

SERVICE MANUAL

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

TM500E-2 PRELIMINARY

Crane Model Number

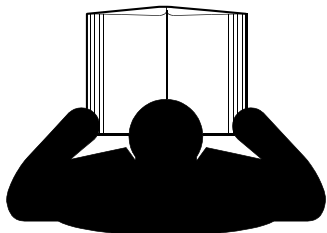
This Manual is divided into the following Sections:

SECTION 1	INTRODUCTION
SECTION 2	HYDRAULIC SYSTEM
SECTION 3	ELECTRIC SYSTEM
SECTION 4	BOOM
SECTION 5	HOIST AND COUNTERWEIGHT
SECTION 6	SWING SYSTEM
SECTION 7	POWER TRAIN
SECTION 8	UNDERCARRIAGE
SECTION 9	LUBRICATION

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 stamped on the top of the outrigger box.
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.

DUAL ROD TELESCOPE CYLINDER (102 FOOT BOOM)

Description

The boom dual rod telescope cylinder for the 31 m (102 foot) boom (Figure 2-23) has a 17.7 cm (7.0 inch) bore. The cylinder is internally ported (rod ported). Oil from the telescope control valve is routed to the cylinder by external lines. Foreign material is prevented from entering the cylinder rod during retraction by a wiper seal in the head. O-ring seals prevent internal and external leakage (Figure 2-23).

The cylinder incorporates two cylinder rods with separate strokes. One rod has a stroke of 709.1 cm (279.2 inches), and one rod has a stroke of 707.8 cm (278.7 inches), which provides a combined overall stroke of 1417.0 cm (557.9 inches).

CAUTION

Do not retract the cylinder completely if it is not attached to the boom. Maintain a spacer that is split or hinged 6.88" long to prevent cylinder from retracting completely.

The cylinder weighs approximately 1249 kg (2753.5 pounds) wet.

Maintenance

Disassembly

NOTE: Any maintenance requiring disassembly of the cylinder should include replacement of all cylinder seals and O-rings.

1. Using a spanner wrench, unscrew the outer cylinder head from the cylinder barrel.



DANGER

Do not use air pressure to remove the cylinder rod assembly. Use only a source of controlled hydraulic oil pressure if the rod is hard to remove.

CAUTION

Exercise extreme care when handling or setting down the cylinder rod. Do not damage the chrome surface.

2. Remove the cylinder rod assembly from the cylinder barrel and cover the barrel to avoid contamination.

CAUTION

When removing seals and rings, avoid scratching grooved and gland surfaces.

NOTE: Aligning discarded seals and rings in the order of disassembly will facilitate installation of new seals and rings.

3. Remove the hydrolock piston seal to gain access to the setscrew securing the piston to the outer cylinder rod.
4. Remove the setscrew and unscrew the piston from the cylinder rod.
5. Remove the remaining hydrolock seal and wear rings from the outside of the piston and the O-ring and two backup rings from the inside of the piston.
6. Remove the spacer from the rod.
7. Remove the cylinder head from the outer rod.
8. Remove the O-ring and backup ring from the outside of the head and the wear rings, buffer seal, rod seal, backup ring and the wiper ring from the inside of the head.
9. Using a spanner wrench, unscrew the inner cylinder head from the outer cylinder rod.

CAUTION

Do not use air pressure to remove the cylinder rod assembly. Use only a source of controlled hydraulic oil pressure if the rod is hard to remove.

CAUTION

Exercise extreme care when handling or setting down the cylinder rod. Do not damage the chrome surface.

10. Remove the inner cylinder rod assembly from the outer cylinder rod and cover the opening to avoid contamination.
11. Remove the hydrolock piston seal to gain access to the setscrew securing the piston to the inner cylinder rod.
12. Remove the setscrew and unscrew the piston from the cylinder rod.
13. Remove the remaining hydrolock seal and wear ring from the outside of the piston and the O-ring and two backup rings from the cylinder rod.
14. Remove the spacer from the rod and remove the wear ring from the spacer.
15. Remove the cylinder head from the inner rod.

An ABS wheel speed sensor is mounted in each monitored wheel. As the wheel spins, the sensor sends a fluctuating signal to the ABS ECU, which the ECU interprets as wheel speed.

The crane is also equipped with combination sensors that can measure both pressure and temperature of certain engine functions.

The pyrometer measures exhaust temperature and this is a direct input into the Gateway. The pyrometer is a thermocouple; the voltage potential (mV) changes with temperature.

Specifications

Special Torque Chart

Item	Specification
Bulkhead Pass-Through Stud Nut	88 ± 10 in.-lb (10 ± 2 N·m)
Starter Solenoid Stud Nut	22 ± 2.6 ft-lb (31 ± 3.5 N·m)
Battery Cable Clamping Bracket	150 ± 27 in.-lb (17 ± 3 N·m)
Battery Cable Terminal Clamp	212 ± 35 in.-lb (24 ± 4 N·m)
Negative Battery Cable at the Starter Ground Stud	22 ± 2.6 ft-lb (31 ± 3.5 N·m)
Fusible Link Cable Assembly Nut-to-the-Engine Block	168 ± 35 in.-lb (19 ± 4 N·m)

Diagnostic Equipment

Example of diagnostic tools:

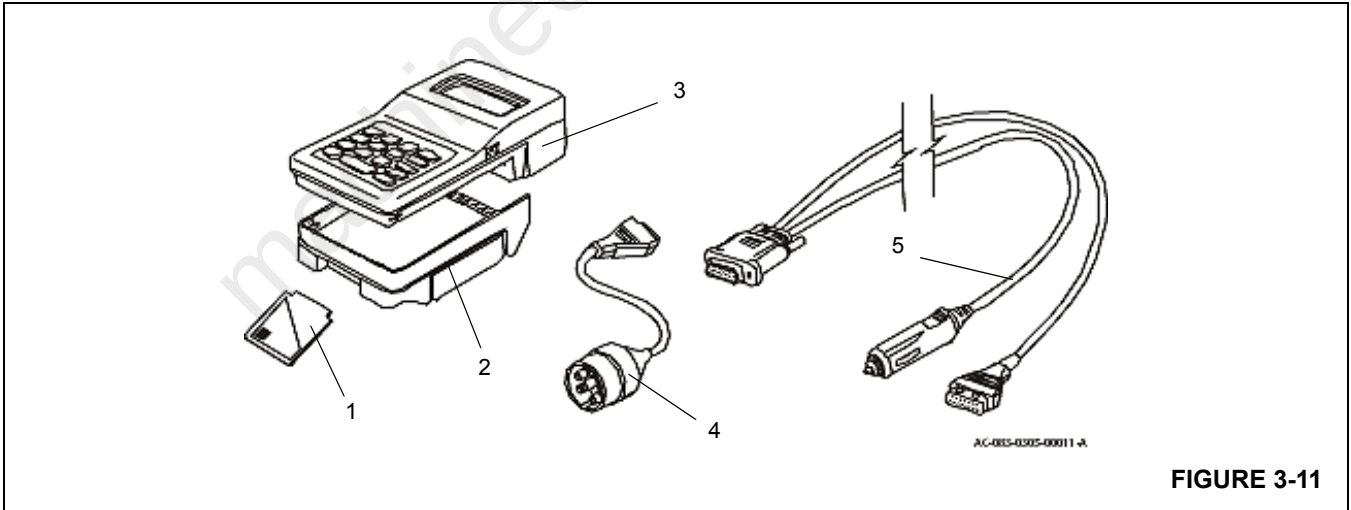


FIGURE 3-11

Item	Description
1	ABS Cartridge
2	Multi-Protocol Cartridge (MPC)
3	Digital Input/Output Data Display

Item	Description
4	9-Pin Deutsch Connector
5	Power/Data Cable

8. If necessary, remove the capscrews (1) securing each lower rear side wear pad (2) to the fly section (3) (Figure 4-108). Remove wear pads and shims. Note location of shims for installation.

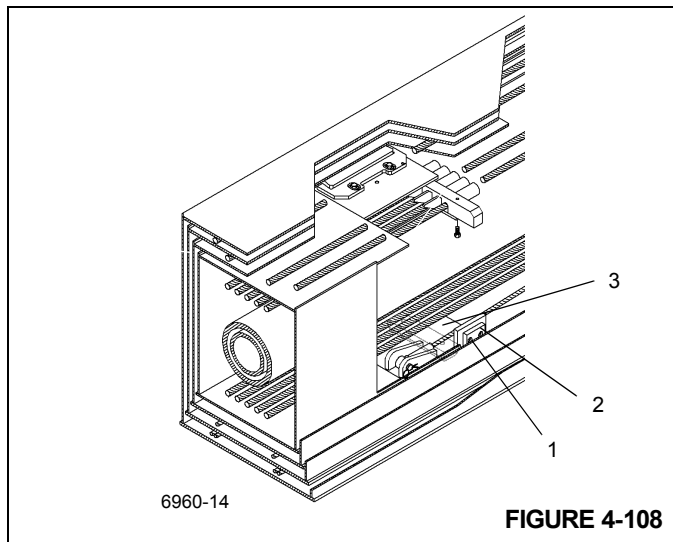


FIGURE 4-108

9. If new cylinder is to be installed, remove the cable retainer, cables, extend sheave assembly, and sheave mounting assembly from the barrel end of the cylinder.
10. If removal of the boom nose sheaves are required, refer to BOOM NOSE SHEAVES - Removal in this section.
11. Refer to BOOM EXTENSION AND RETRACTION CABLE MAINTENANCE in this section for cable inspection.

Boom Nose Sheaves

NOTE: Boom nose sheave removal and installation is identical for both the 31 m (102 foot) boom and the 29 m (95 foot) boom. Refer to BOOM NOSE SHEAVES in this section.

BOOM ASSEMBLY FOR THE OPTIONAL 29 M (95 FOOT) BOOM

CAUTION

When adjusting cables, hold the cable end and turn the nut. do not turn cable. Turning cable while adjusting will result in damage or failure of cable.

CAUTION

Install cables in their natural untwisted condition. Do not twist cable. Twisting of cable will result in damage or failure of cable.

NOTE: Apply Loctite 242 to the threads of all attaching hardware except cable ends and cable lock nuts.

NOTE: Apply multipurpose grease (MPG) to all

NOTE: Use standard torque values specified in Section 1-INTRODUCTION of this Manual unless otherwise specified.

NOTE: When installing upper and lower side wear pad, use shims as necessary so wear pad is within 1.7 mm (0.06 inch) from side plate of next inner section. Use equal number of shims on each side.

Install Telescope Cylinder

1. Measure and mark the center line of the fly section. This mark will be used to set the adjustable wear pads after the section is installed in the outer mid section.
2. If removed from the telescope cylinder (3) assembly, install the sheave mounting assembly (1) with four capscrews and washers (2). Do not tighten lower two capscrews at this time. They will be torqued later.

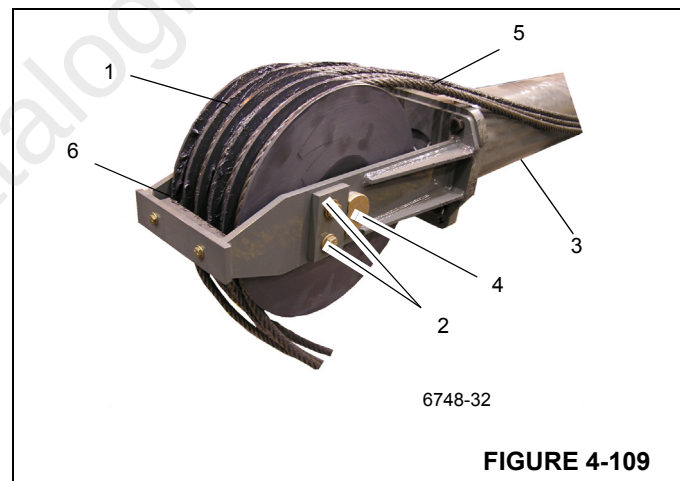
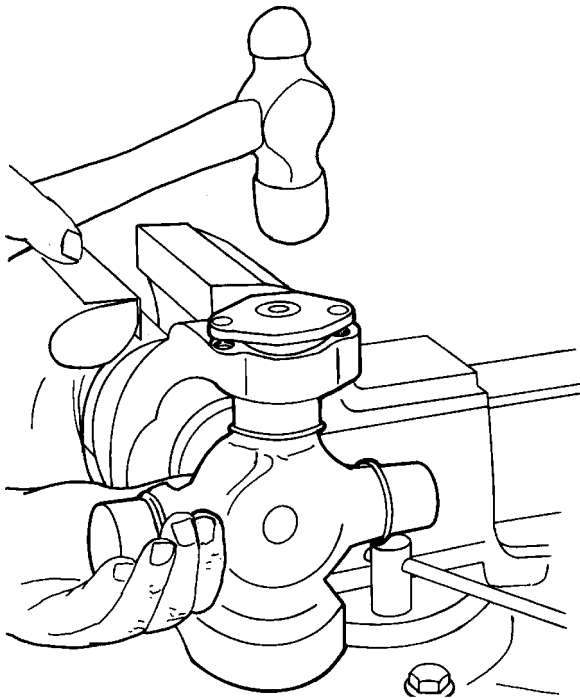


FIGURE 4-109

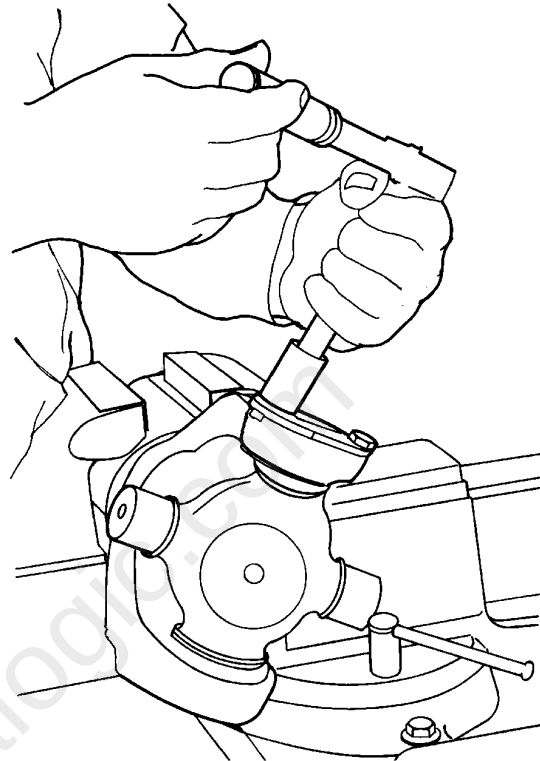
3. Install the telescope sheave assembly to the telescope cylinder as follows:
 - a. Using the extend sheave shaft, install the extend cable sheave assembly with spacer on each side, on the sheave mounting assembly.
 - b. Install grease fitting (4) (Figure 4-109) in shaft.
 - c. Lubricate sheave.
4. Route the five extension cables (5) (Figure 4-109) up and around the extend cable sheave assembly about one foot on to cylinder. To aid in assembly, secure the cables to the top end of the cylinder by wrapping tape around the cylinder.

Figure 1

Tapping in Bearing Cap**FIGURE 8-19**

AC-451-0306-G405

Figure 2

Reinstalling Bearing Cap Bolts**FIGURE 8-20**

AC-451-0306-G406

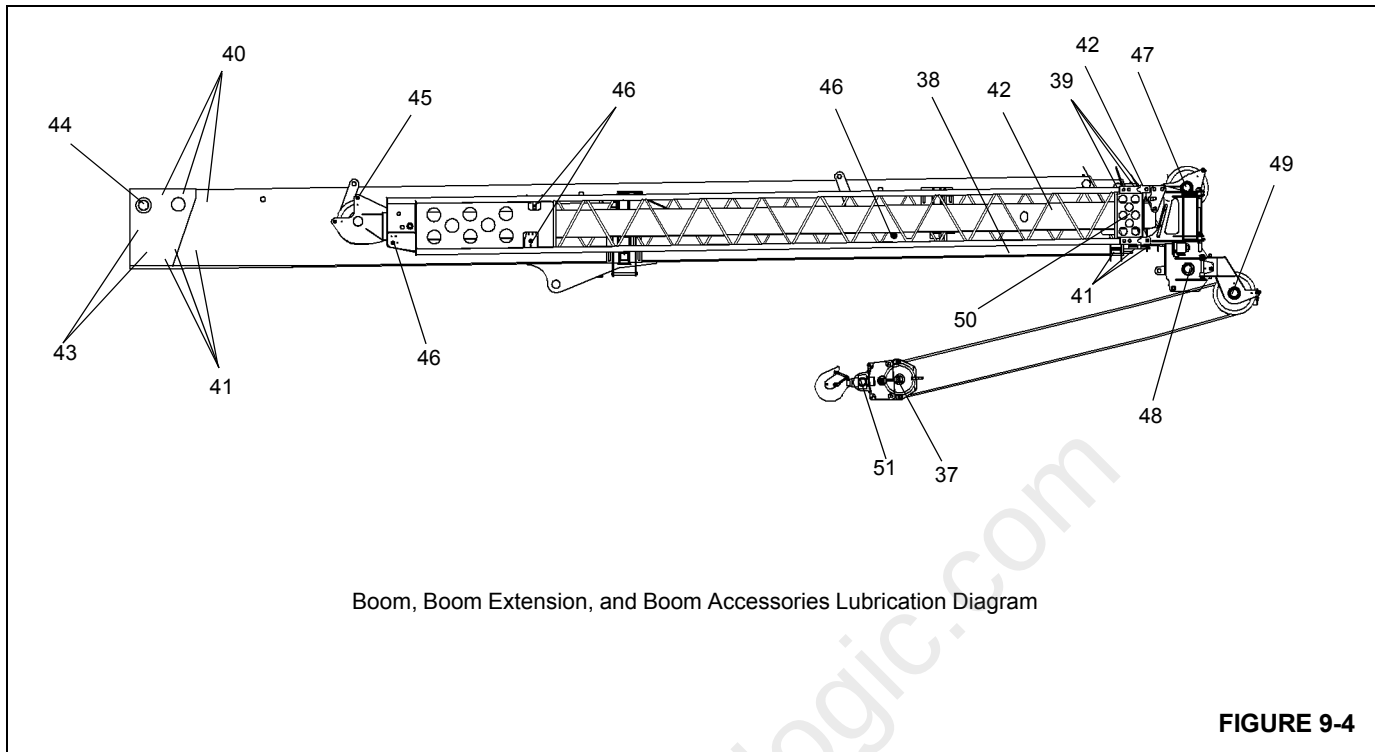
NOTE: Exact fit of all driveshaft components is extremely important. The correct parts and clean mating surfaces are essential for safe operation and good repair.

5. Move the cross laterally to the opposite side and through the cross hole beyond the machined surface of the yoke lug. Place a bearing assembly over the cross trunnion and slide it into the cross hole, seating the plate to the face of the lug.
6. Put the lock plate tab in place and thread the bolts with hand or wrench into tapped holes in yoke.

7. Repeat installation process for cross and bearing kit at the opposite end of the driveshaft. Make sure to position the cross in the yoke so that the lube fitting is in line with the lube fitting at the other end.
8. For flange yoke applications, install the flange yoke, bearing assemblies and bolts at this time.

⚠ CAUTION

Using a new cross with a worn bearing assembly, or a worn cross with a new bearing assembly will cause rapid wear, making another replacement necessary in a short time. Always replace the cross, four bearing assemblies and bolts as a unit.



Item	Description
31	Headache Ball Swivel Top
32	Hook Block Sheaves
33	Telescope Cylinder Wear Pads
34	Side Wear Pads
35	Boom Section Upper Wear Pads
36	Boom Section Lower Wear Pads
37	Extend Cable Sheaves
38	Retract Cable Sheaves
39	Boom Pivot Shaft
40	Boom Extension Sheave
41	Boom Extension Roller
42	Upper Boom Nose Sheave
43	Lower Boom Nose Sheave
44	Auxiliary Boom Nose Sheave
45	Boom Extension Mast Sheave
46	Hook Block Swivel Bearing

42. Extend Cable Sheaves

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months; whichever interval occurs first

Lube Amount - Until grease extrudes

Application - 3 grease fitting; extend boom for entry through access holes.

43. Retract Cable Sheaves

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months; whichever interval occurs first

Lube Amount - Until grease extrudes

Application - 4 grease fittings; extend boom for entry through access holes.

44. Boom Pivot Shaft

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months; whichever interval occurs first

Lube Amount - Until grease extrudes

Application - 2 grease fittings, one on each side

Full Version Available

Grove TM500E-2 Truck Crane Service Manual

Grove TM500E-2 truck crane service manual with repair procedures, adjustments and troubleshooting for the main systems. Instant PDF download.

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