

SERVICE MANUAL

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

1400A Telescoping Crane

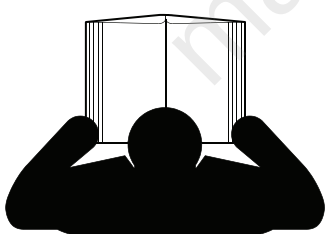
This Manual is Divided into the following Sections:

SECTION 1	INTRODUCTION
SECTION 2	HYDRAULIC SYSTEM
SECTION 3	ELECTRIC SYSTEM
SECTION 4	BOOM MAINTENANCE
SECTION 5	WINCH
SECTION 6	SWING
SECTION 7	OUTRIGGERS
SECTION 8	LUBRICATION
SECTION 9	CRANE INSTALLATION
SECTION 10	SCHEMATICS

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.

DANGER

Locate the machine on a firm supporting surface and position the boom over the front on outriggers when extending the boom at low angles.

- To remove entrapped air from telescope cylinders, lower the boom to below horizontal and fully telescope the boom in and out several times.
- If the air is still trapped, lower the boom to below horizontal, extend the telescope cylinders as far as practical, and allow the boom to remain in this position overnight. This should allow trapped air to find its way to the holding valve so that telescoping the boom IN the next morning should force the air back to the reservoir. Ensure the boom is first telescoped IN (not OUT) in the morning. Telescoping OUT may cause air to be forced back into a cylinder.

DANGER

Extreme care must be used when removing any plugs or restrictions from a hydraulic system suspected to have entrapped air that may be pressurized.

- Trapped air can be removed from cylinders having wet rods by cycling. On certain cylinders, a plugged port is provided on the rod end to bleed off trapped air.

DANGER

Do not attempt to loosen fittings in pressurized lines or while the hydraulic pumps are in operation.

- In the event that trapped air persists, bleed off the air by loosening various clamp and screw type fittings.
- If the above procedures fail to eliminate trapped air, contact your authorized National Crane Distributor.

SYSTEM DESCRIPTION

The hydraulic system is pressure compensated with a closed center. The hydraulic system of the 1400A consist of the following:

- Axial Piston Pump
- Three Section Main Control Valve (Standard)
- Optional Four Section Main Control Valve for Auxiliary Winch
- LMI Lockout Manifold
- Swing Control Valve
- Outrigger Control Manifolds

- Hydraulic Tank with Filter
- Hydraulic Remote Controllers (HRC)

Axial Piston Pump

The axial piston pump is pressure compensated and supplies a 70 gpm flow of up to 4000 psi at a pump shaft speed of 1900 rpm. A shaft speed of 1000 rpm delivers 35 gpm which is enough to run any single function at full speed. Higher speeds are required when running two or more functions at the same time. The pump has a load sense standby pressure of 350 - 400 psi.

Main Control Valve

The main control valve is located in the turret and has three sections. The main control valve and controls the hoist, lift, and telescope.

- Section one controls the boom up and down and contains the lift relief valves that protect the lift circuit.
- Section two controls the winch and uses the system relief valve to protect the winch circuit.
- Section three controls the telescope out and telescope in and contains the extend and retract relief valves.
- Optional fourth section controls the auxiliary winch and uses the system relief to protect the winch circuit.

The main and the load sense relief valves are located in the main relief valve.

Swing Control Valve

The swing control valve is located in the turret and controls the swing motor. The valve limits the maximum flow to 16 gpm in both directions and has internal relief valves that are set to 3100 psi. The valve has an open center that goes back to tank when the valve is in the neutral position.

LMI Dump Manifold

The LMI dump manifold is located in the turret and disables crane functions when the LMI senses an impending tipping condition. The manifold dumps the HRC pressures for the crane functions that make the condition worse (winch up, boom down, tele out). The functions are returned when the impending tipping condition is eliminated.

Outrigger Control Manifolds

The outrigger manifolds control the outrigger functions. The outrigger circuit is set to operate at 3000 psi which is determined by a flow control valve located on the front outrigger.

31. Visually verify that the extend cables are properly routed on the sheaves and continue to slide with the extend cylinder and cables into the boom sections. Keep the extend cables supported and slightly tensioned during insertion of cylinder to maintain proper cable placement.
32. As the extend cylinder nears complete insertion into the 2ND-3ND-4TH section assembly, adjust the height of the cylinder to allow the cylinder anchor collars to access the cylinder keeper cutouts in the doubler plates on the sides of the 2ND and 3RD sections.
33. Drop the cylinder down into the vertical cutouts in the doubler plates on the sides of the 2ND and 3RD sections. Cylinder length on boom section placement may have to be adjusted to allow cylinder collars to drop into their proper position.
34. Install the lock bar and capscrews to the extend cylinder collar in the 3RD section.
35. Install the large extend cable anchor into anchor cutouts in the doubler plates in the rear of the 2ND section. Route the 7/8 inch (22.22 mm) extend cables through the anchor and the small 7/16 inch (11.11 mm) cable over the anchor. Slide the anchor fully into cutout.
36. Install the keeper plates and hardware. The keeper plate retains both the horizontal movement of the extend anchor and the vertical movement of the extend cylinder.
37. Install 2ND-3RD-4TH section boom assembly into 1ST section boom. Use caution when sliding sections together because the 3RD section retract cables must maintain position to prevent damage. Do not let the boom rest on cables or damage will result.
38. Assemble bottom front wear pads for 1ST section and Teflon wear plugs.
39. Use an appropriate lifting device and lift the 2ND-3RD-4TH section assembly to allow for wear pad installation in front of 1ST. Install the wear pads. Slide the sections together within 12 inches (30 cm) of full retraction.
40. Install the upper spacer to front of 1ST section.
41. Install the front side wear pads with the appropriate shims between 2ND and 1ST sections. If the boom has been disassembled, and no sections have been replaced, reinstall shims as per removal tags.
42. Push the boom together until extend cylinder buff plate makes contact with the rear cylinder anchor plates in the rear of the 1ST section. Install spacers, washers, and capscrews, attaching the cylinder to 1ST section boom. If the cylinder is misaligned with the anchor points, the cylinder buff plate can be rotated to achieve proper alignment (holding valve up, parallel with boom top plate).
43. Assemble the top rear wear pads and cam plates to the top rear of the 2ND boom section. Install the capscrews through the holes in outer boom sections.

The wear pads on each side at the top rear of the boom can be adjusted over a range of 3/16 inch (4.8mm) by rotating, end for end, the wear pad and plate together or independently. The holes in these parts are offset from the center and various combinations of rotation of these parts allow the adjustment.
44. Install the thick winch attachment bar through winch mount. This bar anchors the 7/16 inch (11.11 mm) extend cable and serves as the upper winch attachment point. Hold this bar up in its slot with a spacer on each side. This will facilitate easier assembly.
45. Install the threaded end of the 7/16 inch (11.11 mm) extend cable through hole in center of the winch attachment bar.
46. Slightly tighten all cables. Cycle boom slowly to assure proper operation before torquing cables. Refer to the "Four Section Cable Tensioning" section to properly torque the cables in the extend system. Cables must be torqued to proper specifications for proper boom operation.
47. Install winch and anti-two block system.

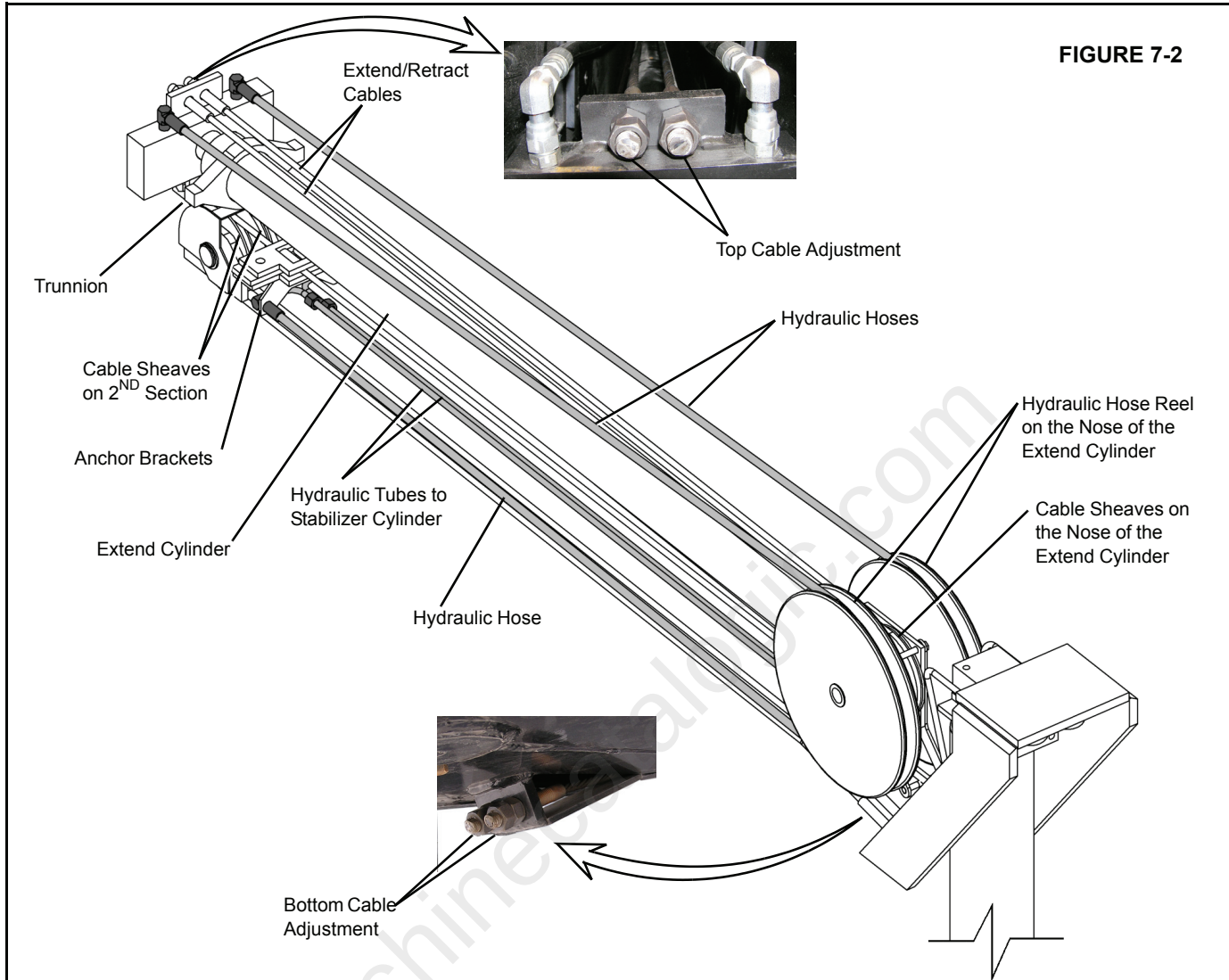


FIGURE 7-2

Removal

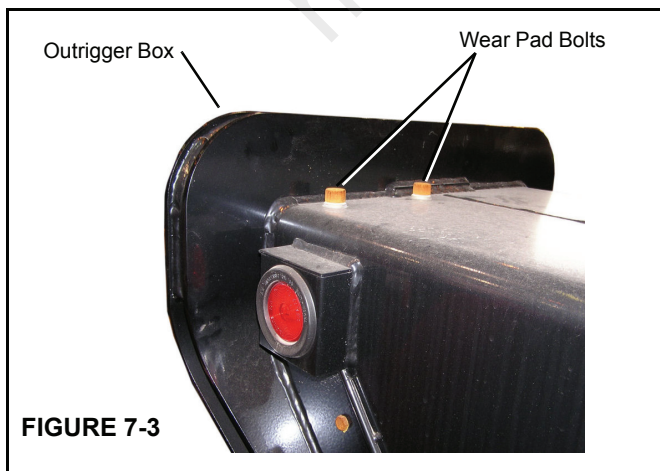


FIGURE 7-3

1. Check that the stabilizer is fully retracted and the float removed.
2. On the stabilizer end, tag and remove the top wear pads and shims from the outrigger beam.

NOTE: The outrigger wear pads and shims are adjusted at the factory. Tag the shims and wear pads during removal to ensure proper reinstallation.

See page 4-16 for wear pad adjustment.
3. Extend the outrigger beam slightly so that a lifting strap (Figure 7-4) can be attached to the outrigger beam.

NOTE: To prevent nick and gouges to the bottom of the outrigger beam, do not attach chains to the outrigger beam.
4. Remove the hydraulic lines from the base of the extend cylinder (Figure 7-1).

Item	Quantity	Description
1	6	Capscrew
2	3	Support Rod
3	6	Capscrew
4	1	Output Gear Set
4-1	1	Output Carrier
4-2	3	Planet Gear
4-3	3	Planet Pin
4-4	3	Retaining Ring
4-5	1	Plate
4-6	6	Bearing
4-7	3	Spacer
4-8	6	Race
5	1	Drum
6	2	Race
7	1	Kit, Seal
7-1	1	O-ring
7-2	1	O-ring
7-3	1	O-ring
7-4	2	Seal, Oil
7-5	1	Seal, Oil
7-6	1	O-ring
7-7	1	Ring, Backup
7-8	1	Ring, Backup
7-9	Omit	Omit
7-10	1	O-ring
8	1	Input Sun Gear
9	8	Capscrew
10	1	Brake Piston
11	4	Capscrew
12	1	Kit, Counterbalance, Motor
12-1	1	Counterbalance Valve
12-2	1	Block, Valve
12-3	3	Capscrew
12-4	1	Motor
12-5	2	O-ring
13	1	Brake Driver
14	2	Race
15	2	Retaining Ring
16	1	Output Sun Gear

Item	Quantity	Description
17	2	Bushing
18	7	Friction Disc
19	8	Stator Plate
20	1	Brake Cover
21	1	Brake Housing
22	Omit	Omit
23	2	Retaining Ring
24	12	Brake Spring
25	Omit	Omit
26	1	Carrier, Bearing
27	1	90 Deg. Adapter
28	2	Ball Bearing
29	1	Sideplate
30	2	Breather
31	1	Plug
33	1	Plug
34	1	Clutch
35	1	Cable Wedge
36	1	Input Gear Set
36-1	1	Input Carrier
36-2	3	Planet Gear
36-3	3	Planet Pin
36-4	3	Retaining Ring
36-5	1	Plate
36-6	3	Bearing
36-7	6	Race
37	1	90 Deg. Adapter
38	1	Input Driver
39	1	Bushing
40	1	Plug
41	1	Sideplate
42	1	Straight Adapter
43	1	Pipe Bushing
44	1	Lock washer
45	1	Straight Adapter
46	1	Hose Assy
47	1	Capscrew
48	1	Retaining Ring
49	1	90 Deg. Adapter

Full Version Available

National Crane 1400A Boom Truck Service Manual

National Crane 1400A boom truck service manual with repair procedures, adjustments and troubleshooting for the main systems. Instant PDF download.

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