These instructions and the operator’s manual are to be delivered with the unit. Operating instructions and safety items are to be read and understood by operator before using equipment.

PARTS LIST AND OPERATOR’S MANUAL

When ordering parts or inquiring about the crane, you must include the serial number which is located on the crane turret on the curb side when the crane is in storage position.
SAFETY

Safety Rules:
Your safety and the safety of those around you is highly dependent upon the care and good judgment you exercise in the use of this equipment. Know the positions and functions of all controls before attempting to operate. BE SURE TO CHECK ALL CONTROLS IN A SAFE OPEN AREA BEFORE STARTING YOUR WORK.

READ THIS MANUAL THOROUGHLY, and make sure you understand the contents. Be sure you understand, for example, load capacities at various radii, before starting to operate.

WARNING!
Do not attempt operation until familiar with the machine. Refer to this operator’s manual for help.

The safety information presented in this manual is not intended to replace safety codes, insurance requirements, federal, state or local laws, rules and regulations. Know the regulations and laws that apply to your area, and be sure that your machine is properly equipped to meet such laws and regulations.

Safety instructions given in this manual apply only to the crane.

WARNING!
Never move or swing a load above the heads of other workers, as serious injury or death may result.

WARNING!
Do not leave machine unattended when in working position. An inadvertently released or otherwise moved load may result in serious injury or death.

WARNING!
Do not operate crane without first setting outriggers and/or stabilizers and ensuring they are on level and solid ground, otherwise the machine may tip. Use heavy timber mats or steel plates under pads when needed.

WARNING!
Do not overload crane, see crane capacity charts on decal and in this manual for safe lifting capacities. Failure to observe this warning may cause machine to tip and/or cause structural damage to machine resulting in collapse of load and/or machine.

WARNING!
This crane is equipped with an automatic overload protection system. If crane load exceeds rated capacity, the boom extend and winch up controls will cease to function. Reset the system by retracting booms to a position within capacity limits. Reset is automatic.

WARNING!
DO NOT use crane as a man lift or possible personal injury may result.

WARNING!
When working on a grade or hill, always work uphill.
• The weight of any extra equipment mounted on the crane (blocks, slings, hooks, etc.) must be deducted from the allowable load indicated by the load charts.
• Do not attempt to lift fixed or frozen down loads.
• The operating radius is defined as the horizontal distance from the axis of rotation to the center of the vertical hoist line or line block WITH LOAD APPLIED.
• This crane has been equipped with an overload protection valve that prevents overloading of the crane through hydraulic limitation. Alteration of the setting of this valve will void the crane warranty. DO NOT CHANGE THE SETTING!
• Always position the boom tip directly over the load to be lifted. NEVER DRAG A LOAD INTO LIFTING POSITION.
• Keep the load as close to the ground as possible during lifts.
• Use insulated tag lines to control loads.
• Use a signal person if necessary.
• Move control levers slowly to provide for smooth crane operation.
• Main boom load ratings are based upon the boom hoist cylinder pressure and do not exceed 85% of the tipping moment.
• BEWARE of electrical storms, high wind conditions and dim lighting conditions.
• Always deduct the weight of the load handling devices when determining crane capacity.
• Know the weight of the load to be lifted and know the radius at the start of the lift and the radius where the load will be placed.
• Do not attempt to find the stability point to determine the weight of a load.
• Keep the operators platform clear of tools, equipment, etc.
• Do not drag loads with the boom or winch.
• Keep other workers and equipment a safe distance from the crane.
• Never leave a suspended load unattended.
• Keep personnel clear of outriggers when operating.
• Read and understand this manual and the caution and danger decals on the equipment.
• Do not service or repair the crane when it is operating or when the PTO is engaged.
• Always relieve hydraulic pressure from circuits before disconnecting any component.
• Never allow anyone to “ride” the crane in any manner.
• Be aware that the boom and winch have separate capacities. Understand how the capacity of each is determined.

**LIFTING OPERATIONS**

Before conducting lifting operations, study the load capacity chart carefully and adhere to load capacities and radii of operation given.

All load ratings are given on the basis that the unit is installed correctly on at least the minimum recommended truck and operations are to be conducted on firm and level terrain with outriggers extended firmly to the ground.

Ratings should be reduced in a degree related to the extent of deviation from the prescribed conditions. Any unfavorable conditions such a soft, sloping, or uneven terrain constitutes a deviation, and the crane capacity shall be reduced accordingly.

Crane load ratings on outriggers are based on freely suspended loads with the machine leveled and standing on a firm, uniform supporting surface. No attempt shall be made to move a load horizontally on the ground in any direction.
LIFTING OPERATIONS CONTINUED
Practical working loads depend on the supporting surface, wind, and other factors affecting stability, such as dangerous work areas, experience of operators, and proper operational practices, all of which must be taken into account when determining maximum safe working load.

WINCH OPERATION
1. Do not use the winch to drag loads.
2. Never attempt to lift objects that are fixed in place (i.e. objects that are frozen to the ground).
3. Before lifting any load be certain that three full wraps of rope will remain on the winch drum at every point during the lift.
4. When lifting heavy loads with the winch, raise the load only a few inches and stop to make certain the winch brake is operating properly before proceeding with the lift.
5. Always operate the winch to pay out cable when extending the boom to maintain clearance between the boom tip and cable attachments. Even if the machine is equipped with an anti two-block device, this should be used as a fail-safe device, and not relied upon to inform the operator to stop lifting or extending.
6. Before winch operation, inspect for kinks and twist or improperly seated on the winch drum or sheaves. During operation always maintain tension on the cable to prevent kinking or improper spooling of the cable.
7. Before lifting loads, position the boom tip directly over the load. Be certain that the load rating of the crane will be adequate and remain within the capacity ratings during the lifting operations.
8. When starting or ending winching operations, always activate controls slightly to prevent shock loads from being transferred to the crane. Remember, capacity is based on static lifting conditions, and crane structural damage or overturning may result from shock loading.
9. Control loads during lifts with the use of an insulated tag line attached to the load.
10. Loads should be visible to the operator at all positions during the lift. If this is not possible, assign a person to signal the crane operator during the period when the loads is not visible to the operator.
11. Be aware that the winch system operates independently of other crane systems and in some instances may be capable of pulling more that the rated crane capacity.
12. Always know the weight of any load before attempting a lift.
13. Some lifts within the capacity range may require multiple part reeving to increase winch capacity and remain within the safe working limits of the cable. Multiple part reeving will reduce the winch line speed.

CRANE TRANSPORTATION
1. Never move the vehicle unless the crane is properly stored for transportation.
2. The following procedures must be completed each time the vehicle is moved:
   2.1 Position the boom over the boom rest.
   2.2 Carefully lower the boom onto the storage bumper to prepare for travel. Note: Always store the boom before retracting outriggers and/or stabilizers. CAUTION: The crane rest is designed to support the weight of the boom only, and may collapse if excessive down pressure is exerted by the boom.
   2.3 Retract outriggers and stabilizers and double check to be sure all are fully and properly retracted.
   2.4 Disengage hydraulics.
   2.5 Be certain any loads or other items on the truck bed are secured properly.
   2.6 Disengage the parking brake.
3. Also be aware of the following safety considerations before transporting the vehicle and equipment.
   3.1 Be certain that all truck systems are operating correctly, such as braking and steering systems.
   3.2 Be sure tires are inflated to correct pressure.
   3.3 Never travel with a load suspended from the crane.
   3.4 Know the transport height of the crane and be certain of clearance heights on travel routes.
   3.5 Never allow personnel on the equipment during transport.
   3.6 Never move the equipment without good visibility unless a signal person is used for guidance through poor visibility areas.
SAFETY INSPECTION CHECK LIST

It is recommended that the crane be inspected periodically for signs of wear, damage and other deficiencies which could affect the safety and performance of the crane. The following check list has been prepared for your use. The check list is based upon ANSI and OSHA regulations. These standards require that prior to initial use all new and altered cranes shall be inspected for the items listed below.

See diagrams on pages 20-26 for location of parts.

**Frequent Inspection - Daily to Monthly Intervals**

Items such as the following shall be inspected for defects including observation during operation for any deficiencies which might appear between regular inspections. Any deficiencies such as listed are to be carefully examined and determination made as to whether they constitute a hazard and replaced before resuming operation if necessary.

1. All control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter. --- Inspect daily to monthly depending on usage.
2. All control mechanisms for maladjustment which interferes with proper operation. — Inspect daily when used.
3. All safety devices for malfunction. --- Inspect daily
4. Hydraulic hoses --- Inspect daily
   4.1 Hoses which flex during normal operation should be visually inspected daily
   4.2 Evidence of leakage at the surface of the flexible hose or its junction with the metal end couplings.
   4.3 Blistering or abnormal deformation to the outer covering of the hose.
   4.4 Evidence of excessive abrasion or scrubbing on the outer surface of a hose. Steps should be taken to eliminate the interference of elements in contact or otherwise protect the components.
5. Hook, hook-block and hook-latch. ------ Inspect daily
   5.1 Any damaged hook-latch should be immediately replaced.
   5.2 Any distortion or crack on a hook is a signal that replacement is needed immediately.
   5.3 Swivel end play (gap) of more than 1/16" along the swivel is a signal that replacement is needed immediately.
   5.4 Spreading of hook block side plates is a sure sign of overload. Replace immediately.
   5.5 Loose nuts should be re-tightened to the proper torque values as shown in the chart on page 19.
6. Cable ------ Inspect daily
   6.1 The visual inspection shall consist of observation of all cable which can reasonably be expected to be in use during the day’s operations. These visual observations should be concerned with discovering damage such as listed below, and when such damage is discovered, remove and replace the cable.
   6.2 Distortion of the cable such as kinking, crushing, unstranding, birdcaging, main strand displacement or core protrusion
   6.3 General corrosion
   6.4 Broken or cut strands
   6.5 Reduction of nominal diameter (0.3750") of more than 0.038".
7. Hydraulic system for proper oil level ------ Inspect daily

**Periodic Inspection ---- Monthly to Yearly**

Complete inspections of the crane shall be performed at intervals as generally defined below, depending on its activity, severity of service, and environment. Any deficiencies such as listed should be carefully examined and a determination made as to whether they constitute a hazard and replaced before resuming operation.

1. Deformed, cracked or corroded members in the crane structure and entire boom ------ Inspect monthly.
2. Loose bolts ------ Inspect monthly
3. Cracked or worn sheaves and drums ------ Inspect bi-monthly
4. Boom angle and other indicators over their full range for any significant inaccuracies ------ Inspect bi-monthly
Periodic Inspection ---- Monthly to Yearly, Continued

5 Worn, cracked, or distorted parts such as pins, bearings and locking devices --- Inspect monthly
6 Hydraulic hose and fittings for leakage that cannot be eliminated by tightening --- Inspect monthly
7 Hydraulic cylinders --- Inspect monthly
   7.1 Drifting caused by fluid leaking across piston.
   7.2 Rod seals leaking.
   7.3 Leaks at welded joints.
   7.4 Scored, nicked or dented cylinder rods.
   7.5 Dented case (barrel).
   7.6 Loose or deformed rod eyes or connecting joints.

Special Note:
The above check list has been formulated by the manufacturer based upon the ANSI and OSHA standards in effect at the time of manufacture. For further information regarding recommended ANSI and OSHA inspection guidelines, consult the official publications.

It is also recommended that you consult the official ANSI and OSHA publications as well as the truck manufacturer’s manual for information relative to inspection of the truck and its component parts and systems. Remember, the crane operates off the truck’s various systems.

It is recommended that cranes which have been idle between one and six months be given an inspection for items as listed under Frequent Inspection before placing in service. Cranes which have been idle for over six months should be given a complete inspection for items such as those listed under both Frequent and Periodic Inspections before placing in service. Cranes which are exposed to adverse environments should be inspected more frequently. The intervals given are guidelines only. Actual intervals must be determined by the equipment user according to the frequency and severity of usage.

OSHA requires written, dated and signed inspection reports and records be made monthly on critical items such as crane hooks, ropes, and hydraulic cylinders. These records shall be kept readily available. The sheet on the following page is for your convenience in keeping track of inspections. You may copy this chart or make your own similar chart.
<table>
<thead>
<tr>
<th>Date</th>
<th>Comments</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety Devices (Daily)</th>
<th>Control Mechanisms (Daily)</th>
<th>Swing Drive Assembly (Daily)</th>
<th>Main Boom (Daily)</th>
<th>Telescopic Boom (Daily)</th>
<th>Winch (Daily)</th>
<th>Cable (Daily)</th>
<th>Cable Wrapping (Daily)</th>
<th>Sheaves (Daily)</th>
<th>Hook/Block/Wedge (Daily)</th>
<th>Hydraulic Oil Level (Daily)</th>
<th>Cylinders (Monthly)</th>
<th>Hoses/Fittings (Monthly)</th>
<th>Load Decals/Indicators (Monthly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Comments</td>
<td>Initials</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

I
Operation Near Power Lines

DANGER!
ELECTROCUTION HAZARD
POSSIBILITY OF DEATH OR SERIOUS BODILY HARM

Whenever this crane must be operated in the vicinity of an electrical power source or power line, first notify the power company and request that the power be shut off and grounded. Make sure that the power has been shut off and grounded before beginning work.

If the crane must be operated in the vicinity of an energized power source or power line, do not permit crane, any part thereof, or the load to touch or come within such distance of the power source or power line as is declared unsafe by local or other applicable safety codes or regulations. ANSI and OSHA safety standards specify that a minimum clearance of 10 feet (3 m) be maintained between the crane or the load being handled and energized power sources or lines having voltage up to 50 kV. Refer to chart below for greater clearances which are required for high voltages.

### Required Clearance When Operating Near Power Lines

**A. When operating near high voltage power lines**

<table>
<thead>
<tr>
<th>Normal Voltage (Phase to Phase)</th>
<th>Minimum Clearance Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>To 50 kV</td>
<td>10 ft. (3.05 m)</td>
</tr>
<tr>
<td>50 to 200 kV</td>
<td>15 ft. (4.60 m)</td>
</tr>
<tr>
<td>200 to 350 kV</td>
<td>20 ft. (6.10 m)</td>
</tr>
<tr>
<td>350 to 500 kV</td>
<td>25 ft. (7.62 m)</td>
</tr>
<tr>
<td>500 to 750 kV</td>
<td>35 ft. (10.67 m)</td>
</tr>
<tr>
<td>750 to 1000 kV</td>
<td>45 ft. (13.72 m)</td>
</tr>
</tbody>
</table>

**B. While in transit with no load and boom lowered**

<table>
<thead>
<tr>
<th>Normal Voltage (Phase to Phase)</th>
<th>Minimum Clearance Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>To 0.75 kV</td>
<td>4 ft. (3.05 m)</td>
</tr>
<tr>
<td>0.75 to 50 kV</td>
<td>6 ft. (4.60 m)</td>
</tr>
<tr>
<td>50 to 345 kV</td>
<td>10 ft. (6.10 m)</td>
</tr>
<tr>
<td>345 to 750 kV</td>
<td>16 ft. (7.62 m)</td>
</tr>
<tr>
<td>750 to 1000 kV</td>
<td>20 ft. (10.67 m)</td>
</tr>
</tbody>
</table>

Refer to OSHA Regulation 29 CFR Part 1926 Section 550.15 for further guidelines.
CABLE
The cable must be cleaned and lubricated regularly to reduce wear. Cable cannot be lubricated sufficiently during manufacture to last its entire life. Therefore, new lubricant must be added periodically throughout the life of a cable to replace factory lubricant which is used or lost.

The surface of some cables may become covered with dirt, rock dust, or other material during their operation. This covering can prevent field applied lubricants from properly penetrating into the cable. These cables should therefore be cleaned before being lubricated.

The lubricant applied should be light bodied enough to penetrate to the core of the cable. Lubricant may be applied effectively by various methods. It may be dripped, sprayed, or brushed on, but in all cases it should be applied at a place where the cable is being bent, such as at a sheave. It should be applied at the top of the bend, because at that point the strands are spread by bending and are more easily penetrated. The service life of the cable will be directly proportional to the effectiveness of the method used and amount of lubricant reaching the working (inner) parts of the cable.

Use care when handling cable to prevent the formation of kinks which can alter the original position of the strands and cause unequal tensions within the cable, thereby reducing the life and strength of the cable. Care is advised because once damaged, the cable cannot be effectively repaired.

Always attempt to keep an even distribution of the cable as it is reeved on the winch drum. Proper reeving of the cable will provide a smooth and safe hoist operation while also preventing unreeling problems and damage to the cable.

Immediately replace worn or damaged sheaves to avoid abrasion and flattening of the cable. Never pull cable over a rigid support or an inoperative sheave, as damage may occur to the cable. Responsible use and properly operating sheaves are essential to safe operation and cable longevity.

INSPECTION
When inspecting cable take special notice of the following points:
A. Corrosion  B. Broken Strands (note number and distribution of breaks)
C. Distortion of the cable, including kinking, core protrusion, crushing, birdcaging, loss of cable diameter, unevenness or flat spots on strands. Evidence of any of these flaws normally indicates that the cable needs to be replaced. The entire cable must be examined at least monthly for these deformities.

Any cable which has been unused for a month or more due to storage must be thoroughly and entirely inspected before it is returned to service.

Cable in daily service must be visually inspected daily before it is placed in service for that day. Particular attention should be given to areas of cable attachments and portions of the cable which receive the greatest amount of use. If for any reason the cable is suspected of being unusable, replace it before using the crane. Normally, if damage exists at the end of the cable it is possible to remove the damaged section as long as sufficient cable remains so at least three full wraps of cable remain on the drum at all times.

Exact guidelines for cable replacement cannot be given since there can be several considerations involved. However, OSHA regulations stipulate that a cable must be removed from service if any of the following apply:
1. In running cables, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay.
2. Wear of one-third the original diameter of outside individual wires. Kinking, crushing, birdcaging or any other damage resulting in distortion of the cable structure.
3. Evidence of heat damage from any cause.
4. Reductions from nominal diameter of more than 1/64” for diameters up to and including 5/16”; 1/32” for diameters 3/8” up to and including 1/2”; and 3/64” for diameters 9/16” up to and including 3/4”.

! WARNING
Failure to replace a damaged cable may result in personal injury or property damage.
CRANE HOOKS AND BLOCKS
When inspecting cable, also inspect the crane hook and snatch block for cracks and other apparent damage. Snatch blocks should also be checked for deformation of the side plates which would indicate and overload required replacement. Hook latches should be inspected for proper operation and replaced if necessary.

As with cable, OSHA regulations indicate that hooks should be removed from service if either of the following conditions exist:
1. More than 15% excess of normal throat opening.
2. More than 10% twist of hook.

Crane hooks cannot be repaired. If either condition exists, replace the hook before placing the crane in service.
### Power Lift 6000 Lubrication Chart

<table>
<thead>
<tr>
<th>Location</th>
<th>Lubricant</th>
<th>Operation</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Winch Gearbox</td>
<td>E. P. SAE 140</td>
<td>Change</td>
<td>Annually</td>
</tr>
<tr>
<td>2 Main Pivot Pin</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>3 Lift Cylinder Base Pin</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>4 Rotation Gear Race</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>5 Lift Cylinder Boom Pin</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>6 Cable</td>
<td>Cable Lubricant</td>
<td>Spray, Drip or Brush</td>
<td>Monthly</td>
</tr>
<tr>
<td>7 Rotation Gear Teeth</td>
<td>E. P. Grease</td>
<td>Brush</td>
<td>Weekly</td>
</tr>
<tr>
<td>8 Sheaves</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>9 Swivel Hook</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>10 Winch Bearing</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>11 Rotation Worm Gear</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>Not Shown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two Line Block Sheave</td>
<td>NLGI Grade 2 Grease</td>
<td>Grease Gun</td>
<td>Weekly</td>
</tr>
<tr>
<td>Hydraulic Oil Tank</td>
<td>Sunoco TH Fluid or Equivalent</td>
<td>Change</td>
<td>100 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Thereafter 6 Months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check / Fill</td>
<td>Weekly</td>
</tr>
<tr>
<td>Hydraulic Filter</td>
<td>New Filter Element</td>
<td>Change</td>
<td>6 Months</td>
</tr>
<tr>
<td>Reservoir Breather</td>
<td>New Cap/Element</td>
<td>Change</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clean</td>
<td>Monthly</td>
</tr>
</tbody>
</table>

**NOTE:** For maximum crane and component service life, adhere strictly to the lubrication schedule as shown above. Failure to check oil levels and maintain proper lubrication will result in premature crane wear.
General Lubrication Continued
It is suggested that a service log be established that records servicing of the equipment. A crane usage log of times and operating conditions can also be beneficial in determination of an applicable service interval.

When checking oil levels, park the crane on a level surface with the crane in the transport position. Unless otherwise noted, all oil levels should be checked with the system cold, as levels may not be accurate when checked at operating temperatures due to expansion of the oil.

Refer to other parts of this section for particular information regarding winch and rotation gearboxes. See the following pages for detailed information regarding the hydraulic oils used for the crane.

Always replace worn or damaged grease fittings as soon as possible.

When checking hydraulic oil levels be certain that the crane (and other systems if equipped) are in retracted positions. Always allow space in the hydraulic tank to compensate for expansion of the oil at system operating temperatures.

After service of the hydraulic system be certain that any suction line gate valves or other open-close valves are in the open position.

Cleanliness
An often overlooked consideration of component performance and lifespan is cleanliness. Attempt to clean the equipment as often as possible to avoid the introduction of contaminants. Always clean the crane before servicing if possible. This is of critical importance when servicing any part of the hydraulic system, since the system operates within very tight tolerances and may be adversely affected by even a slight amount of contamination.

Other normal maintenance procedures should be observed, such as touch up of the paint, which will extend corrosion protection.

The time when the crane is out of service for lubrication or maintenance may also be opportune for safety and operational inspections as outlined elsewhere in this manual.

HYDRAULIC OIL
Selection of a proper hydraulic oil is crucial. System performance, cooling and lubrication properties are all related to the oil as the power transmission fluid. The highest quality hydraulic components can be limited by the selection of hydraulic oil. The two most important factors in hydraulic oil selection are VISCOSITY and ANTIWEAR ADDITIVES.

VISCOSITY is a measure of fluidity. This measure may be expressed as SUS (Saybolt Universal Seconds) or cTs (Centistokes). Viscosity is important for proper flow characteristics and lubrication capabilities. The oil must be light enough to provide lubrication at operating temperatures and flow through the system at a minimal flow and pressure loss. Oil too light will cause lower efficiency, increased component wear, pressure losses and higher leakage rates. Oil too thick may cause poor system performance, increased temperatures, pressure drops and higher power requirements. Recommended viscosity is 90 to 180 SUS (16 to 40 cSt) at system operating temperature.

The VISCOSITY INDEX of an oil is a measure of the way the viscosity changes in relation to a temperature change. The smaller the viscosity change the higher the viscosity index. A minimum viscosity index of 100 is recommended.

ANTIWEAR ADDITIVES in hydraulic fluids provide superior antiwear characteristics assuring longer fluid life and increased system longevity. Additives also give rust and oxidation protection.
HYDRAULIC OIL CONTINUED
The oil should contain an anti-foaming agent to prevent the oil from foaming in the tank. Tank foam can have adverse effects on the hydraulic system. The weights given below will generally meet the viscosity requirements for engine crankcase oil and antiwear hydraulic oil.

<table>
<thead>
<tr>
<th>ISO Grade</th>
<th>Operating Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>-5 to 140 °F, -21 to 60 °C</td>
</tr>
<tr>
<td>32</td>
<td>5 to 170 °F, -15 to 77 °C</td>
</tr>
<tr>
<td>46</td>
<td>15 to 190 °F, -9 to 88 °C</td>
</tr>
<tr>
<td>68</td>
<td>30 to 210 °F, -1 to 99 °C</td>
</tr>
</tbody>
</table>

Temperatures shown are cold start up to maximum operating. During cold start-up, avoid high speed operation of hydraulic components until the system is warmed up to provide adequate lubrication.

In most cases, petroleum oil designed for cold conditions will be satisfactory for use in temperatures below 0°F. For colder temperatures use oil designed for arctic conditions. Your oil supplier will be able to help select the proper oil for your operating conditions.

Synthetic fluids may cause seal compatibility and system performance problems. Contact your oil supplier to determine if synthetic fluids may be used in your system.

If the hydraulic system should become contaminated by the failure of a hydraulic component or introduction of contaminants into the system, all the hydraulic oil and filters should be replaced.

Replace the hydraulic oil and filter a minimum of one time per year. Do not mix different fluid types in the same hydraulic system.
The lube level of the winch gearbox should be checked every other month to ensure that it is full to the proper level. The lube level should be full to the bottom of the level plug shown above. If the level is low, lube should be added to be certain of adequate gearbox lubrication. When adding lube, add slowly as it will take a little time for the lube to flow and for the level to register correctly. Always be certain gearbox is horizontal before checking lube level.

It is recommended that the winch gearbox lube be changed periodically to eliminate contamination from moisture or other sources.

Many name brand lubes are suitable for use when changing or adding lube to the winch gearbox provided they meet the SAE standard E.P. 140 API Class GL-5. The gearbox has a capacity of approximately one pint (16 oz).

The only other winch system component that requires lubrication is the shaft pillow block bearing shown on the lubrication chart. Follow lubrication chart instructions for lubricants and frequency of lubrication.
DOUBLE LINE RIGGING

CAUTION!
ANSI/OSHA standards state that allowable single line pull must be within a 3.5 to 1 safety factor. For the Power Lift 8000 equipped with the standard 3/8” Ø cable, the maximum allowable single line pull is 4000 pounds. For any lifts exceeding 4000 lb. a double line must be rigged.

RECOMMENDED TWO PART LINE RIGGING PROCEDURES
Refer to appropriate parts listings (p. 21) for identification of part numbers referenced in this section.
1. Remove swivel hook (384801) by removing pin.
2. With only the cable wedge and socket (384803) remaining attached to the cable, install the socket to the second stage boom sheave ears with the pin provided. An installed view is shown on the crane lubrication chart on page 11 of this manual. The cable is now looped from the boom sheaves back to the boom.
3. Finish installation by splitting the cover on the two part line block (384855), installing over the cable (384857) and reassembling the cover. The double line rigging is then completed and prepared for lifting loads over 4000 pounds.

WARNING!
The winch system may be capable of single line pulls greater than the maximum allowable 4000 pounds. It is the responsibility of the operator to know the weight to be handled and to rig the line parts appropriately.

WARNING!
The overload system incorporated on this crane will limit lifting based upon the boom capacity. The operator must be aware that in some situations the winch single line pull can exceed the 4000 pound limit, but still remain within the crane capacity. In this circumstance, the operator must not rely upon the overload system to limit winch single line pull. Always refer to the angle indicator on each side of the boom to determine what the maximum load should be for a given radius and elevation.
CRANE HYDRAULIC SCHEMATIC

Hydraulic Motor Drain Line

A

B

Warm Gear Rotation Motor

Lift Cylinder

Pressure Switch

Extend Cylinder

Rotate Cw

Boom Extend

Boom Down

Winch Down

Winch Motor Port A is closest to Boom when installed on Crane

P - Pressure Port
T - Tank (Return) Port
E - Extend Port
R - Retract Port

Hydraulic Motor Drain Line

Lower

Raise

Winch Motor

Drain Line Must be 1/4" or Larger and must go directly to tank. Do not go through filter.

Return

Pressure

Notes
Directional Valve does not include Relief.
Relief Valve must be installed in system.
Relief set to 2700 PSI Gag.

Schematic shows Crane only.
Other Hydraulic Components may be installed.

PTO, Pump, Tank, & Filter not supplied w/ Crane
Pendant Installation Instructions

1. Find #13 (Red) in pendant cable (using an ohmmeter) and connect w/ black wire from pressure switch on cylinder & 12V DC power.
2. Plug in pendant and turn power switch on.
3. Locate #1 (Blue) (Feather Touch) and #10 (Orange) (Priority Valve) & insulate ends if not used. These normally “hot” wires will short out if not insulated.
4. Using an ohmmeter, trigger each switch to find the proper wire to connect with wire from solenoid. The wire colors shown may not be identical on all cranes.
Torque values shown are in foot-pounds. Torque specifications are with residual oils on bolts. Multiply figures shown by 0.9 if any special high stress lubricants such as Never-Seez, White Lead, or other lubricants are used. Torque values shown are not affected by the use of Locktite or other retaining fluids.

**Important Note:**
The 5/8-11 socket head capscrews used for mounting the rotation bearing should be torqued to 210 to 220 foot-pounds. DO NOT USE any lubricants or Locktite on these bolts. DO NOT USE ANY Belville or other spring type washers for these bolts. Manufacturers warranty is void if these instructions are not followed.
<table>
<thead>
<tr>
<th>Ref #</th>
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<th>Description</th>
<th>Part #</th>
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<td>1</td>
<td>Base Weldment</td>
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<tr>
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<td>1</td>
<td>Rotation Worm gear Drive</td>
<td>384862</td>
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<td>3</td>
<td>1</td>
<td>Electric Box Assembly</td>
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<td>1/4 Lock Washer</td>
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<td>Lift Cylinder Seal Kit</td>
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BOOM PARTS

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WINCH GEARBOX/BRAKE PARTS
Assembly #384852

Ref #QtyDescriptionPart #
11Bearing Sleeve..........................41314
21Brake Housing.........................40069
31Output Shaft..........................41694
41Winch Housing.........................40640
51Bushing/Breather Kit.................4101
61Cover .....................................40893
71Oil Seal ..................................40643
81Worm .......................................40598
91Gear .......................................40618
101O-Ring ..................................40547
116Cap Screw ..............................40407
121Bushing .................................40968
131Washer .................................40644
141Washer .................................29017
152Key ........................................40518
162Retaining Ring ..........................40396
172Ball Bearing ............................40395
182Pipe Plug .................................32220
192Gasket ....................................40147
201Brake Hub ...............................40617
212Friction Disc .........................40075
222Stator Plate ...........................40076
232Socket Head Cap Screw ............40546
242Cap Screw ...............................40410
251Cam Clutch .............................40113
261Protector ...............................33561
271Spring ...................................40077
282Square Key ..............................40762
296Washer .................................30841
301Thrust Washer .........................40078
311Set Screw ...............................40775
321Sealing Lock Nut .....................40774
331Seal Washer ............................29044
341Brake Spacer ...........................40599
## TROUBLE SHOOTING

The following chart lists possible operational problems and possible solutions. While the following chart may not cover every situation, problems and solutions listed will help isolate the cause of the problem. It is important when trouble shooting to check only one variable at a time. Attempting to check several solutions at once may prevent discovery of the actual malfunction.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible Cause</th>
<th>Possible Solution</th>
</tr>
</thead>
</table>
| No response to controls | Load over capacity  
Relief valve stuck  
Relief setting wrong  
PTO not engaged  
Low hydraulic fluid supply  
Suction line restricted  
Pump defective  
Valve spool not open | Check crane capacity chart  
Clean valve  
Check and adjust setting  
Engage PTO  
Check and fill to level  
Check line for restriction  
Check gate valve is open  
Check pressure---replace  
Check for proper operation |
| Boom Extend/Winch Raise Functions Do Not Operate | Overload valve activated  
Overload system defective | Retract functions or lower load to eliminate  
Check sense valve operation |
| Cylinders Drift | Holding valves dirty  
Holding valves setting wrong  
(Lift up & extend out only)  
Piston seals worn/damaged  
Air in hydraulic system  
Temperature change | Remove, clean, replace  
Loosen locknut and turn out to increase setting  
Replace as needed  
Cycle cylinders to remove air  
Slight drift normally occurs |
| Solenoid Controls Do Not Operate | Loss of voltage  
Main Switch Off  
Conductor broken/shorted  
Solenoid coils defective | Test circuit(s) for correct voltage  
Turn Switch On  
Replace/Repair Conductor  
Replace  
Check for proper operation using manual overrides |
| Erratic Rotation | Bearing/Drive mount loose  
Erratic valve actuation  
Worn rotation drive-bearing | Torque bolts (see torque chart)  
Operate controls smoothly  
Inspect/replace if necessary |
| No Rotation | Incline is too great  
Turntable bearing friction  
Hydraulic problem | Level machine  
Lubricate bearing  
Check for dirty filters or malfunctioning components |
| Noisy Rotation | Bearing not lubricated  
Bearing/drive loose/worn  
Gear backlash incorrect | Lubricate (see lube section)  
See above  
Set backlash (call factory) |
## TROUBLE SHOOTING CONTINUED

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible Cause</th>
<th>Possible Solution</th>
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<tbody>
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<td>General Slow or Noisy Operation</td>
<td>Hydraulic oil supply low</td>
<td>Check and fill to level</td>
</tr>
<tr>
<td></td>
<td>Low pump speed</td>
<td>Adjust truck throttle</td>
</tr>
<tr>
<td></td>
<td>Thin oil/high temperature</td>
<td>Check viscosity for season</td>
</tr>
<tr>
<td></td>
<td>Relief setting/condition</td>
<td>Adjust or replace</td>
</tr>
<tr>
<td></td>
<td>Filter element dirty</td>
<td>Replace element</td>
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<td></td>
<td>Suction strainer plugged</td>
<td>Clean or replace</td>
</tr>
<tr>
<td></td>
<td>Valve contaminated</td>
<td>Clean or replace</td>
</tr>
<tr>
<td>Noisy Boom Operation</td>
<td>Requires lubrication</td>
<td>Lubricate (see lube chart)</td>
</tr>
<tr>
<td></td>
<td>Worn/damaged wear pads</td>
<td>Lubricate lightly or replace</td>
</tr>
<tr>
<td>Winch does not Operate Or</td>
<td>Hydraulic or electric cause</td>
<td>See other sections of this chart</td>
</tr>
<tr>
<td>Operates Improperly</td>
<td>Motor worn/damaged</td>
<td>Repair/replace</td>
</tr>
<tr>
<td></td>
<td>Gearbox worn/damaged</td>
<td>Repair/replace</td>
</tr>
</tbody>
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Common causes of problems associated with the directional valve and remote control system are listed below.

A. Directional valve spool is sticky and not moving smoothly. Remove spool and clean with solvent to remove any dirt.

B. Conductor wire is open (broken), shorted, or grounded. This may occur in any portion of the wiring harness. First inspect for voltage to main on-off switch. Further checking of conductors with a continuity tester may further isolate the problem. If a faulty conductor is found in the main remote, it can be replaced with unused conductors also found in the main remote. See electrical schematic (p. 18) for illustration.

C. Toggle switch may be defective causing sudden or intermittent improper operation. Switch may be checked with test equipment.

All units are equipped with an overload system which consists of a hydraulic activated pressure switch and cutoff relay. Problems associated with the overload system will generally be limited to the boom extend and winch up functions as these are the functions deactivated by the overload system. Activation of the overload system is indicated when the red light on the electrical junction box is lit. Operation problems with this system are generally involving the relay or pressure switch assemblies. Troubleshooting may be conducted in a manner similar to that described previously. Refer to the appropriate schematics in this manual for complete system depiction.

Should additional assistance be required in determination of solution to a malfunction, please be prepared to proved the crane serial number, description of malfunction and testing/trouble shooting attempted, if any, when making the inquiry. Your cooperation will assist in the proper determination of the problem and likely solution.

Please refer to supplemental documentation provided regarding any optional or special equipment supplied on the crane.

Specific documentation for radio controls, proportional speed control systems, and other equipment is included in the documentation supplied for units ordered with specific options.