



OPERATION AND SERVICE MANUAL

This Manual has been prepared for and is considered part of -

1500 Series Telescoping Crane

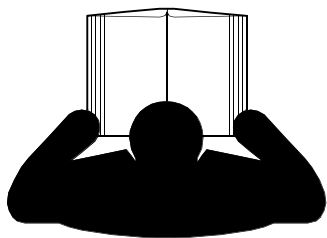
This Manual is Divided into the following Sections:

SECTION 1	SAFETY
SECTION 2	CONTROLS
SECTION 3	OPERATING PROCEDURES
SECTION 4	JIB OPERATION
SECTION 5	INSPECTION AND MAINTENANCE
SECTION 6	LUBRICATION
SECTION 7	SERVICE AND REPAIR
SECTION 8	FIVE SECTION BOOM SERVICE
SECTION 9	FOUR SECTION BOOM SERVICE
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SECTION 11	JIB INSTALLATION AND ADJUSTMENT
SECTION 12	EXTEND CYLINDER REPAIR
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SECTION 16	CRANE INSTALLATION

NOTICE

The crane serial number is the only method your distributor or the factory has of providing you with correct parts and service information.

The crane serial number is identified on the builder's decal attached to the crane frame. ***Always furnish crane serial number*** when ordering parts or communicating service problems with your distributor or the factory.



WARNING

To prevent death or serious injury:

- Avoid unsafe operation and maintenance.
- This crane must be operated and maintained by trained and experienced personnel. National Crane is not responsible for qualifying these personnel.
- Do not operate or work on this crane without first reading and understanding Operator's Manual and Rating Plate supplied with crane.
- If Operator's Manual or Capacity Charts are missing from crane, contact your distributor for new ones.

SECTION 1

SAFETY PRECAUTIONS

DIESEL ENGINE EXHAUST HAZARD



CALIFORNIA

PROPOSITION 65 WARNING

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

BATTERY POSTS, TERMINALS, AND RELATED ACCESSORIES HAZARDS



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PROPOSITION 65 WARNING

The battery posts, terminals, and related accessories contains chemical lead and lead compounds, chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Wash hands after handling.

SAFETY MESSAGES

General

The importance of safe operation and maintenance cannot be overemphasized. Carelessness or neglect on the part of operators, job supervisors and planners, rigging personnel, and job site workers can result in their death or injury and costly damage to the crane and property.

To alert personnel to hazardous operating practices and maintenance procedures, safety messages are used throughout the manual. Each safety message contains a safety alert symbol and a signal word to identify the hazard's degree of seriousness.

Safety Alert Symbol



This safety alert symbol means **ATTENTION!** Become alert - **your safety is involved!** Obey all safety messages that follow this symbol to avoid possible death or injury.

Signal Words



DANGER

Identifies **immediate hazards** that will result in death or serious injury if the message is ignored.



CAUTION

Identifies **potential hazards** that could result in minor or moderate injury if the message is ignored.

CAUTION

Without the safety alert symbol, identifies **potential hazards** that could result in property damage if the message is ignored.

NOTE: Highlights operation or maintenance procedures.

GENERAL INFORMATION

NOTE: Illustrations have been included in this section to emphasize certain proper and improper points; **READ AND FOLLOW PRINTED INSTRUCTIONS.**

It is impossible to compile a list of safety precautions covering all situations. However, there are basic principles that **MUST** be followed during your daily routine. Safety is **YOUR PRIMARY RESPONSIBILITY**, since any piece of equipment is only as safe **AS THE PERSON AT THE CONTROLS**.

With this thought in mind, this information has been provided to assist you, the operator, in promoting a safe working atmosphere for yourself and those around you. It is not meant to cover every conceivable circumstance which could arise. It is intended to present basic safety precautions that should be followed in daily operation.

Because you, the operator, are the only part of the crane that can think and reason, your responsibility is not lessened by the addition of operational aids or warning devices. Indeed, you must guard against acquiring a false sense of security when using them. They are there to assist, not direct the operation. Operational aids or warning devices can be mechanical, electrical, electronic, or a combination thereof. They are subject to failure or misuse and should not be relied upon in place of good operating practices.

CARE OF WIRE ROPE

Care is required in the handling of wire rope to prevent damage to the rope or the individual wires which will affect the overall strength and performance of the rope. The formation of kinks should always be prevented as this displaces the strands of wire from their original position and relation to each other causing severe bending and unequal tensions in the strands. This distortion and wire displacement cannot be corrected even under high tension and a permanent weak point remains in the rope. Displaced or raised wires indicate a previous kink, but will not show the damaged condition of the inner rope wires.

Wire rope should never be pulled over a non-rotating support such as a spindle bar, a pin or an inoperative sheave. This practice causes severe abrasion to the outer strand wires. A properly operating sheave or snatch block is essential to safety and long service life of the rope.

The use of worn sheaves or sheaves with flat grooves should be avoided since they do not provide sufficient support to prevent the distortion and flattening of the rope as it passes over the sheave. Sheaves having nicked or broken flanges are likely to cut or otherwise damage the rope and should not be used.

An even distribution of wire rope coils over the hoist drum is essential to smooth operation and to prevent rope from either cutting down through or crushing other coils on the drum with resultant damage to the rope and difficulty in unreeling rope.

ROPE CONSTRUCTION

If wire rope replacement is required for crane extension system, replacement ropes must be obtained through The National Crane Product Support Department. Extension ropes are prestretched and have special connections for proper operation.

Standard

5/8 in. Dia. Wire Rope (Main and Auxiliary Hoist)	Rotation Resistant Nominal Breaking Strength 22.7 tons
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Optional

5/8 in. Dia. Wire Rope (Main and Auxiliary Hoist)	6x25 General purpose Nominal Breaking Strength 20.6 tons
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If wire rope replacement is required for crane loadline, care should be taken in selecting a wire rope suitable for crane use. Wire rope strength requirements

are shown on the crane capacity chart to match the winch option selected when the crane was purchased. Rope construction required is optional with 6 x 25 and Dyform being the most common lifting ropes. High strength, rotation resistant is preferred and furnished standard by National Crane. This rope eliminates single part line load spin. It also eliminates load block spin up when multi-part reeving is used which results in prolonged rope life. The main winch and optional auxiliary winch both use the same 5/8 diameter rope.

Do not use a swivel on rotation resistant rope. A swivel on this rope will cause premature rope core failure.

ADJUSTMENTS AND REPAIRS

Before adjustments and repairs are started on a crane, the following precautions shall be taken as applicable:

1. A warning tag should be placed in a conspicuous place at the controls stating that the machine requires adjustment or repair before it can be operated.
2. The crane should be placed where it will cause the least interference with other equipment or operations in the area.
3. All controls at the OFF position and all operating features secured from inadvertent motion by brakes or other means.
4. All methods used to start the truck's engine rendered inoperative.
5. Power plant stopped or disconnected at take-off.
6. Boom lowered to the ground or otherwise secured against dropping.
7. Load block lowered to ground or otherwise secured against dropping.
8. Relieve hydraulic oil pressure from all hydraulic circuits before loosening or removing hydraulic components.

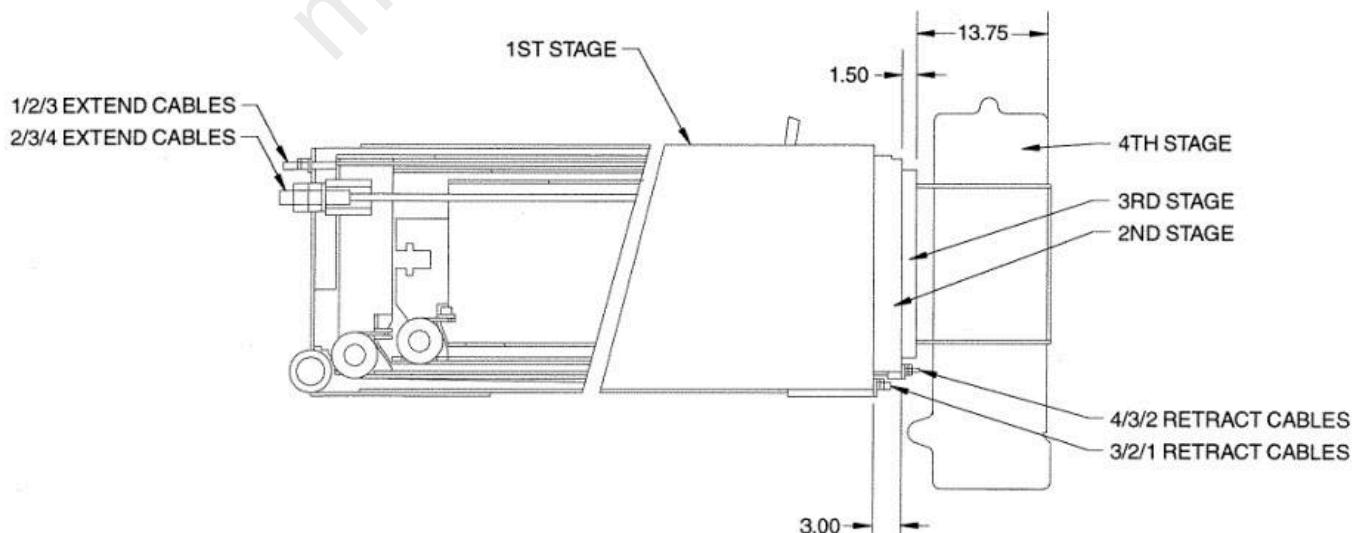
After adjustments and repairs have been made, the crane shall not be returned to service until all guards have been reinstalled, trapped air removed from hydraulic system if required, safety devices reactivated, and maintenance equipment and all warning tags removed.

Any hazardous conditions disclosed by the inspection requirements listed above shall be corrected before operation of the crane is resumed. Adjustments and repairs shall be done only by designated personnel who are properly trained. Use only National Crane supplied parts to repair the crane.

FOUR SECTION CABLE TENSIONING

After boom reassembly or from time to time if interior proportioning cables appear loose, cable tensioning may be required. Tensioning must be done with the boom horizontal. Proceed as follows:

1. Cycle boom approximately 8 feet out and in a few times (2 feet per section).
2. Fully retract boom. At full retraction the base of the 2nd stage boom bottoms out in the base of the 1st stage boom, the base of the 3rd stage boom bottoms out in the base of the 2nd stage, the base of the 4th stage boom bottoms out in the base of the 3rd stage boom. (Dimensional References: the 2nd stage boom extends 3.00" out from the 1st stage boom, the 3rd stage boom extends 1.50" out from the 2nd stage boom, and the 4th stage boom extends 13.75" out from the 3rd stage boom.)
3. Tighten the 4/3/2 retract, 2/3/4 extend, 3/2/1 retract and 1/2/3 extend cables (in order listed) to remove slack from the cables and to achieve proper sequencing of bottoming out base of booms. (To reach the 2/3/4 extend cables boom must be extended out approximately 18.00", 6.00" per stage and tightened through opening in top plate of the 1st stage boom.
4. Torque the 4/3/2 retract cables to 4 ft lbs, starting with the two inside cable ends equally, then the two outside cable ends equally. Use the flats at the front of the cable ends to keep the cables from rotating while torquing. These cables are located at the bottom tip of the 2nd stage boom.
5. Torque the 2/3/4 extend cables to 22-1/2 ft lbs each. These cables are located at the top base of the 2nd stage boom. (Reference step #3 for access to the 2/3/4 extend cables.)
6. Torque the 3/2/1 retract cables to 3 ft lbs, starting with the two inside cable ends equally then the two center cable ends equally, then the two outside cable ends equally. Use the flats at the front of the cable ends to keep the cables from rotating while torquing. These cables are located at the bottom tip of the 1st stage boom.
7. Torque the 1/2/3 extend cables to 11 ft lbs each. These cables are located at the top of the 1st stage boom winch mount plate.
8. Check to ensure that boom sections are all bottoming out simultaneously as in Step 2. If not, proceed as follows:
 - a. If 2nd stage is bottoming out late, loosen 3/2/1 retract cables, tighten 1/2/3 extend cables. Extend and retract boom a few feet. Torque 3/2/1 retract cables in step 6 and torque 1/2/3 extend cables as in Step 7. Repeat this process until 2nd stage bottoms out correctly.
 - b. If 3rd stage is bottoming out late, loosen 4/3/2 retract cables, tighten 2/3/4 extend cables, extend and retract boom a few feet and then torque 4/3/2 retract cables as in step 4 and torque 2/3/4 cables as in step 5. Repeat this process until 3rd stage bottoms out correctly.
9. Repeat step 8 as required until all sections are bottoming out simultaneously.
10. Repeat steps 4 through 7. Torque the 4/3/2 retract cables to 8 ft lbs. Torque the 2/3/4 extend cables to 45 ft lbs. Torque the 3/2/1 retract cables to 6 ft lbs. Torque the 1/2/3 extend cables to 22 ft lbs.
11. Cycle boom fully, check that all cables are torqued properly and that all sections are retracted completely, then add locknuts to all cables. Each threaded cable end must have two nuts locked together.





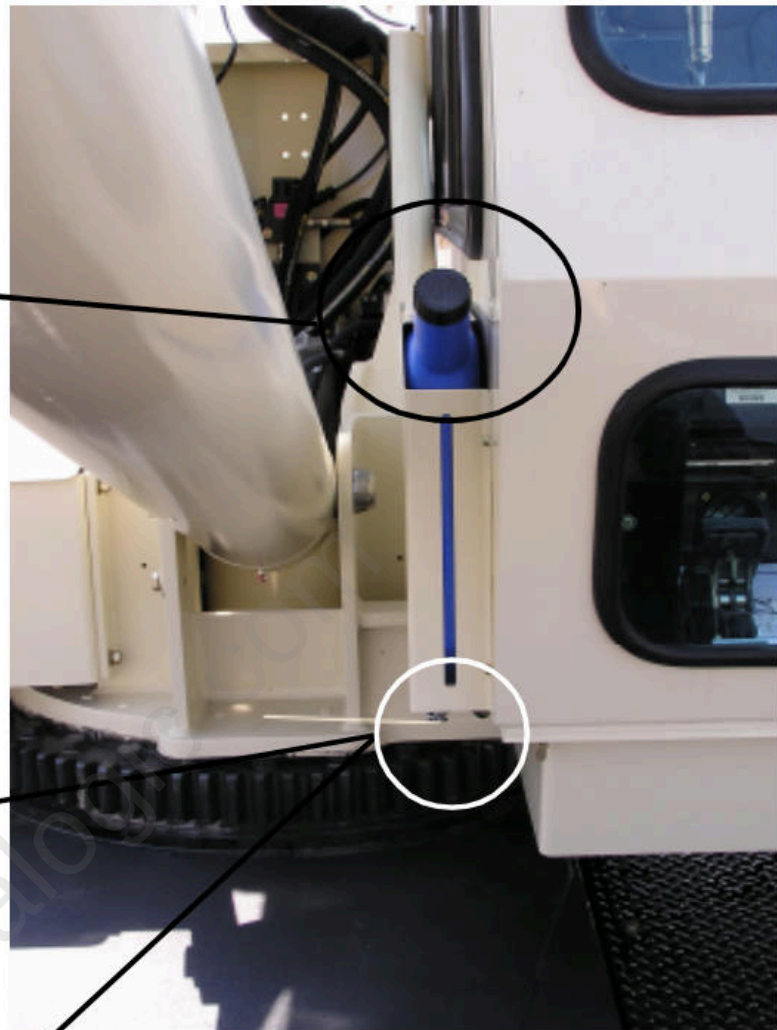
Heater Diesel Fill Point



Fuel "OFF"



Fuel "ON"



Heater Exhaust (Rear of Cab)

and install bolts, washers and nuts according to parts pages and torque to specifications. Loosen mounting straps and install the rubber channels between both mounting brackets and the tank. Tighten the reservoir mounting straps.

13. Measure and cut suction hose to the proper length and install fittings, hose and clamps on reservoir and pump. Route suction hose without sharp bends and with clearance or protection between hose and stationary or moving parts which could wear against the hose.
14. Refer to parts pages. Install oil cooler diverter valve on return filter on top of tank. Route and install return hose from subbase. Route and install oil cooler feed and return hoses.
15. Route and install fittings and pressure hose from the swivel onto the pump. Install pressure hose

from pump pressure fitting to the outrigger directional valve pressure port (Figure E).

16. Install fittings at the load sense port on the pump and connect load sense lines from the swivel and from the outrigger directional control valve.
17. Install fittings and connect the return line from the outrigger directional control valve to the reservoir according to the parts pages.
18. Install the fitting and the pump case drain line from the top of the pump to the reservoir.
19. The reservoir can now be filled through the top of the filter housing with the proper multi-viscosity hydraulic oil as specified in the Lubrication Section. Open the filter cap and remove the plastic diverter plate and fill through the filter. Replace the diverter plate as it was removed and replace the filter cap.

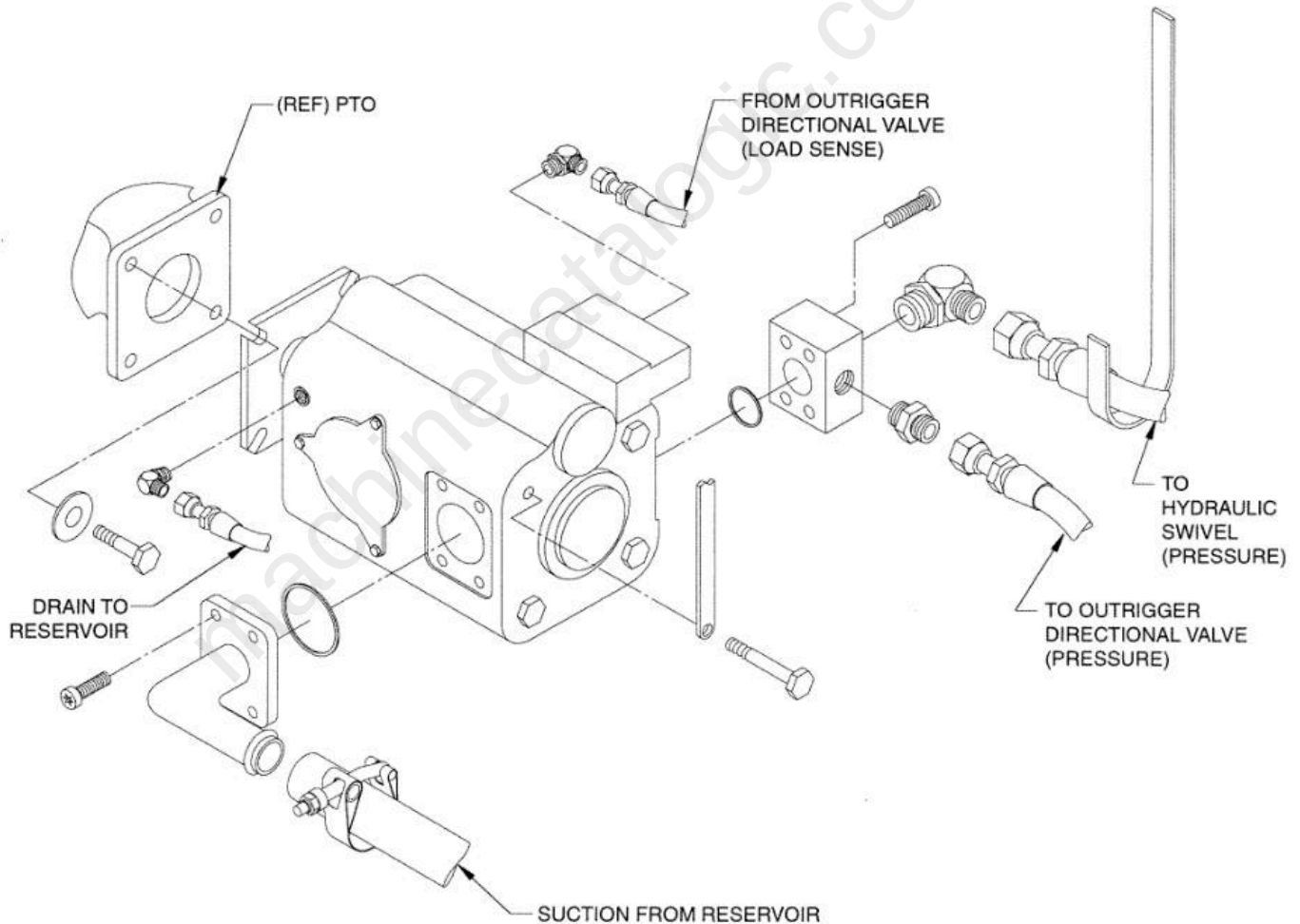


FIGURE E

Full Version Available

National Crane 1500 Boom Truck Service Manual

National Crane 1500 boom truck service manual with repair procedures, adjustments and troubleshooting for the main systems. Instant PDF download.

VIEW THE FULL MANUAL

<https://machinecatalogic.com/national-crane-1500-boom-truck-service-manual/>

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