

OPERATOR'S MANUAL

This manual has been prepared for and is considered part of the

600H Series Cranes

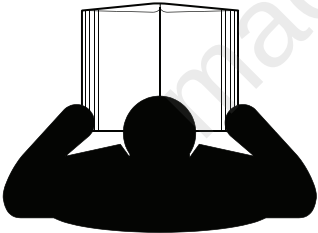
This Manual is divided into the following sections:

SECTION 1	INTRODUCTION
SECTION 2	SAFETY PRECAUTIONS
SECTION 3	CONTROLS AND OPERATING PROCEDURES
SECTION 4	SET-UP
SECTION 5	LUBRICATION PROCEDURE AND CHARTS
SECTION 6	MAINTENANCE CHECKLIST
OPTIONS	ROTATING STEEL PERSONNEL BASKET

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 right side of the turret. **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. Manitowoc 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.
- Store Operator's Manual in holder provided on crane.
- Attach laminated Capacity Charts supplied with crane to chain in operator's cab.
- If Operator's Manual or Capacity Charts are missing from cab, contact your distributor for new ones.

(1) Recalibration or repair of the operational aid shall be accomplished as soon as is reasonably possible, as determined by a qualified person.

(2) When a load indicator, rated capacity indicator, or rated capacity limiter is inoperative or malfunctioning, the designated person responsible for supervising the lifting operations shall establish procedures for determining load weights and for conducting the lifts in accordance with paras. 5-3.2.1.1(a) through (c). (Note: Paras. 5-3.2.1.1(a)-(c) relate to using the crane within the limits of the load capacity chart.)

(3) When a boom angle or radius indicator is inoperative or malfunctioning, radii or boom angle shall be determined by measurement.

(4) When an anti-two-block device, two-block damage prevention device, or two-block warning device is inoperative or malfunctioning, the designated person responsible for supervising the lifting operations shall establish procedures, such as assigning an additional signal person, to furnish equivalent protection. This does not apply when lifting personnel. Personnel shall not be lifted when two-block devices are not functioning properly.

(5) When a boom length indicator is inoperative or malfunctioning, the designated person responsible for supervising the lifting operations shall establish procedures for conducting the lifts in accordance with paras. 5-3.2.2.1(a) through (c).

(6) When a level indicator is inoperative or malfunctioning, other means shall be used to level the crane within the level requirements specified by the manufacturer.

Contact the Manitowoc Crane CARE office should you have any questions.

Load Charts

Load Charts represent the absolute maximum allowable loads, which are based on either tipping or structural limitations of the crane under specific conditions. Knowing the precise load radius, boom length, and boom angle must be a part of your routine planning and operation. Actual loads, including necessary allowances, should be kept below the capacity shown on the applicable Load Chart.

Load Chart capacities are based on freely suspended loads.

You must use the appropriate Load Chart for the crane configuration when determining the capability of the crane.

Do not remove the Load Charts from the crane.

Wind Forces

Wind forces can exert extreme dynamic loads. **National Crane recommends that a lift not be made if the wind can cause a loss of control in handling the load.** National Crane recommends if the wind speed (velocity) is between 32 km/h (20 mph) to 48 km/h (30 mph), that the load capacities shall be reduced to account for the size and shape of the load and the wind direction in relation to the machine for all boom, boom extension, and jib lengths. Further, operation of the crane in wind velocities over 48 km/h (30 mph) is not recommended. To assist you in determining prevailing wind conditions, a chart has been provided below.

WIND VELOCITY CHART

Wind Force		Wind Velocity km/h (mph)	Visible Indicator Effects of wind as observed on land
Beauford Scale	Designation		
Zero (0)	Calm	<2 (<1)	No wind: smoke rises vertically
1	Light Air	2-5 (1-3)	Wind direction seen by smoke but not by wind vanes
2	Light Breeze	6-11 (4-7)	Wind felt on face: leaves rustle: wind vane moves slightly
3	Gentle Breeze	13-19 (8-12)	Leaves/small twigs in constant motion: wind extends flag
4	Moderate Breeze	21-29 (13-18)	Raises dust & loose paper: moves small branches
Reduce crane load ratings and operating parameters at 32 km/h (20 mph)			
5	Fresh Breeze	31-39 (19-24)	Small trees in leaf begin to sway: on ponds, crested wavelets form
6	Strong Breeze	40-50 (25-31)	Large branches in motion: telegraph wires whistle: umbrellas used with difficulty
Cease all craning operations at 48 km/h (30 mph); lower & retract boom			
7	Moderate Gale	52-61 (32-38)	Whole trees in motion: walking against wind is inconvenient

Equipment Checks

Prior to placing the unit in operation, do a complete walk-around visual inspection and look for structural damage, loose components, leaks, or other conditions that require immediate correction for safe operation. The following inspection list is suggested.

Check:

- for any unusual conditions such as pools of hydraulic fluid or lubricating oil under the chassis, an outrigger which may have crept down or up, signs of damage, or improper maintenance.
- the tires are inflated to the proper pressure.
- the level of the hydraulic reservoir.
- the operation of the "stop" and horn circuits.
- for missing and loose bolts.
- for damaged structural members and welds.
- all rope guides and cable keepers.
- all sheaves for free turning.
- the winch cable for kinks, broken strands or other damage in accordance with instructions on page 6-2.
- to see that the hydraulic hoses and fittings are in good condition and show no signs of leaking. Repair damaged or leaking hoses immediately.
- the LMI and anti-two-block system for proper operation.
- the electrical wiring connecting the various parts of the system for physical damage.

NOTE: Consult the truck manufacturer's manual for vehicle checks.

Cold Weather Operation

The following recommendations are for operating National cranes in very low (i.e., sub-zero) temperatures.

Cranes should have appropriate hydraulic oil, lubricants, and other auxiliary items required for operation in sub-zero temperatures. Operate individual crane functions to ensure they are sufficiently warmed prior to performing a lift.

Only experienced operators should operate cranes at full rated capacities between 0° F (-18° C) and -40° F (-40° C) and for derated capacities in colder temperatures to ensure smooth operation. Shock loading shall be avoided.

Derated capacities for each °C below -40°C

Derate the rated load shown on the capacity charts 3.67 percent for each degree celsius below -40° C.

Derated capacities for each °F below -40°F

Derate the rated load shown on the capacity charts 2 percent for each degree fahrenheit below -40° F.

Anti-two-block Check

DANGER

The following tests must be performed with caution to prevent damage to the machine or injury to personnel.

Check the anti-two-block alarm light and the audible alarm by lifting the anti-two-block weight until the switch is activated. To check the anti-two-block switch:

- manually lift the weight.
- slowly raise the winch cable.
- slowly extend (telescope) the boom.

DANGER

If the light and audible alarm do not function as described and the crane movements are not stopped, the system is not working properly. The malfunction must be corrected before operating the crane.

If the crane is equipped with a jib that is deployed and rigged for work, repeat the test procedure for the jib anti-two-block switch.

LMI Check

Perform the following checks to verify proper LMI operation.

- Check that the display of the main boom length agrees with the actual boom length.
- Check that the display of the main boom angle agrees with the actual boom angles.
- Check that the display of the operating radius of the crane agrees with the actual radius.

Check the load display by lifting a load of known weight. The accuracy of the load indication shall be within the tolerance of SAE J159.

DANGER

If there is a deviation between displayed and actual values, an authorized LMI service representative shall be called for repair and/or recalibration of LMI system.

SECTION 4

SET-UP

This section contains information on how to perform the following tasks:

- Set the outriggers.
- Erect the jib.
- Stow the jib
- Remove the jib
- Use multipart reeving.
- Install the winch cable.
- Install the anti-two-block weight.
- Install a wedge socket.

DANGER

Do not operate outriggers unless they are visible to either the operator or a designated signal person to avoid crushing injury.

OUTRIGGER SETUP

Site Selection

The outrigger floats must be on a firm solid surface that is level. The surface must keep the crane stable and not allow the stabilizer float to sink or slide. Avoid areas that are:

- uneven
- rocky
- muddy

Setting the Outriggers

The outrigger setup procedure is as follows:

1. On the operators console select the desired outrigger control.
2. To extend any two outrigger components, position the control to activate the outrigger components.
3. Any two front or rear outrigger beams or stabilizers extend.
4. To activate a single component, position the outrigger selector switch to this side or other side.
5. Position the desired outrigger control to activate the component.
6. Any one front or rear outrigger beam or stabilizer extends.

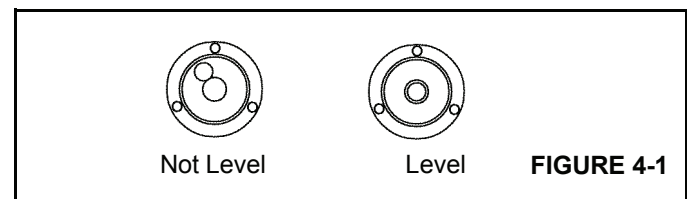
7. Set all four outrigger beams to:

- a. the fully retracted position. Does not require the outrigger beams to be extended.
- b. the midpoint position. Engage the manual midspan over-center locks for the midpoint position.
- c. the fully extended position.

DANGER

All four outriggers must either be fully retracted, at the midpoint, or fully extended, and the LMI set to the correct position. Failure to do so creates a tipping hazard.

8. Remove the outrigger floats from the carrying brackets and place the floats under the stabilizer.
9. Extend the stabilizer down to engage the floats.
10. Secure the outrigger floats to the stabilizers with the pins and clips.
11. Extend all four stabilizers until the truck tires are about four inches off the ground.
12. Using the level indicator, adjust the stabilizers until the bubble is in the center of the bulls eye. Do not allow the tires to touch the ground.



13. Lower the center front stabilizer only after all other stabilizers are set.

JIB SAFETY INFORMATION

1. The anti-two-block switch weight and cord must be attached to the jib when deployed.
2. Do not lift load with the boom tip when the jib is pinned on the boom tip.
3. Operate with jib by radius when main boom is fully extended. If necessary, increase boom angle to maintain loaded radius.

When radius is between points listed on capacity chart, the load shown at the next longer radius shall be used.



DANGER

Do not use a swivel on rotation resistant cable. A swivel on this cable causes premature cable core failure.

Standard

9/16 in. (14.3mm) Dia. Wire cable:
Rotation Resistant
18X25 Nominal Breaking Strength:
19.25 Tons (17,463 kg)

CRANE ADJUSTMENTS AND REPAIRS

Before adjustments or repairs are started on a crane, read and be familiar with the safety information outlined under "Maintenance Practices" in Section 2.

Boom Extension Cable

If a cable replacement is required for the boom extension system, the replacement cable must be obtained through the Manitowoc Crane Care. Extension cables are pre-stretched and have special connections for proper operation

Jib Jack Service and Maintenance

Important: Use only a good grade hydraulic jack oil, transmission oil, or turbine oil. Avoid mixing types of oil. Do not use brake fluid, alcohol, glycerin, detergent motor oil, or dirty oil. Improper fluid can cause serious internal damage to the jack rendering it inoperative.

Adding Oil to the Jib Jack

To add oil to the jib jack, do the following:

1. Set the jack in an upright level position.
2. Lower the saddle and make sure the piston is fully depressed.
3. Remove the oil filler plug.
4. Fill until the oil is level with the filler plug hole.

Changing the Jib Jack Oil

For best performance and longest life, replace the oil at least once a year. To change oil, do the following:

1. Remove the filler plug.
2. Lay the jack on its side and drain the oil into a drain pan. The oil will run slowly because air must enter as oil drains out.
3. Be careful to prevent dirt or foreign matter from entering the system.
4. Replace with proper oil as described above.

Lubrication

Add proper lubrication oil to all pivoting sections every three months.

Rust Prevention

Check the ram every three months for any sign of rust or corrosion. Clean as needed and wipe with oil saturated cloth.

NOTE: When not in use, always leave the saddle and ram all the way down.

Condition	Possible Cause	Possible Solution
Boom chatters during extension/retraction or doesn't proportion properly.	Boom sections need lubrication.	Grease boom.
	Wear pads not shimmed correctly.	Re-shim as described in boom assembly section.
	Worn wear pads.	Replace pads.
	Extension cables out of adjustment.	Readjust cables and tension properly.
	Extend or retract cables broken.	Disassemble, inspect, and replace cables.
Boom will not extend.	Proportioning cables not attached.	Reconnect, replace and/or adjust cables.
	Anti-two-block system shut down.	Lower hook, and extend load.
	Defective anti-two-block system	Repair ATB if defective.
System is in a state of constant cut-out.	Blown fuse at the crane console.	Replace fuse.
	ATB switch open.	Ensure that ATB switch is closed.
System cuts out too early or too late.	LMI programmed wrong.	Reprogram LMI with correct lift values.

Jib Jack Troubleshooting

Will not lift load.	No oil in system. Release valve not closed.	Add oil to reservoir. Turn handle clockwise tightly.
Will lift load only part way.	Oil level low.	Add oil to reservoir tank.
Will lift load but will not hold.	The following valve or valves leaking. a. Suction valve b. Delivery valve c. Release valve	Replace jack
	Packings worn or damaged.	Replace jack
Jack will not lower.	Release valve stuck, probably dirt or foreign matter.	Transfer load then replace dirty oil, flush oil reservoir with non-flammable solvent.
Poor lifting.	Dirty oil. Air in hydraulic system.	Change oil. Purge air from system.
Poor pumping action.	Oil seal for pump unit worn or damaged.	Replace jack.

TORQUE VALUES GRADE 5 AND 8 BOLTS

NOTE: Torque values are in foot pounds (ft-lb) and Newton meters (N-m) and apply to plain finish and zinc plated fasteners. Torque values specified are dry with as received residual oils. Special lubricants are not recommended.

Torque values for bolts listed above are not affected with the use of Loctite. Loctite should not be used on rotation bearing fasteners. Hardened washers should be used with Grade 8 fasteners.

Hex socket and Torx head fasteners are considered Grade 8, and unless otherwise specified, Grade 8 tightening torques should be used. Grade 5 tightening torques should be used for all wear pad fasteners.

Grade 5



Grade 8



Grade of stud bolts is identified by the radial lines stamped in the end with the shortest thread length.

Grade 5



Grade 8



Two Point Attach Head

Models 1400, 1400H, 1500 and 1800

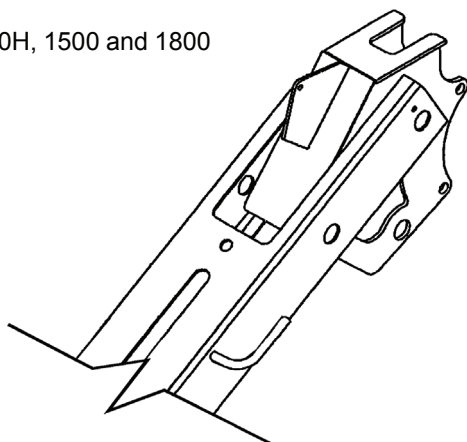
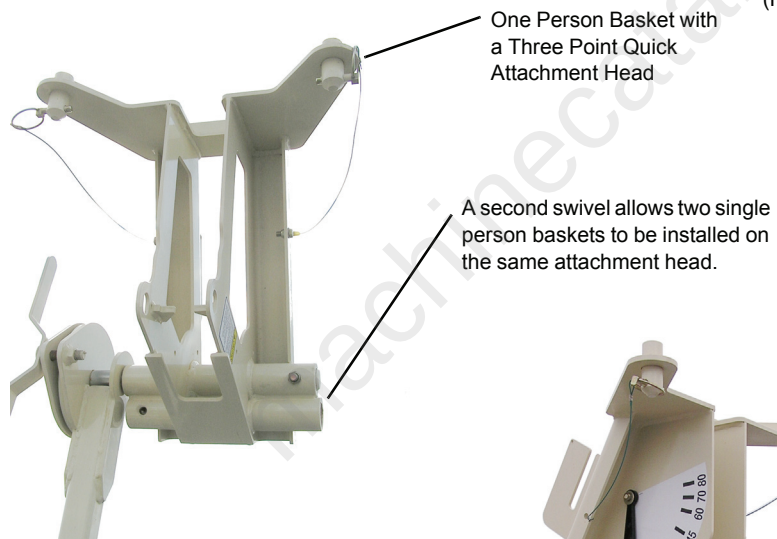


FIGURE O-B2

One and Two Person Basket Attach Heads



Two Person Basket with a Two Point Attachment Head (Rotating)



Two Person Basket Three with a Point Quick Attachment Head (Nonrotating)



FIGURE O-B3

Full Version Available

National Crane 600H Boom Truck Operator Manual

National Crane 600H boom truck operator manual covering controls, setup, safe operation and load charts. Searchable 78-page PDF. Instant PDF download.

VIEW THE FULL MANUAL

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Book No: CTRL091-01 · File Pages: 78 · File Count: 1 · File Language: English