



Technical Manual

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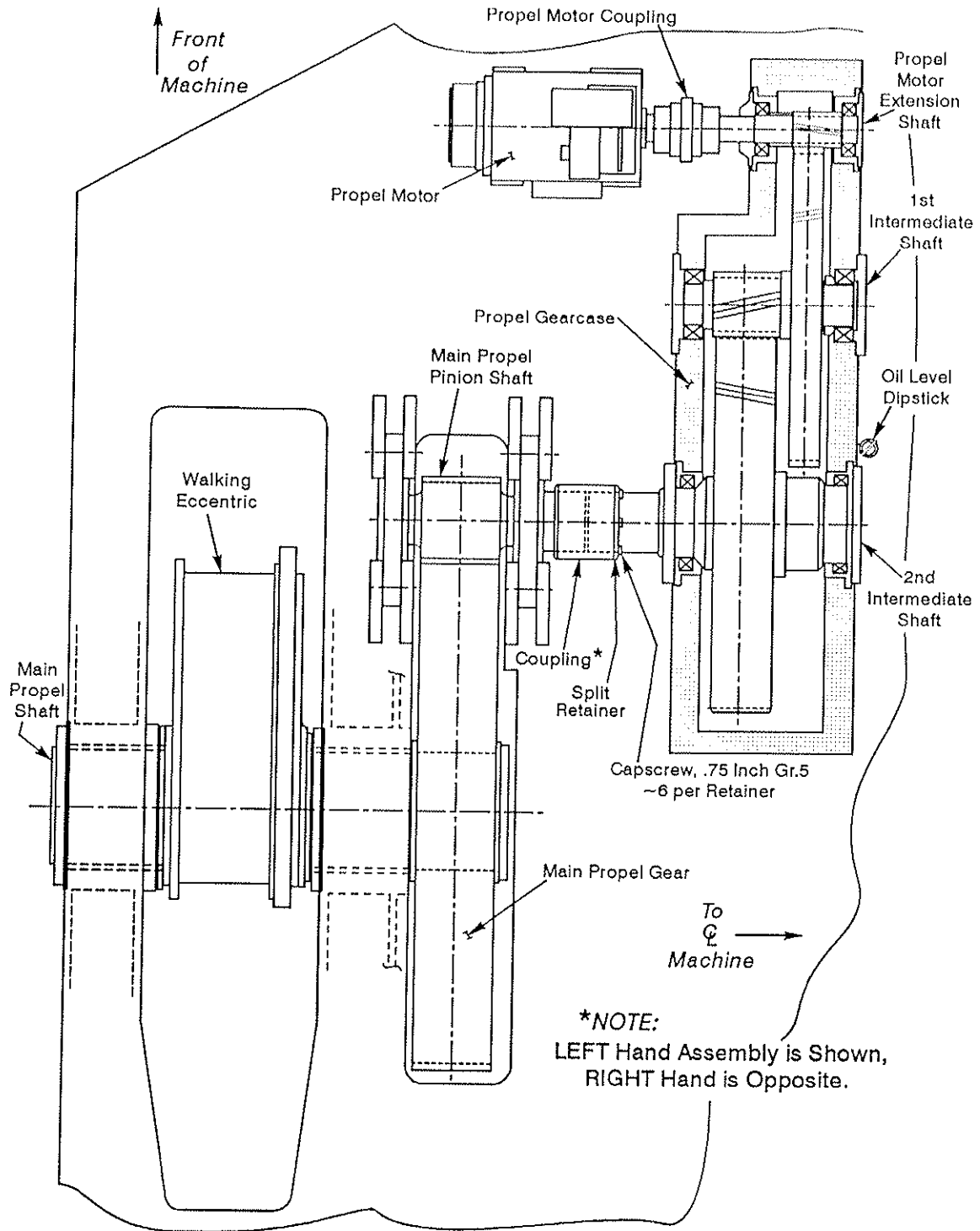


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FIRE PREVENTION

- Always have a "charged" fire extinguisher on hand and know how to use it. Inspect and service the extinguisher as indicated on its instruction plate.
 - *DO NOT* smoke while handling flammables or when near batteries.
 - Inspect all lines, tubes, and hoses carefully. Tighten all connections to the recommended torque. See the Visual Inspection Schedule for the walk around inspection procedure.
 - Loose or damaged lines, tubes, and hoses, which leak, can cause a fire.
 - Make certain that all clamps, guards, and shields are replaced correctly so as to prevent vibration and the rubbing of one part against another which might result in heat build-up during operation.
 - *DO NOT* carry flammable fluids such as gasoline or solvents on board the machine.
 - *DO NOT* over-bend or strike pressurized hose lines. *DO NOT* install bent or damaged lines, tubes, or hoses. Replace them with new immediately.
 - *DO NOT* start the machine or move any of the controls if a warning tag is attached to the controls or the start panel.
 - Keep all cleaning rags properly stored. *DO NOT* discard them into a pile on board.
 - Keep all structural frame compartments, walkways, and work areas clean and free of lubricant residue.
 - *NEVER* weld, burn, or perform service on the machine alone.
 - If a motor or other component is running hot, shutdown the machine until it has cooled and/or the cause eliminated.
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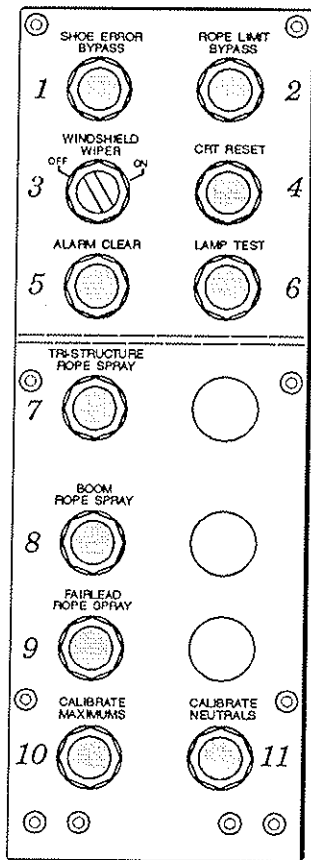


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8200 PROPEL MACHINERY

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The following items are on the LEFT CONTROL PANEL:



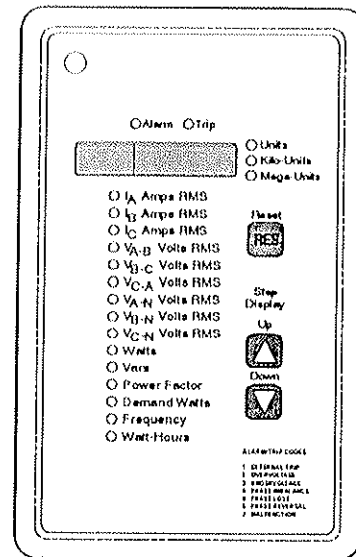
LEFT
CONTROL PANEL

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1. **SHOE ERROR BYPASS** - A red illuminated pushbutton that is used to bypass an error shutdown so that the walking shoes can be re-synchronized. This pushbutton that will flash when the walking shoes are in a non-shutdown position (80° to 360°) and shoe error exceeds 10° . The indicator will be steady when an automatic shutdown occurs. Shutdown will occur if the walking shoes are between 0° and 80° , and the error exceeds 5° .
 2. **ROPE LIMIT BYPASS** - A pushbutton used to back out of a final hoist, drag or tightline limit. A light will flash when in a first stage limit and be steady on a shutdown.
 3. **WINDSHIELD WIPER** - A two-position selector switch for controlling the electrically powered wiper assembly on the front cab window.

MAINTENANCE NOTE ON THE WIPER: Maintain wiper sweep by adjusting the rod between the gear reducer and the wiper pivot. The wiper pressure on the glass is adjusted by the nut on the spring rod located at the top of the wiper arm outside the window.
 4. **CRT RESET** - A black pushbutton to reset the OIT flat panel display.
 5. **ALARM CLEAR** - A pushbutton that will deactivate the audible alarm. Any warning lights will remain lit until the cause for the problem has been corrected.
 6. **LAMP TEST** - A pushbutton that will check all the warning lights on the annunciator panel. (Any burned out lamps should be replaced before operating the machine.)
 7. **TRI-STRUCTURE ROPE SPRAY** - A pushbutton that will activate the tri-structure rope spray system. The system will remain active until the button is released.
 8. **BOOM ROPE SPRAY** - A pushbutton that will activate the boom rope spray system. The system will remain active until the button is released.
 9. **FAIRLEAD ROPE SPRAY** - A pushbutton that will activate the fairlead rope spray system. The system will remain active until the button is released.
 10. **CALIBRATE MAXIMUMS** - A black pushbutton used to calibrate the maximum positions of the hoist and drag controllers. Refer to the Masterswitch Calibration for the proper procedure.
 11. **CALIBRATE NEUTRALS** - A black pushbutton used to calibrate the neutral position of the Hoist and Drag controllers. Refer to the Masterswitch Calibration for the proper procedure.

The following is a description of the controls on the Starting Panel:

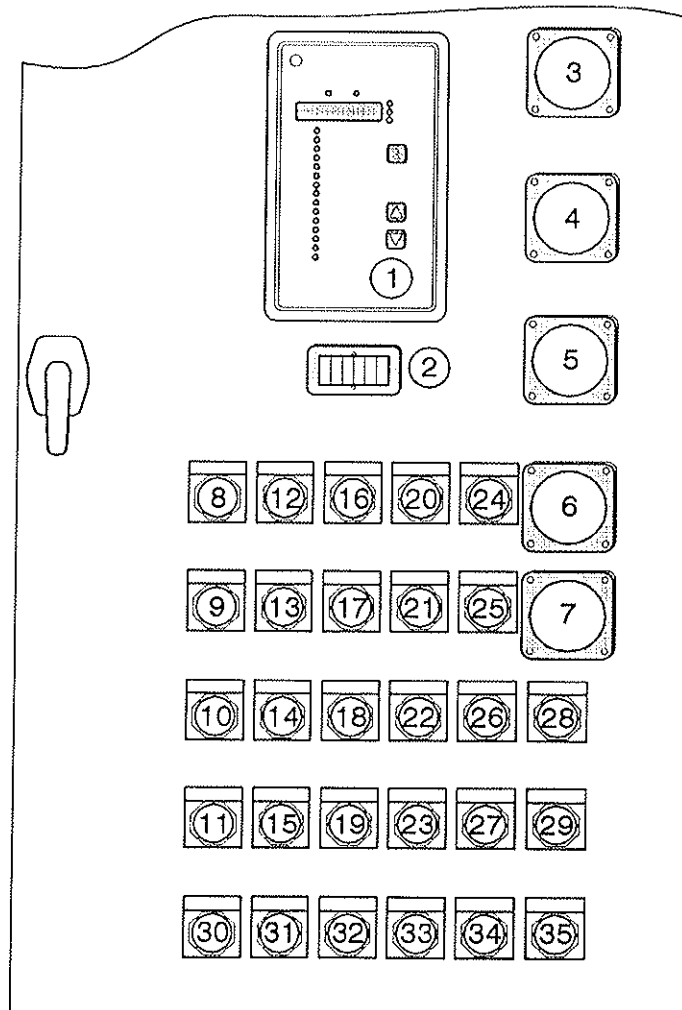
1. **22KV INCOMING POWER** - A High Voltage Protection Relay for the 22KV incoming power to the machine. The relay monitors all values indicated by LED lights on the panel. It also provides trip and /or alarm for the following:
 - a. External trip.
 - b. Overvoltage.
 - c. Under-voltage.
 - d. Phase imbalance.
 - e. Phase loss.
 - f. Phase reversal.
 - g. Malfunction.



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HIGH VOLTAGE PROTECTION RELAY

2. **PROPEL STEP COUNTER** - Records the total number of walking steps.
3. **PROPEL TIME** - A meter which records the time in propel mode.
4. **MG SET TIME** - A meter which records the running time when all 3 MG sets are operating.
5. **LINE EXCITATION TIME** - A meter which records the time when Line Excitation (L.E.) is energized.
6. **ELAPSED TIME METER, AIR COMPRESSOR NO.1** - Records total operating time for Air Compressor No.1.
7. **ELAPSED TIME METER, AIR COMPRESSOR NO.2** - Records total operating time for Air Compressor No.2.



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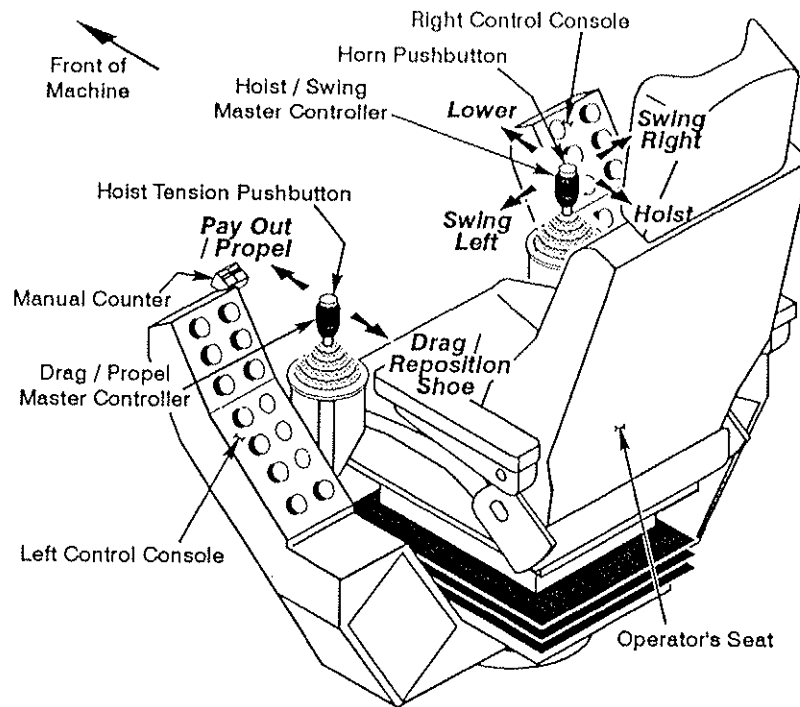
STARTING PANEL

7. Start the Machinery House Filter Fans. Move the 3-position selector switch to the *START* position momentarily and then release it. This will start the bleed duct fans. In approximately 5 seconds the main fans will automatically start and then the selector switch will light up. These fans introduce clean air into the machinery house to cool the dragline operating equipment. They also maintain a positive pressure within the house to prevent dust entry if all the access doors are kept closed.
8. When the above systems have been started and are operating correctly, go to the Operators cab and observe the air pressure indicator in the OIT. This indicator provides a visual reference for the air system pressure and should indicate from 95 to 115 PSI during machine operation.
9. Press the *TEST* button on the ANNUNCIATOR panel to insure that all indicators light up. Any indicator that doesn't light up indicates a burned out lamp or a blown fuse, either of which should be replaced before operating the machine. After releasing the *TEST* button, if any indicators are still lit, it indicates a problem that should be corrected before the machine is operated.
10. Sit into and adjust the operators seat.
11. Check the Hoist, Swing, Drag, and Propel Brake selector switches. If they are not at their *SET* positions, put all of them there now, even if the red light in the switch is on.
12. Check to be sure that the hoist and drag controllers are in their *NEUTRAL* position and that their is no pressure applied to the swing pedals.

IMPORTANT NOTE:

This machine is equipped with an electronic rope limit control system. This system is designed to aid the operator in avoiding serious mechanical damage to the machine due to hoist or drag bucket overtravel or bucket tight-lining. However, the system is not a substitute for careful operating procedures. The rope limit control system should be verified for proper operation on a daily basis. It is **EXTREMELY** important that the system be recalibrated after any rope or bucket rigging changes have been made. Refer to the Electrical Service Manual for this machine for proper procedures.

13. Press the DRAG MODE pushbutton on the Drag Control Stand, then press the EXCITATION START pushbutton on the Hoist Control Stand. This will energize the operating controls.
14. Turn the Hoist, Drag and Swing drag brake selector switches to the *RELEASE* position.



OPERATOR CONTROLS

As the first walking step commences and the shoes move off their *PARK* position, the swing and hoist brakes will automatically set if they had not already been set manually. During extended travel over long distances, it sometimes becomes necessary to alter the direction of travel or reposition the bucket. This can be done without transferring to the *DRAG* mode. Stop the walking shoes in their *PARK* position. Check that the *CLEAR TO SWING* indicator is lit and the drag/propel brakes are set. Release the Hoist and/or Swing brakes then press the *EXCITATION ON* pushbutton. To continue propelling, set the hoist and swing brakes, release the drag/propel brakes and press the *EXCITATION ON* pushbutton.

During walking, if a ground roll develops at the front edge of the tub, "heel" the bucket for a couple of steps. If the tub roll persists, swing the machine 30°-40° to one side and propel one or two steps. This will spread the roll over the ground. Then return to the line of travel desired.

When the machine is walking, both shoes should contact the ground at the same time. If one of the shoes sets down on a high spot, or does not contact the ground, or steps into a soft ground area that will not support it, then the machine will rotate in relation to the tub if the walking step is completed. If this occurs and the operator can, he should stop the step before the machine is lifted and reverse the shoes up to top dead center position. He can then change machine travel direction with the swing motion and walk around the problem ground area.

Remove the plugs on the main supply line, one at a time, starting at those nearest the pump. Pump lube into the system until ALL air bleeds out and lube flows from the opening. Replace the plug and proceed until ALL the lube supply lines are filled.

NOTE: Do not use pipe unions on the boom or the gantry. Due to vibration and movement, hose and hose fittings work best in these areas. Allow slack where any structural movement is anticipated and avoid sharp bends.

The operation of each of the circuits is controlled electronically to start and stop the air powered grease pumps. The injectors cycle during pump operation to meter the lubricant to the lube points. The system monitors operating faults which are indicated on the annunciator panel in the operators cab and the lube control panel.

The Auto Lube system consists of:

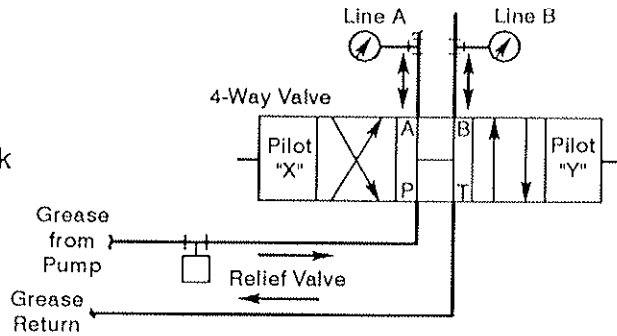
- OGL & MPG lube reservoirs fitted with air operated lube pumps (50:1 & 75:1 ratios).
- Air supply from the compressed air system, with a manual shutoff valve for maintenance purposes and a pressure regulator for limiting operating air pressure to the lube pumps.



CAUTION: The air line shutoff valve must be open during machine operation.

- Solenoid-controlled air valves that direct air to the lube pumps.
- Lincoln type SL-1 or VSL high pressure lubricant injectors.
- Air and hydraulic pressure gauges located at strategic points for visually monitoring system operation.
- High pressure switches in each circuit to signal control to shutdown pumps and terminate cycles at 2500 PSI (17.2 MPa).
- Safety unloaders (non-adjustable) in both pump delivery lines to protect the lube system from excessive pressure.
- Pressure switch to activate the high air pressure warning.
- Electric control panel to control the manual operation of the lube circuits and to help locate faults.
- AC power supply network to control panel.
- Programmable controller located in the Power Control Room to control the cycle and alarm times.

NOTE: The 4-way hydraulic valve operation will be fouled if the operator filter is left in place. Check and remove from new valves at installation.



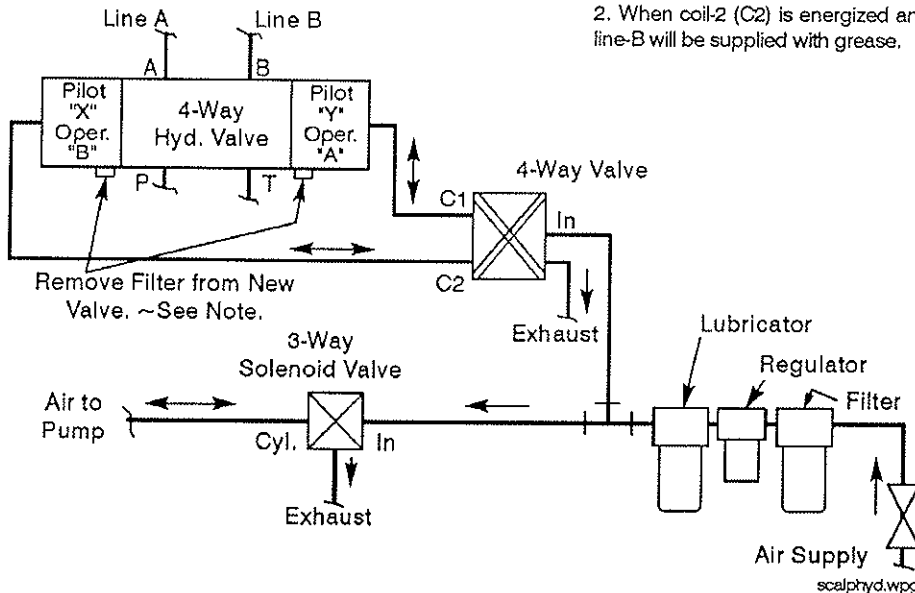
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Schematic ~AUTO LUBE PANEL GREASE

4-Way Valve (2-Sol.)

Functions:

1. When coil-1 (C1) is energized and coil-2 (C2) is de-energized, line-A will be supplied with grease.
2. When coil-2 (C2) is energized and coil-1 (C1) is de-energized, line-B will be supplied with grease.

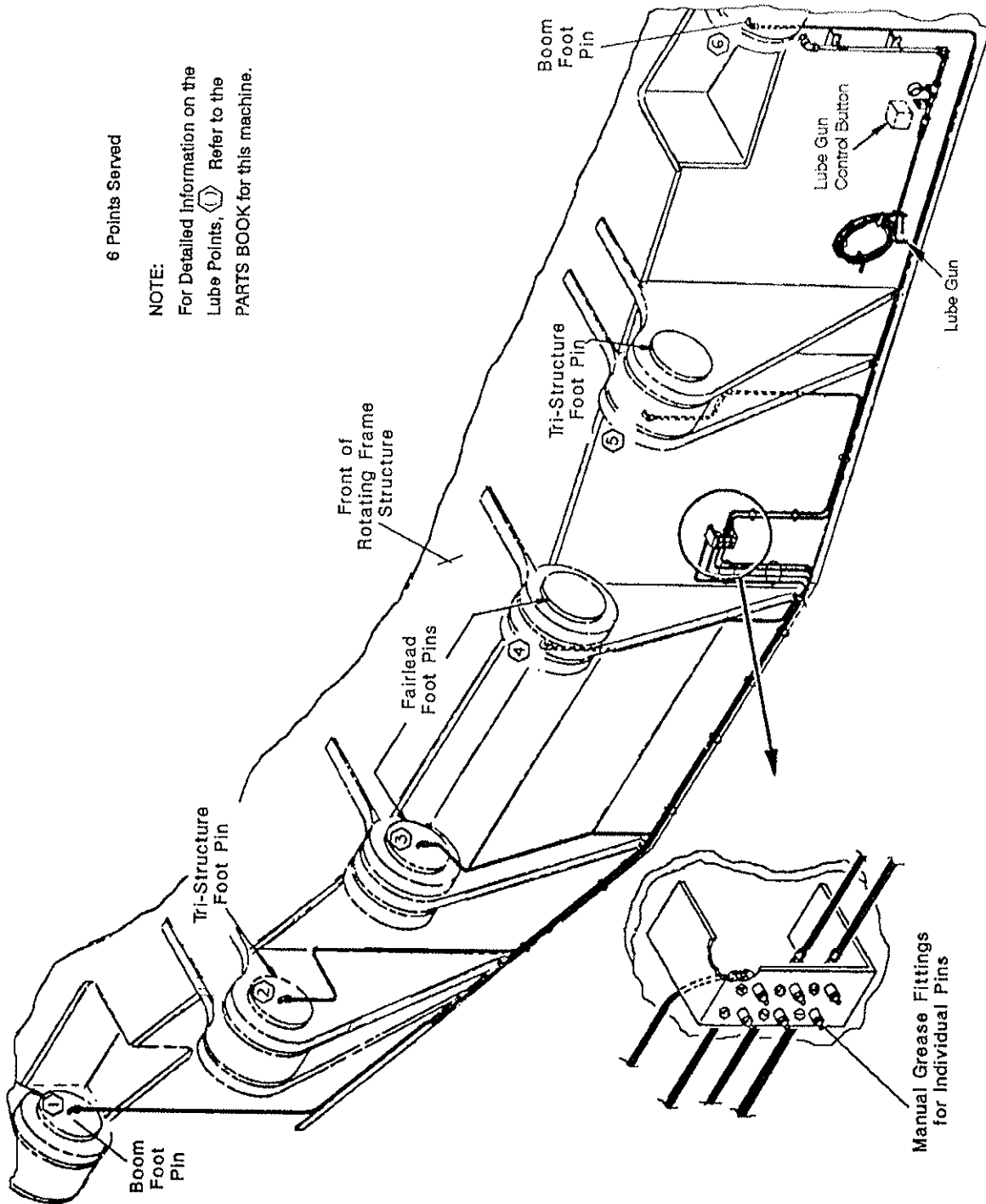


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Schematic ~AUTO LUBE PANEL AIR

6 Points Served

NOTE:
For Detailed Information on the Lube Points, (1) Refer to the PARTS BOOK for this machine.



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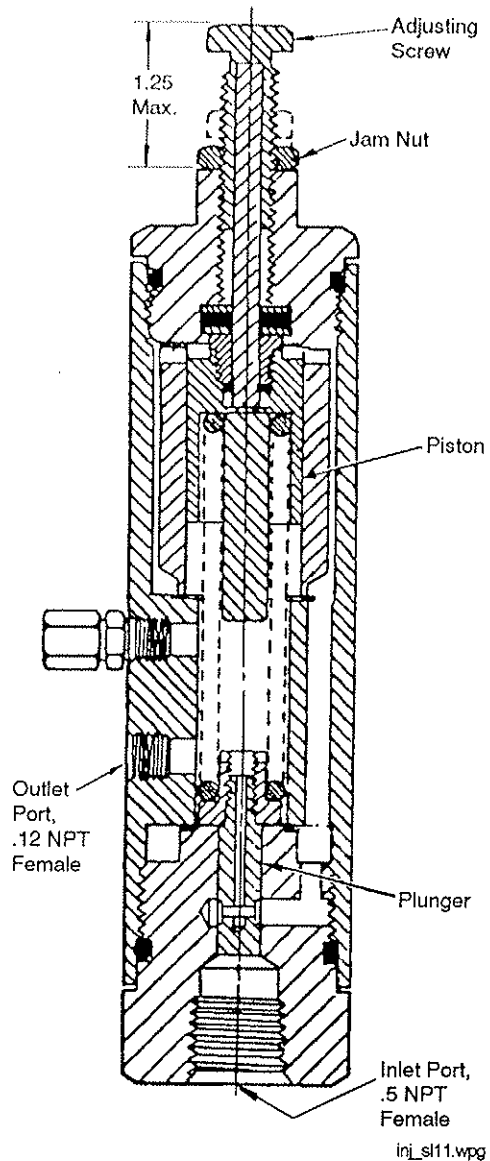
Auto Lube - ROLLERS, PINS and LUBE GUN (MPG)
ROTATING FRAME CONTROL PANEL, Line-B

LINCOLN SL-11 INJECTORS

The SL-11 injectors on this machine dispense OGL to the swing pinions. These pressure operating, spring reset injectors are equipped with dual outlet ports which permit the injectors to be piped in series to increase the lube supplied if required. The SL-11 will expel a maximum of .5 cubic inch of lube each cycle. Although the injector output is adjustable, the system has been designed for the maximum output and adjustment is not recommended.

NOTE:

The operation of the SL-11 injector is the same as the SL-1 injector. Refer to page 3.7.2.



NOTE:

Maximum Operating Pressure:	3500 PSI	Minimum Operating Pressure:	1850 PSI
RECOMMENDED Operating Pressure:	2500 PSI	Maximum Recharge Pressure:	300 PSI

If the piston is jammed, proceed with disassembly. Dismantle distributor by first removing tie-rods. With individual sections on the bench, remove the hex head plugs from both ends of each section. Now taking one section at a time, remove the piston. If it appears to be stuck, try removing it from the other direction. If it is badly jammed, it may be necessary to use a brass rod to tap it out. Now flush the section and piston in a clean suitable solvent until all the lubricant has been cleaned away. Blow out all ports thoroughly and use a small piece of wire to make sure that all passages are clean and open. Next inspect the cylinder bore carefully for scratches, score marks, or other damage. Inspect the piston in the same manner. If either of these parts is damaged, a new section should be installed. If the distributor section and piston both appear in good condition, reassembly as before making certain that the piston slides smoothly but snugly in the cylinder bore. Repeat the operation on each section. Take care, however, not to replace piston in any section except the one from which it was removed. (Early models of the new M and MX Distributors with Check Valves, employed a nylon ball in the circular check valve, located at top center of each Intermediate Section. Under heat or special pressure conditions, these nylon balls, now replaced by steel, would sometimes become deformed causing blockage. Replace if necessary.)

After all sections have been cleaned, blown out, inspected and found to be in good condition, reassemble the distributor assembly by following your sketch. **IMPORTANT** – use the torque settings listed below. Test the operation of the assembly on the bench by pumping lubricant (preferably oil) into the inlet of the distributor with a hand grease gun. If it now functions properly, replace it in the system and again test for proper operation. **REMEMBER – DIRT AND FOREIGN MATERIAL ARE THE WORST ENEMIES OF ANY LUBRICATING SYSTEM.** All servicing should be carried out under the cleanest possible conditions.

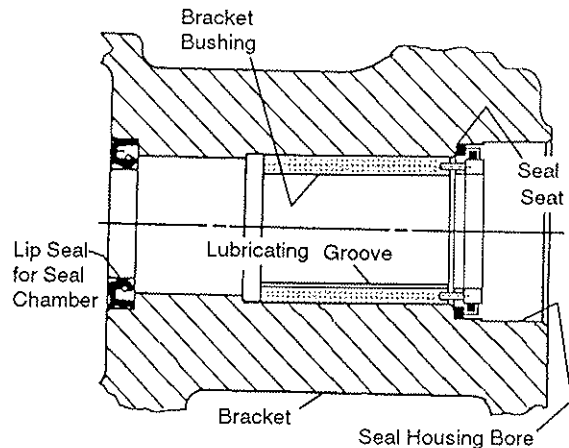
Torque Information (in Foot Pounds)			
	MJ	M-MV	MX
Tie Rod Nuts:	12	20	25
Alternate Outlets:	10	10	24
Check Valves:	10	15	19
End Plugs:	15	15	45

NOTES:

1. Re-stack distributor according to your sketch.
2. Check proper assembly, including gaskets, etc.
3. Draw up assembly to proper torque settings.
4. Test distributor with light oil.



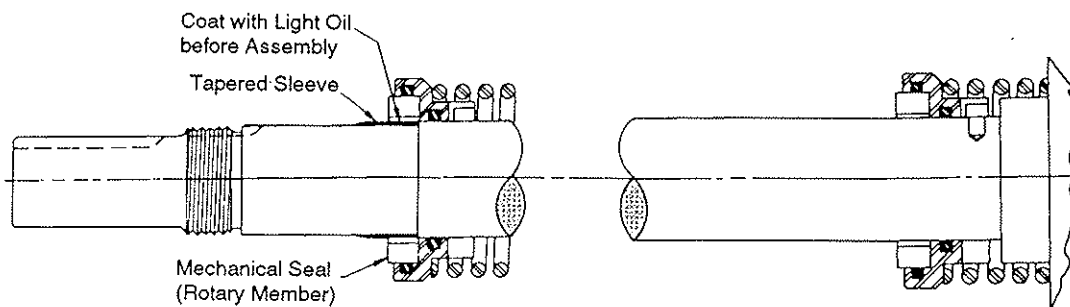
3. Coat the idler pin with non-detergent SAE 30 weight oil and place the idler and bushing on the idler pin in the head.
4. Clean the rotor hub and bracket seal housing bore. Make sure both are free from dirt and grit. Coat the outer diameter of the seal seat and the inner diameter of the seal housing bore with non-detergent SAE 30 weight oil.



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5. Install the seal seat in the seal housing bore. Make sure the drive pins are located in slots in the bracket bushing.
6. Place the tapered installation sleeve on the shaft. The sleeve is furnished with replacement mechanical seals. Coat the rotor shaft, the tapered installation sleeve and the inner diameter of the mechanical seal rotary member with a generous amount of non-detergent SAE 30 weight oil. Petrolatum may be used but grease is not recommended.

7. Place the seal spring on the shaft against the rotor hub.



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8. Slide the rotary member, lapped contact surface facing away from the spring, over the installation sleeve on the shaft until it is against the spring. The slot in the seal must line up with the drive pin shaft.

NOTE: For teflon seals the rotary member and installation sleeve go on together. Do not compress spring.

Flush the sealing faces of both the rotary member and the stationary member with non-detergent SAE 30 weight oil just before installing the rotor and shaft.

9. Coat the rotor shaft with non-detergent SAE 30 weight oil. Start the end of shaft into the bracket bushing and turn from right to left, slowly pushing it in until the ends of the rotor teeth are just below the face of the casing.

GEAR LUBRICANTS ~ HGL (OIL TYPE)

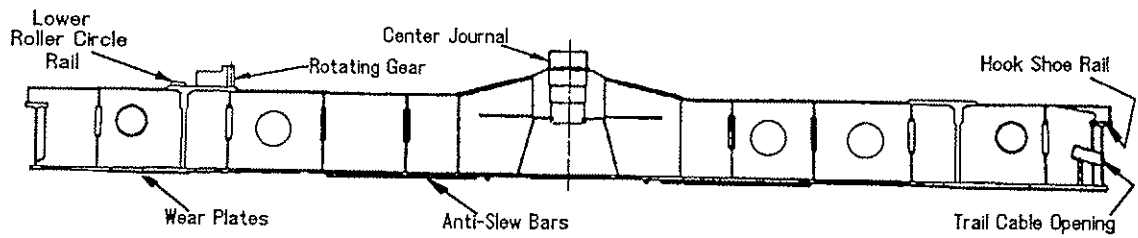
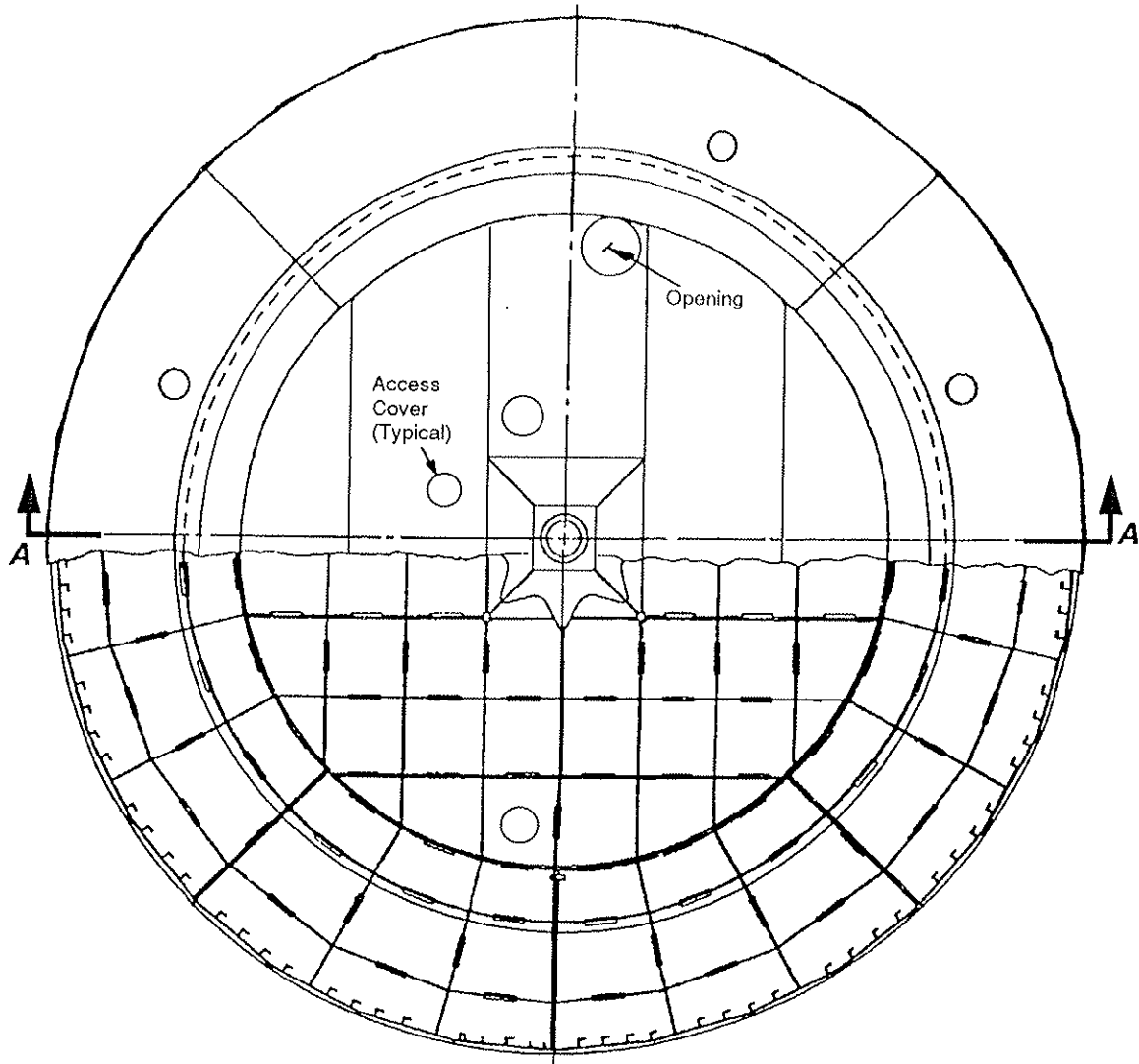
NOTE: Solid additives, such as graphite or molybdenum disulfide, are excluded from use in HGL gear lubricant.

CODE or SYMBOL SET	ASTM or TEST	HGL ARCTIC	HGL MODERATE	HGL HOT
Ambient Temp Range (°F)	—	-40 to +50	+5 to +122	+40 to +150
Ambient Temp Range (°C)	—	-40 to +10	-15 to +50	+4 to +65
Viscosity - CTS at 50°C	—	20 - 31.5	80 - 125	—
Viscosity - CTS at 40°C	—	28 - 49	135 - 220	300 - 350
Viscosity - CTS at -40°C	—	15,000 max.	12.0 at 100°C min.	22.0 at 100°C min.
I.S.O. Visc. Grade	—	32 and 46	150 and 220	320
Pour Point °C max.	D-97	-45	-15	-9
Flash Point °C min.	D-92	160	200	200
Viscosity - SUS at 100°F	—	150 - 230	750 - 1200	1200 - 1700
Viscosity - SUS at 210°F	—	46 - 53	70 - 100	110 min.
Viscosity - SUS at -40°F	—	79,000 max.	—	—
Viscosity Index min.	—	120	90	90
E.P.Timken min. OK-Load	—	55 Lbs.(25 Kg)	55 Lbs.(25 Kg)	55 Lbs.(25 Kg)
Foam Test	D-892	Pass	Pass	Pass
Weld Point Kg. min.	—	220	220	230
FZG Gear Test	—	12	12	12
Rusting	D665B	Pass	Pass	Pass
Oil Sump Temperature (operating oil)	—	-40°F to +122°F -40°C to +50°C	+5°F to +180°F -15°C to +82°C	+40°F to +190°F +4°C to +88°C

NAME OF PART	TYPE	NO. OF POINTS	LOCATION	LUBE SYM.	METHOD & FREQUENCY
Hoist Gear and Pinion	---	8	Drip on	OGL	Automatic
Hoist Motor	Anti-Friction	8	In motor end bell	EMG	By hand (see elect. sect.)

DRAG MACHINERY

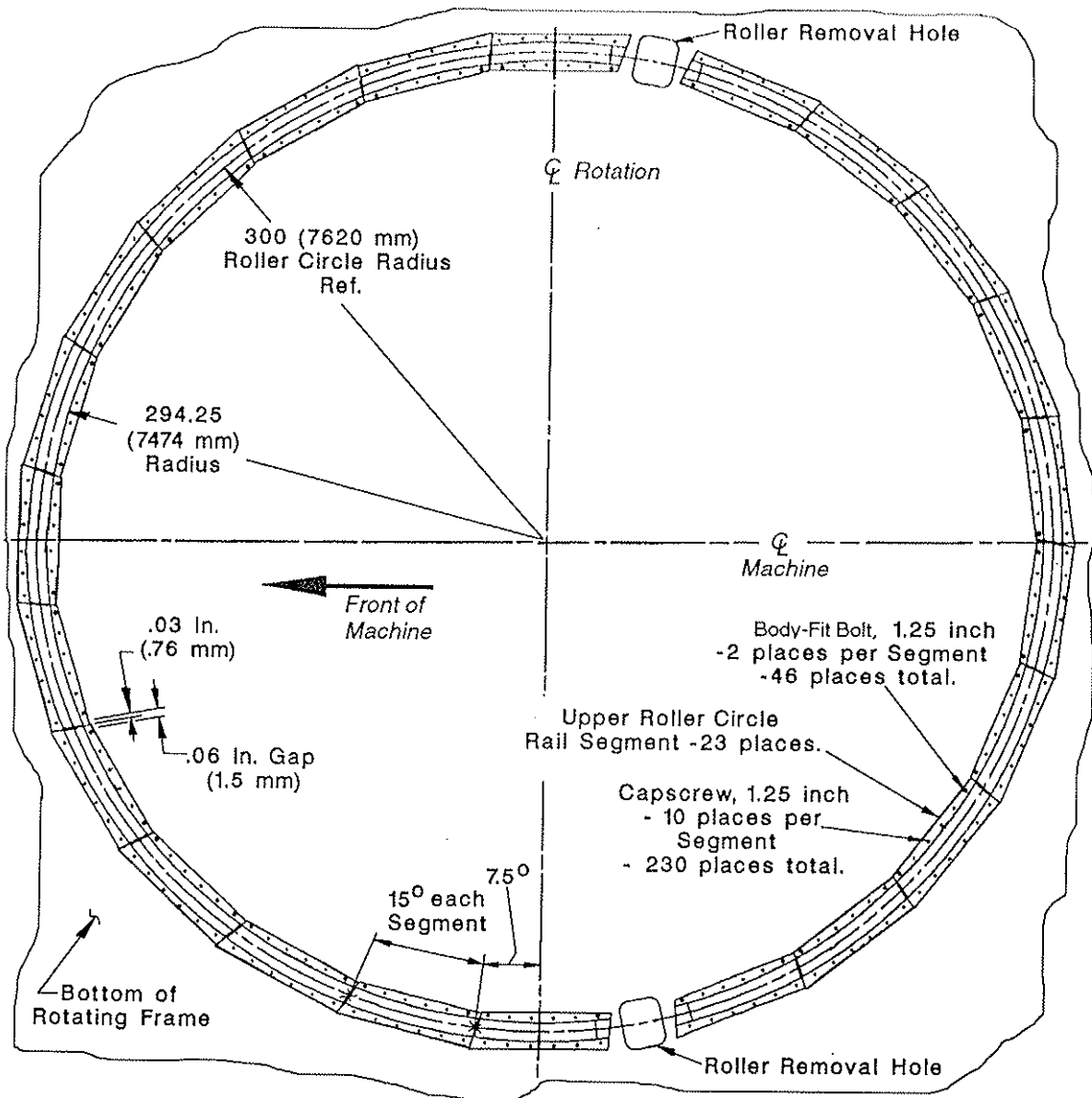
Drag Drum Support Bearing	Anti-Friction	2	In bearing housing	MPG	Automatic
Intermediate Drag Shaft (in case)	Anti-Friction	---	From gearcase, fill at air filter	GL	74 Gal. (280 liters) Each case. Check weekly at dipstick. Keep full.
Intermediate Drag Shaft (inboard)	Anti-Friction	3	In bearing retainer.	MPG	Automatic
Drag Motor Extension Shaft	Anti-Friction	---	From gearcase	GL	---
Drag Motor Coupling	---	4	Plug in coupling flange.	MPG	By hand - 3 months, keep filled.
Drag Gear and Pinions	---	8	Drip on	OGL	Automatic
Drag Motor	Anti-Friction	8	In motor end bell.	EMG	By hand (see elect. sect.)



Section A-A
TUB ASSEMBLY (BASE FRAME)

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ROLLER CIRCLE RAIL REPLACEMENT ~UPPER



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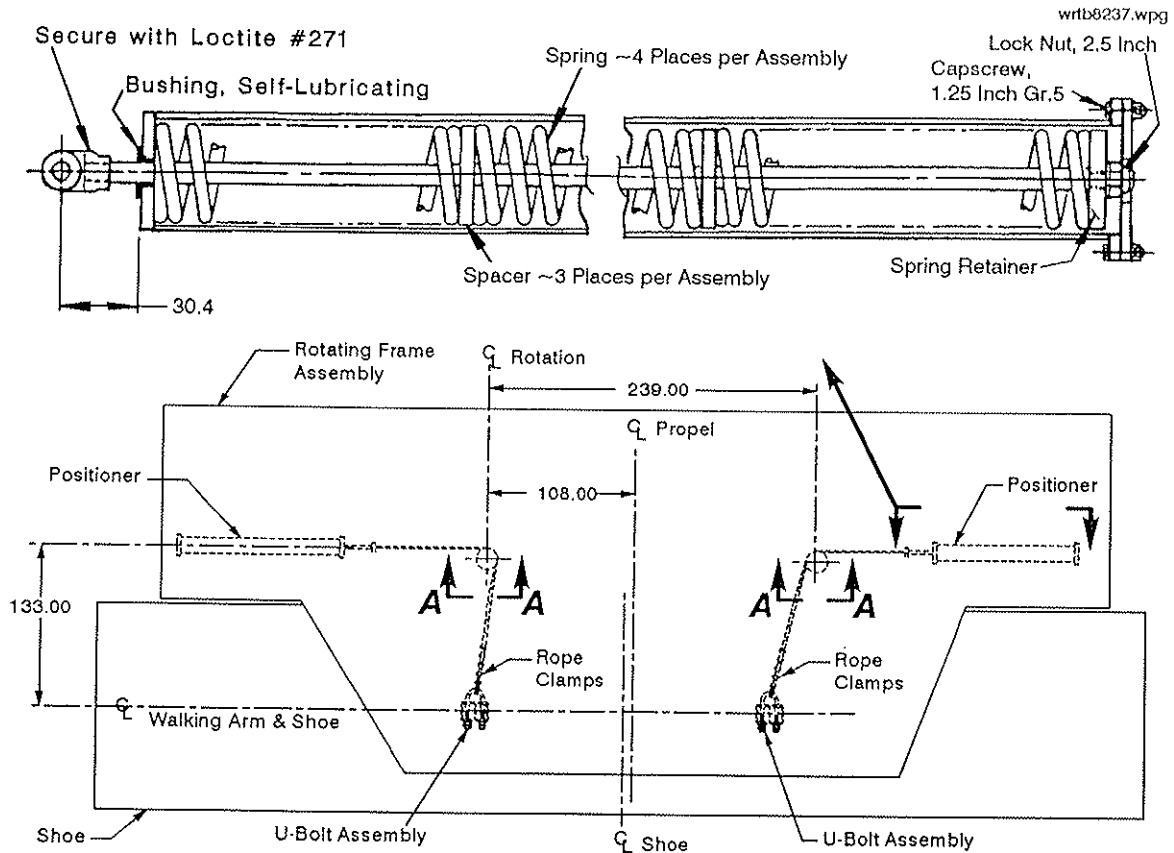
UPPER ROLLER CIRCLE RAIL SEGMENTS
(View is Looking UP at the Bottom of the Rotating Frame)

The upper rails are composed of 23 segments with a gap at each side of the machine for access to the roller circle rollers. Several rails can be replaced as follows:

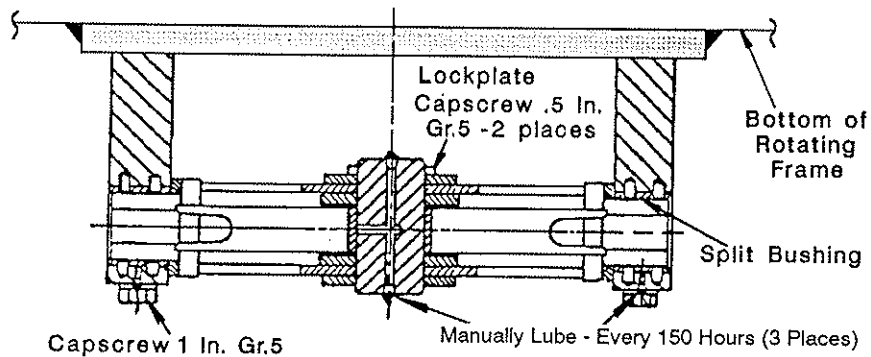
1. Park the machine in a level, dry work area. Set the bucket on the ground and set all the brakes.
2. Remove one of the roller circle segments ~8 roller assemblies plus the inner and outer cage bars.

WALKING SHOE RETURN MECHANISM

When propelling and in the *PARKED* position, the shoe return mechanism aligns the shoes parallel to the rotating frame by using 2 spring-loaded wire ropes at each shoe. The spring-loaded positioners are welded to the underside of the rotating frame. The ropes are reeved through a swivel mounted deflector sheave and then attached to an adjustable U-Bolt on the walking shoe.



SHOE RETURN MECHANISM with POSITIONERS

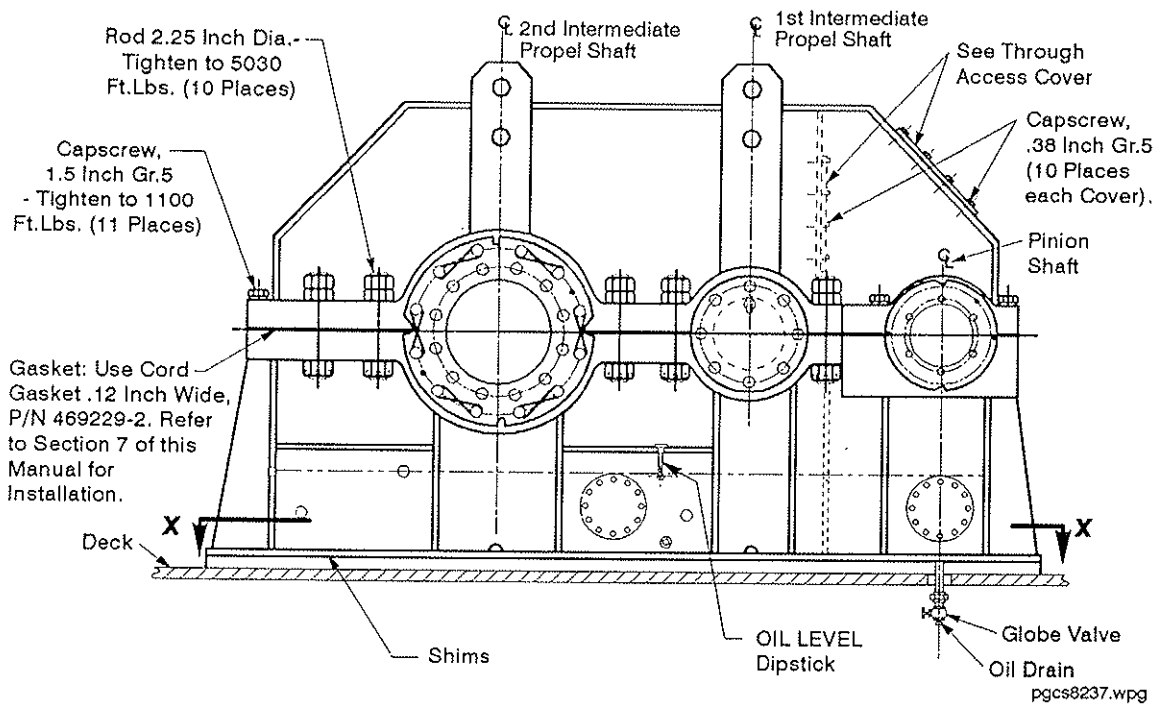


Section A-A ~Swivel Mounted Deflector Sheave

3. Grease the bearings with multi-purpose grease at assembly.
4. Assemble the pinion shaft assembly to the rotating frame mounting brackets. Secure each bearing housing with the 2 - 6.5 inch diameter pins.
5. Coat the splines with OGL, slide the coupling into position and install the split retainers.

PROPEL GEARCASE

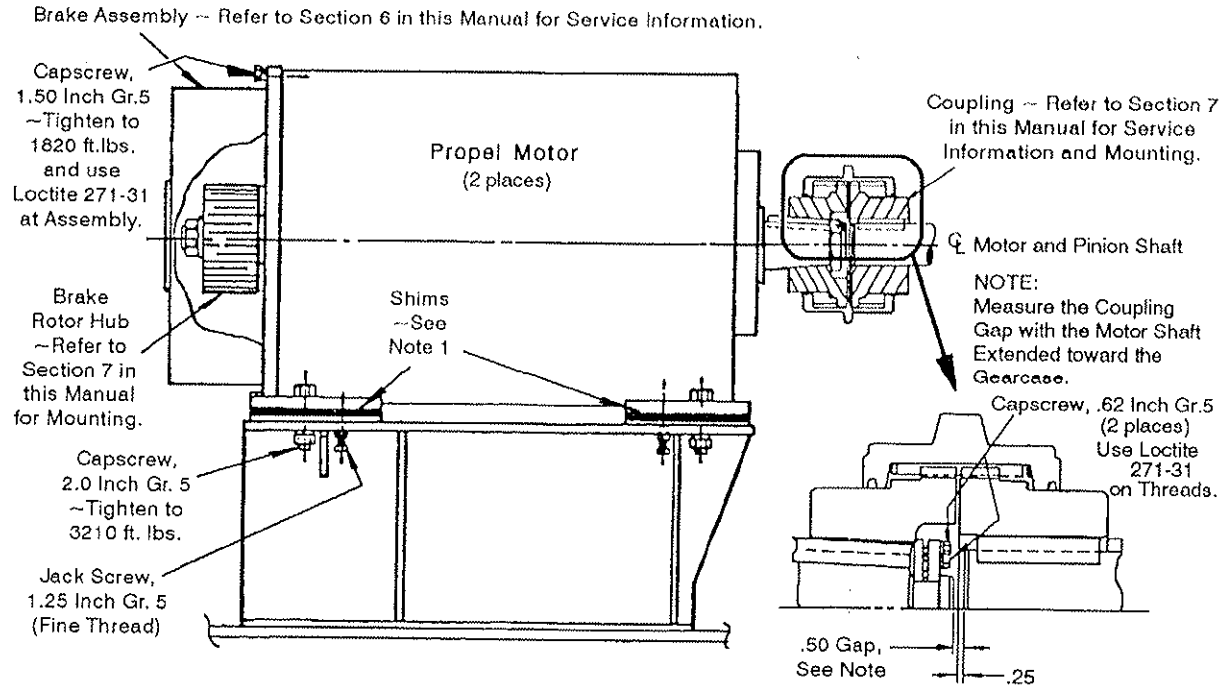
The Propel Gearcases are oil-tight and enclose the first 3 shaft assemblies of the propel gear train. These shaft assemblies are: the propel motor extension shaft, the 1st intermediate propel shaft and the 2nd intermediate propel shaft.



Section B-B

NOTE: Check the gear tooth wear pattern monthly. Adjust the pinion or 2nd reduction shafts as required.

PROPEL MOTOR ASSEMBLY



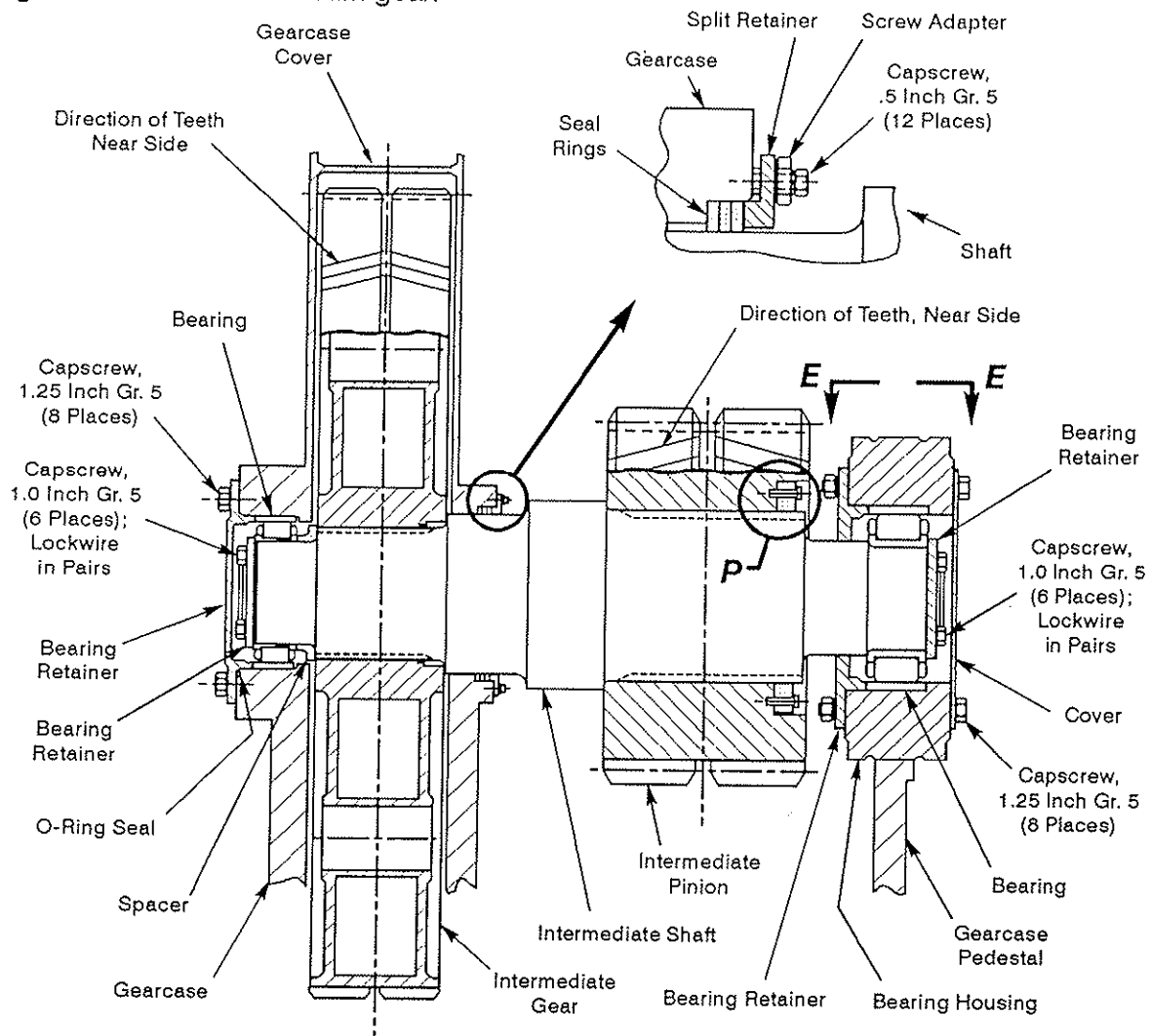
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NOTE #1: Align the motor coupling per the instructions in Section 6 of this manual. After installing the shims, tighten the 2 inch mounting bolts and recheck the coupling alignment.

INTERMEDIATE SHAFT ASSEMBLY

The Intermediate Shaft assembly drives the drum gear. Each assembly consists of a large double-helical gear, a double-helical pinion, a shaft, bearings and a bearing housing.

The intermediate gear and pinion are splined to the intermediate shaft, which is supported by 2 single-row roller bearings. The bearing on the drive gear end of the shaft is mounted in the boss of the gearcase, while the other bearing is mounted in a housing which is pinned to the gearcase structure. The drive gear is inside the oil-tight gearcase. The case is sealed with a split seal between the gear and the pinion. The intermediate pinion is a guarded open gear which drives the drum gear.



INTERMEDIATE SHAFT ASSEMBLY ~Section View

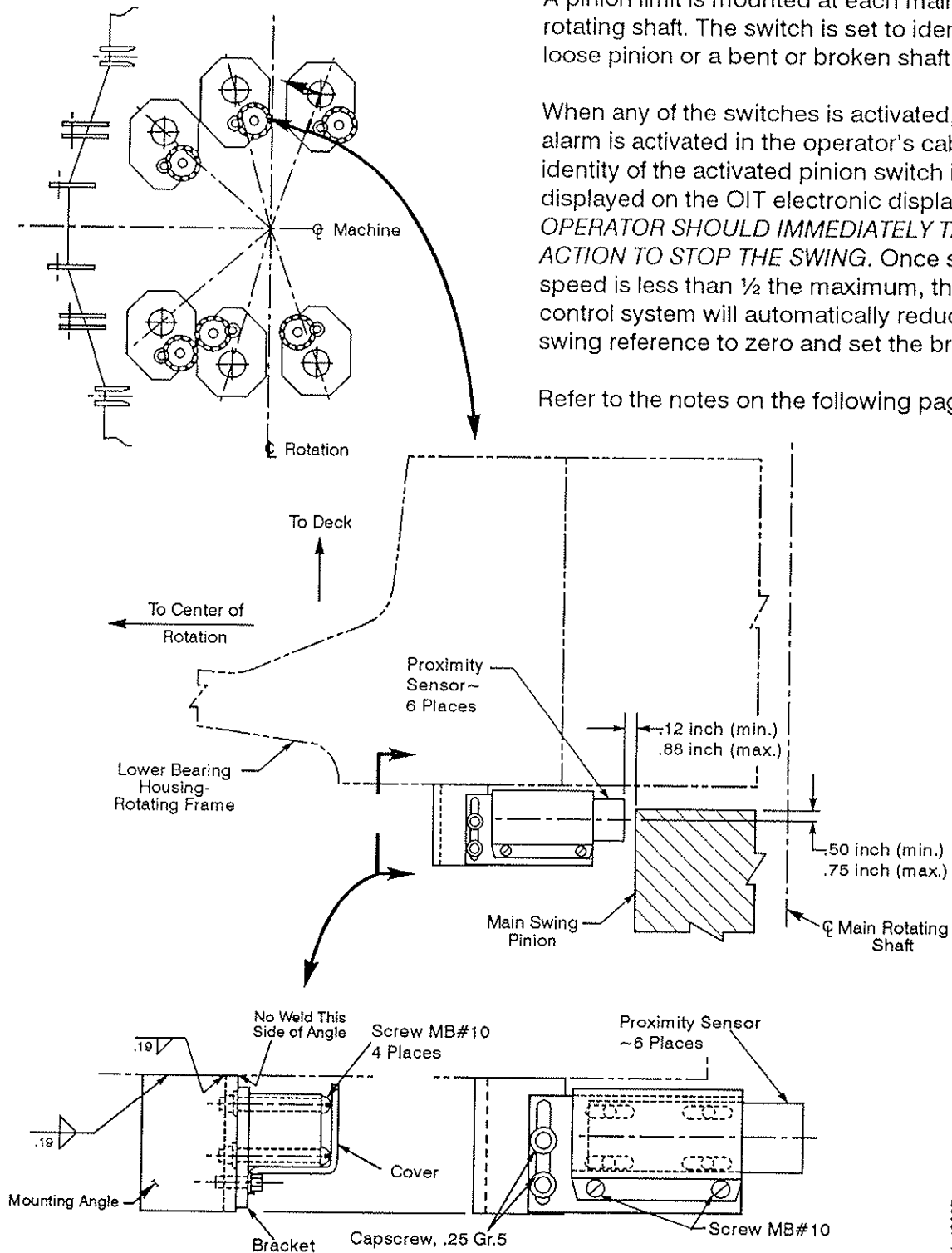
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MAIN ROTATING SHAFT PINION LIMIT

A pinion limit is mounted at each main rotating shaft. The switch is set to identify a loose pinion or a bent or broken shaft.

When any of the switches is activated, an alarm is activated in the operator's cab. The identity of the activated pinion switch is displayed on the OIT electronic display. *THE OPERATOR SHOULD IMMEDIATELY TAKE ACTION TO STOP THE SWING.* Once swing speed is less than 1/2 the maximum, the control system will automatically reduce swing reference to zero and set the brakes.

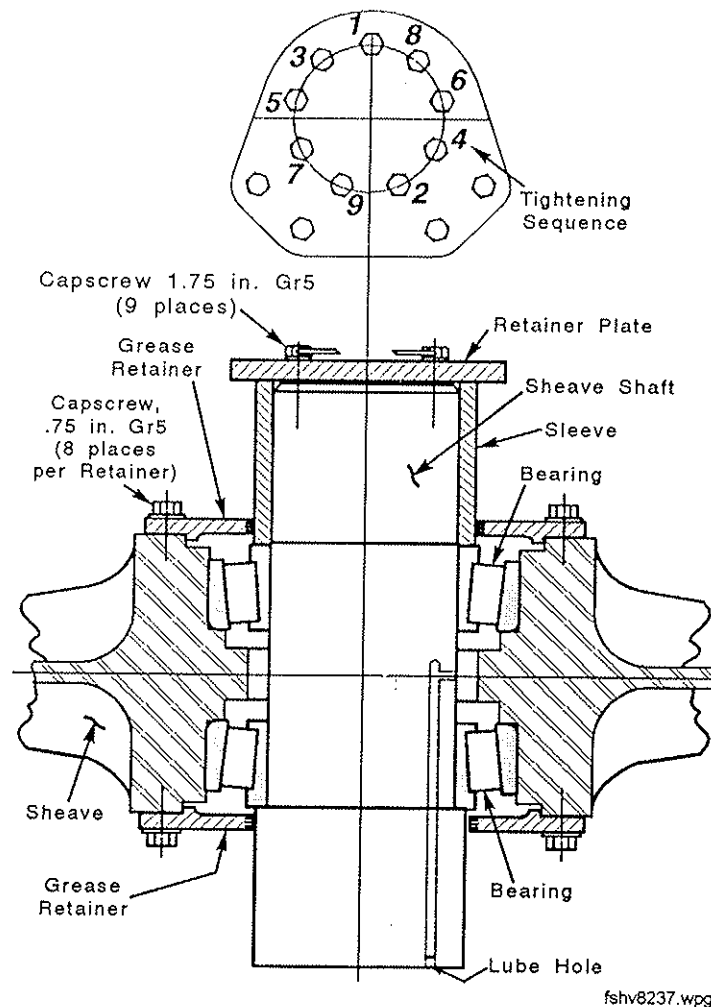
Refer to the notes on the following page.



9. Remove the lower bearing blocks, end retainers, sleeve, grease retainers and bearings from the sheave.
10. Clean and thoroughly inspect all parts. Replace/repair any damaged or worn parts before reassembly. *DO NOT INTERMIX PARTS BETWEEN THE BEARING ASSEMBLIES.* Match mark them in a non-destructive manner before separating them.

LOWER FAIRLEAD SHEAVE BEARING INSTALLATION

NOTE: Installation setup of the bearing preload is done best in a shop environment.



1. Set the shaft in a horizontal position. Assemble the retainer and bearing cone at the large end of the shaft. Do not mix bearing parts. Coat the bearings with oil.
2. Set the sheave with bearing cups in place over the shaft and install the remaining bearing cone, retainer, sleeve and retainer plate.

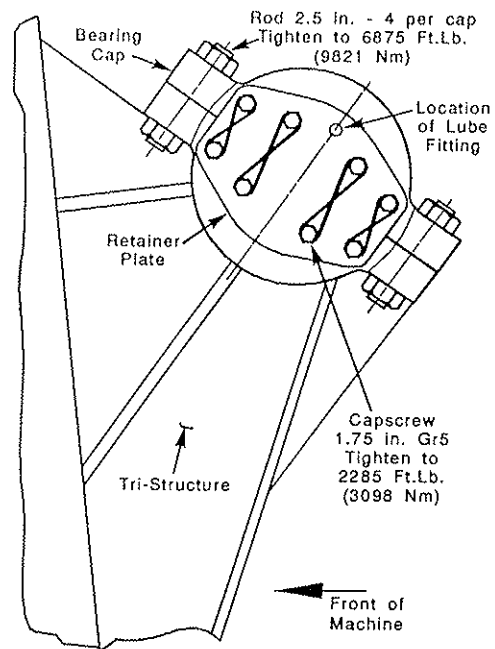
HOIST ROPE DEFLECTING SHEAVE REMOVAL

1. Park the machine in a safe, level work area. Allow room for a service crane to remove the sheave assembly.
2. Slacken the hoist rope until it can be lifted out of the sheave groove. Place it to one side to allow access to the sheave assembly. Protect the rope where it contacts any structures.



CAUTION: ALWAYS USE A SAFETY HARNESS WHEN WORKING ON THE FRONT END SUPER-STRUCTURES TO AVOID FALLING.

3. Attach a sling to the sheave and tighten to remove the slack.
4. Remove the four 1.75 inch capscrews which secure the retainer plate to the Tri-Structure. Loosen the four 1.75 inch capscrews which secure the retainer plate to the shaft.
5. Remove the four 2.5 inch rods holding each bearing cap in place and remove the bearing caps. Match mark the caps to insure correct re-assembly.
6. Lift the sheave clear of the Tri-Structure, set it on cribbing and remove the retainer, sleeve, shaft and bearings. Clean and inspect all parts.

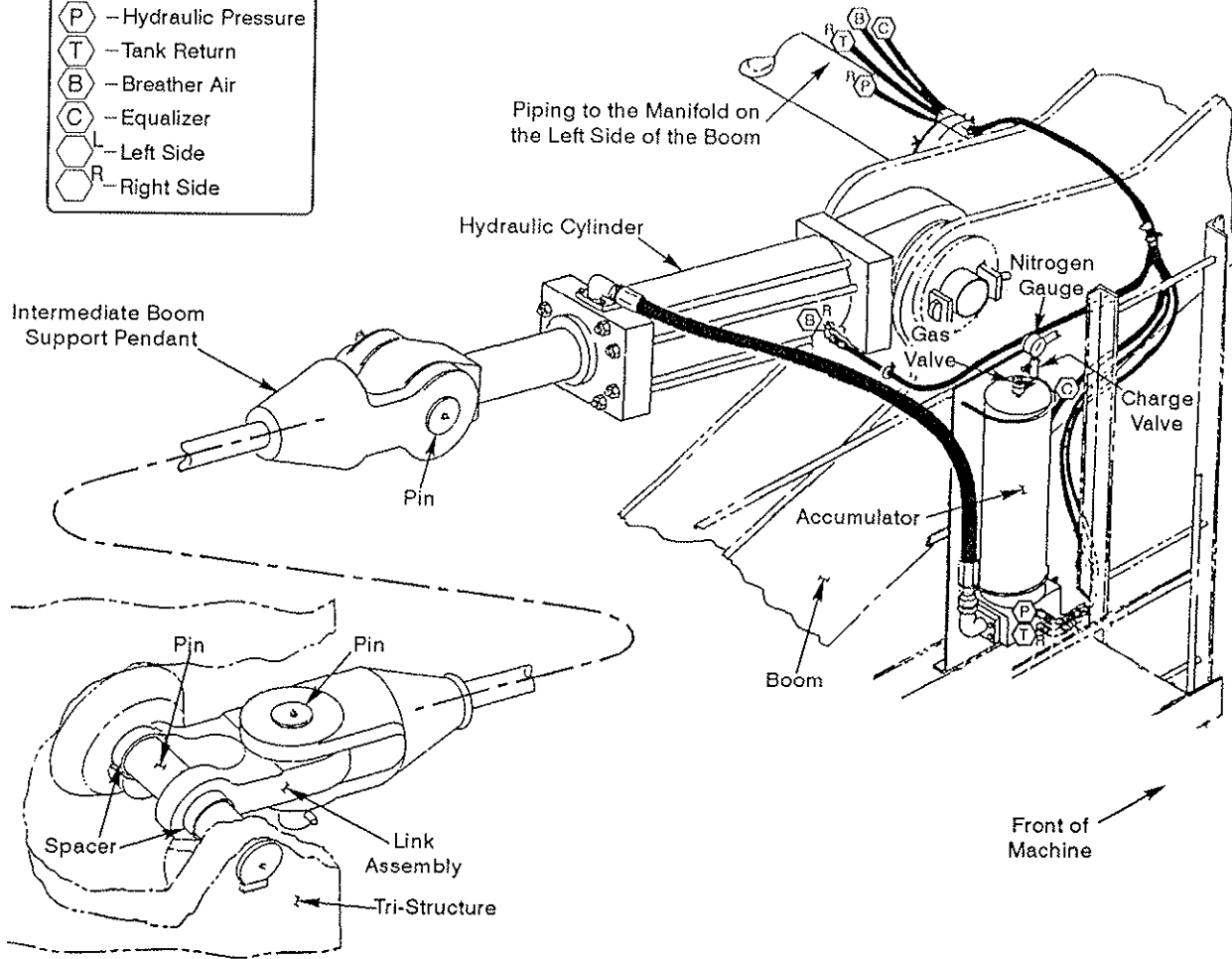


t-end834.wpg

IMPORTANT: The boom must be in its operating position and the intermediate pendants connected before energizing the hydraulic system.

LEGEND:

A	- Air Supply
P	- Hydraulic Pressure
T	- Tank Return
B	- Breather Air
C	- Equalizer
L	- Left Side
R	- Right Side



ibsb8237.wpg

INTERMEDIATE BOOM SUPPORT ~Right Side

3. Disassemble the air line and components from the pump, including the pilot line for the cycling valve.
4. Have an electrician disconnect the wiring to the low pressure switch.
5. Remove the low pressure switch from the outlet line and then the outlet line from the pump.

IMPORTANT: Cap and plug all air and hydraulic lines and ports to guard against contaminants entering either system. Contain any oil spills and dispose of the lost oil in compliance with local codes.

6. Unscrew the pump from the top of the reservoir and install a new or rebuilt pump.
7. Reverse this procedure to reassemble the air and hydraulic lines to the replacement pump. Be sure to purge any air from the hydraulic line between the pump and the pressure line filter.
8. Adjust the air regulator setting upwards in small increments as needed to obtain the hydraulic system operating pressure of 970 PSI, then reduce the air pressure setting 25 PSI below this value for machine operation. The air operated pump can be rebuilt and reused. To order any seal kits and/or replacement parts needed, refer to the parts book for this machine.

CYLINDER ASSEMBLY

There are 2 hydraulic cylinders used in the intermediate suspension on this machine. The cylinders connect the intermediate boom support pendants and the top boom chords. Each cylinder is a special JIC heavy duty series cylinder.

Monitor the head end port on each cylinder for evidence of oil leaking past the piston seals. Excessive leakage indicates the seals need to be replaced. Remove the faulty cylinder assembly from the boom for repair or rebuild and replace it with a spare. Have a qualified hydraulic shop do the work. Marion can perform the repair or rebuild for you. Obtain a quote from our Parts Department. Our Customer Service Department will furnish the test data for this assembly upon request.

REMOVAL and INSTALLATION of I.B.S. PENDANTS and CYLINDERS

The Intermediate Suspension Pendants should be replaced in sets, the cylinders can be replaced individually.

1. Set the bucket and rigging on the ground and shut down the machine.

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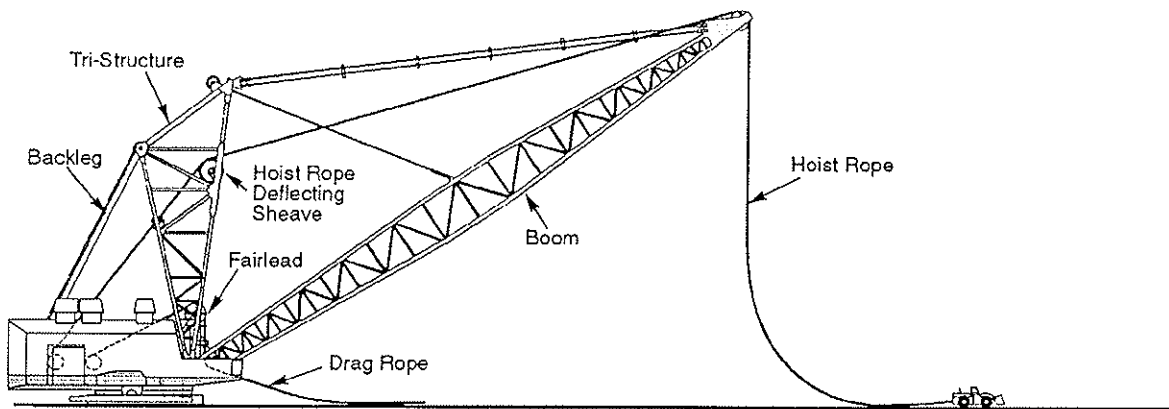
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Dead End Anchor: The ropes are anchored at center of the drum with 6 rope clamps for each rope. Thread the rope through the 6 clamps and allow at least 16 inches of rope to extend past the last clamp. Keep the active length of ropes matched in pairs. Reeve at least 2 dead wraps onto the drum.

CHANGING the HOIST ROPE(S)

To change the hoist ropes:

1. Block the boom point trunnion to prevent rotation within the boom.
2. Disconnect the ropes from the bucket rigging.
3. Disconnect the fouled rope limit and insert a spacer between the switch and plunger to place the switch in its normal position.
4. Attach the ropes to a truck or dozer.
5. *CAUTIOUSLY* pull the ropes away from the machine until they are completely unwound from the drum. Use care to keep the ropes from the boom point sheave(s) to the ground as perpendicular as possible.
6. Push and hold the rope limit bypass to completely unspool the drum.



CHANGING the HOIST and DRAG ROPES

7. Reeve a winch rope and attach it to one hoist rope at the drum.
8. Remove the hoist rope from the drum clamps.
9. Operate the winch and continue to pull the rope until it is removed from the machine.
10. Attach the winch rope to the new hoist rope. Pull it into place and attach it to the hoist drum.

Section 5

Compressed Air Systems

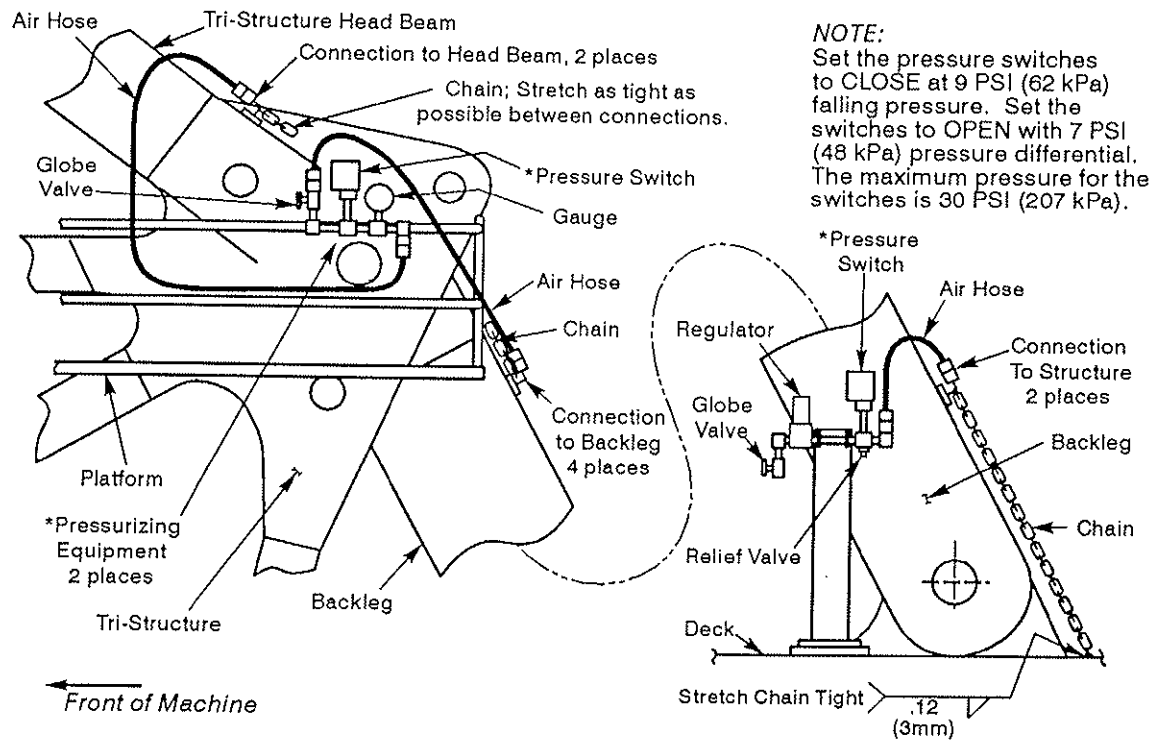
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When LOSS of AIR OCCURS

Proceed as follows:

1. Reset the air pressure.
2. Check all charging and monitoring hardware for leaks.
3. Check all weld seams over the entire weldment for air leaks.
4. Make any necessary repairs.
5. Repeat the charging procedure.



Schematic ~TRI-STRUCTURE PRESSURIZATION

SWING BRAKE ~ CENTERING the DISC

After the swing brake has been assembled to the swing motor, the rotor disc must be centered between the friction discs so it will not rub when released during operation. Check this running clearance once per operating week and readjust it when required.

1. Remove the outer shield and lifter guard from the brake unit.

NOTE: Only two capscrews hold the lifter guard to the end plate. Do Not remove the other 4 capscrews from the end plate during this procedure.

2. Remove the top hex jam nut from the centering plug extending through the lifter housing.

3. Release the brake, using the manual override on the air control valve.
MAKE SURE THE MACHINE CANNOT ROTATE!



DANGER: STAY CLEAR OF THE SPRING LOADED BRAKE ASSEMBLY WHEN ACTUATING IT FOR TEST.

4. Hold the bottom jam nut on the centering plug with a wrench and turn the centering plug to obtain equal running clearance between the rotor disc and the two friction discs.

5. When the running clearance is equal on each side of the rotor disc, install the top hex jam nut to the centering plug and tighten.

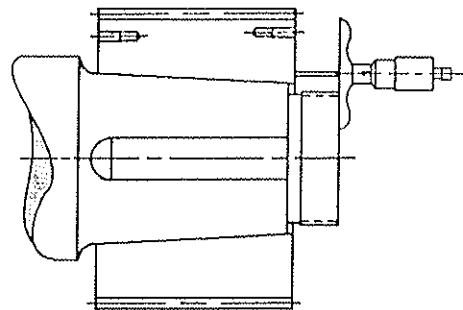
6. Reinstall the outer shield and lifter guard.



DANGER: BE SURE TO RESET THE MANUAL OVERRIDE ON THE AIR CONTROL VALVE TO NORMAL OPERATING MODE AFTER CENTERING THE DISCS ON THE SWING BRAKES. Failure to do so could result in major machine damage and possibly personal injury or death.

ROTOR HUB SUB-ASSEMBLY and MOUNTING

1. Attach the front plate (It.#93) to the motor side of the gear (It.#22) with four hex head screws (It.#99) and lockwashers (It.#100), noting the orientation of the keyway slots and the step in the plate. Tighten the screws to 44 Ft.Lbs, dry.
2. Ensure that the motor shaft is clean and free of nicks or burrs and that the key fits properly in the shaft and gear. Tap the key into the shaft keyway and position the hub on the shaft to check for binding of the key. Correct if necessary.
3. Mount the hub cold by placing it on the shaft and snapping it in position by hand. Measure the cold position of the hub, using a micrometer depth gauge, as on Figure 3. Mark the position of the depth gauge, so that measurements can be taken from the same position after the hub has been mounted.
4. Remove the hub from the shaft and heat it in an oven to a temperature approximately 110°F above that of the temperature of the shaft. For example if the shaft temperature is 70°F, heat the hub to a stable temperature of approximately 180°F for mounting.



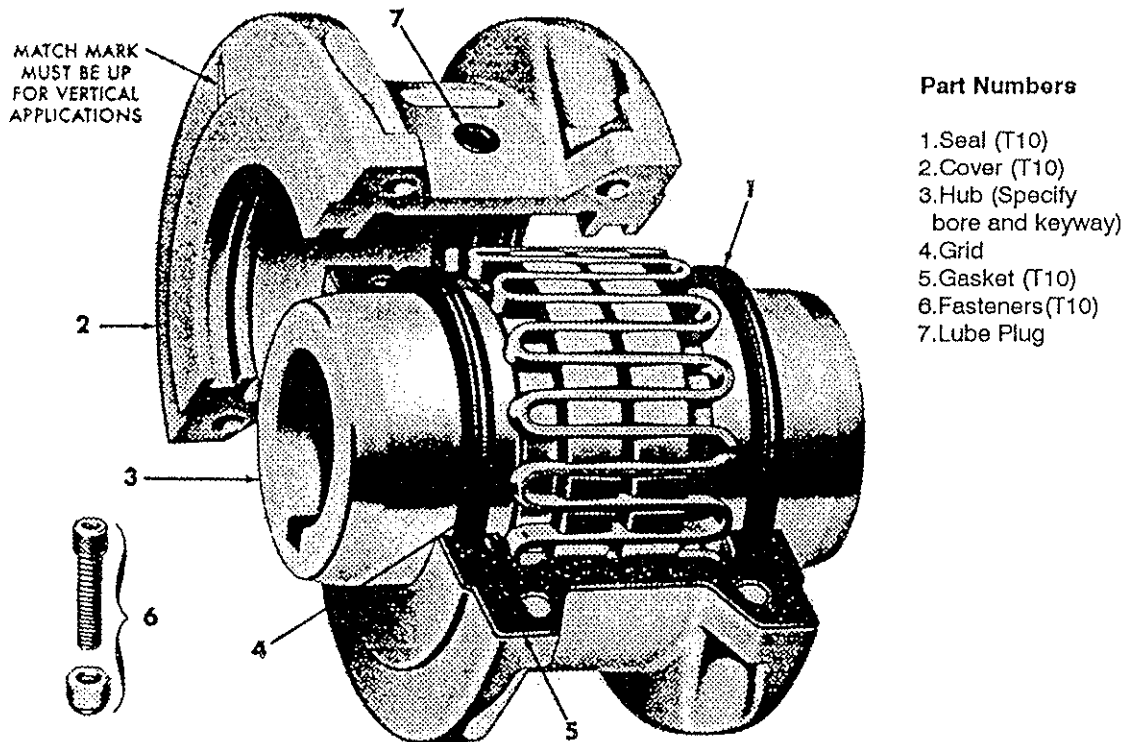
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NOTE: This temperature difference is estimated only and can be adjusted to maintain the advance specified in the following procedures.

5. After making sure the bore is clean, mount the heated hub on the shaft. When the hub is nearly engaged with the taper fit, snap it forcibly in place with a quick push.
6. After allowing the hub to cool, check the position of the hub on the shaft with the micrometer depth gauge. Subtract the reading obtained in Step No. 3 from this dimension. The difference between the two readings should be $.040 \pm .010$ ". If the advance is not within $.030$ to $.050$ ", the hub should be pulled and remounted.
7. Secure the hub to the shaft with the nut and lockwasher provided with the motor, tightening the nut firmly. Bend the lockwasher against one flat of the nut.
8. On 822 Frame motors, slide the spacer plate (It.#94) onto the hub, attaching it to the front plate with hex head screws (It.#99) and lockwashers (It.#100). Tighten the screws to 44 Ft.Lbs., dry.
9. Position the spacer plate (It.#95) on the front plate (It.#93), (or spacer plate (It.#94) on 822 Frame motors). Apply Loctite 242 (blue), or equivalent, to the threads of the hex head screws (It.#103). Install and tighten the screws to 75 In.Lbs.

6.2 COUPLINGS

GRID COUPLINGS



cp1ggrd1.wpg

INTRODUCTION

These instructions apply to Tapered Grid Couplings. They are designed to operate in either the horizontal or vertical position without modification. However, for vertical applications, the match mark shown above, must be up. The performance and life of the couplings depend largely upon how you install and service them. Carefully follow these instructions for optimum performance and trouble free service.

PARTS IDENTIFICATION

All coupling parts have identifying part numbers as shown above. When ordering parts, always *SPECIFY SIZE and TYPE* shown in the coupling data table in this section.

LUBE FITTINGS

Cover halves have 1/8 NPT lube holes. Use a standard grease gun and lube fitting.

RUNNING CLEARANCES for BRONZE BUSHINGS
Inches (Millimeters)

Nominal Diameter	Shaft		Running Clearance	Nominal Diameter	Shaft		Running Clearance
	Nominal Diameter	Outside Diameter			Nominal Diameter	Outside Diameter	
9.50 (241.3)	9.500-9.497 (241.300-241.224)	.016-.027 (.406-.686)		13.75 (349.25)	13.750-13.747 (349.250-349.174)	.021-.034 (.533-.864)	
9.75 (247.65)	9.750-9.747 (247.650-247.574)	.016-.027 (.406-.686)		14.00 (355.6)	14.000-13.997 (355.600-355.524)	.022-.035 (.559-.889)	
10.00 (254.0)	10.000-9.997 (254.000-253.924)	.016-.027 (.406-.686)		14.25 (361.95)	14.250-14.247 (361.950-361.874)	.022-.035 (.559-.889)	
10.25 (260.35)	10.250-10.247 (260.350-260.274)	.016-.027 (.406-.686)		14.50 (368.3)	14.500-14.497 (368.300-368.224)	.022-.035 (.559-.889)	
10.50 (266.7)	10.500-10.497 (266.700-266.624)	.016-.027 (.406-.686)		14.75 (374.65)	14.750-14.747 (374.650-374.574)	.023-.036 (.584-.914)	
10.75 (273.05)	10.750-10.747 (273.050-272.974)	.016-.027 (.406-.686)		15.00 (381.0)	15.000-14.997 (381.000-380.924)	.024-.036 (.610-.914)	
11.00 (279.4)	11.000-10.997 (279.400-279.324)	.017-.028 (.432-.711)		15.25 (387.35)	15.250-15.247 (387.350-387.274)	.024-.036 (.610-.914)	
11.25 (285.75)	11.250-11.247 (285.750-285.674)	.017-.028 (.432-.711)		15.50 (393.7)	15.500-15.497 (393.700-393.624)	.024-.036 (.610-.914)	
11.50 (292.1)	11.500-11.497 (292.100-292.024)	.017-.028 (.432-.711)		15.75 (400.05)	15.750-15.747 (400.050-399.974)	.024-.036 (.610-.914)	
11.75 (298.45)	11.750-11.747 (298.450-298.374)	.017-.028 (.432-.711)		16.00 (406.4)	16.000-15.997 (406.400-406.324)	.026-.039 (.660-.991)	
12.00 (304.8)	12.000-11.997 (304.800-304.724)	.017-.028 (.432-.711)		16.25 (412.75)	16.250-16.246 (412.750-412.648)	.026-.040 (.660-1.016)	
12.25 (311.15)	12.250-12.247 (311.150-311.074)	.017-.028 (.432-.711)		16.50 (419.1)	16.500-16.496 (419.100-419.024)	.026-.040 (.660-1.016)	
12.50 (317.5)	12.500-12.497 (317.500-317.424)	.017-.028 (.432-.711)		16.75 (425.45)	16.750-16.746 (425.450-425.348)	.026-.040 (.660-1.016)	
12.75 (323.85)	12.750-12.747 (323.850-323.774)	.019-.030 (.483-.762)		17.00 (431.8)	17.000-16.996 (431.800-431.724)	.027-.041 (.685-1.041)	
13.00 (330.2)	13.000-12.997 (330.200-330.124)	.020-.033 (.508-.838)		17.25 (438.15)	17.250-17.246 (438.150-438.024)	.027-.041 (.685-1.041)	
13.25 (336.55)	13.250-13.247 (336.550-336.474)	.020-.033 (.508-.838)		17.50 (444.5)	17.500-17.496 (444.500-444.398)	.027-.041 (.685-1.041)	
13.50 (342.9)	13.500-13.497 (342.900-342.824)	.020-.033 (.508-.838)		17.75 (450.85)	17.750-17.746 (450.850-450.748)	.027-.041 (.685-1.041)	

Draw the Rod Securely Into the Sleeve ~

Assemble a small bore washer and nut on the bottom end of the alignment rod and tighten the nut to 4380 Ft.Lbs.

Install the Remaining Alignment Rod ~

Follow the same procedure to install the three remaining rods. Install both rods for one split before proceeding to the other split.

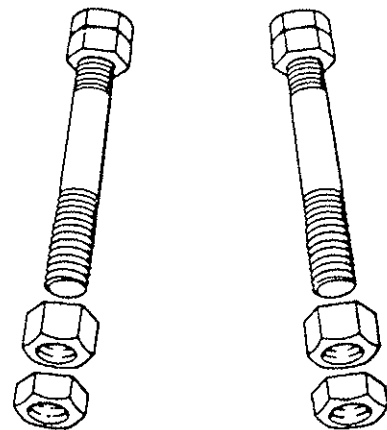
Check the Alignment ~

With a small parallel and feeler gauge, check the alignment on the rim faces of the gear halves. They should align themselves within approximately .003".

INSTALLATION of CLEARANCE RODS

Position the Clearance Rods ~

After the rods have been inserted, adjust top and bottom nuts so that equal portions extend above and below the split. Remove the bottom nut, making sure that it rotates freely. Slip the rod out of the hole so that the entire unthreaded portion is exposed. **DO NOT DAMAGE THE THREADS.**



Clearance Rods

Rod Heating ~

If the rod can be installed after both gear halves are joined, heat the rod, with a full nut on each end, in a rod oven to obtain a temperature of 227°F. above the ambient temperature at installation. If the rods must be heated while on the gear, heat the *unthreaded* portion only and as uniformly as possible. Use a pyrometer to monitor the temperature.

ORIENTATION

Reference centerlines are selected relative to a plane defined by the pinion and gear axis of rotation as shown in *Figures 3A* and *39B* on the previous page. They are selected for the pinion shaft ends only. One reference centerline is in the plane (X-X) and the other is perpendicular (Y-Y) to the plane.

It does not matter if the reference centerlines were opposite from those selected in *Figure 3B*, as long as one reference centerline is in the plane and the other one is perpendicular to the plane.

From the previous section on eccentric cartridge theory, shaft end No. 1 will move perpendicular to the reference centerline, that is, along the X-X axis. This movement could also be described as moving shaft end No. 1 "into" or "out of" -mesh. Obviously then, shaft end No. 2 would move in a direction perpendicular to end No. 1 or along the Y-Y axis. This movement is often referred to as the "cross-bearing" adjustment.

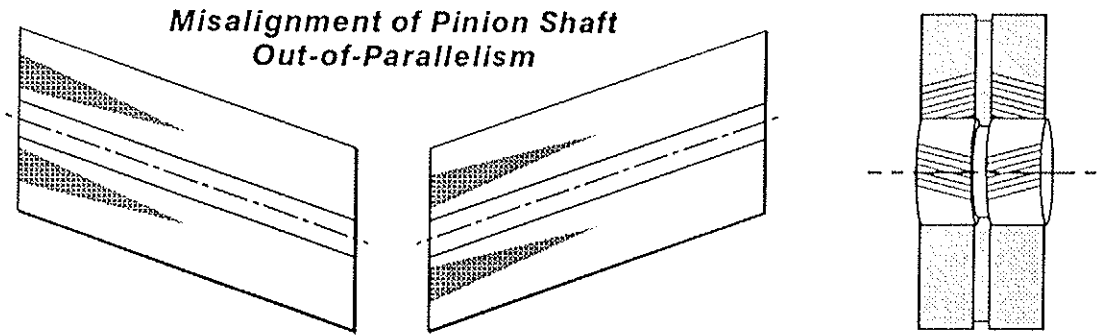
OUT-of-PLANE ADJUSTMENT

When shaft end No. 2 is moved along the Y-Y axis (*Figure 3B*) the adjustment is called out of plane because it seems to move out of the plane of interest.

OUT-of-PARALLEL ADJUSTMENT

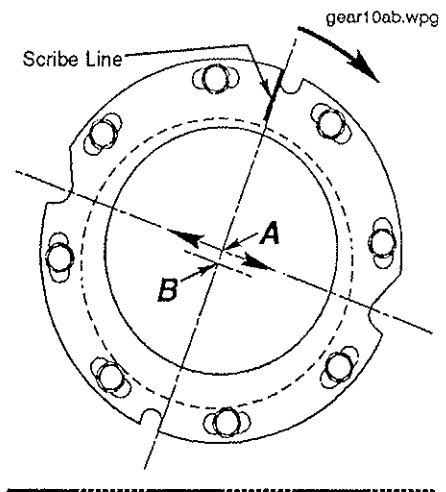
When shaft end No. 1 is moved along the X-X axis (*Figure 3B*) the adjustment is called out of parallel because it seems to move the shafts out of parallel.

NOTE: It is recognized that both of the aforementioned adjustments seem to move the shafts out of parallel. However, to identify the direction of adjustment the "out of parallel" and "out of plane" nomenclature are used.

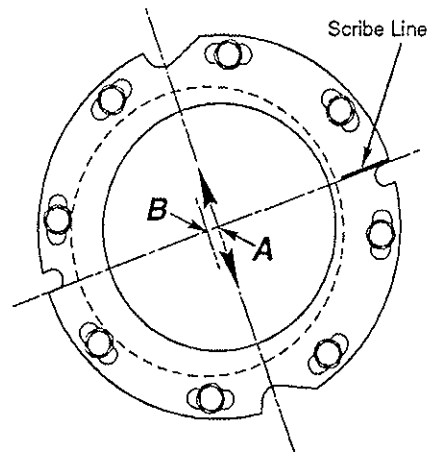


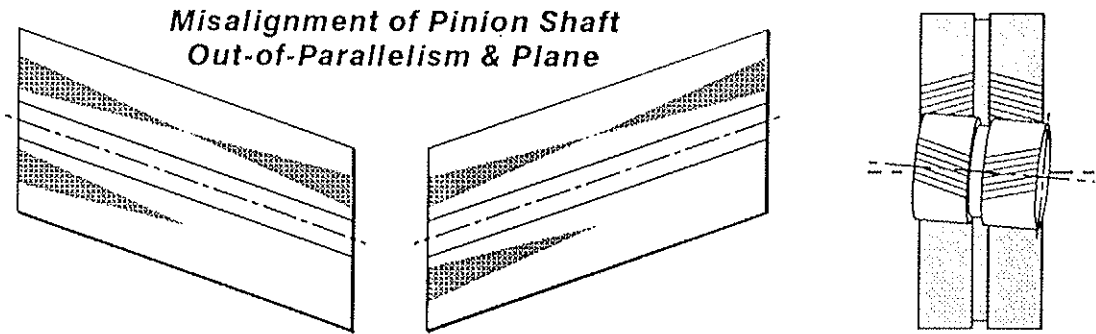
Corrective Adjustment:

View A-A
Adjust Eccentric in
CLOCKWISE Direction.



View B-B
No Adjustment Required.



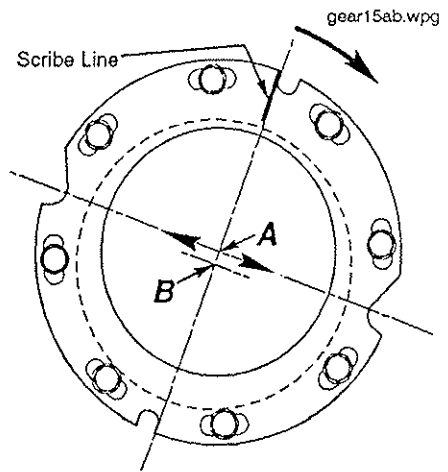


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Corrective Adjustment:

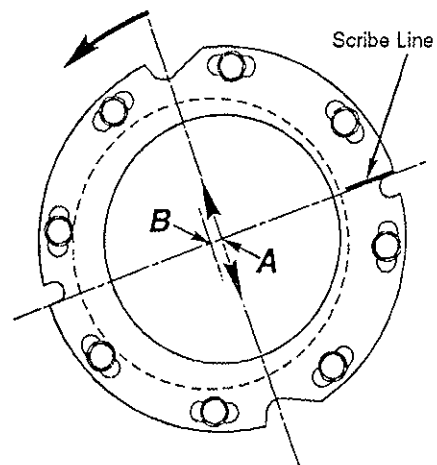
View A-A

Adjust Eccentric In
CLOCKWISE Direction.



View B-B

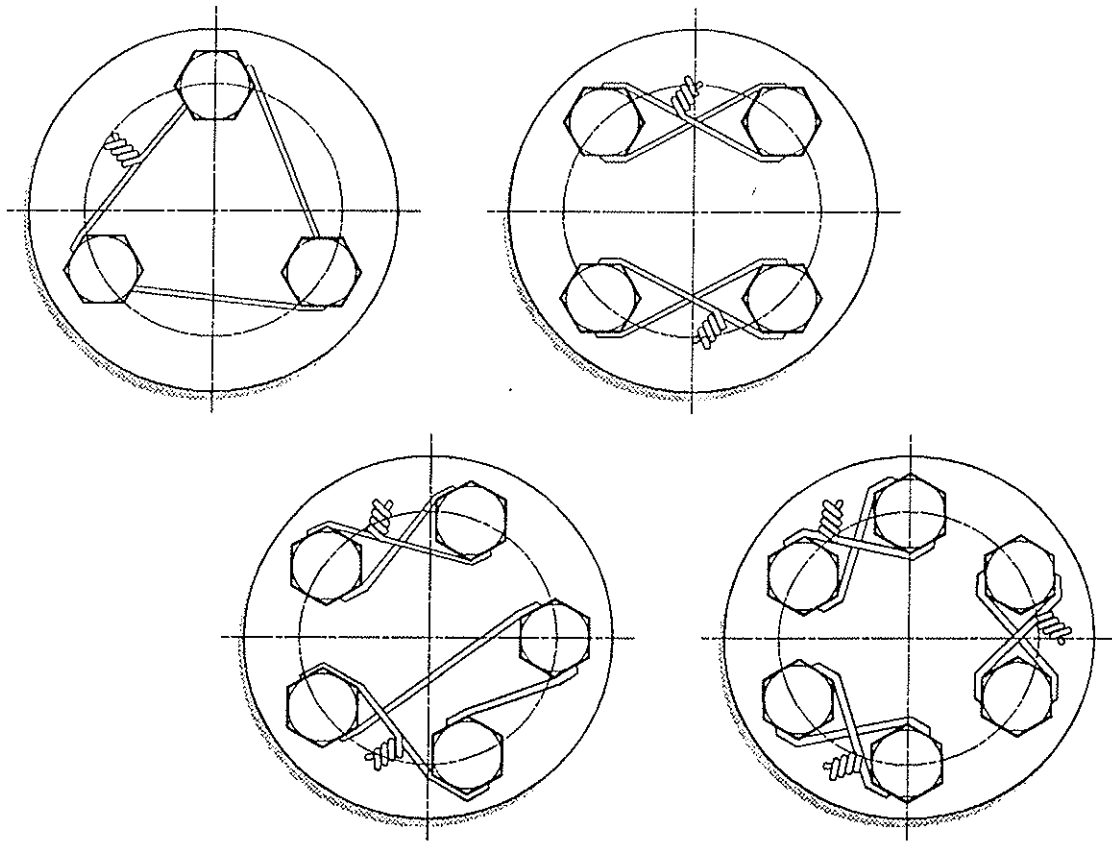
Adjust Eccentric In
COUNTER-CLOCKWISE Direction.



WIRE LOCKING CAPSCREWS

Wire locking of capscrews is used when maximum lock assurance is required when periodic visual inspection is not possible.

The illustrations below show the recommended wire locking methods for various right hand thread capscrew patterns. For patterns not shown, wire lock the screws "in pairs". For odd numbered patterns, wire lock the screws in pairs except the remaining 3 capscrews wire lock together.



wirelock.wpg

PATTERNS for WIRELOCKING CAPSCREWS

Use 14 gauge soft annealed lockwire. Thread the wire through the capscrew head so that tightening stress on the wire will exert a tightening torque on the direction of capscrew thread. (The illustrations show lock wire threading for right hand threaded capscrews. Reverse the lock wire patterns shown for left hand capscrews.)

When repairing a part in the field or shop, all the convenient facilities are not available for preheating. Probably the most common preheating device is a heating torch which uses oxygen and some type of fuel or another preheating device such as resistant heaters. It is important when using a preheating torch to allow the heat to soak into the part gradually, a minimum of 3 inches (76 mm) beyond the repair area in all directions. The surrounding repair area should be covered with an insulating blanket to keep the heat from dissipating too fast. A temporary furnace can be made to preheat large parts. All repairs should be sheltered from cold drafts. This can be done by building a temporary shelter around the part if it can not be taken to a shop.

Do not short change the repair by skimping on the preheat. It is always better to preheat than to repair a job without preheat plus the chances of a successful repair are better. The only steel where preheating temperatures can be detrimental to the repair is austenite manganese steel. This type of steel may be used on bucket or dipper lips, track pads, drive tumblers and dipper racks. The preheat and interpass temperature should never go beyond 400°F(204°C). This steel can be quickly determined by the use of a magnet since it is a nonmagnetic material.

STEP 7 -- Welding Techniques.

The first and most important part of a repair procedure is to pick your best welder or welders who will follow explicit welding repair procedures. This type of welder is a person who enjoys such challenges even when he is in an uncomfortable position and the preheat is uncomfortable.

A technique highly recommended for a repair is to butter the groove with weld metal. What is buttering and what does buttering do for you? Buttering is the addition of one or more layers of weld metal to the face of the joint or surfaces to be welded. Every weld repair of a large structure can be considered a high restraint joint, therefore, buttering is highly recommended. If we examine the mechanical properties of parent material and weld metal, we find the weld metal will have the best ductility. We know when weld metal cools shrinkage stresses will be created, therefore, when the center joining passes are put in, the weld metal will be pulling on the butter passes instead of the parent material which has less ductility.

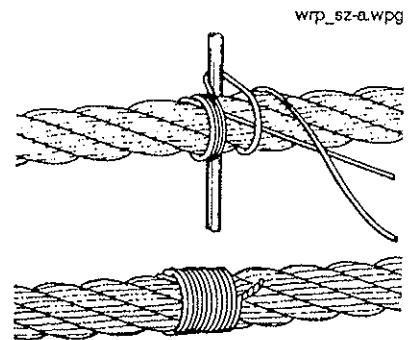
The buttering assures all finish weld beads will be made only into previously deposited weld metal resulting in maximum tempering of previously created fusion and heat affected zones in the base materials. Buttering can also be used to reduce the high preheat required for high alloy steels. Many times a repair does not require the hardenability or heat treatment of the parent material, therefore, high strength electrodes are used for the repair. The parent material can be buttered with two layers of weld metal at the recommended preheat for the parent material and then the preheat can be lowered to about 200°F (93°C) for the comfort of the welder. A good example would be the changing of racks on dipper handles. The racks are usually made of an alloy steel which requires a preheat of 450 - 500°F (232 - 260°C). The rack bevel could be preheated and buttered with a layer of the required weld metal. The racks would then be installed on the dipper handle and then preheated to about 200 - 250°F (93 - 121°C) and welded eliminating the high preheat required to weld the assembly.

SEIZING WIRE ROPE

While there are numerous ways to cut wire rope, in every case, certain precautions must be observed. For one thing, proper seizings are always applied on both sides of the place where the cut is to be made. In a wire rope, carelessly or inadequately sized, ends may become distorted and flattened, and the strands may loosen. Subsequently, when the rope is put to work, there may be an uneven distribution of loads to the strands; a condition that will significantly shorten the life of the rope.

The two widely accepted methods of applying seizing are illustrated. The seizing itself should be soft, or annealed wire or strand. Seizing wire diameter and the length of the seize will depend on the diameter of the wire rope. But the length of the seizing should never be less than the diameter of the rope being seized. Normally, for preformed ropes, one seizing on each side of the cut is sufficient. But for ropes that are not preformed, a minimum of two seizings on each side is recommended; and these should be spaced six rope diameters apart.

Lay one end of the seizing wire in the groove between two strands; wrap the other end *tightly* in a close helix over a position of the groove using a seizing iron (a round bar 1/2" to 5/8" diam. x 18" long) as shown above. Both ends of the seizing wire should be twisted together tightly, and the finished appearance as shown below. Seizing widths should not be less than the rope diameter.



wrp_sz-a.wpg

Seizing METHOD A

3. *Reduction in rope diameter:*

Any marked reduction rope diameter indicates degradation. Such reduction may be attributed to:

- Excessive external abrasion.
- Internal or external corrosion.
- Loosening or tightening of rope lay.
- Inner wire breakage.
- Rope stretch.
- Ironing or milking of strands.

In the past, whether or not a rope was allowed to remain in service depended to a great extent on the rope's diameter at the time of inspection. Currently this practice has undergone significant modification.

Previously, a decrease in the rope's diameter was compared with published standards of minimum diameters. The amount of change in diameter is, of course, useful in assessing a rope's condition. But, comparing this figure with a fixed set of values can be misleading. These long-accepted minimums are not, in themselves, of any serious significance since they do not take into account such factors as:

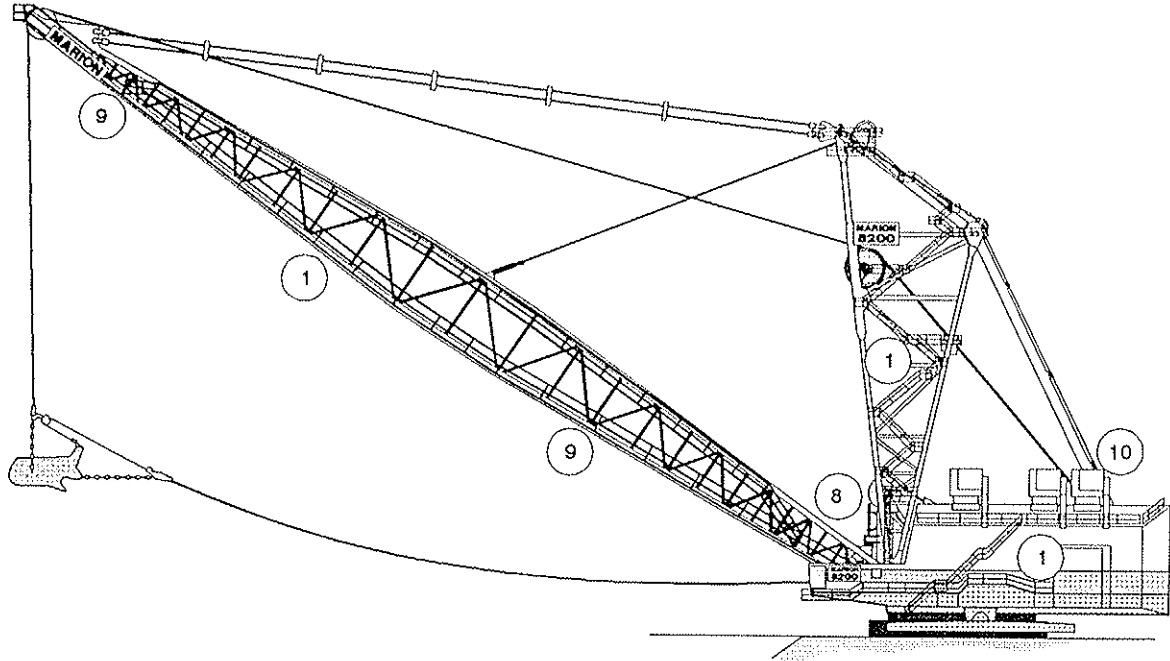
- 1) Variations in compressibility between IWRC and Fiber Core.
- 2) Differences in the amount of reduction in diameter from abrasive wear, or from core compression, or a combination of both.
- 3) The actual original diameter of the rope rather than its nominal value.

As a matter of fact, all ropes will show a significant reduction in diameter when a load is applied. Therefore, a rope manufactured close to its nominal size may, when it is subjected to loading, be reduced to a smaller diameter than stipulated in the minimum diameter table. Yet, under these circumstances, the rope would be declared unsafe although it may, in actuality, be safe.

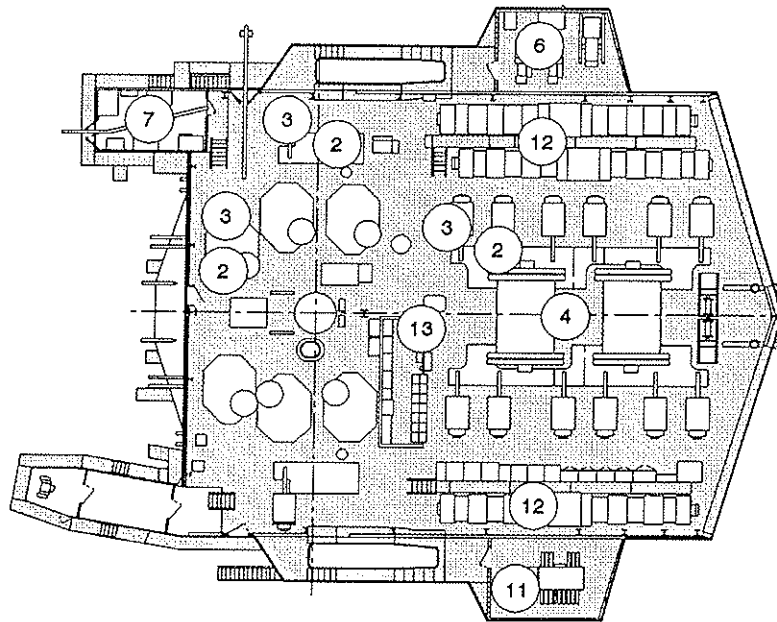
As an example of the possible error at the other extreme, we can take the case of a rope manufactured near the upper limits of allowable size. If the diameter has reached a reduction to nominal or slightly below that, the tables would show this rope to be safe. But it should, perhaps, be removed.

Today, evaluations of the rope diameter are first predicated on a comparison of the original diameter—when new and subjected to a known load—with the current reading under like circumstances. Periodically, throughout the life of the rope, the actual diameter should be recorded when the rope is under equivalent loading and in the same operation section. This procedure, if followed carefully, reveals a common rope characteristic: after an initial reduction, the diameter soon stabilizes. Later, there will be a continuous, albeit small, decrease in diameter throughout its life.

Daily –

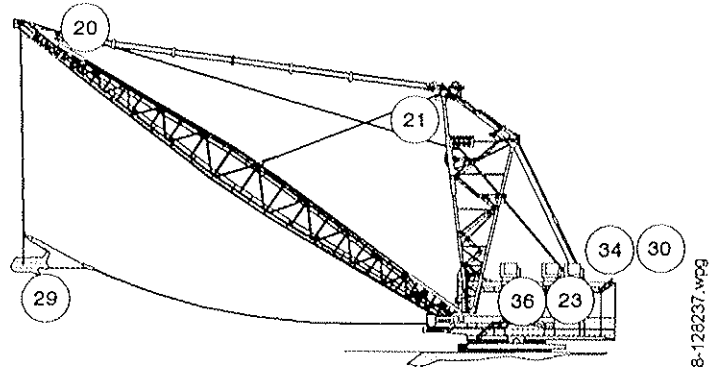


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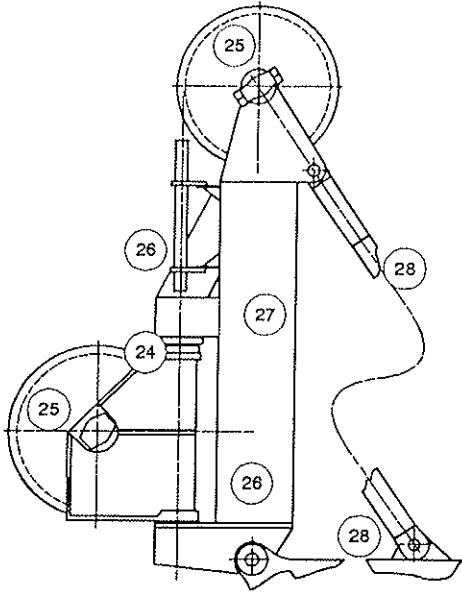


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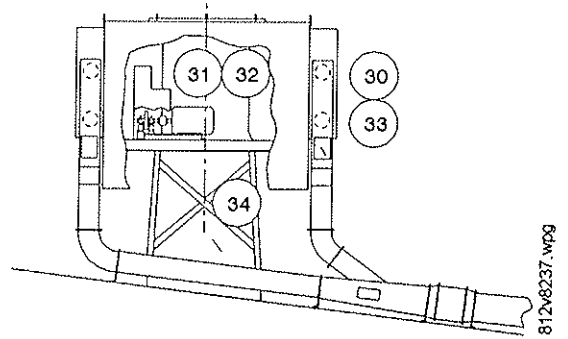
Weekly (cont.)—



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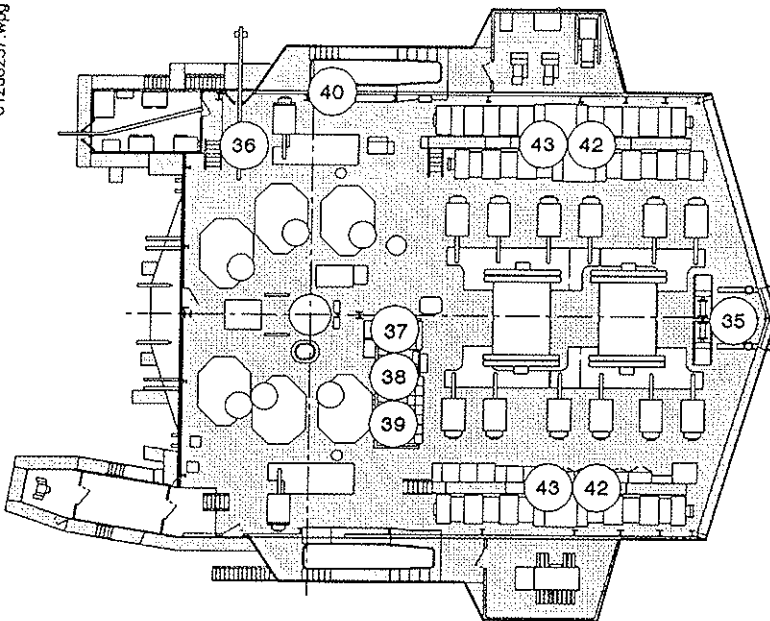


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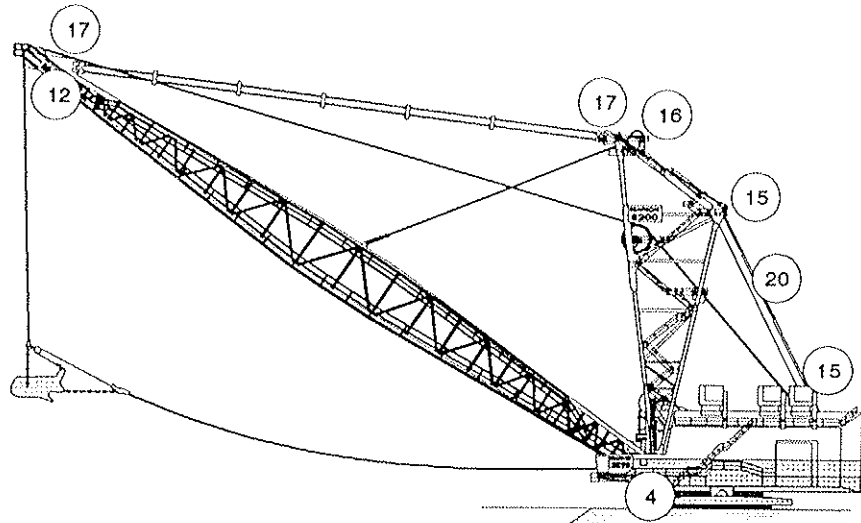


812v8237.wpg

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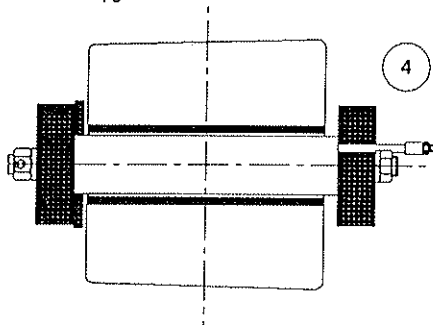


Annual (cont.) —

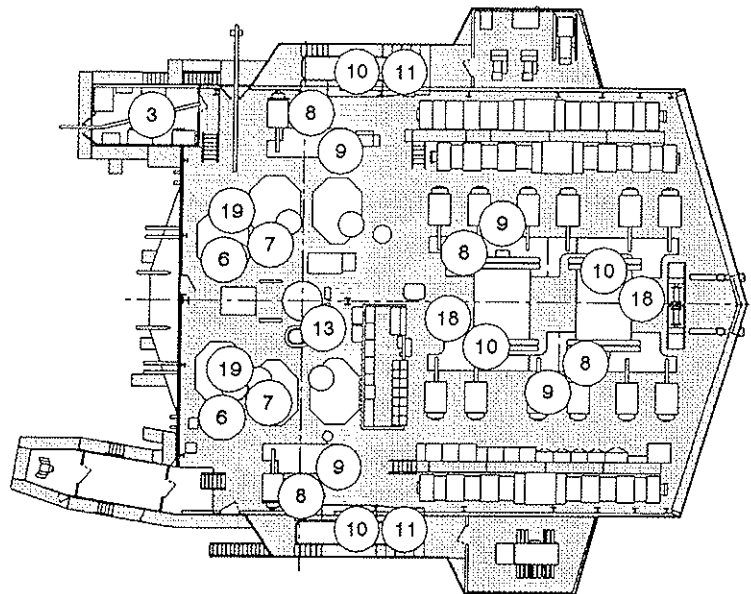
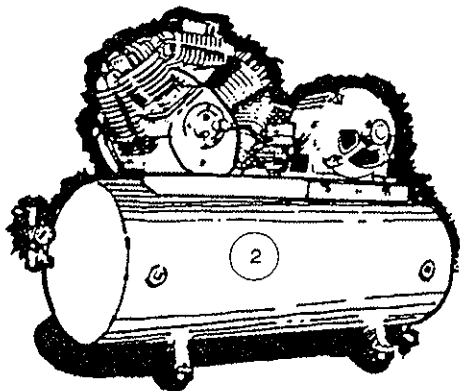


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820a8237.wpg



820d8237.wpg

About once a year, or after 7500 operating hours, purge the bearings by pumping enough lube through the bearing while running so that new grease appears at the shaft or bottom plug hole. **IMPORTANT!** — As lube seeps out along the shaft, wipe it away. Finally, after 15 or 20 minutes of operation, thoroughly clean off the shaft. New grease usually appears first at the bottom hole, but it may be seen first at the shaft. **DO NOT FORGET THE DRAIN PLUG.**

Whenever possible, about once every 2 years, disassemble the bearings and remove ALL the old lube by thoroughly cleaning with light oil or petroleum solvent. Each time the bottom plug is removed, push a clean wire into the hole to insure that the lube is not hard and plugging the hole.

When repacking bearings with fresh grease, the housings or grease reservoirs should be filled from ½ to 2/3 full. An excessive amount of grease in the bearing will cause excessive bearing temperatures. See table 2 below.

Bearing Lubrication Data - Table 2

<i>Minimum amount of grease (reservoir ½ full) and maximum amount of grease (reservoir 2/3 full) at each bearing.</i>				
Frame Size	Grease			
	(inches ³)	(centimeters ³)	(ounces)	(grams)
802	3.5-4.5	57-74	1.75-2.25	50-64
803	4-5.5	66-90	2-2.75	50-78
804	5-7	82-115	2.5-3.5	71-99
806	6.5-9	107-147	3.25-4.5	92-128
808	8.5-11.5	139-188	4.25-5.75	120-163
810	13-17.5	213-287	6.5-8.75	184-248
812	17-23	279-377	8.5-11.5	241-326
814	20-27	328-442	10-13.5	284-383
816	24-32	393-524	12-16	340-454
818	24-33	393-541	12-16.5	340-468
820	29-38	475-623	14.5-19	411-539
822	34-45	557-737	17-22.5	482-638
824	42-51	688-836	21-25.5	595-723
828	67-78	1098-1278	33.5-39	950-1106

9.3 REFERENCE PUBLICATIONS

For Detailed Electrical Information,
Refer to the
ELECTRICAL INSTRUCTION MANUAL

For Information on the
MAIN COLLECTOR RINGS and the
AUXILIARY COLLECTOR RINGS,
Refer to Section 4 of this manual.

Marion provides (under separate cover) a **PARTS BOOK** from the electrical manufacturers in addition to the information supplied in this section and the above sources.

2.0.0 INSTALLATION AND COMMISSIONING

Time spent ensuring the preparation for installation will pay dividends by reducing service requirements during operation.

2.1.0 Installation

Ensure the following:

- Area is clean, flat and strong enough to support the system.
- Adequate space is provided around the unit for service and air flow.
- There is nothing underneath which will obstruct airflow or distribution.

Mark out supply and return cutouts either from the drawing or the roof sealing frame AS900606. Carefully cut out apertures. Place sealing frame in position, and tack corners. Check that supply and return air plenum support assemblies fit. Some grinding may be required on the inside edge of the roof sealing frame assembly to provide clearance.

The support assemblies AS9006096 (return and supply) should mount with the drilled angle level - or near to - the ceiling. The supply and return air plenums bolt to these frames. The skirt of the mounting assembly can then be cut to suit and welded in position.

The roof sealing frame should then be welded to the roof, well sealed, and painted.

Lift the air conditioner into position making sure that the casing to cab seal is firmly in position on the underside of the unit prior to final positioning. Lower the unit down onto the sealing frame.

The mounting channels have holes on the bottom for mounting to studded bar, thus enabling ready removal of unit.

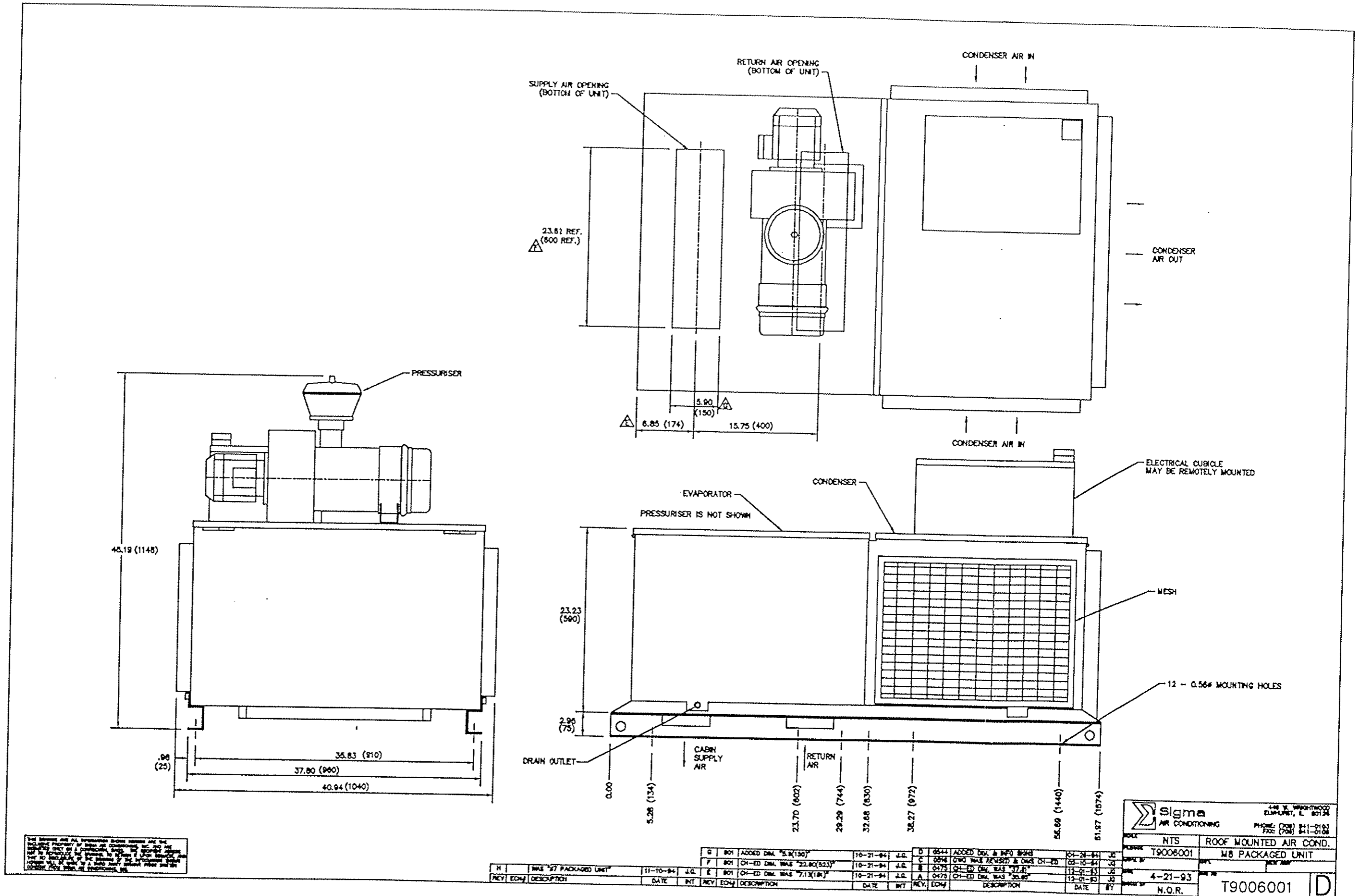
Fit the supply and return air plenums, and mount the thermostat near the return air opening.

Run the electrical inter-connecting cables to the appropriate site standards.

Run the condensate drains to a point where condensate is not going to create a problem.

NOTE: In some cases with an old, or thin roof, it is a good idea to manufacture a separate roof plate out of 1/4" steel to provide a sound, flat mounting surface. Thin skins buckle when welded seals are often poor and there is a high degree of pre-stress which in industrial applications could lead to fatigue failure, cracks, and leaks.

SPARE PARTS



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REV	DATE	BY	DESCRIPTION
D	10-21-94	J.L.R.	ADDED DIM 5.90(150)
C	10-21-94	J.L.R.	ADDED DIM 22.80(583)
B	10-21-94	J.L.R.	ADDED DIM 7.13(181)
A	10-21-94	J.L.R.	ADDED DIM 30.82

Sigma
AIR CONDITIONING

148 W. WRIGHTWOOD
ELMOUR, IL 60124
PHONE: (708) 841-0163
FAX: (708) 841-0168

PROJECT	NTS	ROOF MOUNTED AIR COND.
DRAWING NO.	T9006001	W8 PACKAGED UNIT
DATE	4-21-93	
BY	N.O.R.	T9006001

PHYSICAL DATA

Bolling Point	-26.2°C (-15.2°F) at 736 mm Hg.
Vapor Pressure	96 psia at 25 deg C (77 deg F)
Vapor Density	3.60 (Air = 1.0) at 25 deg C (77 deg F)
% Volatiles	100 WT %
Water Solubility	0.15 WT % at 25°C (77°F) and 14.7 psia
Odor	Slight ethereal
Form	Liquefied gas
Color	Clear, colorless
Density	1.21 g/cc at 25 deg C (77 deg F) - Liquid

HAZARDOUS REACTIVITY

Instability	Material is stable. However, avoid open flames and high temperatures.
Incompatibility	Incompatible with alkali or alkaline earth metals- powdered Al, Zn, Be, etc.
Polymerization	Polymerization will not occur.
Decomposition	: Decomposition products are hazardous. "SUVA" Cold-MP can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride.

FIRE AND EXPLOSION DATA

Flash Point	Will not burn
Method	TOC
Flammable Limits in Air, % by Volume	LEL Not applicable UEL Not applicable
Autolgnition	>750°C (>1,382°F)
	"SUVA" Cold-MP is not flammable at ambient temperatures and atmospheric pressure. However, "SUVA" Cold-MP has been shown in tests to be combustible at pressures as low as 5.5 psig at 177 deg C (351 deg F) when mixed with air at concentrations of generally more than 60 volume % air. At lower temperatures, higher pressures are required for combustibility. Experimental data have also been reported which indicate combustibility of HFC-134a in the presence of certain concentrations of chlorine.
Fire and Explosion Hazards	Cylinders may rupture under fire conditions. Decomposition may occur.
Extinguishing Media	As appropriate for combustibles in area.
Special Fire Fighting Instructions	Cool cylinders with water spray. Self-contained breathing apparatus (SCBA) may be required if cylinders rupture or release under fire conditions.

(continued)

5.3.0 Electrical

380/3/50Hz.	460/3/60Hz.	Qty/Unit	Description
641362	641362	1	Circuit Breaker- Pressurizer
641363	641363	2	Circuit Breaker-Evap., Cond. LOW
641368	641368	2	Circuit Breaker-Evap., Cond. HIGH
641369	641369	1	Circuit Breaker- Compressor
641-C036	641-C036	1	Leak Detection Circuit Breaker
651-C054	651-C054	5	Contactora, Motors
651-C055	651-C055	2	Contactora, Compressor, Heaters (3 used for 18Kw heat)
653-C014	653-C014	1	Auxiliary Control Circuit Breaker
653-C015	653-C015	5	Auxiliary, NO (normally open)
653-C016	653-C016	3	Auxiliary, NC (normally closed)
674-C022	674-C022	7	Arc Suppressor
664-C003	664-C003	1	Lockable Door Isolation Switch
666-C009	666-C009	1	Transformer
	661-C041		Relay

5.4.0 Pilot Control

380/3/50Hz.	460/3/60Hz.	Qty/Unit	Description
662-C001	662-C001	1	Fan Speed Switch
662-C003	662-C003	1	Main Selector Switch HEAT OFF/VENT COOL
682-C001	682-C001	1	Thermostat

5.5.0 Pressurizer

380/3/50Hz.	460/3/60Hz.	Qty/Unit	Description
319-C056	319-C056	1	Motor
410-C062	410-C062	1	Blower Wheel
460-C096	410-C062	1	Pre-cleaner
460-C018	460-C018	1	Filter
643-C007	643-C007	3	(F1) Heater Fuse
643-C063	643-C063	2	(F4) Primary Fuse XFMR
643-C066	643-C066	1	L.D.O. Fuse

CHAPTER **10**

**MATERIAL SAFETY
DATA SHEETS**

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