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## Safety Practices

### 1.6.4 Operational Hazards

**ENGINE:** Stop the engine before performing any service unless specifically instructed otherwise.

**VENTILATION:** Avoid prolonged engine operation in enclosed areas without adequate ventilation.

**SOFT SURFACES AND SLOPES:** **NEVER** work on a machine that is parked on a soft surface or slope. The machine must be on a hard level surface, with the wheels blocked before performing any service.

**FLUID PRESSURE:** Before loosening any hydraulic or diesel fuel component, hose or tube, turn the engine OFF. Wear heavy, protective gloves and eye protection. **NEVER** check for leaks using any part of your body; use a piece of cardboard or wood instead. If injured, seek medical attention immediately. Diesel fluid leaking under pressure can explode. Hydraulic fluid and diesel fuel leaking under pressure can penetrate the skin, cause infection, gangrene and other serious personal injury.

Refer to the engine manufacturers manual for specific details concerning the fuel system.

Relieve all pressure before disconnecting any component, part, line or hose. Slowly loosen parts and allow release of residual pressure before removing any part or component. Before starting the engine or applying pressure, use components, parts, hoses and pipes that are in good condition, connected properly and are tightened to the proper torque. Capture fluid in an appropriate container and dispose of in accordance with prevailing environmental regulations.

**COOLANT SYSTEM CAP:** The cooling system is under pressure, and escaping coolant can cause severe burns and eye injury. To prevent personal injury, **NEVER** remove the coolant system cap while the cooling system is hot. Wear safety glasses. Turn the coolant system cap to allow pressure to escape before removing the cap completely. Failure to follow the safety practices could result in death or serious injury.

**FLUID FLAMABILITY:** **DO NOT** service the fuel or hydraulic systems near an open flame, sparks or smoking materials.

Properly disconnect battery prior to servicing the fuel or hydraulic systems.

**NEVER** drain or store fluids in an open container. Engine fuel and hydraulic fluid are flammable and can cause a fire and/or explosion.

**DO NOT** mix gasoline or alcohol with diesel fuel. The mixture can cause an explosion.

**PRESSURE TESTING:** When conducting any test, only use test equipment that is correctly calibrated and in good condition. Use the correct equipment in the proper manner, and make changes or repairs as indicated by the test procedure to achieve the desired result.

**LEAVING MACHINE:** Lower the forks or attachment to the ground before leaving the machine.

**TIRES:** Always keep tires inflated to the proper pressure to help prevent tipover. **DO NOT** over-inflate tires.

**NEVER** use mismatched tire types, sizes or ply ratings. Always use matched sets according to machine specifications.

**MAJOR COMPONENTS:** Never alter, remove, or substitute any items such as counterweights, tires, batteries or other items that may reduce or affect the overall weight or stability of the machine.

**BATTERY:** **DO NOT** charge a frozen battery. Charging a frozen battery may cause it to explode. Allow the battery to thaw before jump-starting or connecting a battery charger.

### 1.7 SAFETY DECALS

Check that all safety decals are present and readable on the machine. Refer to the Operation & Safety Manual supplied with machine for information.



## 2.2 TORQUE CHARTS

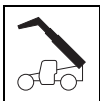
### 2.2.1 SAE Fastener Torque Chart

| Values for Zinc Yellow Chromate Fasteners |     |          |                     |            |              |       |                   |       |  |       |   |       |
|---|-----|----------|---------------------|------------|--------------|-------|-------------------|-------|--|-------|---|-------|
| SAE GRADE 5 BOLTS & GRADE 2 NUTS          |     |          |                     |            |              |       |                   |       |  |       |   |       |
| Size                                      | TPI | Bolt Dia | Tensile Stress Area | Clamp Load | Torque (Dry) |       | Torque Lubricated |       | Torque Loctite® 242™ or 271™ OR Vibra-TITE™ 111 or 140 |       | Torque Loctite® 262™ OR Vibra-TITE™ 131 |       |
|   |     |          |                     |            | IN-LB        | [N.m] | IN-LB             | [N.m] | IN-LB  | [N.m] | IN-LB                                   | [N.m] |
| 4   | 40  | 0.1120   | 0.00604             | 380        | 8            | 0.9   | 6                 | 0.7   |  |       |   |       |
|   | 48  | 0.1120   | 0.00661             | 420        | 9            | 1.0   | 7                 | 0.8   |  |       |   |       |
| 6   | 32  | 0.1380   | 0.00909             | 580        | 16           | 1.8   | 12                | 1.4   |  |       |   |       |
|   | 40  | 0.1380   | 0.01015             | 610        | 18           | 2.0   | 13                | 1.5   |  |       |   |       |
| 8   | 32  | 0.1640   | 0.01400             | 900        | 30           | 3.4   | 22                | 2.5   |  |       |   |       |
|   | 36  | 0.1640   | 0.01474             | 940        | 31           | 3.5   | 23                | 2.6   |  |       |   |       |
| 10  | 24  | 0.1900   | 0.01750             | 1120       | 43           | 4.8   | 32                | 3.5   |  |       |   |       |
|   | 32  | 0.1900   | 0.02000             | 1285       | 49           | 5.5   | 36                | 4     |  |       |   |       |
| 1/4                                       | 20  | 0.2500   | 0.0318              | 2020       | 96           | 10.8  | 75                | 9     | 105  | 12    |   |       |
|   | 28  | 0.2500   | 0.0364              | 2320       | 120          | 13.5  | 86                | 10    | 135  | 15    |   |       |
|   |     | In       | Sq In               | LB         | FT-LB        | [N.m] | FT-LB             | [N.m] | FT-LB  | [N.m] | FT-LB                                   | [N.m] |
| 5/16                                      | 18  | 0.3125   | 0.0524              | 3340       | 17           | 23    | 13                | 18    | 19   | 26    | 16                                      | 22    |
|   | 24  | 0.3125   | 0.0580              | 3700       | 19           | 26    | 14                | 19    | 21   | 29    | 17                                      | 23    |
| 3/8                                       | 16  | 0.3750   | 0.0775              | 4940       | 30           | 41    | 23                | 31    | 35   | 48    | 28                                      | 38    |
|   | 24  | 0.3750   | 0.0878              | 5600       | 35           | 47    | 25                | 34    | 40   | 54    | 32                                      | 43    |
| 7/16                                      | 14  | 0.4375   | 0.1063              | 6800       | 50           | 68    | 35                | 47    | 55   | 75    | 45                                      | 61    |
|   | 20  | 0.4375   | 0.1187              | 7550       | 55           | 75    | 40                | 54    | 60   | 82    | 50                                      | 68    |
| 1/2                                       | 13  | 0.5000   | 0.1419              | 9050       | 75           | 102   | 55                | 75    | 85   | 116   | 68                                      | 92    |
|   | 20  | 0.5000   | 0.1599              | 10700      | 90           | 122   | 65                | 88    | 100  | 136   | 80                                      | 108   |
| 9/16                                      | 12  | 0.5625   | 0.1820              | 11600      | 110          | 149   | 80                | 108   | 120  | 163   | 98                                      | 133   |
|   | 18  | 0.5625   | 0.2030              | 12950      | 120          | 163   | 90                | 122   | 135  | 184   | 109                                     | 148   |
| 5/8                                       | 11  | 0.6250   | 0.2260              | 14400      | 150          | 203   | 110               | 149   | 165  | 224   | 135                                     | 183   |
|   | 18  | 0.6250   | 0.2560              | 16300      | 170          | 230   | 130               | 176   | 190  | 258   | 153                                     | 207   |
| 3/4                                       | 10  | 0.7500   | 0.3340              | 21300      | 260          | 353   | 200               | 271   | 285  | 388   | 240                                     | 325   |
|   | 16  | 0.7500   | 0.3730              | 23800      | 300          | 407   | 220               | 298   | 330  | 449   | 268                                     | 363   |
| 7/8                                       | 9   | 0.8750   | 0.4620              | 29400      | 430          | 583   | 320               | 434   | 475  | 646   | 386                                     | 523   |
|   | 14  | 0.8750   | 0.5090              | 32400      | 470          | 637   | 350               | 475   | 520  | 707   | 425                                     | 576   |
| 1   | 8   | 1.0000   | 0.6060              | 38600      | 640          | 868   | 480               | 651   | 675  | 918   | 579                                     | 785   |
|   | 12  | 1.0000   | 0.6630              | 42200      | 700          | 949   | 530               | 719   | 735  | 1000  | 633                                     | 858   |
| 1 1/8                                     | 7   | 1.1250   | 0.7630              | 42300      | 800          | 1085  | 600               | 813   | 840  | 1142  | 714                                     | 968   |
|   | 12  | 1.1250   | 0.8560              | 47500      | 880          | 1193  | 660               | 895   | 925  | 1258  | 802                                     | 1087  |
| 1 1/4                                     | 7   | 1.2500   | 0.9690              | 53800      | 1120         | 1518  | 840               | 1139  | 1175   | 1598  | 1009                                    | 1368  |
|   | 12  | 1.2500   | 1.0730              | 59600      | 1240         | 1681  | 920               | 1247  | 1300   | 1768  | 1118                                    | 1516  |
| 1 3/8                                     | 6   | 1.3750   | 1.1550              | 64100      | 1460         | 1979  | 1100              | 1491  | 1525   | 2074  | 1322                                    | 1792  |
|   | 12  | 1.3750   | 1.3150              | 73000      | 1680         | 2278  | 1260              | 1708  | 1750   | 2380  | 1506                                    | 2042  |
| 1 1/2                                     | 6   | 1.5000   | 1.4050              | 78000      | 1940         | 2630  | 1460              | 1979  | 2025   | 2754  | 1755                                    | 2379  |
|   | 12  | 1.5000   | 1.5800              | 87700      | 2200         | 2983  | 1640              | 2224  | 2300   | 3128  | 1974                                    | 2676  |

- NOTES: 1. THESE TORQUE VALUES DO NOT APPLY TO CADMIUM PLATED FASTENERS  
 2. ALL TORQUE VALUES ARE STATIC TORQUE MEASURED PER STANDARD AUDIT METHODS TOLERANCE = ±10%  
 3. \* ASSEMBLY USES HARDENED WASHER

| REFERENCE JLG ANEROBIC THREAD LOCKING COMPOUND |              |                   |                              |
|--|--------------|-------------------|------------------------------|
| JLG P/N  | Loctite® P/N | ND Industries P/N | Description                  |
| 0100011  | 242™         | Vibra-TITE™ 121   | Medium Strength (Blue)       |
| 0100019  | 271™         | Vibra-TITE™ 140   | High Strength (Red)          |
| 0100071  | 262™         | Vibra-TITE™ 131   | Medium - High Strength (Red) |

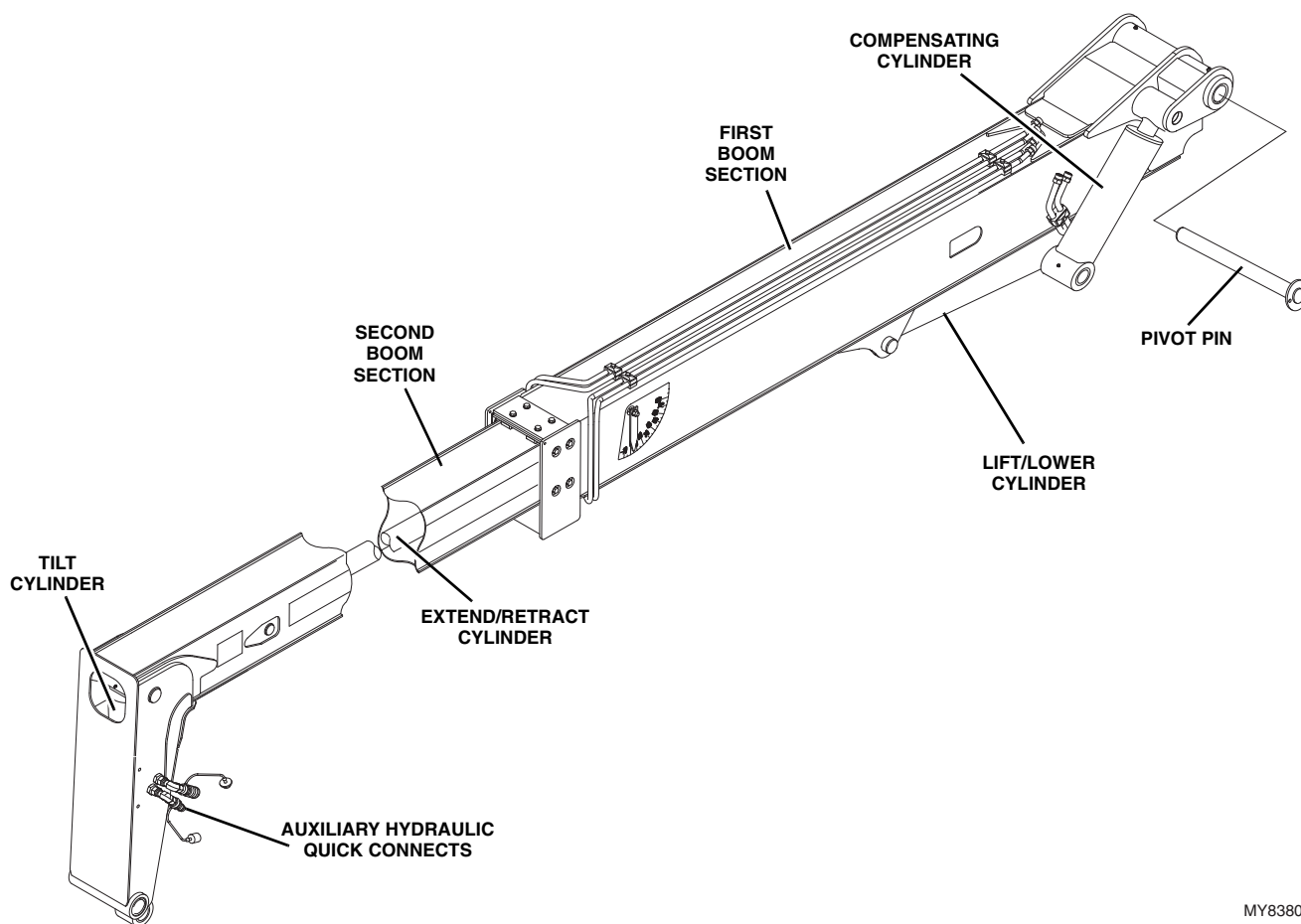
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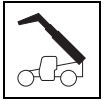
## Boom

### 3.1 BOOM SYSTEM COMPONENT TERMINOLOGY

To understand the safety, operation and maintenance information presented in this section, it is necessary that the operator/mechanic be familiar with the names and locations of the major assemblies of the boom system. The following illustration identifies the components that are referred to throughout this section.



MY8380



### 3.4.6 Extend/Retract Cylinder Installation

1. Carefully install the extend/retract cylinder into rear of boom using a suitable sling.
2. Line up barrel end of cylinder with pin bores on first boom section.

**Note:** The tilt hoses and (if equipped) the auxiliary hoses may need to be moved during installation of the extend/retract cylinder.

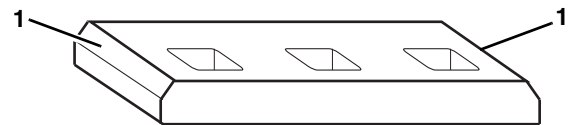
3. Install mounting pin (19), spacers and washers through frame access hole on chassis and first boom section bore and cylinder barrel. Secure with hardware (18) removed earlier.
4. Remove plugs in bottom of extend/retract cylinder and install previously removed fittings (17).
5. Uncap and connect tubes (16) to previously labeled fittings at extend/retract cylinder. Apply locking compound to fittings.
6. Uncap and reconnect tilt hoses and (if equipped) auxiliary hoses (15) to their appropriate fittings until wrench-tight. Mark the fitting and torque to specification. Refer to Section 2.2.3, "Hydraulic Hose Torque Chart."
7. Install cover plate (14) and hose clamps at rear of boom assembly.
8. Reinstall any miscellaneous parts, such as mirror, if removed previously.
9. Properly connect battery.
10. Start machine and extend the extend/retract cylinder until rod eye of cylinder aligns with pin bore in second boom section.
11. Shut the engine OFF.
12. Install mounting pin through side of second boom section (13) and secure with retaining clips.
13. Start machine and cycle extend/retract cylinder to bleed any air out of hydraulic system.
14. Check for fluid leaks or any alignment problems.
15. Check the hydraulic fluid level in tank and add fluid as required.
16. Clean up all debris, hydraulic fluid, etc., in, on, near and around the machine.
17. Close and secure the engine cover.
18. Remove Do Not Operate Tags from both ignition key switch and the steering wheel.
19. Install previously removed attachment to quick attach assembly.

## 3.5 BOOM WEAR PADS

A total of 14 wear pads are installed on the boom.

Twelve of fourteen wear pads on this boom are flat rectangular wear pads with metal inserts. Two wear pads on bottom of second section boom are channeled for tilt hose and auxiliary hose clearance.

### 3.5.1 Wear Pad Inspection



Ma2070

Inspect all wear pads for wear. If angle indicators (1) on end of wear pads are visible, wear pads can be reused. If the wear pads show uneven wear (front to back), they should be replaced. Replace wear pads as a set if worn or damaged.

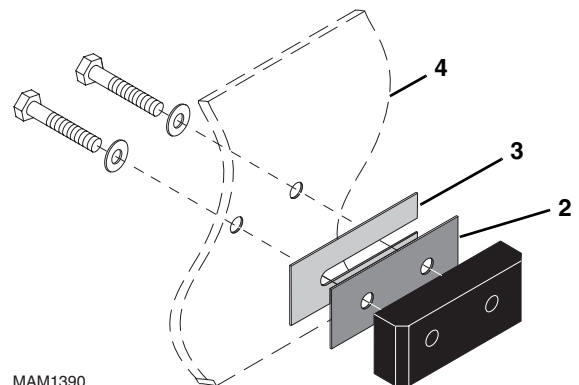
### 3.5.2 Wear Pad Installation and Lubrication

**Note:** Inspect all wear pads. Replace as necessary.

The following wear pad procedure must be followed to insure proper wear pad installation:

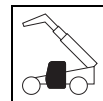
**Note:** MUST clean wear pad inserts and mounting bolts of any grease, oil or other contaminates before applying locking compound and installing mounting bolts.

- Apply locking compound to all the wear pad mounting bolts.



MAM1390

- Assemble as shown using spacer (2) with holes before any shim (3) is used.
- If required, a shim (3) must be inserted between the spacer (2) and wear pad support plate, block or boom section (4).



## 4.2 SAFETY INFORMATION

### **WARNING**

**DO NOT** service the machine without following all safety precautions as outlined in the "Safety Practices" section of this manual.

## 4.3 OPERATOR CAB

### 4.3.1 Operator Cab Description

The welded metal cab features a modular design, allowing for a relatively quick, simple exchange of entire cab and/or component parts. Cab is bolted directly to frame.

The operator cab is a protective structure. The cab itself contains rollover protective and falling object protective structures (ROPS/FOPS) for operator.

### **WARNING**

**DO NOT** weld, grind, drill, repair or modify the cab in any way. Any modification or damage to cab structural components requires cab replacement.

To help ensure optimum safety, protection and performance, replace cab if it is damaged. Refer to appropriate parts manual for ordering information.

The cab contains seat, operating controls, numerous panels, steering and brake components and more.

Covers and mirrors on machine exist for safety, protection and appearance. They are relatively simple to remove and replace.

### 4.3.2 Serial Number Decal

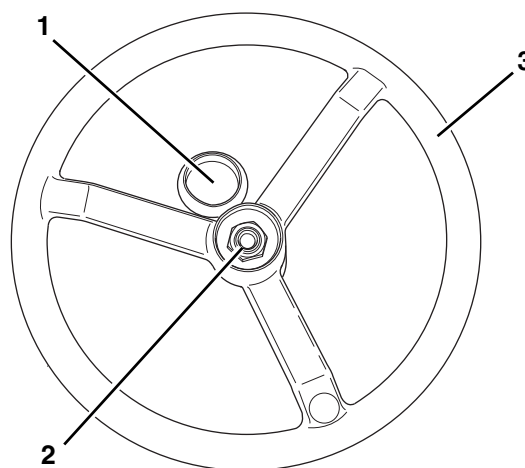
The cab serial number decal is located inside cab, under the seat. Information specified on serial number plate includes cab model number, cab serial number and other data. Write this information down in a convenient location to use in cab correspondence.

## 4.4 CAB COMPONENTS

### 4.4.1 Steering Wheel

#### a. Steering Wheel Removal

1. Park machine on a hard, level surface.
2. Fully retract boom, lower boom, place transmission control lever in (N) NEUTRAL.
3. Engage park brake and shut engine OFF.
4. Place a Do Not Operate Tag on both ignition key switch and steering wheel.
5. Properly disconnect battery.
6. Open engine cover. Allow system fluids to cool.



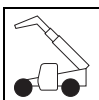
MAH0430

7. Carefully pry center button (1) out of steering wheel.
8. Mark steering wheel and shaft to ensure proper installation. Remove nut (2) securing steering wheel (3) to splined steering column shaft.
9. Use a steering wheel puller to remove steering wheel (3) from splined shaft.

#### b. Steering Wheel Installation

1. Install steering wheel (3) onto splined steering column shaft.
2. Secure steering wheel with nut (2).
3. Press center button (1) onto steering wheel.
4. Properly connect battery.
5. Close and secure engine cover.
6. Remove a Do Not Operate Tag on both ignition key switch and steering wheel.





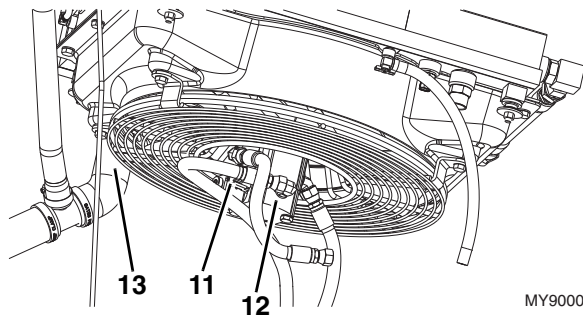
## Axles, Drive Shafts, Wheels and Tires

### 5.4.7 Axle Assembly and Drive Shaft Troubleshooting (Continued)

| Problem   | Possible Causes   | Remedy   |
|---|---|--|
| <b>7. Axle overheating.</b>   | <ol style="list-style-type: none"> <li>1. Oil level too high.</li> <li>2. Axle and/or wheel end housings filled with incorrect oil or oil contaminated or oil level low.</li> </ol>                               | <ol style="list-style-type: none"> <li>1. Fill oil to correct level. (Refer to Section 2.4, "Fluids, Lubricants and Capacities.")</li> <li>2. Drain axle and/or wheel end housing and fill to correct level. (Refer to Section 2.4, "Fluids, Lubricants and Capacities.")</li> </ol> |
| <b>8. High steering effort required.</b>                              | <ol style="list-style-type: none"> <li>1. Steering (hydraulic) system not operating properly.</li> <li>2. Excessive joint housing swivel bearing preload.</li> <li>3. Worn or damaged swivel bearings.</li> </ol> | <ol style="list-style-type: none"> <li>1. Refer to the appropriate Axle Repair Manual.</li> <li>2. Correct bearing preload by adding or removing shims as needed.</li> <li>3. Replace swivel bearings as needed.</li> </ol>  |
| <b>9. Slow steering response.</b>                                     | <ol style="list-style-type: none"> <li>1. Steering (hydraulic) system not operating properly.</li> <li>2. Steering cylinder leaking internally.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Refer to the appropriate Axle Repair Manual.</li> <li>2. Repair or replace steering cylinder as needed.</li> </ol>   |
| <b>10. Excessive noise when brakes are engaged.</b>                   | <ol style="list-style-type: none"> <li>1. Brake discs worn.</li> <li>2. Brake discs damaged.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Check brake discs for wear. Refer to appropriate Axle Repair Manual.</li> <li>2. Replace brake discs.</li> </ol>   |
| <b>11. Brakes will not engage.</b>                                    | <ol style="list-style-type: none"> <li>1. Brake (hydraulic) system not operating properly.</li> <li>2. Brake piston o-rings and seals damaged (leaking).</li> </ol>   | <ol style="list-style-type: none"> <li>1. Refer to the appropriate Axle Repair Manual.</li> <li>2. Replace o-rings and seals.</li> </ol>   |
| <b>12. Brakes will not hold the machine or braking power reduced.</b> | <ol style="list-style-type: none"> <li>1. Brake discs worn.</li> <li>2. Brake (hydraulic) system not operating properly.</li> <li>3. Brake piston o-rings and seals damaged (leaking).</li> </ol>                 | <ol style="list-style-type: none"> <li>1. Check brake discs for wear. Refer to the appropriate Axle Repair Manual.</li> <li>2. Refer to the appropriate Axle Repair Manual.</li> <li>3. Replace o-rings and seals.</li> </ol>  |



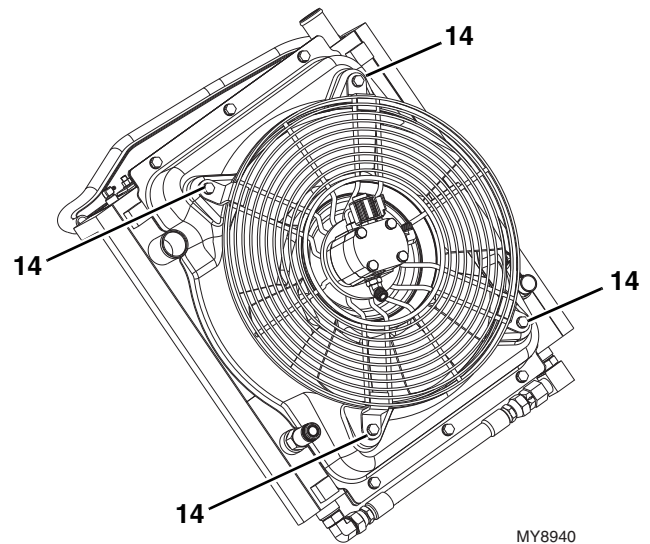
17. Place a funnel at the base of the radiator to channel the drained coolant into the container. Open the radiator petcock and drain the coolant into the funnel. Transfer the fluid into a properly labeled container. Dispose of properly if coolant needs to be replaced. Close the radiator petcock.
18. Remove air dam (6) to gain access to the cooling package lifting eye mounts.
19. Loosen the mounting bolts and move the surge tank (4) to access the cooling package lifting eye mounts.
20. Remove the top radiator hose (7) and hose from the surge tank attached to the radiator. Cap all fittings and openings to keep dirt & debris from entering the cooling system.
21. Place a suitable container beneath the hydraulic oil cooler fittings. Transfer any hydraulic oil into a properly labeled container. Dispose of properly.
22. Disconnect and cap the hydraulic hose (8) attached to the radiator/oil cooler assembly. Allow hydraulic oil to drain from the hydraulic oil cooler. Cap all fittings and openings to keep dirt & debris from entering the hydraulic system.
23. Disconnect the hydraulic cooler temperature sensor (9).
24. Loosen and remove the four mounting nuts and rebound washers (9) from the radiator assembly.
25. Connect a lifting strap to the radiator/oil cooler assembly lifting eyes.
26. Slowly lift the radiator assembly to gain access to the fan side, hydraulic oil cooler out hose connections and the bottom radiator hose.



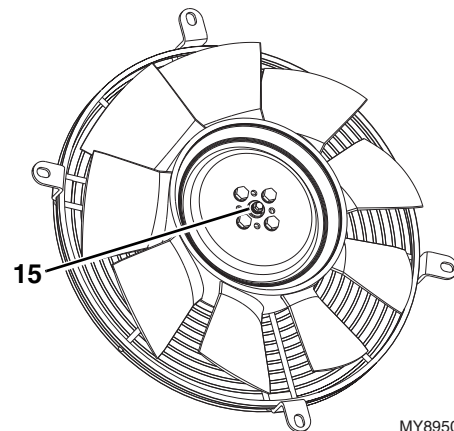
27. Disconnect the connector on the fan solenoid(s). Loosen and remove the fan solenoid(s) (11).
28. Label, disconnect and cap the three hydraulic hoses attached to the fan motor (12). Cap all fittings and openings to keep dirt and debris from entering the hydraulic system.

29. Loosen and remove the lower hydraulic oil cooler hose. Cap all fittings and openings to keep dirt & debris from entering the hydraulic system.
30. Remove the bottom radiator hose (13). Cap all fittings and openings to keep dirt & debris from entering the cooling system.
31. Slowly remove the radiator/oil cooler from the machine.

#### b. Cooler/Fan Motor Removal



1. Turn the radiator/cooler assembly over and place on a secure location.
2. Remove the four bolts (14) securing the fan motor/guard to the radiator/cooler shroud.



3. Turn the fan motor/guard over to access the fan assembly.
4. Loosen and remove the center bolt and washer (15) securing the fan to the motor shaft.



### 8.8 HYDRAULIC RESERVOIR

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The hydraulic reservoir and fuel tank are part of the frame. For this reason, neither tank can be removed. For cleaning instructions, see Section 7.4.2, "Fuel/Hydraulic Oil Tank."

Occasionally, fluid may seep, leak or be more forcefully expelled from the filter head when system pressure exceeds the rating of the filter head or filler cap. If the return filter becomes plugged, return hydraulic oil will bypass the filter when pressure reaches 22 psi (1,5 bar) and return to the reservoir unfiltered.

Carefully examine fluid seepage or leaks from the hydraulic reservoir to determine the exact cause. Clean the reservoir and note where any seepage occurs.

Leaks from a cracked or damaged reservoir require that the reservoir be flushed completely with water and repaired by a certified welder using approved techniques. If these conditions cannot be met, the reservoir must be replaced in its entirety. Contact the local **JLG** dealer should reservoir welding be required.

#### 8.8.1 Pressurized Hydraulic Oil Fill Cap

The fill cap will allow the hydraulic oil reservoir to pressurize to 2 psi (0,14 bar). Inspect the condition of the cap seal to maintain proper reservoir pressure.

#### 8.8.2 Hydraulic Oil Reservoir Draining

1. Park the machine on a firm, level surface, fully retract the boom, support the boom, place the transmission control lever in (N) NEUTRAL, engage the park brake and shut the engine OFF.
2. Place a Do Not Operate Tag on both the ignition key switch and the steering wheel, stating that the machine should not be operated.
3. Open the battery and engine covers. Allow the system fluids to cool.
4. Properly disconnect the battery.
5. Remove the drain plug at the bottom of the hydraulic oil reservoir.
6. Transfer the used hydraulic oil into a suitable, covered container, and label as "Used Oil". Dispose of used oil at an approved recycling facility. Clean and reinstall the drain plug.
7. Wipe up any spilled hydraulic oil.

#### 8.8.3 Hydraulic Oil Reservoir Filling

1. Be sure the reservoir is clean and free of all debris.
2. Install new hydraulic oil filters.
3. Fill the reservoir with Cat HDO oil. Refer to Section 2.4, "Fluids, Lubricants and Capacities."
4. Properly connect the battery.
5. Close and secure the battery and engine covers.
6. Remove the Do Not Operate Tags from both the ignition key and the steering wheel.
7. Start the machine. Run engine to normal operating temperature. Operate all hydraulic functions.



## Hydraulic System

6. Inspect the hand brake valve and connections for leaks, and check the level of the hydraulic fluid in the reservoir. Shut the engine OFF.
7. Install the hand brake cover with the two capscrews.
8. Wipe up any hydraulic fluid spillage in, on, near and around the machine, work area and tools.
9. Close and secure the battery and engine covers.
10. Remove the Do Not Operate Tags from both the ignition key and the steering wheel.

### d. Hand Brake Valve Test.

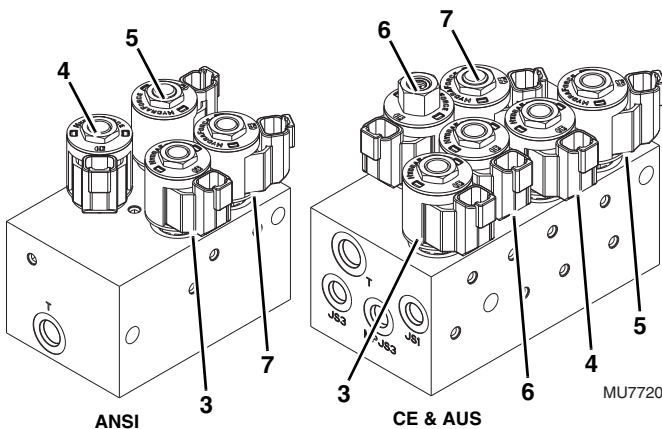
1. Start the machine and engage the shift lever to the forward position. Slowly depress the throttle to mid idle. The hand brake will not allow the machine to move.
2. If further troubleshooting is required, refer to the Section 8.7, "Hydraulic Schematic," or Section 9.4, "Electrical System Schematics."

### 8.11.5 Steering Orbitrol Valve

Refer to Section 4.4.2, "Steering Column/Valve Replacement," for details.

### 8.11.6 Pilot Select Valve

The pilot select valve is attached to a manifold mounted on a mounting plate inside the frame in front of the comp cylinder.



Verify the correct operation of the pilot select valve solenoids: boom lift/lower (3), auxiliary (4), tilt (5), boom extend/retract (6) and front auxiliary (7) before considering replacement of the valve. The housing of the pilot select valve is not serviceable and must be replaced if defective.

### a. Pilot Select Valve Removal

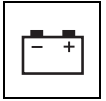
1. Park the machine on a firm, level surface, fully retract the boom, lower the boom, place the transmission control lever in (N) NEUTRAL, engage the park brake and shut the engine OFF.
2. Place a Do Not Operate Tag on both the ignition key switch and the steering wheel, stating that the machine should not be operated.
3. Open the battery and engine covers. Allow the system fluids to cool.
4. Properly disconnect the battery.
5. Label or otherwise mark the hydraulic hoses in relation to the pilot select valve. Disconnect and cap all hoses, fittings, solenoid wire terminal leads, etc.
6. Remove the capscrews that attach the valve to the frame.
7. Remove the pilot select valve from the machine. Wipe up any hydraulic fluid spillage in, on, near and around the machine.

### b. Pilot Select Valve Disassembly, Cleaning, Inspection and Assembly

1. Place the pilot select assembly on a suitable work surface.
2. Remove the solenoid valves and cartridges (3, 4 & 5) from the steer select housing.
3. Clean all components with a suitable cleaner before inspection.
4. Inspect the solenoid cartridges for proper operation. Check by shifting the spool to ensure that it is functioning properly. Check that the spring is intact. Inspect the cartridge interior for contamination.
5. Inspect internal passageways of the steer select manifold and valve for wear, damage, etc. If inner surfaces of the manifold **DO NOT** display an ultra-smooth, polished finish, or components are damaged in any way, replace the manifold or appropriate part. Often, dirty hydraulic fluid causes failure of internal seals and damage to the polished surfaces within the unit.

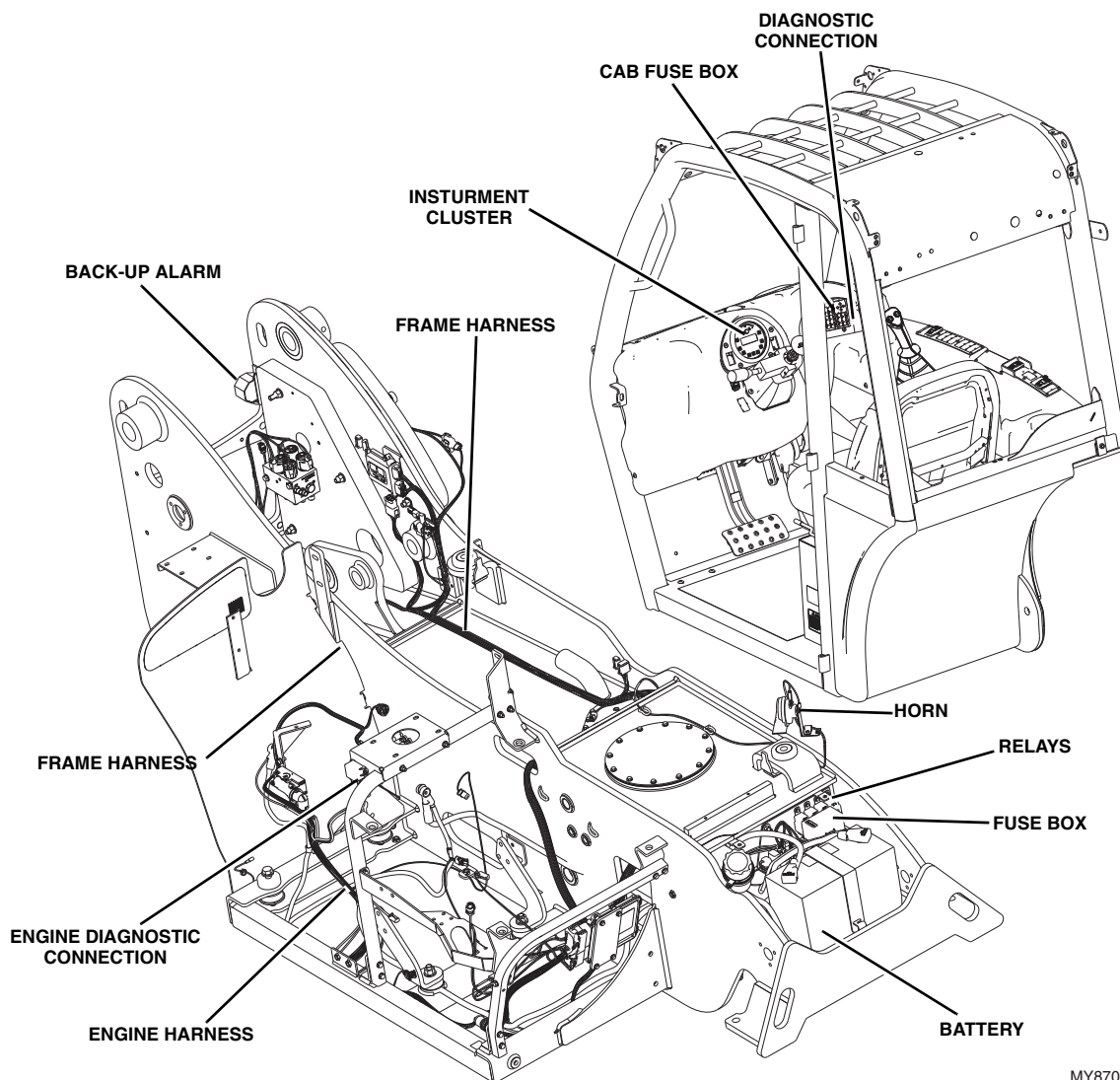
**Note:** ALWAYS replace seals, o-rings, gaskets, etc., with new parts to help ensure proper sealing and operation. Lubricate seals and o-rings with clean hydraulic oil.

6. Install the solenoid valves and cartridges in the pilot select housing.



## 9.1 ELECTRICAL COMPONENT TERMINOLOGY

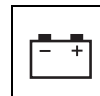
To understand the safety, operation, and service information presented in this section, it is necessary that the operator/mechanic be familiar with the name and location of the electrical components of the machine. The following illustration identifies the components that are referred to throughout this section.



MY8700







## 9.14 ENGINE DIAGNOSTIC TROUBLE CODE EMR4

### 9.14.1 Gauge Fault Code Display

| Fault Codes | SPN Codes | FMI Codes | Deutz Description  |
|-------------|-----------|-----------|--|
| 1           | 132       | 11        | Air flow sensor load correction factor exceeding the maximum drift limit; plausibility error   |
| 2           | 132       | 11        | Air flow sensor load correction factor exceeding drift limit; plausibility error   |
| 3           | 132       | 11        | Air flow sensor low idle correction factor exceeding the maximum drift limit   |
| 4           | 132       | 11        | Air flow sensor load correction factor exceeding the maximum drift limit   |
| 9           | 172       | 2         | Sensor ambient air temperature; plausibility error   |
| 34          | 523006    | 3         | Controller mode switch; short circuit to battery   |
| 35          | 523006    | 4         | Controller mode switch; short circuit to ground  |
| 36          | 523923    | 3         | UB1; Short circuit to battery error of actuator relay 1  |
| 37          | 523924    | 3         | UB2; Short circuit to battery error of actuator relay 2  |
| 38          | 523925    | 3         | UB3; Short circuit to battery error of actuator relay 3  |
| 39          | 523926    | 3         | UB4; Short circuit to battery error of actuator relay 4  |
| 40          | 523927    | 3         | UB5; Short circuit to battery error of actuator relay 5  |
| 45          | 168       | 3         | Sensor error battery voltage; signal range check high  |
| 46          | 168       | 4         | Sensor error battery voltage; signal range check low   |
| 47          | 168       | 2         | High battery voltage; warning threshold exceeded   |
| 48          | 168       | 2         | Low battery voltage; warning threshold exceeded  |
| 49          | 597       | 2         | Break lever main switch and break lever redundancy switch status not plausible   |
| 55          | 523910    | 14        | Air pump doesn't achieve air mass flow set point   |
| 56          | 524013    | 7         | Burner flame unintentional deleted   |
| 57          | 524020    | 14        | Engine power; Not enough oxygen for regeneration   |
| 58          | 523911    | 0         | Burner dosing valve (DV2); over current at the end of the injection phase  |
| 59          | 523911    | 12        | Burner dosing valve (DV2); powerstage over temperature   |
| 60          | 523911    | 3         | Burner dosing valve (DV2); short circuit to battery  |
| 61          | 523911    | 3         | Burner dosing valve (DV2); short circuit to battery on high side   |
| 62          | 523911    | 4         | Burner dosing valve (DV2); short circuit to ground   |
| 63          | 523911    | 11        | Burner dosing valve (DV2); short circuit high side powerstage  |
| 64          | 523912    | 2         | Burner dosing valve (DV2) downstream pressure sensor; plausibility error   |
| 66          | 523912    | 0         | Physical range check high for burner dosing valve (DV2) downstream pressure; shut off regeneration   |
| 69          | 523912    | 1         | Physical range check low for burner dosing valve (DV2) downstream pressure; shut off regeneration. When burner injector is actuated, the measured pressure does not rise above ca. 1250mbarabs (expected; ca. 2400mbar). |
| 72          | 523912    | 3         | Sensor error burner dosing valve (DV2) downstream pressure sensor; signal range check high   |
| 73          | 523912    | 4         | Sensor error burner dosing valve (DV2) downstream pressure sensor; signal range check low  |
| 74          | 523913    | 3         | Sensor error glow plug control diagnostic line voltage; signal range check high  |