

SERVICE MANUAL

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

5540F & YB5515

Crane Model Number

Crane Serial Number

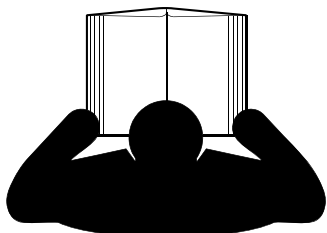
This Manual is Divided into the following Sections:

SECTION 1	INTRODUCTION
SECTION 2	SAFETY PRACTICES
SECTION 3	ELECTRIC SYSTEM
SECTION 4	HYDRAULIC SYSTEM
SECTION 5	PREVENTATIVE MAINTENANCE
SECTION 6	ENGINE AND ENGINE SYSTEMS
SECTION 7	TRANSMISSION AND TORQUE CONVERTER
SECTION 8	AXLES/DRIVE SHAFTS/WHEELS AND TIRES
SECTION 9	BRAKE SYSTEM
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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 operator's cab. **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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FIGURE 4-31

Inspect the Crane Structure and Booms for Damage

Thoroughly inspect the crane structure and booms for the following:

1. Inspect for loose mounting hardware. Tighten any loose hardware.
2. Inspect for cracked or broken welds. Do not operate the crane if a critical weld is cracked or broken until the weld is repaired. Contact your distributor.
3. Inspect for missing or unreadable warning decals. Replace if necessary.
4. Inspect for excessive rust or corrosion on crane structure and booms. Paint any areas with excessive rust or corrosion.
5. Inspect for missing items. Replace if necessary.
6. Inspect the crane for any damage that might inhibit safe operation of the crane. Repair any damage.

Testing the Load Moment Indicator (Optional)

See the Load Moment Indicator manual furnished with this crane and test the indicator according to instructions in the manual.

MISCELLANEOUS MAINTENANCE**Batteries/Charging System**

NOTE: Lead-acid batteries produce flammable and explosive gases. To avoid personal injury, when checking, testing or charging batteries:

- **DO NOT** use smoking materials near batteries.
- Keep arcs, sparks and flames away from batteries.
- Provide ventilation and wear safety glasses.
- Never check battery charge by placing a metal object across the posts. The sparks could explode battery gases and cause injury or death. Use a voltmeter or hydrometer.

**Checking the Charging System**

Check the voltmeter reading on the instrument panel. Normal voltmeter readers are as follows:

Normal Operating Ranges

Engine above idle - 14 to 16 volts

Engine stopped - 10 to 14 volts

A reading of less than 10 volts with the engine at low indicates a low battery charge.

A reading of less than 14 volts with the engine speed above low idle indicates a problem in the charging system. The system should be checked out by an qualified service technician.

Charging the Battery

Under normal conditions, the engine's alternator will have no problem keeping a charge on the batteries. The only condition in which the battery(s) may cause a problem is when they have been completely discharged for a long period of time. Under this condition the alternator may not be able to recharge the battery(s) and a battery charger will be required for charging the battery(s).

Before using a battery charger, an attempt can be made to recharge the battery using the engine alternator by first jump starting the crane (See Jump Starting, in Section 3) and letting the engine run.

DO NOT charge a frozen battery; it may explode and cause injury. Let the battery warm up before attaching a charger.

Charging rates between 3 to 50 amperes are satisfactory if no excessive gassing or spewing of electrolyte occurs or the battery does not feel excessively warm (over 125° F [52° C]). If spewing or gassing occurs or temperatures exceed 125° F (52° C), the charging rate must be reduced or temporarily stopped to permit cooling.

Replacing the Battery

NOTE: The fluid in electric storage batteries contains sulfuric acid, which is **POISON** and can cause **SEVERE CHEMICAL BURNS**. Avoid all contact of fluid with eyes, skin or clothing. Use proper protective gear when handling batteries. **DO NOT** tip any battery beyond a 45° angle in any direction. If fluid contact does occur, follow the First Aid suggestions that follows.

Battery Electrolyte First Aid

- **External Contact** - Flush with water.
- **Eyes** - Flush with water for at least 15 minutes and get immediate medical attention.

Reverser Clutch

The reverser clutch unit 1 (See Figure 7-9) transfers drive from the input shaft A3 to either gear G1 or gear G2 depending on which of the two clutches (A1 or A2) is engaged, giving forward or reverse drive. When neither clutch is engaged, neutral is selected.

The clutches are of the wet, multi-plate type.

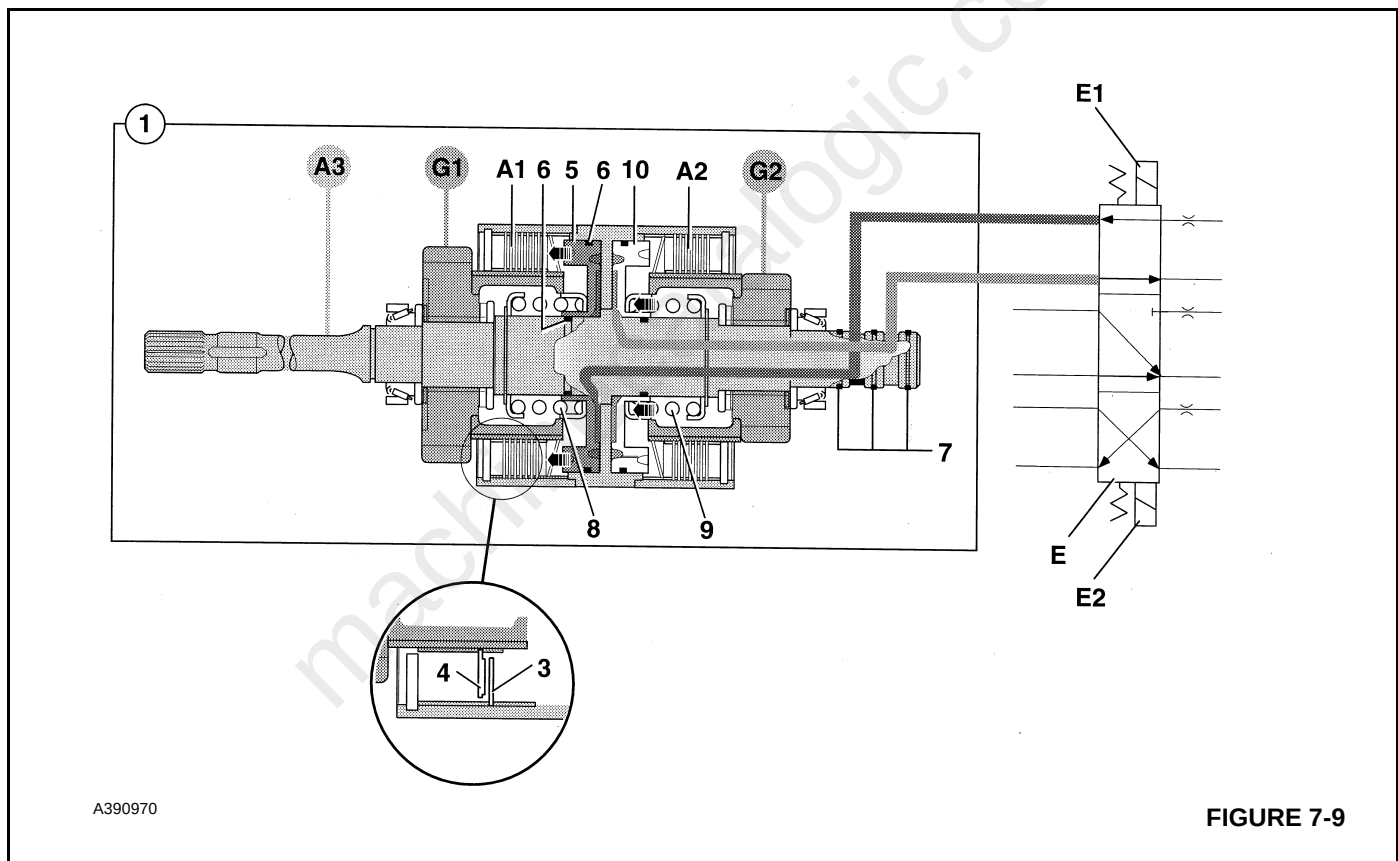
The clutch housings and input shaft are a one piece assembly A3. The assembly is permanently driven by the engine via the torque converter. Clutch counter plates 3 are also permanently driven via meshing teeth inside the clutch housings. Clutch friction plates 4 are meshed with the gear/plate carriers (G1 and G2).

In the diagram, clutch A1 is engaged. The counter plates 3 and friction plates 4 are pressed together by hydraulically actuated piston 5. Drive is then transmitted from the input

shaft to the gear G1. Clutch A2 is disengaged and no drive is transmitted to gear/plate carrier G2. The gear is also free to rotate on the input shaft assembly.

Actuation of the hydraulic pistons 10 and 5 is controlled via three position solenoid valve Et. When neutral is selected, solenoids E1 and E2 are deactivated and the flow of pressurised oil to the clutches is blocked. Springs 8 and 9 move the pistons away from the clutch plates and oil from both pistons is vented to the sump. When either forward or reverse is selected, the solenoid valve E diverts pressurised oil via cross drillings inside the input shaft A3 to the appropriate clutch (piston 10 or 5) in the unit. Pressure from the other clutch is vented to the sump via the solenoid valve spool. Oil is prevented from leaking by seals 6 on the pistons and ring seals 7 on the input shaft A3.

t The valve E is shown using symbols



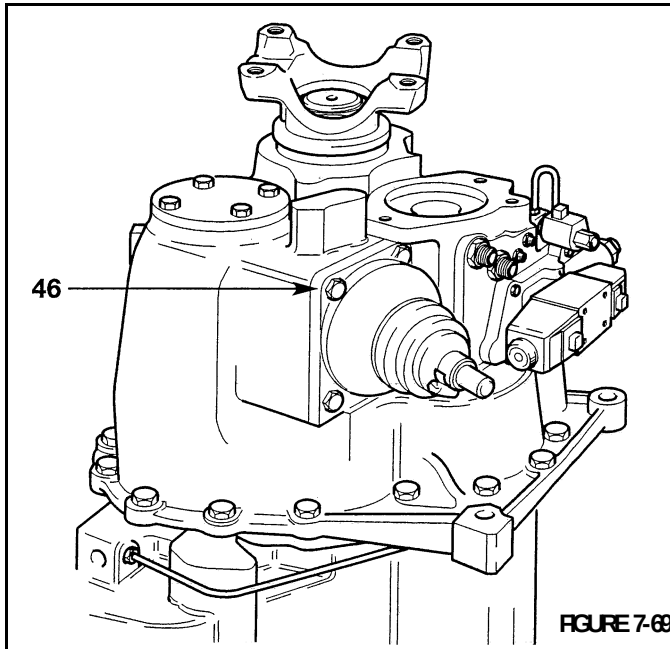


FIGURE 7-69

NOTE: Note: It is recommended that a 75 micron (0.075mm) service suction strainer (892/00970) is fitted to clean the system after a major overhaul.

Remove the service strainer and fit a production strainer after the first 100 hours operation. Renew the oil.

47. Using a new gasket, install suction strainer 47 (Figure 7-70) . Apply Loctite 242 to bolts and tighten to (7 lb ft) 10 Nm .

48. Install a new filter 48.

49. Install dipstick/oil filler tube (not shown) as follows

- a. Fit nut to tube followed by seal.
- b. Insert tube fully down bore in casing. Engage nut and tighten down loosely onto seal.
- c. Tighten nut fully after tube has been correctly phased

See Hydraulic 2/4 Wheel Drive Unit for 4WD clutch disassembly and assembly procedures.

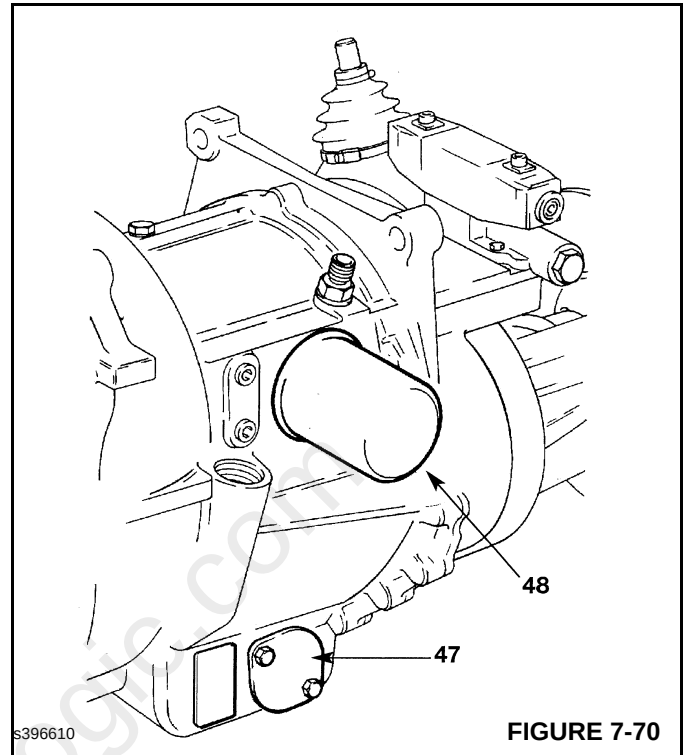


FIGURE 7-70

50. Fit a new sealing ring 50a (Figure 7-71) to the pump drive shaft. Insert the pump drive shaft followed by bearing 50b and circlip 50c.

51. Carefully locate the splined shaft of the pump into the gearbox. Apply Loctite 242 to the threads of the two fixing bolts and secure the pump flange to the gearbox mounting face.

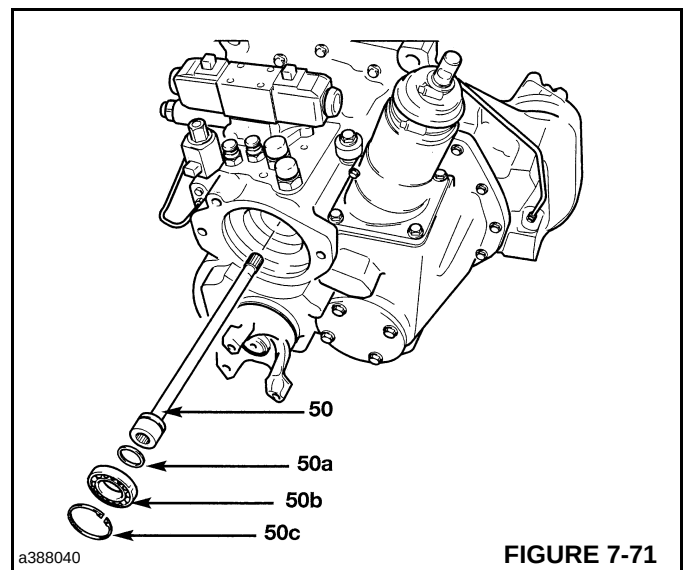


FIGURE 7-71

Low Pressure Warning Switch

The low pressure warning switch illuminates a red light on the dash when the brake pressure goes below 850 psi (5861 kPa). When the red light illuminates, there still is enough pressure for brake application to stop the crane. After which, the brake system must be checked and repaired.

Accumulator

The accumulator is a hydro-pneumatic, piston-type accumulator. This means that the accumulator is charged with nitrogen and stores hydraulic fluid to a pressure of 2000 psi (13 790 kPa) for brake system usage.

Needle Valve

The needle valve is used during service of the brake system. When closed, it shuts off the hydraulic supply from the accumulator, holding a pressure in the accumulator. This eliminates the need to charge the accumulator after brake system service.

NOTE: The needle valve must be in the open position for the brake system to operate properly. If it is not open, the charging pump will cycle every time the brake pedal is depressed and if the crane's engine stops there may not be enough pressure to stop the crane.

Brake Modulating Valve

The brake modulating valve is a closed-center spool design. When the valve is in no-applied position, brake port, **A** Figure 9-1 is open to tank port **T**. As the valve is initially actuated, tank port **T** is closed off from brake port **T**. Additional actuation opens pressure port **P** to brake port **A**. More input force will increase the pressure to brake port **A** until actuation effort and hydraulic reaction forces are balanced. When actuation is released, the valve returns to its non-applied position.

Brake Light Switch

The brake light switch illuminates the brake lights when the brake modulating valve builds system pressure to 60 psi (414 kPa).

Front Axle Brakes

The front brakes are self-adjusting oil immersed and are located on both sides of the axle center housing Figure 9-3. Each brake assembly consists of five friction plates and six counter plates. The brakes are applied when the brake pedal in the operator's compartment is actuated. Brake fluid is forced from the master cylinder through the brake lines to both of axle brakes. The brake fluid under pressure reacts against the brake pistons, forcing the friction plates against the counter plates, slowing and/or stopping the crane.

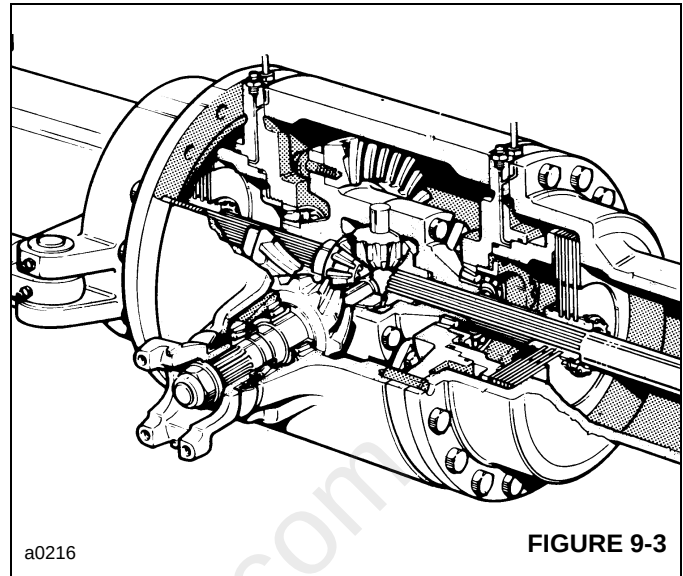


FIGURE 9-3

Rear Axle Brakes

The rear brakes are self-adjusting, oil immersed and are located in each axle hub Figure 9-4. Each brake assembly consists of three friction plates and four counter plates. The brakes are applied when the brake pedal in the operator's compartment is actuated. Brake fluid is forced from the master cylinder through the brake lines to both of axle brakes. The brake fluid under pressure reacts against the brake pistons, forcing the friction plates against the counter plates, slowing and/or stopping the crane.

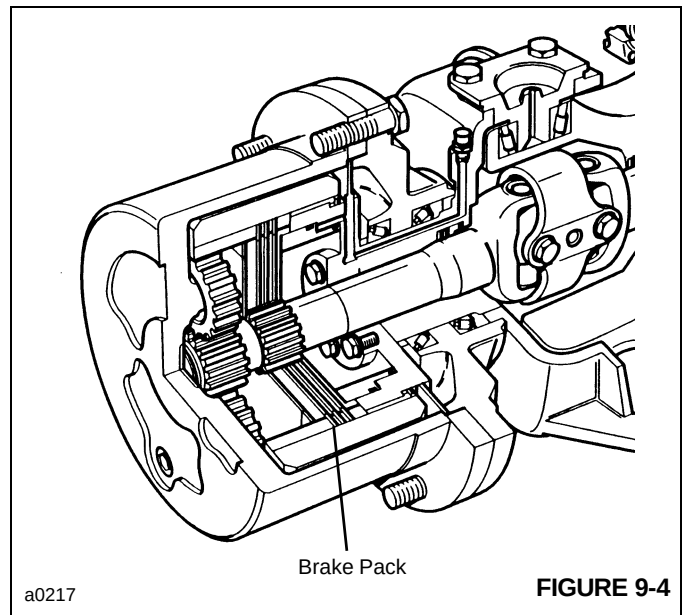
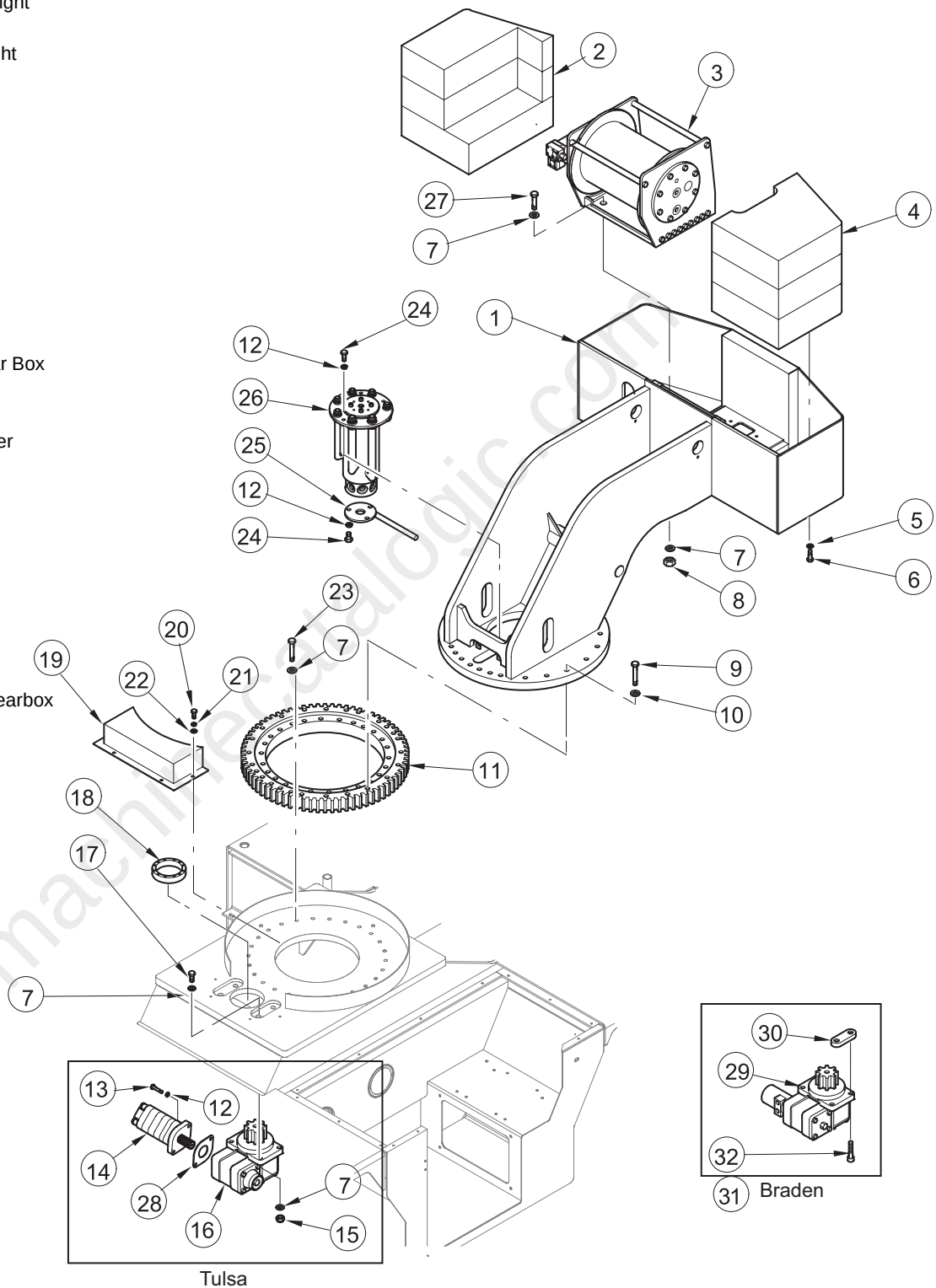


FIGURE 9-4

Item	Description
------	-------------

- | | |
|----|----------------------|
| 1 | Mast |
| 2 | Right Counterweight |
| 3 | Winch |
| 4 | Left Counterweight |
| 5 | Washer |
| 6 | Bolt |
| 7 | Washer |
| 8 | Nut |
| 9 | Bolt |
| 10 | Washer |
| 11 | Swing Bearing |
| 12 | Lock Washer |
| 13 | Bolt |
| 14 | Swing Motor |
| 15 | Nut |
| 16 | Tulsa Swing Gear Box |
| 17 | Bolt |
| 18 | Eccentric Ring |
| 19 | Pinion Gear Cover |
| 20 | Bolt |
| 21 | Lock Washer |
| 22 | Washer |
| 23 | Bolt |
| 24 | Bolt |
| 25 | Stop Assembly |
| 26 | Hydraulic Swivel |
| 27 | Bolt |
| 28 | Gasket |
| 29 | Braden Swing Gearbox |
| 30 | Bar |
| 31 | Bolt |



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Mast Assembly

FIGURE 11-125

Full Version Available

Grove 5540F + YB5515 Rough Terrain Crane Service Manual

Grove 5540F, YB5515 rough terrain crane service manual with repair procedures, adjustments and troubleshooting. Instant PDF download.

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