# Grove RT765E-2

## Operator Manual

# SECTION 1
# INTRODUCTION





## GENERAL

**NOTE:** Throughout this manual, 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 Operator Manual provides important information for the operator of the Model RT765E-2 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. Hydraulic, double box, sliding beam outriggers are integral with the frame.

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 hoist and an optional auxiliary hoist.

### Customer Support

Grove and our Distributor Network want to ensure your satisfaction with our products and customer support. Your local distributor 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 distributor's service management to coordinate the contact on your behalf.

A compact disc or USB flash drive, which includes sections on Operation, Safety and Maintenance for crane operators and owners, is supplied when the crane is purchased new. Additional copies are available from your Grove distributor.

#### *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: https://www.manitowoccranes.com/en/Parts_Services/ServiceAndSupport/ChangeOfOwnershipForm and complete the form.

## NOISE/VIBRATION TEST RESULTS

### Noise Level Test Results

When equipped with the CE certification package, the guaranteed sound power level at the operator's station with closed cab operation is $L_{wa}$ 105 dB(A) as measured by Directive 2000/14/EC and 80 dB(A) at the crane operator's position as measured by Annex G.1 of EN 13000:2010.

### Vibration Level Test Results

At the operator's station with closed cab operation, vibration levels are less than 0.5 m/s/s for Whole Body Vibration exposure and are less than 2.5 m/s/s for Hand Arm Vibration exposure when measured according to 89/392/EEC

# SECTION 2
# SAFETY INFORMATION

## SECTION CONTENTS

**Calculation of Projected Wind Area (Ap)**:

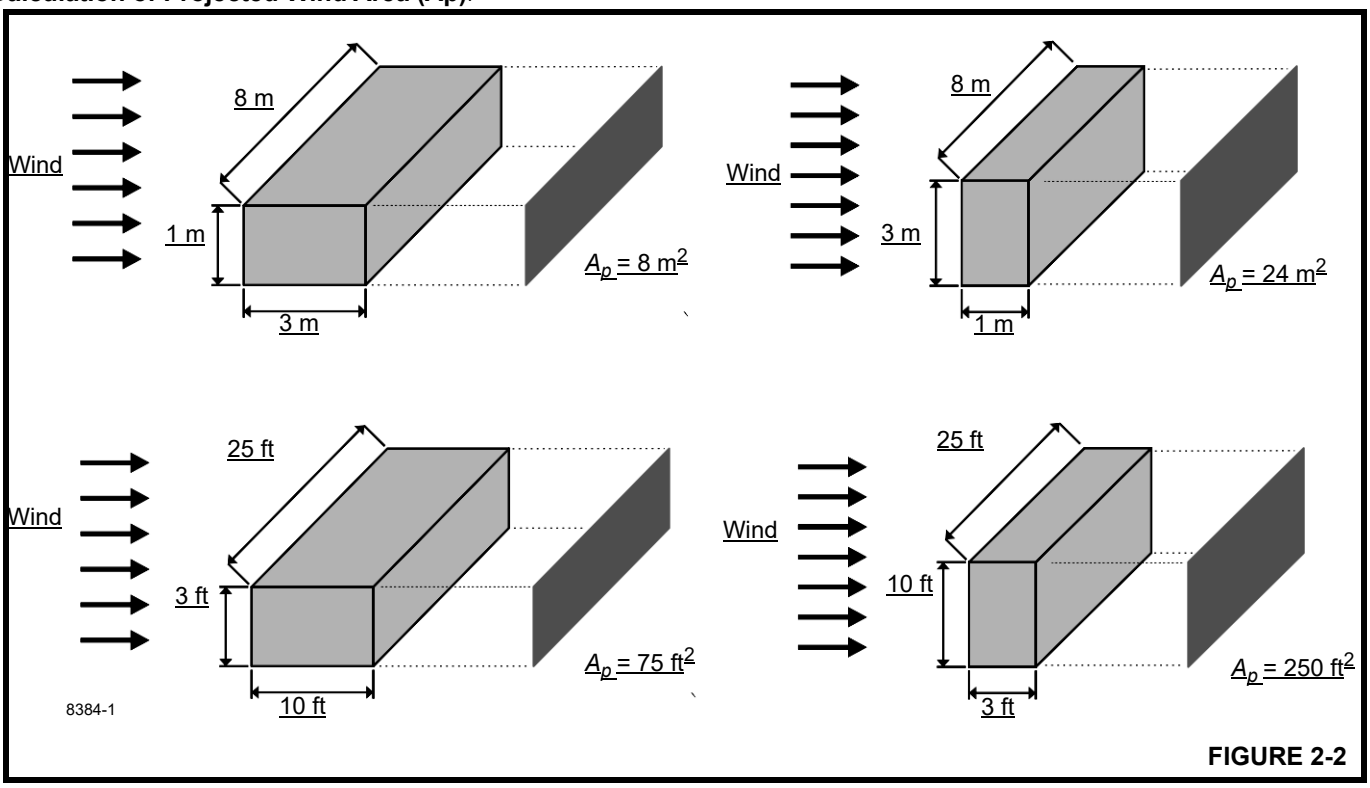


**FIGURE 2-2**

***Determining Wind Drag Coefficient (Cd)***

Table 2-2 shows the typical Shapes and corresponding Wind Drag Coefficient ***(Cd)*** values.

If the exact Wind Drag Coefficient of a shape is not known, use the maximum value of the shape's range ((Table 2-2)).

If the wind drag coefficient of the load cannot be estimated or determined, it shall be assumed that ***(Cd)*** = 2.4.

## Multiple Crane Lifts

Multiple crane lifts are not recommended.

Any lift that requires more than one crane must be precisely planned and coordinated by a qualified person. If it is necessary to perform a multi-crane lift, the operator shall be responsible for assuring that the following minimum safety precautions are taken:

- Secure the services of a qualified person to direct the operation.
- Make sure that all signals are coordinated through the lift director or person in charge of the lift.
- Coordinate lifting plans with the operators, designated person, and signal person prior to beginning the lift.
- Maintain communication between all parties throughout the entire operation. If possible, provide approved radio equipment for voice communication between all parties engaged in the lift.
- Use outriggers on cranes so equipped.
- Calculate the amount of weight to be lifted by each crane and attach slings at the correct points for proper weight distribution.
- Make sure that the load lines are directly over the attach points to avoid side loading and transfer of loading from one crane to the other.
- Do not travel. Lift only from a stationary position.

## Lifting Multiple Loads

Grove recommends lifting only one load at a time.

Lifting two or more separately rigged loads at one time is only permitted during steel erection in accordance with 29CFR1926.753 when the following criteria are met:

1926.753(e)(1) A multiple lift shall only be performed if the following criteria are met:

- 1926.753(e)(1)(i) A multiple lift rigging assembly is used;
- 1926.753(e)(1)(ii) A maximum of five members are hoisted per lift;
- 1926.753(e)(1)(iii) Only beams and similar structural members are lifted; and
- 1926.753(e)(1)(iv) All employees engaged in the multiple lift have been trained in these procedures in accordance with § 1926.761(c)(1).
- 1926.753(e)(1)(v) No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations.

1926.753(e)(2) Components of the multiple lift rigging assembly shall be specifically designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, shall be based on the manufacturer's specifications with a 5 to 1 safety factor for all components.

1926.753(e)(3) The total load shall not exceed:

- 1926.753(e)(3)(i) The rated capacity of the hoisting equipment specified in the hoisting equipment load charts;
- 1926.753(e)(3)(ii) The rigging capacity specified in the rigging rating chart.

1926.753(e)(4) The multiple lift rigging assembly shall be rigged with members:

- 1926.753(e)(4)(i) Attached at their center of gravity and maintained reasonably level;
- 1926.753(e)(4)(ii) Rigged from top down; and
- 1926.753(e)(4)(iii) Rigged at least 7 feet (2.1 m) apart.

1926.753(e)(5) The members on the multiple lift rigging assembly shall be set from the bottom up.

1926.753(e)(6) Controlled load lowering shall be used whenever the load is over the connectors.

## Tilt-Up Panel Lifting

Requirements and recommendations regarding operation and use of Grove cranes are stated on decals and in the Operator Manual provided with each specific model machine. Using the subject crane to perform tilt-up panel lifting with two hoist lines poses new and different hazards than does normal lifting use.

Therefore, the following additional precautions must be taken if it is necessary for the crane to be used to perform tilt-up panel lifting using a crane equipped with two hoists:

- The crane must be set up and operated in accordance with Grove’s instructions in the Operator Manual, Load Capacity Chart, and decals affixed to the crane.
- The hoist rope from the main hoist shall be reeved over the main boom nose reeved for two parts of line.
- The hoist rope from the auxiliary hoist shall be reeved over the auxiliary boom nose reeved for one part of line or up to two parts of line depending on the applicable load chart ratings.
- The load shall be connected with the main hoist line connected to the end closest to crane and the auxiliary hoist line connected to the end farthest from the crane.

ASME and similar organizations. See the *Service Manual* for inspection procedures.

When inspecting ropes and attachments, keep all parts of your body and clothing away from rotating hoist drums and all rotating sheaves. Never handle the rope with bare hands.

Some conditions that lead to problems in wire rope systems include:

- Sheaves that are too small, worn or corrugated cause damage to a wire rope.
- Broken wires mean a loss in strength.
- Kinks permanently damage a rope and must be avoided.
- Ropes are damaged by knots. Rope with knots must never be used.
- Environmental factors such as corrosive conditions and heat can damage a wire rope.
- Lack of lubrication can significantly shorten the useful life of a wire rope.
- Contact with electrical wires and resulting arcing will damage a wire rope.

- An inspection should include verification that none of the specified removal criteria for this usage are met by checking for such things as:
  - Surface wear; nominal and unusual.
  - Broken wires; number and location.
  - Reduction in diameter.
  - Rope stretch (elongation).
  - Integrity of end attachments.
  - Evidence of abuse or contact with another object.
  - Heat damage.
  - Corrosion.

**NOTE:** A more detailed rope inspection procedure is given in the *Service Manual*.

- ***When a rope has been removed from service because it is no longer suitable for use, it must not be reused on another application.***

**Installing a new rope**

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

## TEMPERATURE EFFECTS ON HYDRAULIC CYLINDERS

Hydraulic oil expands when heated and contracts when cooled. This is a natural phenomena that happens to all liquids. The coefficient of expansion for API Group 1 hydraulic oil is approximately 0.00077 $cm^3$ per $cm^3$ of volume for 1°C of temperature change (0.00043 $in^3$ per $in^3$ of volume for 1°F of temperature change). **Thermal contraction will allow a cylinder to retract as the hydraulic fluid which is trapped in the cylinder cools.**

The change in the length of a cylinder is proportional to the extended length of the cylinder and to the change in temperature of the oil in the cylinder. For example, a cylinder extended 7.6 m (25 ft) in which the oil cools 15.5°C (60°F) would retract approximately 196 mm (7 3/4 in) [see Table 2-9 and Table 2-8]. The rate at which the oil cools depends on many factors and will be more noticeable with a larger difference in oil temperature verses the ambient temperature.

Thermal contraction coupled with improper lubrication or improper wear pad adjustments may, under certain conditions, cause a “stick-slip” condition in the boom. This “stick-slip” condition could result in the load not moving smoothly. Proper boom lubrication and wear pad adjustment is important to permit the boom sections to slide freely. Slow movement of the boom may be undetected by the operator unless a load is suspended for a long period of time. To minimize the effects of thermal contraction or “Stick-slip” it is recommended that the telescope control lever is activated periodically in the extend position to mitigate the effects of cooling oil.

If a load and the boom is allowed to remain stationary for a period of time and the ambient temperature is cooler than the trapped oil temperature, the trapped oil in the cylinders will cool. The load will lower as the telescope cylinder(s) retracts allowing the boom to come in. Also, the boom angle will decrease as the lift cylinder(s) retracts causing an increase in radius and a decrease in load height.

This situation will also occur in reverse. If a crane is set up in the morning with cool oil and the daytime ambient temperature heats the oil, the cylinders will extend in similar proportions.

(Table 2-8) and (Table 2-9) have been prepared to assist you in determining the approximate amount of retraction/extension that may be expected from a hydraulic cylinder as a result of change in the temperature of the hydraulic oil inside the cylinder. The chart is for dry rod cylinders. If the cylinder rod is filled with hydraulic oil, the contraction rate is somewhat greater.

# SECTION 3
# OPERATING CONTROLS AND PROCEDURES

## SECTION CONTENTS

## Low Fuel Level

The Low Fuel Level Indicator (27) (Figure 3-6) illuminates when the fuel level in the tank is nearing empty (15%). When this indicator comes on fuel should be added to the fuel tank immediately. The light will go out when the fuel tank level reaches 20% of capacity.

## Battery Charge Indicator

With the engine running, the Battery Charge Indicator (28) (Figure 3-6) illuminates red if battery system voltage is below nine (9) volts, engine ECM voltage is below 9 volts, or there is no alternator charge signal present.

If the engine is running and the Battery Charge Indicator illuminates, investigate possible alternator, alternator fuse, or alternator wiring problems.

When the engine is not running and the Ignition Switch is in the ACC or RUN position, the Battery Charge Indicator turns on to indicate the batteries are being drained and not being charged.

## Voltmeter

The Voltmeter (battery gauge) (29) (Figure 3-6) is located in the steering column gauge display. The Voltmeter indicates the voltage being supplied to or from the batteries and has a scale of 8 to 18 volts.

If the Ignition Switch is in the ACC or RUN position and the Voltmeter indicator is in the red, the batteries may need to be recharged or possibly replaced.

## Tachometer

The Tachometer (30) (Figure 3-6) is located in the steering column gauge display. The tachometer registers engine RPM and is calibrated in RPM x 100 with a range of zero [0] to 35. The tachometer receives a signal from the engine ECM.

## DEF Level and Gauge

The DEF Level and Gauge (32) (Figure 3-6) is located in the steering column gauge display. The DEF level is displayed as a percent remaining in the DEF tank and a gauge as a graphical representation of the quantity left in the tank.

### *Reeving*

When reeving the boom, always reeve the main hoist wire rope through the rope grab; if also reeving the auxiliary hoist rope, reeve the auxiliary hoist rope outside of the rope grab.

## Cold Weather Operation

The following recommendations are for operating Grove cranes in regions with ambient temperatures below -9°C (15°F) which are considered arctic.

**NOTE:** Additional information regarding cold weather operation is available through your Cummins dealer/service center under Service Bulletin 3379009.

Use particular care to ensure that cranes being operated in very cold temperatures are operated and maintained in accordance with the procedures as provided by Grove.Therefore, always ensure adequate lubrication during system warm-up and proper operation of all crane functions when operating in cold weather and regardless of the oil viscosity of the crane's lubricants, always follow the cold weather start-up and operating procedures described in the *Operator Manual.* To ensure adequate lubrication during system warm-up and proper operation of all crane functions, (Refer to *Arctic Lubricants and Conditions*, page 5-3.) If in doubt of the suitability of a specific fluid or lubricant, check with an authorized Grove distributor or Manitowoc Crane Care. Cranes should have appropriate hydraulic oil, lubricants, and other auxiliary items required for operation in sub-zero temperatures.

Grove recommends the crane is equipped with the following cold weather accessories:

**Down to -29°C (-20°F) Package**

- Battery heater
- Fuel line heater
- Engine hood insulation
- Fan clutch
- Radiator air shutters
- Air diverter
- Diesel fired cab heater
- Cold weather alternator
- Fluids suitable to -29°C (-20°F)
  - Arctic windshield washer fluid
  - Arctic fuel

**Down to -40°C (-40°F) Package**

- Coolant heater (to circulate warm coolant through heaters and engine)
- Transmission heater
- Swivel heater
- Battery heater
- Fuel line heater
- Engine hood insulation
- Fan clutch
- Radiator shutters
- Air diverter
- Diesel fired cab heater
- Cold weather alternator
- Super-capacitor starting system
- Fluids suitable to -40°C (-40°F):
  - Arctic windshield washer fluid
  - Arctic fuel

Individual crane functions should be operated to ensure they are sufficiently warmed prior to performing a lift.

Operation of cranes at full rated capacities in ambient temperatures between -9°C and -40°C (15°F and -40°F) or lower should be accomplished only by competent operators who possess the skill, experience, and dexterity to ensure smooth operation. Shock loading shall be avoided. See Section 5 of this manual for more detailed information on operation of cranes down to -40°C (-40°F).

### *Component Coolant Heater*

A diesel fueled coolant heater circulates warm coolant through engine and crane components when operating during arctic temperatures. The coolant heater should be activated 2 hours before starting the crane to allow sufficient time to preheat fluids and assist with easy start-up conditions.

**WARNING**

**Explosion Hazard!**

Before switching on, check if the heater can be operated at the current site of the crane. There is a danger of explosion when using the heater around combustible objects! Do not park the vehicle near objects that are flammable.

Use caution near the exhaust tailpipe as it will also become very hot.

**NOTE:** Operation of the heater is not permissible:

- At locations where flammable gas or vapors are found or can be formed (example: at fuel stations and chemical factories)

- Position the boom over the front of the crane.
- Engage the swing brake and turntable lock pin.
- Remove hookblock from main boom nose.
- Overhaul ball may be reeved over boom extension, hanging 3 ft (0.9 m) below sheave.

***Extended Travel***

Depending upon the tire manufacturer, the higher inflation pressures normally specified for lifting on rubber are not recommended for site to site transfer over extended distances. The higher static/creep 5 mph (8 km/h) inflation pressures may remain in the tire while operating the crane on site within a distance of less than 4 mi (6.4 km).

**CAUTION**

**Tire Damage!**

For extended travel, check the cold tire pressure prior to start. (Refer to tire inflation chart in Load Chart Book.) After every one hour of travel time, regardless of ambient temperature, stop and allow the tires to cool off for at least 30 minutes. At the destination, the tires must be allowed to cool to ambient temperature before crane lifting on rubber.

***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.

**WARNING**

**Run-away Crane Hazard!**

Releasing the parking brake while the low service brake pressure indicator is illuminated and the buzzer is sounding, indicating the service brakes are inoperable, may result in the crane rolling away freely without the ability of the operator to stop the crane.

Never release the parking brake while the low service brake pressure indicator is illuminated and the buzzer is sounding.

3. Disengage the parking brake.
4. 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.

5. 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.
6. 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 3-31.

**CAUTION**

**Possible Machine Damage!**

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

**CAUTION**

**Possible Machine Damage!**

When defining virtual wall(s), always allow a safe working distance to any obstacles. Never work outside a safe working area as defined by common practice, standards, and manuals.

**WARNING**

**Risk of Unexpected Operation!**

There are no machine cutouts associated with the swing angle set limitation or the work area definition features, except when the optional work area definition lockout system that cuts out swing is installed.

**An Anti-Two Block Device** is also incorporated into the system to prevent the hook block or overhaul ball from coming into contact with the boom nose or boom extension. This condition will cause a lockout of hoist up, boom down, and telescope out, and also provide a visual and an audible alarm.

Refer to the RCL Operator Handbook for more detailed information on the function of the RCL system.

**Using the Tare Function**

The tare function is not shown on the RCL Display Module (RDM) at crane startup.

To show the tare function, do one of the following:

- Press the Screen Toggle Button (1, (Figure 3-20)) at the Jog Dial to select the RDM screen control.

  From the RCL Setup Screen, press the Tab Button (2).

  - or -

- Press the Tab Button (3, (Figure 3-20)) on the RDM Navigation Control Pad.

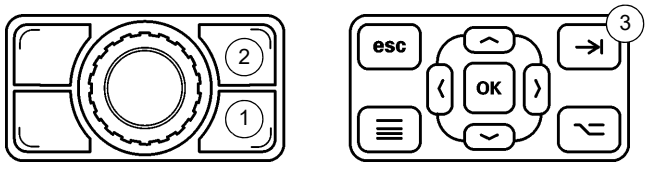


FIGURE 3-20

The tare weight (1. (Figure 3-21)) is shown below the percentage of the actual versus maximum percent load. The tare weight value equals the actual weight value until the tare weight is zeroed out. The operator sets the tare weight to zero by pressing the Tab Button on either the Jog Dial or the RDM Navigation Control Pad.

If the Operator changes the Load Chart Code Number, the tare weight will be reset to equal the current Actual Weight.

To disable the tare function, the operator must switch power off and back on using the Ignition Key Switch.

**NOTE:** The tare function does not change nor override the value of the Actual Load, and does not affect the Rated Capacity Limiter (RCL) and its function lockouts.

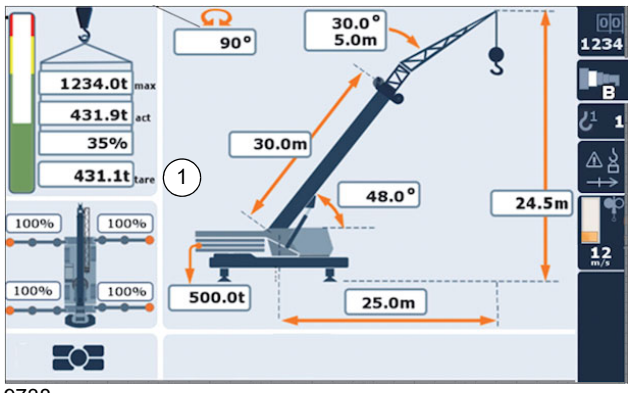


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FIGURE 3-21

**Control Lever Lockout System**

The control lever lockout system consists of hydraulic solenoid valves (located in the directional control valves) which are in series between the hydraulic remote control valves in the cab and the pilot-operated directional control valves. When the valves are actuated, they prevent pilot flow between the hydraulic remote control valve in the cab and the appropriate directional control valve. The valves are activated in such a manner as to prevent worsening the condition, i.e. boom down, telescope out, or hoist up. The control lever lockout system is used with the anti-two-block system or the Rated Capacity Limiter (RCL) system.

## Stowing and Parking

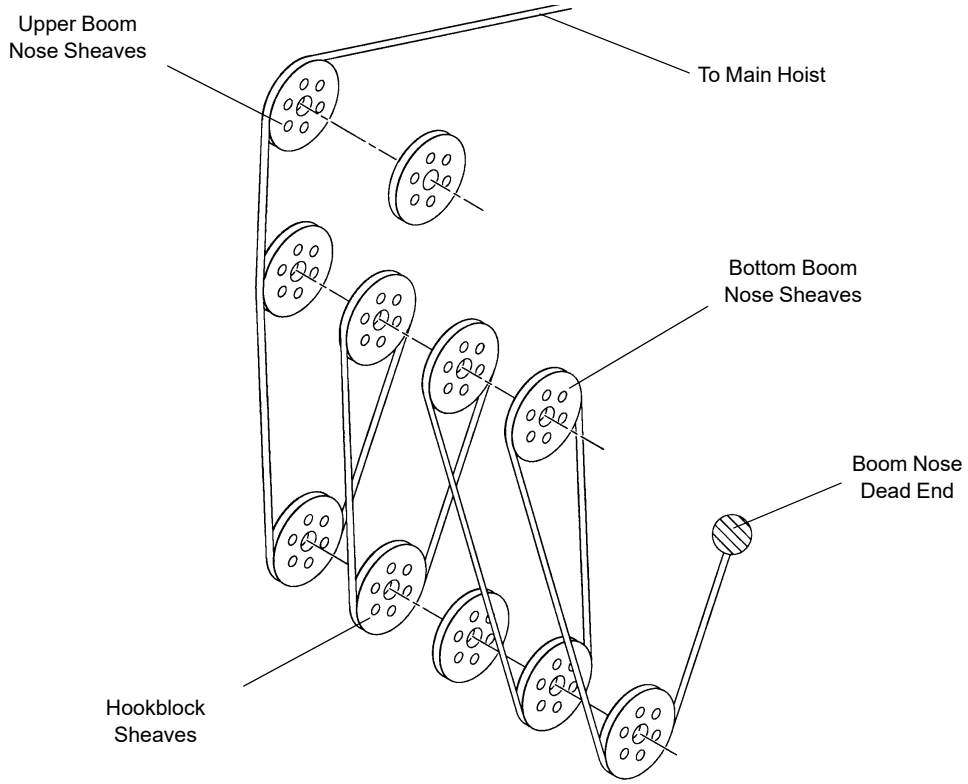
**WARNING**

**Tipping Hazard!**

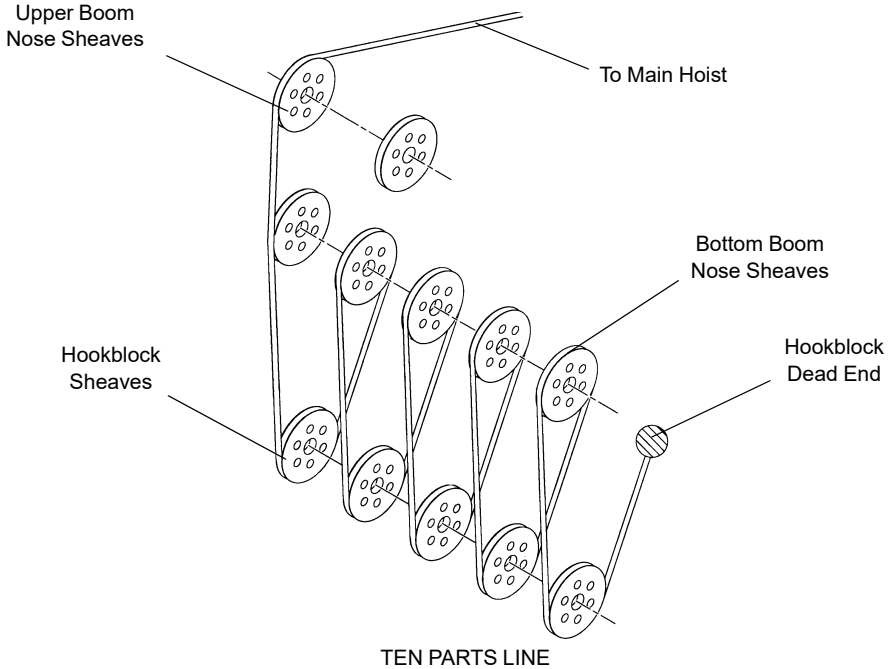
Never park the crane near holes, or on rocky or extremely soft surfaces. This may cause the crane to overturn, resulting in injury to personnel.

When parking the crane, do the following:

1. Park the crane on a stable surface.
2. Remove the load from the hook.
3. Stow the swingaway boom extension, if erected.




EIGHT PARTS LINE




TEN PARTS LINE

5 SHEAVE HOOKBLOCK

**FIGURE 4-8 continued**

4

with the attachment fittings on the left side of the base section.

**e.** Install the attachment pin into the anchor and attachment fittings on the left side of the base section.

**f.** Lower the boom and remove the rope from the tip of the extension.

**NOTE:** Refer to *Setting the Folding Swingaway Offset, page 4-21* to obtain a 25 or 45 degree offset with the swingaway.

**24.** Remove the cable retainer pins and clip pins from the tip of the extension base section or extension fly section.

**25.** Remove the mast assembly clip pin and pin from the stowed position on the extension and raise the mast assembly to an upright position. Install the pin and clip pin. Remove the cable retainer pin and clip pin from the mast.

**NOTE:** The hoist cable is not routed over the base extension sheave when using the fly extension.

**26.** Route the hoist cable over the mast sheave, the rollers on the adapter, the roller on the fly extension, and the sheave on the extension tip. Install the cable retainer pins and clip pins.

**NOTE:** Do not reeve hoist cable through sheaves on the main boom nose.

**27.** Rig the hoist cable.

## Stowing the Swing-Away Boom Extension

**NOTE:** The boom extension must be set at the zero (0) degree offset. Refer to *Setting the Folding Swingaway Offset, page 4-21*.

**NOTE:** If so equipped, the folding fly section must be stowed on the side of the base section.

**1.** Fully retract the boom and swing it over the front.

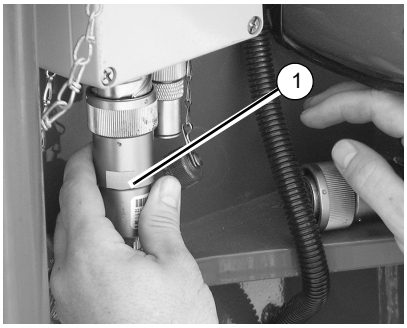
**2.** Lower the boom to minimum elevation.

**3.** Remove the cable retainer pins and clip pins from the swingaway tip and mast assembly. Remove the hoist cable from the extension sheave and or mast. Install the cable retainer pins and clip pins.

**4.** Remove the mast assembly pin and clip pin securing the mast in the upright position. Lay the mast over to the stowed position and install the mast assembly pin and clip pin.

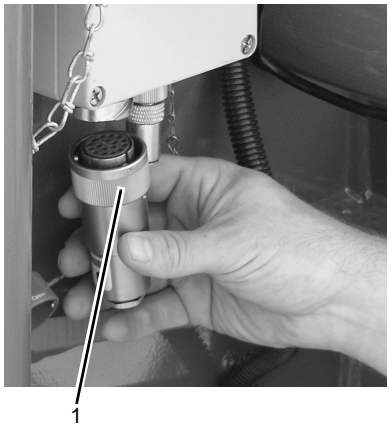
**5.** Disconnect RCL cable.

**a.** Remove connector (1, Figure 4-16) from junction box on boom nose.



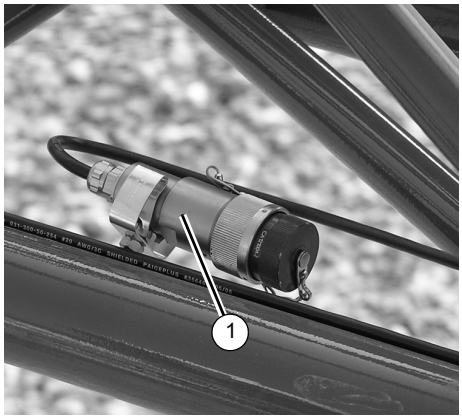

6642-21 **FIGURE 4-16**

**b.** Install dummy plug (1, Figure 4-17) on junction box.




6642-20 **FIGURE 4-17**

**c.** Route cable through boom extension and stow connector (1, Figure 4-18).




6642-19 **FIGURE 4-18**

**6.** If erected, stow the extension fly section as follows:

**a.** Attach a length of rope to the fly extension tip.

**b.** Raise the boom to horizontal.

**c.** Remove the retainer clip and attachment pin from the anchor and attach fittings on the left side of the base section and stow in the base section.

# SECTION 5
# MAINTENANCE AND LUBRICATION

## SECTION CONTENTS



## GENERAL

Following the designated lubrication procedures is important in ensuring maximum crane lifetime and utilization. The procedures and lubrication charts in this section include information on the types of lubricants used, the location of the lubrication points, the frequency of lubrication, and other information.

Refer to your *Inspection and Lubrication Service Log* for routine checks which will help maintain the safety, dependability, and productivity designed into your crane. One copy of the *Inspection and Lubrication Service Log* is provided in the original package of manuals shipped with the crane. Additional copies are available through the Manitowoc distributor network.

Refer to your Service Manual for specific maintenance and adjustment procedures.

## ENVIRONMENTAL PROTECTION

***Dispose of waste properly!*** Improperly disposing of waste can threaten the environment.

Potentially harmful waste used in Grove cranes includes — but is not limited to — oil, fuel, grease, coolant, air conditioning refrigerant, filters, batteries, and cloths which have come into contact with these environmentally harmful substances.

Handle and dispose of waste according to local, state, and federal environmental regulations.

When filling and draining crane components, observe the following:

- Do not pour waste fluids onto the ground, down any drain, or into any source of water.
- Always drain waste fluids into leak proof containers that are clearly marked with what they contain.
- Always fill or add fluids with a funnel or a filling pump.
- Immediately clean up any spills.

## LUBRICANTS AND LUBRICATION INTERVALS

The service intervals specified are for normal operation where moderate ambient temperature, humidity, and atmospheric conditions prevail. In areas of extreme conditions, the service periods and lubrication specifications should be altered to meet existing conditions.

**NOTE:** All fluids and lubricants may be purchased by contacting an authorized Grove distributor or Manitowoc Crane Care Parts Department.

| Item | Lube Point Description | Figure No. | Approved Lubricant | Lube Capacity | Lube Interval | Application |
|---|---|---|---|---|---|---|
| **Drive Train** | | | | | | |
| **20a**<br>**20b** | a. Engine Crankcase<br>b. Filter | Figure 5-3 | EO-15W/40 Engine Oil SAE 15W-40 6829104182 | 20 qt (18.9 l) | • Check level every 10 hours or daily<br>• Drain, fill and replace filter every 500 hours | • Through fill cap to FULL mark on dipstick<br>• Filter located on left side of frame beneath radiator |
| **21a**<br><br><br>**21b** | a. Transmission, Torque Converter, Dipstick<br>b. Filter | Figure 5-3 | HYDO Hydraulic Oil 6829006444 | 40 qt (37.8 l) | • Check level every 10 hours or daily<br>• Drain and refill every 1000 hours or 6 months<br>• Change transmission filter after first 50 and 100 hours of service, then every 500 hours thereafter | Through fill pipe to FULL mark on dipstick |
| **NOTE:**<br>• Check fluid level with engine running at low idle and the oil at 180 to 200°F (82 to 93°C). Do not attempt an oil level check with cold oil. To bring the oil temperature to this range, it is necessary to either work the crane or stall the converter. Converter stall should be accomplished by engaging shift lever in forward high range with the brakes applied and then accelerating the engine to half or three-quarter throttle. Hold the stall until the required converter temperature is reached and stabilized.<br>Do not operate the converter at stall condition for longer than 30 seconds at one time. Shift to neutral for 15 seconds and repeat the procedure until the desired temperature is reached. Excessive temperature, i.e, 250°F (120°C) maximum will cause damage to transmission clutches, fluid, converter and seals.<br>• Drain and fill with the oil at 150 to 200°F (65 to 93°C).<br>• Transmission filters are located on the outside left hand frame in the area of the hydraulic oil cooler inside left hand engine cover.<br>• To add fluid:<br>**a.** Fill to FULL mark on dipstick<br>**b.** Run engine at low idle to prime torque converter and lines<br>**c.** Check oil level with engine running at low idle and oil at 180 to 200°F (82 to 93°C). Add oil to bring oil level to FULL mark on dipstick. | | | | | | |
| **22** | Engine Cooling System and SCA Levels | Figure 5-3 | AFC 50/50 50/50 Blended Fully Formulated Antifreeze Coolant 6829101130<br>SCA 6829012858 | 40 qt (37.8 l) | • Check coolant level every 10 hours or daily<br>• Check SCA levels every 500 hours<br>• Check coolant for contamination every 1000 hours | See *Service Manual* |
| **NOTE:** Radiator Fill Procedure: Open the petcock or loosen plug to allow trapped air to bleed. Slowly fill the system with specified coolant/antifreeze. FIll to the bottom of the surge tank filler neck. A fill rate exceeding 3 gpm (12 l/min) can give a false reading. Close the petcock or secure air bleed plug. Wait one minute and re-check the coolant/ antifreeze level. Refill as necessary. Run engine through two thermal cycles and re-check the antifreeze/coolant level. Refill as necessary. | | | | | | |
| **23** | Coolant Strainer (Cab Heater) | Figure 5-3 | --- | --- | Clean strainer screen after first 100 hours and every 2000 hours or 12 months intervals thereafter. | Close shutoff valves. Unscrew hex plug to clean filter. |

| Item | Lube Point Description | Figure No. | Approved Lubricant | Lube Capacity | Lube Interval | Application |
|---|---|---|---|---|---|---|
| **Boom** (continued) | | | | | | |
| **75** | Boom Section Front Wear Pads | Figure 5-8 | EP-MPG Extreme Pressure Multipurpose Grease 6829003477 | Thoroughly coat all areas the wear pad moves on | 50 hours or 1 week | Brush grease on the outside of sections 1, 2, & 3 in the area that the front wear pads move on |
| **NOTE:** Lubricate items more frequently than interval indicated in table if environmental conditions and/or operating conditions necessitate. | | | | | | |
| **76** | Extend Cable Sheaves | Figure 5-8 | EP-MPG Extreme Pressure Multipurpose Grease 6829003477 | Until grease extrudes | 250 hours or 3 months | 1 grease fitting Extend boom for access through holes |
| **NOTE:** Lubricate items more frequently than interval indicated in table if environmental conditions and/or operating conditions necessitate. | | | | | | |
| **77** | Retract Cable Sheaves | Figure 5-8 | EP-MPG Extreme Pressure Multipurpose Grease 6829003477 | Until grease extrudes | 250 hours or 3 months | 2 grease fittings |
| **78** | Boom Pivot Shaft | Figure 5-8 | | Until grease extrudes | 250 hours or 3 months | 2 grease fittings |
| **79** | Boom Extension Sheave | Figure 5-8 | | Until grease extrudes | 250 hours or 3 months | 1 grease fitting |
| **81** | Upper Boom Nose Sheave | Figure 5-8 | | Until grease extrudes | 250 hours or 3 months | 2 grease fittings (1) per sheave |
| **82** | Lower Boom Nose Sheave | Figure 5-8 | | Until grease extrudes | 250 hours or 3 months | 5 grease fittings |
| **83** | Auxiliary Boom Nose Sheave | Figure 5-8 | | Until grease extrudes | 250 hours or 3 months | 1 grease fitting |