

Grove RT880E

Operator Manual



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Manitowoc

National Crane

Potain



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SECTION 1 INTRODUCTION

SECTION CONTENTS

Customer Support	Noise/Vibration Test Results
New Owners	Noise Level Test Results
General	Vibration Level Test Results
	Serial Number Location

This handbook has been compiled to assist you in properly operating and maintaining your Grove Crane.

Before placing the crane in service, take time to thoroughly familiarize yourself with the contents of this manual. After all sections have been read and understood, retain the manual for future reference in a readily accessible location.

The Grove Crane has been designed for maximum performance with minimum maintenance. With proper care, years of trouble-free service can be expected.

Constant improvement and engineering progress makes it necessary that we reserve the right to make specification and equipment changes without notice.

Grove and our Dealer Network want to ensure your satisfaction with our products and customer support. Your local dealer is the best equipped and most knowledgeable to assist you for parts, service and warranty issues. They have the facilities, parts, factory trained personnel, and the information to assist you in a timely manner. We request that you first contact them for assistance. If you feel you need factory assistance, please ask the dealer's service management to coordinate the contact on your behalf.

Engine operating procedures and routine maintenance procedures are supplied in a separate manual with each crane, and should be referred to for detailed information.

Information in this manual does not replace federal, state, or local regulations, safety codes, or insurance requirements.

CUSTOMER SUPPORT

Manitowoc and our Dealer Network want to ensure your satisfaction with our products and customer support. Your local dealer is the best equipped and most knowledgeable to assist you for parts, service and warranty issues. They have the facilities, parts, factory trained personnel, and the information to assist you in a timely manner. We request that you first contact them for assistance. If you feel you need factory assistance, please ask the dealer's service management to coordinate the contact on your behalf.

New Owners

If you are the new owner of a Grove crane, please register it with Manitowoc Crane Care so we have the ability to contact you if the need arises.

Go to: http://www.manitowoccranes.com/MCG_CARE/Includes/EN/changeOfOwnership.cfm and complete the form.

GENERAL

NOTE: Throughout this handbook, reference is made to left, right, front, and rear when describing locations. These reference locations are to be considered as those viewed from the operator's seat with the superstructure facing forward over the front of the carrier frame.

This Handbook provides important information for the operator of the Model RT880E Series Grove Crane.

The rough terrain crane incorporates an all welded steel frame, using planetary drive axles to provide four-wheel drive. Axle steering is accomplished utilizing hydraulic steer cylinders. The engine is mounted at the rear of the crane and provides motive power through a six speed forward and reverse transmission.

The carrier frame incorporates an integral fifth wheel, to which the rear axle is mounted, to provide axle oscillation. Axle oscillation lockout is automatic when the superstructure rotates from the travel position.

The superstructure is capable of 360° rotation in either direction. All crane functions are controlled from the fully-enclosed cab mounted on the superstructure. The crane is equipped with a four-section, full power, sequenced and synchronized boom. Additional reach is obtained by utilizing an optional swingaway boom extension. Lifting is provided by a main and auxiliary hoist.


DANGER

**DEATH OR SERIOUS INJURY
 COULD RESULT FROM IMPROPER
 CRANE SET-UP ON OUTRIGGERS**

**FAILURE TO FOLLOW THESE INSTRUCTIONS
 CAN RESULT IN THE CRANE OVERTURNING**

- BE SURE OUTRIGGERS ARE PROPERLY EXTENDED AND SET AND CRANE IS LEVEL FOR OPERATION ON OUTRIGGERS.
- ALL FOUR OUTRIGGER BEAMS MUST BE EQUALLY EXTENDED TO THE APPROPRIATE VERTICAL STRIPE BEFORE BEGINNING OPERATION.
- ALL FOUR OUTRIGGER BEAM LOCK PINS MUST BE ENGAGED BEFORE OPERATING FROM THE MID-EXTEND POSITION.
- OPERATOR MUST SELECT PROPER LOAD CHART AND LMI PROGRAM FOR THE OUTRIGGER POSITION SELECTED.

Carefully follow the procedures in this handbook when extending or retracting the outriggers. Death or serious injury could result from improper crane setup on outriggers.

Be sure the outriggers are properly extended and set, and the crane is level for operation on outriggers.

All four outrigger beams must be equally extended to the mid position vertical stripe or fully extended position before beginning operation.

All four outrigger beam lock pins must be engaged before operating from the mid-extend position.

The operator must select the proper Load Chart and Load Moment Indicating (LMI) System program for the outrigger position selected.

KEEP THE BOOM SHORT. Swinging loads with a long line can create an unstable condition and possible structural failure of the boom.

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 should 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.

You must use the appropriate Load Chart when determining the capability of the crane in the configuration required to perform the lift.

Maximum lifting capacity is available at the shortest radius, minimum boom length, and highest boom angle.

Do not remove the Load Charts from the crane.

WORK SITE

Prior to any operation, you must inspect the ENTIRE work site, (including ground conditions) where the crane will travel and operate. Be sure that the surfaces will support a load greater than the crane's weight and maximum capacity.

Barricade the area where the crane is working and keep all unnecessary personnel out of that area.

Use caution when operating in the vicinity of overhanging banks and edges.

Be aware of all conditions that could adversely affect the stability of the crane.

Wind can have a significant affect on loads that may be lifted by a crane. Wind forces act differently on a crane depending upon the direction from which the wind is blowing (e.g., wind on the rear of the boom can result in decreased forward stability, wind on the underside of the boom can result in decreased backward stability, wind on the side of the boom can result in structural damages, etc.). To assist you in determining prevailing wind conditions, refer to the *Wind Velocity Chart*, page 2-7.

LIFTING OPERATIONS

If the boom extension, jib, or auxiliary boom nose is to be used, ensure the electrical cable and the weight for the anti-two-block switch are properly installed and the LMI is programmed for the crane configuration. Refer to the LMI handbook supplied with the crane.

Before lifting, position the crane on a firm surface, properly extend and set the outriggers, and level the crane.

If the boom extension or auxiliary boom nose is to be used, you must ensure that the cable for the LMI system is properly connected at the junction box located on the boom nose.

Depending on the nature of the supporting surface, adequate cribbing may be required to obtain a larger bearing surface.

DO NOT OVERLOAD THE CRANE by exceeding the capacities shown on the appropriate Load Chart. Death or serious injury could result from the crane tipping over or failing structurally from overload.

Do not rely on the crane's tipping to determine your lifting capacity.

If you should encounter a tipping condition, immediately lower the load with the hoist line and retract or elevate the boom to decrease the load radius. Never lower or extend the boom, this will aggravate the condition.

Be sure the load is properly rigged and attached. Always determine the weight of the load before you attempt to lift it

Always make daily inspections of the wire rope, keeping in mind that all wire rope will eventually deteriorate to a point where it is no longer usable. Wire rope shall be taken out of service when any of the following conditions exist:

1. For rotation-resistant running ropes; more than two (2) broken wires in a length of rope equal to six (6) times the rope diameter, or more than four (4) broken wires in a length of rope equal to thirty (30) times the rope diameter.
2. For running ropes other than rotation resistant; six (6) broken wires in one rope lay or three (3) broken wires in one valley break where the wire fractures between strands in a running rope is cause for removal.
3. Abrasion of the rope resulting in wear of the individual outside wires of 1/3 of the original wire diameter.
4. Any kinking, bird caging, crushing, corrosion, or other damage resulting in distortion of the rope structure.
5. Rope that has been in contact with a live power line or has been used as a ground in an electric circuit (eg. welding) may have wires that are fused or annealed and must be removed from service.
6. In standing ropes, more than three (3) breaks in one rope lay in sections beyond the end connection or more than two (2) broken wires at an end connection.
7. Core deterioration is usually observed as a rapid reduction in rope diameter and is cause for immediate removal of the rope.

Refuse to work with worn or damaged wire rope.

When installing and inspecting wire ropes and attachments, keep all parts of your body and clothing away from rotating hoist drums and all rotating sheaves.

Never handle the wire rope with bare hands.

Periodic rope inspection records are required by law. Make sure these records have been reviewed and are up to date.

When installing a new rope:

- Follow proper instructions for removing rope from a reel.
- Apply back tension to the storage/payoff reel of the new rope to insure tight, even spooling onto the hoist drum.
- Operate the new rope - first through several cycles at light load and then through several cycles at intermediate load to allow the rope to adjust to operating conditions.

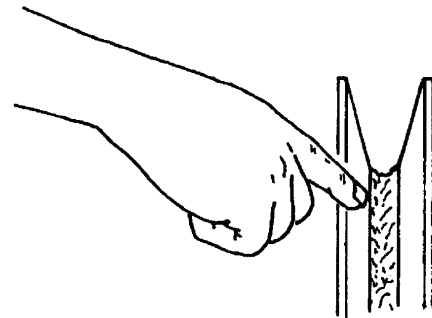
When using a wedge socket:

- Always inspect socket, wedge, and pin for correct size and condition.

- Do not use parts that are damaged, cracked, or modified.
- Assemble the wedge socket with live end of rope aligned with the centerline of pin and assure proper length of tail (dead end) protrudes beyond the socket.

Never overload or shock load a wire rope. Lubricate the wire rope periodically as the lubricant becomes depleted.

Sheaves



Inspect the boom nose and hook block sheaves for proper operation, excessive wear, and damage every 50 hours or weekly. Inoperable, damaged and/or worn sheaves cause rapid deterioration of wire rope. Ensure sheaves carrying ropes that can be momentarily unloaded are equipped with close fitting guards or other devices to guide the rope back into the groove when the load is reapplied. Ensure sheaves in the lower load block are equipped with close fitting guards that will prevent the ropes from becoming fouled when the block is lying on the ground with loose ropes.

To attain maximum wire rope life and minimize hook block rotation, it is recommended that even numbers of parts-of-line be used in multiple-part reeving whenever possible.

The use of nylon (nylatron) sheaves, as compared with metallic sheaves, may change the replacement criteria of rotation-resistant wire rope.

NOTE: The use of cast nylon (nylatron) sheaves will substantially increase the service life of wire rope. However, conventional rope retirement criteria based only upon visible wire breaks may prove inadequate in predicting rope failure. The use of cast nylon sheaves is therefore cautioned that a retirement criteria should be established based upon the user's experience and the demands of his application.

Batteries

Battery electrolyte must not be allowed to contact the skin or eyes. If this occurs, flush the contacted area with water and consult a doctor immediately.

When checking and maintaining batteries exercise the following procedures and precautions:

CAB OVERHEAD CONTROLS

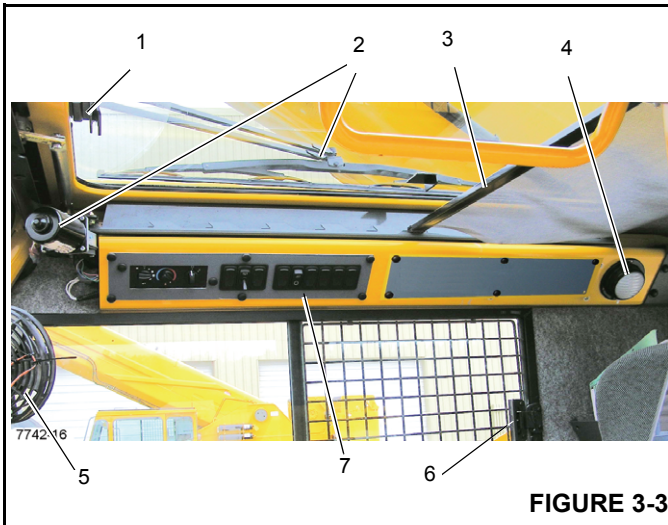


FIGURE 3-3

Item	Description
1	Skylight Window Latch
2	Skylight Wiper & Motor
3	Skylight Sunscreen
4	Dome Light
5	Cab Circulating Fan
6	Window Latch
7	Overhead Control Panels

Skylight Window Latch

The Skylight Window Latch (1, (Figure 3-3)) is at the front of the window. Squeeze the latch and slide the window to the rear to open. To close slide the window forward until the latch engages.

Skylight Wiper and Wiper Motor

The Skylight Wiper (2, Figure 3-3) is controlled by the Skylight Wiper Switch, (4, Figure 3-4), and operated by the Wiper Motor.

Skylight Sunscreen

The Skylight Sunscreen (3, Figure 3-3) is used to diminish direct sunlight. The sunscreen is self retracting and can be set to screen all the light or adjusted reward by moving it into the notches provided.

Dome Light

The cab Dome Light (4, Figure 3-3) is on the right rear corner of the cab overhead console and provides illumination in the cab. The dome light is controlled by a switch on the light.

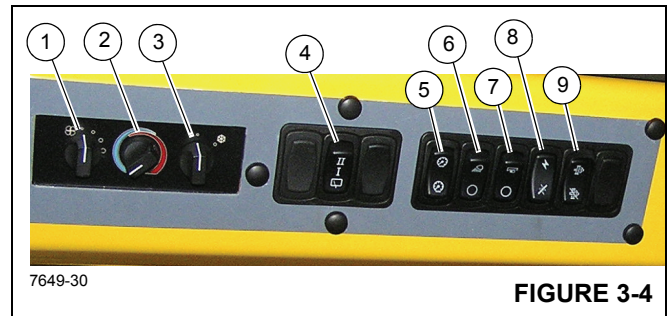
Cab Circulating Fan

The Cab Circulating Fan (5, Figure 3-3) is located on the left front side of the cab, above the window frame. A swivel allows the fan to be rotated and a switch on the fan base controls the fan. The switch has a high, low and off position.

Right Side Window Latch

The window on the right side of the cab can be opened. Squeeze latch (6, Figure 3-3) to release and slide forward. To close, slide the window rearward until the latch engages.

OVERHEAD CONTROL PANEL



7649-30

FIGURE 3-4

Figure 3-4 Item Numbers

Item	Description
1	Heater/Air Conditioner Fan Switch
2	Heater Control Switch
3	Air Conditioning Switch
4	Skylight Wiper Switch
5	Panel Dimmer Switch
6	Work Lights Switch
7	Boom Lights Switch (Optional)
8	Crane Function Power Switch
9	DPF Regeneration Switch (Tier 4 engine only)

Heater/Air Conditioner Fan Switch

The Heater/Air Conditioner Fan Switch (1) (Figure 3-4) controls the cab fan's speed. Fan speed controls the volume of heated air output (or cooled air output) of the fan. Settings are off, low speed, medium speed, and high speed.

Heater Control Switch

The Heater Control Switch (2) (Figure 3-4) controls intensity of heating temperature. Turn the switch to the right (clockwise) to open the valve for heat. (Heat comes from heated fluid going through the heater coil.) Turn the switch to the left



Axle Differential Lock Control Switch (Optional)

NOTE: The differential lock will only work when the crane is in the 4WD mode.

The Differential Lock (Axle Diff) Control Switch (9) (Figure 3-8) is located on the left arm rest. It is a two position, momentary rocker switch. When positioned to lock, the splines on the shift collar are engaged with the splines on the differential case and the axle shafts and the differential assembly are locked together and there is no differential action between the wheels. When positioned to unlock, there is normal differential action between the wheels all the time. The amber indicator on the steering column is illuminated when the proximity switches in each axle are activated.

Cab Door Release

Use the Cab Door Release Lever (10) (Figure 3-8) to open and close the cab door from inside the cab.

Seat Back Adjustment

To adjust the back of the seat press the adjustment knob (11) (Figure 3-8) and then adjust the seat as needed.

A/C Heater, Climate Control

The crane cab Air Conditioner/Heater Climate Control unit (16) (Figure 3-8) is located in the cab under the driver's seat. The vents (12) are part of the climate control unit and can be adjusted to direct the flow of air.

Seat Slide Lever

Moving the Seat Slide Lever (13) (Figure 3-8) will slide the seat only, either forward or backward.

Seat Frame Slide Lever

Moving the Seat Frame Slide Lever (14) (Figure 3-8) will slide the seat and the seat frame either forward or backward.

Armrest Adjustment

The Armrest and armrest controls can be adjusted using the adjustment knobs (15) (Figure 3-8). Loosen the knob and rotate the entire armrest to the desired position, retighten the knob when finished making the adjustment.

Hoist Rotation Indicators

The Hoist Rotation Indicators for the auxiliary and main hoist is located on top of each hoist control lever (1,4) (Figure 3-8). Each indicator is electronically driven by an input signal from a sensor attached to its related hoist and an output signal from a control module. Each hoist control lever (1,4) pulses when its hoist is running so the operator's thumb can sense it.

Cab Tilt Switch

The Cab Tilt Switch (17) is located in the right arm rest. It is a three position, momentary spring centered to off rocker switch. It has two positions, up and down, allowing the cab to be tilted either up or down.

NOTE: The Parking Brake must be engaged to operate the Cab Tilt feature and the cab must be completely down for the drive functions to be enabled.

Two-Speed Swing Switch

The Two-Speed Swing Switch (18) is located on the left armrest. This two-position (fast/slow) switch determines the swing motor speed. When in the fast position, the swing speed high solenoid is energized.

Hydraulic Boost Switch

The Hydraulic Boost Switch (19) (Figure 3-8) is located on the right armrest. This two position switch is used to control the High Speed Boost Selector Valve. With the switch in the ON position, the solenoid valve is energized. In this state, the solenoid valve stops the flow of oil from Pump No. 1, Section 2 to the Rear Steer/Outrigger Valve. The poppet check valve opens to combine this flow of oil with the output from Pump No. 1, Section 1.

NOTE: The hydraulic boost function is disabled when outrigger extend or retract is selected, rear steer right or left is selected, or when the transmission is not in neutral.

Armrest Switch (Not Shown)

The Armrest Switch is a proximity switch located in the lefthand armrest. The lefthand armrest must be in the down position before crane functions can be activated.

Seat Switch (Not Shown)

This switch is located in the seat. An operator must be sitting in the seat before the crane functions can be activated.

Traveling — Forward**CAUTION****Machine Damage Hazard!**

Engage the turntable lock pin for extended travel. Failure to engage the lock pin may allow the superstructure to swing uncontrolled, damaging the machine and/or property.

1. With the Transmission Shift Lever in the neutral (N) position, start the engine and allow it to adequately warm up.
2. Depress the Service Brake Foot Pedal.
3. Position the Drive Axle Switch to either two-wheel high or four-wheel low.

CAUTION

Use four-wheel drive only when more traction is required.

NOTE: If service brake hydraulic accumulator pressure is low, the parking brake cannot be released.

4. Lift the Transmission Shift Lever up out of its detent and push the lever to the forward (F) position, then rotate the Transmission Shift Lever Knob to the first (1) gear position. The gear selection "F1" will appear in the LCD Display to indicate that forward propulsion and first (1) gear have been selected; if the Service Brake Foot Pedal is not depressed prior to shifting to a gear, the gear selection will flash in the LCD Display until the Transmission Shift Lever is returned to the neutral (N) position and the transmission will not shift.
5. Release the Service Brake Foot Pedal and depress the Foot Throttle Pedal until maximum first gear speed is attained, then rotate the Transmission Shift Lever Knob to the second (2) gear position to continue to increase speed. For additional speed, continue shifting to a higher gear.

CAUTION**Possible Machine Damage!**

Do not downshift to a lower gear if the road speed is greater than the maximum speed of the lower gear.

Traveling — Reverse

Traveling in reverse is accomplished the same way as traveling forward, except for shifting the Transmission Shift

Lever to reverse (R). Refer to *Traveling — Forward*, page 3-25.

CAUTION**Possible Machine Damage!**

Apply service brakes and bring crane to a complete stop before shifting transmission into reverse.

Steering

Steering is accomplished by the steering wheel and the rear steer control. These controls, used singly or together, provide front wheel steering, rear wheel steering, four-wheel steering, and crabbing capabilities (Figure 3-14).

Front Wheel Steering

Conventional front wheel steering is accomplished with the steering wheel. This method of steering should always be used when traveling at higher speeds.

**WARNING****Unintentioned Operation Hazard!**

Operate the rear steer ONLY at slow speeds for added job site maneuverability.

Rear Wheel Steering

Rear wheel steering is controlled by the Rear Steer Control Switch. Moving the control switch to the desired position activates the rear steer cylinders, thereby steering the crane in the selected direction.

Four Wheel Steering

Four wheel steering is accomplished with the steering wheel and the Rear Steer Control Switch. Depending upon which direction the operator wishes to travel, the steering wheel is turned opposite direction of the Rear Steer control position. This allows the crane to turn or maneuver in close, restricted areas.

Crabbing

Crabbing is accomplished with the steering wheel and the Rear Steer Control Switch. Depending upon which direction the operator wishes to travel (crab), the steering wheel is turned in the same direction as the Rear Steer Control Switch. This permits driving the crane forward or backward in a crabbing manner.

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SECTION 4 SET-UP AND INSTALLATION

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GENERAL

This section provides procedures for installing the hoist cable on the hoist drum, cable reeving, and erecting and stowing the boom extension.

INSTALLING CABLE ON THE HOIST

CAUTION

If cable is wound from the storage drum, the reel should be rotated in the same direction as the hoist.

NOTE: The cable should preferably be straightened before installation on the hoist drum.

Install cable on the hoist drum in accordance with the following procedure:

1. Position the cable over the boom nose sheave and route to the hoist drum.
2. Position the hoist drum with the cable anchor slot on top.
3. Insert the cable through the slot and position around the anchor wedge (1) (Figure 4-1).

NOTE: The end of the cable should be even with the bottom of the slot for the anchor wedge.

5. Using the control levers (left and right), simultaneously extend (lower) the counterweight onto the frame counterweight supports. Feather individual controls as required to lower the counterweight in a level position.
6. Remove the counterweight removal cylinder support pins from turntable wing/support brackets and using the control levers (left and right), retract the counterweight removal cylinders fully.
7. Disconnect and secure the counterweight removal cylinder hydraulic lines and replace the counterweight removal cylinder support pins on the turntable wing/support brackets.
8. If applicable, properly attach chains with clevis to the counterweight lifting holes (Figure 4-9) and use a crane to carefully transfer the counterweight to the ground or a suitable transport vehicle.

Installation

1. Position the crane on a firm, level surface. Fully extend and set the outriggers. Level the crane.
2. Position the boom over the front of the machine and engage the turntable lock.
3. If applicable, properly attach chains with clevis to the counterweight lifting holes (Figure 4-9) and use a crane to carefully transfer the counterweight to the frame counterweight supports over the rear outrigger box.
4. Attach the counterweight removal cylinder hydraulic lines.
5. Using the control levers (left and right) extend the counterweight removal cylinders, one at a time, guiding them into the turntable wing/support brackets and pin securely.
6. Using the control levers (left and right) simultaneously retract (raise) the counterweight removal cylinders until the counterweight round bar engages the lugs on the turntable and the counterweight pinning holes are aligned with the counterweight mounting pins. Feather individual controls as required to raise the counterweight in a level position.
7. Engage the counterweight mounting pins using the control lever (center).
8. Attach the ball detent pins securing the counterweight mounting pins.
9. Relieve pressure on the counterweight removal cylinder so that weight is fully supported by the counterweight mounting pins.

INSTALLING THE BI-FOLD MANUAL BOOM EXTENSION



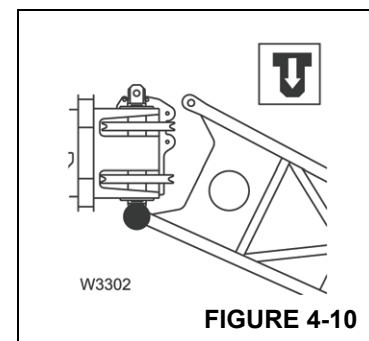
DANGER

To prevent serious injury or death, always wear personal protective equipment; i.e., a hard hat, eye protection, gloves and metatarsal boots.

1. Before installing the boom extension make sure the crane is set up on outriggers using normal setup procedures. Refer to *Setting the Outriggers*, page 3-29.

NOTE: An auxiliary crane with sling is required to install the bi-fold boom extension.

2. Check the transport condition of the bi-fold extension.
3. Using an auxiliary crane, attach sling to the bi-fold extension.
4. Lift the bi-fold extension in front of the main boom with the auxiliary crane and lock the 33 ft (10.1 m) section to the right of the main boom head (Figure 4-10).



5. Pin the left side to the boom nose.
6. Establish electrical connection between the extension and the main boom.
7. For units equipped with hydraulic luffing boom extension, establish hydraulic connections between the extension and the main boom.

NOTE: You can also install the bi-fold swingaway boom extension in front of a 16 ft (4.9 m) section when you are changing directly from the 56 ft (17.1 m) bi-fold swingaway extension to a boom extension.

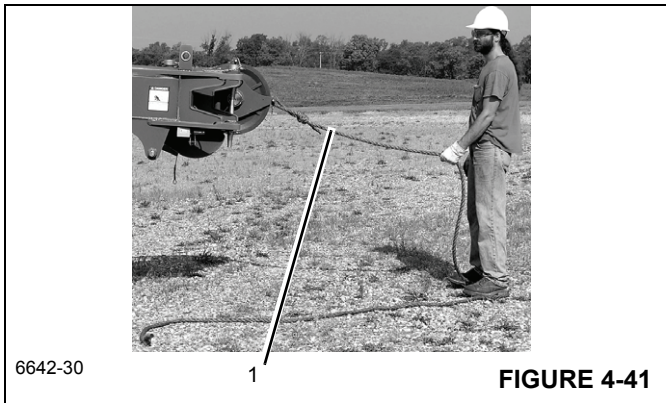
Checking the Transport Condition

For transportation you must establish certain connections between both parts of the lattice extension. The connections which need to be established depend on whether the lattice extension:

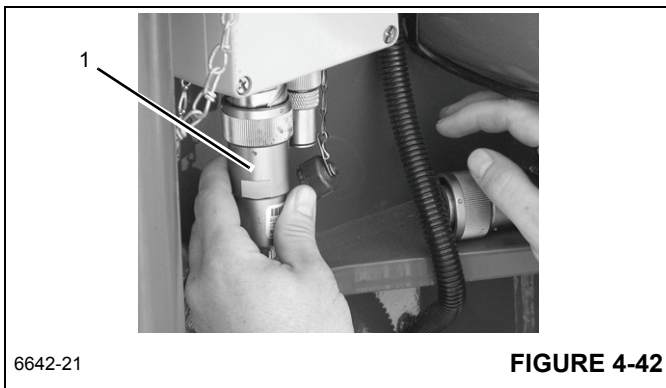
- is folded up at the side of the main boom for transportation or

33 ft (10.1 m) Boom Extension

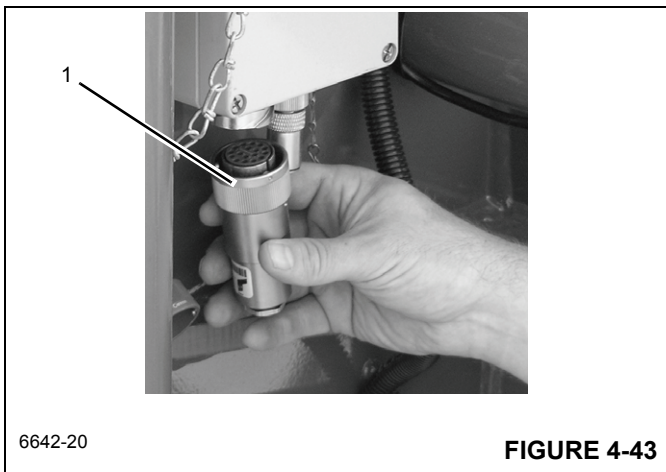
1. Lower boom and secure tag line (1, Figure 4-41) to tip of boom extension. shows the 23 ft (7 m) and 33 ft (10.1 m) extension together.



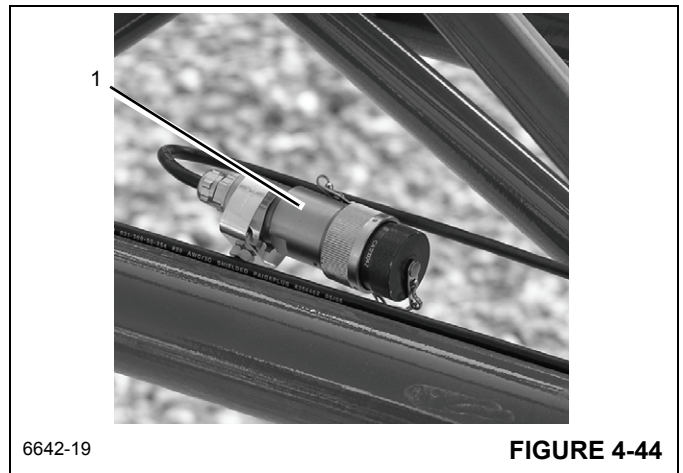
2. Disconnect LMI Cable.
 - a. Remove connector (1, Figure 4-42) from junction box on boom nose.



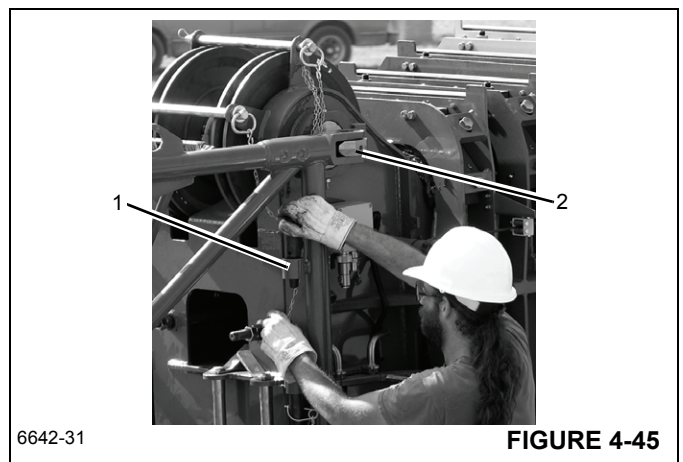
- b. Install dummy plug (1, Figure 4-43) on junction box.



- c. Route cable through boom extension and stow connector (1, Figure 4-44).



3. Remove two pins attaching the boom extension to the left side of boom nose (2, Figure 4-45). Stow the pins in the boom extension pin holders (1) and install the retainer clips.



4. Completely retract boom.
5. Extend boom approximately 2 ft (60.9 cm).
6. Raise boom above horizontal.

NOTE: Step 7 is stowing with the 23 ft (7 m) section and 33 ft (10.1 m) section together. If the 23 ft (7 m) section remained on the boom, proceed to step 9.

7. Use the tag line to maintain control of the boom extension, and swing the extension into the stowed position (Figure 4-46).

Electrical Connection at the Boom Inserts

The following describes the electrical connections at the 20 ft (6.1 m) inserts. Establish the electrical connection at the bi-fold swingaway lattice extension per the procedures in the *Operator's Manual*.

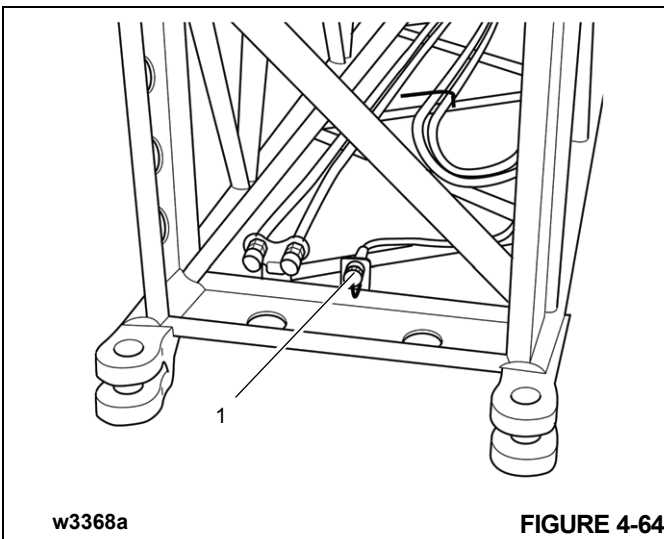
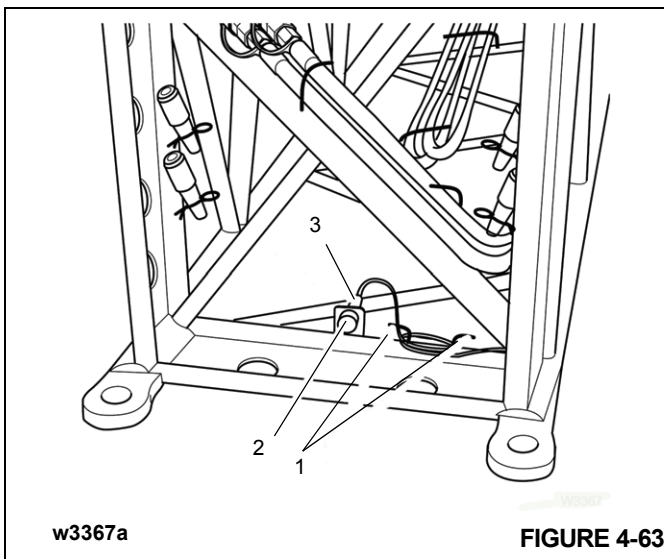
There is a plug socket (1) at the front of each 20 ft (6.1 m) insert Figure 4-64.

For transport, the sockets are covered with protective caps.

Electrical Connection — Transport Configuration

For transport, make the following electrical connections.

There is a cable with a plug (3) at the rear of the 20 ft inserts Figure 4-63. For transport, the cable is wound around the holders (1) and the plug is inserted in the dummy socket (2).



Electrical Connection — 76 ft (23.2 m) Boom Extension

Establishing a Connection

1. Connect the cable of the 33 ft (10.1 m) section to the socket of the second 20 ft (4.9 m) insert section at the front.
2. Connect the cable of the 20 ft (6.1 m) section to the socket at the main boom.

Disconnecting

1. Detach the electrical connection between 33 ft (10.1 m) and 20 ft (6.1 m) section.
2. Detach the electrical connection between 20 ft (6.1 m) section and main boom head.
3. Prepare the electrical connections at the 33 ft (10.1 m) section for transport.

Electrical Connection — 96 ft (29.3 m) Boom Extension

Establishing a Connection

1. Connect the cable of the 33 ft (10.1 m) section to the socket of the second 20 ft (6.1 m) insert section at the front.
2. Connect the cable of the second 20 ft (6.1 m) section to the socket of the first 20 ft (6.1 m) section at the front.
3. Connect the cable of the first 20 ft (6.1 m) section to the socket at the main boom head.

Disconnecting

1. Detach the electrical connection between the 33 ft (10.1 m) and front 20 ft (6.1 m) section.
2. Detach the electrical connection between the two 20 ft (6.1 m) sections.
3. Detach the electrical connection between the rear 20 ft (6.1 m) section and the main boom head.
4. Prepare the electrical connections at the 20 ft (6.1 m) section for transport (see *Electrical Connection — Transport Configuration, page 4-31*).
5. Prepare the electrical connections at the 33 ft (10.1 m) section for transport.

WIRE ROPE LUBRICATION

Wire rope is lubricated during manufacturing so that the strands, and individual wires in strands, may move as the rope moves and bends. A wire rope cannot be lubricated sufficiently during manufacture to last its entire life. Therefore, new lubricant must be added periodically throughout the life of a rope to replace factory lubricant which is used or lost. For more detailed information concerning the lubrication and inspection of wire rope, refer to *WIRE ROPE* in *Section 1- INTRODUCTION* in the Service Manual.

LUBRICATION POINTS

A regular frequency of lubrication must be established for all lubrication points. Normally, this is based on component operating time. The most efficient method of keeping track of lube requirements is to maintain a job log indicating crane usage. The log must use the engine hourmeter to ensure coverage of lube points that will receive attention based on their hours operated. Other lubrication requirements must be made on a time interval basis, i.e. daily, weekly, monthly, etc.

All oil levels are to be checked with the crane parked on a level surface in transport position, tires on the ground, and the suspension set at the proper ride height.

Lubrication checks must be performed while the oil is cool and has not been operated within the past 30 minutes, unless otherwise specified.

On plug type check points, the oil levels are to be at the bottom edge of the fill plug hole.

All grease fittings are SAE STANDARD unless otherwise indicated. Grease non-sealed bearings until grease is seen extruding from the bearing. One ounce(28 grams) of EP-MPG equals one pump on a standard one pound (0.45 kg) grease gun.

Over lubrication on non-sealed bearings will not harm the bearings or components, but under lubrication will definitely lead to a shorter lifetime.

On sealed U-joints, care must be exercised to prevent rupturing seals. Fill only until expansion of the seals first becomes visible.

Unless otherwise indicated, items not equipped with grease fittings, such as linkages, pins, levers, etc., should be lubricated with oil once a week. Motor oil, applied sparingly, will provide the necessary lubrication and help prevent the formation of rust. An Anti-Seize compound may be used if rust has not formed, otherwise the component must be cleaned first.

Grease fittings that are worn and will not hold the grease gun, or those that have a stuck check ball, must be replaced.

Where wear pads are used, cycle the components and relubricate to ensure complete lubrication of the entire wear area.

CraneLUBE

Manitowoc highly recommends the use of CraneLUBE lubricants to increase your crane's reliability and performance. Contact your Maniowoc Distributor for information about the Maniowoc's CraneLUBE lubrication program.

Safety

To lubricate many of the locations, the engine will need to be started. After positioning areas of the unit for lubrication the engine must be turned off and the moved areas stable before approaching.



Movement of the superstructure and the boom may create a crushing and/or pinching hazard. Failure to observe this warning could result in death or serious injury.

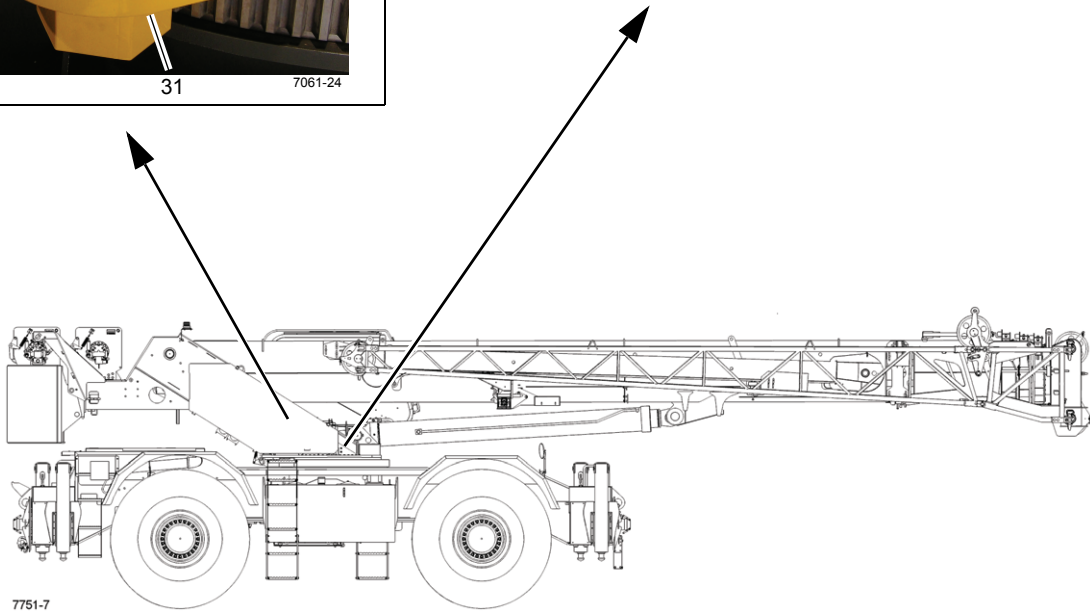


FIGURE 5-5

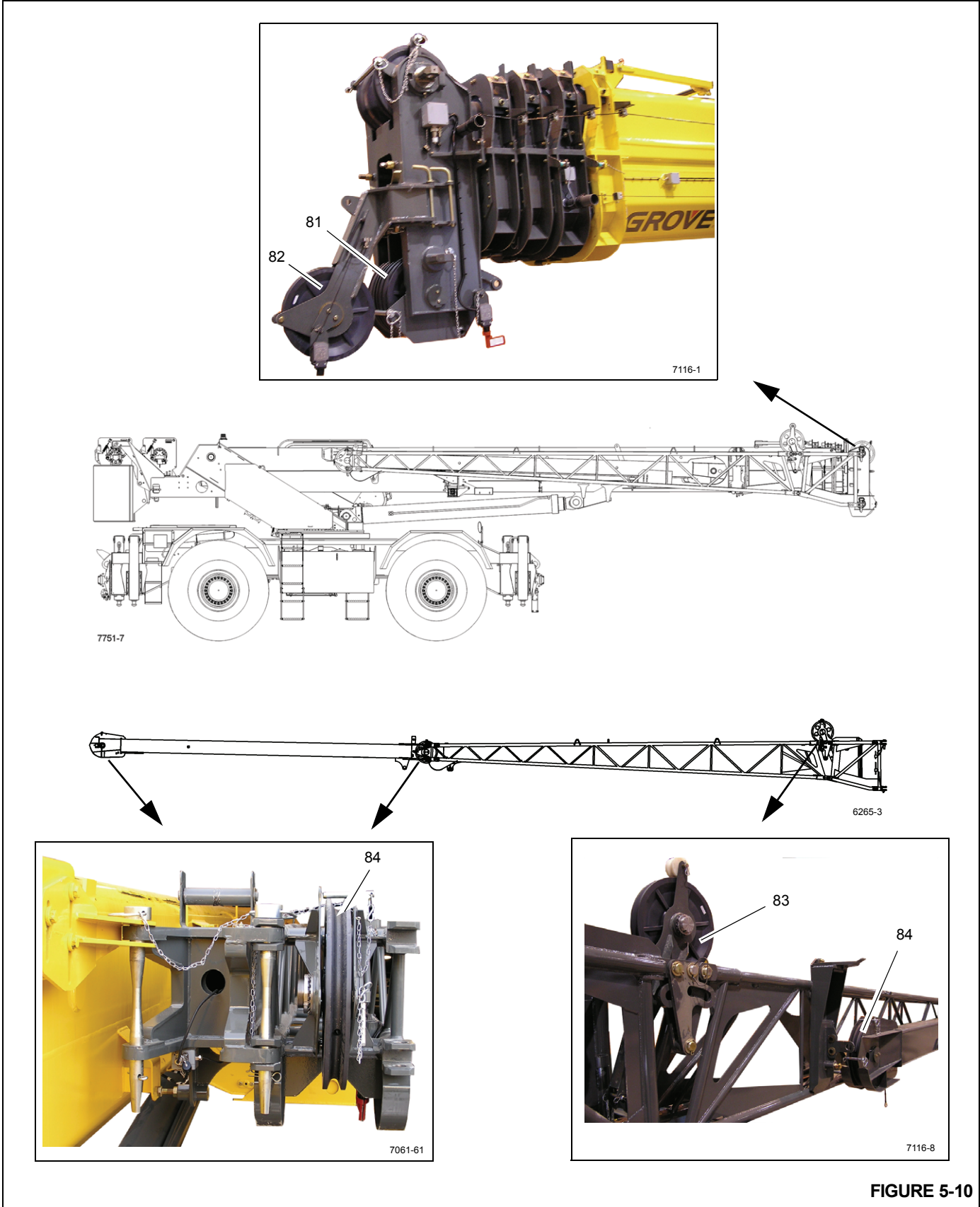


FIGURE 5-10

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