

OPERATOR'S MANUAL

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

1400A Series Cranes

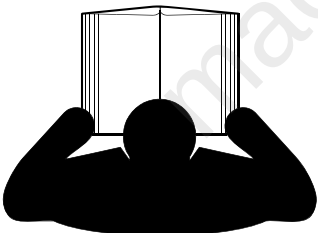
This Manual is divided into the following sections:

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
OPTION	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.

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Provided the crane is properly set-up, as indicated within the accompanying documentation with the crane, is in good working condition, and all operator's aids are properly programmed and qualified crane operators adhere to the instructions and parameters of the applicable load capacity chart, the Operator's and Safety Handbook, the decals on the machine, and follow established safe crane operating practices, the subject cranes should not be unstable.	2-10
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ELECTROCUTION HAZARD

Federal law [29CFR1910.180 and 29CFR1926.550] prohibits the use of cranes closer than 10 ft (3 m) to all power sources of up to 50,000 volts. For higher voltages, one additional foot (30 cm) for each 30,000 volts of additional voltage is required.

Keep all personnel away from this machine if it is being operated near electrical power lines or equipment.

Before operating this crane in the vicinity of electrical power lines or equipment, notify the power utility company. Obtain positive and absolute assurance that the power has been turned off.

This machine is NOT INSULATED. Always consider all parts of the load and the crane, including the wire rope, winch cable, pendant cables, and tag lines, as conductors.

Most overhead power lines ARE NOT insulated. Treat all overhead power lines as being energized unless you have reliable information to the contrary from the utility company or owner.

The rules in this manual must be followed at all times, even if the electrical power lines or equipment have been de-energized.

Crane operation is dangerous when close to an energized electrical power source. Exercise extreme caution and

prudent judgement. Operate slowly and cautiously when in the vicinity of power lines.

If the load, wire rope, crane boom, or any portion of the crane contacts or comes too close to an electrical power source, everyone in, on, and around the crane can be seriously injured or killed.

The safest way to avoid electrocution is to stay away from electrical power lines and electrical power sources.

You, the operator, are responsible for alerting all personnel of dangers associated with electrical power lines and equipment. The crane is not insulated. Do not allow unnecessary personnel in the vicinity of the crane while operating. Permit no one to lean against or touch the crane. Permit no one, including riggers and load handlers, to hold the load, load lines, tag lines, or rigging gear.

Even if the crane operator is not affected by an electrical contact, others in the area may become seriously injured or killed.

It is not always necessary to contact a power line or power source to become electrocuted. Electricity, depending on magnitude, can arc or jump to any part of the load, load line, or crane boom if it comes too close to an electrical power source. Low voltages can also be dangerous.

Thoroughly read, understand, and abide by all applicable federal, state, and local regulations.

⚠ DANGER

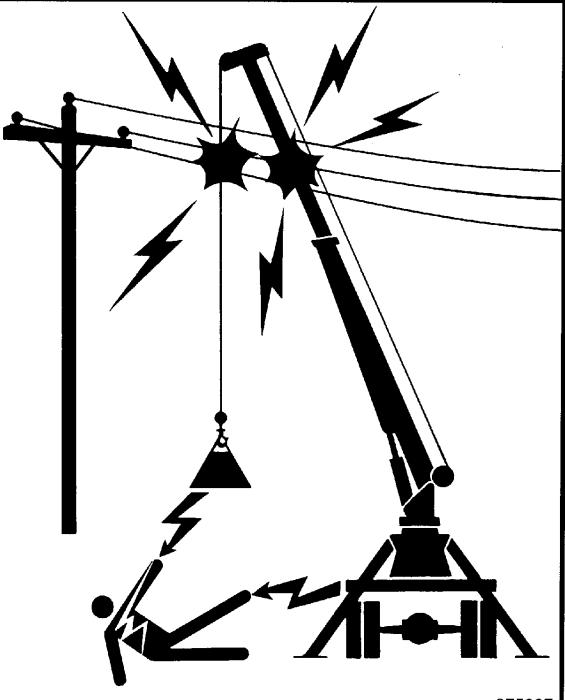
ELECTROCUTION HAZARD
THIS CRANE IS NOT INSULATED
DEATH OR SERIOUS INJURY WILL
RESULT FROM CONTACT OR
INADEQUATE CLEARANCE

Maintain safe clearances from electrical lines. Allow for boom, electrical line, and loadline swaying.

This crane does not provide protection from contact with or proximity to an electrically charged conductor.

Maintain a clearance of at least 10 feet between any part of the crane, loadline or load and any electrical line carrying up to 50,000 volts.

One foot additional clearance is required for every additional 30,000 volts or less.



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Heater Cold Weather Fuel Mixture

At temperatures below 20° F (-7° C), add a cold weather additive or mix kerosene with the diesel fuel at a 50/50 ratio.



Do not mix gasoline with diesel fuel.

Air Conditioner Controls (Optional)

The air conditioner (A/C) is controlled by two toggle switches on the crane cab console (Figure 3-6).

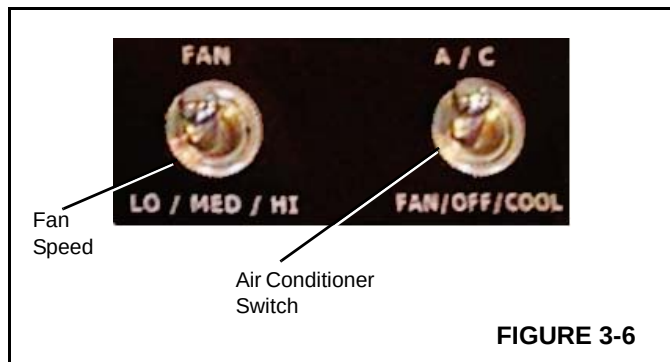


FIGURE 3-6

The FAN switch sets the fan speed and the A/C switch controls the air conditioner. The fan speed can be set to LO (low), MED (medium), or HI (high). Both the fan and air conditioner are on when the A/C switch is in the COOL position. Only the fan runs when the switch is in the FAN position.

Turn the fan switch to the HI position and the A/C switch to COOL when the air conditioner is first turned on. When the cab is comfortable, adjust the temperature by turning the fan switch to the low or medium position.

If the compressor cycles for only a few seconds at a time when the unit is first turned on, set the fan switch to the low position until the compressor continues to run. Then gradually switch to medium and high.

OPERATING PROCEDURES

You need to be familiar with the safety precautions outlined in SECTION 2 before operating the crane.

Equipment Familiarization

All members of the crew should become familiar with the location and operation of the controls, the correct operating procedure, the maximum lifting capacities, and the Safety Precautions in Section 2 of this manual. Carefully follow the operating procedures outlined below and the information in the load charts located in the crane cab.

Crane Cab Access

Pull the ladder out from under the crane cab door before entering the crane cab. Do not try to access the crane cab by other means. Take all precautions not to fall off the crane. Falling from any elevation can cause serious injury or death.

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 requires immediate correction for safe operation. The following checklist of items are suggested to ensure the crane is prepared for performing work operations. Check:

- for any unusual conditions such as pools of hydraulic fluid or lubricating oil under the chassis, any outrigger which may have crept down or up and any 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. The hoses should be free from cuts and abrasions and there should be no evidence of binding. Any damage or leakage should be repaired 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.

Operation of cranes at full rated capacities in temperatures between -18°C (0°F) and -40°C (-40°F) or lower should be accomplished only by competent operators who possess the

9. Remove pins C2 from upper and lower jib ears. Do not remove C1 pins at this time. C1 pins will be used as a pivot point to swing jib into stow position. A slight hammer strike may be necessary to remove pins. Always use proper eye protection during this step.
10. Raise the boom to the horizontal position.
11. Extend boom approximately 1 foot (.3m).
12. Using tag line attached to jib sheave case, slowly swing jib into stow position (parallel with 1st section boom). Pins C1 are the jib pivot points during this operation.

! CAUTION

Use caution when swinging jib to avoid unnecessary impact with 1st section boom.

13. Install jib swing pin B with spring clip through jib ear and boom sheave case holes. This pin will keep the jib assembly in line (parallel) with the 1st section boom. Jib swing pin B does not retain the jib in its stowed position on the 1st section boom.
14. Using boom telescope function, slowly retract boom. The ramp/side stow bracket assembly on the side of the 1st section jib will engage the hook on the side of the 1st section boom, first lifting the jib and then engaging the jib side stow bracket and the boom hook completely upon full retraction of the boom.
15. Install stow pin A with spring clip into the ramp/ side stow bracket assembly on the jib. Complete engagement of stow brackets and proper installation of pin A is critical for secure jib stow attachment.
16. Remove pins C1 from upper and lower jib ears. A slight hammer strike may be necessary to remove pins. Always use proper eye protection during this step.
17. Reinstall loadline over boom sheave case.

! DANGER

Visually check all pin positions and make sure the jib is fully retracted into side stow brackets, jib stow attachment is secure, and all pins and spring clips are in their proper locations. Failure to properly secure the jib during stowing and erecting may allow the jib to fall. Serious personal injury or death could result.

Always have at least one, if not both of the following in place at all times:

- Side stow bracket completely engaged into stow hook with stow pin A properly in place.
- Both pins C1 in upper and lower jib holes properly in place through mating holes on boom tip.

! CAUTION

The 44 foot jib weights 1470 pounds (667 kg) at 147 inches (374 cm) when retracted from mounting pin holes.

JIB REMOVAL

Should jib removal from the boom become necessary, proceed as follows:

1. Unstow and swing jib into position on the boom tip according to Steps 1 - 10 in the preceding jib deployment section.
2. Support and raise the jib at its balance point and remove the two swing around pins. Jib is now free of boom.
3. To install, proceed in reverse order of removal.

When the jib is stowed on side of crane, always leave the ram and handle sleeve of the jib jack pushed all the way down to reduce exposure to rusting.

Jib Maintenance

1. Lubricate as outlined in SECTION 5.
2. Check for free rotation of jib sheave daily when using jib.

ANTI-TWO-BLOCK WEIGHT INSTALLATION

To prevent the winch cable from slipping out of the anti-two-block weight, rig the weight as shown in Figure 4-3.

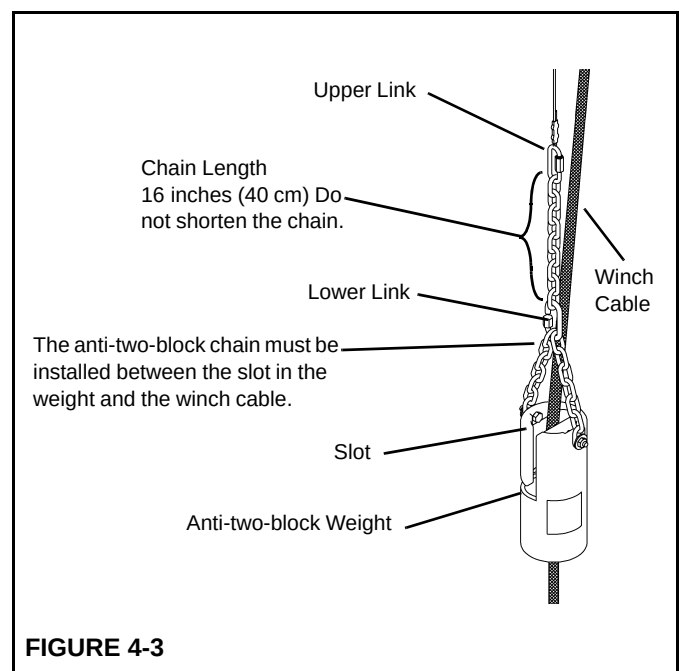
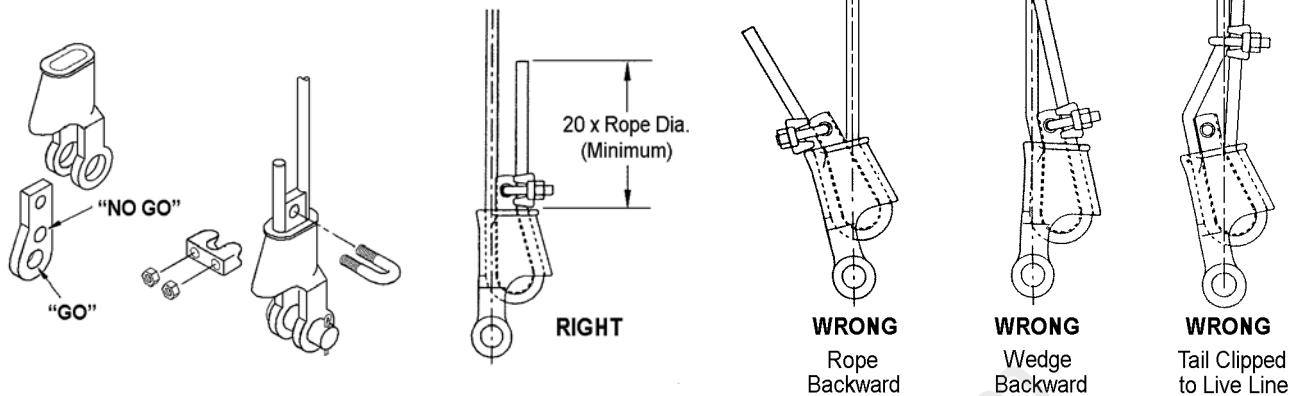


FIGURE 4-3

Terminator Wedge Socket

Torque Value Table

Cable Size (inches)	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4
Torque ft/lbs	45	65	65	95	95	130	225	225	225	360

Torque values shown are based upon clean dry threads free of lubrication.

FIGURE 4-6**Wedge Socket Installation**

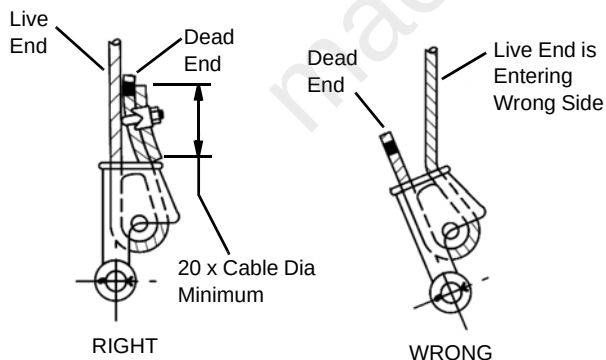
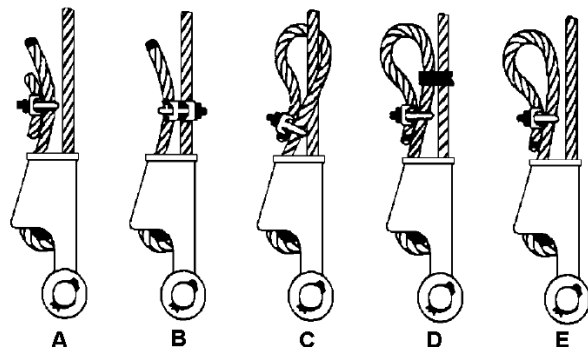
To attach a wedge socket, use the following procedure:

1. Remove rough edges and burrs from the wedge socket.
2. Use annealed wire to seize the end of the cable. Do not weld the end of the cable. If the end of the cable is welded, cut the end off and seize the end.

Insert the live end into the socket so that it is in line with the ears

3. Loop the cable around the wedge and insert the dead end back into the socket. Pull on the live end until the cable and wedge are secure in the socket. The length of dead end that is exposed must be at least 20 x cable diameter (Figure 4-7).
4. Secure the dead end.
5. Seat the cable in the wedge by lifting a light load with the winch.

Sketches A through E in Figure 4-8 illustrate different methods of treating the dead-ends of winch cable in a wedge socket.

Wedge Socket**FIGURE 4-7****Wedge Socket****FIGURE 4-8**

Metric Wide Base Tires for Trucks, Busses, and Trailers Used in Normal Highway Service

Tires Used as Singles Mounted on 15° Drop Center Rims

Tire and Rim Association Standard

TABLE MWB-1

		Tire Load Limits at Various Cold Inflation Pressures										
TIRE SIZE DESIGNATION	kPa psi	480 70	520 75	550 80	590 85	620 90	660 95	690 100	720 105	760 110	790 115	830 120
445/65R19.5	kg lbs.	3410 7540	3610 7930	3750 8270	3960 8680	4100 9040	4250 9370	4410 9730	4540 10100	4750(J) 10500(J) 162		
385/65R22.5	kg lbs.	2880 6380	3060 6720	3150 6940	3350 7350	3470 7650	3650 8050	3740 8230	3850 8510	4000 8820	4100 9050	4250(J) 9370(J) 158
425/65R22.5	kg lbs.	3430 7590	3640 7990	3750 8270	3980 8740	4130 9100	4250 9370	4440 9790	4580 10100	4750(J) 10500(J) 162	4880 10700	5000(L) 11000(L) 164
445/65R22.5	kg lbs.	3720 8230	3950 8660	4125 9090	4320 9480	4470 9870	4625(H) 10200(H) 181	4820 10600	4960 11000	5150 11400	5290 11700	5600(L) 12300(L) 168

Radial Ply Tires for Trucks, Busses, and Trailers Used in Normal Highway Service

Radial Ply Tires Mounted on 15° Drop Center Rims

Tire and Rim Association Standard

TABLE TTB-3R

		TIRE LOAD LIMITS (kg/lbs.) AT VARIOUS COLD INFLATION PRESSURES (kPa/psi)										
TIRE SIZE DESIGNATION	USAGE	480 70	520 75	550 80	590 85	620 90	660 95	690 100	720 105	760 110	790 115	830 120
8R19.5	DUAL	1120 2460	1170 2570	1215(D) 2680(D) 115	1260 2785	1310 2890	1360(E) 3000(E) 119	1410 3100	1460 3200	1500(F) 3305(F) 122		
	SINGLE	1150 2540	1220 2680	1285(D) 2835(D) 117	1340 2955	1400 3075	1450(E) 3195(E) 121	1500 3305	1550 3415	1600(F) 3525(F) 124		
8R22.5	DUAL	1250 2750	1300 2870	1360(D) 3000(D) 119	1410 3100	1460 3200	1500(E) 3305(E) 122	1570 3455	1640 3605	1700(F) 3750(F) 126		
	SINGLE	1290 2840	1360 2990	1450(D) 3195(D) 121	1500 3305	1550 3415	1600(E) 3525(E) 124	1670 3675	1740 3825	1800(F) 3970(F) 128		
9R22.5	DUAL	1480 3270	1550 3410	1610 3550	1670 3690	1750(F) 3860(E) 127	1820 4005	1890 4150	1950(F) 4300(F) 131	2010 4425	2070 4550	2120(G) 4675(G) 134
	SINGLE	1530 3370	1610 3560	1690 3730	1760 3890	1850(E) 4080(E) 129	1920 4235	1990 4390	2060(F) 4540(F) 133	2120 4675	2180 4810	2240(G) 4940(G) 136
10R22.5	DUAL	1750 3860	1830 4045	1910 4230	2000(E) 4410(E) 132	2080 4585	2160 4760	2240(F) 4940(F) 136	2300 5075	2360 5210	2430(G) 5355(G) 139	
	SINGLE	1850 4080	1940 4280	2030 4480	2120(E) 4675(E) 134	2200 4850	2280 5025	2360(F) 5205(F) 138	2430 5360	2500 5515	2575(G) 5675(G) 141	
11R22.5	DUAL	1990 4380	2080 4580	2160 4760	2250 4950	2360(F) 5205(F) 138	2460 5415	2560 5625	2650(G) 5840(G) 142	2680 5895	2710 5950	2725(H) 6005(H) 143
	SINGLE	2050 4530	2160 4770	2260 4990	2370 5220	2500(F) 5510(F) 140	2600 5730	2700 5950	2800(G) 6175(G) 144	2870 6320	2940 6465	3000(H) 6610(H) 146
11R24.5	DUAL	2110 4660	2210 4870	2300 5070	2390 5260	2500(F) 5510(F) 140	2580 5675	2660 5840	2725(G) 6005(G) 143	2820 6205	2910 6405	3000(H) 6610(H) 146
	SINGLE	2190 4820	2300 5070	2410 5310	2520 5550	2650(F) 6005(F) 142	2770 6095	2890 6350	3000(G) 6610(G) 146	3080 6790	3160 6970	3250(H) 7160(H) 149
12R22.5	DUAL	2170 4780	2260 4990	2350 5190	2440 5390	2575(F) 5675(F) 141	2630 5785	2680 5895	2725(G) 6005(G) 143	2840 6265	2960 6525	3075(H) 6780(H) 147
	SINGLE	2240 4940	2360 5200	2470 5450	2580 5690	2725(F) 6005(F) 143	2820 6205	2910 6405	3000(G) 6610(G) 146	3120 6870	3240 7130	3350(H) 7390(H) 150
12R24.5	DUAL	2300 5080	2400 5300	2500 5520	2600 5730	2650(F) 5840(F) 142	2770 6095	2890 6350	3000(G) 6610(G) 146	3080 6790	3160 6970	3250(H) 7160(H) 149
	SINGLE	2380 5240	2500 5520	2630 5790	2740 6040	2900(F) 6395(F) 145	3020 6650	3140 6910	3250(G) 7160(G) 149	3350 7380	3450 7600	3550(H) 7830(H) 152

PERSONNEL BASKET BOOM APPLICATION

There are several different type baskets that can be attached to the boom. The model of basket that can be attached to the boom depends on the size basket and model of crane. The chart below shows the boom configuration that is acceptable for each type of basket.

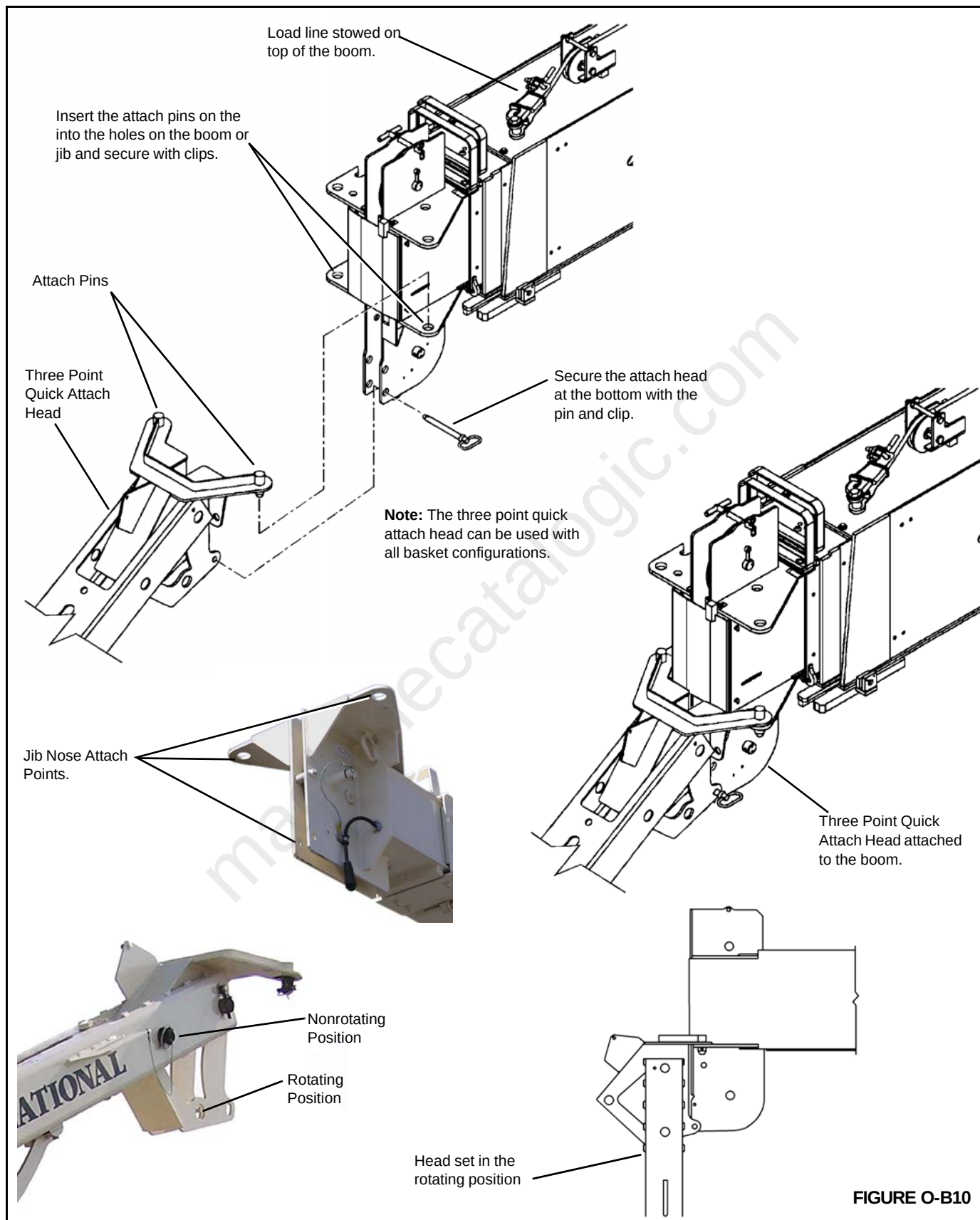
BOOM NOSE ATTACH HEAD

The attachment heads for the personnel baskets are shown in Figure O-B1, Figure O-B2, Figure O-B3, Figure O-B4. A three point quick attach head and a two point attach head is used for the one person two person and two person rotating baskets. **The Yoke Basket assemblies use a 3 point quick attach adapter.**

NCC Personnel Basket Boom Application Chart

SERIES	B1-S One Person Basket		2B1-S-Dual One Person Basket		BSA-1 Two Person Basket		BSA-R1 Two Person Rotating Basket		Yoke Basket One & Two Person	
	Main Boom	Jib	Main Boom	Jib	Main Boom	Jib (Boom)	Main Boom	Jib (Boom)	Boom	Jib
300C	X		X							
400B	X	X	X							
500E & E2	X	X	X		X		X			
600E & E2	X	X	X		X		X			
600H	X	X	X		X		X			
800D	X	X	X	X	X	39' (80') 44' (90' & 100')	X	39' (80') 44' (90' & 100')	X	X
900A	X	X	X	X	X	X	X	X	X	X
900H	X	X	X	X	X	X	X	X	X	X
1100	X	X	X	X	X	44' (95' & 105')	X	44' (95' & 105')	X	X
1300A	X	X	X	X	X	44' (100' & 110')	X	44' (100' & 110')	X	X
1300H	X	X	X	X	X	44' (100' & 110')	X	44' (100' & 110')	X	X
1400H	X	X	X	X	X	X	X	X	X	X
1400A	X	X	X	X	X	X	X	X	X	X
1500	X	X	X	X	X	X	X	X	X	X
1800	X	X	X	X	X	X	X	X	X	X

Note: The jib does not stow with dual baskets BSA-1 and BSA-R1.



Full Version Available

National Crane 1400A Boom Truck Operator Manual

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