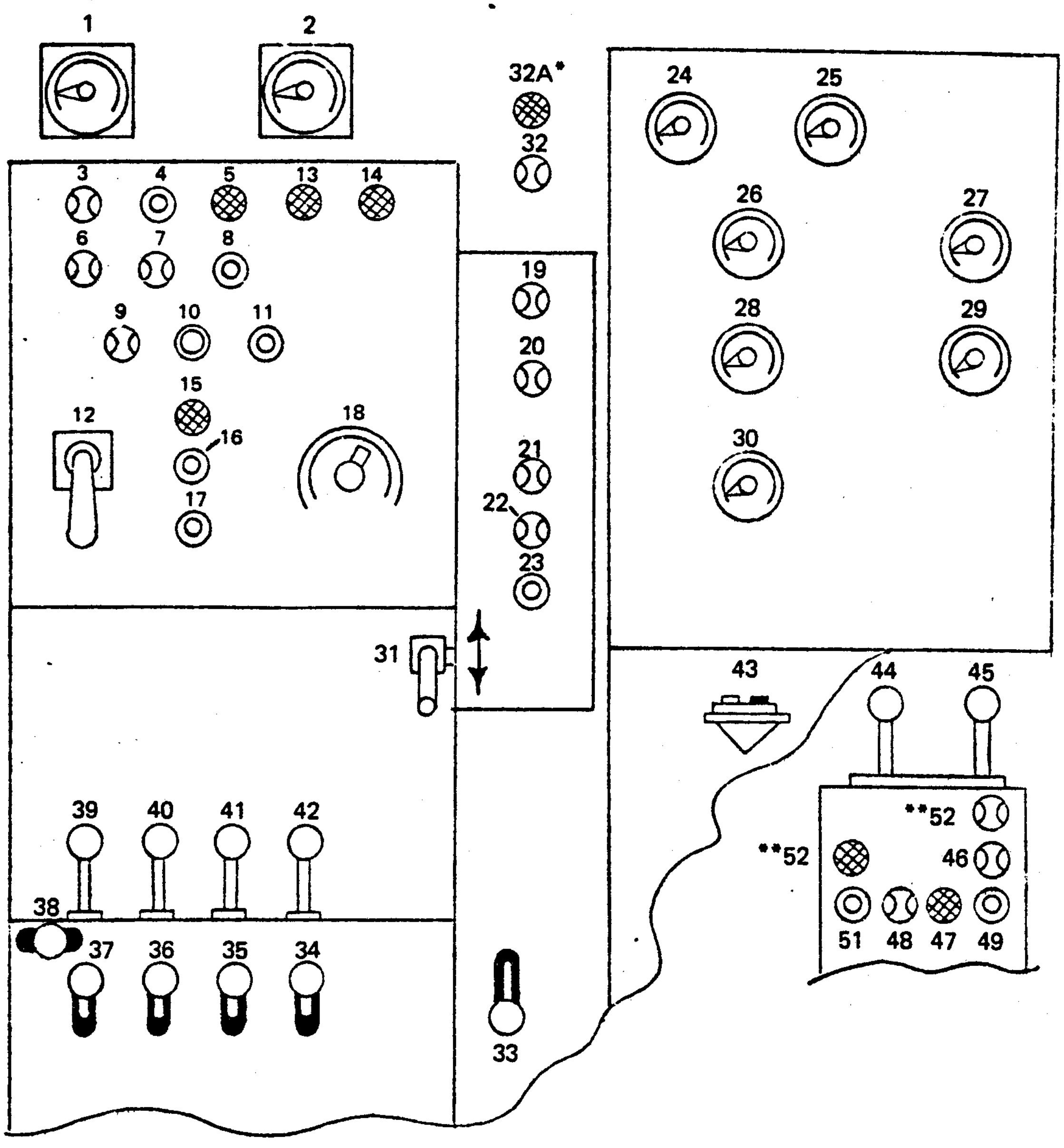
STEP 2 ANGULAR ALIGNMENT - Reposition your dial indicator as shown in Figure 5-8 to check alignment. Once again, rotate the motor hub to check misalignment, loosen the motor mounting bolts and adjust the position until the angular alignment is within tolerance.

STEP 3 PARALLEL OFFSET ALIGNMENT - Clean oil and dirt from the hub faces in preparation for parallel alignment. Place a dial indicator on the compressor hub as shown in Figure 5-9 and rotate the motor hub to check alignment. The vertical offset is adjusted by the addition or removal of motor mounting shims. To correct the horizontal offset, loosen the motor mounting bolts and slide the motor sideways until parallel offset alignment specifications are reached.

NOTE

Do not upset the offset alignment or hub gap when adjusting motor position.

When within the limits specified in Table 1, tighten the motor mounting bolts and recheck the offset and angular alignment. If the vertical angular



*GE Equipment Only.
**Optional

CONTROL PANEL

INSPECTION FORM

REMARKS: ____

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INSPECTED BY: ______________________________ DATE ____________

CORRECTION: ____

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AUTHORIZED BY: ______________________________ DATE ____________

INSPECTION FORM

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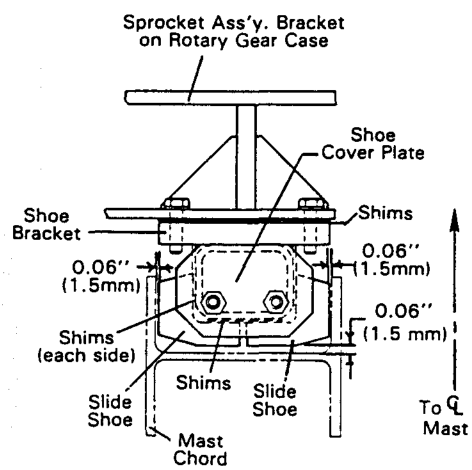
GEARBOX GUIDE SHOES align the rotary gear case (gearbox) in the mast. Two shoe assemblies each side of the gear case seat into the two rear mast chords (H-beams). Each shoe assembly consists of a bracket, two nylatron slide shoes, a cover plate, and shims to adjust the running clearance.

Adjust the running clearance of the gearbox side to side by placing shims between either the gearcase and the bracket or the bracket and the shoes. Adjust the running clearance of the gearbox front to back by placing shims between the bracket and the shoes. Keep 0.06 in. (1.59 mm) clearance between shoe assembly and contact surfaces of mast chord each side. The rotary gear case must travel the full length of the mast without binding.

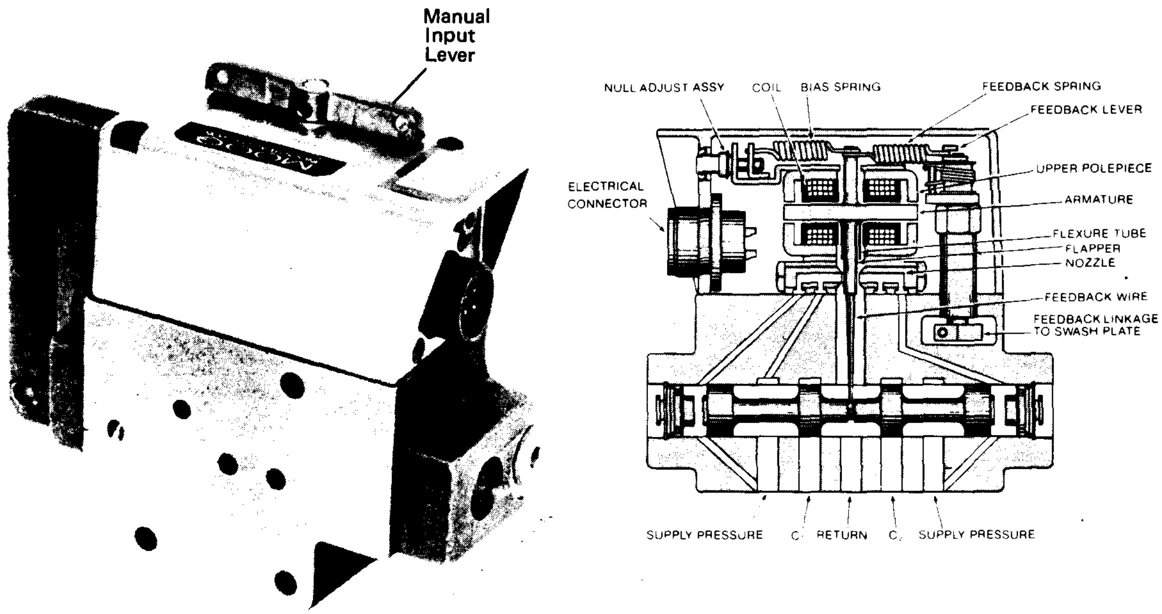
If the slide shoes become damaged or worn, replace both shoes in the assembly. Shoe wear of 0.50 in (12 mm) combined front to back or 0.25 in (6 mm) shoe to chord web necessitates replacement in that slide assembly. Slide shoes in each guide shoe assembly will probably not wear evenly. This uneven wear can be overcome by periodically interchanging the slide shoes, front to back, on the guide shoe bracket when uneven wear is detected. Always replace both shoes at the same time in the assembly.



Store extra, unused shims in Tube of Shoe Bracket.

CONTROLLERS on the MAIN PUMPS are Moog model 63-501 electrohydraulic controllers. The controller on each main pump functions basically the same as a manual pump controller. The control valve provides flow to the swashplate control pistons, and responds to displacement of the swashplate thru a linkage and spring follow-up.

Input to the controller is electrical current in the coils of the torque motor. This current produces a torque on the armature/flapper that is ultimately balanced out by deflection of the feedback spring due to the swashplate movement in the main pump.



MAIN PUMP CONTROLLER
(Moog model 63-501 electrohydraulic controller)

The controller works as follows. When the electrical input current changes, the torque balance at the armature/flapper is upset. This causes the flapper to move towards one nozzle. The fluid flowing to this nozzle thru the upstream orifice is then diverted and moves the spool. As the spool moves, the cantilever spring wire that engages the center of the spool is deflected. This creates a feedback torque on the flapper that causes spool displacement to be proportional to the magnitude of torque unbalance at the input.

When the valve spool is displaced out of the null region, flow is ported to the control pistons in the main pump. These pistons move to change the angle of the swashplate, and so change the displacement of the main pump. As the swashplate moves, the feedback lever pulls on a tension spring connected to the torque motor.

The swashplate in the main pump continues to move until the feedback spring in the controller balances out the torque caused by the electrical signal to the torque motor. At this

MINOR REPAIRS, MAIN PUMP CONTROLLER

The areas of repair indicated herein may be performed without voiding the warranty, provided that the procedures given in this manual are followed. Adjustments and/or repairs other than those specifically set forth in the text of this manual are not recommended to be done by anyone other than personnel qualified to perform them. Contact the DRESSER Service Department for assistance.

The following applies to Moog electrohydraulic controllers, series 63-500.

List of tools and equipment needed to perform these repairs are:

a. blade screwdriver
b. 5/64 inch Allen wrench
c. 9/64 inch Allen wrench
d. 3/32 inch Allen wrench
e. 3/16 inch Allen wrench
f. 7/32 inch Allen wrench
g. 5/16 - 18 x 2 inch long socket head capscrew
h. pin extractor (Moog P/N AT24321)
i. 25-50 watt soldering iron
j. volt-ohm-milliameter
k. tweezers
l. small hammer
m. 9/16 inch open end wrench
n. various torque wrenches to meet reassembly requirements
o. snap-ring pliers, internal type

General servicing recommendations to be observed before working on the main pump controller are to:

a. disconnect the electrical lead to the controller.
b. relieve the hydraulic system of residual pressure.
c. remove the controller from the main pump. (Shutdown the hydraulic system.)
d. thoroughly review this entire article.

ELECTRICAL CHECKOUT

1. Disconnect the electrical cable from the controller.

2. Use an ohmmeter to measure the resistance across the electrical connector pins on the controller. These resistances must be within the specified tolerances. Refer to the electrical prints. Contact DRESSER if assistance is required.

3. If an open circuit (infinite ohms) or a short circuit (zero ohms) exists, proceed as follows:

   a. Remove the two flat head screws (1) using the 5/64 inch Allen wrench.

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