Genie®

Service Manual

Third Edition
First Printing
Part No. 65196

S™-60
S™-65

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SPECIFICATIONS

Deutz Engine F4L 1011F

Displacement	166.7 cu in 2.732 liters
Number of cylinders	4
Bore and stroke	3.58 x 4.13 inches 91 x 105 mm
Horsepower	56 @ 3000 rpm
Firing order	1 - 3 - 4 - 2
Compression ratio	18.5:1
Compression pressure	362 to 435 psi 25 to 30 bar
Low idle	1500 rpm
High idle	2300 rpm
Governor	centrifugal mechanical
Valve clearance, cold	
Intake	0.012 in 0.3 mm
Exhaust	0.020 in 0.5 mm
Lubrication system	
Oil pressure	26 to 87 psi 1.8 to 6 bar
Oil capacity (including filter)	11 quarts 10.5 liters
Oil viscosity requirements	
Temperature below 60°F / 15.5°C (synthetic)	5W-30
-10°F to 90°F / -23°C to 32°C	10W-40
Temperature above -4°F / -34°C	15W-40

Engine oil should have properties of API classification SG/CC or CD/SG grades.
Units ship with 10W-40 SG/CC.

Injection system	
Injection pump make	OMAP
Injection pump pressure	4351 psi 300 bar
Injector opening pressure	3626 psi 250 bar
Fuel requirement	diesel number 2-D
Alternator output	55A, 14VDC
Starter motor	
Current draw, no load	90A
Brush length, new	0.748 in 19 mm
Brush length, minimum	0.5 in 12.7 mm
Battery	
Type 31	12VDC, Group
Quantity	1
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	200 minutes
Fan belt deflection	3/8 to 1/2 inch 9 to 12 mm

Table A Procedures

A-1 Inspect the Operators and Safety Manuals

Maintaining the operator's and safety manuals in good condition is essential to safe machine operation. Manuals are included with each machine and should be stored in the container provided in the platform. An illegible or missing manual will not provide safety and operational information necessary for a safe operating condition.

1 Check to be sure that the storage container is present and in good condition.

2 Check to make sure that the operator's, responsibilities and safety manuals are present and complete in the storage container in the platform.

3 Examine the pages of each manual to be sure that they are legible and in good condition.

4 Always return the manuals to the storage container after use.

NOTICE Contact your authorized Genie distributor or Genie Industries if replacement manuals are needed.

A-2 Inspect the Decals and Placards

Maintaining all of the safety and instructional decals and placards in good condition is mandatory for safe machine operation. Decals alert operators and personnel to the many possible hazards associated with using this machine. They also provide users with operation and maintenance information. An illegible decal will fail to alert personnel of a procedure or hazard and could result in unsafe operating conditions.

1 Refer to the *Decals* section in the *Genie S-60 & Genie S-65 Operator's Manual* and use the decal list and illustrations to determine that all decals and placards are in place.

2 Inspect all decals for legibility and damage. Replace any damaged or illegible decal immediately.

NOTICE Contact your authorized Genie distributor or Genie Industries if replacement decals are needed.

TABLE A PROCEDURES

3 Manually activate the boom up drive limit switch.

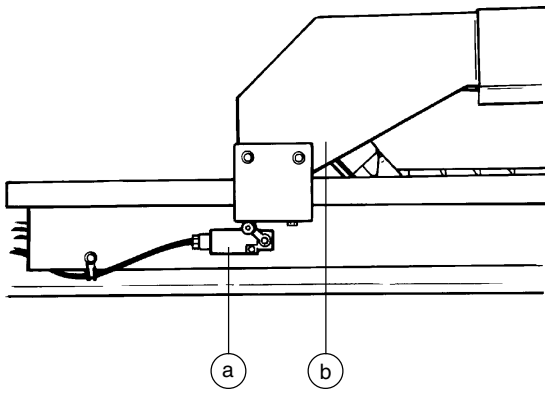
⊙ Result: The boom up drive limit switch arm should move freely and spring return to center. A distinct click should be felt and heard.

4 Visually inspect the boom extend drive limit switch located at the end of the cable track on the boom. Inspect for the following:

· Broken or missing roller or arm

· Missing fasteners

· Loose wiring



a boom extend drive limit switch (LS1)
b cable track

5 Start the engine from the ground controls.

6 Extend the boom approximately 3 feet (0.9 m).

7 Manually activate the boom extend drive limit switch.

⊙ Result: The boom extend drive limit switch arm should move freely and spring return to center. A distinct click should be felt and heard.

8 Turn the key switch to platform controls and fully retract the boom.

9 Move the lift/drive selector switch to the drive position (if equipped).

10 Press down the foot switch and slowly move the drive controller off center.

⊙ Result: The machine should move at normal drive speeds.

11 Move the lift/drive selector switch to the lift position (if equipped).

12 Raise the boom to just above horizontal.

13 Move the lift/drive selector switch to the drive position (if equipped).

14 Slowly move the drive controller off center.

⊙ Result: The machine should move at a reduced drive speed.

15 Move the lift/drive selector switch to the lift position (if equipped).

16 Lower the boom to the stowed position, then extend the boom 3 feet (0.9 m).

17 Move the lift/drive selector switch to the drive position (if equipped).

18 Slowly move the drive controller off center.

⊙ Result: The machine should move at a reduced drive speed.

Drive speed, maximum, raised or extended position	
All models	1 foot per second (0.6 mph) 0.3 meter per second (0.97 km/h)

A-22
Check the Oil Cooler and Cooling Fins - Deutz Diesel Models

NOTICE Engine specifications require that this procedure be performed every 125 hours.

Maintaining the oil cooler in good condition is essential for good engine performance. Operating a machine with a damaged oil cooler may result in engine damage. Also, restricting air flow through the oil cooler will affect the performance of the cooling system.

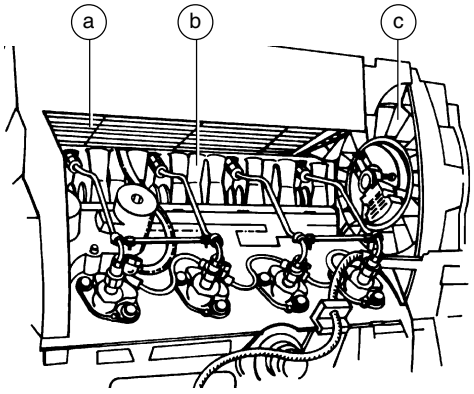
⚠WARNING Bodily injury hazard. Do not inspect while the engine is running. Remove the key to secure from operation.

⚠CAUTION Bodily injury hazard. Beware of hot engine components. Contact with hot engine components may cause severe burns.

Oil Cooler

1 Remove the engine side cover mounting fasteners. Remove the engine side turntable cover.

2 Inspect the oil cooler for leaks and physical damage.



a oil cooler
b cylinder head cooling fins
c fan blower fins

3 Clean the oil cooler of debris and foreign material.

TABLE B PROCEDURES

2 If necessary, add oil until the oil level is even with the bottom of the side plug hole.

3 Apply pipe thread sealant to the plug, and install the plug in the drive hub.

Turntable rotate drive hub oil	
Capacity	17 fluid ounces 0.51 liters
Type SAE 90 multipurpose hypoid gear oil - API service classification GL5	

B-18
Test the Drive Speed - Stowed Position

Proper drive function movement is essential to safe machine operation. The drive function should respond quickly and smoothly to operator control. Drive performance should also be free of hesitation, jerking and unusual noise over the entire proportionally controlled speed range.

NOTICE Select a test area that is firm, level and free of obstructions.

NOTICE Be sure the boom is fully retracted and lowered to the stowed position.

1 Create start and finish lines by marking two lines on the ground 40 feet (12.2 m) apart.

2 Start the engine from the platform controls.

3 Move the lift/drive select switch to the drive position (if equipped).

4 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the start and finish lines.

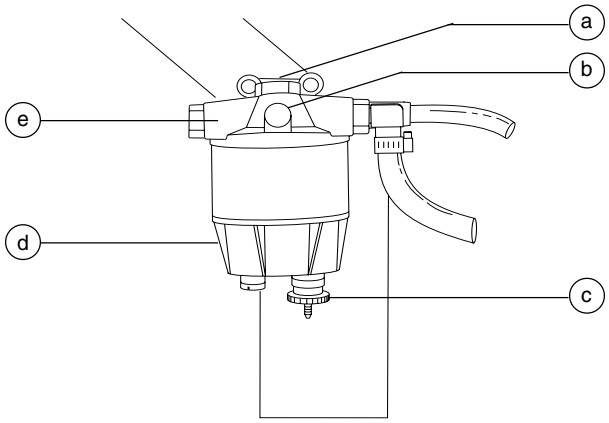
5 Bring the machine to top drive speed before reaching the start line. Begin timing when your reference point on the machine crosses the start line.

6 Continue at full speed and note the time when the machine reference point crosses the finish line.

Drive speed: stowed position	**2WD**	**4WD**
Ford models	40 ft/6.2 sec 12.2 m/6.2 sec	40 ft/9.1 sec 12.2 m/9.1 sec
Diesel models	40 ft/6.8 sec 12.2 m/6.8 sec	40 ft/9.7 sec 12.2 m/9.7 sec

TABLE C PROCEDURES

3 Loosen the vent plug located on the fuel filter/ water separator head.



Fuel filter/water separator
a head bolt
b vent plug
c drain plug
d filter bowl
e separator head

4 Place a suitable container under the filter bowl. Loosen the drain plug located at the bottom of the bowl. Completely drain the fuel.

5 Loosen the head bolt. Rotate the filter bowl counterclockwise and remove it from the element.

6 Rotate the filter element counterclockwise and remove it from the filter head.

7 Install the bowl onto the new filter element (Genie part number 22942).

8 Apply a thin layer of clean diesel fuel onto the element gasket. Install the filter/bowl assembly onto the filter head. Tighten the drain plug.

9 Tighten the head bolt to 65 in-lbs (7 Nm).

10 Tighten the vent plug.

11 Clean up any diesel fuel that may have spilled during the installation procedure.

12 Connect the fuel hose from the fuel tank to the fuel filter/water separator. Tighten the clamp.

Bleed the fuel system:

NOTICE Before bleeding the system, fill the fuel tank.

13 Loosen the vent plug located on the fuel filter/ water separator head.

14 Operate the priming lever of the fuel lift pump until fuel, free from air, comes from the vent plug. Tighten the vent plug.

15 Loosen the air vent screw, located on top of the fuel injection pump.

16 Tighten the air vent screw when air stops coming through the air vent.

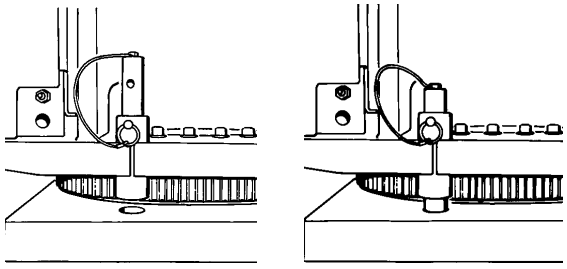
17 Clean up any diesel fuel that may have spilled during the bleeding procedure and dispose of properly.

18 Start the engine from ground controls and check for leaks.

TABLE D PROCEDURES

Turntable Rotate Drive Hub:

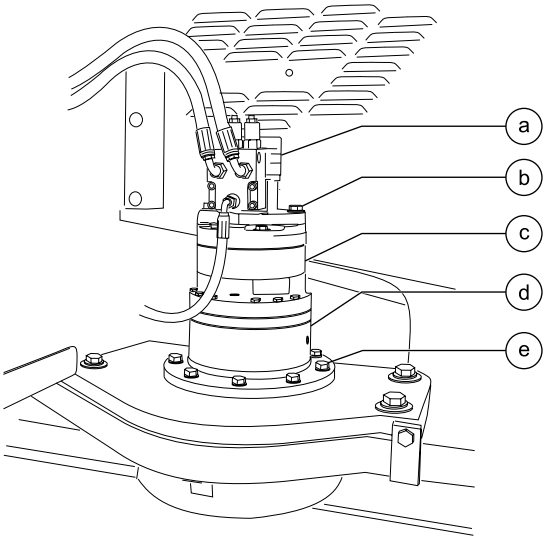
1 Secure the turntable from rotating with the turntable rotation lock pin.



unlocked locked

2 Remove the motor/brake mounting bolts, and then remove the motor and brake from the drive hub and set them to the side.

CAUTION Component damage hazard. Hoses can be damaged if they are kinked or pinched.



a motor
b motor/brake mounting bolts
c brake
d drive hub
e drive hub mounting bolts

3 Remove the drive hub mounting bolts, and use a lifting device to remove the drive hub from the machine.

4 Remove the plug from the side of the drive hub. Then drain the oil from the hub.

5 Install the drive hub. Torque the drive hub mounting bolts to 180 ft-lbs (244 Nm).

6 Install the brake and motor onto the drive hub. Torque the motor/brake mounting bolts to 180 ft-lbs (244 Nm).

7 Fill the hub with oil from the side hole until the oil level is even with the bottom of the hole. Apply pipe thread sealant to the plug. Install the plug.

8 Adjust turntable rotation gear backlash. See 13-1, *How to Adjust the Turntable Rotation Gear Backlash.*

Turntable rotate drive hub	
Oil capacity	17 fluid ounces 0.51 liters
Type: SAE 90 multipurpose hypoid gear oil - API service classification GL5	

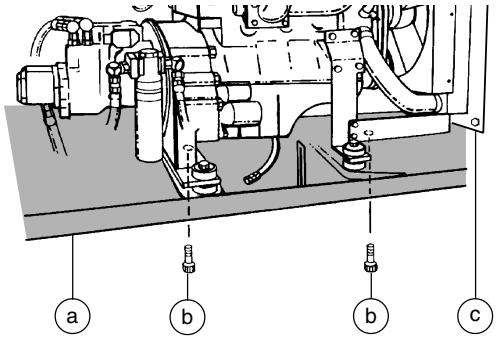
E-2
Change or Recondition the Engine Coolant - Liquid Cooled Models

Replacing or reconditioning the engine coolant is essential to good engine performance and service life. Old or dirty coolant may cause the engine to perform poorly and continued use may cause engine damage. Extremely dirty conditions may require coolant to be changed more frequently.

⚠CAUTION Bodily injury hazard. Beware of hot engine parts and coolant. Contact with hot engine parts and/or coolant may cause severe burns.

NOTICE Perform this procedure with the engine off and cooled.

1 Remove the 2 engine pivot plate retaining bolts. Swing the engine pivot plate away from the machine to access the cooling system.



a engine pivot plate
b pivot plate retaining bolts
c air baffle

2 Put on protective clothing and eye wear.

3 Disconnect the coolant return hose at the radiator and drain the coolant return tank into a suitable container.

4 Slowly remove the radiator cap from the radiator.

⚠CAUTION Bodily injury hazard. Allow any pressure to dissipate gradually before removing the radiator cap.

5 Open the drain valve on the radiator and allow all the coolant to drain into a suitable container.

6 After all the coolant has drained, close the drain valve. Connect the coolant return hose to the radiator.

7 Open the drain valve on the engine block and allow the coolant to drain into a suitable container. After the fluid has drained, close the drain valve.

8 Replace all coolant hoses and clamps.

9 Fill the radiator with the proper coolant mixture (coolant and water) for your climate until it is full.

10 Fill the coolant recovery tank to the NORMAL range.

11 Clean up any coolant that may have spilled during this procedure.

12 Start the engine from the ground controls and let it run for 30 seconds. Turn the engine off and inspect for leaks.

FAULT CODE CHART

Fault Code	Problem	Cause	Solution
42	Heated Oxygen (HO2) sensor high voltage.	A leaking or malfunctioning fuel injector, misfiring cylinder, faulty TP sensor or contamination of fuel OR use of improper thread sealant on sensor threads OR sensor wires shorted to ground or poor terminal connections OR HO2 sensor is faulty.	Test for a leaking or malfunctioning fuel injector, misfiring cylinder or bad TP sensor. Remove HO2 sensor and check condition of sensor for contamination OR check for poor terminal connections or shorted wires from the HO2 sensor to the ECM to ground OR replace HO2 sensor.
43	Engine Coolant Temperature (ECT) sensor low voltage.	ECM detects excessively low signal voltage from the ECT sensor.	Check engine coolant level OR check for shorted wires or poor terminal connections from the ECT sensor to the ECM OR replace the ECT sensor.
45	Intake Air Temperature (IAT) sensor low voltage.	ECM detects an excessively low signal voltage from the IAT sensor.	The IAT sensor shares the same ground wire as the ECT and MAP sensors. Check for shorted wires or poor terminal connections from the IAT sensor to the ECT and MAP sensors to the ECM OR replace the IAT sensor.
51	Low oil pressure.	Faulty oil pressure switch, wires shorted to ground or not enough engine oil.	Check engine oil level OR check for shorted wires or poor terminal connections from the oil pressure switch to the ECM OR replace the oil pressure switch

CHART 3

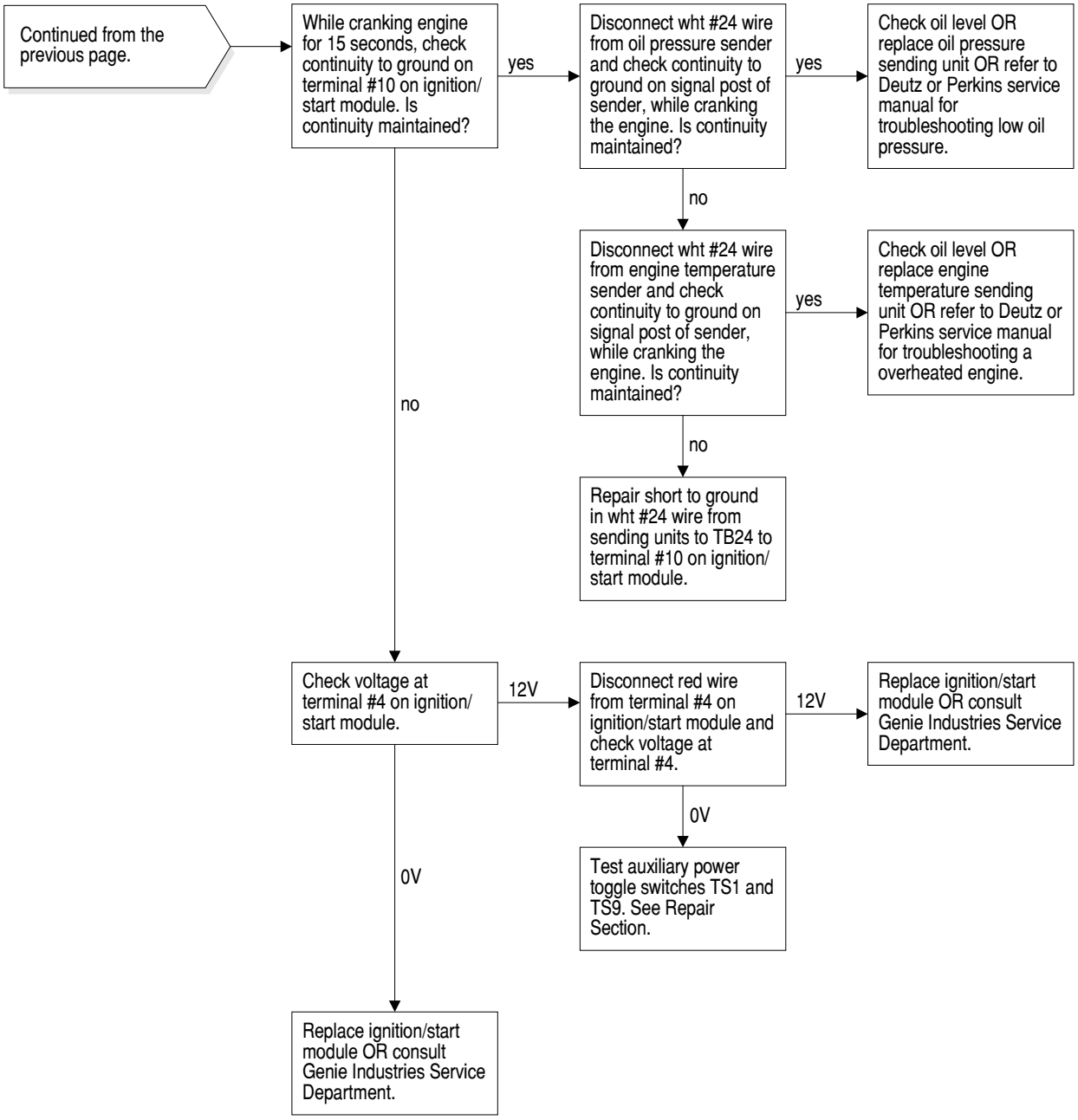

Continued from the previous page.
While cranking engine for 15 seconds, check continuity to ground on terminal #10 on ignition/ start module. Is continuity maintained?
yes
Disconnect wht #24 wire from oil pressure sender and check continuity to ground on signal post of sender, while cranking the engine. Is continuity maintained?
yes
Check oil level OR replace oil pressure sending unit OR refer to Deutz or Perkins service manual for troubleshooting low oil pressure.
no
Disconnect wht #24 wire from engine temperature sender and check continuity to ground on signal post of sender, while cranking the engine. Is continuity maintained?
yes
Check oil level OR replace engine temperature sending unit OR refer to Deutz or Perkins service manual for troubleshooting a overheated engine.
no
Repair short to ground in wht #24 wire from sending units to TB24 to terminal #10 on ignition/ start module.
no
Check voltage at terminal #4 on ignition/ start module.
12V
Disconnect red wire from terminal #4 on ignition/start module and check voltage at terminal #4.
12V
Replace ignition/start module OR consult Genie Industries Service Department.
0V
Test auxiliary power toggle switches TS1 and TS9. See Repair Section.
0V
Replace ignition/start module OR consult Genie Industries Service Department.

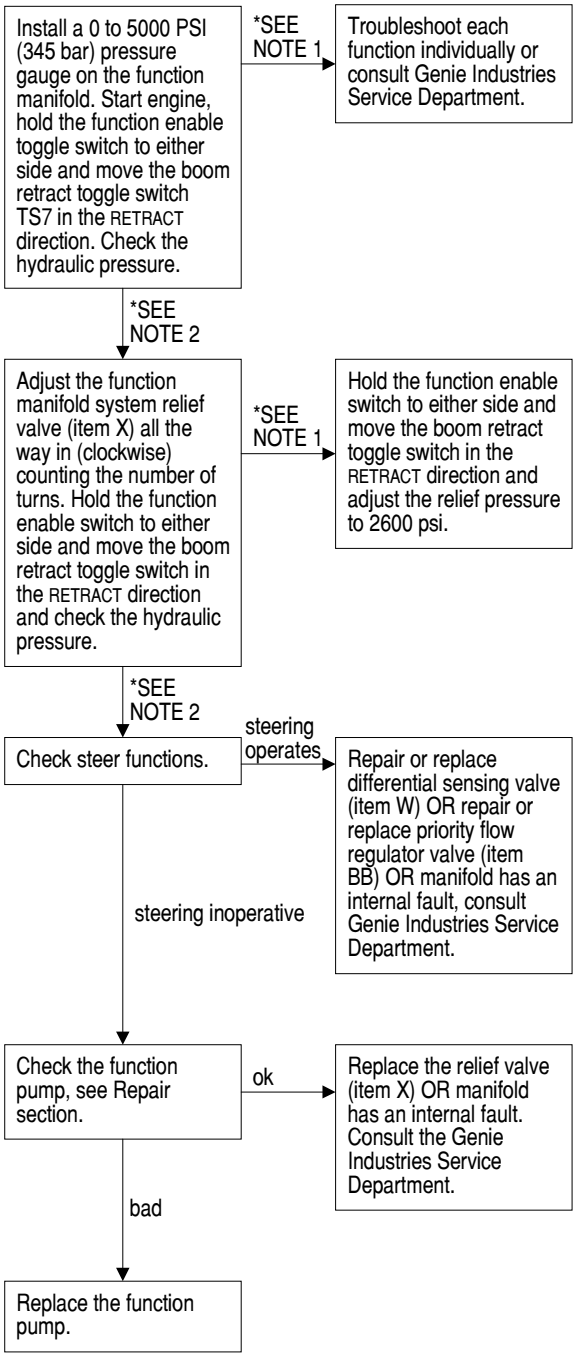
Chart 11

All Lift and Steer Functions Inoperative, Drive Functions Operational

Be sure the generator on/off toggle switch (if equipped) is in the OFF position.

Be sure the hydraulic suction line shutoff valve for the lift/steer pump is in the OPEN position.

Be sure all grounding wires for the hydraulic manifold valves are free of corrosion and have full continuity to ground.



*NOTE 1
S-60: 2600 PSI or more
S-65: 2900 PSI or more

*NOTE 2
S-60: Less than 2600 PSI
S-65: Less than 2900 PSI

CHART 16

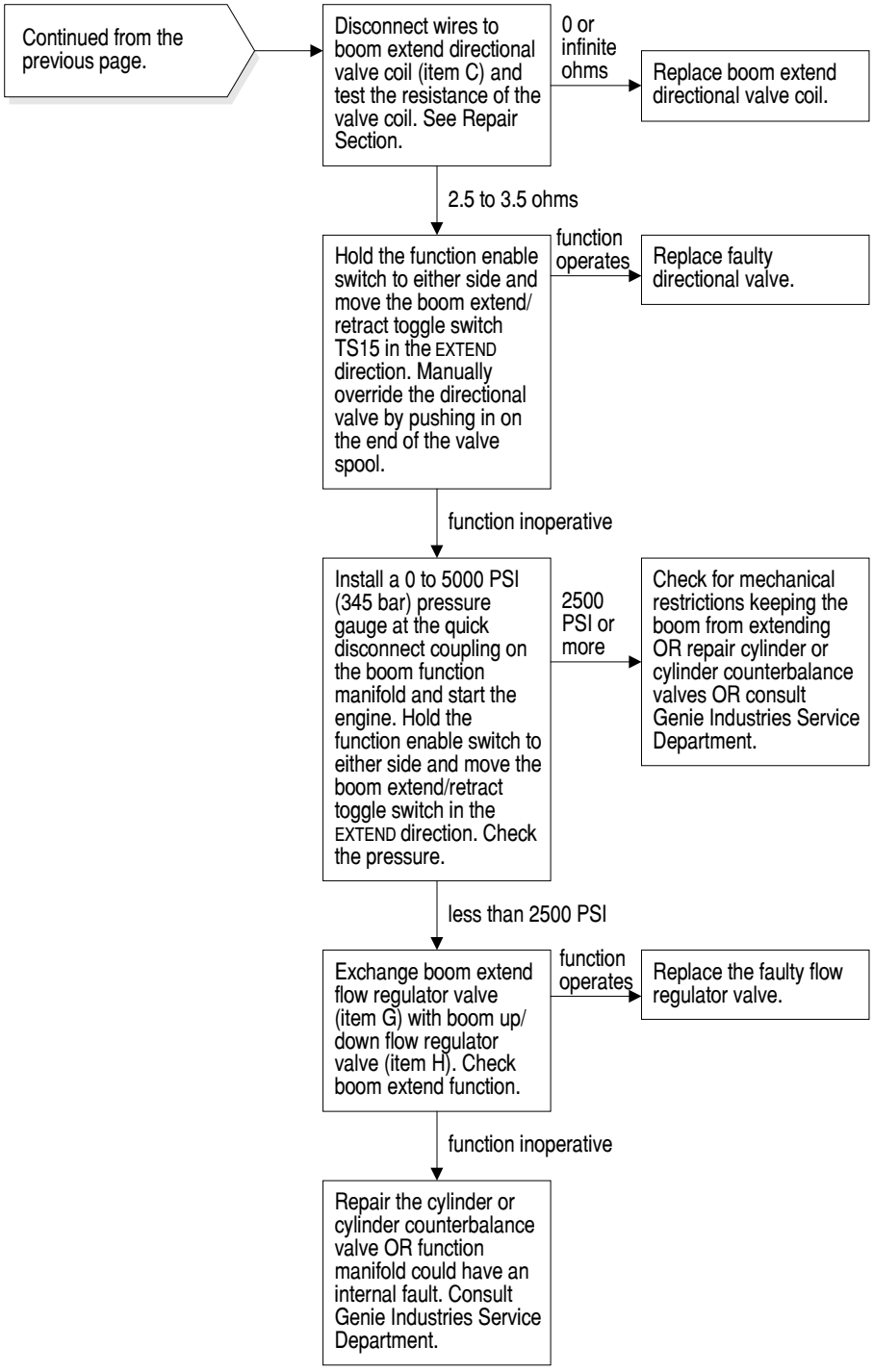

Continued from the previous page.
Disconnect wires to boom extend directional valve coil (item C) and test the resistance of the valve coil. See Repair Section.
0 or infinite ohms
Replace boom extend directional valve coil.
2.5 to 3.5 ohms
Hold the function enable switch to either side and move the boom extend/ retract toggle switch TS15 in the EXTEND direction. Manually override the directional valve by pushing in on the end of the valve spool.
function operates
Replace faulty directional valve.
function inoperative
Install a 0 to 5000 PSI (345 bar) pressure gauge at the quick disconnect coupling on the boom function manifold and start the engine. Hold the function enable switch to either side and move the boom extend/retract toggle switch in the EXTEND direction. Check the pressure.
2500 PSI or more
Check for mechanical restrictions keeping the boom from extending OR repair cylinder or cylinder counterbalance valves OR consult Genie Industries Service Department.
less than 2500 PSI
Exchange boom extend flow regulator valve (item G) with boom up/ down flow regulator valve (item H). Check boom extend function.
function operates
Replace the faulty flow regulator valve.
function inoperative
Repair the cylinder or cylinder counterbalance valve OR function manifold could have an internal fault. Consult Genie Industries Service Department.

CHART 19

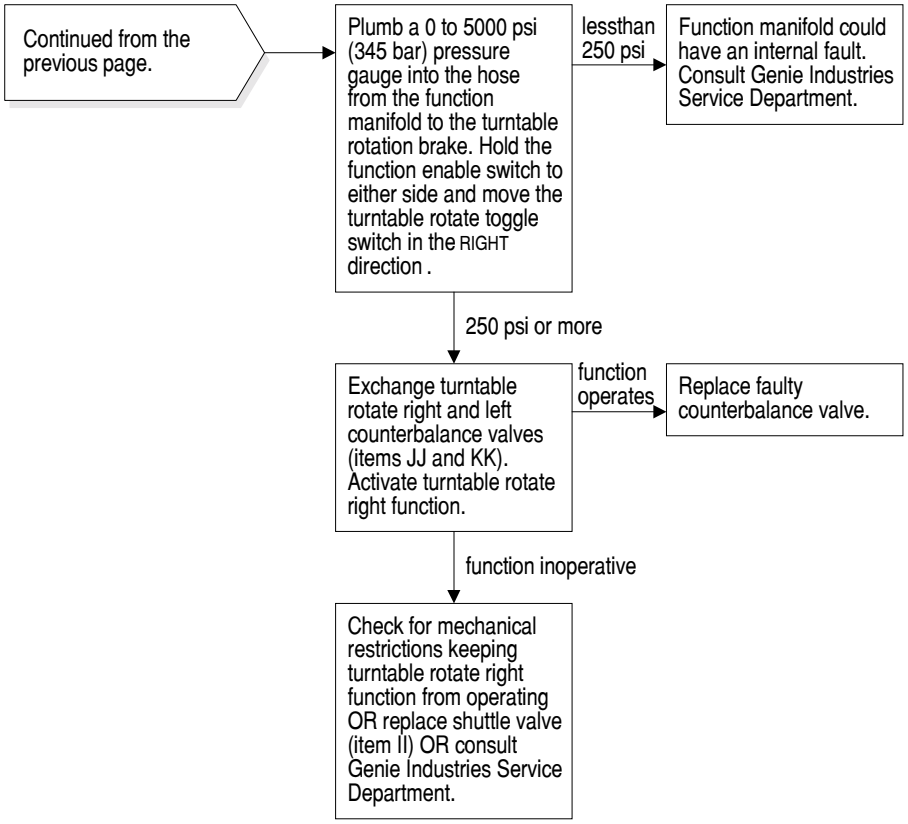

Continued from the previous page.
Plumb a 0 to 5000 psi (345 bar) pressure gauge into the hose from the function manifold to the turntable rotation brake. Hold the function enable switch to either side and move the turntable rotate toggle switch in the RIGHT direction .
lessthan 250 psi
Function manifold could have an internal fault. Consult Genie Industries Service Department.
250 psi or more
Exchange turntable rotate right and left counterbalance valves (items JJ and KK). Activate turntable rotate right function.
function operates
Replace faulty counterbalance valve.
function inoperative
Check for mechanical restrictions keeping turntable rotate right function from operating OR replace shuttle valve (item II) OR consult Genie Industries Service Department.

Chart 25

Oscillate Function Inoperative

Be sure all other functions operate normally.

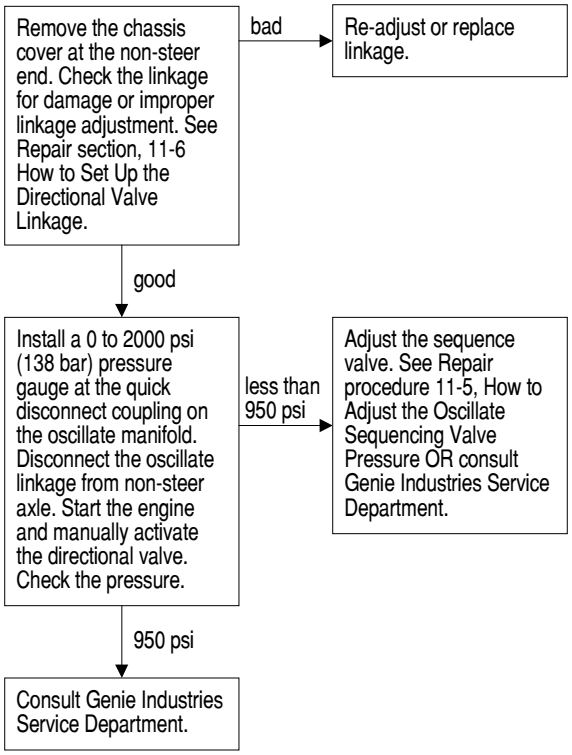
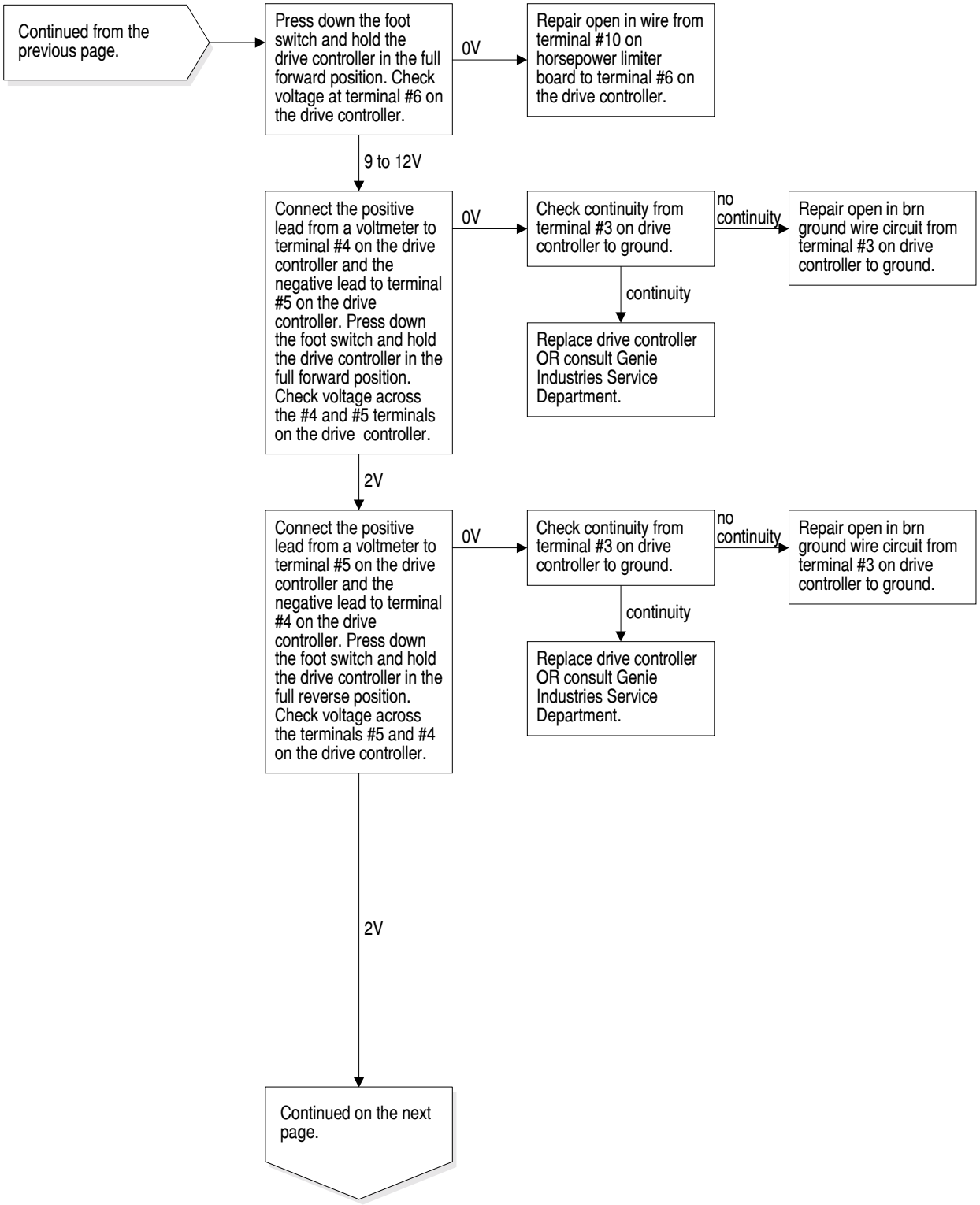


CHART 30


Continued from the previous page.
Press down the foot switch and hold the drive controller in the full forward position. Check voltage at terminal #6 on the drive controller.
0V
Repair open in wire from terminal #10 on horsepower limiter board to terminal #6 on the drive controller.
9 to 12V
Connect the positive lead from a voltmeter to terminal #4 on the drive controller and the negative lead to terminal #5 on the drive controller. Press down the foot switch and hold the drive controller in the full forward position. Check voltage across the #4 and #5 terminals on the drive controller.
0V
Check continuity from terminal #3 on drive controller to ground.
no continuity
Repair open in brn ground wire circuit from terminal #3 on drive controller to ground.
continuity
Replace drive controller OR consult Genie Industries Service Department.
2V
Connect the positive lead from a voltmeter to terminal #5 on the drive controller and the negative lead to terminal #4 on the drive controller. Press down the foot switch and hold the drive controller in the full reverse position. Check voltage across the terminals #5 and #4 on the drive controller.
0V
Check continuity from terminal #3 on drive controller to ground.
no continuity
Repair open in brn ground wire circuit from terminal #3 on drive controller to ground.
continuity
Replace drive controller OR consult Genie Industries Service Department.
2V
Continued on the next page.

Schematics

Observe and Obey:

- ☑ Troubleshooting and repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.

Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions printed in the *Genie S-60 & Genie S-65 Operator's Manual.*
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.

About This Section

There are two groups of schematics in this section. An illustration legend precedes each group of drawings.

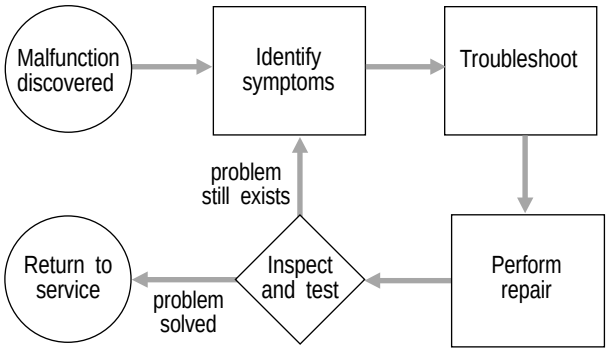
Electrical Schematics

⚠WARNING Electrocution hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

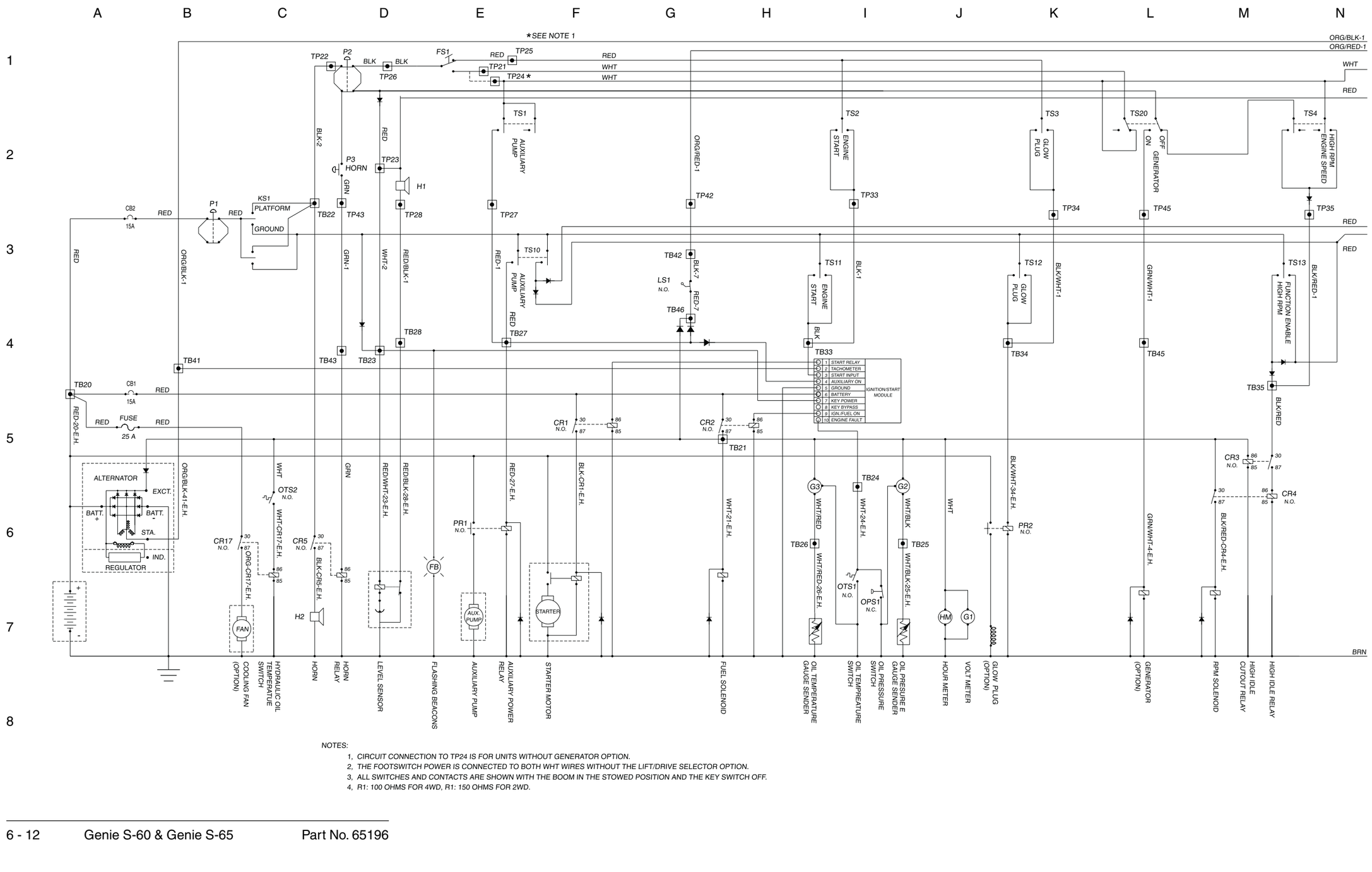
Hydraulic Schematics

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

General Repair Process



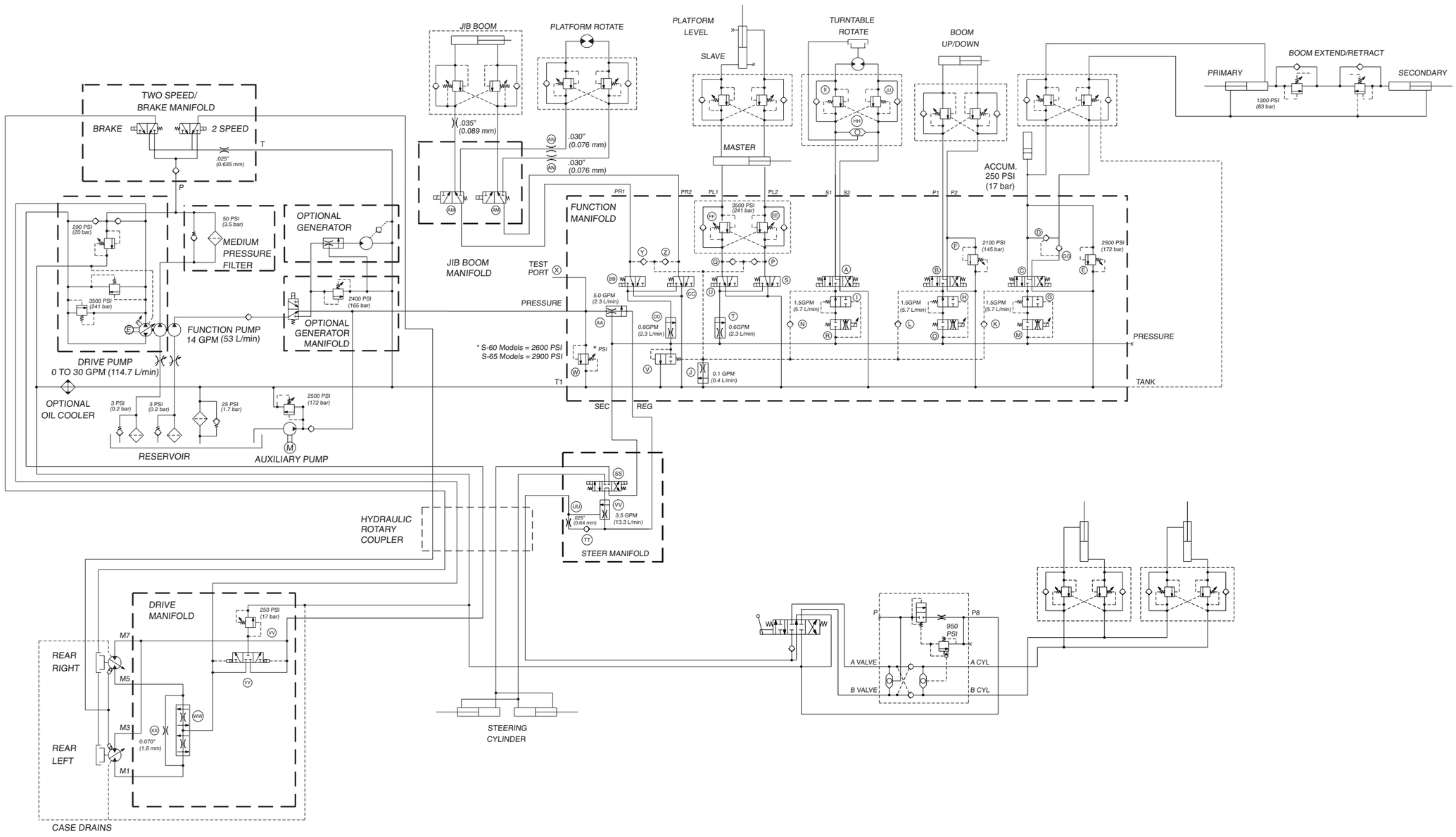
Electrical Schematic- Deutz Diesel Models



NOTES:

1. CIRCUIT CONNECTION TO TP24 IS FOR UNITS WITHOUT GENERATOR OPTION.
2. THE FOOTSWITCH POWER IS CONNECTED TO BOTH WHT WIRES WITHOUT THE LIFT/DRIVE SELECTOR OPTION.
3. ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND THE KEY SWITCH OFF.
4. R1: 100 OHMS FOR 4WD, R1: 150 OHMS FOR 2WD.

2WD Hydraulic Schematic
Oscillating Axle



PLATFORM CONTROLS

7 Set the max out: Press down the foot switch, then move the controller all the way to the EXTEND position. Adjust the voltage to 9.75V DC. Turn the max out trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

8 Set the lo range: Press down the foot switch, then move the controller all the way to the RETRACT position. Adjust the voltage to 9.2V DC. Turn the lo range trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

9 Start the engine and move the engine idle control switch to foot switch activated high idle (rabbit and foot switch symbol). Lower the boom to the stowed position.

NOTICE Engine should be at normal operating temperature.

10 Start a timer and record how long it takes for the boom to fully extend. Adjust the max out trimpot to achieve a 60 to 64 second cycle time.

11 Start a timer and record how long it takes for the boom to fully retract. Adjust the lo range trimpot to achieve a 55 to 60 second cycle time.

NOTICE If the function cycle time is not achievable, check the relief valve pressure. See 11-2, *Valve Adjustments - Function Manifold.*

12 Turn the engine off and re-connect the volt meter.

13 Pull out the Emergency Stop button to the ON position.

14 Press down the foot switch and move the controller all the way to the EXTEND position. Record the maximum voltage reading.

15 Start the engine.

16 Start a timer and simultaneously move the control handle all the way to the EXTEND position. Note how long it takes to reach the maximum voltage recorded in step 14. This is the ramp rate.

17 Set the ramp rate: turn the ramp rate adjustment trimpot to obtain a 3 second ramp rate. Turn the ramp rate trimpot adjustment screw clockwise to increase the time or counterclockwise to decrease the time.

Boom extend/retract specifications

Threshold	3.5V DC
Boom extend - Max out	9.75V DC
Cycle time	60 to 64 seconds
Boom retract - Lo range	9.2V DC
Cycle time	55 to 60 seconds
Ramp rate	3 seconds

Jib Boom Components, S-65 Models

3-1
Jib Boom

How to Remove the Jib Boom

NOTICE Perform this procedure with the boom in the stowed position.

NOTICE When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.
Refer to Section Two, *Hydraulic Hose and Fitting Torque Specifications.*

1 Remove the platform. See 2-1, *How to Remove the Platform*.

2 Remove the platform mounting weldment and the platform rotator. See 2-3, *How to Remove the Platform Rotator*.

3 From the ground controls, raise the jib boom to a horizontal position.

4 Attach a lifting strap from an overhead crane to the center of the jib boom.

5 Tag, disconnect and plug the jib boom lift cylinder hydraulic hoses. Cap the fittings on the jib boom cylinder.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

6 Remove the hose cover, hoses and cables from the side of the jib boom and set them aside.

CAUTION Component damage hazard. Cables and hoses can be damaged if they are kinked or pinched.

7 Remove the pin retaining fastener from the jib boom lift cylinder barrel-end pivot pin. Do not remove the pin.

8 Support the jib boom lift cylinder, then use a soft metal drift to remove the pivot pin. Lower the barrrel end of the cylinder toward the ground.

9 Remove the pin retaining fastener from the jib boom pivot pin. Use a soft metal drift to remove the pin.

10 Remove the jib boom from the bell crank.

⚠WARNING Crushing hazard. The jib boom could become unbalanced and fall when it is removed from the machine if it is not properly supported.

BOOM COMPONENTS

3 Remove the external snap rings from the extension cylinder rod-end pivot pin at the platform end of the boom. Use a soft metal drift to remove the pin.

4 Remove the turntable end cover located at the pivot end of the boom.

5 Tag, disconnect and plug the extension cylinder hydraulic hoses. Cap the fittings on the cylinder.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

6 Remove the trunnion cover fasteners from both sides of the number 1 boom tube at the pivot end of the boom.

7 Remove the trunnion pin retaining fasteners from both sides of the number 2 boom tube at the pivot end of the boom.

8 Use a slide hammer to remove the trunnion pins.

9 Attach a strap from an overhead crane to the rod end of the lower extension cylinder.

10 Remove the external snap rings from both sides of the extension cylinder pivot pin at the pivot end of the boom.

11 Use a soft metal drift to remove the extension cylinder pivot pin.

12 Carefully slide the extension cylinder out of the pivot end of the boom.

⚠WARNING Crushing hazard. The extension cylinder will fall when it is removed from the extension boom if it is not properly supported.

NOTICE Note the length of the cylinder after removal. The cylinder must measure the same length for installation.

Ground Controls

9-1 Control Relays

Relays used for single function switching are single pole double throw (SPDT) relays.

How to Test a Single Pole Double Throw Relay

⚠WARNING Electrocution hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

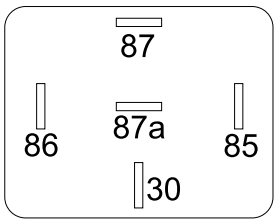
1 Label and then disconnect all the wiring from the relay to be tested.

2 Connect the leads from an ohmmeter or continuity tester to each terminal combination and check for continuity. Terminals 85 and 86 represent the coil and should not be tested in any other combination.

Test	Desired result
terminal 85 to 86 with resistor	75 to 85Ω
terminal 87 to 87a & 30	no continuity (infinite Ω)
terminal 87a to 30	continuity (zero Ω)

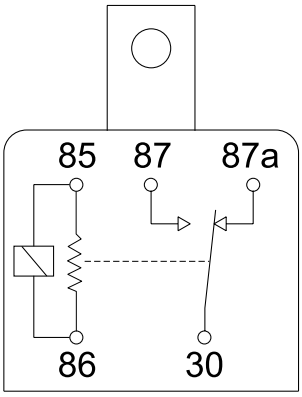
3 Connect 12V DC to terminal 85 and a ground wire to terminal 86, then test the following terminal combinations.

Test	Desired result
terminal 87 to 87a & 30	no continuity (infinite Ω)
terminal 87 to 30	continuity (zero Ω)



a terminal no. 87a - N.C.
b terminal no. 85 - coil negative (-)
c terminal no. 30 - common
d terminal no. 86 - coil positive (+)
e terminal no. 87 - N.O.

Control Relay Schematic - with resistor



MANIFOLDS

11-2 Valve Adjustments - Function Manifold

How to Adjust the System Relief Valve

NOTICE Perform this procedure with the boom in the stowed position.

1 Connect a 0 to 5000 psi (0 to 345 bar) pressure gauge to the diagnostic nipple (item 24) on the function manifold.

2 Start the engine from the ground controls.

3 Hold the function enable switch to either side and activate and hold the retract switch with the boom fully retracted. Observe the pressure reading on the pressure gauge.

System relief valve specifications

Pressure		
S-60 models	2600 psi	179.3 bar
S-65 models	2900 psi	200 bar

4 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item 23) on the function manifold.

5 Adjust the internal hex socket. Turn it clockwise to increase pressure or counterclockwise to decrease pressure. Install the relief valve cap.

⚠WARNING Tip-over hazard. Do not adjust the relief valves higher than specified.

6 Repeat steps 2 through 5 to confirm relief valve pressure.

How to Adjust the Boom Down Relief Valve

NOTICE Perform this procedure with the boom in the stowed position.

1 Connect a 0 to 5000 psi (0 to 345 bar) pressure gauge to the diagnostic nipple (item 24) on the function manifold.

2 Start the engine from the ground controls.

3 Hold the function enable switch to either side and activate and hold the boom down toggle switch with the boom fully lowered. Observe the pressure reading on the pressure gauge.

Boom down relief valve specifications

Pressure	2100 psi 145 bar

4 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item 6) on the function manifold.

5 Adjust the internal hex socket. Turn it clockwise to increase pressure or counterclockwise to decrease pressure. Install the relief valve cap.

⚠WARNING Tip-over hazard. Do not adjust the relief valves higher than specified.

6 Repeat steps 2 through 5 and confirm relief valve pressure.

MANIFOLDS

11-10
Valve Adjustments, 2WD Drive Manifold

How to Adjust the Charge Pressure Relief Valve

1 Connect a 0 to 600 psi (0 to 41 bar) pressure gauge to the diagnostic nipple (index 5) located on the drive manifold.

2 Start the engine from the platform controls.

3 Drive the machine slowly in either direction and observe the pressure reading on the pressure gauge.

Charge Pressure Relief valve specifications

Pressure	250 psi 17 bar

4 Turn the engine off. Hold the charge pressure relief valve with a wrench and remove the cap (index 1).

5 Adjust the internal hex socket. Turn it clockwise to increase the pressure or counterclockwise to decrease the pressure. Install the valve cap.

6 Start the engine from the platform controls. Drive the machine in either direction and confirm the valve pressure.

7 Turn the engine off, and remove the pressure gauge.

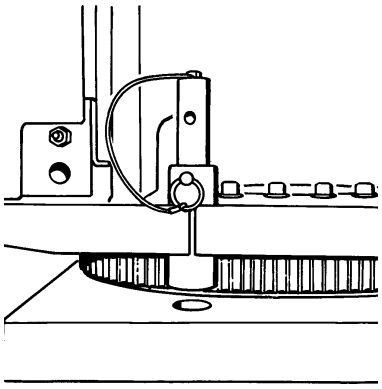
Turntable Rotation Components

13-1
Rotation Hydraulic Motor

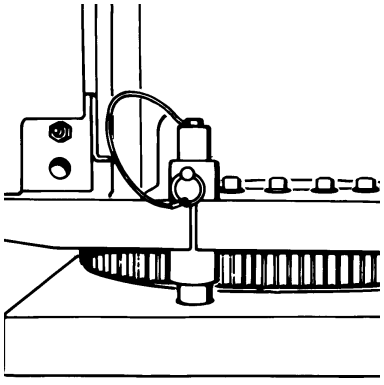
How to Remove the Rotation Hydraulic Motor

NOTICE When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section Two, *Hydraulic Hose and Fitting Torque Specifications.*

1 Secure the turntable from rotating with the turntable rotation lock pin.



Unlocked position

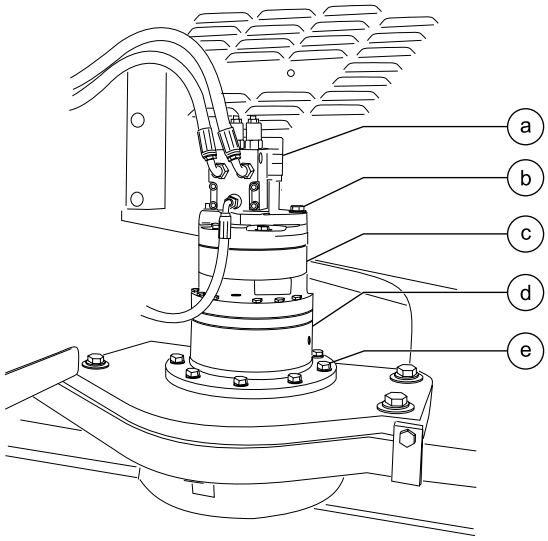


Locked position

2 Tag, disconnect and plug the hydraulic hoses from the motor, brake and manifold. Cap the fittings on the motor, brake and manifold.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

3 Remove the motor/brake mounting fasteners, then remove the motor from the brake.



a motor
b motor/brake mounting bolts
c brake
d drive hub
e drive hub mounting bolts