NATIONAL CRANE

OPERATION AND SERVICE MANUAL

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

N135 Series Articulating Crane

This Manual is Divided into the following Sections:

SAFETY AND OPERATION
SERVICE AND MAINTENANCE
SPECIFICATIONS
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.

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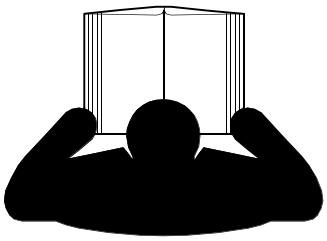

⚠ WARNING

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.

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OPERATOR QUALIFICATIONS

Crane operation shall be limted to personnel with the following minimum qualifications:

1. Designated, competent and experienced persons.
2. Trainees or untrained persons under the direct supervision of qualified persons.
3. Maintenance and test personnel, only in so far as it is necessary for the performance of their duties.
4. Supervisor with a designated experienced person present.

Operators and trainees shall meet the following physical qualifications:

1. Have vision of at least 20/30 snellen in one eye, and 20/50 in the other with or without corrective lenses.
2. Be able to distinguish colors regardless of their position, if color perception is required for operation.
3. Hearing, with or without hearing aid, must be adequate for the specific operation.
4. A history of mental stability and not subject to epileptic seizures, dizziness or any other disability which may cause injury to himself or others present at the jobsite.
5. If an operator becomes physically or mentally unfit, he shall disqualify himself.
6. No one should operate a crane while under the influence of alcohol, drugs, prescription medicine or anything that might impair their abilities.

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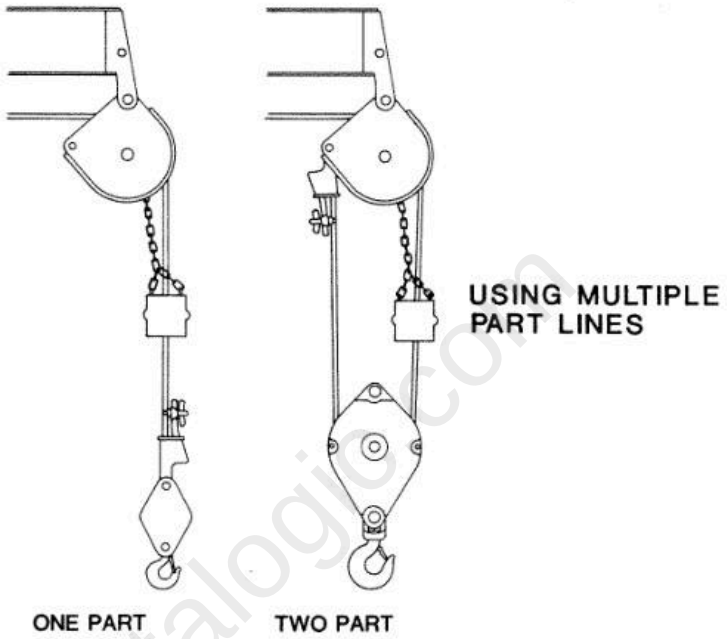
WINCH SYSTEM OPERATION (OPTIONAL)

The winch is mounted at the rear bottom of the outer boom. It has capacities totally independent of the rest of the crane and can normally pull more than the crane itself can withstand. Therefore, care must be taken to insure that the load being lifted is within boom rating. To lift some of the heavier loads on the capacity chart, it will be necessary to multiple-part reeve the winch block to increase the lifting capacity of the winch (the speed is proportionately slower) and remain in the strength limitations of the winch and wire rope.



The winch load rating chart on each machine provides the information for pull limitations on the winch with various applicable part reevings. These ratings are based on providing the proper operating safety factor on the wire rope supplied with the machine. Therefore, any replacement rope must meet the rope specifications for size, construction and strength as outlined in specification sections of this manual.

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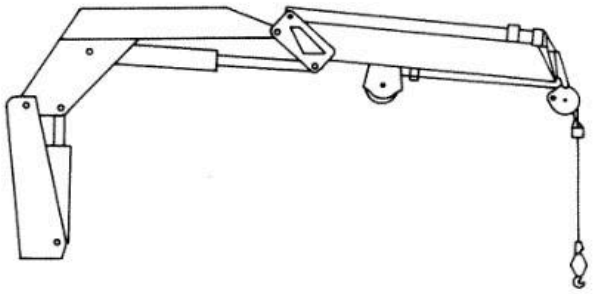
STOWING THE WINCH LINE BLOCK

When preparing to stow the boom when it is equipped with the optional winch, certain procedures must be followed.

STEP 1

Position the hook block approximately 6 feet down from the sheave block.



7. Cylinder movement due to leakage. Be sure oil temperature is stabilized because heating or cooling of oil causes expansion and contraction.

8. Evidence of oil leak from hoses or gearboxes.

9. Controls including hand throttle for malfunction or misadjustment.

10. Truck hand brake operation.

11. All securing hardware such as cotter pins, snap rings, hairpins, and pin keepers for proper installations.

12. All safety covers for proper installation.

13. Cylinder holding valves for proper operation. Operate lift down and fold under functions with truck engine off. Boom should not move.

On winch equipped machines also check:

14. Condition of loadline and end attachment for corrosion, severe kinking, crushing, cutting or slippage of cable clamps or wedge socket.

15. Position of loadline with guides and on sheaves.

16. Free turning of sheaves.

17. Condition and operation of anti-two block system.

WEEKLY INSPECTIONS

Check the following items:

1. Battery water level.

2. Tire pressure

3. Lubrication of points required by Lubrication Chart.

4. Proper tightness of mounting bolts during first month of operation of new machine and then monthly thereafter.

5. Winch brake for proper operation at winch capacity load (if equipped).

6. Presence and proper operation of load hook safety latch.

7. Check to see that crane owner's manual is with the unit. If not, obtain serial number of unit and order manual immediately.

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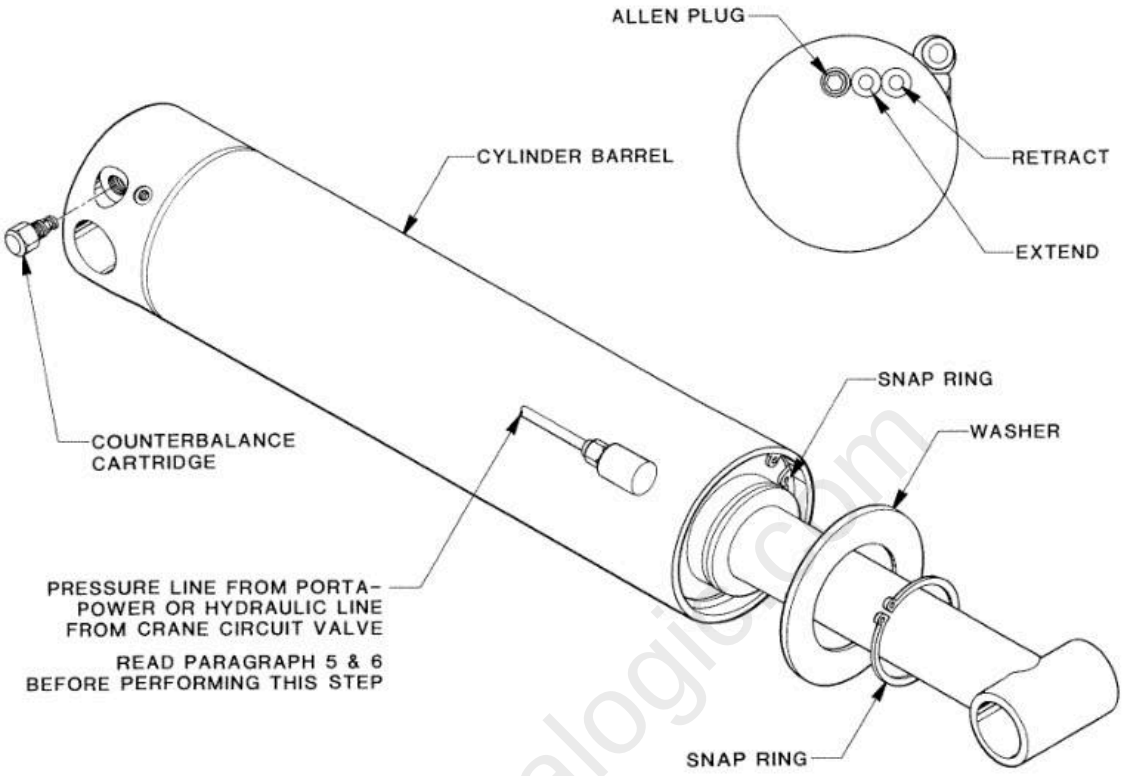
LIFT AND FOLD BOOM CYLINDER DISASSEMBLY AND REPAIR



NOTE: THE FLUSH MOUNTED ALLEN PLUGGED PORTS IN THE BACK OF THE CYLINDER ARE CONNECTED DIRECTLY INTO THE BORE SIDE OF THE CYLINDER AND SHOULD NOT BE REMOVED UNLESS ALL HYDRAULIC PRESSURE IS RELEASED FROM BOTH BORE AND SHAFT SIDE OF THE CYLINDER.

1. Disconnect shaft end of cylinder from machine.

2. Retract cylinder shaft with oil from the hydraulic system until about 12" of shaft is extended. The barrel must be filled with oil to prevent a compressed air chamber being formed which could result in injury at disassembly.

3. Remove the cylinder from the machine and place on supports with an oil pan directly beneath the cylinder head area.

4. Using the proper size of external snap ring pliers, remove the outer snap ring and slide the snap ring and washer away from the barrel. Remove the inner internal snap ring and slide it away from the barrel.

5. Attach a porta power hand pump or hydraulic line from crane circuit valve to the shaft end of the cylinder. DEBURR THE SNAP RING GROOVE EDGE IN THE BARREL. Failure to do so will damage barrel or packing gland.

6. Operate hand pump or crane circuit valve, preferably the boom extension circuit, to force packing gland out of barrel.

SERVICING THE CONTROL VALVES

DISASSEMBLY AND REASSEMBLY OF CONTROL VALVES TO REPLACE SEALS

NOTE: FOR CLARIFICATION, WE SHALL CALL THE INLET COVER CONTAINING THE MAIN RELIEF THE LEFT SIDE OF THE VALVE ASSEMBLY.

1. Before disassembly, it is suggested that each valve section be marked numerically to avoid incorrect reassembly.

2. Remove three assembly stud nuts from the end section using a 9/16" thin wall socket.

3. Remove valve sections by sliding from assembly studs.

4. If valve sections are to be added or removed, use the proper length assembly stud.

   NOTE: USE ASSEMBLY NUTS, THREE REQUIRED, WITH ALL ASSEMBLY STUDS. NO LOCK-WASHERS! ALL STUDS ARE STRESS-PROOF MATERIAL AND SHOULD BE REPLACED ONLY WITH ORIGINAL EQUIPMENT REPLACEMENT PARTS.

5. Thoroughly clean O-ring counterbores and ground surfaces of each section.

6. Replace the four O-rings, two seals per section. Buna-N seals are standard.

7. Replace valve sections on assembly studs in the same order in which they were removed.

   NOTE: USE CARE IN REPLACING VALVE SECTIONS TO AVOID DISLODGING O-RINGS FROM COUNTERBORES.

8. When all valve sections are positioned on assembly studs, replace stud nuts and tighten evenly to 32 ft. lbs. torque.

   NOTE: IF STUD NUTS ARE NOT TIGHTENED TO THE PROPER TORQUE, VALVE SPOOLS MAY BIND OR STICK, OR CAUSE SECTION SEALS TO EXTRUDE.

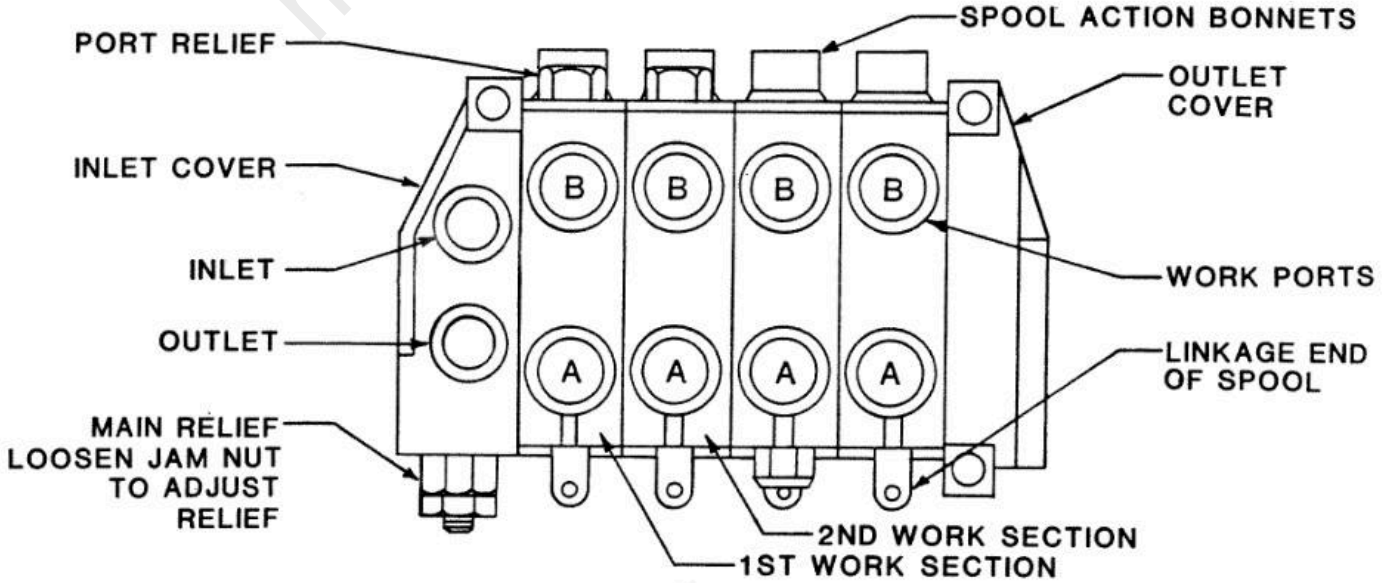
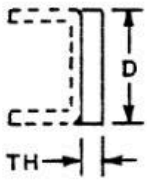
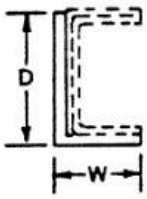


TABLE C



TH \ D	8	9	10	11	12	13	14	15	16
3/16	2.0	2.51	3.10	3.75	4.46	5.24	6.08	6.98	7.94
1/4	2.66	3.37	4.16	5.03	5.99	7.03	8.15	9.36	10.5
5/16	3.33	4.21	5.20	6.29	7.49	8.79	10.19	11.7	13.31
3/8	4.0	5.06	6.25	7.56	9.00	10.56	12.25	14.06	16.0
7/16	4.67	5.9	7.29	8.82	10.5	12.32	14.29	16.4	18.66

TABLE D



THICKNESS 3/16

D \ W	3	3½	4	4½
8½	5.7	6.4	7.0	7.7
9½	6.7	7.4	8.1	8.9
10½	7.7	8.5	9.3	10.1
11½	8.8	9.7	10.6	11.4
12½	10.0	10.9	11.9	12.8
13½	11.2	12.2	13.2	14.3
14½	12.5	13.6	14.6	15.7
15½	13.8	15.0	16.1	17.3

THICKNESS 1/4

D \ W	3	3½	4	4½
8½	7.7	8.6	9.4	10.3
9½	9.1	10.0	10.9	11.9
10½	10.5	11.5	12.5	13.6
11½	11.9	13.1	14.2	15.4
12½	13.5	14.7	16.0	17.2
13½	15.2	16.5	17.8	19.2
14½	16.9	18.3	19.7	21.2
15½	18.7	20.2	21.7	23.3

THICKNESS 5/16

D \ W	3	3½	4	4½
8½	9.8	10.8	11.9	12.9
9½	11.5	12.6	13.8	15.0
10½	13.3	14.5	15.8	17.1
11½	15.1	16.5	18.0	19.4
12½	17.1	18.6	20.2	21.7
13½	19.2	20.8	22.5	24.2
14½	21.4	23.1	24.9	26.7
15½	23.7	25.5	27.4	29.4

THICKNESS 3/8

D \ W	3	3½	4	4½
8½	11.9	13.2	14.4	15.6
9½	14.0	15.3	16.7	18.1
10½	16.2	17.7	19.2	20.7
11½	18.4	20.1	21.8	23.5
12½	20.9	22.6	24.5	26.3
13½	23.4	25.3	27.3	29.3
14½	26.0	28.1	30.2	32.4
15½	28.8	31.0	33.3	35.6

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National Crane N135 Articulating Crane Service Manual

National Crane N135 articulating crane service manual with repair, adjustment and maintenance guidance for the main systems. Instant PDF download.

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