# SECTION 1
# GENERAL INFORMATION

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# PRECAUTIONARY STATEMENTS

## PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements (“CAUTION”, “WARNING”, and “DANGER”) followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.



**CAUTION: THE WORD “CAUTION” IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.**



**WARNING: THE WORD “WARNING” DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.**



**DANGER: THE WORD “DANGER” DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.**

**FAILURE TO FOLLOW THE “CAUTION”, “WARNING”, AND “DANGER” INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.**

## MACHINE SAFETY

Additional precautionary statements (“ATTENTION” and “IMPORTANT”) are followed by specific instructions. These statements are intended for machine safety.

*ATTENTION: The word “ATTENTION” is used to warn the operator of potential machine damage if a certain procedure is not followed.*

*IMPORTANT: The word “IMPORTANT” is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.*

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ENGINE - EARLY MODEL & SERIAL NUMBER RANGE
- L565 - 850751 to 999999 and 0001 to 31279
- LX565 - 847451 to 999999 and 0001 to 40190
- LX565 High Flow - 847451 to 999999 and 0001 to 40215
- Lx665 - 847851 to 999999 and 0001 to 66996
- Lx665 High Flow - 847851 to 999999 and 0001 to 67011

| | |
|---|---|
| Oil type | API SG/CF SAE 10W-30 |
| Filter part # | NH #86546618 |
| Engine crankcase capacity w/filter | 6.6 L (7qt.) |
| Dipstick length | 381 mm (15″) |

ENGINE - LATER MODEL & SERIAL NUMBER RANGE
- L565 - 31280 to 850750
- Lx565 - 40191 to 847450
- Lx565 High Flow - 40216 to 847450
- Lx665 - 66997 to 847850
- Lx665 High Flow - 67012 to 847850

| | |
|---|---|
| Oil type | API SG/CF SAE 10W-30 |
| Filter part # | NH #86546618 |
| Engine crankcase capacity w/filter | 7.6 L (8 qt.) |
| Dipstick length | 367 mm (14.4″) |

ELECTRICAL SYSTEM

| | |
|---|---|
| Battery | SAE PC31 - 12V 625 amps @ 0°F (–18°C) |
| Alternator capacity | 40 amps |
| Starter switch | Key start and relay |
| Ignition system protection | Fuse 15 amps |
| Headlights (work) See S/N Break* | NH #9847313 |
| Taillights (work) See S/N Break* | NH #9847313 |

*Headlight and Taillight Serial Number Break

| Model | Serial Number Range |
|---|---|
| L565 | 850751 to 999999 and 0001 to 31153 |
| Lx565 | 847451 to 999999 and 0001 to 38841 |
| Lx665 | 847851 to 999999 and 0001 to 64384 |

| | |
|---|---|
| Headlights (work) See S/N Break** | NH86533429 |
| Taillights (work) See S/N Break** | NH86533429 |

**Headlight and Taillight Serial Number Break

| Model | Serial Number Range |
|---|---|
| L565 | 31154 to 850750 |
| Lx565 | 38842 to 847450 |
| Lx665 | 64385 to 847850 |

| | |
|---|---|
| Taillights (road) | 86505510 |
| Amber flasher | NH #529068 |

HYDRAULIC SYSTEM

| | | |
|---|---|---|
| Pump - Type | | Gear pump |
| Output | (Standard Flow - L565/Lx565) | 15.2 GPM (57.5 LPM) @3050 RPM-@1000 PSI |
| | (Optional High Flow - L565/Lx565) | 25.7 GPM (97.3 LPM) @3050 RPM-@2300 PSI |
| | (Standard Flow - Lx665) | 17.4 GPM (65.9 LPM) @3050 RPM-@1000 PSI |
| | (Optional High Flow - Lx665) | 27.7 GPM (104.9 LPM) @3050 RPM-@2300 PSI |
| Reservoir | | 22.7 L (6.5 gal.) |
| Hydraulic Fluid | | SAE 10W-30 - API SG/CF |



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# SPECIFICATIONS

| MODEL | L565-Lx565 | Lx665 |
|---|---|---|
| ENGINE MANUFACTURER | NEW HOLLAND | NEW HOLLAND |
| MODEL | N844 Diesel | N844T Diesel |
| CYLINDERS | 4 | 4 |
| ASPIRATION | NATURAL | TURBOCHARGED |
| CYCLE | 4 STROKE | 4 STROKE |
| BORE AND STROKE | 84 90 mm (3.31″ 3.54″) | 84 90 mm (3.31″ 3.54″) |
| DISPLACEMENT | 1995 cu. cm (121.7 cu. in.) | 1995 cu. cm (121.7 cu. in.) |
| COMPRESSION RATIO | 22 to 1 | 22 to 1 |
| SPEEDS | | |
| -FAST (no load) | 3070 to 3150 RPM | 3070 to 3150 RPM |
| -IDLE (no load) | 900 to 1000 RPM | 900 to 1000 RPM |
| HORSEPOWER | | |
| (SAE GROSS) | 42.5 @2900 RPM | 52.0 @2900 RPM |
| (SAE NET) | 40.0 @2900 RPM | 50.0 @2900 RPM |
| TORQUE - (mfg. rating) Gross | 126 N·m (93 ft. lbs.) | 153 N·m (113 ft. lbs.) |
| VALVE CLEARANCE | | |
| -Intake (cold). | 0.2 mm (0.008 in.) | 0.2 mm (0.0008 in.) |
| -Exhaust (cold). | 0.2 mm (0.008 in.) | 0.2 mm (0.0008 in.) |
| FIRING ORDER | 1-3-4-2 | |
| FUEL CONSUMPTION (approximate at continuous full load) | | L565/Lx565 - 9.5 LPH (2.5 GPH)<br>Lx665 - 12.1 LPH (3.2 GPH) |
| IGNITION TYPE | | Compression |
| GRADEABILITY (Intermittent duty) | | 30 Degrees All Directions |
| AIR CLEANER - Dry type dual element | | |
| Primary element | | NH #86504145 |
| Safety element | | NH #86504143 |
| FUEL SYSTEM | | |
| Type of fuel | | Diesel |
| Cleaning system | | Inline filter replaceable NH#9611973<br>Inline water trap NH#86504140 |
| CAPACITIES | | |
| Cooling system | | 10.3 L (10.8 qt.) |
| Fuel tank | | 52.9 L (14 gal.) |
| Hydraulic reservoir | | 22.7 L (6 gal.) |
| Chain case (final drive - per side) | | 7.6 L (8 qt.) |
| Gearbox (per box) | | 0.95 L (1 qt.) |

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# MINIMUM HARDWARE TIGHTENING TORQUES

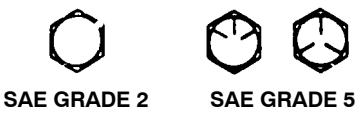
## IN FOOT POUNDS (NEWTON-METERS) FOR NORMAL ASSEMBLY APPLICATIONS

## INCH HARDWARE AND LOCKNUTS

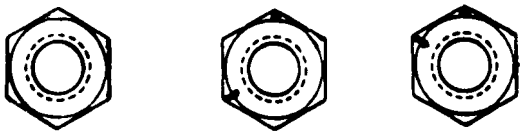
| NOMINAL SIZE | SAE GRADE 2 | | SAE GRADE 5 | | SAE GRADE 8 | | LOCKNUTS | | NOMINAL SIZE |
|---|---|---|---|---|---|---|---|---|---|
| | UNPLATED or PLATED SILVER | PLATED W/ZnCr GOLD | UNPLATED or PLATED SILVER | PLATED W/ZnCr GOLD | UNPLATED or PLATED SILVER | PLATED W/ZnCr GOLD | GR.B w/GR5 BOLT | GR.C w/GR8 BOLT | |
| 1/4 | 55* (6.2) | 72* (8.1) | 86* (9.7) | 112* (13) | 121* (14) | 157* (18) | 61* (6.9) | 86* (9.8) | 1/4 |
| 5/16 | 115* (13) | 149* (17) | 178* (20) | 229* (26) | 250* (28) | 324* (37) | 125* (14) | 176* (20) | 5/16 |
| 3/8 | 17 (23) | 22 (30) | 26 (35) | 34 (46) | 37 (50) | 48 (65) | 19 (26) | 26 (35) | 3/8 |
| 7/16 | 27 (37) | 35 (47) | 42 (57) | 54 (73) | 59 (80) | 77 (104) | 30 (41) | 42 (57) | 7/16 |
| 1/2 | 42 (57) | 54 (73) | 64 (87) | 83 (113) | 91 (123) | 117 (159) | 45 (61) | 64 (88) | 1/2 |
| 9/16 | 60 (81) | 77 (104) | 92 (125) | 120 (163) | 130 (176) | 169 (229) | 65 (88) | 92 (125) | 9/16 |
| 5/8 | 83 (112) | 107 (145) | 128 (174) | 165 (224) | 180 (244) | 233 (316) | 90 (122) | 127 (172) | 5/8 |
| 3/4 | 146 (198) | 189 (256) | 226 (306) | 293 (397) | 319 (432) | 413 (560) | 160 (217) | 226 (306) | 3/4 |
| 7/8 | 142 (193) | 183 (248) | 365 (495) | 473 (641) | 515 (698) | 667 (904) | 258 (350) | 364 (494) | 7/8 |
| 1 | 213 (289) | 275 (373) | 547 (742) | 708 (960) | 773 (1048) | 1000 (1356) | 386 (523) | 545 (739) | 1 |

**NOTE: Torque values shown with * are inch pounds.**

## IDENTIFICATION
## CAP SCREWS AND CARRIAGE BOLTS



SAE GRADE 2 — SAE GRADE 5 — SAE GRADE 8



REGULAR NUTS — SAE GRADE 5 HEX NUTS — SAE GRADE 8 HEX NUTS

## LOCKNUTS



GRADE IDENTIFICATION
GRADE A NO NOTCHES
GRADE B ONE CIRCUMFERENTIAL NOTCH
GRADE C TWO CIRCUMFERENTIAL NOTCHES



GRADE IDENTIFICATION
GRADE A NO MARKS
GRADE B THREE MARKS
GRADE C SIX MARKS
MARKS NEED NOT BE LOCATED AT CORNERS



GRADE A NO MARKS
GRADE B LETTER B
GRADE C LETTER C
GRADE IDENTIFICATION

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# TROUBLESHOOTING

## ENGINE WILL CRANK BUT DOES NOT START

| CAUSE | CORRECTION |
|---|---|
| Faulty key switch | Correct the connection and/or replace switch |
| Blown 5-amp electronic ignition fuse (cab fuse panel) | Replace fuse |
| Fuel solenoid not operating | Check solenoid for battery voltage and correct |
| Insufficient charging or complete discharging of the battery | Charge or replace battery |
| Lack of fuel | Fill fuel tank |
| Air mixed in the fuel system | Bleed the air |
| Clogged fuel filter | Replace |
| Irregular and faulty fuel supply (electric fuel pump) | Check power supply; check fuse in fuse panel; check for corroded internal components (replace pump and in-line filter if corroded) |
| Irregular and faulty fuel supply (injection pump trouble) | Repair in an authorized service shop |
| Glow plug not heating | Failure of the glow plug; replace |
| Improper viscosity of the lubricating oil | Inspect and replace |
| Clogged air cleaner | Clean or replace |
| No compression | Repair in a service shop |

## ENGINE WILL NOT CRANK OR START

| CAUSE | CORRECTION |
|---|---|
| Seat belt not fastened | Buckle seat belt |
| Faulty key switch | Correct the connection and/or replace switch |
| Insufficient charging or complete discharging of the battery | Charge or replace battery |
| Blown 5-amp electronic battery fuse (engine fuse panel) | Replace fuse |
| Blown 15-amp key main fuse (engine fuse panel) | Replace fuse |
| Open in W/O (white-orange) wire between the seat/seat belt connector and start inter-lock relay | Check and repair as required |
| Faulty start interlock relay | Check and repair as required |

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# GENERAL ENGINE INFORMATION

NEW HOLLAND ENGINES, N844 used in the MODELS L565 and LX565 SKID-STEER LOADERS and N844T TURBOCHARGER ENGINE used in the MODEL LX665 SKID-STEER LOADER:

## GENERAL DESCRIPTION

The N844, N844T Series are four-cylinder stroke, liquid-cooled, compression ignition engines, designed for durability, low weight and compactness. The engines are IDI (In Direct Injection). The linerless cylinder block, three-piece helical gear train, and flange-mounted fuel injection pump on the engine cam, reduce frictional power loss and engine weight. The special direct-injection or swirl chamber, along with the small bore multi-cylinder design, offers good fuel consumption, low noise, and excellent start-ability.

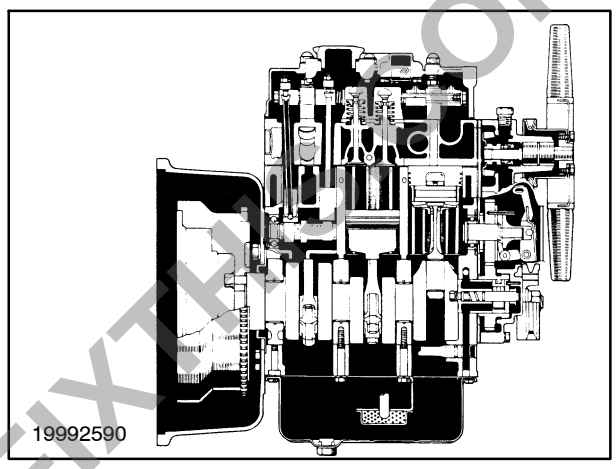



**Figure 2-1**

## COMPONENT ASSEMBLY DESCRIPTION

### Cylinder Block

The cylinder block is made from high-grade cast iron with copper and chrome additives and is integral with the crankcase. The crankcase features five main bearings of the tunnel block design, with crankcase walls extending well below the crankshaft centerline for strength and rigidity. The cylinder's bores are plateau honed for oil retention and extended ring life. The non-machined surfaces are sealed to ensure cleanliness.

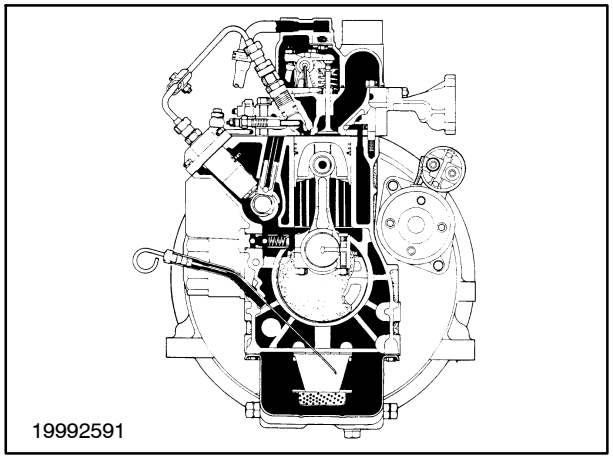



**Figure 2-2**

### Crankshaft

The crankshaft is a chrome-molybdenum steel forging, fully machined, static, and dynamically balanced with integral counterweights. All bearing surfaces are induction hardened. The axial location is by thrust washers at the number five main bearing. The five main journals run in replaceable steel-backed cast copper/lead alloy bearings. The front of the crankshaft is keyed.

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## CAB AND BOOM TILT PROCEDURE

The cab and boom assembly can be tilted forward for easier access to the major skid-steer loader hydrostatic transmission or engine components. To tilt the cab, the proper cab tilting tool must be used to ensure safety and to prevent damage to the loader frame, cab, and boom structure. Contact your New Holland dealer for major service or repairs of the skid-steer loader. Using the proper cab tilting tool and following these steps, the cab and boom can be tilted forward.

1. Remove any attachment, bucket, etc. from the boom quick-attach plate.

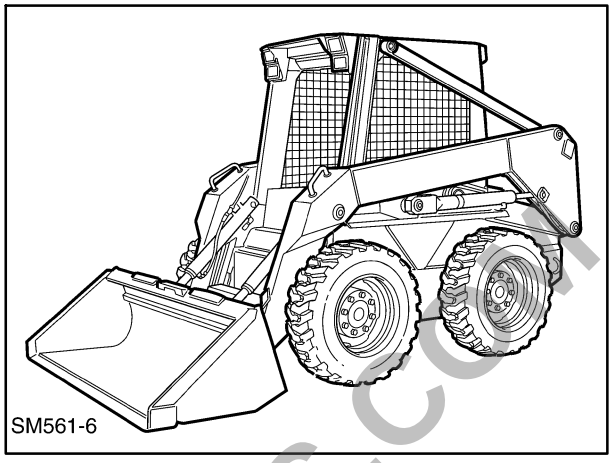



**Figure 1-6**

2. Raise the boom and lower onto boom lock pins, 1.
   a. Raise boom above boom lock pins.
   b. Engage boom lock pins.
   c. Stop engine, ignition key off position.
   d. Turn ignition key to the on position.
   e. Lower boom onto boom lock pins.
   f. Turn the ignition key to the “OFF” position.

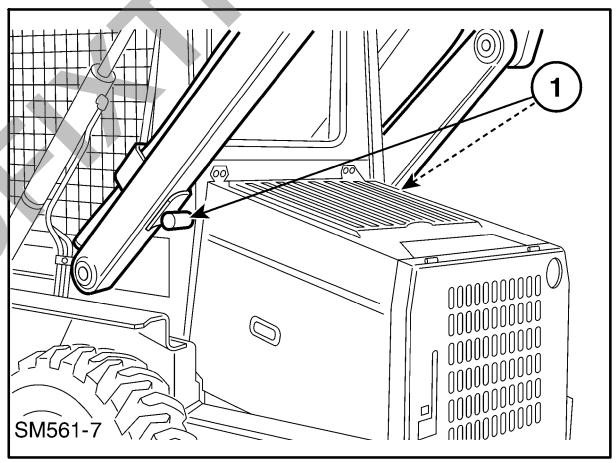



**Figure 1-7**

3. Jack up the loader and block it securely with all four wheels off the ground, as shown. Position the front blocks, 1, to the front of the final drive housings and the rear blocks, 2, to the rear of the flat area of the final drive housings.

**WARNING: NEVER ATTEMPT TO TILT THE SKID-STEER LOADER CAB OVER UNLESS THE LOADER IS SECURELY SUPPORTED.**

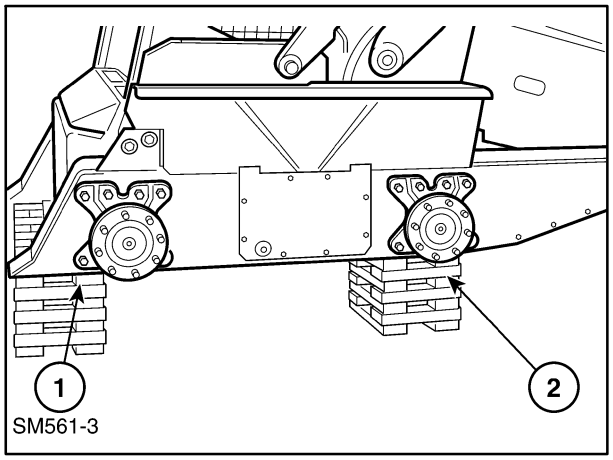



**Figure 1-8**

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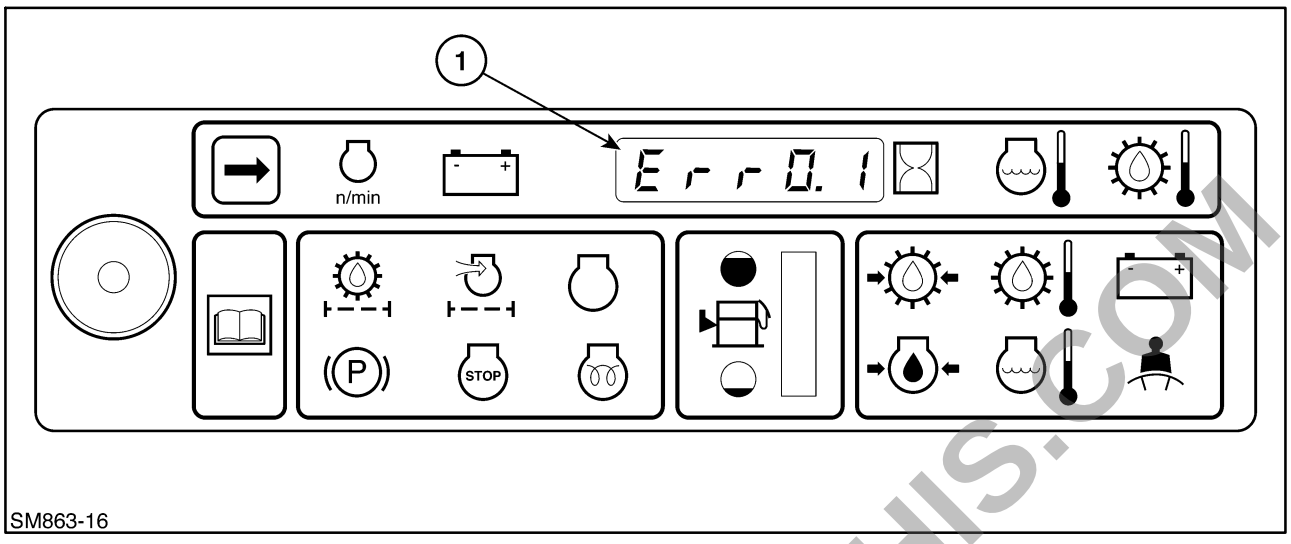



**Figure 3-24**

## EIC ERROR MESSAGES

The EIC character display, 1, will display certain error messages when unusual conditions occur during operation. The “ERROR” messages will only occur when there is a fault in one of the controlled circuits not a monitored function. The following are the fault conditions and the associated error messages:

1. ERR01: Memory store error (engine hours may not be valid).
2. ERR02: Output circuit to the fuel solenoid has shorted/opened.

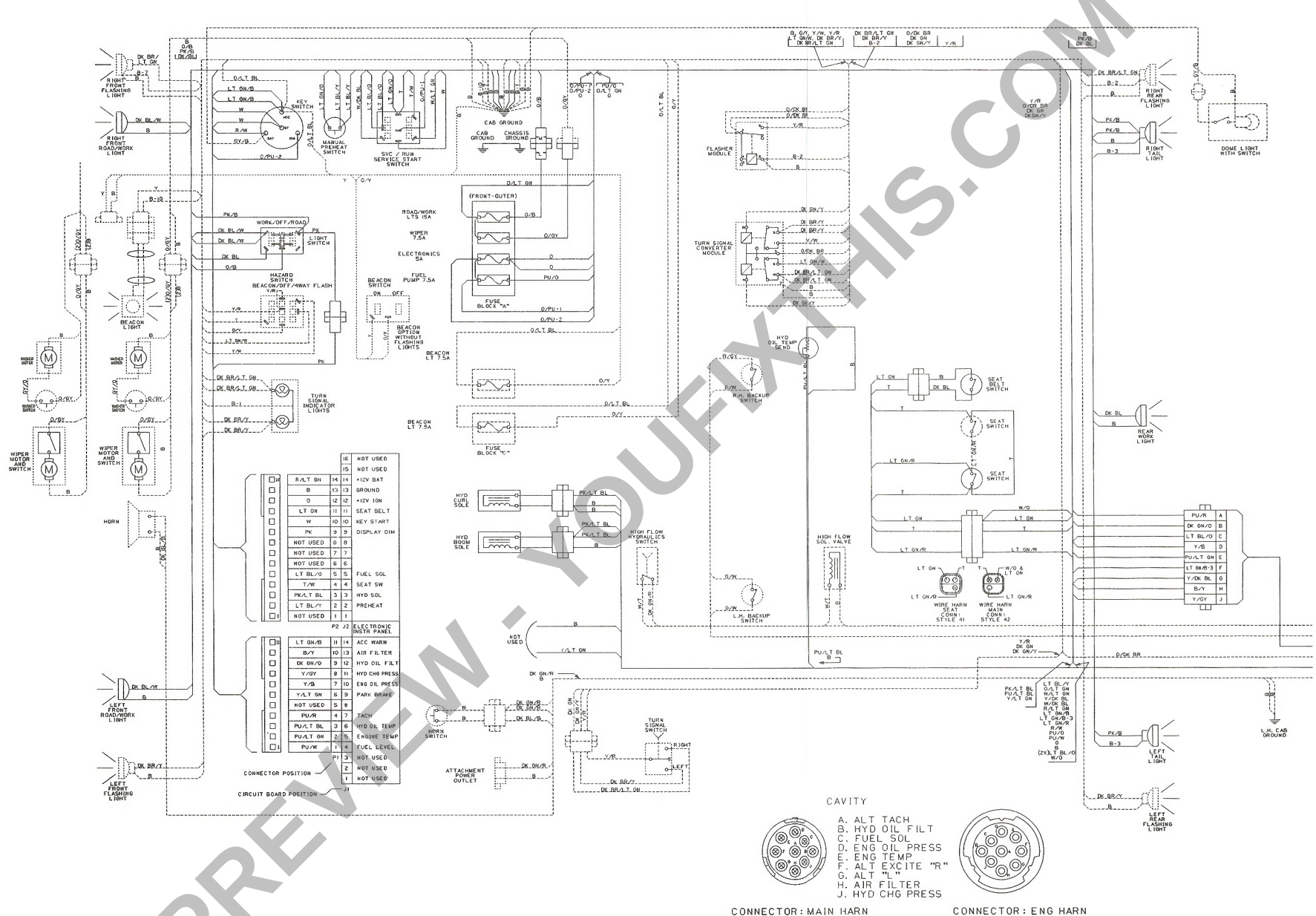
   **NOTE: This will occur when the service/run switch has been moved from “SERVICE” to “RUN” position during normal operation. This is not an indication of a failure.**
3. ERR03: Output circuit to the hydraulic solenoid has shorted/opened.
4. ERR04: Output circuit to the engine preheat relay has shorted/opened.

An error message is canceled by pressing the Arrow switch. The system will return to the start-up condition and the operator may then attempt to operate normally again. If an error message reappears, check the circuit for the cause of the error and repair or contact your New Holland dealer for service.

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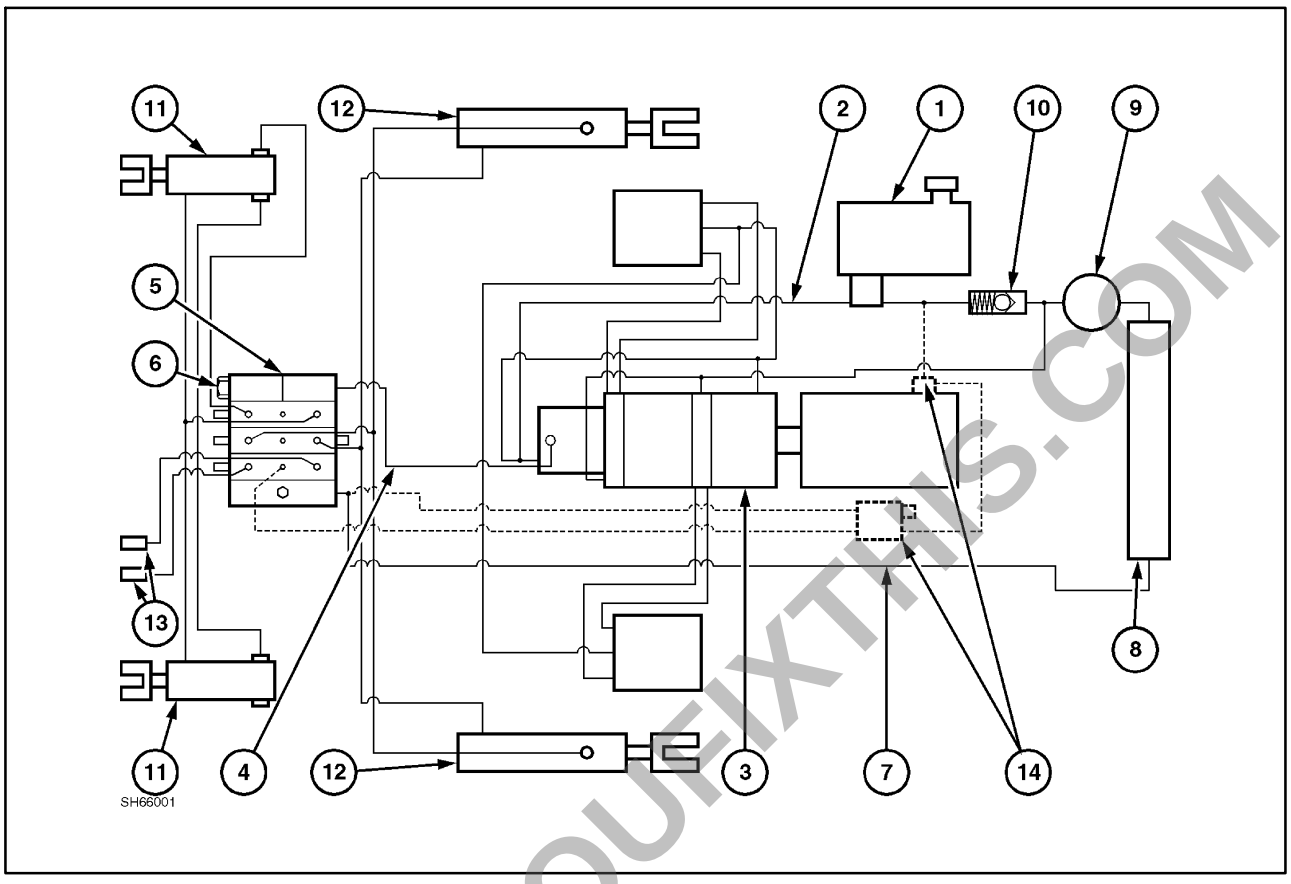



**Figure 6-1**

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# SAFETY PRECAUTION INFORMATION

**UNSAFE OPERATING PRACTICES AND IMPROPER USE OF THE SKID-STEER LOADER AND ITS ATTACHMENTS ON THE PART OF THE OPERATOR CAN RESULT IN INJURIES. OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AT ALL TIMES:**

1. **FOR SERVICING, THE LOADER SHOULD BE ON LEVEL TERRAIN, ENGINE STOPPED WITH THE WHEELS BLOCKED OR THE ENTIRE LOADER SOLIDLY SUPPORTED WITH THE WHEELS OFF THE GROUND BEFORE SERVICING ANY COMPONENT OF THE DRIVETRAIN.**
2. **FOR SERVICING UNDER THE OPERATOR'S SEAT, RAISE THE SEAT AND PAN ASSEMBLY TO THE RAISED LATCHED POSITION AND SECURELY LATCH.**
3. **DO NOT OPERATE THE LOADER UNLESS THE SEAT IS LATCHED IN THE OPERATE POSITION.**
4. **DO NOT SERVICE THE LOADER WITH A RAISED BOOM UNLESS THE BOOM IS RESTING ON THE BOOM LOCK PINS.**
5. **DO NOT SERVICE THE LOADER WITH THE ENGINE RUNNING UNLESS THE LOADER IS PROPERLY AND SECURELY SUPPORTED WITH ALL FOUR WHEELS OFF THE GROUND.**
6. **USE CAUTION WHEN SERVICING THE UNIT AROUND MOVING PARTS.**
7. **DO NOT TILT THE BOOM AND CAB WITHOUT PROPER INSTRUCTION.**
8. **DO NOT TILT THE BOOM AND CAB WITHOUT USING THE PROPER CAB TILTING TOOL.**
9. **REINSTALL ALL SHIELDS REMOVED FOR SERVICE.**
10. **NEVER LOOSEN ANY HYDRAULIC CONNECTIONS BEFORE RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM.**
11. **WEAR EYE PROTECTION SUCH AS GOGGLES, ETC.**
12. **WEAR EAR PROTECTION SUCH AS EARPLUGS, ETC. WHEN YOU FEEL THE NOISE LEVEL IS UNCOMFORTABLE.**
13. **IF ANY SERVICING OR ADJUSTMENTS REQUIRE THE BATTERY TO BE DISCONNECTED, DISCONNECT THE (-) NEGATIVE GROUND CABLE.**
14. **WHEN SERVICING ELECTRICAL COMPONENTS, DISCONNECT THE (-) NEGATIVE GROUND CABLE.**
15. **IF THE ELECTRONIC INSTRUMENT CLUSTER (EIC) REQUIRES REMOVAL FROM THE DASH AREA OR THE SKID-STEER LOADER, DISCONNECT THE (-) NEGATIVE GROUND BATTERY CABLE. THIS WILL SHUT OFF POWER TO THE EIC AND PREVENT DAMAGE TO THE EIC BOARD OR BLOWING THE 5-AMP FUSES IF THE BOARD IS ACCIDENTALLY GROUNDED.**
16. **IF WELDING IS REQUIRED ON THE SKID-STEER LOADER, DISCONNECT THE (-) NEGATIVE GROUND CABLE. FAILURE TO DISCONNECT THE BATTERY MAY RESULT IN DAMAGE TO THE EIC (ELECTRONIC INSTRUMENT CLUSTER) MONITORING SYSTEM AND OTHER ELECTRICAL COMPONENTS.**
17. **IF WELDING IS REQUIRED ON AN ATTACHMENT, REMOVE THE ATTACHMENT FROM THE SKID-STEER LOADER.**



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## METHOD 2
## (Tilting Cab and Boom Forward)

Follow the cab tilting procedure in Section 1 of this manual for proper instructions.

1. Remove the muffler from the exhaust manifold, 1.
2. Remove the battery.

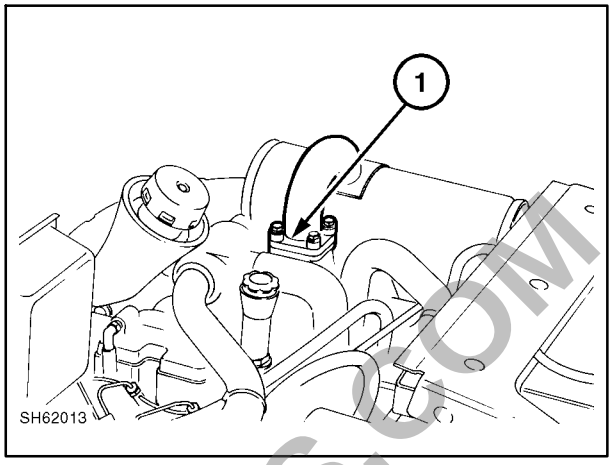



**Figure 2-14**

3. Drain the cooling system, radiator and engine block, raise handles, 1, moving the radiator to the rear and drain the cooling system from drain plug, 2.
4. Remove the upper and lower radiator hoses from the engine block and plug the hoses with plastic plugs.

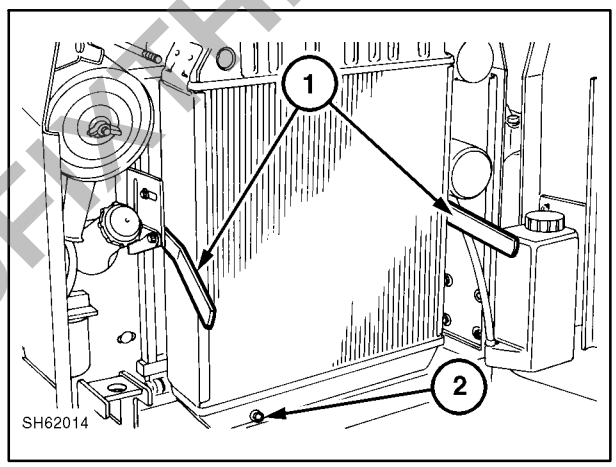



**Figure 2-15**

5. Remove the air cleaner hose, 1, from the intake manifold and cap.
6. Unplug the engine wire harness, 2, from the main harness and ground wires, 3, from the engine bellhousing.
7. Unhook the control valve hydraulic oil return line at the oil cooler and cap at 4.

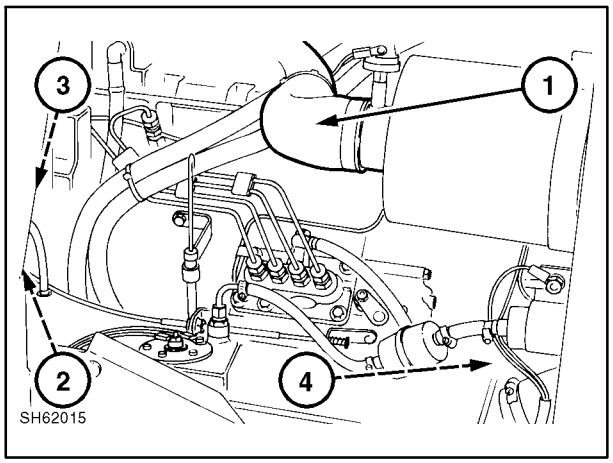



**Figure 2-16**

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# FUEL SYSTEM

## FUEL SPECIFICATIONS

Fuel tank capacity is 14.3 U.S. gal. (54 L).

## DIESEL FUEL

Use clean, quality No.1-D or No. 2-D fuel (ASTM D975).

Use No. 1-D if the ambient temperature is expected to be less than 40° F (4° C) or if the loader is to be used at an altitude exceeding 5000 ft. (1524 m).

The sulfur content of the fuel should be no more than 0.5%.

The sediment and water content should not exceed 0.05%.

To prevent fuel flow problems in cold weather, use No. 1-2 diesel fuel with a pour point of at least 10° F below the expected ambient temperature.

Minimum cetane number is 40. Low temperature or high altitude operation may require the use of fuel with a higher cetane number.

In most areas, diesel fuel is properly blended for summer and winter grades as ambient temperatures change. In winter, use winter grade diesel fuel only. Otherwise, the fuel may cloud and block the fuel system. When temperatures are extremely cold, use properly mixed winter fuel.

Use New Holland diesel fuel conditioner part #251202 to mix with the diesel fuel. Follow the directions for use as indicated on the container.

## DIESEL FUEL STORAGE

**NOTE: Diesel fuels stored for a long time may form gum and plug filters.**

Keep fuel in a clean container in a protected area. Water and sediment must be removed before fuel gets to the engine. Do not use deicers to remove water from fuel. Do not depend on fuel filters to remove water. If possible, remove water and sediment at the storage tank outlet.

*IMPORTANT: Do not store diesel fuel in galvanized containers. Diesel fuel stored in galvanized containers reacts with the zinc coating of the container to form zinc flakes. If fuel contains any water, a zinc gel may also form. The gel and flakes will quickly plug fuel filters and may damage the injector pump and injectors.*

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9. Remove the idler gear and small pinion from the drive end frame if they were not dislodged when the housing was separated.

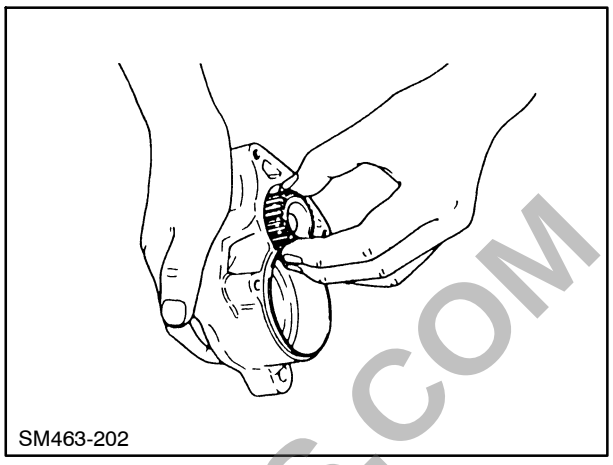



**Figure 2-241**

10. Remove the idler gear bearing rollers and retainer.

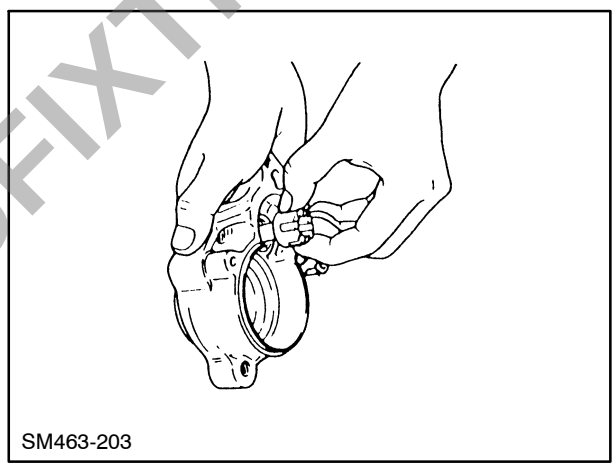



**Figure 2-242**

11. Remove the return spring from the electric solenoid.

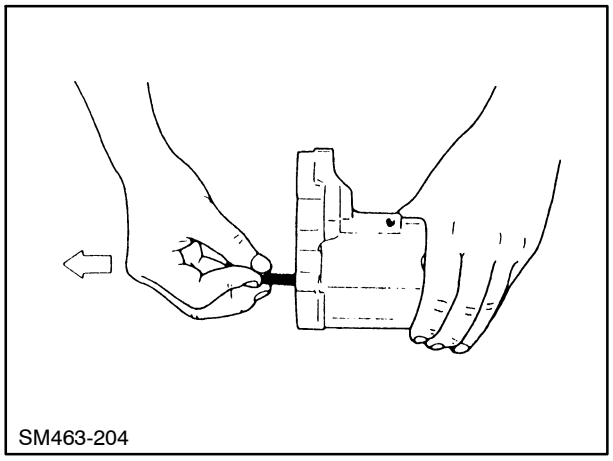



**Figure 2-243**

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## ELECTRONIC INSTRUMENT CLUSTER (EIC) AND STARTER CIRCUITS:

### BLOWN FUSE SYMPTOMS AND TESTING

**Electronic Ignition Fuse, 1**
**(Cab Fuse Panel - 5A)**
**Service/Run Switch "Run" Position**

1. Board shows self test (with operator in seat).
2. Board shows 5.2 volts.
3. Board seat belt and park brake lights will flash.
4. Board seat belt light will go off when seat belt is buckled. Park brake light will still flash.
5. Key "ON" position - board will show 5.2 volts and no preheat cycle.
6. Engine will crank but will not start.
7. Toggle Service/Run switch to "SERVICE" position - unit will start.

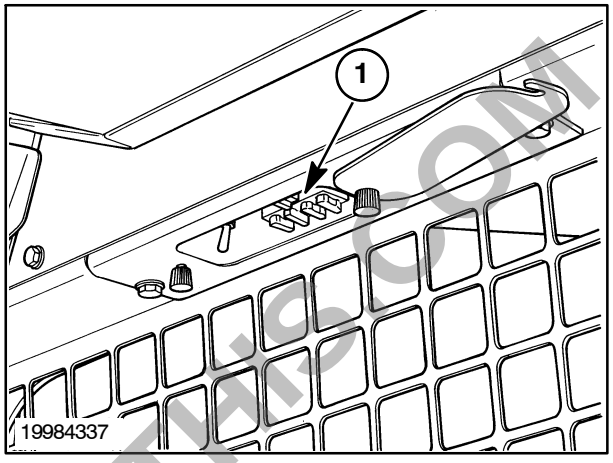



**Figure 3-32**

**Electronic Battery Fuse, 1**
**(Engine Fuse Panel - 5A)**
**Service/Run Switch "Run" Position**

1. When operator sits in seat, the board will not power up - no readings.
2. Unit will not crank.
3. Toggle Service/Run Switch to - "SERVICE" position - unit will crank and may start if engine is warm, NO preheat is available.

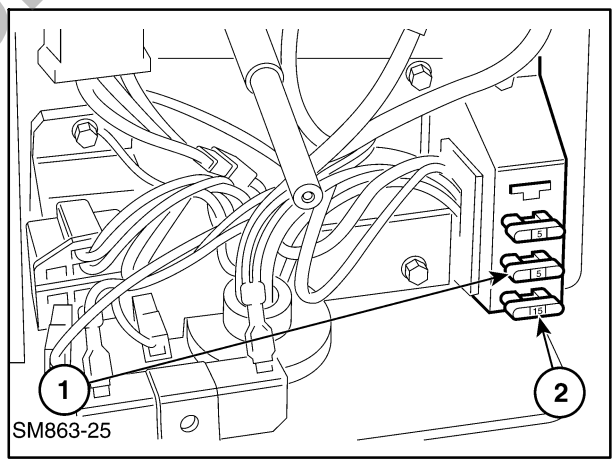



**Figure 3-33**

**Key Main Fuse, 2**
**(Engine Fuse Panel - 15A)**
**Service/Run Switch "Run" Position**

1. Board will power up and self test.
2. Board seat belt and park brake lights will flash.
3. Board seat belt light will go off when seat belt is buckled; the park brake light will still flash.
4. Key on - system dead.
5. Toggle Service/Run Switch to "SERVICE" position - system dead.

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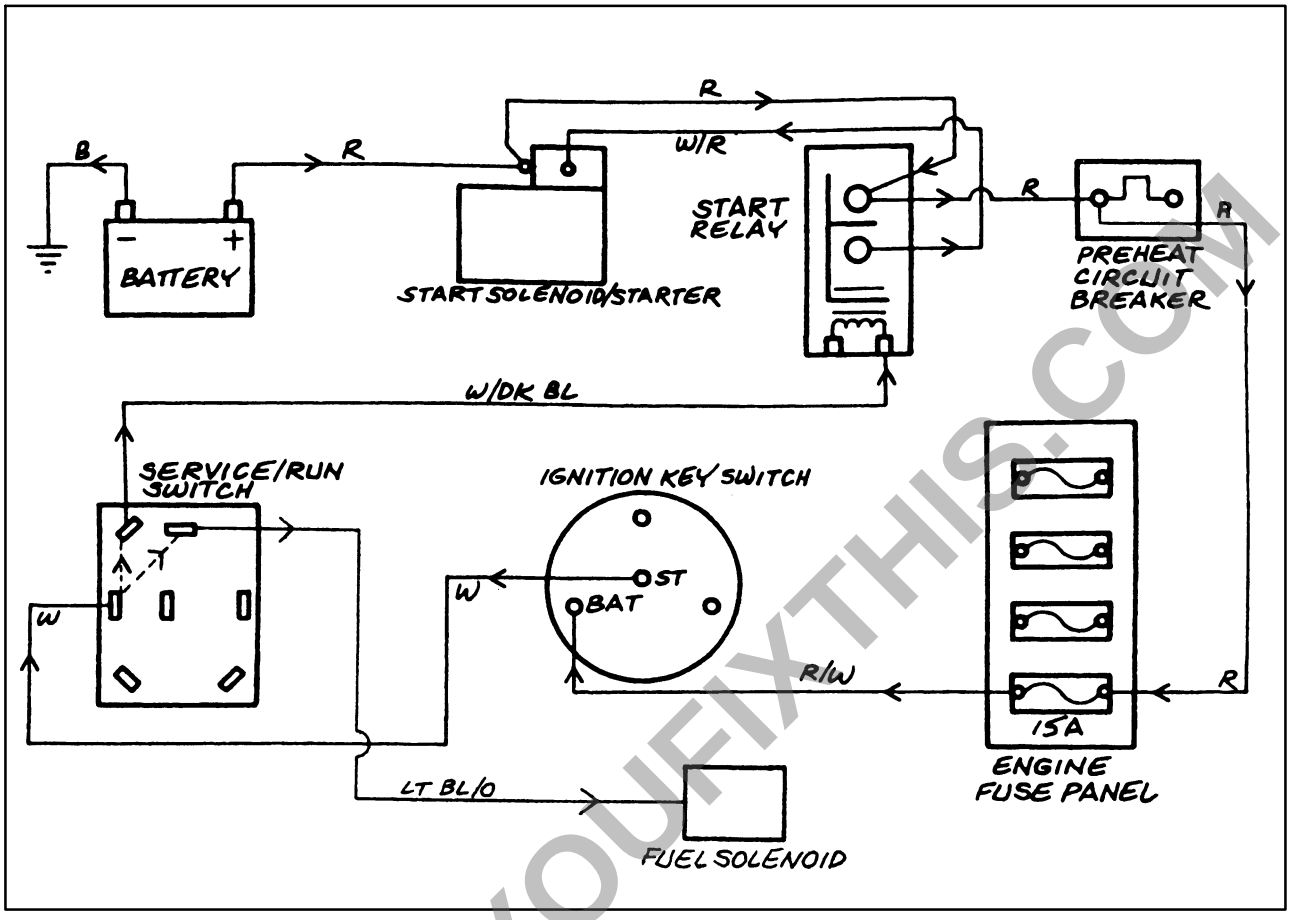



Figure 3-112

**Service/Run switch in the "SERVICE" position**

The power originates at the battery and flows through the (R) positive battery cable to the starter solenoid. From here the power flows through the (R) wire to the battery side of the start relay.

The power then flows through the (R) wire to the preheat circuit breaker and to the engine fuse panel to the 15A key main fuse.

The power then flows through the (R/W) wire to the battery terminal on the ignition key switch.

With the key switch in the "START" position, current flows through the (W) wire to the service/run switch.

With the service/run switch in the "SERVICE" position, power goes through the (W/DKBL) wire from the service/run switch to the start relay to activate the relay.

When the start relay is activated, power goes through the (W/R) wire to the starter solenoid, which connects battery power to the starter motor.

With the service/run switch in the "SERVICE" position, power goes through the LTBL/O wire from the service/run switch to the fuel solenoid, opening the solenoid to allow the engine to start.

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3. With the test ammeter terminals short-circuited, start the engine.

**CAUTION: IN THE CASE OF WHERE THE TEST AMMETER IS CONNECTED AT THE POSITION SHOWN IN FIGURE 2-214, MAKE SURE NO STARTING CURRENT IS APPLIED TO THE AMMETER WHEN THE ENGINE IS STARTED.**

4. Remove the short circuit across the test ammeter terminals and increase the engine speed immediately to approximately 2000 RPM. Take the ammeter reading.
5. If the ammeter reading is 5A or less, take the voltmeter reading without changing the engine speed (approximately 2000 RPM). The reading is the adjusting voltage.
6. If the ammeter reading is more than 5A, continue to charge the battery until the reading falls to less than 5A or replace the battery with a fully charged one.

   An alternative method is to limit the charging current by connecting a 1/4 (25W) resistor in series with the battery.

## Checking Output

If the previous section “A” check is satisfactory, check the output as follows:

1. After opening the battery switch, disconnect terminal B of the alternator and connect an ammeter (50-amp capacity) at the position shown.
2. Connect the voltmeter between terminal B of the alternator and the ground. Confirm the voltmeter indicates the battery voltage.
3. Close the key switch.
4. Start the engine and turn on all the lamps. Immediately accelerate the engine to 2000 RPM or more and measure the maximum value indicated on the ammeter.
5. If this value is more than 70% of the nominal output (refer to the section on “Service Specifications”), the alternator can be considered as working almost satisfactorily.

   **NOTE: To make the above judgement more accurate, remove the alternator from the engine and check it on a test bench.**

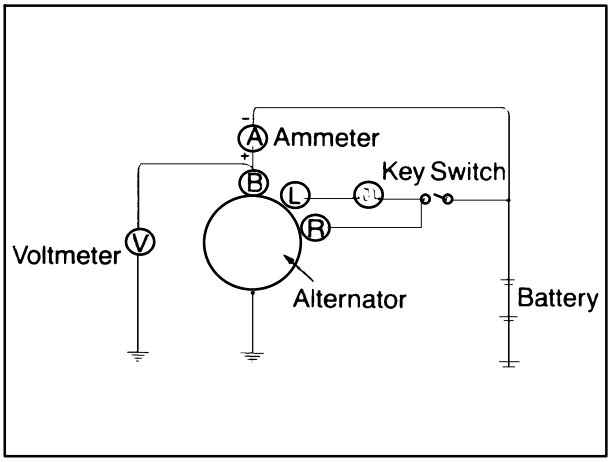



**Figure 3-215**

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3. Securely block the skid-steer loader with all four wheels off the ground. Refer to Section 1 for more detail information on properly supporting a skid-steer loader.

   Support the loader at the front of the final drive cases at 1, and at the rear at 2.

**CAUTION: FAILURE TO SECURELY SUPPORT THE SKID-STEER LOADER COULD RESULT IN MOVEMENT OF THE LOADER CAUSING SERIOUS INJURY OR DAMAGE TO THE EQUIPMENT.**

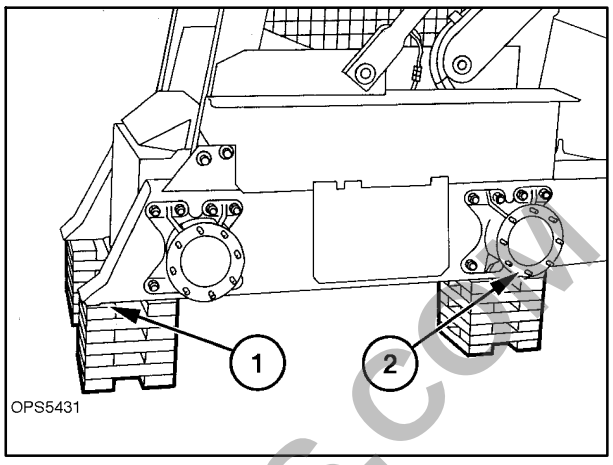



**Figure 4-35**

4. Remove the tires and wheels from the final drive being serviced.
5. Clean the axle and final drive area to prevent debris from entering the final drive case.
6. Remove the eight axle housing retaining nuts and washers, 1, from each axle.
7. Slide the axle housing from the retaining studs and lift the assembly from the final drive case.

   **NOTE: When the axle assembly is removed, the drive sprocket and chain will drop slightly to the bottom of the case.**

8. Remove the final drive cover, 2.

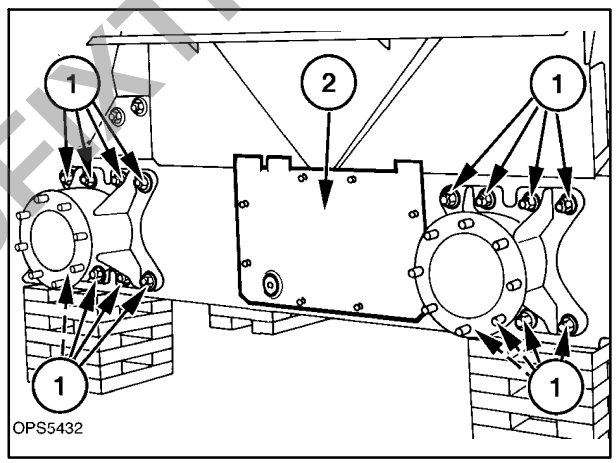



**Figure 4-36**

9. There is a large O ring that seals the axle housing to the side of the final drive case, 1. Remove the O ring from the case or the axle housing.

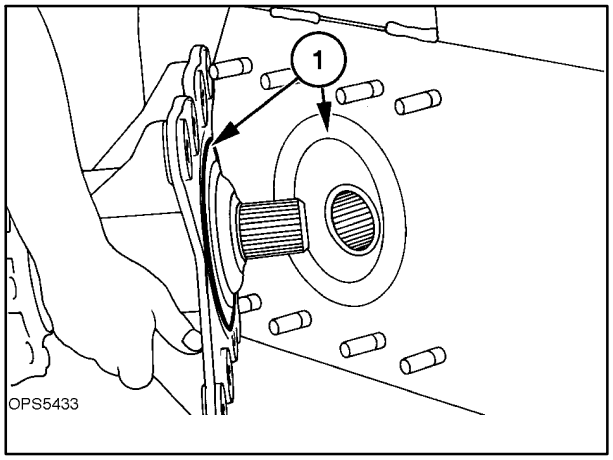



**Figure 4-37**

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The following pump ports control direction of motor (tire) rotation forward or reverse.

Front pump controls right motor.

1 - Forward (top)

2 - Reverse (bottom)

Rear pump controls left motor.

3 - Forward (bottom)

4 - Reverse (top)

*IMPORTANT: Check and make sure the flowmeter is connected properly, so when the pump is stroked the flow from the pump goes to the inlet side of the flowmeter.*

*IMPORTANT: Check the hydraulic oil level and add if required to insure sufficient oil for the test.*

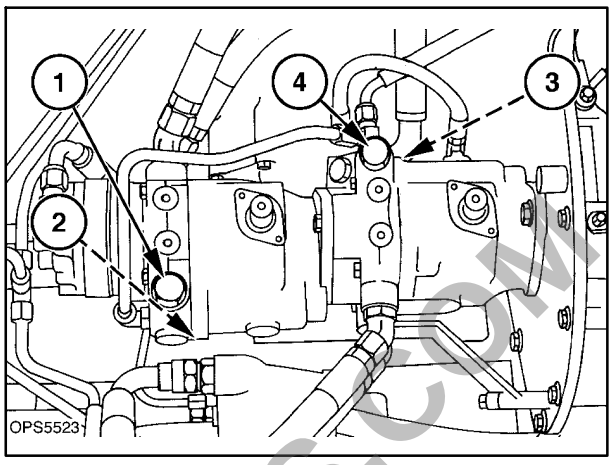



**Figure 5-25**

9. Using the EIC or a photo tach, set the engine speed to 2900 RPM.
10. With the flowmeter regulator valve completely opened, 1, stroke the control lever for the direction to be tested and take a free flow reading and record. The pump free flow is at “0” pressure.

**CAUTION: ALWAYS STAY CLEAR OF MOVING PARTS DURING TESTING OR SERIOUS INJURY COULD OCCUR.**

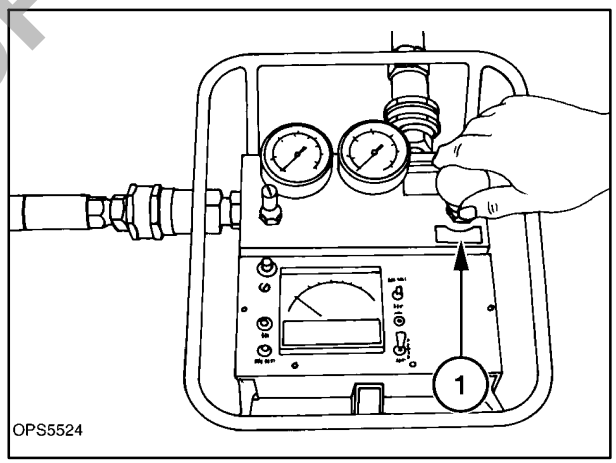



**Figure 5-26**

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5. Securely block the skid-steer loader at 1 and 2 with all four wheels off the ground. Refer to Section 1 for more information on properly supporting a skid-steer loader.

**CAUTION: FAILURE TO SECURELY SUPPORT THE SKID-STEER LOADER COULD RESULT IN MOVEMENT OF THE LOADER CAUSING SERIOUS INJURY OR DAMAGE TO THE EQUIPMENT.**

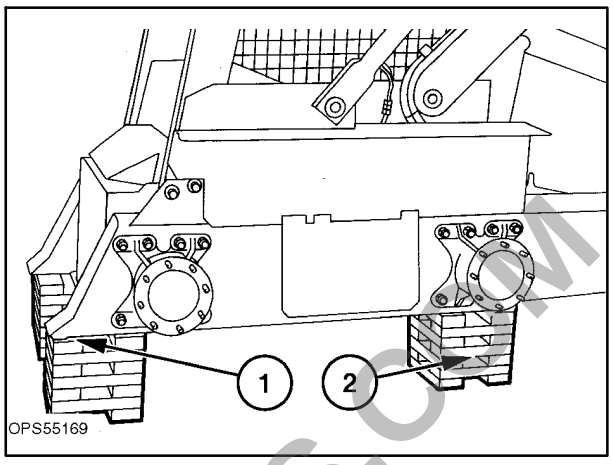



**Figure 5-172**

6. Raise the operator's seat and latch in the raised position.

**CAUTION: NEVER WORK UNDER A RAISED SEAT UNLESS IT IS SECURELY LATCHED IN THE RAISED POSITION.**

7. Remove the step shield, 1, to access the control linkages.

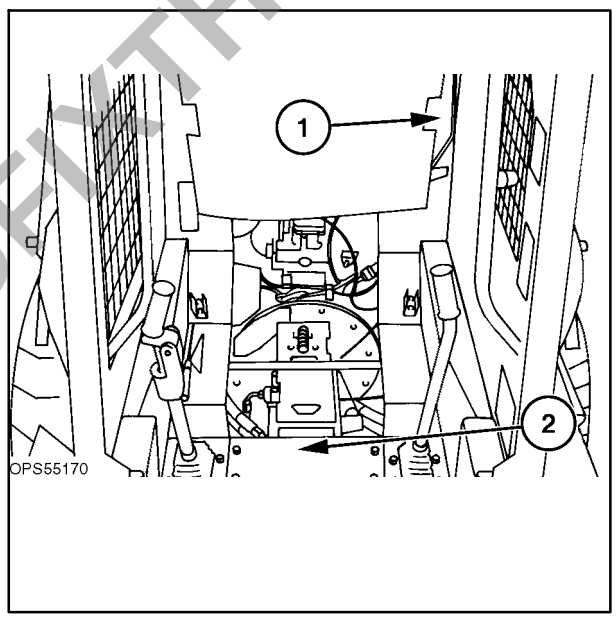



**Figure 5-173**

## NEUTRALIZER AND CONTROL LINKAGE REMOVAL AND PARTS INSPECTION

### Neutralizer Removal

1. Remove the four screws, 1, attaching the front of the plate to the plastic guides.
2. Remove the centering spring, 2, from the engine bellhousing. When removing the retaining bolt, 3, the spring will be under slight pressure. Lift the plate from the unit.

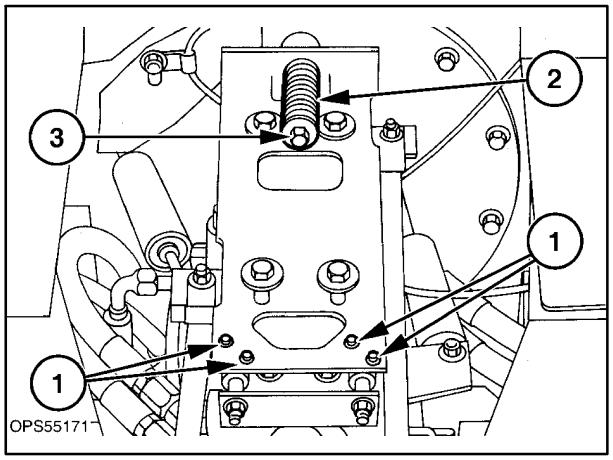



**Figure 5-174**



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5. Remove the rear engine belly pan hardware, 1, and remove the belly pan.

**CAUTION: USE A FLOOR JACK TO SUPPORT THE BELLY PAN TO PREVENT SERIOUS INJURY.**

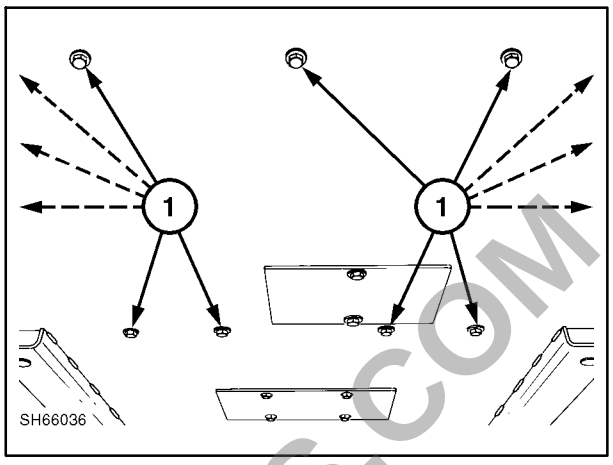



**Figure 6-41**

6. Drain the hydraulic reservoir.
   a. Loosen the return line, 1, at clamp, 2.
   b. Remove the return line at 3, and rotate the line into a suitable drain pan.

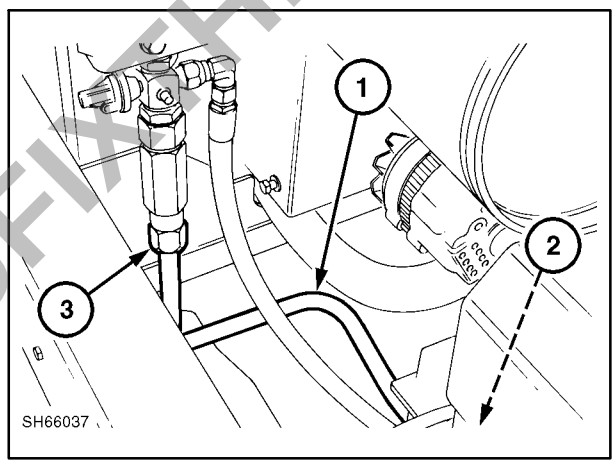



**Figure 6-42**

7. Unplug the spool lock solenoids, 1.
8. Remove the pressure line, 2, and return line, 3; cap both lines to prevent loss of oil and contamination from entering the hydraulic system.
9. Remove the hydraulic lines connected to the work ports of the control valve, 4, four or six lines, if unit is equipped with auxiliary boom hydraulics and cap.
10. Remove the line from the power beyond port, 5, if equipped with auxiliary hydraulics and cap.
11. Unhook the control linkage from the control valve spools at 6.
12. Remove the control valve retaining hardware, 7. Lift the control valve assembly from the loader.

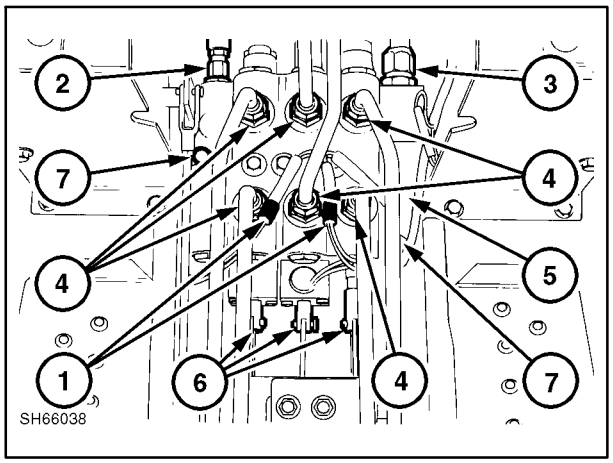



**Figure 6-43**

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## FILTER SYSTEM

The skid-steer loader is equipped with a single spin-on filter canister type located at 1, to the right of the engine radiator. The filter is a 10-micron element.

**NOTE: Allow the hydraulic oil to cool before changing the filter.**

**CAUTION: THE HYDRAULIC OIL FILTER WILL BE UNDER PRESSURE WHEN THE OIL IS AT OPERATING TEMPERATURE.**

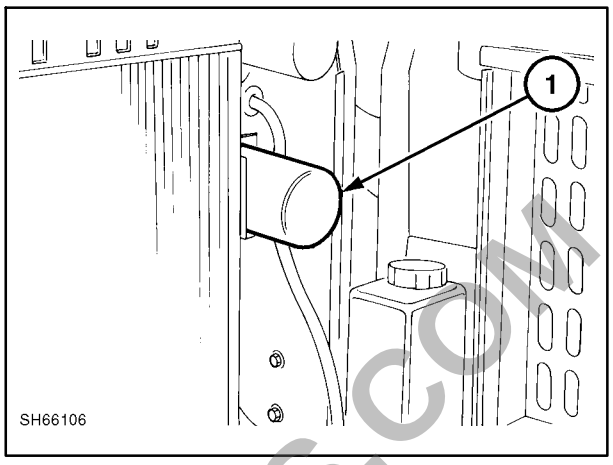



**Figure 6-182**

The filter base is equipped with a bypass valve, 1, to allow cold oil to bypass the filter without damaging the filter or starving the hydrostatic system of lubrication oil during cold weather start-ups.

In cold weather start-ups, allow the hydraulic oil to warm up before operating the boom, bucket, or the hydrostatic ground drive system, to prevent possible damage to the systems.

The filter base is also equipped with a pressure sensor that is monitored by the EIC (Electronic Instrument Cluster) to signal the operator of a plugged oil filter.

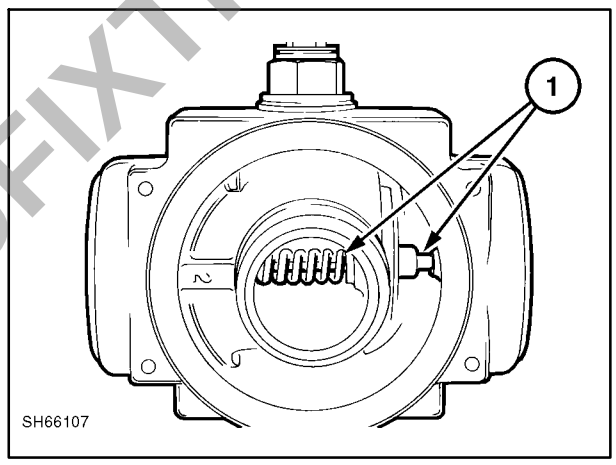



**Figure 6-183**

## FILTER AND BASE REMOVAL

The filter base can be removed by opening the rear door and removing the right engine side panel.

1. Remove the sensor wires, 1.
2. Remove the inlet, 2, and outlet, 3, oil lines and cap to prevent loss of oil.
3. Remove the filter base mounting hardware, 4.
4. Remove the filter assembly from the unit.

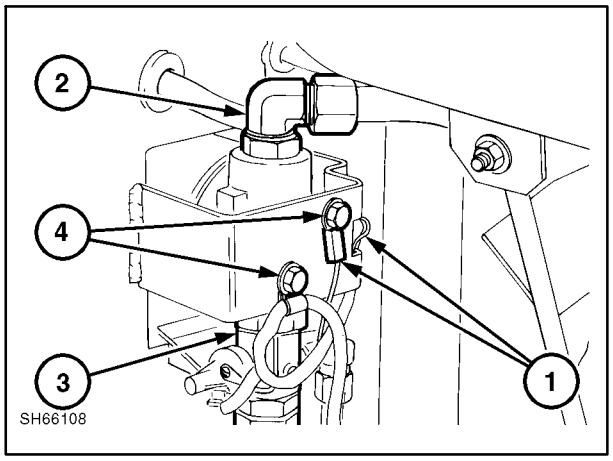



**Figure 6-184**

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4. Remove the hoses from the rear hose support, 1, remove the tube clamps, 2, and disconnect the tubes at the Z-bracket and quick couplers, 3.

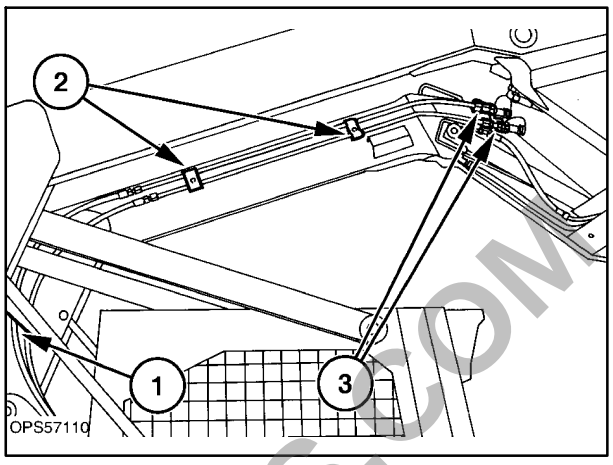



**Figure 7-113**

5. Remove the right and left upper boom cylinder pivot pin retaining hardware, 1, and pin, 2, from cylinders and boom.

   **NOTE: If only the main boom is being removed, the cylinders can remain attached at the bottom pivot.**

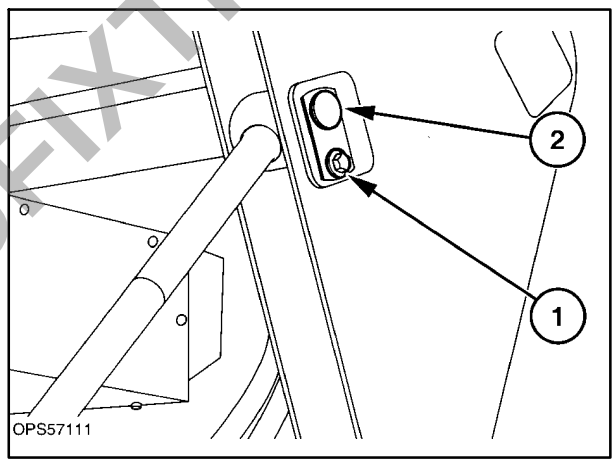



**Figure 7-114**

6. Loosen the right and left lower link rear pivot pin retaining hardware, 1.

**CAUTION: DO NOT REMOVE THE PIN RETAINING HARDWARE UNTIL THE TAPERED PIVOT PIN IS BROKEN LOOSE AT THE TAPERED END OF PIN OR THE LINK AND PIN MAY FALL.**

7. With a soft-faced sledge hammer, strike the lower link as shown to brake the tapered pivot pin loose in the main boom link.

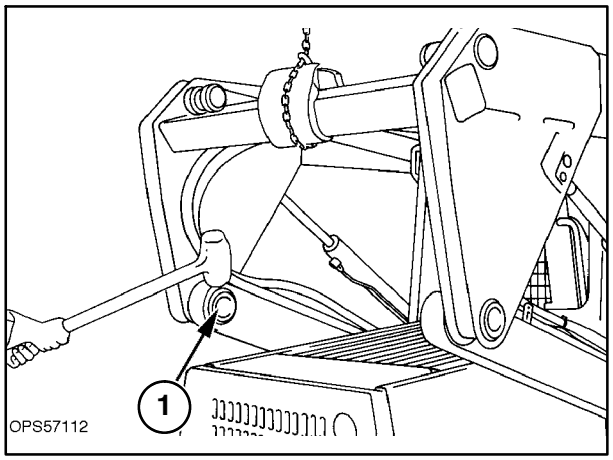



**Figure 7-115**

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## DIRT TOOTH KIT INSTALLATION

### Bucket Dirt Tooth Kit

The dirt tooth kit consists of six teeth that are welded to the bucket cutting edge as indicated below. The teeth are used when rough digging conditions are anticipated to break up the material for easier bucket filling. The teeth are intended to be used only on dirt and foundry or low-profile buckets.

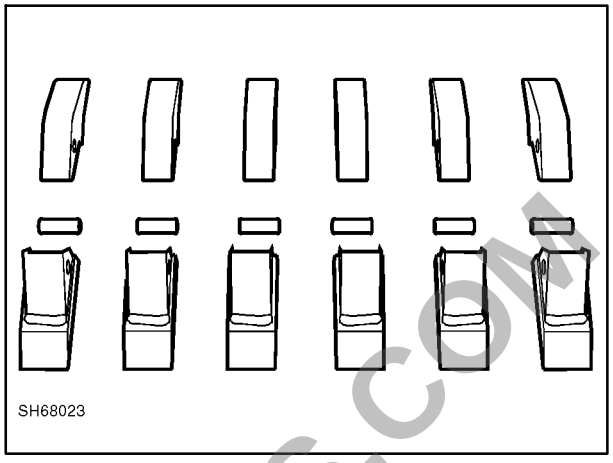



**Figure 8-31**

### Tooth Point Replacement

The points of the teeth are a replaceable “pin-on” design and can be obtained from Parts.

To replace the “pin-on” points, use a punch that just fits into the pin hole, 1, and drive the old retaining pin from the shank.

Place the new point over the shank and insert the retaining pin into pin hole, 1. With a punch that contacts both sides of the metal part of the retaining pin, drive the pin until it is centered in the shank.

**NOTE: If the punch or driver is too small and just contacts the rubber center of the retaining pin, the pin will be damaged and will not retain the point.**

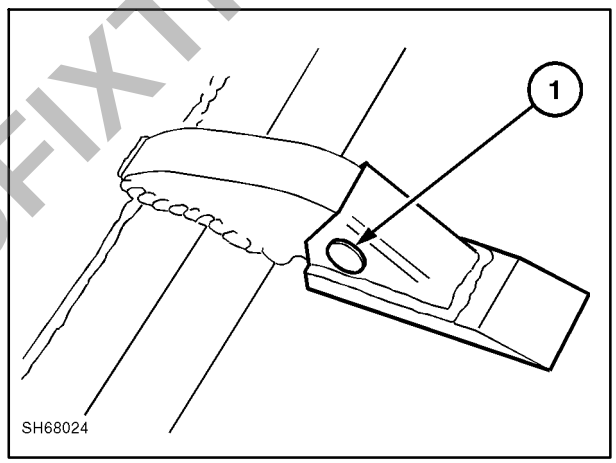



**Figure 8-32**

### Tooth Location and Installation

1. The bucket should be flat on the floor when placing and welding the teeth.

   *ATTENTION: Remove the bucket from the loader while welding teeth to prevent damage to the loader electrical system.*

   Slide the replaceable points in place but do not attach with the steel/rubber pins as the rubber may be damaged during the welding process.

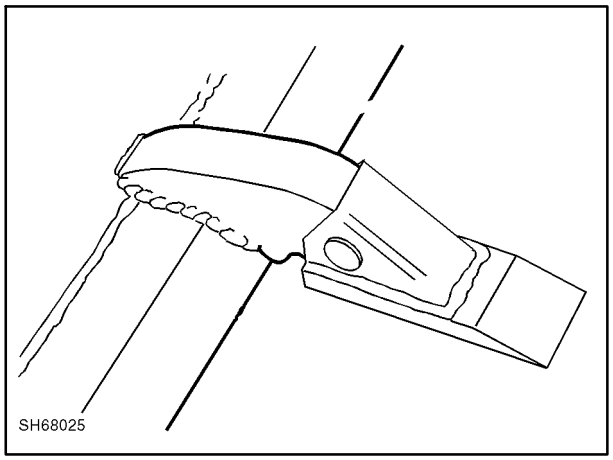



**Figure 8-33**

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