TEREX

OPERATOR'S MANUAL

T300-1

Revised: July 2007

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7. Operator must understand crane signals and take signals only from designated signal people; except the operator must obey the stop signal from anyone.

⚠ OPERATOR'S RESPONSIBILITIES

1. Read and understand the Operator's Manual.

2. Make sure the machine is in proper order and that all operational aids and warning signals are functional before operating.

3. Keep the machine clean, including all instrumentation, windows, lights and other glazed surfaces.

4. Remove all oil, grease, mud, ice and snow from walking surfaces.

5. Store tools and other necessary items in the tool box.

6. Never lift a load without a Rating Chart Manual in the cab.

7. Know the load to be lifted.

8. Be alert, physically fit and free from the influences of alcohol, drugs or medications that might affect the operators eyesight, hearing, or reactions.

9. Keep people, equipment and material out of the work area.

10. Signal person must be used when the operators vision is blocked or working in hazardous areas such as power lines or people.

11. Keep a fully charged fire extinguisher and first aid kit in the cab at all times, and be familiar with how to use these items.

12. Know about movements of other machinery, trucks and personnel at the jobsite.

13. Never permit people on the machine platform while the machine is working.

This section is intended to familiarize the operator with the controls and instruments provided for the operation of this machine. It should be emphasized, however, that merely knowing the controls is inadequate preparation for operating hydraulic cranes. Do not attempt to operate the machine until the other sections of this manual have been covered. Sections 1 and 3 are especially important with respect to machine operation.

Diagrams of the various carrier and upper controls are illustrated on the following pages. A list of these controls and instruments are shown opposite each illustration. More detailed explanations of each control or instrument follow in the same order as they appear in the number key.

UNIVERSAL SYMBOL IDENTIFICATION

FLOODLIGHTS 	**PARKING BRAKE** 	**ENGINE OIL PRESSURE** 
ELECTRICAL ACCESSORIES 	**OUTRIGGERS**	**COOLANT TEMPERATURE** 
ELECTRICAL SYSTEM OFF 	**AIR PRESSURE**	**WIPER** 
ELECTRICAL SYSTEM ON 	**HEADLIGHTS** 	**WASHER** 
IGNITION ON 	**FAST** 	
IGNITION 	**SLOW** 	
ENGINE STOP	**AXLE DISENGAGE/** RANGE SHIFT 	

UPPER CONTROLS & INSTRUMENTS KEY

1. FUEL GAUGE
2. ENGINE COOLANT TEMPERATURE GAUGE
3. ENGINE OIL PRESSURE GAUGE
4. VOLTMETER
5. FRONT OUTRIGGER SWITCH
6. WIPER SWITCH
7. DASH LIGHT SWITCH
8. BEACON SWITCH (OPTION)
9. WORK LIGHT SWITCH
10. WINDOW WASH SWITCH
11. DEFROSTER FAN SWITCH
12. OUTRIGGER EXTEND/RETRACT MASTER SWITCH
13. SWING LOCK SWITCH
14. FRONT JACK INDICATOR
15. LOW COOLANT INDICATOR
16. SWING LOCKED INDICATOR
17. ENGINE STOP
18. IGNITION SWITCH
19. OUTRIGGER SWITCH
20. BUBBLE LEVEL
21. *not used*
22. *not used*
23. *not used*
24. *not used*
25. *not used*
26. SWING BRAKE
27. SWING BRAKE RELEASE
28. BOOM EXTEND/RETRACT PEDAL
29. ACCELERATOR
30. HAND THROTTLE
31. SWING BEARING GREASE FITTING
32. SWING GEAR GREASE FITTING
33. SWING/AUX WINCH CONTROL (Not Shown / See Page 2-15)
34. BOOM HOIST/MAIN WINCH CONTROL (Not Shown / See Page 2-15)
35. FIRE EXTINGUISHER (Not Shown / See Page 2-15)
36. SWING LOCK (Not Shown / See Page 2-15)
37. MAIN WINCH DISABLE SWITCH (Not Shown / See Page 2-16)
38. AUX WINCH DISABLE SWITCH (Not Shown / See Page 2-16)
39. BOOM SEQUENCE OVERRIDE SWITCH (Not Shown / See Page 2-16)

RUNNING THE ENGINE

Oil Pressure

Observe the oil pressure gauge immediately after starting the engine. A good indicator that all of the moving parts are getting lubrication is when the oil pressure gauge registers pressure (5 psi - 34.5 kPa at idle speed). If there is no oil pressure indicated within 10 to 15 seconds, stop the engine and check the lubricating system. The pressure should not fall below 28 psi (193 kPa) at 1800 rpm, and normal operating pressure should be higher. If pressure does not fall within these guidelines, it should be checked with a manual gauge.

To avoid personal injury from the hot oil, do not operate a Series 60 engine with rocker cover removed for any reason.

Warm-up

Run the engine at part throttle for about five minutes to allow it to warm up before applying a load.

Inspection

Transmission - While the engine is idling, check the transmission for proper oil level and add oil as required. Look for coolant, fuel, or lubricating oil leaks at this time. If any are found, shut down the engine immediately and have leaks repaired after the engine has cooled.

Crankcase - If the engine oil was replaced, stop the engine after normal operating temperature has been reached. Allow the oil to drain back into the crankcase for approximately 20 minutes, and check the oil level. If necessary, add oil to bring the level to the proper mark on the dipstick.

Turbocharger - Make a visual inspection of the turbocharger for oil leaks, exhaust leaks, excessive noise or vibration. Stop the engine immediately if a leak or unusual noise or vibration is noted. **Do not restart the engine until the cause of the concern has been investigated and corrected.**

Avoid unnecessary Idling

During long engine idling periods with the transmission in neutral, the engine coolant temperature may fall below the normal operating range. The incomplete combustion of fuel in a cold engine will cause crankcase dilution, formation of lacquer or gummy deposits on the valves, pistons, and rings, and rapid accumulation of sludge in the engine. When prolonged idling is necessary, maintain at least 850 rpm spring/summer and 1200 rpm fall/winter.

STOPPING THE ENGINE

Normal Stopping

1. Decrease engine speed back to normal idle and put all shift levers in the neutral position.

2. Allow the engine to run between idle and 1000 rpm with no load for four or five minutes. This allows the engine to cool and permits the turbocharger(s) to slow down. After four or five minutes, shut down the engine.

Stopping a turbocharged engine immediately after high speed operation may cause damage to the turbocharger as it will continue to turn without an oil supply to the bearings.

MAKING A TYPICAL LIFT

speed. With the lever approximately one half of the way forward, increased “PUSH” is available at reduced speed.

7. Lower the hook block to the load and fasten the hook.

Before making any crane lift, make sure the hook is properly engaged with the slings, or lifting device employed to make the lift. Be certain the hook latch is not supporting any of the load.

Hoisting or lowering of the load with the winch is controlled by the winch lever. LOWER the load by pushing the lever FORWARD and RAISE the load by pulling the lever BACK. Improved control is obtained by operating the engine at low speed while “metering” the control. Always actuate and release this lever slowly to minimize dynamic effects of the load and to prevent “bird nesting” of the cable on the winch drum.

To shift the winch into the high-speed, select high speed using the two speed switch. When slowing the winch, slowly return winch lever to neutral position to bring the load to a gradual stop.

8. Lift the load to the desired height. It is good operating practice to not lift the load any higher than necessary.

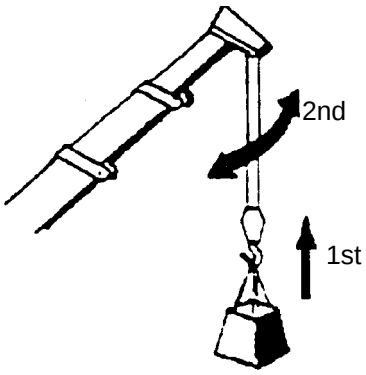
The crane is equipped with an anti two-block system which includes a warning light, audible alarm, and control disconnects. When the hook block or ball activate a correctly installed and maintained anti two-block system, the block or ball will not raise, the boom cannot be extended and the boom cannot be lowered. To return to an operating condition, either lower the hook or ball, retract or raise the boom.

The operator may need to raise the hook block beyond the point at which the anti two block system is activated during rigging or travel. The operator may override the system. *(shown in control and instrument sections).*

CAUTION

Continuing to pull the block up after contact has been made with the boom head may result in damage to boom head and sheaves or the cable may be broken causing the load to drop.

9. Swing and spot the load over the location where it is to be deposited.



10. Lower the load and unfasten the hook.

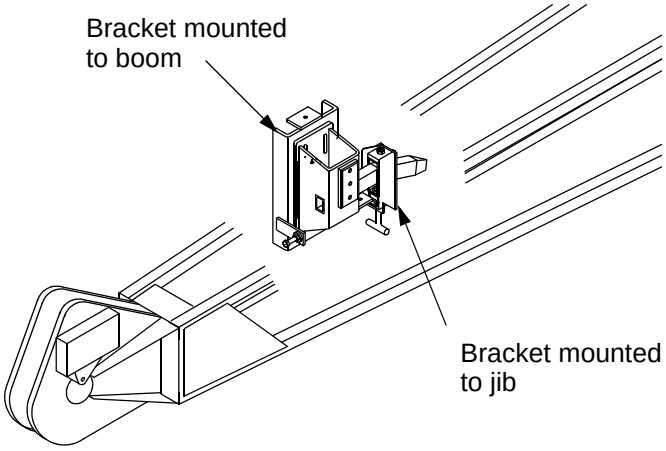
CAUTION

When spotting the load it may be necessary to alter the boom length or boom angle. In making these adjustments, the operator must guard against exceeding the rated load as determined by the load rating charts.

STOWING THE JIB

12. With the engine at idle, slowly retract the boom completely. The jib will engage the jib storage brackets as the boom is retracted.

13. Remove the guide rope from the tip of the jib.



14. As the boom is retracted, verify that the stowage bracket mounted to the jib is engaging properly with the stowage bracket mounted to the boom.

15. Rotate and release the T- handle to lock the jib to the storage brackets.

16. Remove the right upper and lower jib mounting pins.

17. Test the anti two-block system at the boom head by lifting the anti two-block weight. The light and audible alarms should be actuated in the cab and the boom down, boom extend, and winch up controls should disconnect.

INDEX

SECTION 4

KOEHRING SPEC 805 DATA

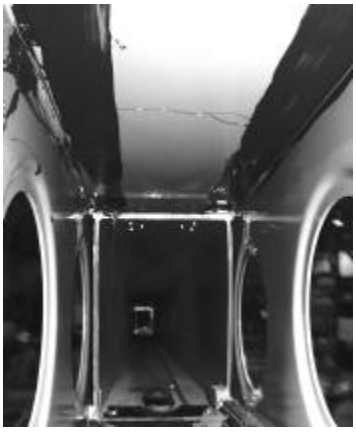
PHYSICAL PROPERTIES	TEST METHOD	REQUIRMENT
A. A.P.I. Gravity	ASTM D287	28 Min.
B. FLash Point	ASTM D92	380× F Min.
C. Viscosity Index 100×F 210×F	ASTM D445 ASTM D445	200-220 SSU 46 SSU MIn.
D. Viscosity Index	ASTM D2270	95 Min.
E. Pour Point	ASTM D97	-25× F Max.
F. Oxidation Test to 2.0 Neut. No.	ASTM D943	2500 Hours Min.
G. Rust Test	ASTM D665 Procedure A	Pass
H. Foam Test	ASTM D892 Sequence I Sequence II Sequence III	Foam Tendency / Foam Stability 25 ml Max. / Nil 50 ml Max. / 10 ml Max. 25 ml Max. / Nil
I. Demulsibility	ASTM D1401 to 40-37-3 point	30 Min. Max.
J. Aniline Point	ASTM D611	200-230× F
K. Pump Wear	Dennison HFO or Vickers M2905 (100 Hrs.@150× F)	Satisfactory
L. % Zn	ASTM D1549	.07 Min.
M. Filterability		Fluid shall show no additive loss when filtered through 5.0 micron filter.
N. Cleanliness		Fluid shall appear bright and clear and shall be free of visible contaminates or sludge.

BOOM LUBRICATION

5 SECTION BOOM (138')

4. Through the holes in the tip end of section 4, apply a liberal amount of multi-purpose grease to the foot of section 5. Also apply grease to approximately the center 12" of the floor of section 4 along the entire length of the section.

5. Apply multi-purpose grease to the outer 5" of both sides of the top plate of Section 4. This area can be accessed through the holes in the #4 section. Apply grease along the entire length of the section.



6. Apply grease to the outer 5" of the floor of Section 3 through holes in 3rd section. Also put a fist sized portion of grease in the center of the bottom plate on the inside through each of the holes in the boom on the path wear the cylinder slides.

7. Cycle the boom several times.

OIL IN RESERVOIR - FOAMING

CAUSE	REMEDY
Air leak in suction side of supply pump	**Refer to pump servicing instructions.**
Pump cavitating	**Check for restriction in pump supply.**
Oil overheating	**See high operating temperatures.**
Incorrect lubricant	**Change to 10W-40 motor oil.**

EXCESSIVE PUMP PRESSURE WITH STEERING GEAR IN NEUTRAL POSITION

CAUSE	REMEDY
Pinched oil return line. High back pressure	**Relocate line.**
Binding steering column	**Repair steering column.**
Damaged actuating shaft bearing	**Replace damaged parts as required.**

WHEEL CUTS RESTRICTED

CAUSE	REMEDY
Relief plungers misadjusted	**Adjust relief plungers (see final adjustments).**

ERRATIC STEERING OR NO STEERING AT ALL

CAUSE	REMEDY
Insufficient volume of oil being metered by flow divider to steering gear induced by foreign particles on flow divider valve, causing the valve to hang up in the bore	**Polish flow divider valve to remove foreign particles and burrs. Refer to pump servicing instructions.**

PARKING BRAKE

MAXI-BRAKES WON'T APPLY
(From Park Brake Button)

CAUSE	REMEDY
Restricted hose or tube	**Remove restriction or replace.**
Defective relay valve	**Repair or replace.**
Defective spring brake valve	**Repair or replace.**
Defective control valve	**Repair or replace.**

MAXI-BRAKES WON'T APPLY
(With loss of air pressure in one service reservoir)

CAUSE	REMEDY
Restricted hose or tube	**Remove restriction or replace.**
Defective control valve	**Repair or replace control valve.**

BRAKES WON'T APPLY ON REAR AXLE
(With loss of air pressure in one service reservoir)

CAUSE	REMEDY
Restricted hose or tube	**Remove restriction or replace.**
Defective spring brake valve	**Repair or replace spring brake valve.**

NO PRESSURE IN SYSTEM (CONTINUED)

CAUSE	REMEDY
Relief valve not functioning due to:	
Cold fluid	**Warm up system. Work with oil at recommended operating temperature range. (See Operation section).**
Air leak or restriction at inlet line	**Repair or clean.**
Internal parts of pump are worn excessively	**Replace pump.**

PUMP MAKING NOISE

CAUSE	REMEDY
Pump disconnect notengaged	**Shut engine off and engage pump disconnect.**
Partially clogged intake line, intake filter or restricted intake pipe	**Clean out intake filter screen or eliminate restriction. Be sure suction line is completely open.**
Air leaks:	
At pump intake pipe joints	**Test by pouring oil on joints while listening for change in sound of operation. Tighten as required.**
Air drawn in through inlet opening	**Check and add oil to reservoir if necessary.**
Air bubbles in oil	**Use hydraulic oil containing a foam depressant.**
Too high oil viscosity	**Work only with oil at recommended operation temperature.**
Oil intake suction filter plugged	**Clean filter.**
Rag, paper, etc., pulled into suction line or pump	**Remove.**
Worn or broken parts	**Replace.**

HEATING CAUSED BY POWER UNIT (RESERVOIR, PUMP, RELIEF VALVE AND COOLERS) (CONTINUED)

CAUSE	REMEDY
Leaking relief valves	**Repair.**
Improper functioning of oil cooler	**Inspect cooler and see that it is working properly.**
Improper machine operation	**Return control to neutral when stalled, cylinder at end of stroke, etc.**

HEATING BECAUSE OF CONDITIONS IN SYSTEM

CAUSE	REMEDY
Restricted lines	**If lines are crimped, replace; if partially plugged for any reason, remove obstruction.**
Internal leaks	**Locate leaks and correct.**
Low oil level	**Check oil level and fill if necessary.**

ELECTRICAL CONTROLS

ELECTRICAL FAILURE

CAUSE	REMEDY
Rocker switch sticking	**Remove switch, check if hole is too tight. Cut out decal or file hole larger.**
Tripped circuit breakers	**Reset breaker**
Disconnected or broken wires	**Replace or repair.**
Open circuit	**Check with test light. Repair or replace.**
Low voltage	**Check wires and grounds.**
Poor engine solenoid connection	**Clean and tighten.**
Defective solenoid	**Replace.**
Solenoid failure	**Replace.**
Poor ground connections	**Clean and tighten connections.**

GENERAL SERVICE INFORMATION

Machine productivity, longevity and low cost performance depend on periodic maintenance, troubleshooting and proper service and adjustment procedures.

As the operator, it is your responsibility to detect any unusual sounds, odors or other signs of abnormal performance that could indicate trouble ahead.

By detecting any malfunctions in their early stages, you can save yourself unnecessary downtime and your employer a lot of money! Therefore, it is also your responsibility to use good judgement in detecting potential problems in the early stages and repairing them quickly. If you don't, one problem may lead to another.

Before attempting to make a repair, ask yourself IF you have the RIGHT TOOLS, IF you have the PROPER TEST EQUIPMENT and IF you can accurately DIAGNOSE the cause of the malfunction.

If you can't answer YES to all three questions, rely on your distributor serviceman. He has the tools, testing equipment and service knowledge to pinpoint the problem in minutes instead of the hours consumed in hit - or - miss methods. TIME IS MONEY! He will save it for you.

If you decide to attempt a repair yourself, follow a logical TROUBLE-SHOOTING PROCEDURE. Don't simply replace parts until the trouble is found.

Once the cause of a problem or malfunction has been diagnosed, take the corrective action specified in this manual. Follow the procedures given for the specific problem. If the difficulty is not covered, consult your Distributor Serviceman.

NOTE: A time table styled check list for periodic maintenance requirements is given in Section 4. Maintenance check procedures are found under each of the respective subject headings.

When performing maintenance on a vehicle ALWAYS PLACE THE SHIFT LEVER IN THE NEUTRAL POSITION, set the parkingbrakes, block the vehicle's wheels, and NEVER work under, in front of, or in back of a vehicle when the engine is running.

The methods used to remove assemblies, guards, cab panels, etc. is left to the discretion of the customer dependent on the type of overhaul equipment and maintenance personnel at hand.

Keep parts in order when large components are disassembled, particularly so when it has a great number of similar parts. Loosely reassemble assemblies whenever possible to prevent small parts from being lost. Keep subassembly parts together, but be careful not to get right and left hand parts mixed up.

When an assembly is removed to correct only one difficulty, it is good practice to recondition the whole assembly at the time thus avoiding repetition of work at a later date.

Bolts and nuts should be placed into their respective holes when removing guards, cases, etc. so that proper bolt will be on hand when reassembling these parts.

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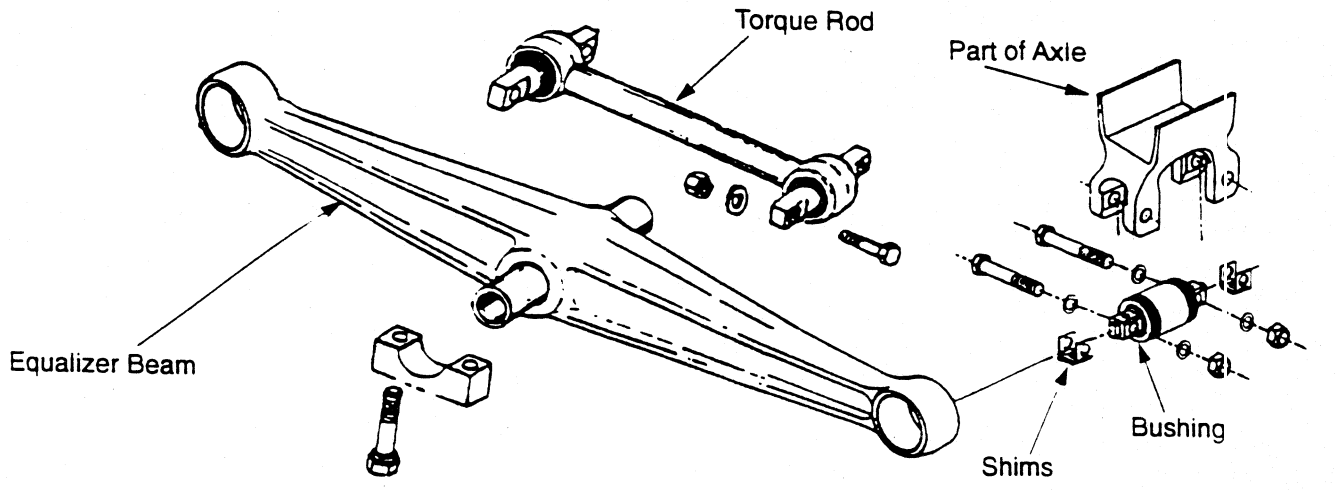
REAR SUSPENSION



The rear suspension incorporates equalizer beams, which link front and rear driving axles, and torque rods which locate the axles. Servicing these components consists of replacing worn bushings.

EQUALIZER BEAM BUSHINGS Both center and end bushings are replaceable. The beams must be removed prior to servicing the bushings. Remove the beams by the following procedure:

1. Remove the capscrews and saddle caps from the beam center pin.

2. Support the beam at one end. Remove the through bolt and shims from the same end. Remove the support and lower the beam end to the ground.

3. Support the other beam end and repeat step #2.

BEAM ISTALLATION Reverse the beam removal procedure to reinstall the beam.

Torque the center pin saddle clamp capscrews to 225-275 ft. lbs and beam end through bolt nuts to 210-240 ft. lbs.

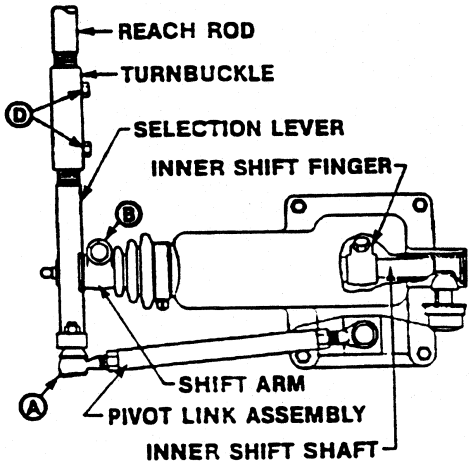
SHIFT CONTROL ADJUSTMENT

Proper adjustment of the L.R.C. is necessary for smooth shift linkage operation. Use the procedure listed below to insure correct adjustment. The steps should be followed as listed to avoid confusion and prevent mistakes.

MOVE THE INNER SHIFT FINGER
TO THE NEUTRAL POSITION

Move gear shift lever forward or backward to the neutral position.

Move the gear shift lever sideways, toward reverse, until you feel resistance from the reverse plunger spring. DO NOT overcome the spring tension and shift to reverse. The shift finger must remain in this position while you are making all the adjustments.



ADJUST THE SLAVE UNIT

Remove the cotter pin, castle nut, and ball joint A from the selection lever. Do not remove the ball joint from the pivot link.

Loosen capscrew B and remove shift arm from inner shaft. Do not disconnect the selection lever from the shift arm.

Turn the shift arm until it is at a right angle (90°) to the selection lever as viewed from the side.

NOTE: Ideally, the shift arm should be adjusted 90° to the selection lever as described, but in some chassis configurations, it may be necessary to index the shift arm in the vertical position. This is done to prevent a shift lever jump out complaint. This type of adjustment will cause an unequal amount of gear shift lever travel between neutral and a forward lever position as compared to neutral and a rearward lever position.

Re-install the shift arm on the splines of the inner shift shaft. You may have to move the shift arm 4 or 5 degrees to align the splines of the two parts. Disregard any movement of the gear shift lever at this point. You will adjust the gear shift lever later.

Tighten capscrew B

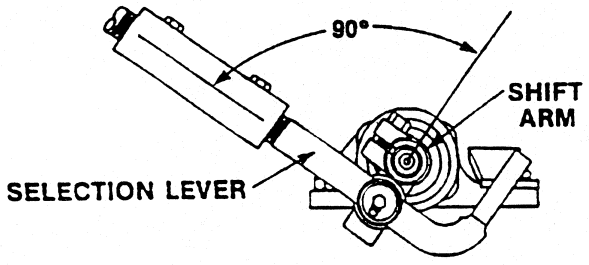
Re-connect pivot link assembly ball joint to selection lever. Secure with castle nut and cotter pin.

Loosen jam nuts C on pivot link.

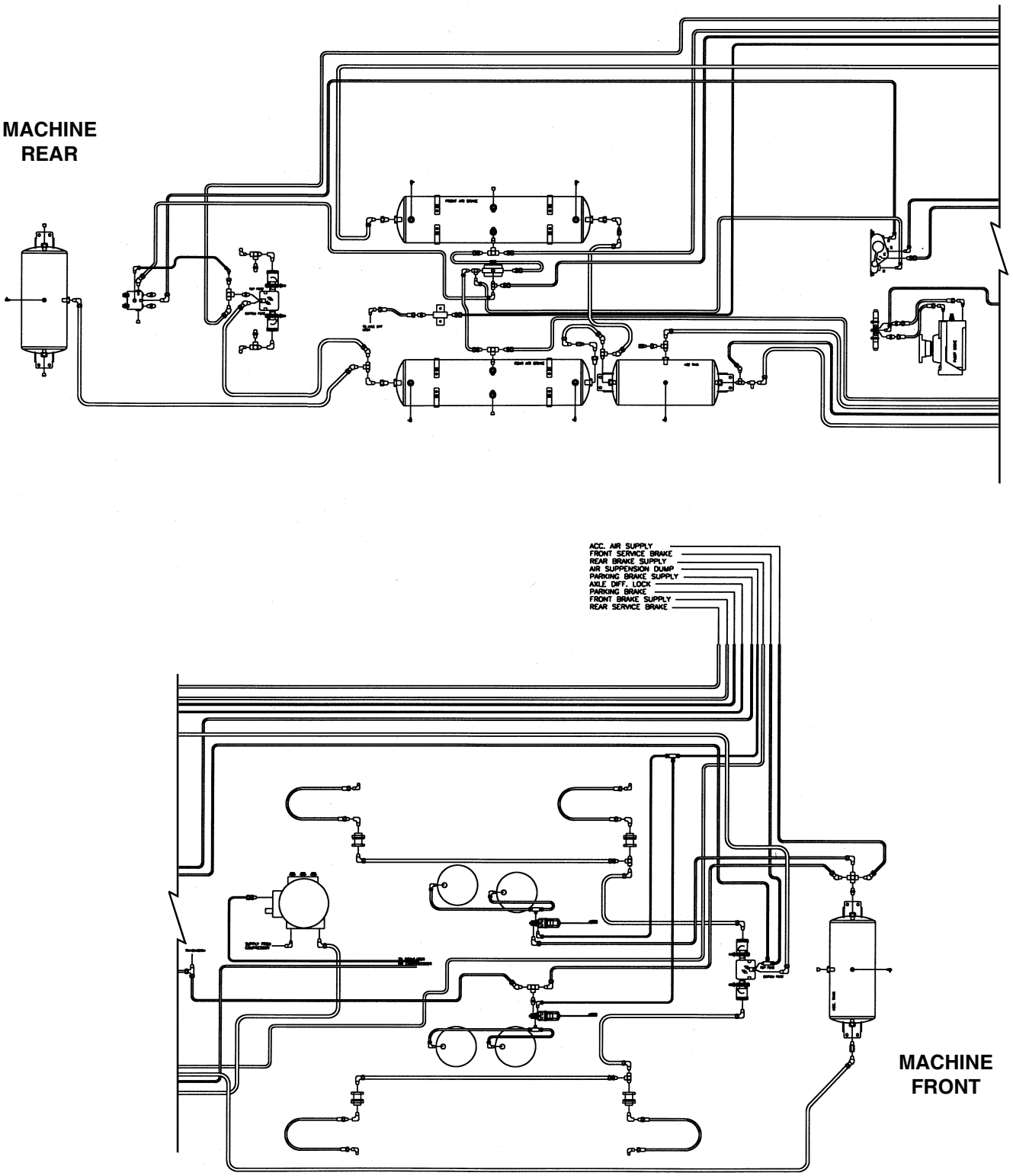
Check to be sure the inner shift finger is still in place as described above.

Rotate pivot link until curved end of selection lever is parallel with the shift arm as viewed from the rear.

Tighten pivot link jam nuts C



AIR SYSTEM SCHEMATIC



PUMPS

TEST PROCEDURE Be sure there is an adequate supply of oil for the pump, at least one gallon of oil for each GPM of pump capacity.

If one section of a tandem pump is being tested, make sure that all other sections not being tested are adequately supplied with oil. If any of the other sections run dry, or if plugs are left in ports, serious and permanent damage will result.

The oil should be a good quality hydraulic oil rated at 150 SSU at 100°F, with the oil temperature held at 120°F plus or minus 5°F.

The feed line must be of adequate size with no more than 5" mercury vacuum adjacent to the pump inlet. As a rule, the feed line must provide a feed flow velocity not in excess of 8 feet per second.

Hot oil must not be fed into a cold pump. It may seize. Jogging may prevent seizure.

Operate the pump at least two minutes at zero pressure and at moderate speed (not over 1500 rpm).

If pump becomes hot to touch, it is binding and may seize. This doesn't happen very often, but if it does, pump will have to be disassembled and rebuilt, with extra care taken to remove burrs and to assure freedom from binding.

Gradually increase pressure on pump, intermittently, until the desired test pressure has been reached. This should take about five minutes.

Delivery should run close to rated catalog performance figures which are averaged from testing several pumps. SOmething like a 5% lower reading may be used as a rated minimum if new or relatively new parts have been used. When rebuilding the pump with parts from the original pump, which, while worn, appear satisfactory for re-use, a 10% or 15% lower reading may be permitted, depending on the performance expected from the equipment. One's own experience will prove the best guide here.

Many repairmen measure the output at normal operating speed and at zero pressure, then again at 1000 psi (or the operating pressure of the equipment) and allow a volume decrease approximating the listing below. It is a suggested reference only which makes allowance for re-used parts.

GPM DELIVERY
at 1800 rpm

	GPM DROP OFF AT		
100 psi	1000 psi/70 bar	2000 psi/140 bar	3000 psi/210 bar
10-30	1 1/2 - 3	2 - 3 1/2	2 1/2 - 4
30-50	2 - 3	2 1/2 -4	3 -4 1/2
50-70	2 1/2 - 3 1/2	3-5	3 1/2 - 5 1/2

Be sure to run the pump in the direction for which it was designed and built. Driving pump in the wrong direction will build up pressure behind shaft seal, damaging it and necessitating replacement.

Since it is rarely feasible to test motors on dynamometers, the practical procedure is to test them as pumps, running complete testing procedures in each direction.

After completing testing procedures, pump is ready for installation and immediate duty operation on equipment. Again, it must be remembered that to prevent seizure, hot oil must not be fed into a cold pump.

⚠ CAUTION

USE OF IMPROPER TOOLS IN SERVICING THESE PUMPS MAY RESULT IN DAMAGE TO PUMP COMPONENTS.

ELECTRICAL SYSTEM
BATTERY CHECK

MAINTENANCE CHECK Observe all instruments and gauges while operating machine and carrying out your *DAILY MAINTENANCE CHECKS*. Replace or repair any malfunctioning instruments or gauges.

BATTERY The maintenance-free batteries are located under the battery cover on the left-hand side of machine. Use maintenance-free battery charging information.

A maintenance-free battery does not require the addition of water during its life in normal service. This is due to the fact that maintenance-free batteries produce little gas at normal charging voltages.

TESTING MAINTENANCE-FREE BATTERIES

CAUTION

WHENEVER THE BATTERY IS PLACED ON CHARGE, WEAR SAFETY GLASSES. DO NOT BREAK "LIVE" CIRCUITS AT THE BATTERY TERMINALS. Maintenance-free batteries of the latest design incorporate flame arrester vents to reduce the possibility of explosions caused by external sparks. Therefore, during charging, the vents, if removable, should remain in place. A wet cloth should be placed over the vent openings as an additional precaution.

Step 1 - Visual Inspection

Visually inspect the outside of the battery for obvious damage such as a cracked or broken case or cover which would allow electrolyte loss. Check for terminal damage. If obvious physical damage is found, replace the battery. If possible, determine the cause of damage and correct.

Check the condition and size of the cables. Are the cable clamps tight? Check for corrosion on the terminal or clamps. Clean corroded parts and/or tighten clamps if necessary. Replace badly corroded cables or cables with defective terminals. Make certain the negative cable is making a good co

connection where it is grounded to the engine and the positive cable to the starter relay. If the "Visual Inspection" is satisfactory, proceed to Step 2.

Step 2 - Electrolyte Levels And State Of Charge Check the electrolyte level in the cells if possible. The level can be seen through translucent plastic cases. It can also be checked in batteries which are not sealed. If the electrolyte level is below the tops of the plates in any cell, add water if the vents are removable. If the battery is sealed, and water cannot be added to it, replace the battery and check the charging system for a malfunction such as a high voltage regulator setting. Follow instructions of manufacturer if the battery has a special indicating device.

If the level is O.K., unknown, or water can be added to the battery, and the stabilized open circuit voltage is below 12.4 volts, charge the battery as described under "Charging". The voltage is stabilized if the battery has stood overnight without being charged or discharged. If the battery has been on charge, the voltage can be stabilized by placing a 15 ampere load across the terminals for 15 seconds. Another method of stabilization is to turn on the headlamps for 15 seconds. Read the voltage at least three minutes after the discharge load is removed. When a hydrometer reading can be taken, a value of 1.225 @ 80°F (26.7°C) can be used instead of the 12.4 voltage reading. If the battery has a test indicator, follow the instructions of the manufacturer. After the battery is recharged, stabilize the voltage as described above, then proceed to Step 3.

If the stabilized voltage of the battery was above 12.4 volts when it was first examined, or the test indicator indicated the battery is charged, proceed to Step 3 without charging the battery.

WIRE ROPE AND REEVING

CABLE REEVING When reeving the machine for any job, remember that hoisting and lowering speeds decrease as the number of parts of line increases. For the most efficient use of the machine, it is desirable to use the minimum number of required parts for lifting the anticipated loads.

This machine incorporates a "Quick Reeving" boom head and block which do not require removal of the wedge and socket from the rope in order to change the reeving. Removal of two pins in the boom head and three in the hook block will allow the wedge and socket to pass through.

CAUTION

NEVER USE LESS THAN THE NUMBER OF PARTS CALLED FOR BY THE LOAD RATING CHART. THE MINIMUM REQUIRED NUMBER OF PARTS IS DETERMINED BY REFERRING TO THE LOAD RATING CHART.

CAUTION

NOTE: IF A SOCKET IS CHANGED OR REPLACED, OR IF YOU ARE CHANGING HOOK BLOCK WEIGHTS; IT IS IMPORTANT TO USE THE CORRECT SOCKET.

SPOOLING WIRE ROPE ON DRUMS

Care must be exercised when installing wire rope on the winch drum. Improper spooling can result in rope damage through crushing, kinking, doglegs, abrasion and cutting. Poorly installed wire rope will also adversely affect the operating characteristics of the machine by causing uneven application of force and motion. This, in turn, can cause premature fatiguing and failure of the rope.

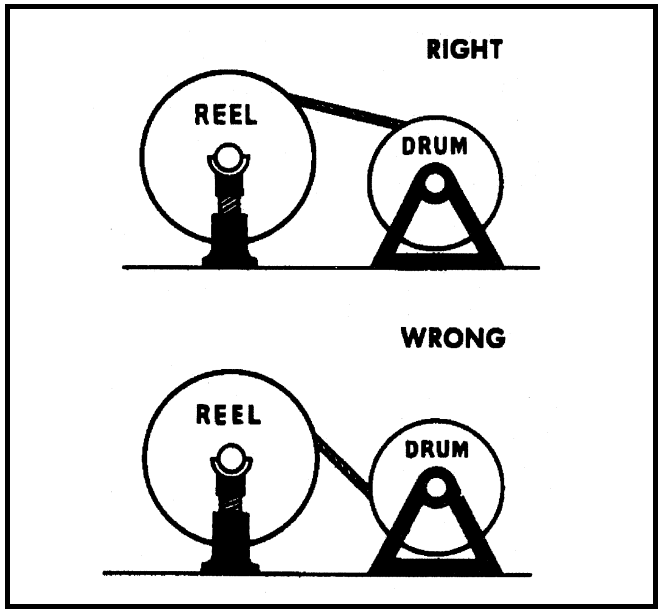
Thoroughly inspect and clean the winch before proceeding with the installation. Check the lagging and drum flanges for cracks, breaks, and excessive wear. Deformed or outsized drum and excessive undercutting at the base of the flange also indicate that repair or replacement of the drum is necessary.

Check the bearings for excessive wear and play.

After correcting any defects revealed by the inspection and determining that the winch is in good operating condition, spool the wire rope as follows:

Mount the cable shipping reel vertically on jacks or a suitable supporting structure, with a pipe or bar through the reel center. The cable should be drawn from the top of the reel, as shown, in order to avoid reverse bending as it is spooled onto the winch drum.

If cable is wound from the storage reel onto the drum, the reel should be rotated in the same direction as the hoist.



Apply braking force to the reel flange in order to prevent overrun as the rope is being drawn off. Loops formed by overrun can cause kinks and doglegs in the rope, resulting in damage and premature rope failure. A timber or block forced against the shipping reel flange can be used to provide the required braking force.

4. Atomize or spray 4 ounces of Nox Rust VCI No. 10 oil, or equivalent, into the transmission through the oil drain hole. Install the drain plug.

5. If additional storage time is required, (3) and (4) above should be repeated at yearly intervals.

***Nox Rust is a preservative additive manufactured by the Daubert Chemical Company, Chicage, Illinois. Motorstor is covered by US Military Specifications MIL-L-46002 (ORD) and MIL-1-23310 (WEP).**

RESTORING TRANSMISSION TO SERVICE

1. If Nox Rust, or equivalent, was used in preparing the transmission for storage, use the following procedures to restore the unit to service.

2. Remove the tape from openings and breather.

3. Wash off all the external grease with solvent.

4. Add hydraulic transmission fluid, type C3 to proper level.

NOTE: It is not necessary to drain C3 oil and Nox Rust mixture from the transmission.

5. If Nox Rust or equivalent, was not used in preparing the transmission for storage, use the following procedures to restore the unit to service.

6. Remove the tape from openings and breathers.

7. Wash off all the external grease with solvent.

8. Drain oil.

9. Install a new oil filter element(s).

10. Refill transmission with hydraulic transmission fluid, type C3 to proper level.

RESTORATION TO SERVICE

Refer to page 7-4, “Restoring Engine to Service”, and page 7-5 and 7-6, “Restoring Transmission to Service”, for the procedures required to restore these components to service.

Remove the **MACHINE** from storage via the following procedure:

1. Remove preservative lubricants from all surfaces.

2. Check all fluid levels, adding or draining as required.

3. Lubricate the machine according to Section 9, making certain that all points with grease fittings are lubricated.

4. Make a thorough visual inspection of the entire machine, placing special emphasis on the condition of all hydraulic hoses.

STANDARD CARRIER EQUIPMENT (continued)

CARRIER CAB

One-man aluminum cab is mounted on vibration absorbing pads and has optimum visibility, safety glass, acoustical foam padding inside cab for insulating against sound and weather, hot air defroster, six-way adjustable air suspension seat with seat belt and arm rests, and a lockable door with roll down window.

CONTROLS

Included are transmission shift, inter-axle differential lock, cruise control, parking brake, two-speed windshield wiper/washer, heater and defroster, lights, headlight dimmer, dome light, and ignition switch.

INSTRUMENTS

Included are speedometer, hourmeter, tachometer, voltmeter, fuel gauge, engine oil pressure gauge, water temperature gauge, dual air pressure gauges. Warning lights include low coolant level, parking brakes on, low air, pumps engaged, and high beam lights.

ACCESSORIES

Included are fire extinguisher, right hand and left hand rear view mirrors, electric horn, access steps and grab handles (located at four separate points around the crane), back-up alarm, two position boom rack, front and rear towing loops.

LIGHTS

Light package includes headlights with foot operated dimmer switch, clearance lights, tail lights, directional signal lights, four-way hazard flasher lights, back-up lights with audible alarm.

OPTIONAL EQUIPMENT

Spare Tire with Wheel • Immersion Heater(s) • Pintle Hook • Cold Weather Kit • Allison 3500 RDS 6-speed Automatic Transmission • Rear Air Suspension • Engine Exhaust Brake • Air Conditioner • Aluminum R/L Hand Tool Boxes • Ground Level Outrigger Controls

HYDRAULIC SYSTEM

HYDRAULIC PUMPS

Triple pump driven from engine flywheel housing PTO with air shifted mechanical pump disconnect at 1.15 times engine speed. A separate steering pump is driven directly from the engine. Combined system capacity is 115 gpm (435 lpm). Hydraulic oil cooler is standard.

Main Winch Pump
54 gpm (204.4 lpm) @ 3,500 psi (246.1 kg/ cm²)
Boom Hoist and Telescope Pump
39 gpm (147.6 lpm) @ 3,500 psi (246.1 kg/ cm²)
Outrigger and Swing Pump
22 gpm (83.3 lpm) @ 2,500 psi (175 kg/ cm²)
Power Steering Pump
8 gpm (30.3 lpm) @ 2000 psi (105.5 kg/cm²)

FILTRATION

Full flow oil filtration system with bypass protection includes a removable 60 mesh (250 micron) suction screen-type filter and 5 micron replaceable return line filter.

HYDRAULIC RESERVOIR

All welded construction with internal baffles and diffuser. Provides easy access to filters and is equipped with an external sight level gauge. The hydraulic tank is pressurized to aid in keeping out contaminants and in reducing potential pump cavitation. Capacity is 91 gal (344 liters).

MAIN WINCH SPECIFICATIONS

Hydraulic winch with bent axis piston motor and planetary reduction gearing provides 2-speed operation with equal speeds for power up and down. Winch is equipped with an integral automatic brake, grooved drum, tapered flanges, standard cable roller on drum, and electronic rotation indicator.

PERFORMANCE	LO-RANGE	HI-RANGE
Max. line speed (no load)		
First layer	167 fpm (50.9 m/min)	335 fpm (102.1 m/min)
Fifth layer	242 fpm (73.8 m/min)	484 fpm (147.5 m/min)
Max. line pull-first layer	15,639 lbs (7093 kg)	7,298 lbs (3310 kg)
Max. line pull-fifth layer	10,827 lbs (4911 kg)	5,052 lbs (2291 kg)
Permissible line pull	9,000 lbs (4082 kg)	

DRUM DIMENSIONS	DRUM CAPACITY
10.62 in (270 mm) drum diameter 17.55 in (446 mm) length 18.0 in (457 mm) flange dia. Cable: 5/8" x 450 ft. (16 mm x 137.2 m) Cable type: 5/8" (16 mm) 6x19 IWRC IPS right regular lay, preformed. Min. breaking strength 17.9 tons (16.2 mt).	Max. Storage: 570 ft (173.7 m) 6th layer not a working layer Max. Usable: 455 ft. (138.7 m)* *Based on minimum flange height above top layer to comply with ANSI B30.5

OPTIONAL AUX. WINCH

Hydraulic 2-speed winch with bent axis piston motor, equal speed power up and down, planetary reduction with integral automatic brake, grooved drum with tapered flanges, drum roller, and rotation indicator.

PERFORMANCE
Max. line speed (no load)
Fifth layer 484 fpm (147.5 m/min)
Max. line pull
First layer 15,639 lbs (7093 kg)
DRUM DIMENSIONS AND CAPACITY
(Same as main winch)

OPTIONAL HOIST LINE

MAIN WINCH AND OPTIONAL AUXILIARY WINCH – 5/8" (16 mm) rotation resistant compacted strand 18 x 19 or 19 x 19. Min breaking strength 22.6 tons (20.6 mt).

ENGINE SPECIFICATIONS

Make and Model	Cummins ISC 300 (300 hp)
Type	6 cylinder
Bore and Stroke	4.49 x 5.32 in. (114 x 135 mm)
Displacement	504.5 cu. in. (8.27 l)
Max. Gross Horsepower	300 hp (224 kw) @ 2000 rpm
Max. Gross Torque	860 lbs•ft. (1166 N•m)/1300 rpm
Net Horsepower	242 hp (180 kw) @ 2000 rpm
Aspiration	turbocharged
Electrical System	12 volt
Alternator	100 amp
Battery	(2) 12V-950 C.C.A. @ 0°F (-18°C)
Fuel Capacity	60 gal (227 l)

SPEED AND GRADEABILITY

Engine Transmission	Speed Range	Gradeability
Cummins Manual	60 mph (96 km/h)	56%
Cummins Automatic	60 mph (96 km/h)	64%

Performance data is based on a gross vehicle weight of 58,000 lb. (26 308 kg). Performance may vary due to engine performance, weight, tire size, etc. Gradeability data is theoretical and is limited by tire slip, vehicle stability, oil pan angle, and other factors.

UNREELING AND UNCOILING

Wire rope is shipped in cut lengths, either in coils or on reels. Great care should be taken when the rope is removed from the shipping package since it can be permanently damaged by improper unreeling or uncoiling. Looping the rope over the head of the reel or pulling the rope off a coil while it is lying on the ground, will create loops in the line. Pulling on a loop will, at the very least, produce imbalance in the rope and may result in open or closed kinks (Fig. 12). Once a rope is kinked, the damage is permanent. To correct this condition, the kinks must be cut out, and the shortened pieces use for some other purpose.

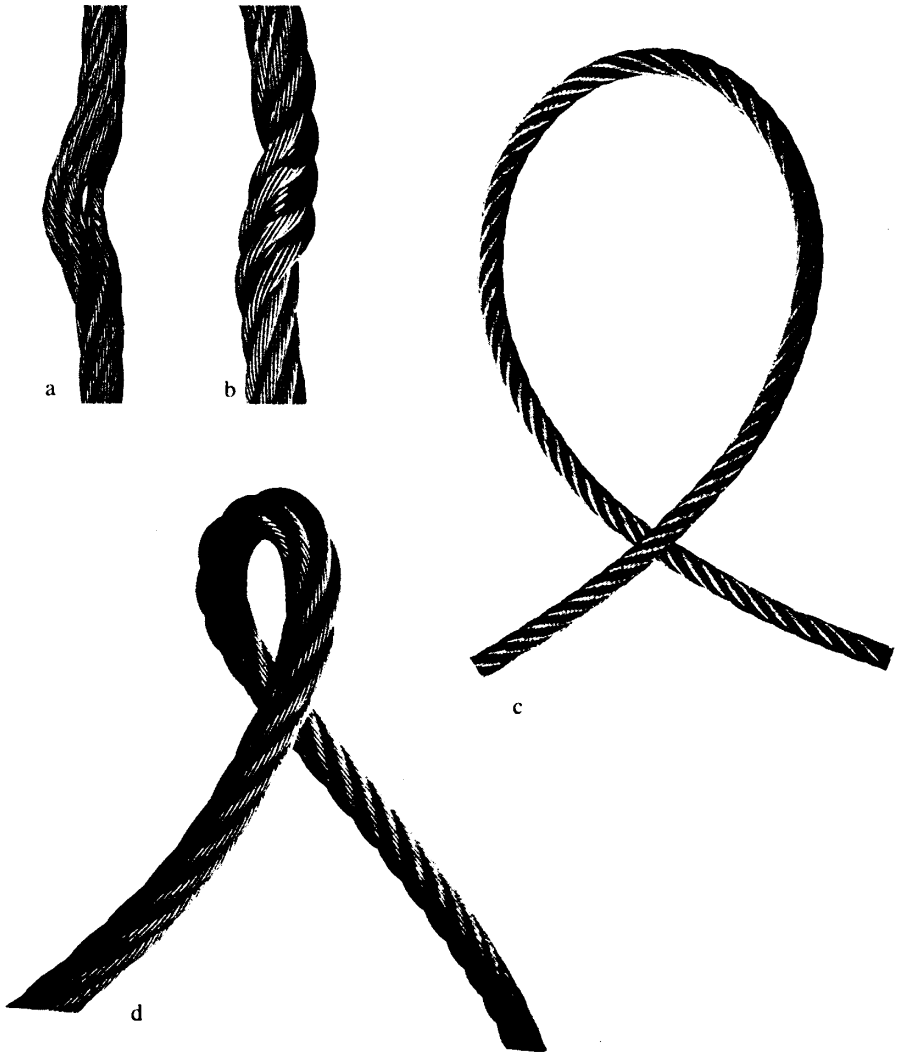


Figure 12. Improper handling will help create *open* (a) or *closed* (b) *kinks*. The open kink will open the rope lay; the closed kink will close it. The *starting loop* (c): do not allow the rope to form a small loop. If, however, a loop forms and is removed at the point shown, a kink will be avoided. The *kink* (d): here the looped rope has been put under tension, the kink has formed, the rope is permanently damaged and is of little value.

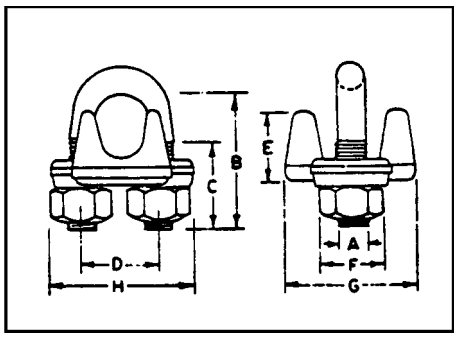


TABLE 6*

Clip Size	A	B	C	D	E	F	G	H	Min. no. of clips	Amount of rope to turn back	Torque in lb/ft	Weight lb/100
⅛	.22	.72	.44	.47	.41	.38	.81	.94	2	3¼	4.5	5
3/16	.25	.97	.56	.59	.50	.44	.94	1.16	2	3¾	7.5	9
¼	.31	1.03	.50	.75	.66	.56	1.19	1.44	2	4¾	15	18
5/16	.38	1.38	.75	.88	.72	.69	1.31	1.69	2	5¼	30	30
⅜	.44	1.50	.75	1.00	.91	.75	1.63	1.94	2	6½	45	42
7/16	.50	1.88	1.00	1.19	1.03	.88	1.81	2.28	2	7	65	70
½	.50	1.88	1.00	1.19	1.13	.88	1.91	2.28	3	11½	65	75
9/16	.56	2.25	1.25	1.31	1.22	.94	2.06	2.50	3	12	95	100
⅝	.56	2.38	1.25	1.31	1.34	.94	2.06	2.50	3	12	95	100
¾	.63	2.75	1.44	1.50	1.41	1.06	2.25	2.84	4	18	130	150
⅞	.75	3.13	1.63	1.75	1.59	1.25	2.44	3.16	4	19	225	240
1	.75	3.50	1.81	1.88	1.78	1.25	2.63	3.47	5	26	225	250
1⅛	.75	3.88	2.00	2.00	1.91	1.25	2.81	3.59	6	34	225	310
1¼	.88	4.25	2.13	2.31	2.19	1.44	3.13	4.13	6	37	360	460
1⅜	.88	4.63	2.31	2.38	2.31	1.44	3.13	4.19	7	44	360	520
1½	.88	4.94	2.38	2.59	2.53	1.44	3.41	4.44	7	48	360	590
1⅝	1.00	5.31	2.63	2.75	2.66	1.63	3.63	4.75	7	51	430	730
1¾	1.13	5.75	2.75	3.06	2.94	1.81	3.81	5.28	7	53	590	980
2	1.25	6.44	3.00	3.38	3.28	2.00	4.44	5.88	8	71	750	1340
2¼	1.25	7.13	3.19	3.88	3.94	2.00	4.56	6.38	8	73	750	1570
2½	1.25	7.69	3.44	4.13	4.44	2.00	4.69	6.63	9	84	750	1790
2¾	1.25	8.31	3.56	4.38	4.88	2.00	5.00	6.88	10	100	750	2200
3	1.50	9.19	3.88	4.75	5.34	2.38	5.31	7.63	10	106	1200	3200

*From The Crosby Group

2) *Rope Stretch*

All ropes will stretch when loads are initially applied. For an extended discussion of stretch, see pp. 73 and following:

As rope deteriorates from wear, fatigue, etc. (excluding accidental damage), continued application of a load of constant magnitude will produce varying amounts of rope stretch. A "stretch" curve plotted for stretch vs. time (Fig. 35) displays three discrete phases:

Phase 1. Initial stretch, during the early (beginning) period of rope service, caused by the rope adjustments to operating conditions (constructional stretch).

Phase 2. Following break-in, there is long period-the greatest part of the rope's service life-during which a slight increase in stretch takes place over an extended time. This results from normal wear, fatigue, etc. On the plotted curve-stretch vs. time-this portion would almost be horizontal straight line inclined slightly upward from its initial level.

Phase 3. Thereafter, the stretch begins to increase at a quicker rate. This means that the rope is reaching the point of rapid deterioration; as result of prolonged subjection to abrasive wear, fatigue, etc. This second upturn of the curve is a warning indicating that the rope should soon be removed.

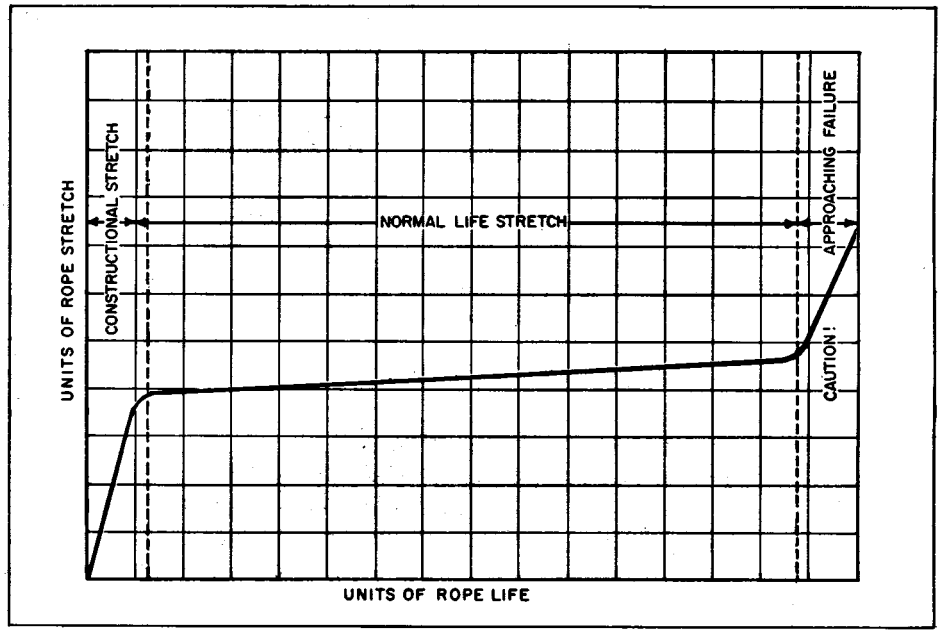


Figure 35. **This curve is plotted to show the relationship of wire rope stretch to the various stages of a rope's life.**

Figure 45. This effect of drum crushing is evidence of bad winding conditions.

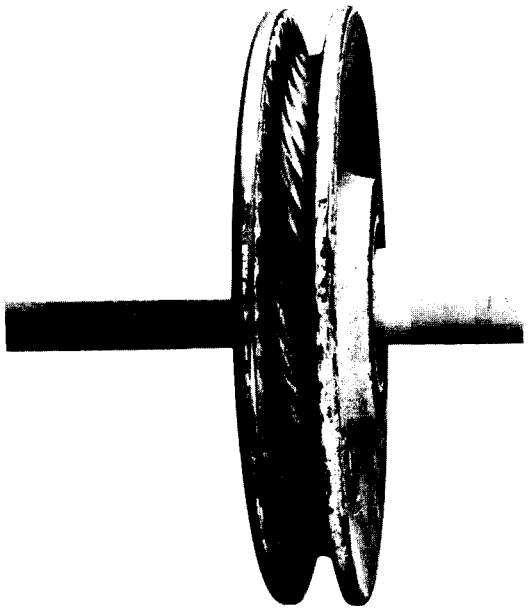


Figure 46. A deeply corrugated sheave.

Figure 47. This rope condition is called a *dog leg*.

OUTLINE OF OPERATION

SYSTEM COMPONENTS

- MicroGuard® Display Unit
- MicroGuard® Computer Unit
- Pressure Transducers
- Extension Reel with length and angle sensors
- Anti 2-Block (ATB) switches
- Cables
- Installation/Operator Manuals

The MicroGuard® TEREX RCI 510 System is intended to aid the crane operator by continuously monitoring the load and warning of an approach to an overload or Two-Block condition. Crane functions are monitored by means of high accuracy sensors. The system continuously compares the load suspended below the boom head with the crane capacity chart stored in the computer memory. At approach to overload, the system warns by means of audible and visual alarms. The system can be configured to cause function kick-out by sending a signal to function disconnect solenoids.

DISPLAY

The operator is provided with a continuous display of:

- Rated Load
- Actual Load
- Bar Graph showing Percentage of Rated Load
- Radius of the Load
- Boom Angle
- Main Boom Length
- Working Area
- Crane Configuration

On-screen messages provide the operator with visual warnings of conditions that occur during operation of the system.

BOOM ANGLE SENSOR

Boom angle is measured by means of a high-accuracy potentiometer/pendulum assembly that is damped to prevent overswing. It provides a voltage proportional to boom angle. The boom angle sensor is mounted inside the cable extension reel assembly.

EXTENSION SENSOR

The extension sensor provides an increasing voltage proportional to the extension of the boom. A cable attached to the boom head provides a low current electrical path for the A2B signal

PRESSURE TRANSDUCERS

Two pressure transducers measure the pressure in the boom hoist cylinder. The resultant Total Moment signal is processed to provide a continuous display of the load suspended below the point of lift.

ANTI TWO BLOCK (A2B)

A switch monitors the approach of the hookblock or overhaul ball to the boom head. The switch is held in the normal position until the hookblock or overhaul ball raises a weight that is mounted around the hoist rope. When the weight is raised, it causes the switch to operate. The resultant signal is sent to the computer via the extension reel causing the A2B alarm to operate and function kick-out to occur.

FUNCTION KICK-OUT

Electrically operated solenoids disconnect the control lever functions for boom hoist lower, telescope out, and winch up whenever an overload or an A2B condition occurs.

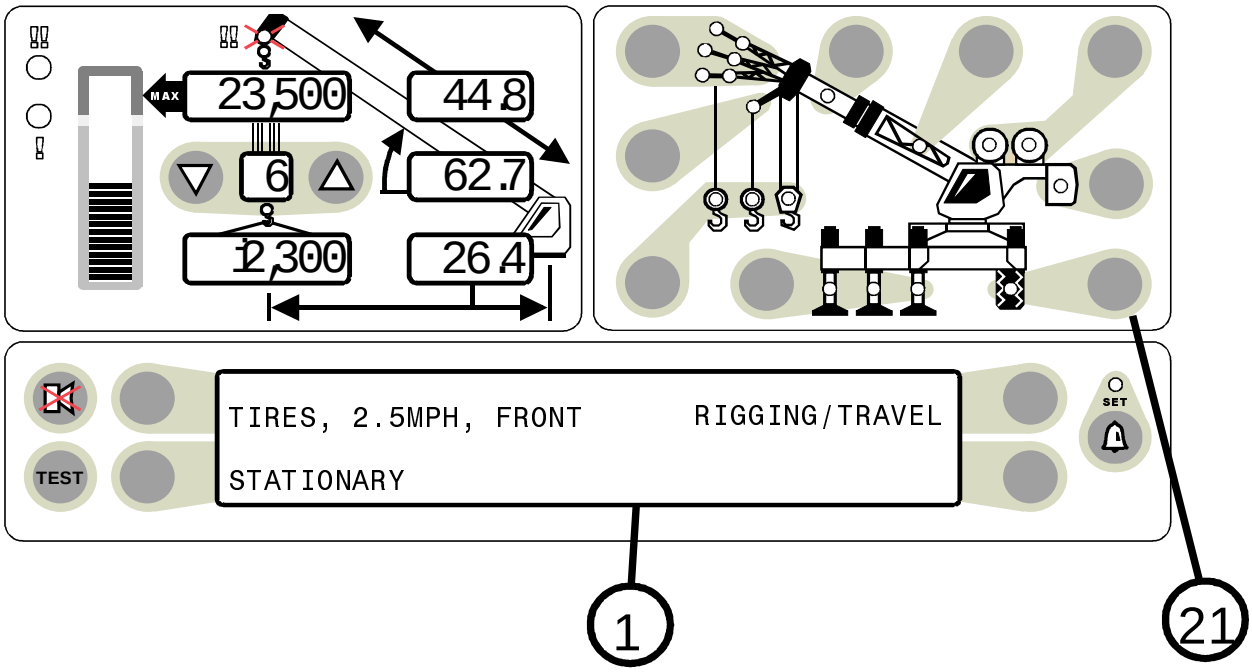
OPERATOR SETTABLE ALARMS

These alarms, when properly set by the operator, define the operating range. This is achieved by means of minimum and maximum angle, maximum height, and/or maximum length. These alarms can be programmed for each job site and allow the operator to work in a defined area.

AREA ALARM

When set, this alarm permits the operator to define the operating zone by only two set points. The use of this method of setting results in a greatly enhanced working area, and also clearly defines the operating zone.

SYSTEM SETUP



TIRES/RIGGING TRAVEL

IF THE TIRE PUSH BUTTON IS PRESSED ON A CRANE THAT DOES NOT HAVE TIRE OPTIONS THE MESSAGE **"NO OTHER TIRE OPTIONS"** WILL APPEAR IN THE INFORMATION DISPLAY. REFER TO YOUR CRANE RATING MANUAL FOR DETAILS OF THE OPTIONS ON YOUR CRANE.

- On cranes that have more than one tire option, e.g. static, creep etc., the operator must select the tire configuration that corresponds to the tire chart to be used.
- Start the choice by pressing the **tire push button** (item 21).
- The available tire selection options will be displayed in the information screen (item 1).

There can be four options displayed at a time, one next to each selection key.

- If the required option is visible, select the option by pressing the button next to it.
- If more than 4 options are available, a second selection screen can be viewed by pressing the button next to the "next" label.
- If only a single option is available, it will automatically be selected.

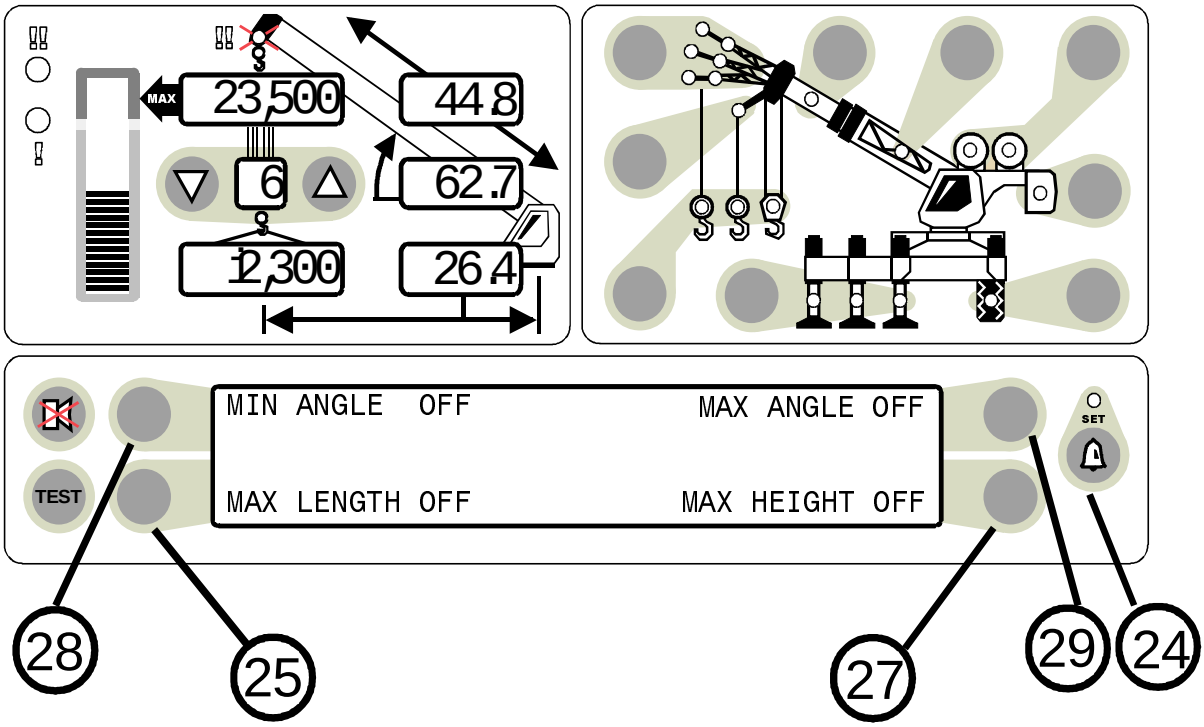
- **RIGGING/TRAVEL MODE** is selected when the crane is in the rigging process or is a rough terrain crane traveling between jobs.

WARNING

DO NOT PERFORM CRANE LIFTING OPERATIONS WHILE THE RIGGING/TRAVEL MODE IS SELECTED.

ALL CRANE CONTROLS REMAIN ACTIVE WHILE THE RIGGING/TRAVEL MODE IS SELECTED.

OPERATOR SETTABLE ALARMS



ACCESSING THE OPERATOR ALARMS

To access the Operator Alarms from the main working screen, press the operator alarms push button (item 24). The Information Screen will then show the current status of the alarms.

The four operator alarms are shown below followed by the number identity of the push button that controls each alarm. These buttons are called out in the illustration above.

Minimum Boom Angle (item 28)

Maximum Boom Angle (item 29)

Maximum Boom Length (item 25)

Maximum Tip Height (item 27)

Each push button operates as a toggle switch turning the alarm "ON" or "OFF."

To activate or deactivate an alarm:

- If the alarm is OFF, press the appropriate push button to turn the alarm ON.
- If the alarm is ON, press the appropriate push button to turn the alarm OFF.

Refer to page 25 for a discussion on minimum and maximum boom angles and page 26 for maximum boom length and maximum tip height.

Return to the main screen by pressing the **operator alarm push button** (item 24) two times.

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