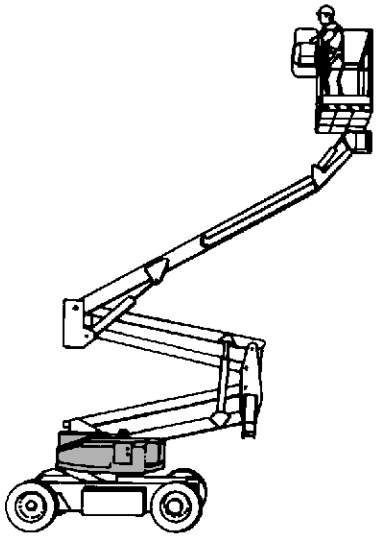
Genie Industries

Genie Z-45/22

Service Manual



Genie Z-45/22 DC2WD

First Edition, First Printing
Part No. 41328

Genie® Z-45/22

Important

Read, understand and obey the safety rules and operating instructions in the *Genie Z-45/22 Series Operator's Manual* before attempting any maintenance or repair procedure.

This manual provides detailed scheduled maintenance information for the machine owner and user. It also provides troubleshooting and repair procedures for qualified service professionals.

Basic mechanical, hydraulic and electrical skills are required to perform most procedures. However, several procedures require specialized skills, tools, lifting equipment and a suitable workshop. In these instances, we strongly recommend that maintenance and repair be performed at a Genie dealer service center.

Genie Industries has endeavored to deliver the highest degree of accuracy possible. However, continuous improvement of our products is a Genie policy. Therefore product specifications are subject to change without notice.

Readers are encouraged to notify Genie of errors and send in suggestions for improvement. All communications will be carefully considered for future printings of this and other manuals. Please write to the technical publications team in care of Genie Industries, PO Box 69, Redmond WA 98073-0069 USA.

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Genie Industries

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Safety Rules



Danger

Failure to obey the instructions and safety rules in this manual and the appropriate *Genie Z-45/22 Series Operator's Manual* will result in death or serious injury.

Many of the hazards identified in the operator's manual are also safety hazards when maintenance and repair procedures are performed.

Do Not Perform Maintenance Unless:

- ☑ You are trained and qualified to perform maintenance on this machine.
- ☑ You read, understand and obey:
  - manufacturer's instructions and safety rules
  - employer's safety rules and worksite regulations
  - applicable governmental regulations
- ☑ You have the appropriate tools, lifting equipment and a suitable workshop.

SAFETY RULES

Personal Safety

Any person working on or around a machine must be aware of all known safety hazards. Personal safety and the continued safe operation of the machine should be your top priority.



Read each procedure thoroughly. This manual and the decals on the machine, use signal words to identify the following:

⚠DANGER Indicates the presence of a hazard that **will** cause death or serious injury.

⚠WARNING Indicates the presence of a hazard that **may** cause death or serious injury.

⚠CAUTION Indicates the presence of a hazard that **will** or **may** cause serious injury or damage to the machine.

NOTICE Indicates special operation or maintenance information.



Be sure to wear protective eye wear and other protective clothing if the situation warrants it.



Be aware of potential crushing hazards such as moving parts, free swinging or unsecured components when lifting or placing loads. Always wear approved steel-toed shoes.

Workplace Safety



Be sure to keep sparks, flames and lighted tobacco away from flammable and combustible materials like battery gases and engine fuels. Always have an approved fire extinguisher within easy reach.



Be sure that all tools and working areas are properly maintained and ready for use. Keep work surfaces clean and free of debris that could get into machine components and cause damage.



Be sure that your workshop or work area is properly ventilated and well lit.



Be sure any forklift, overhead crane or other lifting or supporting device is fully capable of supporting and stabilizing the weight to be lifted. Use only chains or straps that are in good condition and of ample capacity.



Be sure that fasteners intended for one time use (i.e., cotter pins and self-locking nuts) are not reused. These components may fail if they are used a second time.



Be sure to properly dispose of old oil or other fluids. Use an approved container. Please be environmentally safe .

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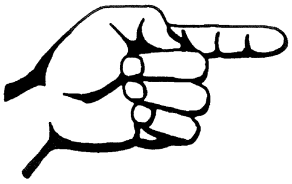
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Specifications

Machine Specifications

Stowed dimensions		
Length	17 ft 8 in	5.4 m
Width	5 ft 11 in	1.8 m
Height	6 ft 6 in	2.0 m
Ground clearance	8 in	20 cm
Operational dimensions		
Maximum platform height	45 ft	13.7 m
Maximum horizontal reach	23 ft	7 m
Maximum turntable tailswing		0
Wheelbase	6 ft 3 in	1.9 m
Minimum turning circle, outside	28 ft 8 in	8.7 m
Minimum turning circle, inside	14 ft	4.2 m
Turntable rotation		359°
Platform rotation		180°
Gradeability (boom stowed)		30 %

Tires and wheels		
Tire size		9-14.5 LT
Tire ply rating	Tread 8	Sidewall 6
Load range		F
Tire contact area	43.5 sq in	280 sq cm
Overall tire diameter	28 in	71 cm
Tire pressure	100 psi	6.89 bar
Wheel diameter	14.5 in	36.8 cm
Wheel width	7 in	17.8 cm
Wheel lugs		
Front		8 @ 5/8-18
Rear		9 @ 5/8-18
Lug nut torque	125 ft-lbs	169.5 Nm

Platform dimensions	4 ft	5 ft	6 ft
Length	4 ft 1.2 m	5 ft 1.5 m	6 ft 1.8 m
Width	30 in 76.2 cm	30 in 76.2 cm	30 in 76.2 cm
Maximum capacity	500 lbs 227 kg	500 lbs 227 kg	500 lbs 227 kg
Hydraulic tank capacity	17.7 gallons		67 liters
Hydraulic system capacity (including tank)	22 gallons		83.3 liters
Machine Weight	13750 lbs		6237 kg

Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.

SPECIFICATIONS

Performance Specifications

Drive speeds, maximum		
Boom stowed	3.5 mph 40 ft/7.8 sec	5.6 km/h 12.2 m/7.8 sec
Boom raised	0.6 mph 40 ft/45.5 sec	0.97 km/h 12.2 m/45.5 sec

Boom function speeds, maximum from platform controls	
Primary boom up	30 to 40 seconds
Primary boom down	23 to 33 seconds
Primary boom extend	57 to 67 seconds
Primary boom retract	35 to 45 seconds
Secondary boom up	28 to 38 seconds
Secondary boom down	29 to 39 seconds
Turntable rotate - 360°	50 to 70 seconds
Platform rotate - 180°	9 to 12 seconds
Platform level up	20 to 30 seconds
Platform level down	15 to 20 seconds

Hydraulic Specifications

Hydraulic fluid	Dexron II equivalent
Main pump	
Type: Gear	
Displacement per revolution	0.194 cu in 3.2 cc
Displacement	2.5 gallons per minute 9.5 liters per minute
Hydraulic tank return line filter	10 micron with 25 psi (1.7 bar) bypass
Function manifold	
Function relief valve pressure	2500 psi 172.4 bar
Primary boom down relief valve pressure	1200 psi 82.8 bar
Secondary boom down relief valve pressure	1200 psi 82.8 bar
Boom extend relief valve pressure	1800 psi 124.1bar

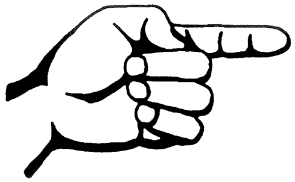
SPECIFICATIONS

Bolt Torque Specifications

Size	Threads per inch	SAE Grade 5 Bolts Torque - Dry inch-pounds	Torque - Dry foot-pounds	Torque - Dry Newton meters	SAE Grade 8 Bolts Torque - Dry inch-pounds	Torque - Dry foot-pounds	Torque - Dry Newton meters
No. 10	24	43		5	60		7
	32	49		6	68		8
1/4 inch	20	96		11	144		16
	28	120		14	168		19
5/16 inch	18		17	23		25	34
	24		19	28		25	34
3/8 inch	16		30	41		45	61
	24		35	48		50	68
7/16 inch	14		50	68		70	95
	20		55	75		80	109
1/2 inch	13		75	102		110	149
	20		90	122		120	163
9/16 inch	12		110	149		150	204
	18		120	163		170	231
5/8 inch	11		150	204		220	298
	18		170	231		240	326
3/4 inch	10		260	353		380	515
	16		300	407		420	570
7/8 inch	9		430	583		600	814
	14		470	637		660	895
1 inch	8		640	868		900	1221
			700	949		1000	1356

Torque specifications for lubricated bolts are 25% less than dry torque specifications for each bolt size.

These bolt torque specifications are for general use only. Specification may vary depending on application of bolt.



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Scheduled Maintenance Inspections



Observe and Obey:

- ☑ Maintenance inspections shall be completed by a person trained and qualified on the maintenance of this machine.
- ☑ Scheduled maintenance inspections shall be completed daily, quarterly, annually and every 2 years as specified on the *Maintenance Inspection Report.*

⚠WARNING Failure to properly complete each inspection when required may cause death, serious injury or substantial damage.

- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating machine.
- ☑ Keep records on all inspections for three years.
- ☑ Machines that have been out of service for a period longer than 3 months must complete the quarterly inspection.

About This Section

The Schedule

There are four types of maintenance inspections that must be performed according to a schedule—daily, quarterly, annual and two year. To account for repeated procedures, the *Maintenance Tables* and the *Maintenance Inspection Report* have been divided into four subsections—A, B, C, D. Use the following chart to determine which group(s) of procedures are required to perform a scheduled inspection.

Inspection	Table or Checklist
Daily	A
Quarterly	A + B
Annual	A + B + C
Two year	A + B + C + D

Maintenance Tables

The maintenance tables contained in this section provide summary information on the specific physical requirements for each inspection.

Complete step-by-step instructions for each scheduled maintenance procedure are provided in section 4, *Scheduled Maintenance Procedures.*

Maintenance Inspection Report

The maintenance inspection report contains checklists for each type of scheduled inspection.

Make copies of the *Maintenance Inspection Report* to use for each inspection. Store completed forms for three years.

Maintenance Tables

Table A		Tools are required	New parts required	Dealer service suggested
A-1	Inspect the Operator's and Safety Manuals			
A-2	Inspect the Decals and Placards			
A-3	Inspect for Damage, Loose or Missing Parts			
A-4	Check the Hydraulic Oil Level			
A-5	Check for Hydraulic Leaks			
A-6	Check the Tire Pressure			
A-7	Test the Platform and Ground Controls			
A-8	Test the Auxiliary Power Operation			
A-9	Test the Tilt Sensor			
A-10	Test the Limit Switches			
A-11	Perform 30 Day Service			

MAINTENANCE TABLES

Table B

		Tools are required	New parts required	Dealer service suggested
B-1	Check the Batteries			
B-2	Check the Hydraulic Tank Filter Condition Indicator			
B-3	Inspect the Electrical Wiring			
B-4	Inspect the Tires and Wheels (including lug nut torque)			
B-5	Confirm the Proper Brake Configuration			
B-6	Check the Oil Level in the Torque Hubs			
B-7	Test the Key Switch			
B-8	Test the Emergency Stop Buttons			
B-9	Test the Ground Control Override			
B-10	Test the Platform Self-leveling			
B-11	Test the Service Horn			
B-12	Test the Foot Switch			
B-13	Test the Drive Enable System			
B-14	Test the Drive Brakes			
B-15	Test the Drive Speed - Stowed Position			
B-16	Test the Alarm Package - Optional Equipment			

MAINTENANCE TABLES

Table B, continued		Tools are required	New parts required	Dealer service suggested
B-17	Perform Hydraulic Oil Anaysis See D-1 *Test or Replace the Hydraulic Oil*			
B-18	Test the Turntable Rotation Stop			
B-19	Check the Electrical Contactors			
Table C				
C-1	Check the Primary Boom Wear Pads			
C-2	Check the Turntable Rotation Bearing Bolts			
C-3	Check the Free-wheel Configuration			
C-4	Grease the Turntable Rotation Bearing and Worm Drive Gear			
C-5	Replace the Torque Hub Oil			
C-6	Replace the Hydraulic Tank Filter			
C-7	Bleed the Platform Rotator			
Table D				
D-1	Test or Replace the Hydraulic Oil			

Maintenance Inspection Report

Model

Serial number

Date

Hour meter

Machine owner

Inspected by (print)

Inspector signature

Inspector title

Inspector company

Instructions

- Make copies of this page to use for each inspection.
- Select the appropriate checklist(s) for the type of inspection to be performed.

☐	**Daily Inspection: A**
☐	**Quarterly Inspection: A+B**
☐	**Annual Inspection: A+B+C**
☐	**2 Year Inspection: A+B+C+D**

- Place a check in the appropriate box after each inspection procedure is completed.
- Use the maintenance tables in this section and the step-by-step procedures in section 4 to learn how to perform these inspections.
- If any inspection receives an "N", tag and remove the machine from service, repair and re-inspect it. After repair, place a check in the "R" box.

Legend

Y = yes, acceptable

N = no, remove from service

R = repaired

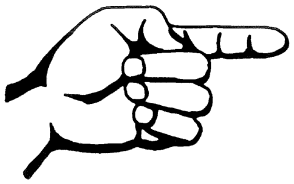
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Checklist A	Y	N	R
Refer to Table A			
A-1 Operator's and Safety manuals			
A-2 Decals and placards			
A-3 Damage, loose or missing parts			
A-4 Hydraulic oil level			
A-5 Hydraulic leaks			
A-6 Tire pressure			
A-7 Platform and ground controls			
A-8 Auxiliary power			
A-9 Tilt sensor			
A-10 Limit switches			

Checklist B	Y	N	R
Refer to Table B			
B-1 Batteries			
B-2 Hydraulic tank filter			
B-3 Electrical wiring			
B-4 Tires and wheels			
B-5 Brake configuration			
B-6 Torque hub oil level			
B-7 Key Switch			
B-8 Emergency Stop			
B-9 Ground control override			
B-10 Platform leveling			
B-11 Service horn			
B-12 Foot switch			
B-13 Drive enable system			
B-14 Drive brakes			
B-15 Drive speed-stowed			
B-16 Alarm package			
B-17 Hydraulic oil analysis			
B-18 Turntable stop			
B-19 Electrical contactors			

Checklist C	Y	N	R
Refer to Table C			
C-1 Boom wear pads			
C-2 Turntable bearing bolts			
C-3 Free-wheel configuration			
C-4 Grease rotation bearing			
C-5 Torque hub oil			
C-6 Hydraulic tank filter			
C-7 Platform rotator			

Checklist D	Y	N	R
Refer to Table D			
D-1 Hydraulic oil			



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Scheduled Maintenance Procedures



Observe and Obey:

- ☑ Maintenance inspections shall be completed by a person trained and qualified on the maintenance of this machine.
- ☑ Scheduled maintenance inspections shall be completed daily, frequently (every 3 months), annually and every 2 years as specified on the maintenance report.

⚠WARNING Failure to properly complete each inspection when required may result in death, serious injury or substantial machine damage.

- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating machine.
- ☑ Keep records on all inspections for three years.
- ☑ Unless otherwise specified, perform each procedure with the machine in the following configuration:
  - Machine parked on a flat level surface
  - Boom in the stowed position
  - Turntable rotated with the boom between the non-steering wheels
  - Key switch in the OFF position with the key removed
  - Wheels chocked

About This Section

This section contains detailed procedures for each scheduled maintenance inspection.

Each procedure includes a description, safety warnings and step-by-step instructions.

Symbols Legend

⚠DANGER Indicates the presence of a hazard that **will** cause death or serious injury.

⚠WARNING Indicates the presence of a hazard that **may** cause death or serious injury.

⚠CAUTION Indicates the presence of a hazard that **will** or **may** cause serious injury or damage to the machine.

NOTICE Indicates special operation or maintenance information.

⊙ Indicates that a specific result is expected after performing a series of steps.

Table A Procedures

A-1
Inspect the Operator's 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 box 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 the storage container and lid are present and in good condition.

2 Check to make sure that the operator's, responsibility and safety manuals are present and complete in the storage container at 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 appropriate *Genie Z-45/22 Series 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.

A-3
Inspect for Damage, Loose or Missing Parts

Daily machine condition inspections are essential to safe machine operation and good machine performance. Failure to locate and repair damage, and discover loose or missing parts may result in an unsafe operating condition.

1 Inspect the entire machine for damage and improperly installed or missing parts including:

- Electrical components, wiring and electrical cables
- Hydraulic power units, hoses, fittings, cylinders and manifolds
- Hydraulic tank
- Drive motors
- Turntable motors and torque hubs
- Boom components and wear pads
- Dents or damage to machine
- Tires and wheels
- Limit switches
- Alarms, service horn and beacon
- Nuts, bolts and other fasteners
- Platform entry mid-rail or gate
- Cracks in welds or structural components
- Compartment covers
- Battery packs, latches and connections

A-4
Check the Hydraulic Oil Level

Maintaining the hydraulic oil at the proper level is essential to machine operation. Improper hydraulic oil levels can damage hydraulic components. Daily checks allow the inspector to identify changes in oil level that might indicate the presence of hydraulic system problems.

1 Be sure that the boom is in the stowed position, then visually inspect the sight gauge located on the side of the hydraulic oil tank.

⊙ Result: The hydraulic oil level should be within the top 2 inches (5 cm) of the sight gauge.

Hydraulic Oil Specifications

Hydraulic oil type		Dexron equivalent
Hydraulic tank capacity	17.7 gallons	67 liters
Hydraulic system (including tank)	22 gallons	83.3 liters

TABLE A PROCEDURES

A-5
Check for Hydraulic Leaks

Detecting hydraulic fluid leaks is essential to operational safety and good machine performance. Undiscovered leaks can develop into hazardous situations, impair machine functions and damage machine components.

1 Inspect for hydraulic oil puddles, dripping or residue on or around the following areas:

- Hydraulic tank—filter, fittings, hoses and turntable surface
- Hydraulic power units, fittings, hoses, main pump, and turntable surface
- All hydraulic cylinders
- All hydraulic manifolds
- Primary and secondary booms
- The underside of the chassis
- Ground area under the machine

A-6
Check the Tire Pressure

NOTICE This procedure does not need to be performed on machines equipped with the foam-filled tire option.

⚠WARNING An over-inflated tire can explode and may cause death or serious injury.

To safeguard maximum stability, achieve optimum machine handling and minimize tire wear, it is essential to maintain proper pressure in all air-filled tires.

1 Check each tire with an air pressure gauge and add air as needed.

Tire Specifications		
Tire size		9-14.5 LT
Pressure	100 psi	6.89 bar

A-7
Test the Platform and Ground Controls

Testing the machine functions and the Emergency Stop buttons for malfunctions is essential for safe machine operation. An unsafe working condition exists if any function fails to operate properly or either Emergency Stop button fails to stop all the machine functions and shut off the engine. Each function should activate, operate smoothly and be free of hesitation, jerking and unusual noise.

1 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

2 Do not hold the function enable switch to either side. Attempt to activate each boom and platform function toggle switch.

⊙ Result: All boom and platform functions should **not** operate.

3 Hold the function enable switch to either side and activate each boom and platform function toggle switch.

⊙ Result: All boom and platform functions should operate through a full cycle. Descent alarm (if equipped) should sound while boom is lowering.

4 Push in the Emergency Stop button to the OFF position.

⊙ Result: No function should operate, the machine should stop.

5 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

6 Operate each machine function through a full cycle.

⊙ Result: All machine functions should operate smoothly.

NOTICE Machines equipped with Platform Level Control Disable Function: The platform level toggle switch will not operate when the boom is raised past the drive speed limit switch.

7 Push in the Emergency Stop button to the OFF position.

⊙ Result: No function should operate, the machine should stop.

NOTICE As a safety feature, selecting and operating the ground controls will override the platform controls, including the Emergency Stop button.

A-8
Test the Auxiliary Power Operation

Detection of auxiliary power system malfunctions is essential for safe machine operation. An unsafe working condition exists if the auxiliary powered functions do not operate in the event of a main power loss. Auxiliary power is designed for short term emergency use only. Excessive use will result in battery drain and component damage.

1 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

2 Simultaneously hold the auxiliary power switch ON while activating each function through a partial cycle.

⊙ Result: Each function should operate smoothly.

3 Turn the key switch to platform control.

4 At the platform controls, pull out the Emergency Stop button to the ON position, then press down the foot switch.

5 Simultaneously hold the auxiliary power switch on while activating each function through a partial cycle.

⊙ Result: Each function should operate smoothly.

NOTICE Drive and steer functions will operate with auxiliary power.

TABLE A PROCEDURES

A-9
Test the Tilt Sensor

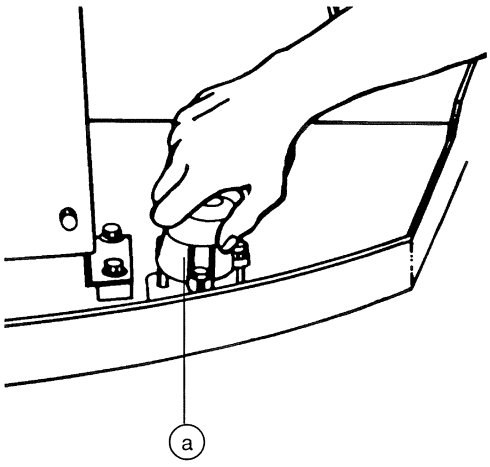
The tilt sensor sounds an alarm in the platform when the incline of the drive chassis exceeds 4.5 degrees.

NOTICE Select a level test area. The tilt alarm should not be sounding prior to test.

1 Turn the key switch to platform control. Then pull out the Emergency Stop button to the ON position at both the ground and platform controls.

2 Open the ground control side cover and press down on one side of the tilt sensor.

⊙ Result: After a 1.5 second delay, the alarm in the platform should sound.



a tilt sensor

A-10
Test the Limit Switches

Detecting limit switch malfunctions is essential to safe machine operation. The drive limit switches are used to restrict drive speed when the boom is raised. The drive enable limit switch activates a signal light to inform the operator that the platform is over the steering wheels, and stops drive movement unless the drive enable override switch is used. Improperly functioning limit switches will allow the boom to raise and/or drive into an unsafe position.

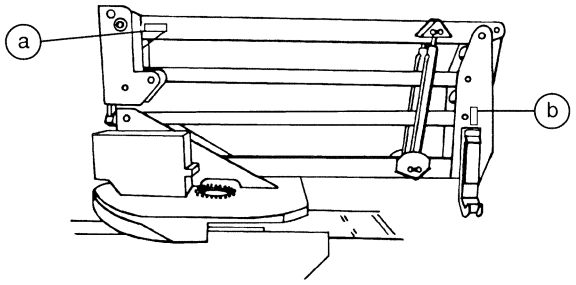
Boom Limit Switches

1 With the machine off and the boom in the stowed position, visually inspect the boom limit switches for the following:

- Broken or missing rollers or arms
- Missing fasteners
- Loose wiring

2 Manually activate the primary boom drive limit switch.

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



a primary boom drive limit switch
b secondary boom drive limit switch

3 Manually activate the secondary boom drive limit switch.

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

4 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at the platform controls.

5 Slowly move the drive control handle off center.

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

6 Raise the primary boom 5 feet (1.5 m).

7 Slowly move the drive control handle off center.

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

8 Lower the primary boom to the stowed position.

9 Raise the secondary boom 5 feet (1.5 m).

10 Slowly move the drive control handle off center.

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

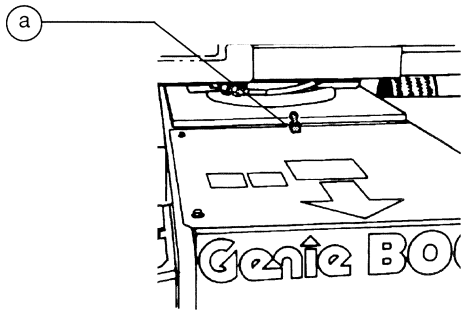
Drive speed, maximum, raised
40 feet/45.5 seconds 12.2 meters/45.5 seconds

Drive Enable Limit Switch

1 With the machine off and the boom in the stowed position, visually inspect the drive enable limit switch for the following:

- Broken or missing rollers or arms
- Missing fasteners
- Loose wiring

2 Manually activate the drive enable limit switch.



a drive enable limit switch

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

3 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

4 Rotate the turntable to the left until the primary boom is past the left steer wheel.

⊙ Result: The drive enable indicator light should be on. Drive function should not operate until the drive enable switch is activated.

5 Rotate the turntable to the right until the primary boom is past the right steer wheel.

⊙ Result: The drive enable indicator light should be on. Drive function should not operate until the drive enable switch is activated.

6 Move and hold the drive enable toggle switch to either side and slowly move the drive control handle off center.

⊙ Result: The drive function should operate.

TABLE A PROCEDURES

A-11
Test the Lift/Drive Select Switch (if equipped)

A properly functioning Lift/Drive Select Switch is essential for safe machine operation. An improperly operating Lift/Drive Select Switch will fail to activate the appropriate platform control which may result in a hazardous situation.

1 Move the lift/drive select switch to the lift position.

2 Press down the foot switch.

3 Move the drive control handle off center.

⊙ Result: No drive functions should operate.

4 Activate each boom function toggle switch.

⊙ Result: All boom functions should operate.

5 Move the lift/drive select switch to the drive position.

6 Press down the foot switch.

7 Activate each boom function toggle switch.

⊙ Result: No boom functions should operate.

8 Move the drive control handle off center.

⊙ Result: The drive functions should operate.

9 Repair any malfunctions before operating the machine.

Table B Procedures

B-1
Check the Batteries

Proper battery condition is essential to good engine performance and operational safety. Improper fluid levels or damaged cables and connections can result in engine component damage and hazardous conditions.

⚠WARNING Batteries contain acid. Avoid spilling or contacting battery acid. Neutralize battery acid spills with baking soda and water.

1 Put on protective clothing and eye wear.

2 Be sure that the battery cable connections are free of corrosion.

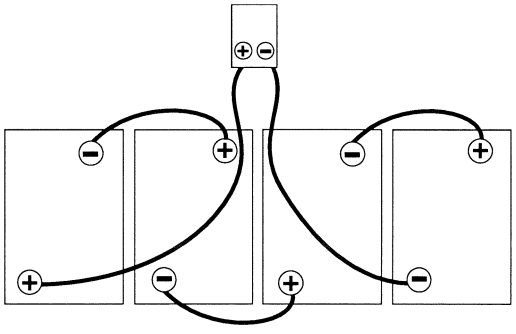
3 Be sure that the battery hold downs and cable connections are tight.

4 Remove the battery vent caps and check the specific gravity of each battery cell with a hydrometer.

5 Check the battery acid level of each battery. If needed, replenish with water to the bottom of the battery fill tube. Do not overfill.

6 Install the vent caps.

7 Check each battery pack, to be sure the batteries are wired correctly.



B-2
Check the Hydraulic Tank Filter Condition Indicator

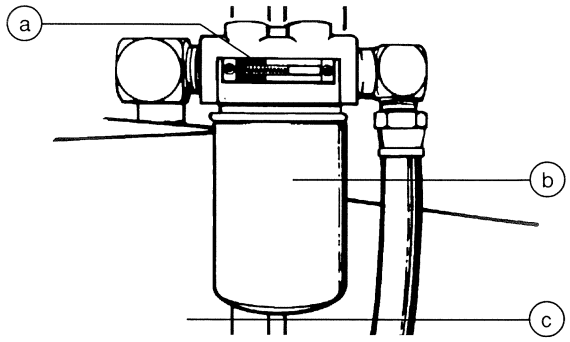
Maintaining the hydraulic tank filter in good condition is essential to good system performance and safe machine operation. The filter condition indicator will show when the hydraulic flow is bypassing a clogged filter. If the filter is not frequently checked and replaced, impurities will remain in the hydraulic system and cause component damage.

1 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

2 Hold the primary boom up switch at the ground controls.

⚠CAUTION Component damage hazard. Be aware of overhead obstructions when raising the boom from the ground controls.

3 Inspect the filter condition indicator.



a filter condition indicator
b filter
c hydraulic tank

⊙ Result: The filter should be operating with the plunger in the green area. If the display shows the plunger in the red area, this indicates that the hydraulic filter is being bypassed and the filter should be replaced. See C-6, *Replace the Hydraulic Tank Filter.*

TABLE B PROCEDURES

B-3
Inspect the Electrical Wiring

Maintaining electrical wiring in good condition is essential to safe operation and good machine performance. Failure to find and replace burnt, chafed, corroded or pinched wires could result in unsafe operating conditions and may cause component damage.

⚠WARNING Electrocution hazard. Contact with hot or live circuits may cause death or serious injury. Remove all rings, watches and other jewelry.

1 Inspect the following areas for burnt, chafed, corroded and loose wires:
   - Drive chassis electrical panel
   - Engine wiring harness
   - Inside of the ground control box
   - Turntable manifold wiring
2 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.
3 Raise the secondary boom until the lower mid-pivot is 10 feet (3 m) off the ground.
4 Inspect the turntable center area for burnt, chafed and pinched cables.
5 Lower the boom to the stowed position and turn the machine off.
6 Visually inspect the following areas for burnt, chafed, corroded, pinched and loose wires:
   - Cable track on the primary and secondary booms
   - Primary boom to platform cable harness
   - Inside of the platform control box

B-4
Inspect the Tires and Wheels (including lug nut torque)

Maintaining the tires and wheels in good condition is essential to safe operation and good performance. Tire and/or wheel failure could result in a machine tip-over. Component damage may also result if problems are not discovered and repaired in a timely fashion.

⚠WARNING An over-inflated tire can explode and may cause death or serious injury.

⚠WARNING Tip-over hazard. Do not use temporary flat tire repair products.

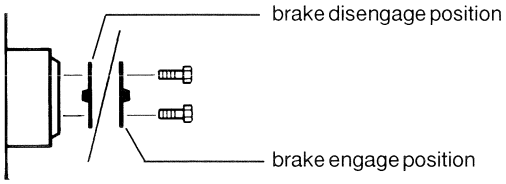
1 Check all tire treads and sidewalls for cuts, cracks, punctures and unusual wear.
2 Check each wheel for damage, bends and cracked welds.
3 Check each lug nut for proper torque.
4 Check the pressure in each air-filled tire.

Tires and wheels		
Tire size		9-14.5 LT
Lug nut torque	125 ft-lbs	169.5 Nm

B-5
Confirm the Proper Brake Configuration

Proper brake configuration is essential to safe operation and good machine performance. Hydrostatic brakes and hydraulically-released, spring-applied individual wheel brakes can appear to operate normally when they are actually not fully operational.

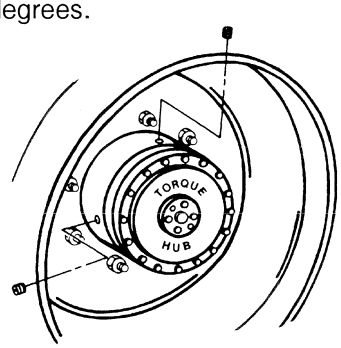
1 Check each torque hub disconnect cap to be sure it is in the engaged position.



B-6
Check the Oil Level in the Torque Hubs

Failure to maintain proper torque hub oil levels may cause the machine to perform poorly and continued use may cause component damage.

1 Drive the machine to rotate the hub until the plugs are located one on top and the other at 90 degrees.



2 Remove the plug located at 90 degrees and check the oil level.

⊙ Result: The oil level should be even with the bottom of the plug hole.

3 If necessary, remove the top plug and add oil until the oil level is even with the bottom of the side plug hole.

4 Apply pipe thread sealant to the plugs, then install the plugs into the hub.

5 Repeat this procedure for each torque hub.

Drive Torque Hub Oil	
Capacity	17 fluid ounces 0.5 liters
Type: SAE 90 multipurpose hypoid gear oil - APIservice classification GL5	

TABLE B PROCEDURES

B-7
Test the Key Switch

Proper key switch action and response is essential to safe machine operation. The machine can be operated from the ground or platform controls and the activation of one or the other is accomplished with the key switch. Failure of the key switch to activate the appropriate control panel could cause a hazardous operating situation.

1 Pull out the Emergency Stop button to the ON position at both the ground and platform controls.

2 Turn the key switch to **platform control**.

3 Check the machine function from the **ground controls**.

⊙ Result: The machine functions should **not** operate.

4 Turn the key switch to ground control.

5 Check the machine function from the **platform controls**.

⊙ Result: The machine functions should **not** operate.

6 Turn the key switch to the OFF position.

⊙ Result: No function should operate, the machine should stop.

B-8
Test the Emergency Stop Buttons

Properly functioning Emergency Stop buttons are essential for safe machine operation. An improperly operating Emergency Stop button will fail to shut off power and stop all machine functions resulting in a hazardous situation.

NOTICE As a safety feature, selecting and operating the ground controls will override the platform controls, including the Emergency Stop button.

1 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

2 Push in the Emergency Stop button to the OFF position.

⊙ Result: No function should operate, the machine should stop.

3 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

4 Push in the Emergency Stop button to the OFF position.

⊙ Result: No machine functions should operate.

NOTICE The ground Emergency Stop button will stop all machine operation, even if the key switch is switched to platform control.

B-9
Test the Ground Control Override

A properly functioning ground control override is essential to safe machine operation. The ground control override function is intended to allow ground personnel to operate the machine from the ground controls whether or not the Emergency Stop button on the platform controls is in the ON or OFF position. This function is particularly useful if the operator at the platform controls cannot return the boom to the stowed position.

1 Push in the platform Emergency Stop button to the OFF position.

2 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

3 Operate each boom function through a partial cycle at the ground controls.

⊙ Result: All boom functions should operate.

B-10
Test the Platform Self-leveling

Automatic platform self-leveling throughout the full cycle of boom raising and lowering is essential for safe machine operation. The platform is maintained at level by the platform leveling slave cylinder which is controlled by the master cylinder located at the base of the primary boom. A platform self-leveling failure creates an unsafe working condition.

1 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

2 Lower the boom to the stowed position.

3 Adjust the platform to a level position using the platform leveling switch.

4 Raise and lower the primary boom through a full cycle.

⊙ Result: The platform should remain level at all times to within ±5 degrees.

NOTICE Machines equipped with Platform Level Control Disable Function: The platform level toggle switch will not operate when the boom is raised past the drive speed limit switch.

B-11
Test the Service Horn

A functional service horn is essential to safe machine operation. The service horn is activated at the platform controls and sounds at the ground as a warning to ground personnel. An improperly functioning horn will prevent the operator from alerting ground personnel of hazards or unsafe conditions.

1 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

2 Push down the service horn button at the platform controls.

⊙ Result: The service horn should sound.

B-12
Test the Foot Switch

A properly functioning foot switch is essential to safe machine operation. Machine functions should activate and operate smoothly as long as the foot switch is pressed down, and promptly stop when the foot switch is released. An improperly functioning foot switch can cause an unsafe working condition.

1 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

2 Without pressing down the foot switch, check the machine functions.

⊙ Result: The machine functions should **not** operate.

3 Press down the foot switch and operate the machine functions.

⊙ Result: The machine functions should operate.

B-13
Test the Drive Enable System

Proper drive enable system operation is essential to safe machine operation. When the primary boom is past the steering wheels, drive movement is stopped and the indicator light turns on. The drive enable switch must be used to reactivate drive function and should inform the operator that the machine will move in the opposite direction that the drive and steer controls are moved. An improperly functioning drive enable system may allow the machine to be moved into an unsafe position.

TABLE B PROCEDURES

1 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

2 Rotate the turntable to the right until the primary boom is past the right steer wheel.

⊙ Result: The drive enable indicator light should turn on.

3 Slowly move the drive control handle off center.

⊙ Result: The drive function should **not** operate.

4 Hold the drive enable toggle switch to either side and slowly move the drive control handle off center.

⚠CAUTION Always use the color-coded direction arrows on the platform control panel and the drive chassis to identify which direction the machine will travel.

⊙ Result: The drive function should operate.

5 Rotate the turntable to the left until the primary boom is past the left steer wheel.

⊙ Result: The drive enable indicator light should come on.

6 Repeat steps 3 and 4.

B-14
Test the Drive Brakes

Proper brake action is essential to safe machine operation. The drive brake function should operate smoothly, free of hesitation, jerking and unusual noise. Hydrostatic brakes and hydraulically-released individual wheel brakes can appear to operate normally when not fully operational.

⚠WARNING Be sure that the machine is not in free-wheel or partial free-wheel configuration. Refer to B-5 in this section, *Confirm the Proper Brake Configuration*.

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

1 Mark a test line on the ground for reference.

2 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

3 Lower the boom into the stowed position.

4 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the test line.

5 Bring the machine to top drive speed before reaching the test line. Release the drive joystick when your reference point on the machine crosses the test line.

6 Measure the distance between the test line and your machine reference point.

Braking: paved surface		
Stopping distance	2.5 to 3.5 ft	0.76 to 1.1 m

NOTICE The brakes must be able to hold the machine on any slope it is able to climb.

TABLE B PROCEDURES

B-15
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.

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

2 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

3 Lower the boom into the stowed position.

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 passes over the finish line.

Drive speed: stowed position,	
40 ft/7.8 sec	12.2m/7.8 sec

B-16
Test the Alarm Package - Optional Equipment

The alarm package includes:

- Travel alarm
- Descent alarm
- Flashing beacon

Alarms and a beacon are installed to alert operators and ground personnel of machine proximity and motion. The alarm package is installed on the turntable counterweight.

1 At the ground controls pull out the Emergency Stop button to the ON position and turn the key switch to ground control.

⊙ Result: The flashing beacon should be on and flashing.

2 Move the primary boom switch to the DOWN position, hold for a moment and then release it. Move the secondary boom switch to the DOWN position, hold for a moment and then release it.

⊙ Result: The descent alarm should sound when each switch is held down.

3 Turn the key switch to platform control.

4 At the platform controls pull out the Emergency Stop button to the ON position.

⊙ Result: The flashing beacon should be on and flashing.

5 Press down the foot switch. Move the primary boom switch to the DOWN position, hold for a moment and then release it. Move the secondary boom switch to the DOWN position, hold for a moment and then release it.

⊙ Result: The descent alarm should sound when each control switch is held down.

TABLE B PROCEDURES

6 Press down the foot switch. Move the drive control handle off center, hold for a moment and then release it. Move the drive control handle off center in the opposite direction, hold for a moment and then release it.

⊙ Result: The travel alarm should sound when the drive control handle is moved off center in either direction.

B-17
Perform Hydraulic Oil Analysis

See D-1, *Test or Replace the Hydraulic Oil.*

B-18
Test the Turntable Rotation Stop

The turntable is capable of rotating the boom 359 degrees and is stopped midpoint between the steer wheels by the rotation stop. Detecting a rotation stop malfunction is essential to safe operation and good machine performance. If the turntable rotates past the rotation stop, component damage may result.

1 Turn the key switch to platform control and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

2 Rotate the turntable to the left as far as it will go.

⊙ Result: Movement should stop when the primary boom reaches mid-point between the steer tires.

3 Rotate the turntable to the right full circle as far as it will go.

⊙ Result: Movement should stop when the primary boom reaches mid-point between the steer tires.

B-19
Check the Electrical Contactors

Maintaining the electrical contactors in good condition is essential to safe machine operation. Failure to locate a worn or damaged contactor could result in an unsafe working condition and component damage.

1 Remove the non-steer end drive chassis cover and locate the electrical contactors mounted on the component mounting panel.

2 Visually inspect the contact points of each contactor for the following items:

- Excessive burns
- Excessive arcs
- Excessive pitting

NOTICE Replace the contactors if any damage is found.

3 Remove the power unit side turntable cover and locate the electrical contactor mounted on the rear of the ground control box.

4 Visually inspect the contact points of the contactor for the following items:

- Excessive burns
- Excessive arcs
- Excessive pitting

NOTICE Replace the contactor if any damage is found.

Table C Procedures

C-1
Check the Primary Boom Wear Pads

Maintaining the primary boom wear pads in good condition is essential to safe machine operation. Wear pads are placed on boom tube surfaces to provide a low friction, replaceable wear pad between moving parts. Improperly shimmed wear pads or continued use of worn out wear pads may result in component damage and unsafe operating conditions.

1 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

2 Raise the end of the primary boom to a comfortable working height (chest high), then extend the primary boom 10 inches (25 cm).

3 Measure each wear pad. Replace the wear pad if it is less than 0.41 inches (1 cm) thick. If the wear pad is more than 0.41 inches (1 cm) thick, shim as necessary to obtain zero clearance and zero drag.

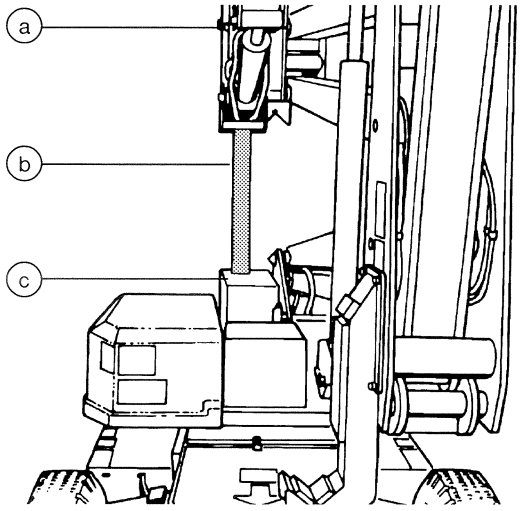
4 Extend and retract the primary boom through the entire range of motion to check for tight spots that could cause binding or scraping.

NOTICE Always maintain squareness between the primary boom outer and inner tubes.

C-2
Check the Turntable Rotation Bearing Bolts

Maintaining proper torque on the turntable bearing bolts is essential to safe machine operation. Improper bolt torque could result in an unsafe operating condition and component damage.

1 Raise the secondary boom and place a 4x4x31 inch (78 cm) block between the turntable counterweight and the upper mid-pivot. Carefully lower the secondary boom onto the block.



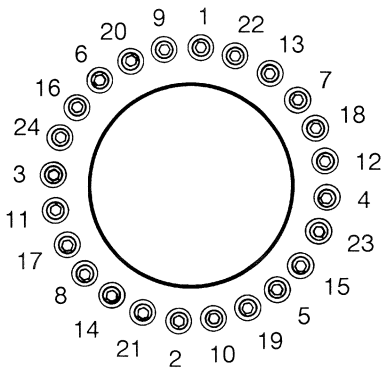
a upper mid-pivot
b 4x4x31 inch block
c counterweight

⚠WARNING Crushing hazard. Keep hands away from the block and all moving parts when lowering the secondary boom.

2 Raise the primary boom until the end of the boom is approximately 7 feet (2 m) off the ground.

3 Check to ensure that each turntable bearing bolt is torqued in specified order to 190 foot-pounds (258 Newton meters).

TABLE C PROCEDURES



Bolt torque sequence

4 Remove the support block and then lower the primary and secondary booms to the stowed position.

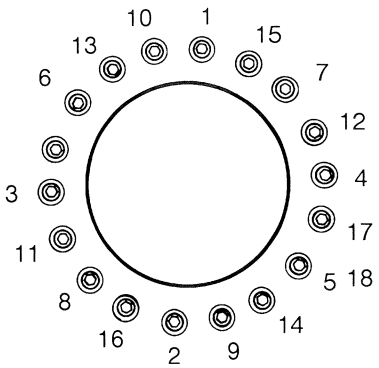
5 Swing out the battery packs.

6 Use a forklift to support the drive chassis counterweight, directly below the turntable bearing.

7 Loosen the counterweight positioning bolt, then remove the 2 mounting bolts.

8 Carefully lower and remove the counterweight.

9 Check to ensure that each bearing mounting bolt under the drive chassis is torqued in specified order to 190 foot-pounds (258 Newton meters).



Bolt torque sequence

10 Install the counterweight.

C-3 Check the Free-wheel Configuration

Proper use of the free-wheel configuration is essential to safe machine operation. The free-wheel configuration is used primarily for towing. A machine configured to free-wheel without operator knowledge may cause death or serious injury and property damage.

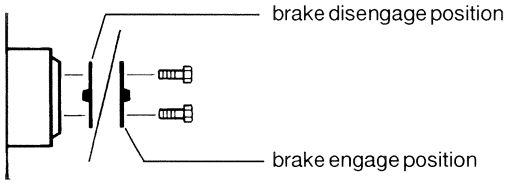
⚠WARNING Collision hazard. Select a work site that is firm and level.

1 Chock the steer wheels to prevent the machine from rolling.

2 Center a lifting jack of ample capacity under the drive chassis between the non-steer wheels.

3 Lift the wheels off the ground and then place jack stands under the drive chassis for support.

4 Disengage the torque hubs by turning over the torque hub disconnect caps on each non-steering wheel hub.



5 Manually rotate each non-steer wheel.

⊙ Result: Each non-steer wheel should rotate with minimum effort.

6 Re-engage the torque hubs by turning over the hub disconnect caps. Carefully remove the jack stands, lower the machine and remove the jack.

⚠WARNING Collision hazard. Failure to re-engage the torque hubs may cause death or serious injury and property damage.

TABLE C PROCEDURES

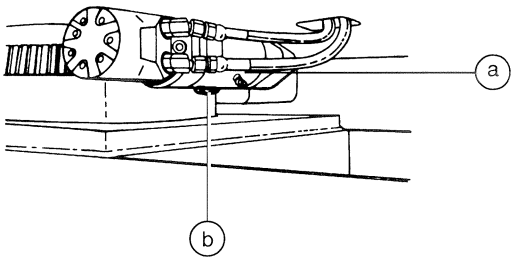
C-4
Grease the Turntable Rotation Bearing and Worm Drive Gear

Yearly application of lubrication to the turntable bearing and worm drive gear is essential to good machine performance and service life. Continued use of an improperly greased gear will result in component damage.

1 Locate the grease fitting mounted to the turntable rotation stop underneath the turntable.

2 Pump grease into the turntable rotation bearing. Rotate the turntable in increments of 4 to 5 inches (10 to 13 cm) at a time and repeat this step until the entire bearing has been greased.

3 Locate the grease fitting on the worm drive housing.



a grease fitting
b grease overflow

4 Pump grease into the gear until you see it coming out of the side of the gear housing.

5 Pump grease onto each tooth on the outside of the ring gear.

Lubricant Type	Multipurpose grease

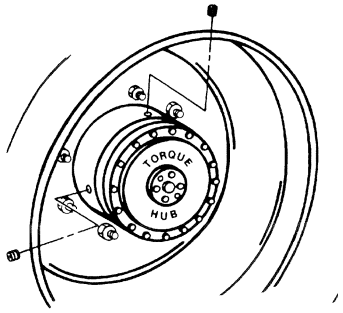
C-5
Replace the Torque Hub Oil

Replacing the torque hub oil is essential for good machine performance and service life. Failure to replace the torque hub oil at yearly intervals may cause the machine to perform poorly and continued use may cause component damage.

1 Select the drive torque hub to be serviced. Then drive the machine until one of the two plugs is at the lowest point.

2 Remove both plugs and drain the oil into a suitable container.

3 Drive the machine until one plug is at the top and the other is at 90 degrees.



4 Fill the hub with oil from the top hole until the oil level is even with the bottom of the side hole.

5 Apply pipe thread sealant to the plugs, then install the plugs.

6 Repeat steps 1 through 4 for the other drive torque hub.

Oil capacity per hub	17 fluid ounces 0.5 liters

Type: SAE 90 multipurpose hypoid gear oil - API service classification GL5

TABLE C PROCEDURES

C-6
Replace the Hydraulic Tank Filter

Replacement of the hydraulic tank filter is essential for good machine performance and service life. A dirty or clogged filter may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the filter be replaced more often.

⚠CAUTION Beware of hot oil. Contact with hot oil may cause severe burns.

1 Clean the area around the oil filter, then remove the filter with an oil filter wrench.

2 Apply a thin layer of oil to the new oil filter gasket.

3 Install the new filter (Genie part no. 20293) and tighten it securely by hand. Clean up any oil that may have spilled during the replacement procedure.

4 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position. Then activate and hold the primary boom up toggle switch.

5 Inspect the filter and related components to be sure that there are no leaks.

C-7
Bleed the Platform Rotator

See Repair procedure 2-3, *How to Bleed the Platform Rotator.*

Table D Procedures

D-1
Test or Replace the Hydraulic Oil

Replacement or testing of the hydraulic oil is essential for good machine performance and service life. Dirty oil and suction strainers may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require oil changes to be performed more often.

NOTICE The machine uses Dexron equivalent hydraulic oil. Before replacing the hydraulic oil, the oil may be tested by an oil distributor for specific levels of contamination to verify that changing the oil is necessary. **If the hydraulic oil is not replaced at the two year inspection, test the oil quarterly. Replace the oil when it fails the test.**

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

1 Remove the drain plug from the hydraulic tank.

2 Completely drain the tank into a suitable container.
See capacity specifications listed below.

3 Tag, disconnect and cap the two suction hoses that are attached to the hydraulic tank.

4 Remove the strainer assembly from the tank.

5 Carefully clean any foreign material from the strainer and inspect for damage.

6 Apply pipe thread sealant to the strainer mounting threads, and then install it in the tank.

7 Apply pipe thread sealant to the drain plug, and then install it in the tank.

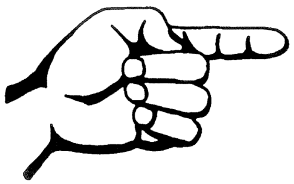
8 Install the two suction hoses.

9 Fill the tank with hydraulic oil until the level is within the top 2 inches (5 cm) of the sight gauge. Do not overfill.

10 Clean up any oil that may have spilled.

Hydraulic Oil Specifications

Hydraulic oil type		Dexron equivalent
Hydraulic tank capacity	17.7 gallons	67 liters
Hydraulic system (including tank)	22 gallons	83.3 liters



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Troubleshooting Flow Charts



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.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - · machine parked on a flat level surface
  - · boom in stowed position
  - · turntable rotated with the boom between the non-steering wheels
  - · turntable secured with the turntable rotation lock pin
  - · key switch in the OFF position with the key removed
  - · wheels chocked

Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions printed in the *Genie Z-45/22 Series Operator's Manual.*
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.
- ☑ Read each appropiate flow chart thoroughly. Attempting shortcuts may produce hazardous conditions.
- ☑ Be aware of the following hazards and follow generally accepted safe workshop practices.

⚠DANGER Crushing hazard. When testing or replacing any hydraulic component, always support the structure and secure it from movement.

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

⚠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.

NOTICE Perform all troubleshooting on a firm level surface.

NOTICE Two persons will be required to safely perform some troubleshooting procedures.

TROUBLESHOOTING FLOW CHARTS

About This Section

When a malfunction is discovered, the flow charts in this section will help a service professional pinpoint the cause of the problem. To use this section, basic hand tools and certain pieces of test equipment are required—voltmeter, ohmmeter, pressure gauges.

The location of terminals mentioned in this section can be found on the appropriate electrical or hydraulic schematics provided in Section 6, *Schematics*.

Since various degrees of a particular function loss may occur, selecting the appropriate flow chart may be troublesome. When a function will not operate with the same speed or power as a machine in good working condition, refer to the flow chart which most closely describes the problem.

General Repair Process

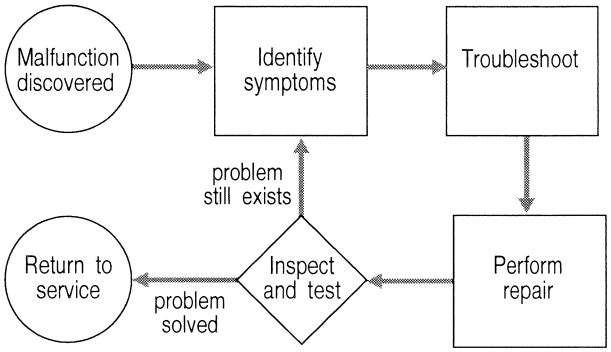


Chart 1

All Functions Will Not Operate

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled

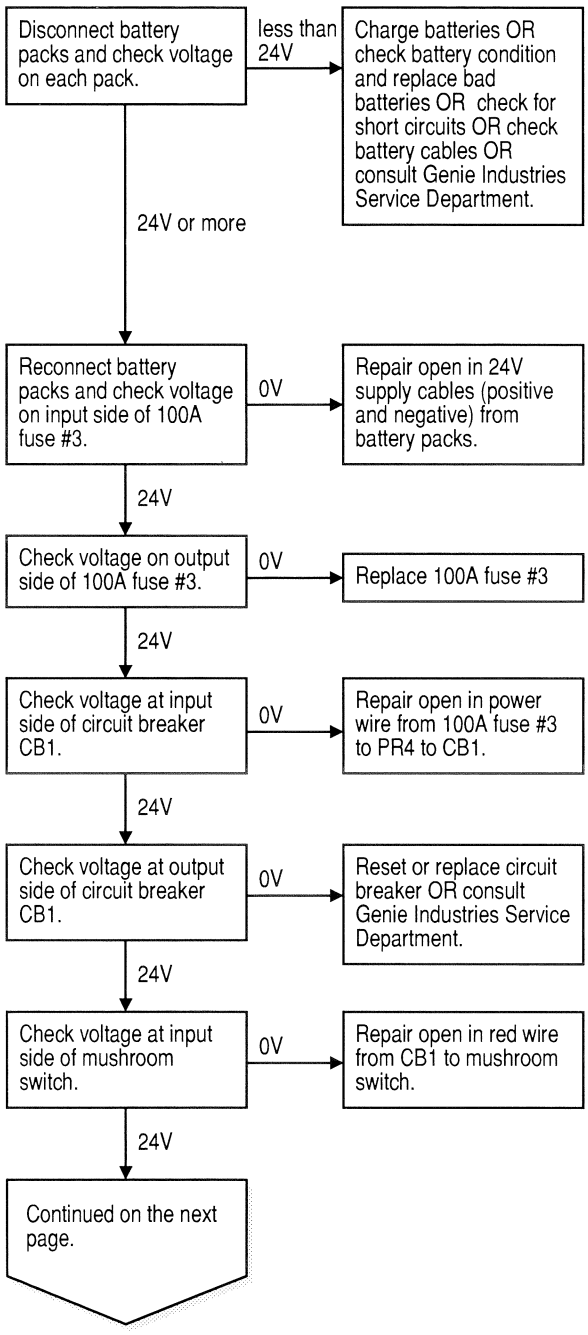


CHART 1

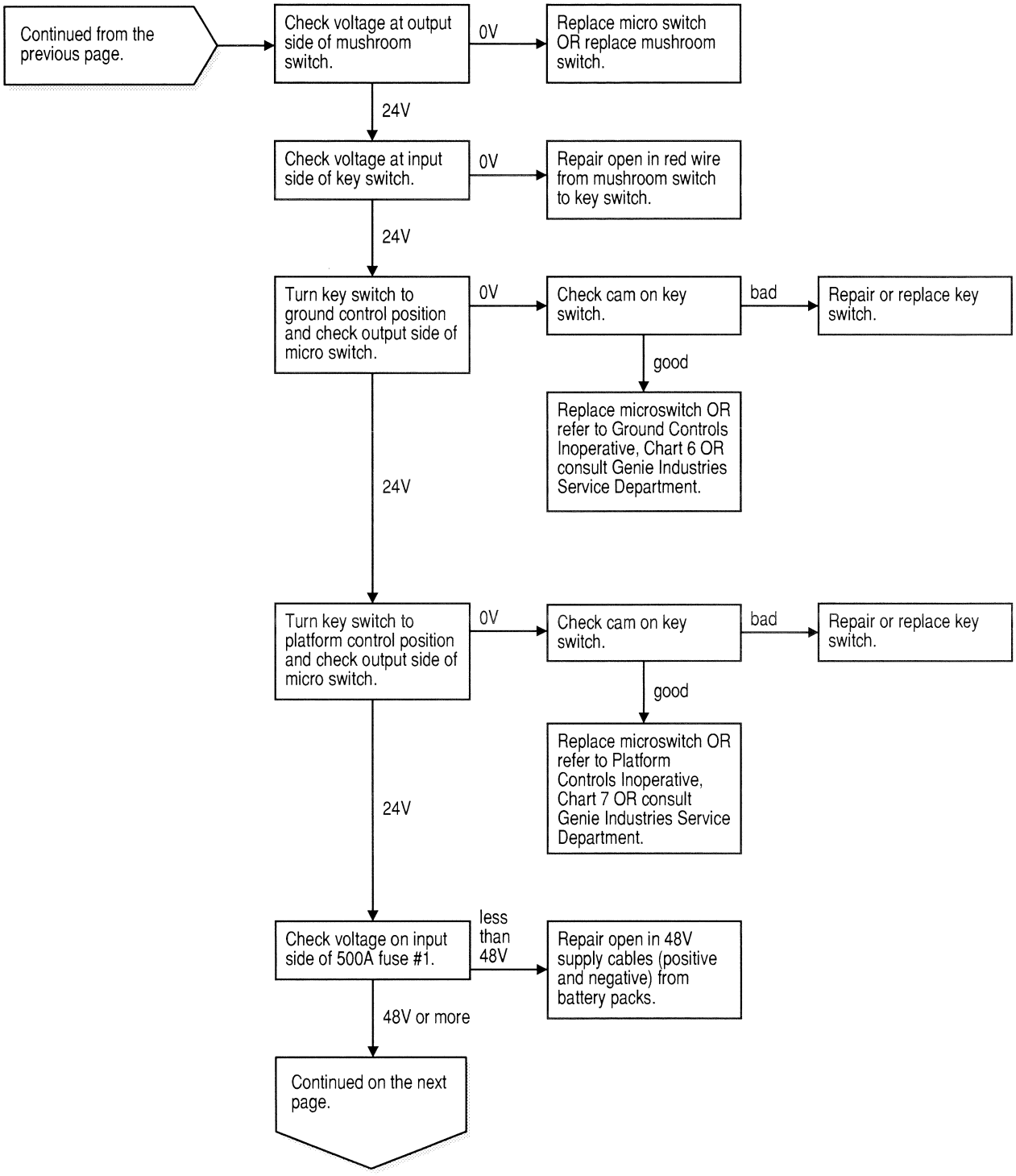

Continued from the previous page.
Check voltage at output side of mushroom switch.
0V
Replace micro switch OR replace mushroom switch.
24V
Check voltage at input side of key switch.
0V
Repair open in red wire from mushroom switch to key switch.
24V
Turn key switch to ground control position and check output side of micro switch.
0V
Check cam on key switch.
bad
Repair or replace key switch.
good
Replace microswitch OR refer to Ground Controls Inoperative, Chart 6 OR consult Genie Industries Service Department.
24V
Turn key switch to platform control position and check output side of micro switch.
0V
Check cam on key switch.
bad
Repair or replace key switch.
good
Replace microswitch OR refer to Platform Controls Inoperative, Chart 7 OR consult Genie Industries Service Department.
24V
Check voltage on input side of 500A fuse #1.
less than 48V
Repair open in 48V supply cables (positive and negative) from battery packs.
48V or more
Continued on the next page.

CHART 1

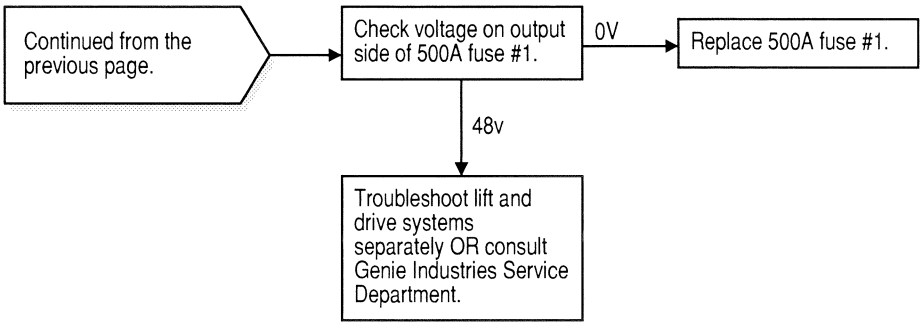

Continued from the previous page.
Check voltage on output side of 500A fuse #1.
0V
Replace 500A fuse #1.
48v
Troubleshoot lift and drive systems separately OR consult Genie Industries Service Department.

Chart 2

Lift Pump Motor Will Not Operate

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

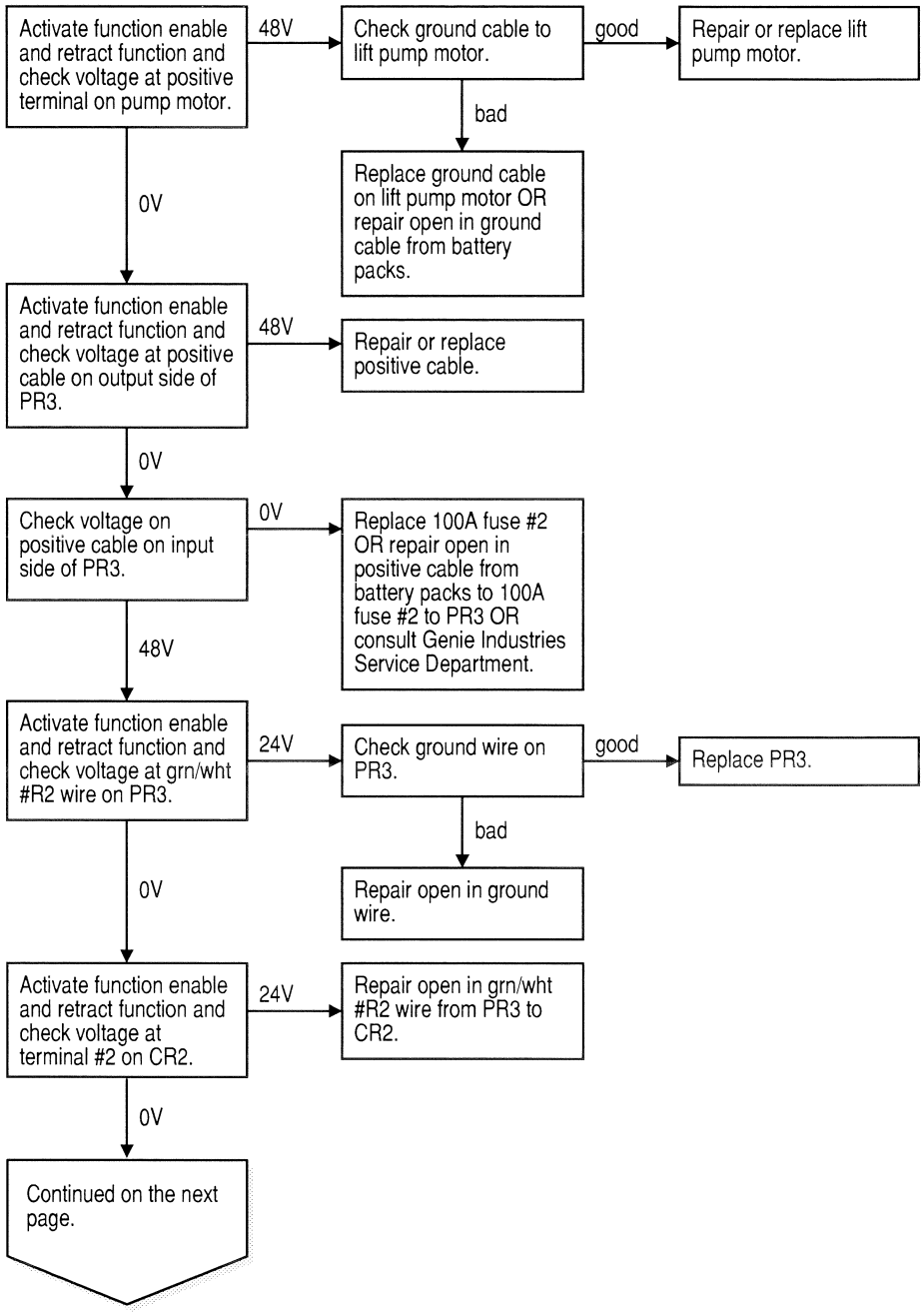


CHART 2

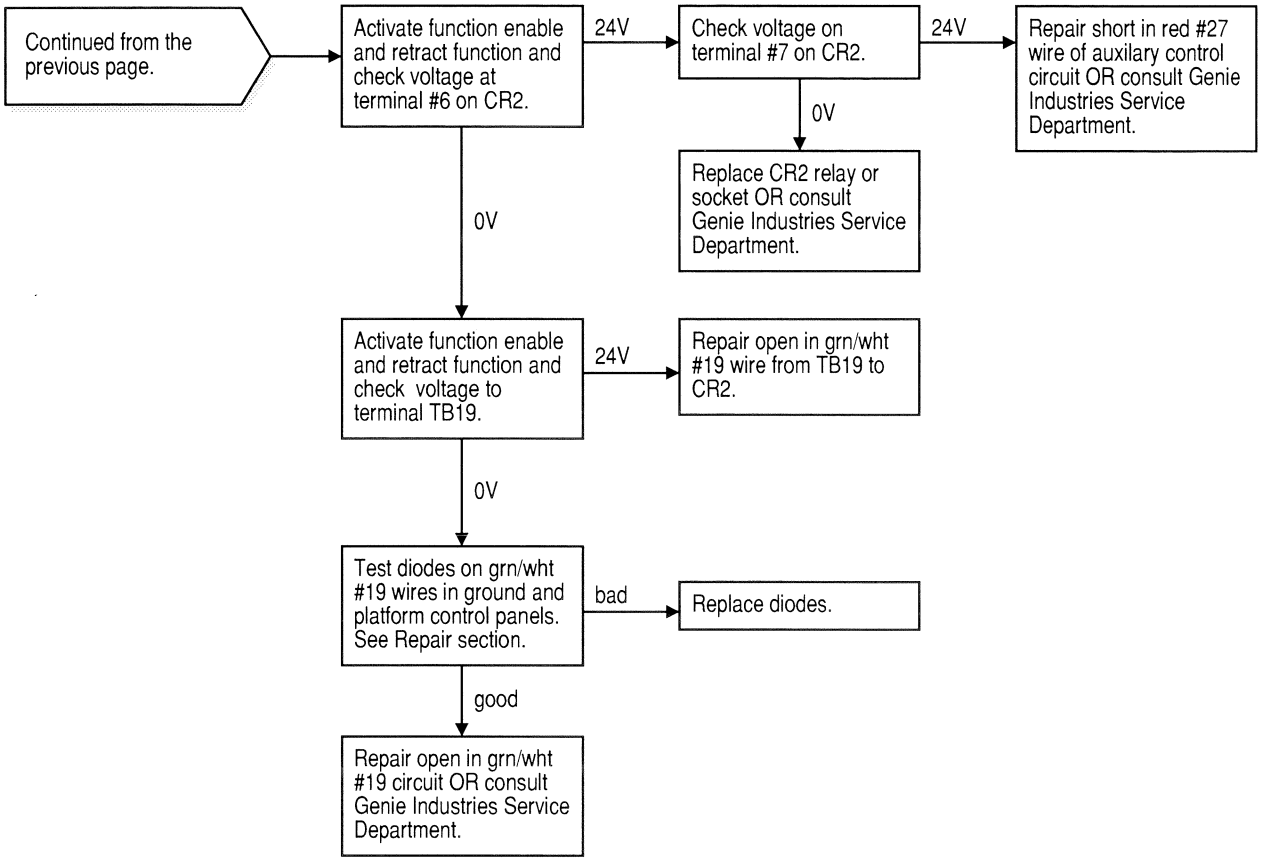

Continued from the previous page.
Activate function enable and retract function and check voltage at terminal #6 on CR2.
24V
Check voltage on terminal #7 on CR2.
24V
Repair short in red #27 wire of auxilary control circuit OR consult Genie Industries Service Department.
0V
Replace CR2 relay or socket OR consult Genie Industries Service Department.
0V
Activate function enable and retract function and check voltage to terminal TB19.
24V
Repair open in grn/wht #19 wire from TB19 to CR2.
0V
Test diodes on grn/wht #19 wires in ground and platform control panels. See Repair section.
bad
Replace diodes.
good
Repair open in grn/wht #19 circuit OR consult Genie Industries Service Department.

Chart 3

Auxiliary Pump Motor Will Not Operate.

Be sure all other functions operate normally.

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

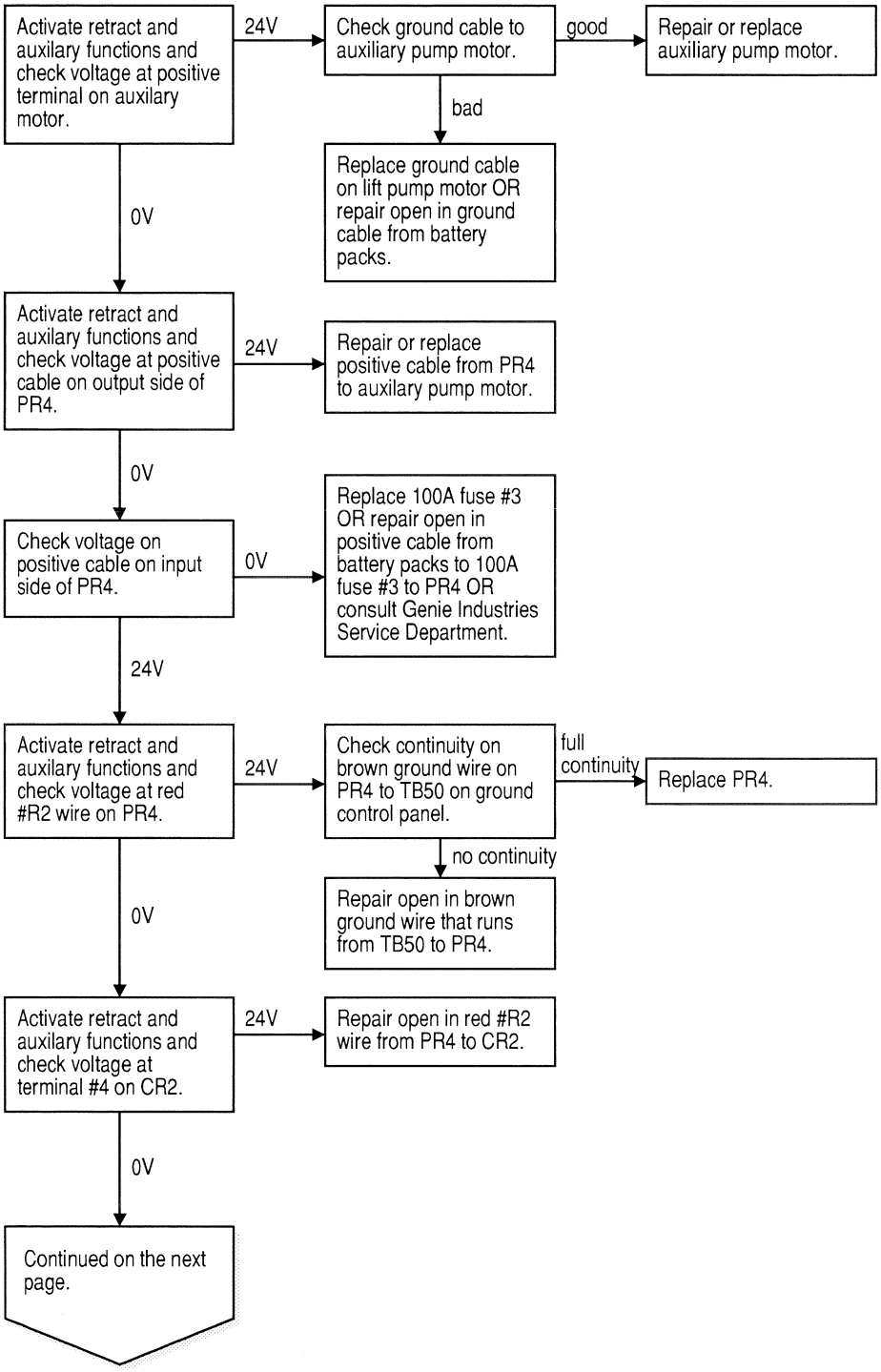


CHART 3

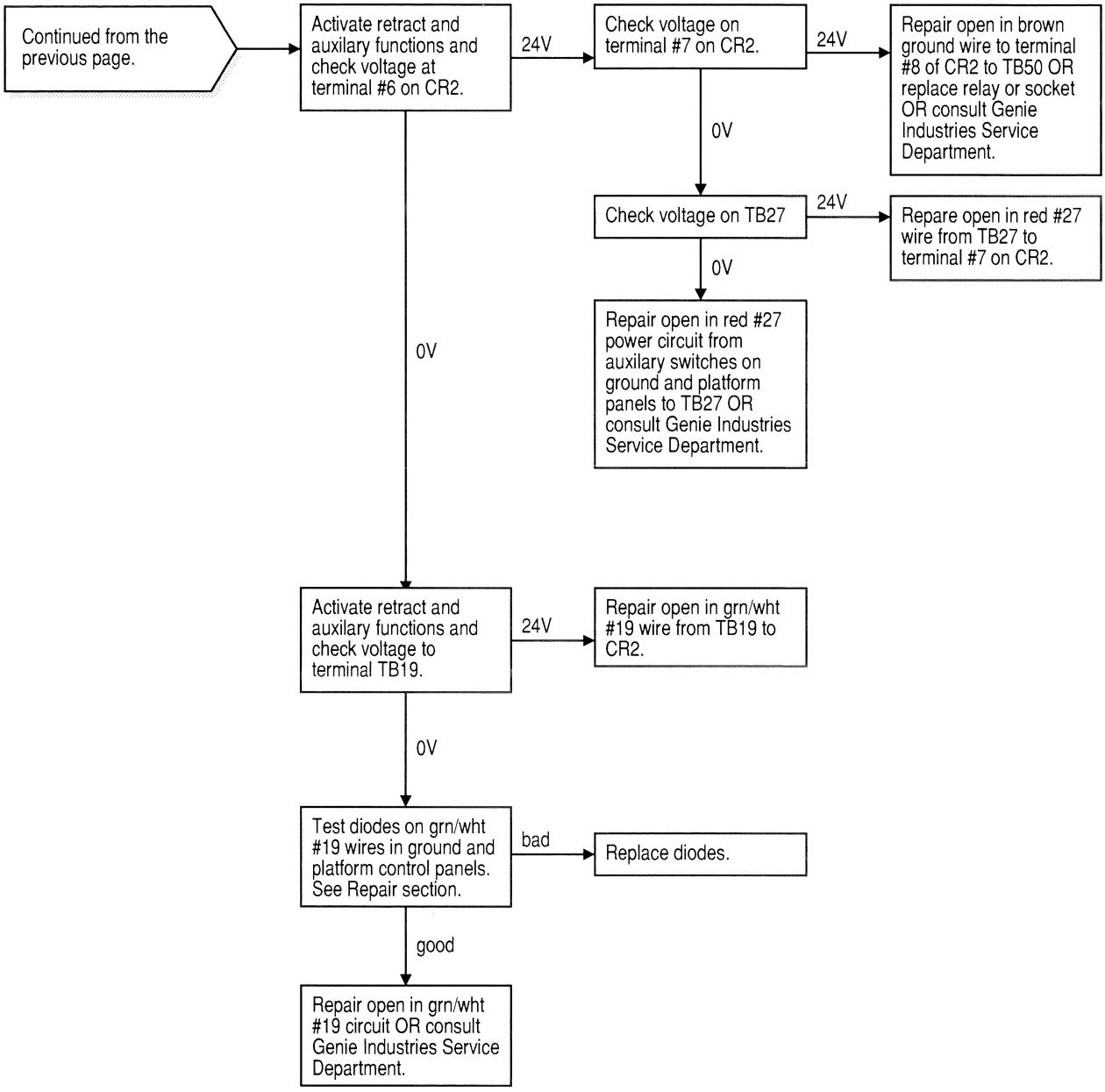

Continued from the previous page.
Activate retract and auxilary functions and check voltage at terminal #6 on CR2.
24V
Check voltage on terminal #7 on CR2.
24V
Repair open in brown ground wire to terminal #8 of CR2 to TB50 OR replace relay or socket OR consult Genie Industries Service Department.
0V
Check voltage on TB27
24V
Repare open in red #27 wire from TB27 to terminal #7 on CR2.
0V
Repair open in red #27 power circuit from auxilary switches on ground and platform panels to TB27 OR consult Genie Industries Service Department.
0V
Activate retract and auxilary functions and check voltage to terminal TB19.
24V
Repair open in grn/wht #19 wire from TB19 to CR2.
0V
Test diodes on grn/wht #19 wires in ground and platform control panels. See Repair section.
bad
Replace diodes.
good
Repair open in grn/wht #19 circuit OR consult Genie Industries Service Department.

Chart 4

All Functions Inoperative, Power Unit Starts and Runs

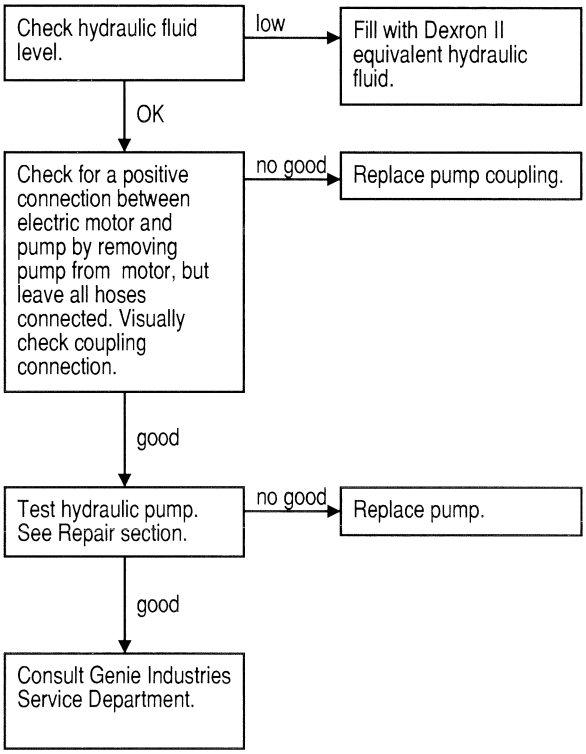


Chart 5

All Lift and Steer Functions Inoperative, Drive Function Operational

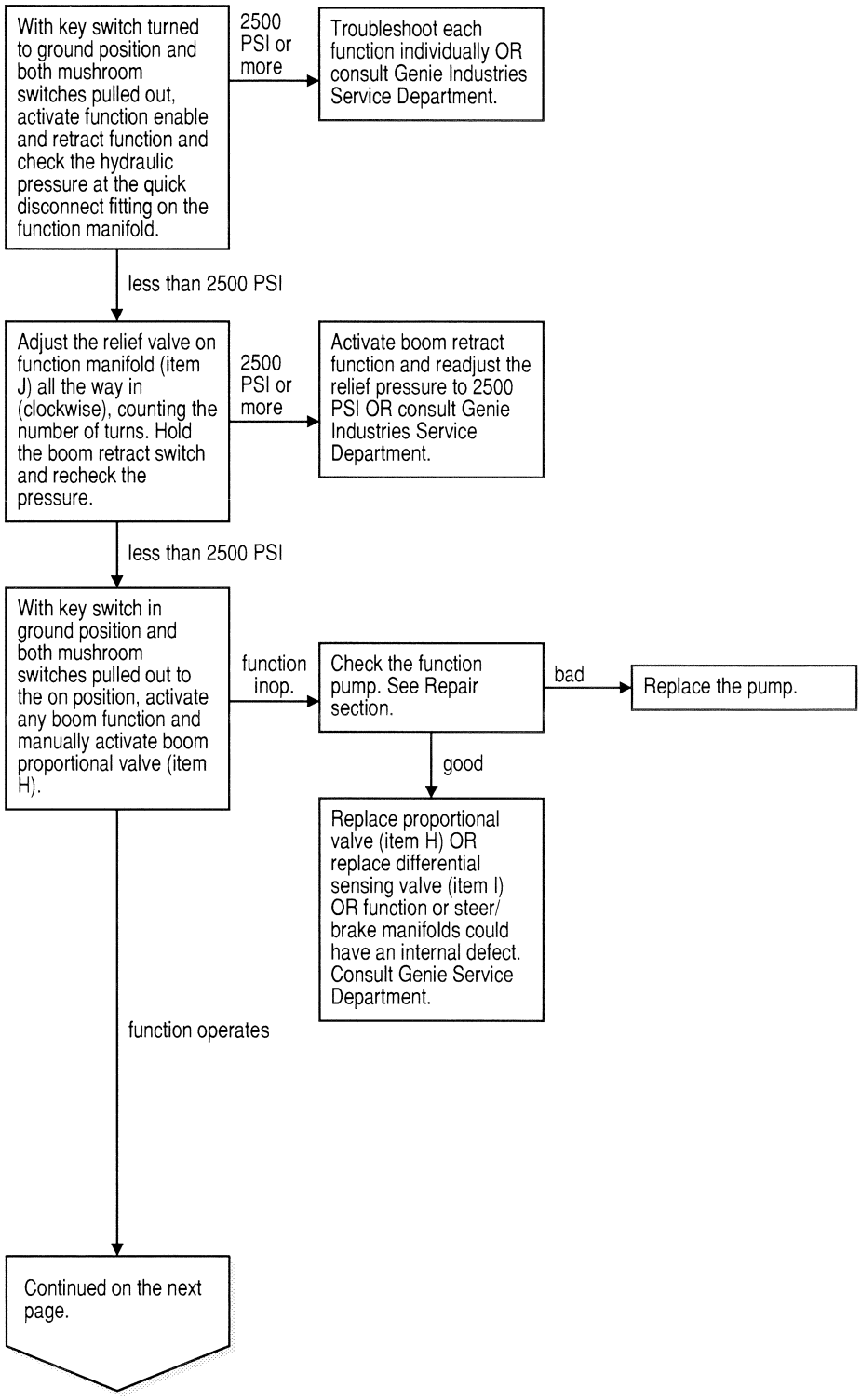


CHART 5

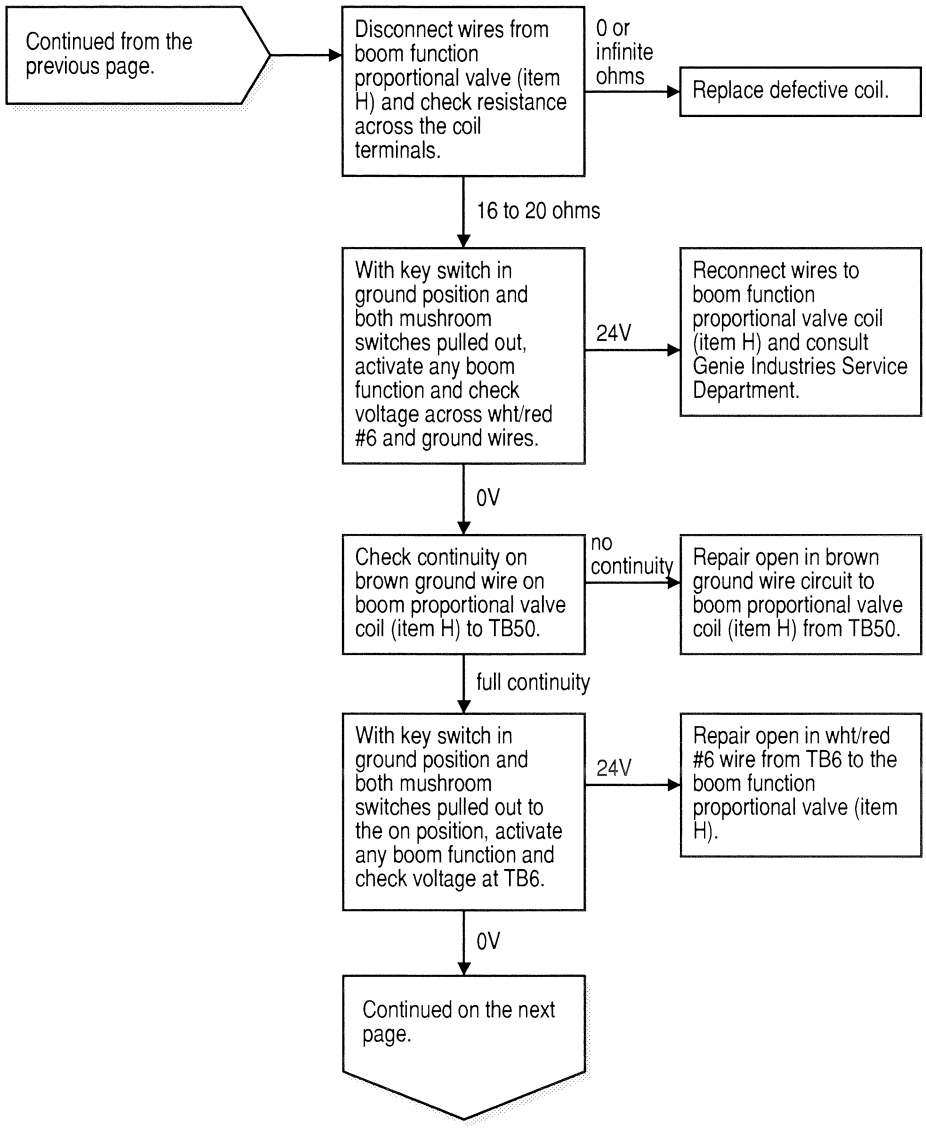

Continued from the previous page.
Disconnect wires from boom function proportional valve (item H) and check resistance across the coil terminals.
0 or infinite ohms
Replace defective coil.
16 to 20 ohms
With key switch in ground position and both mushroom switches pulled out, activate any boom function and check voltage across wht/red #6 and ground wires.
24V
Reconnect wires to boom function proportional valve coil (item H) and consult Genie Industries Service Department.
0V
Check continuity on brown ground wire on boom proportional valve coil (item H) to TB50.
no continuity
Repair open in brown ground wire circuit to boom proportional valve coil (item H) from TB50.
full continuity
With key switch in ground position and both mushroom switches pulled out to the on position, activate any boom function and check voltage at TB6.
24V
Repair open in wht/red #6 wire from TB6 to the boom function proportional valve (item H).
0V
Continued on the next page.

CHART 5

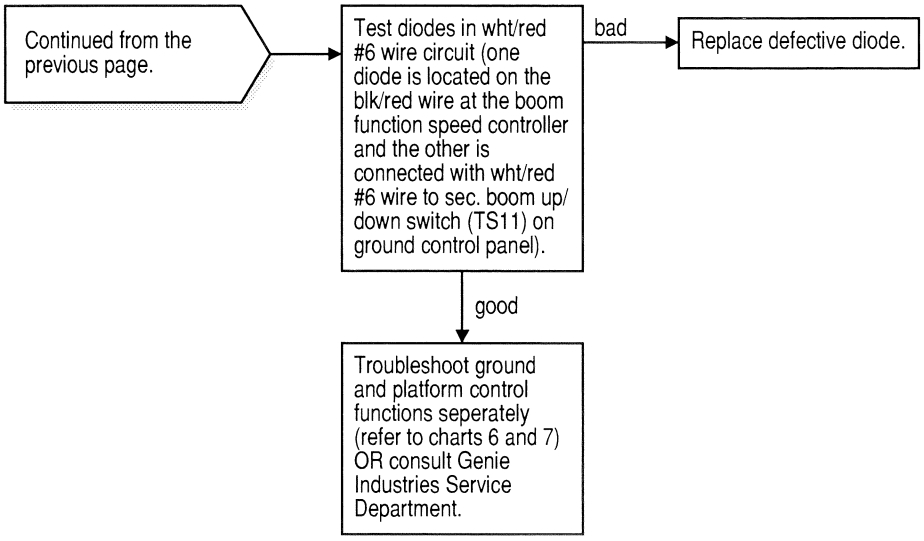

Continued from the previous page.
Test diodes in wht/red #6 wire circuit (one diode is located on the blk/red wire at the boom function speed controller and the other is connected with wht/red #6 wire to sec. boom up/ down switch (TS11) on ground control panel).
bad
Replace defective diode.
good
Troubleshoot ground and platform control functions seperately (refer to charts 6 and 7) OR consult Genie Industries Service Department.

Chart 6

Ground Controls Inoperative, Platform Controls Operate Normally

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

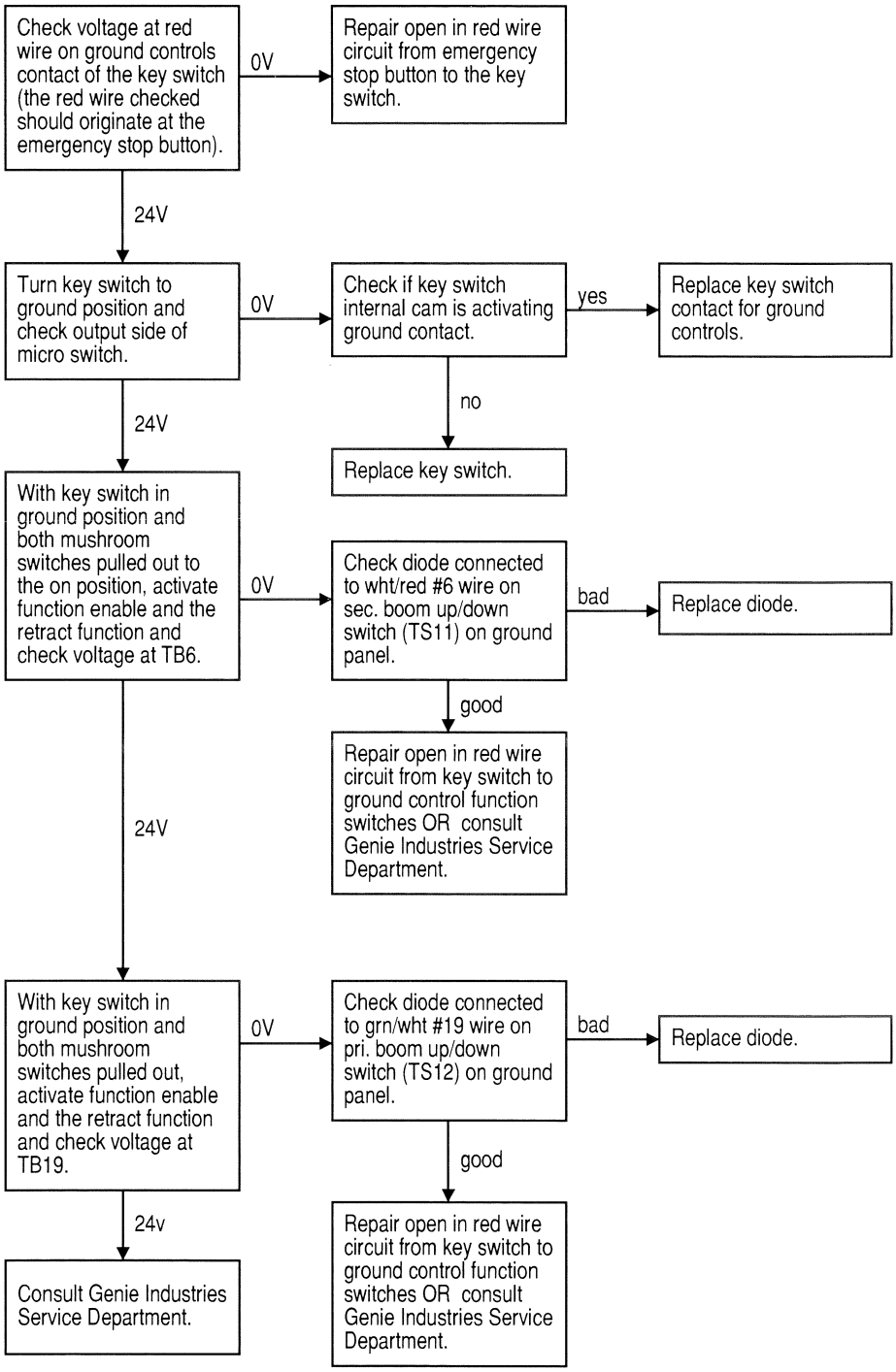


Chart 7

Platform Controls Inoperative, Ground Controls Operate Normally

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

Be sure boom function speed controller is turned to 9.

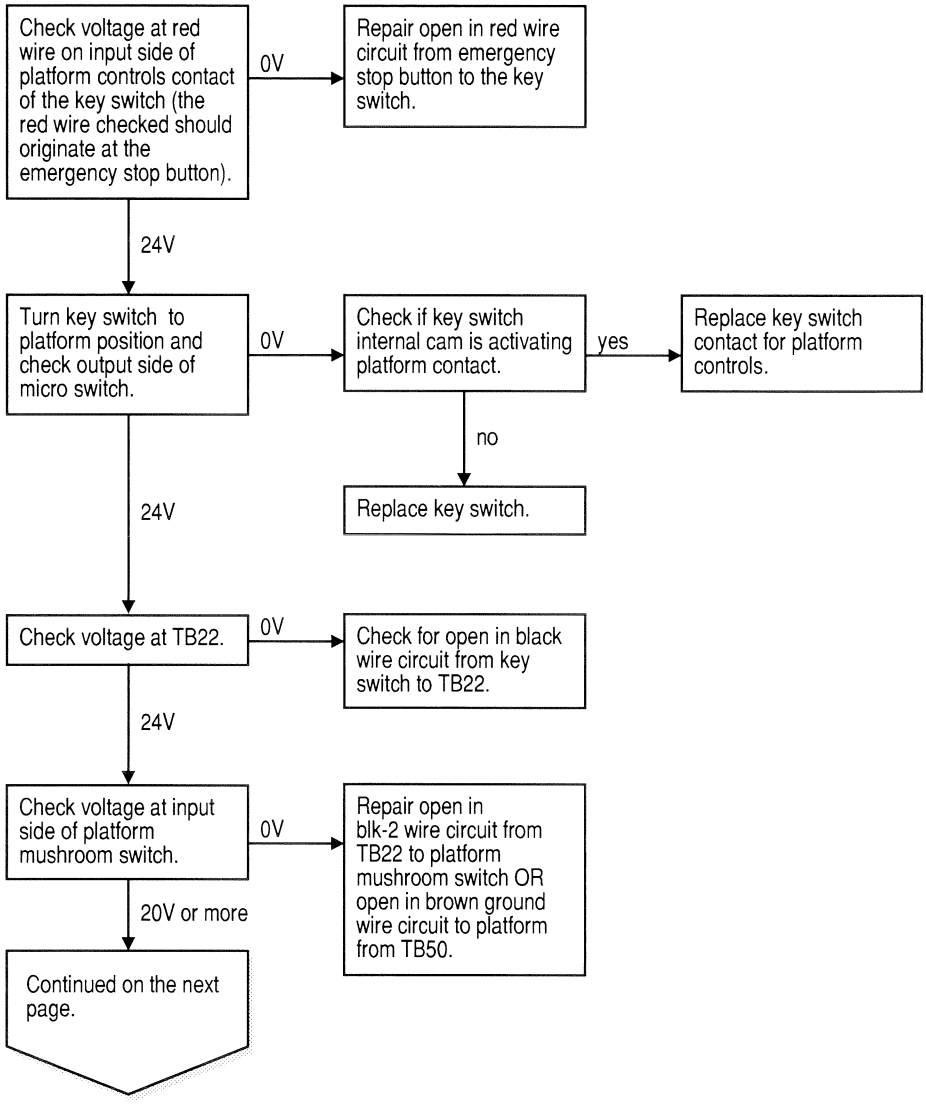


CHART 7

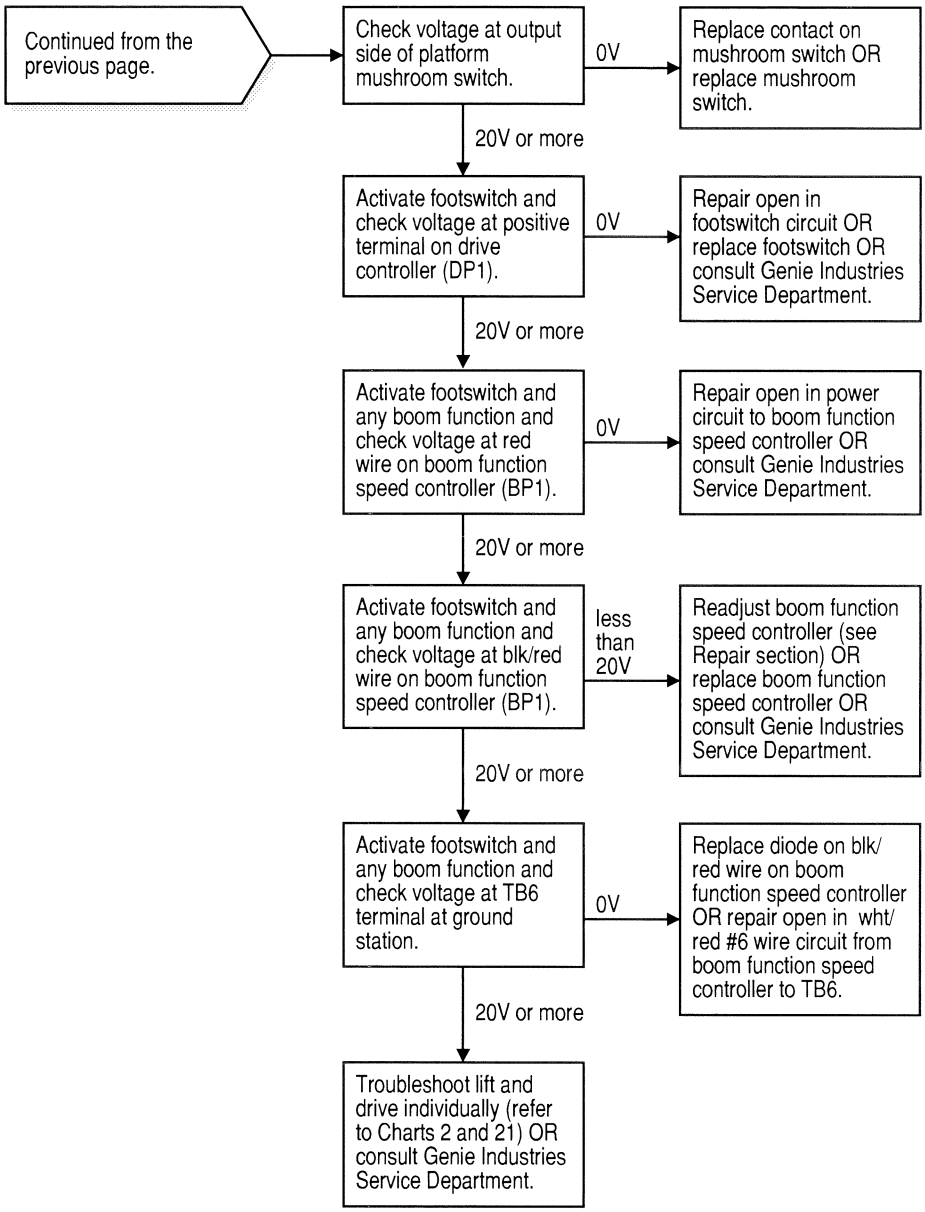

Continued from the previous page.
Check voltage at output side of platform mushroom switch.
0V
Replace contact on mushroom switch OR replace mushroom switch.
20V or more
Activate footswitch and check voltage at positive terminal on drive controller (DP1).
0V
Repair open in footswitch circuit OR replace footswitch OR consult Genie Industries Service Department.
20V or more
Activate footswitch and any boom function and check voltage at red wire on boom function speed controller (BP1).
0V
Repair open in power circuit to boom function speed controller OR consult Genie Industries Service Department.
20V or more
Activate footswitch and any boom function and check voltage at blk/red wire on boom function speed controller (BP1).
less than 20V
Readjust boom function speed controller (see Repair section) OR replace boom function speed controller OR consult Genie Industries Service Department.
20V or more
Activate footswitch and any boom function and check voltage at TB6 terminal at ground station.
0V
Replace diode on blk/red wire on boom function speed controller OR repair open in wht/red #6 wire circuit from boom function speed controller to TB6.
20V or more
Troubleshoot lift and drive individually (refer to Charts 2 and 21) OR consult Genie Industries Service Department.

Chart 8

Primary Boom Up Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

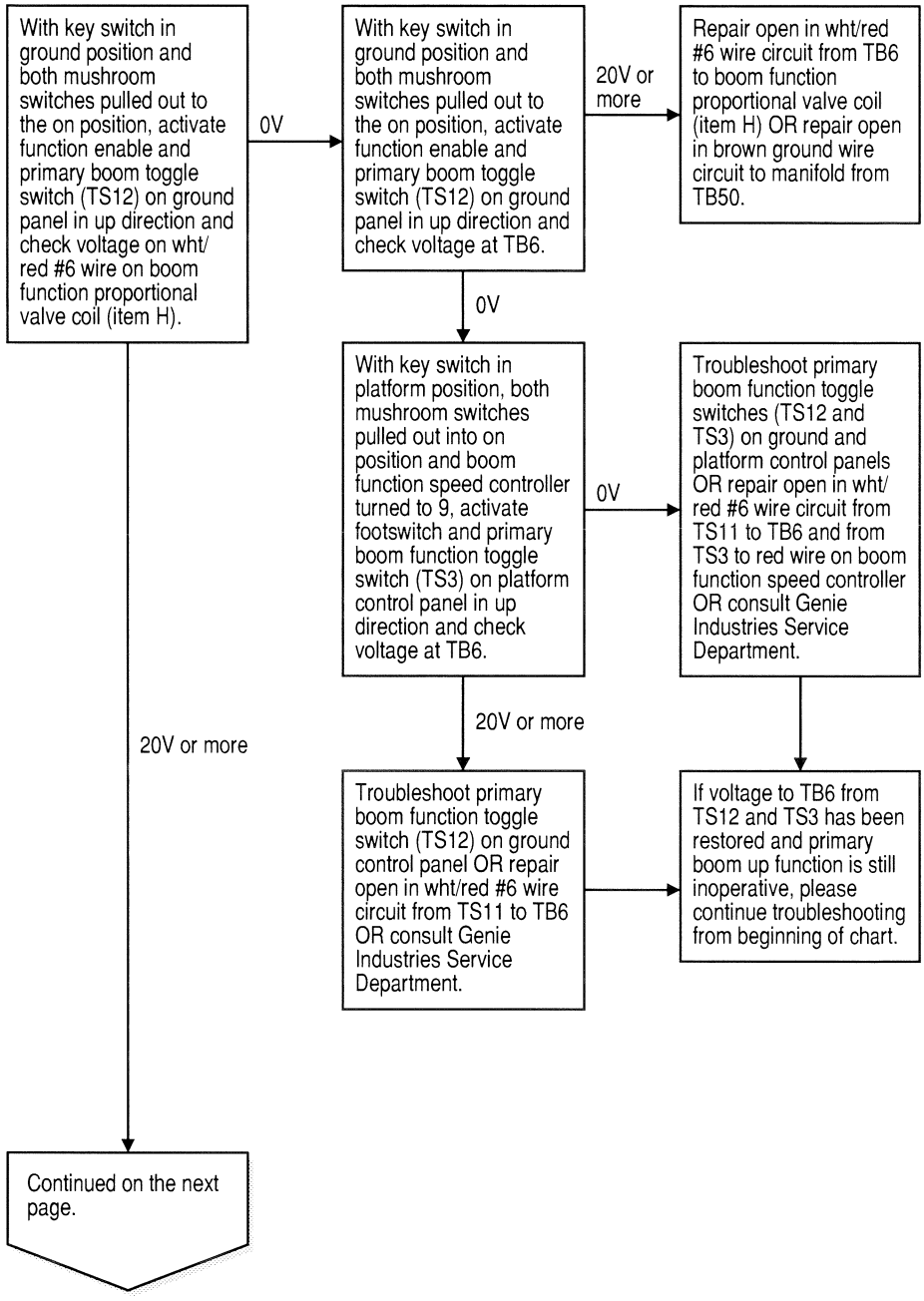


CHART 8

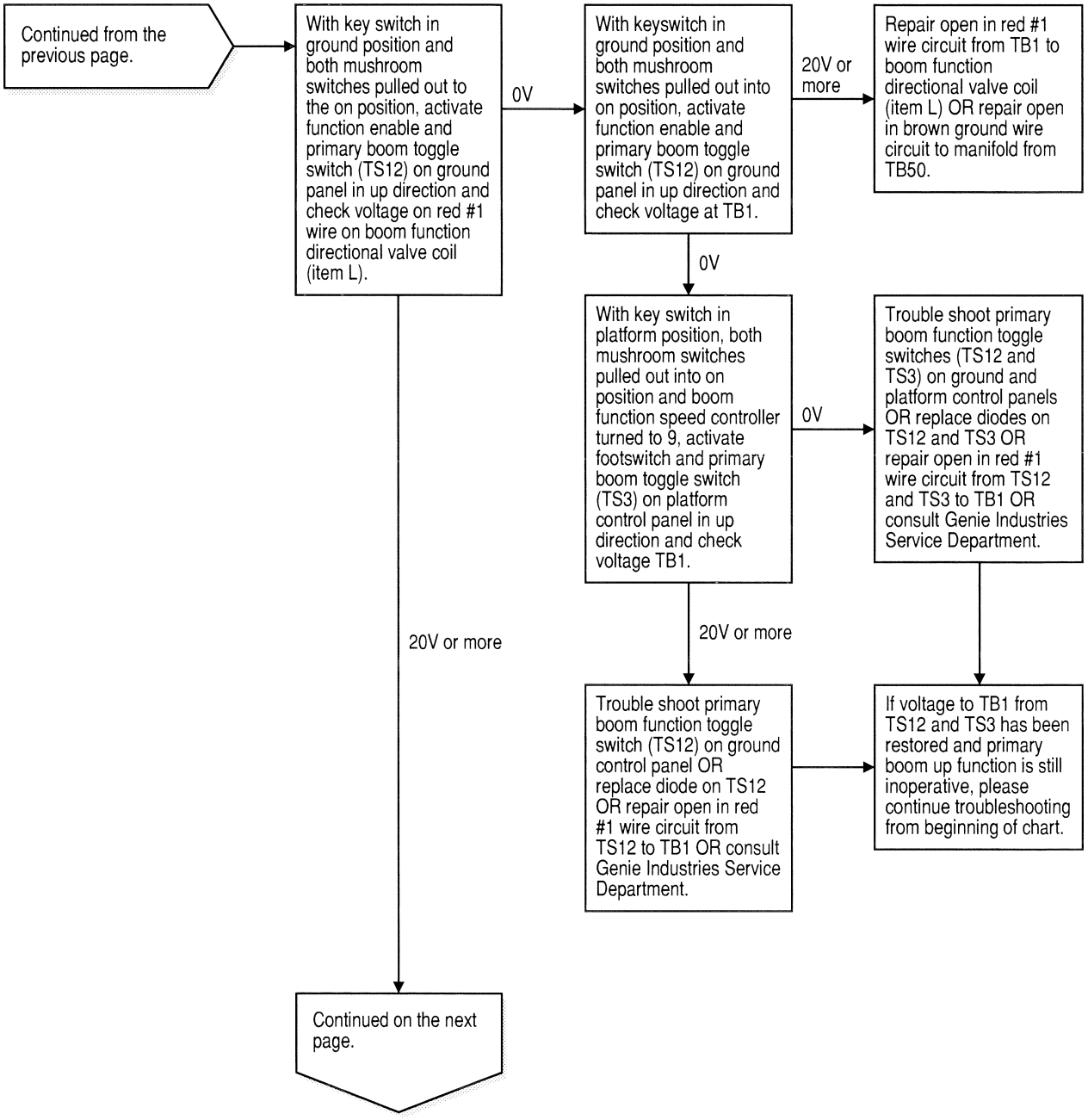

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and primary boom toggle switch (TS12) on ground panel in up direction and check voltage on red #1 wire on boom function directional valve coil (item L).
0V
With keyswitch in ground position and both mushroom switches pulled out into on position, activate function enable and primary boom toggle switch (TS12) on ground panel in up direction and check voltage at TB1.
20V or more
Repair open in red #1 wire circuit from TB1 to boom function directional valve coil (item L) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out into on position and boom function speed controller turned to 9, activate footswitch and primary boom toggle switch (TS3) on platform control panel in up direction and check voltage TB1.
0V
Trouble shoot primary boom function toggle switches (TS12 and TS3) on ground and platform control panels OR replace diodes on TS12 and TS3 OR repair open in red #1 wire circuit from TS12 and TS3 to TB1 OR consult Genie Industries Service Department.
20V or more
20V or more
Trouble shoot primary boom function toggle switch (TS12) on ground control panel OR replace diode on TS12 OR repair open in red #1 wire circuit from TS12 to TB1 OR consult Genie Industries Service Department.
If voltage to TB1 from TS12 and TS3 has been restored and primary boom up function is still inoperative, please continue troubleshooting from beginning of chart.
Continued on the next page.

CHART 8

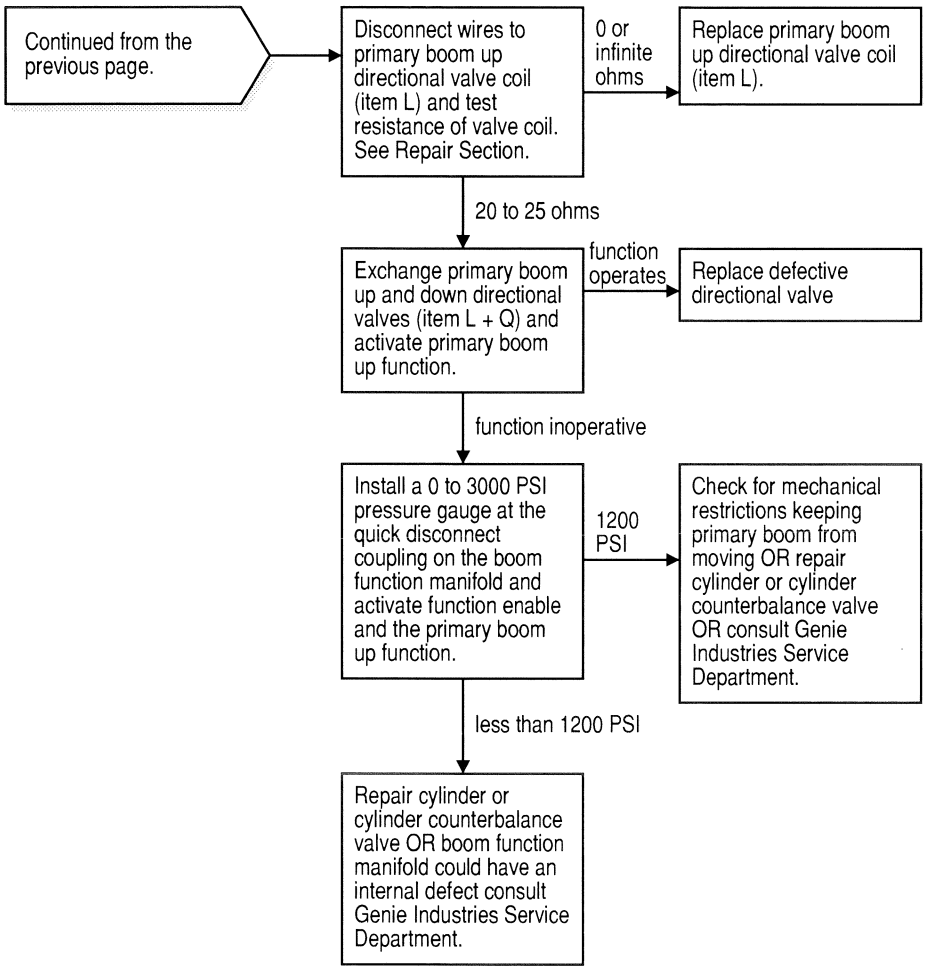

Continued from the previous page.
Disconnect wires to primary boom up directional valve coil (item L) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace primary boom up directional valve coil (item L).
20 to 25 ohms
Exchange primary boom up and down directional valves (item L + Q) and activate primary boom up function.
function operates
Replace defective directional valve
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate function enable and the primary boom up function.
1200 PSI
Check for mechanical restrictions keeping primary boom from moving OR repair cylinder or cylinder counterbalance valve OR consult Genie Industries Service Department.
less than 1200 PSI
Repair cylinder or cylinder counterbalance valve OR boom function manifold could have an internal defect consult Genie Industries Service Department.

Chart 9

Primary Boom Down Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

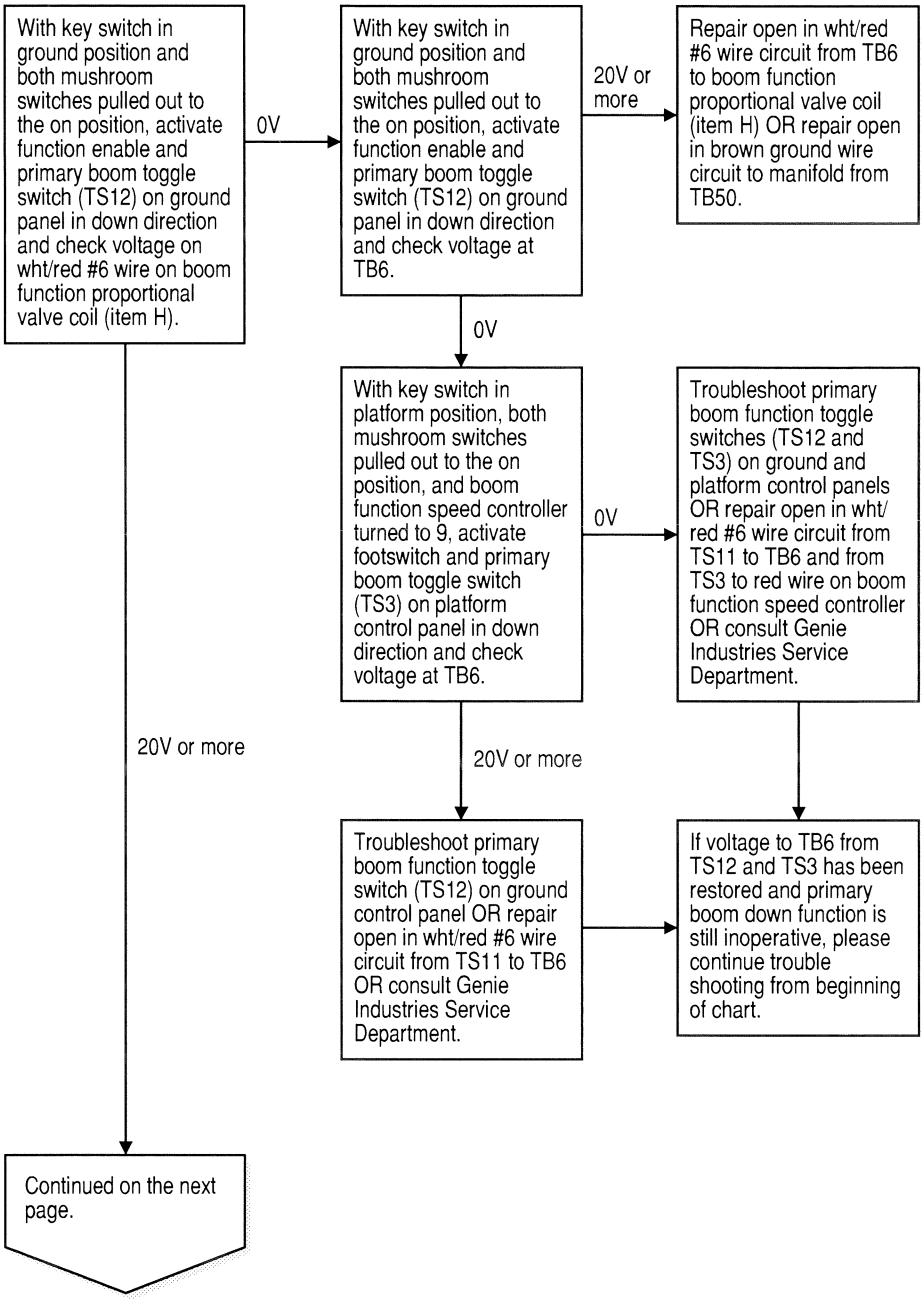


CHART 9

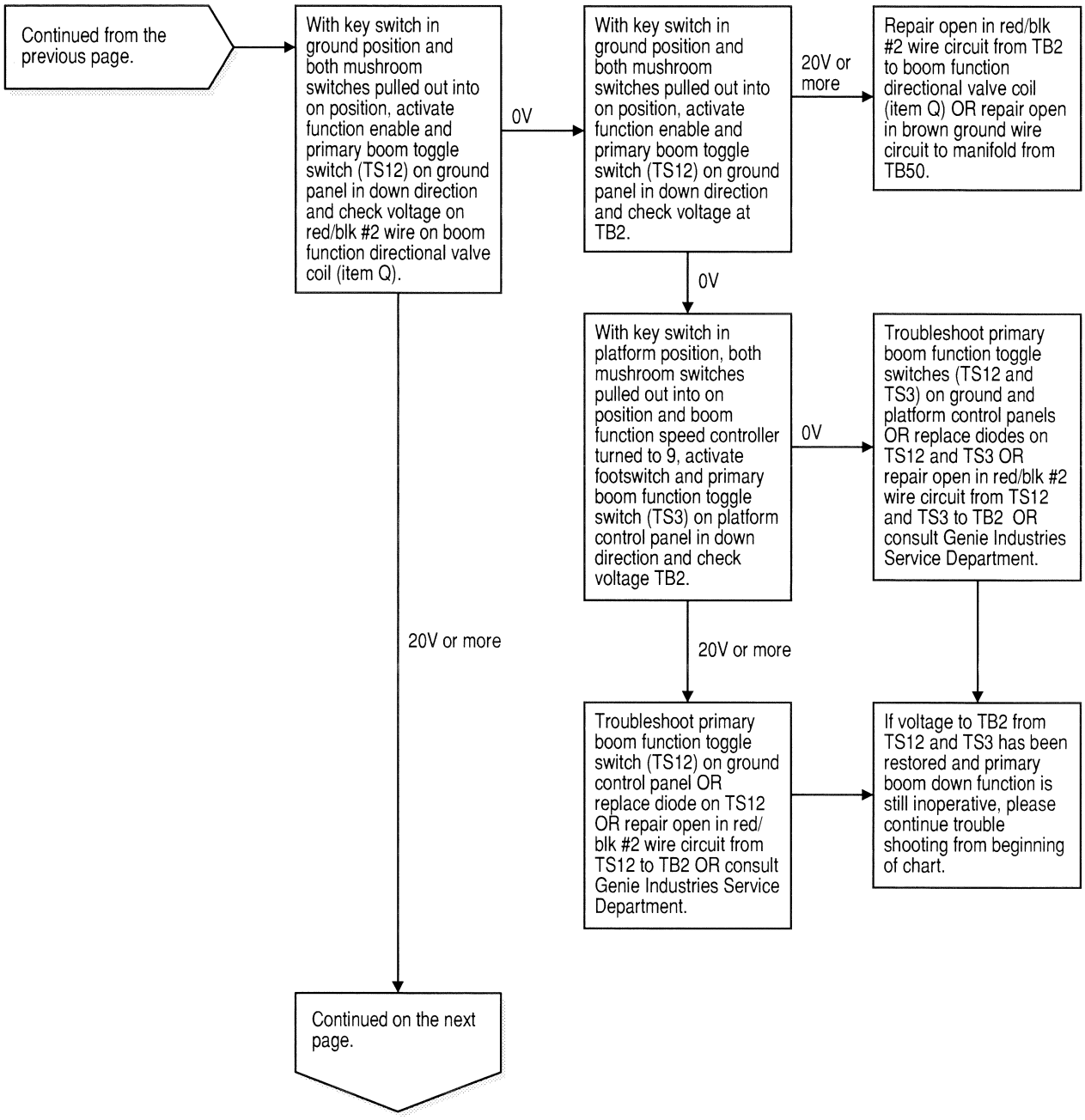

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out into on position, activate function enable and primary boom toggle switch (TS12) on ground panel in down direction and check voltage on red/blk #2 wire on boom function directional valve coil (item Q).
0V
With key switch in ground position and both mushroom switches pulled out into on position, activate function enable and primary boom toggle switch (TS12) on ground panel in down direction and check voltage at TB2.
20V or more
Repair open in red/blk #2 wire circuit from TB2 to boom function directional valve coil (item Q) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out into on position and boom function speed controller turned to 9, activate footswitch and primary boom function toggle switch (TS3) on platform control panel in down direction and check voltage TB2.
0V
Troubleshoot primary boom function toggle switches (TS12 and TS3) on ground and platform control panels OR replace diodes on TS12 and TS3 OR repair open in red/blk #2 wire circuit from TS12 and TS3 to TB2 OR consult Genie Industries Service Department.
20V or more
20V or more
Troubleshoot primary boom function toggle switch (TS12) on ground control panel OR replace diode on TS12 OR repair open in red/blk #2 wire circuit from TS12 to TB2 OR consult Genie Industries Service Department.
If voltage to TB2 from TS12 and TS3 has been restored and primary boom down function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 9

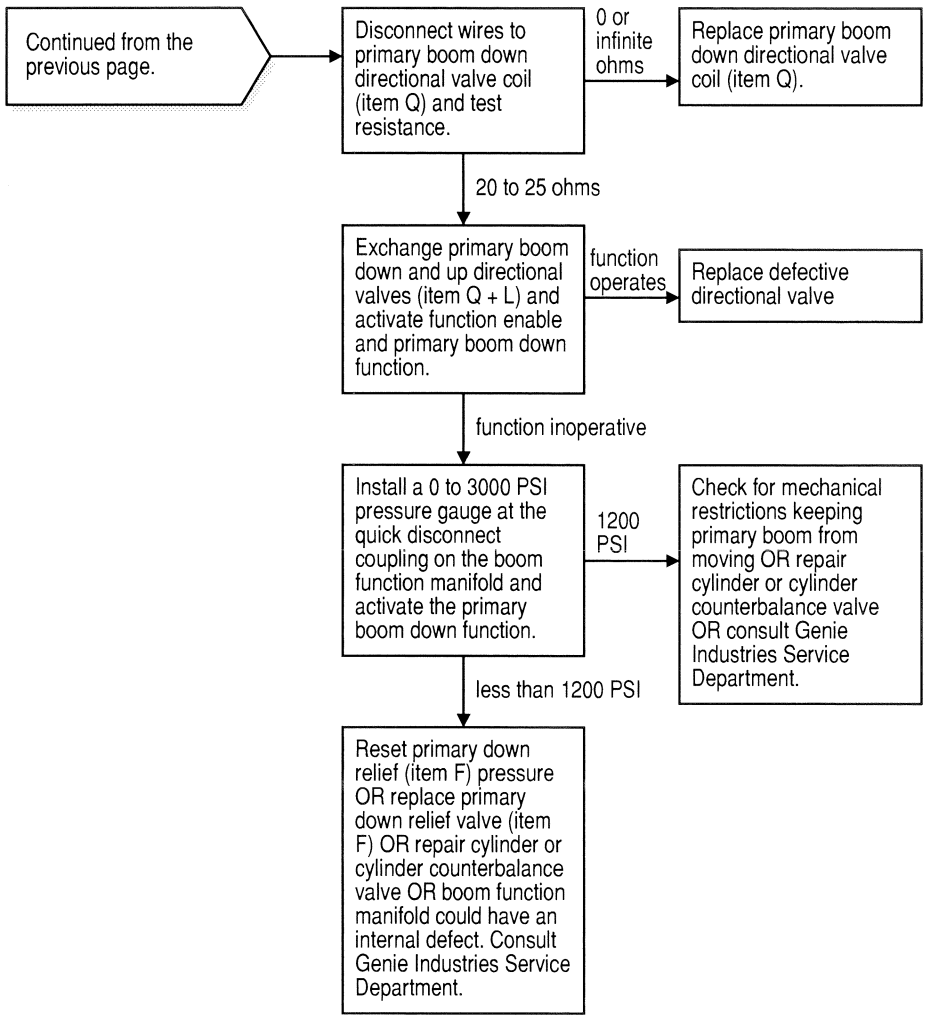

Continued from the previous page.
Disconnect wires to primary boom down directional valve coil (item Q) and test resistance.
0 or infinite ohms
Replace primary boom down directional valve coil (item Q).
20 to 25 ohms
Exchange primary boom down and up directional valves (item Q + L) and activate function enable and primary boom down function.
function operates
Replace defective directional valve
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the primary boom down function.
1200 PSI
Check for mechanical restrictions keeping primary boom from moving OR repair cylinder or cylinder counterbalance valve OR consult Genie Industries Service Department.
less than 1200 PSI
Reset primary down relief (item F) pressure OR replace primary down relief valve (item F) OR repair cylinder or cylinder counterbalance valve OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 10

Secondary Boom Up Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

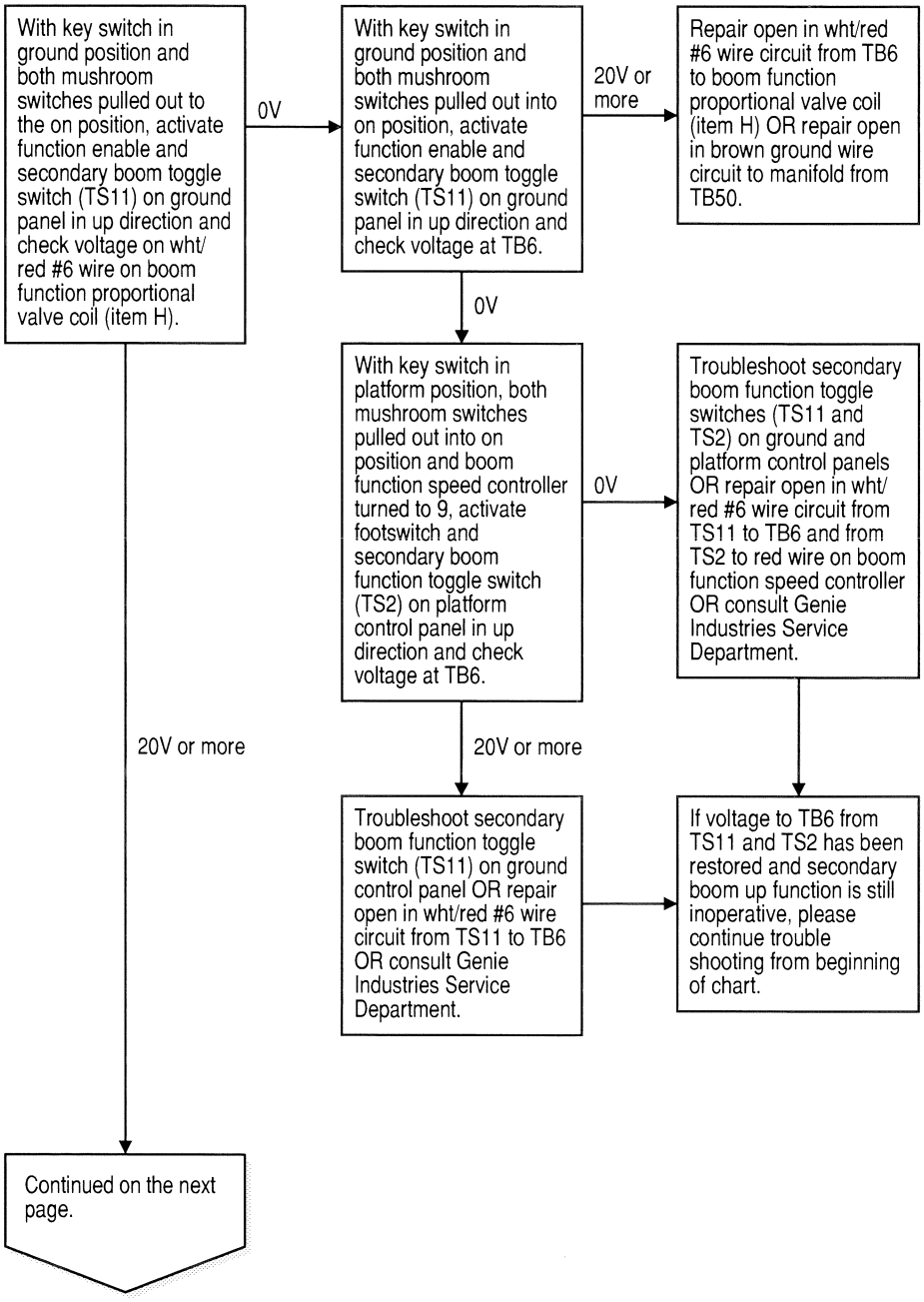


CHART 10

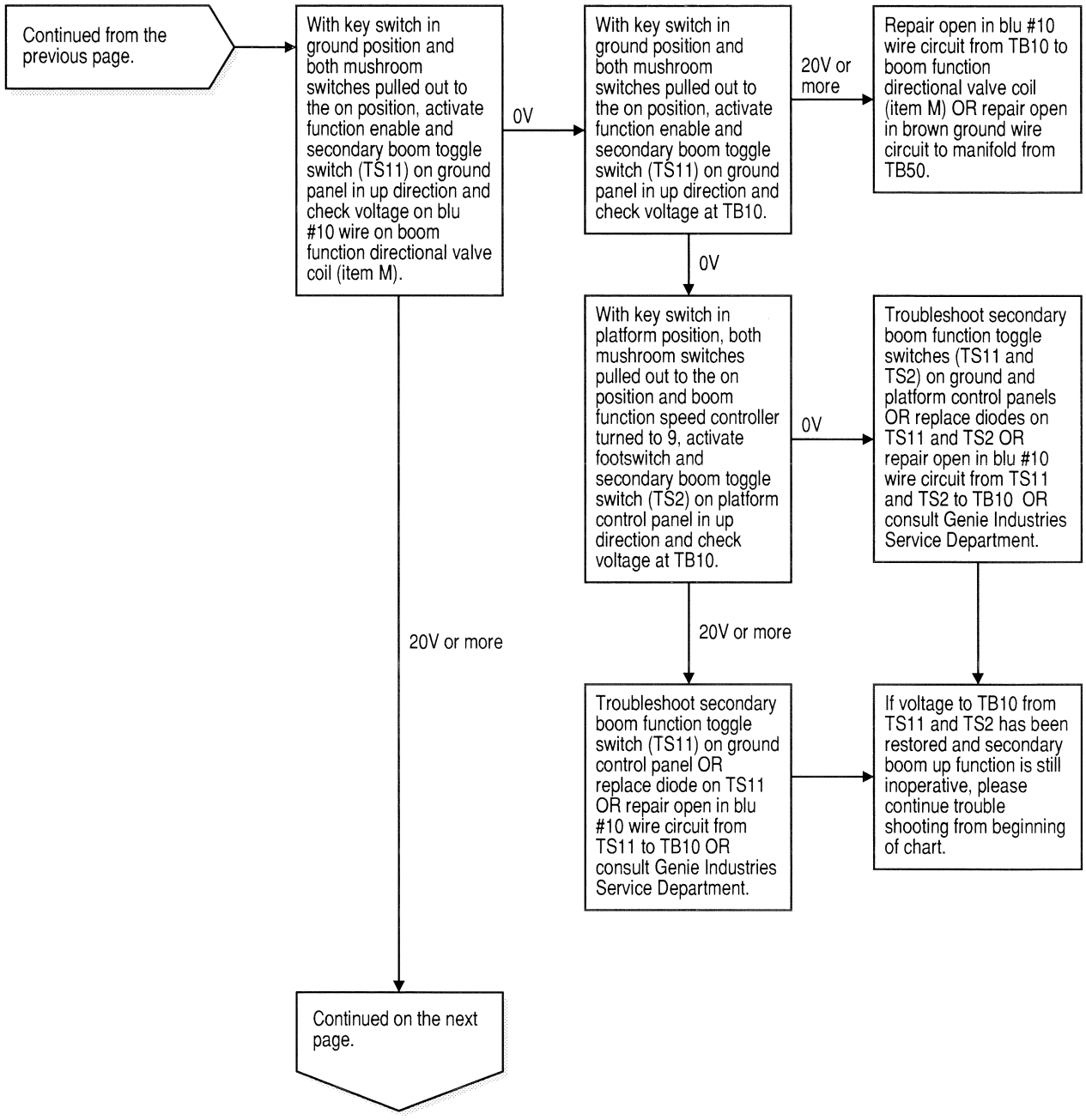

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and secondary boom toggle switch (TS11) on ground panel in up direction and check voltage on blu #10 wire on boom function directional valve coil (item M).
0V
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and secondary boom toggle switch (TS11) on ground panel in up direction and check voltage at TB10.
20V or more
Repair open in blu #10 wire circuit from TB10 to boom function directional valve coil (item M) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and secondary boom toggle switch (TS2) on platform control panel in up direction and check voltage at TB10.
0V
Troubleshoot secondary boom function toggle switches (TS11 and TS2) on ground and platform control panels OR replace diodes on TS11 and TS2 OR repair open in blu #10 wire circuit from TS11 and TS2 to TB10 OR consult Genie Industries Service Department.
20V or more
20V or more
Troubleshoot secondary boom function toggle switch (TS11) on ground control panel OR replace diode on TS11 OR repair open in blu #10 wire circuit from TS11 to TB10 OR consult Genie Industries Service Department.
If voltage to TB10 from TS11 and TS2 has been restored and secondary boom up function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 10

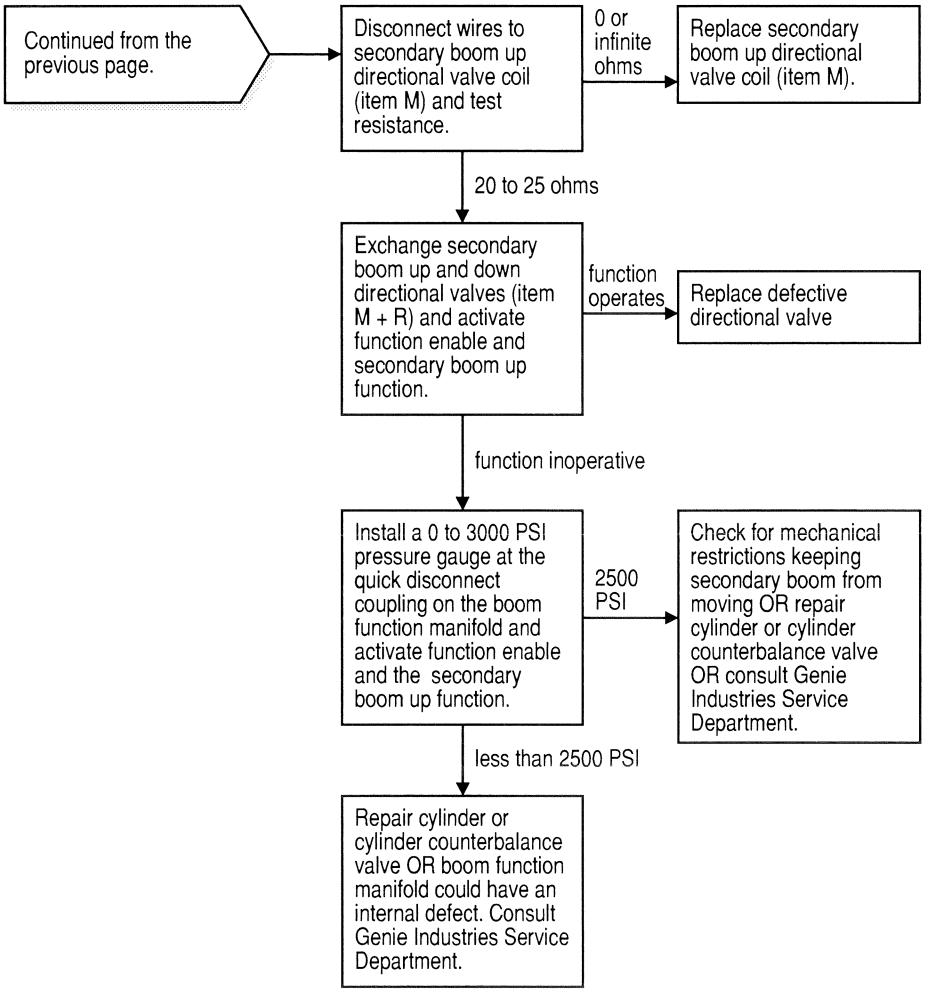

Continued from the previous page.
Disconnect wires to secondary boom up directional valve coil (item M) and test resistance.
0 or infinite ohms
Replace secondary boom up directional valve coil (item M).
20 to 25 ohms
Exchange secondary boom up and down directional valves (item M + R) and activate function enable and secondary boom up function.
function operates
Replace defective directional valve
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate function enable and the secondary boom up function.
2500 PSI
Check for mechanical restrictions keeping secondary boom from moving OR repair cylinder or cylinder counterbalance valve OR consult Genie Industries Service Department.
less than 2500 PSI
Repair cylinder or cylinder counterbalance valve OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 11

Secondary Boom Down Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

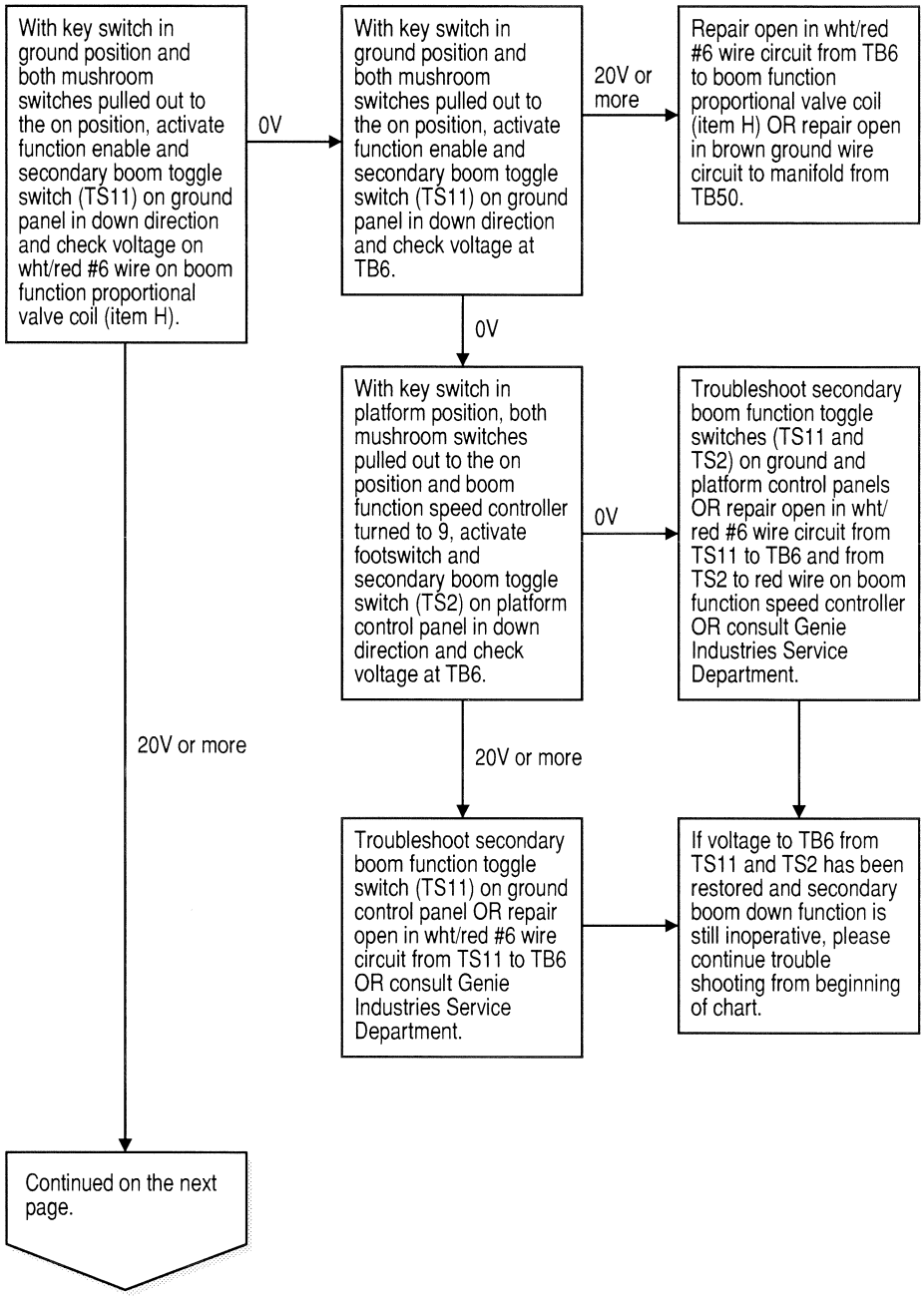


CHART 11

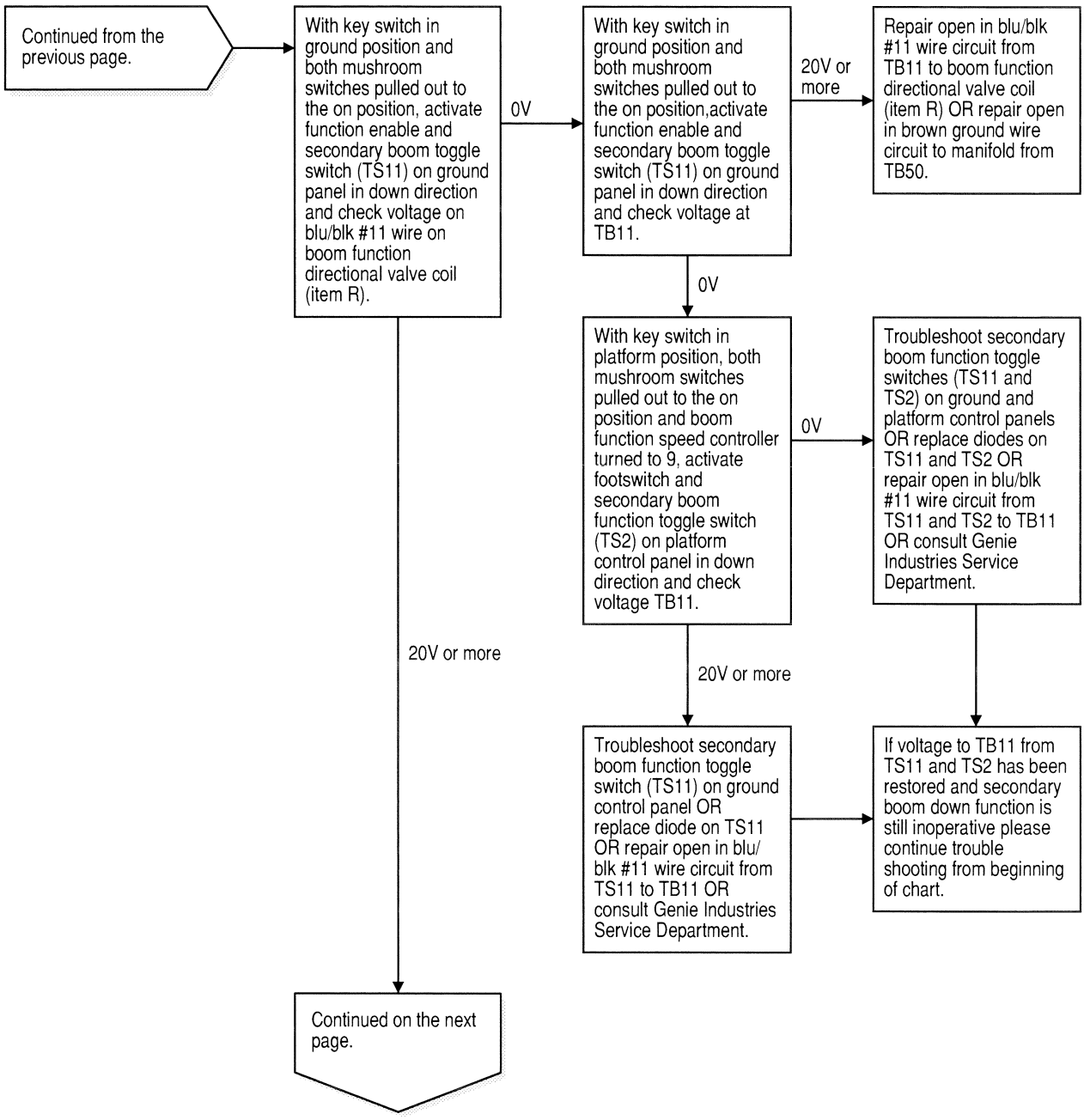

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and secondary boom toggle switch (TS11) on ground panel in down direction and check voltage on blu/blk #11 wire on boom function directional valve coil (item R).
0V
With key switch in ground position and both mushroom switches pulled out to the on position,activate function enable and secondary boom toggle switch (TS11) on ground panel in down direction and check voltage at TB11.
20V or more
Repair open in blu/blk #11 wire circuit from TB11 to boom function directional valve coil (item R) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and secondary boom function toggle switch (TS2) on platform control panel in down direction and check voltage TB11.
0V
Troubleshoot secondary boom function toggle switches (TS11 and TS2) on ground and platform control panels OR replace diodes on TS11 and TS2 OR repair open in blu/blk #11 wire circuit from TS11 and TS2 to TB11 OR consult Genie Industries Service Department.
20V or more
Troubleshoot secondary boom function toggle switch (TS11) on ground control panel OR replace diode on TS11 OR repair open in blu/blk #11 wire circuit from TS11 to TB11 OR consult Genie Industries Service Department.
If voltage to TB11 from TS11 and TS2 has been restored and secondary boom down function is still inoperative please continue trouble shooting from beginning of chart.
20V or more
Continued on the next page.

CHART 11

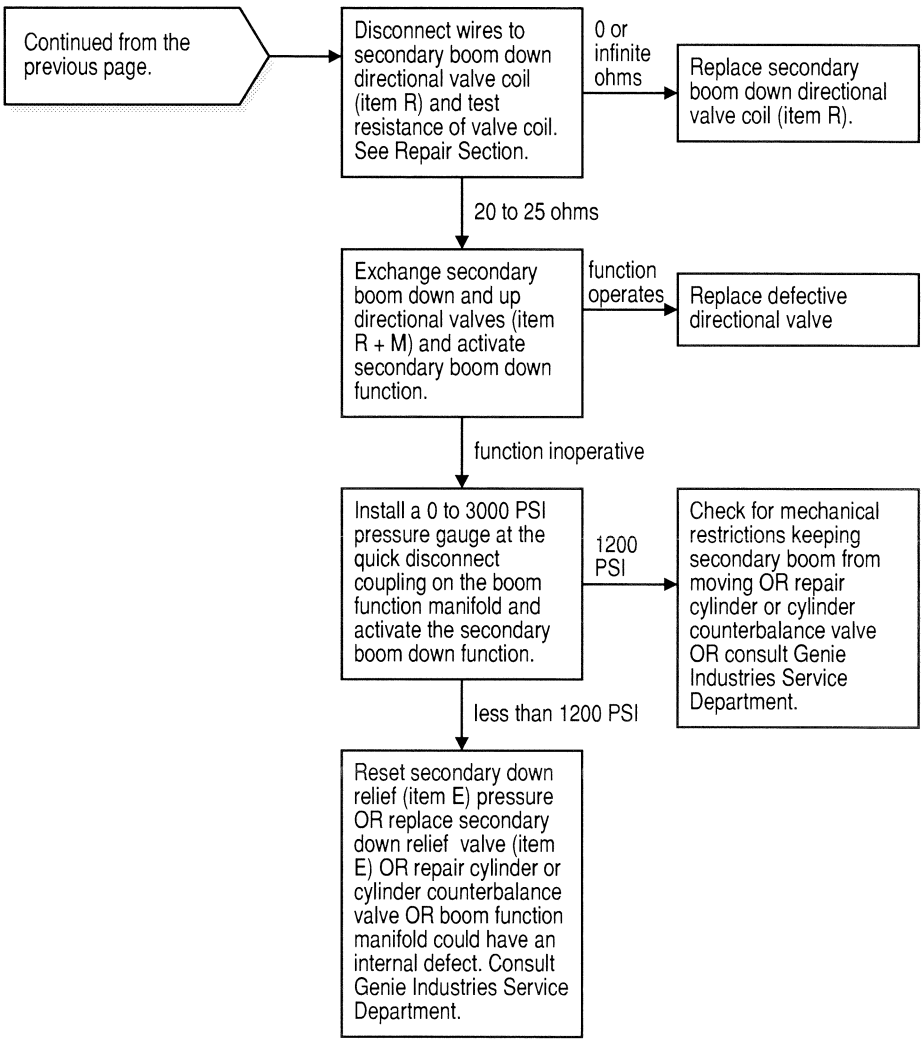

Continued from the previous page.
Disconnect wires to secondary boom down directional valve coil (item R) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace secondary boom down directional valve coil (item R).
20 to 25 ohms
Exchange secondary boom down and up directional valves (item R + M) and activate secondary boom down function.
function operates
Replace defective directional valve
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the secondary boom down function.
1200 PSI
Check for mechanical restrictions keeping secondary boom from moving OR repair cylinder or cylinder counterbalance valve OR consult Genie Industries Service Department.
less than 1200 PSI
Reset secondary down relief (item E) pressure OR replace secondary down relief valve (item E) OR repair cylinder or cylinder counterbalance valve OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 12

Primary Boom Extend Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

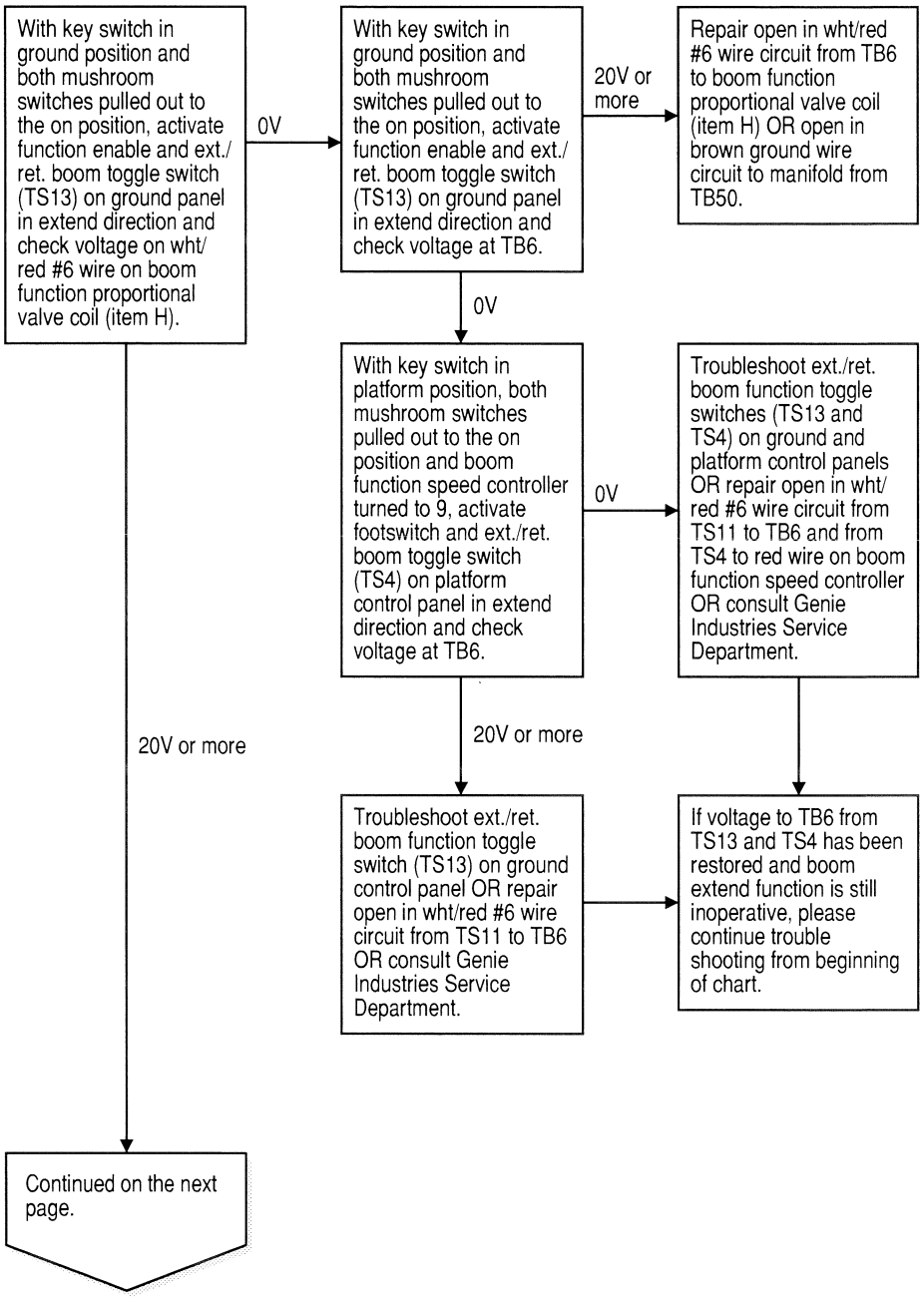


CHART 12

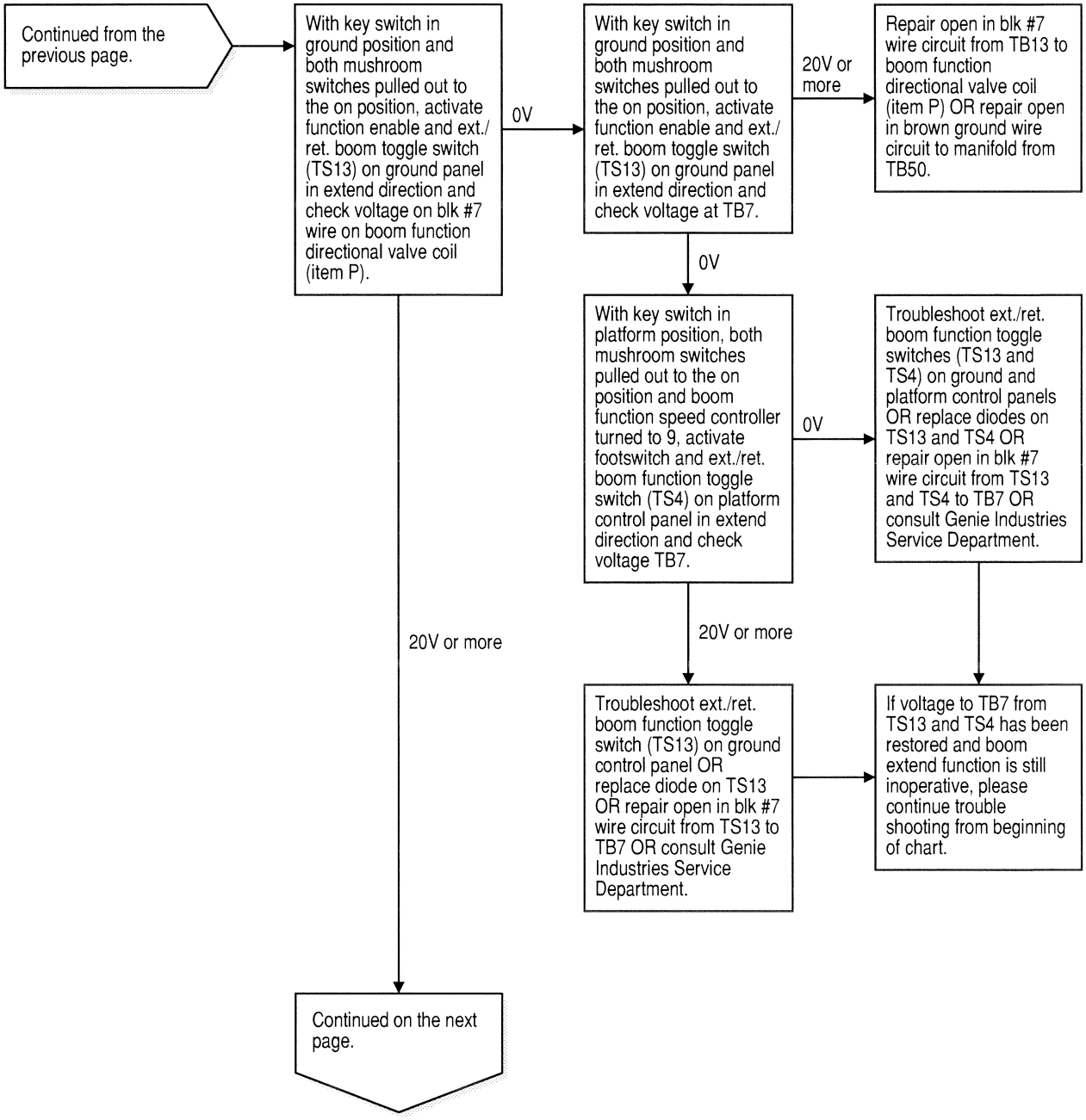

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and ext./ ret. boom toggle switch (TS13) on ground panel in extend direction and check voltage on blk #7 wire on boom function directional valve coil (item P).
0V
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and ext./ ret. boom toggle switch (TS13) on ground panel in extend direction and check voltage at TB7.
20V or more
Repair open in blk #7 wire circuit from TB13 to boom function directional valve coil (item P) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and ext./ret. boom function toggle switch (TS4) on platform control panel in extend direction and check voltage TB7.
0V
Troubleshoot ext./ret. boom function toggle switches (TS13 and TS4) on ground and platform control panels OR replace diodes on TS13 and TS4 OR repair open in blk #7 wire circuit from TS13 and TS4 to TB7 OR consult Genie Industries Service Department.
20V or more
20V or more
Troubleshoot ext./ret. boom function toggle switch (TS13) on ground control panel OR replace diode on TS13 OR repair open in blk #7 wire circuit from TS13 to TB7 OR consult Genie Industries Service Department.
If voltage to TB7 from TS13 and TS4 has been restored and boom extend function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 12

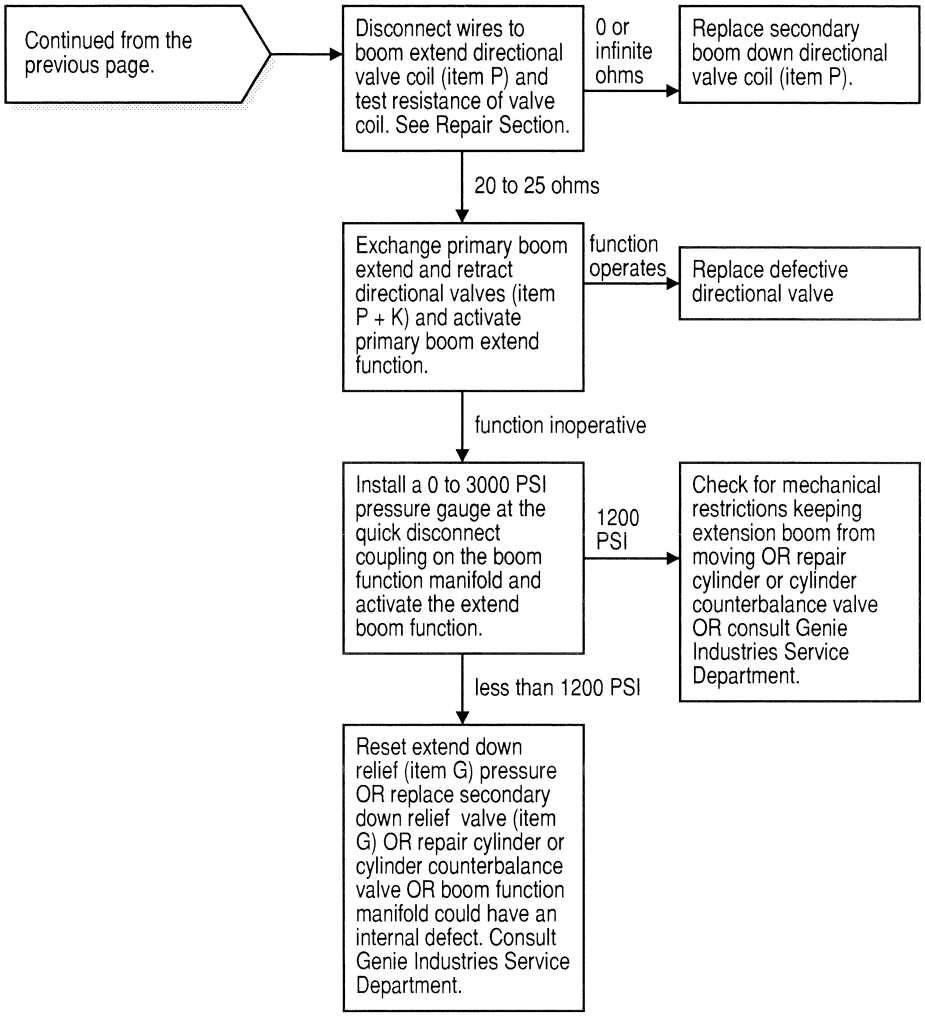

Continued from the previous page.
Disconnect wires to boom extend directional valve coil (item P) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace secondary boom down directional valve coil (item P).
20 to 25 ohms
Exchange primary boom extend and retract directional valves (item P + K) and activate primary boom extend function.
function operates
Replace defective directional valve
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the extend boom function.
1200 PSI
Check for mechanical restrictions keeping extension boom from moving OR repair cylinder or cylinder counterbalance valve OR consult Genie Industries Service Department.
less than 1200 PSI
Reset extend down relief (item G) pressure OR replace secondary down relief valve (item G) OR repair cylinder or cylinder counterbalance valve OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 13

Primary Boom Retract Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

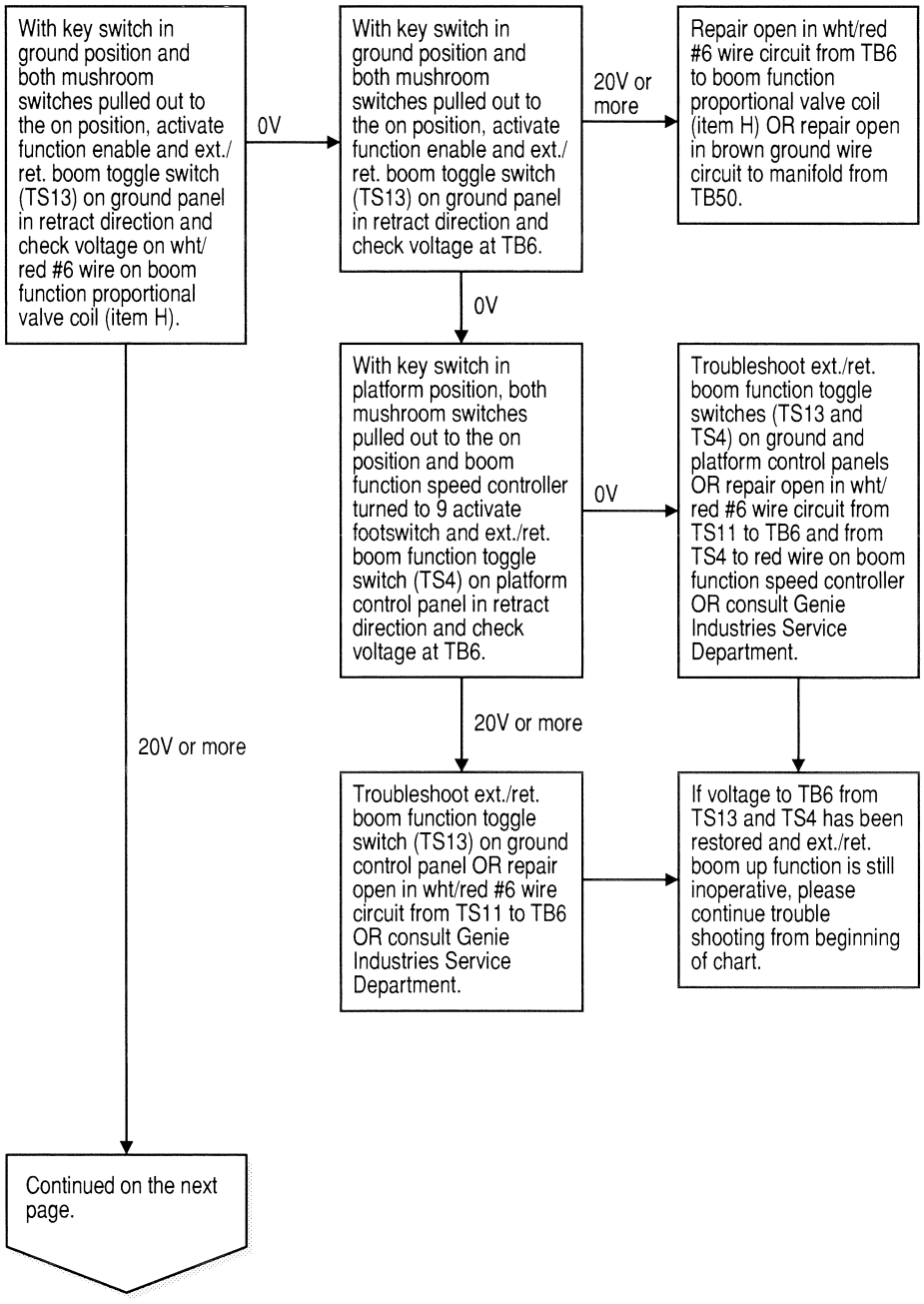


CHART 13

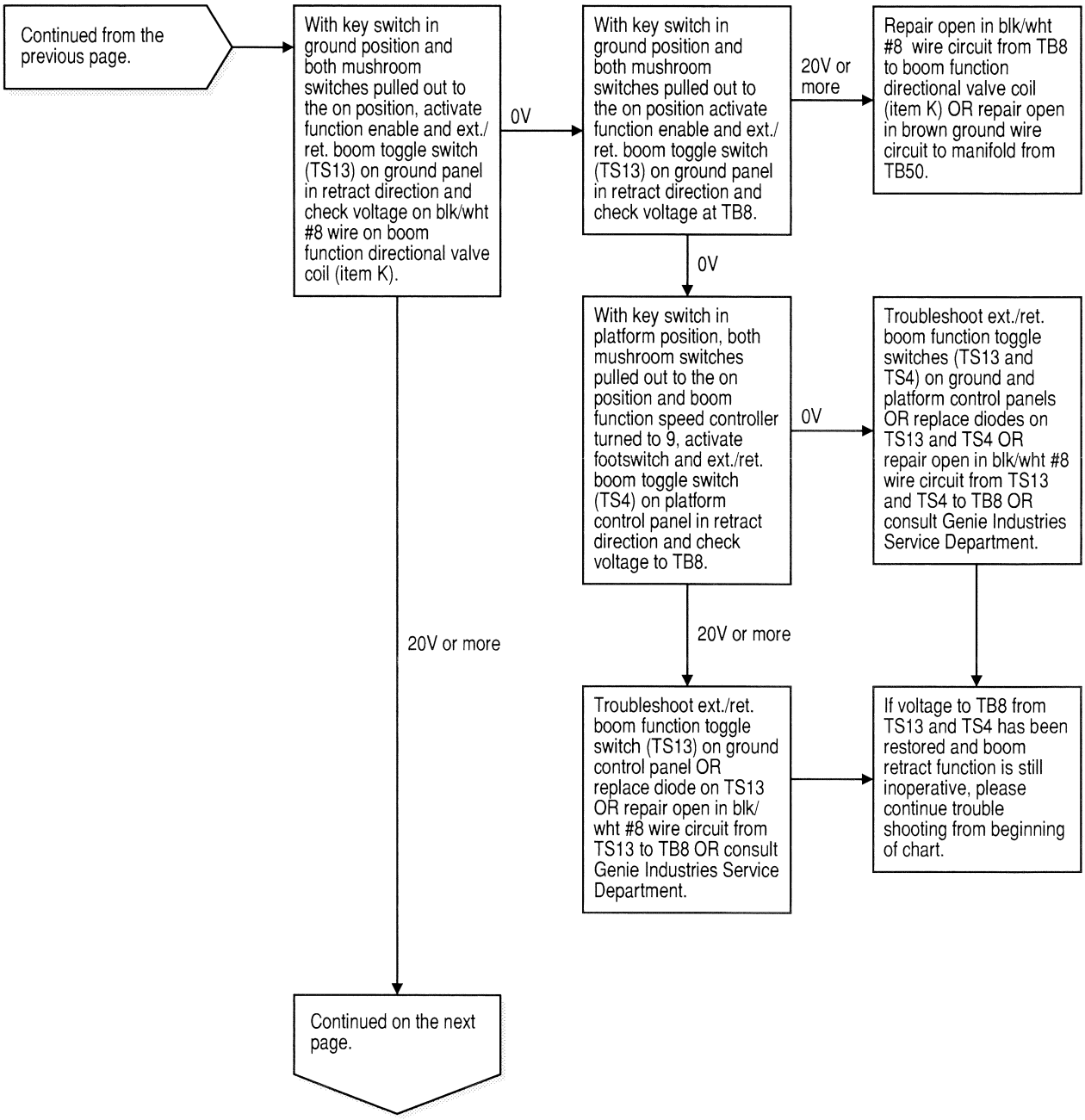

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and ext./ret. boom toggle switch (TS13) on ground panel in retract direction and check voltage on blk/wht #8 wire on boom function directional valve coil (item K).
0V
With key switch in ground position and both mushroom switches pulled out to the on position activate function enable and ext./ret. boom toggle switch (TS13) on ground panel in retract direction and check voltage at TB8.
20V or more
Repair open in blk/wht #8 wire circuit from TB8 to boom function directional valve coil (item K) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and ext./ret. boom toggle switch (TS4) on platform control panel in retract direction and check voltage to TB8.
0V
Troubleshoot ext./ret. boom function toggle switches (TS13 and TS4) on ground and platform control panels OR replace diodes on TS13 and TS4 OR repair open in blk/wht #8 wire circuit from TS13 and TS4 to TB8 OR consult Genie Industries Service Department.
20V or more
Troubleshoot ext./ret. boom function toggle switch (TS13) on ground control panel OR replace diode on TS13 OR repair open in blk/wht #8 wire circuit from TS13 to TB8 OR consult Genie Industries Service Department.
If voltage to TB8 from TS13 and TS4 has been restored and boom retract function is still inoperative, please continue trouble shooting from beginning of chart.
20V or more
Continued on the next page.

CHART 13

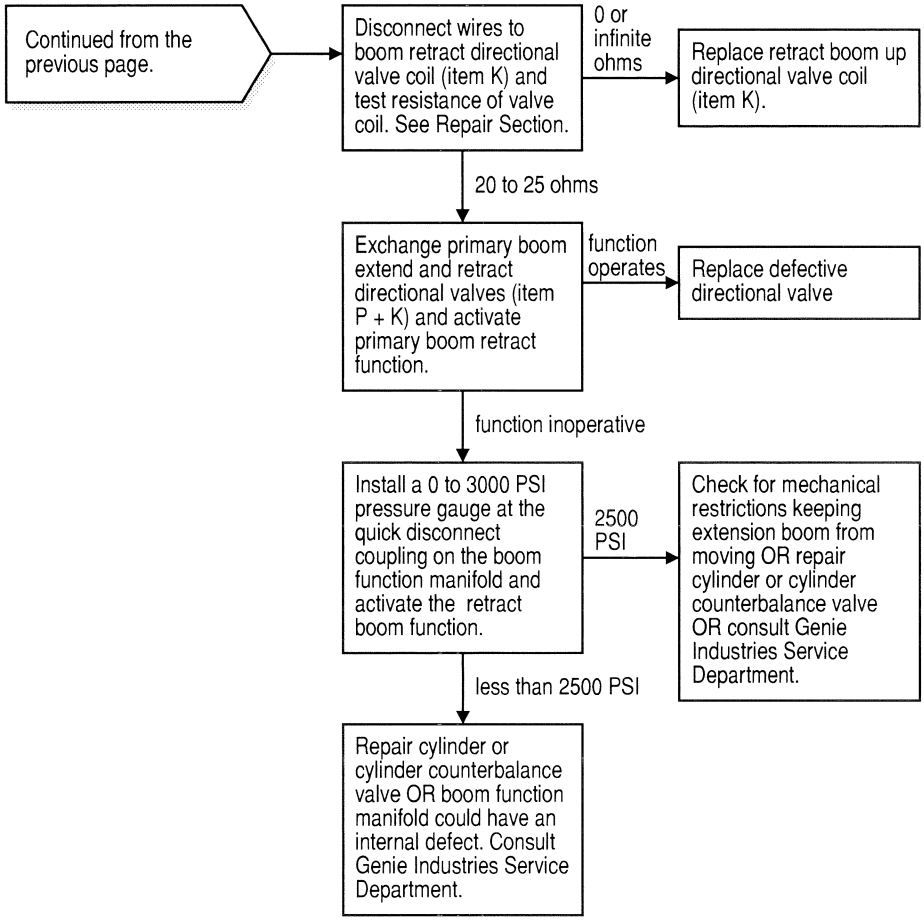

Continued from the previous page.
Disconnect wires to boom retract directional valve coil (item K) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace retract boom up directional valve coil (item K).
20 to 25 ohms
Exchange primary boom extend and retract directional valves (item P + K) and activate primary boom retract function.
function operates
Replace defective directional valve
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the retract boom function.
2500 PSI
Check for mechanical restrictions keeping extension boom from moving OR repair cylinder or cylinder counterbalance valve OR consult Genie Industries Service Department.
less than 2500 PSI
Repair cylinder or cylinder counterbalance valve OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 14

Turntable Rotate Left Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

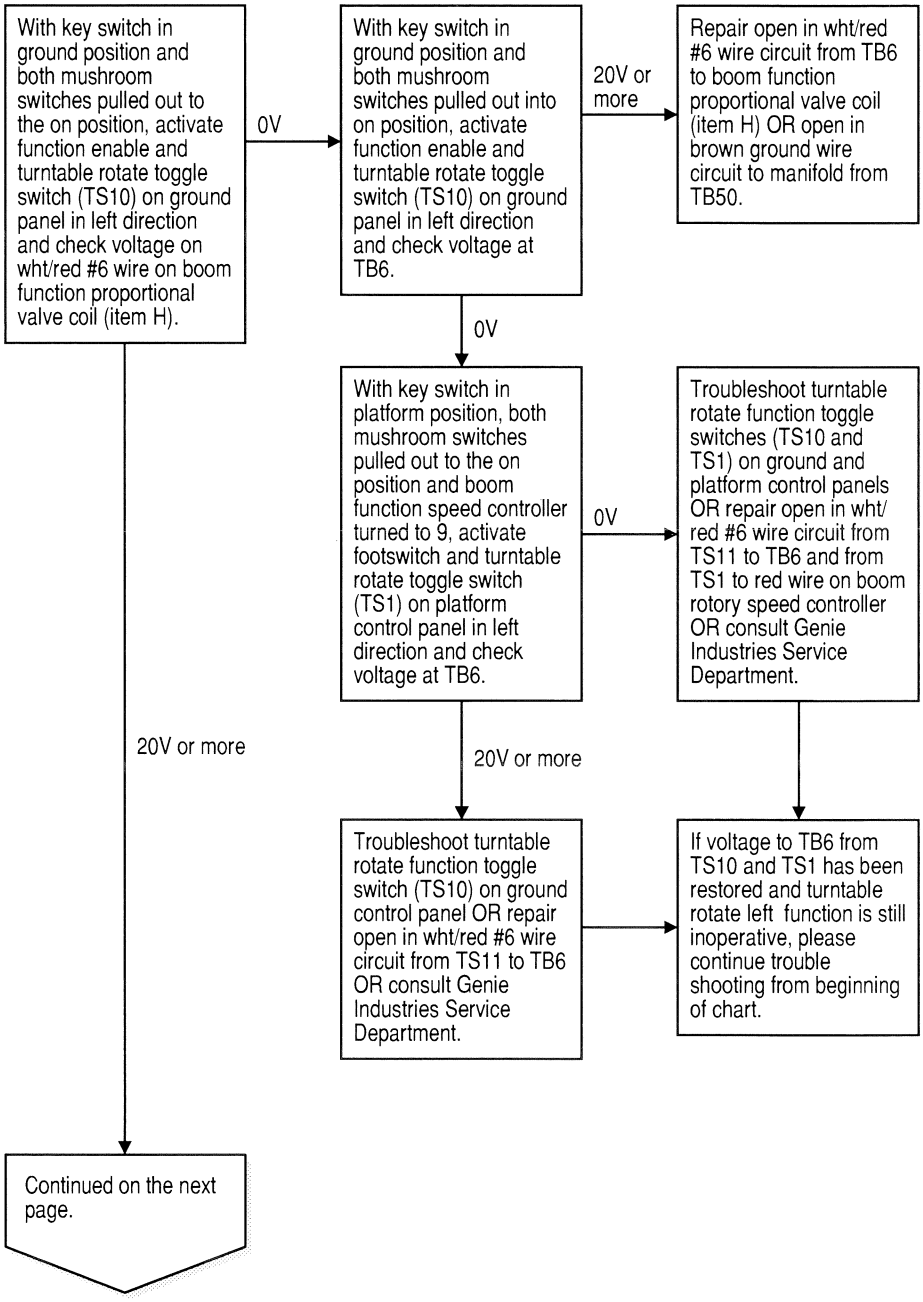


CHART 14

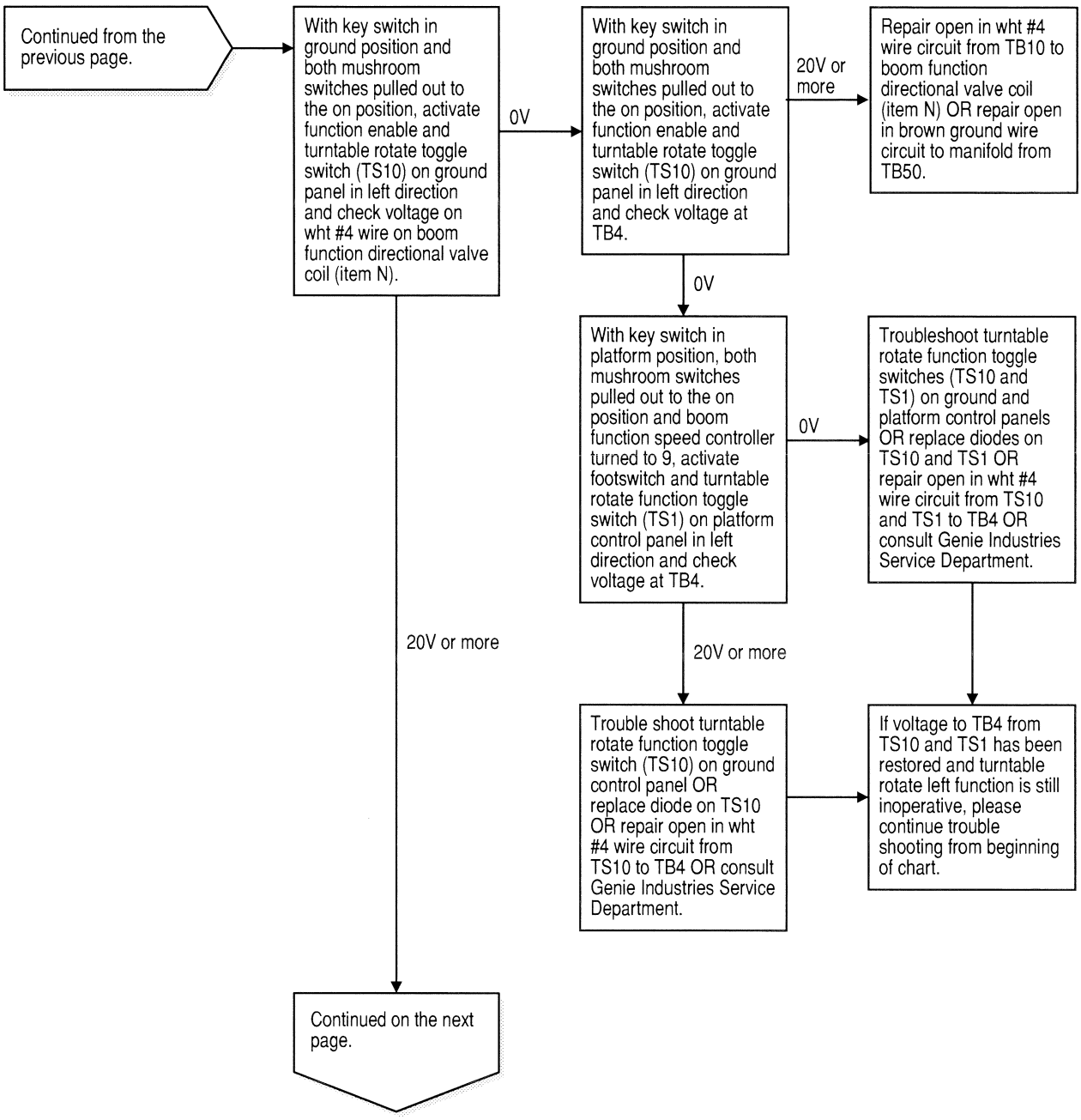

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and turntable rotate toggle switch (TS10) on ground panel in left direction and check voltage on wht #4 wire on boom function directional valve coil (item N).
0V
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and turntable rotate toggle switch (TS10) on ground panel in left direction and check voltage at TB4.
20V or more
Repair open in wht #4 wire circuit from TB10 to boom function directional valve coil (item N) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and turntable rotate function toggle switch (TS1) on platform control panel in left direction and check voltage at TB4.
0V
Troubleshoot turntable rotate function toggle switches (TS10 and TS1) on ground and platform control panels OR replace diodes on TS10 and TS1 OR repair open in wht #4 wire circuit from TS10 and TS1 to TB4 OR consult Genie Industries Service Department.
20V or more
20V or more
Trouble shoot turntable rotate function toggle switch (TS10) on ground control panel OR replace diode on TS10 OR repair open in wht #4 wire circuit from TS10 to TB4 OR consult Genie Industries Service Department.
If voltage to TB4 from TS10 and TS1 has been restored and turntable rotate left function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 14

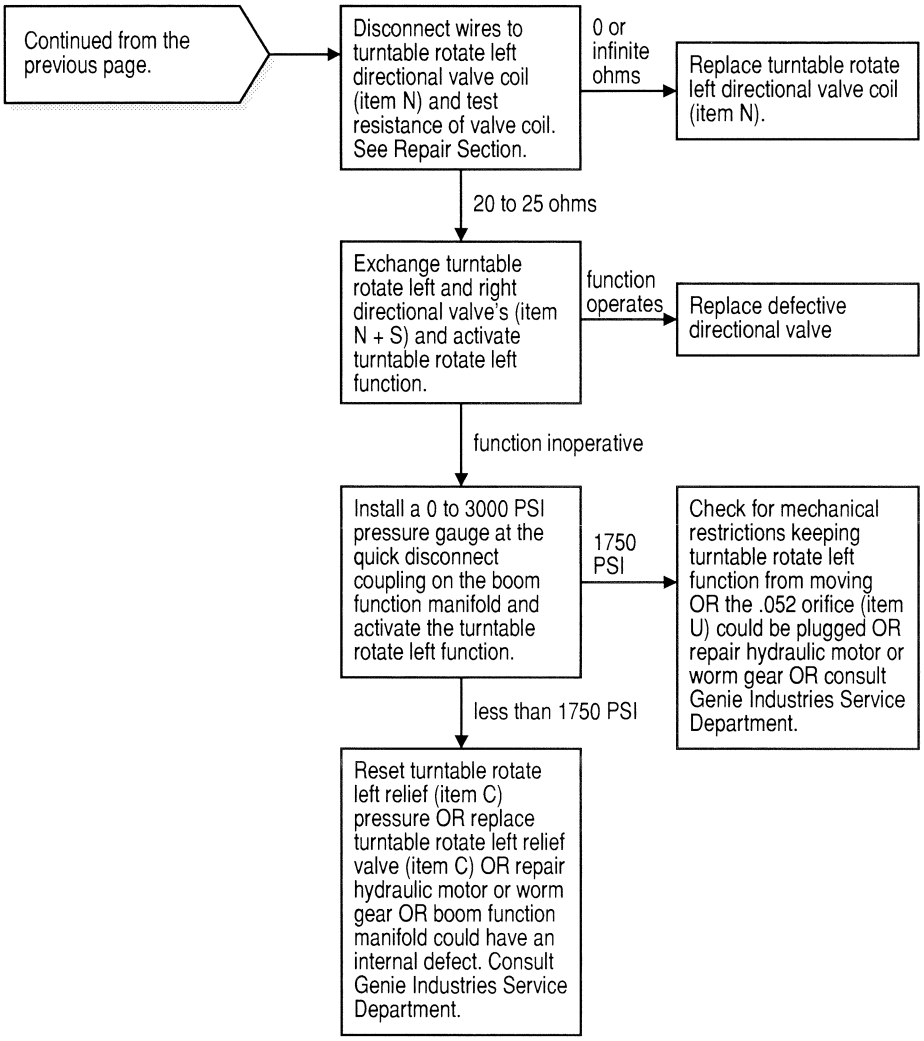

Continued from the previous page.
Disconnect wires to turntable rotate left directional valve coil (item N) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace turntable rotate left directional valve coil (item N).
20 to 25 ohms
Exchange turntable rotate left and right directional valve's (item N + S) and activate turntable rotate left function.
function operates
Replace defective directional valve
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the turntable rotate left function.
1750 PSI
Check for mechanical restrictions keeping turntable rotate left function from moving OR the .052 orifice (item U) could be plugged OR repair hydraulic motor or worm gear OR consult Genie Industries Service Department.
less than 1750 PSI
Reset turntable rotate left relief (item C) pressure OR replace turntable rotate left relief valve (item C) OR repair hydraulic motor or worm gear OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 15

Turntable Rotate Right Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

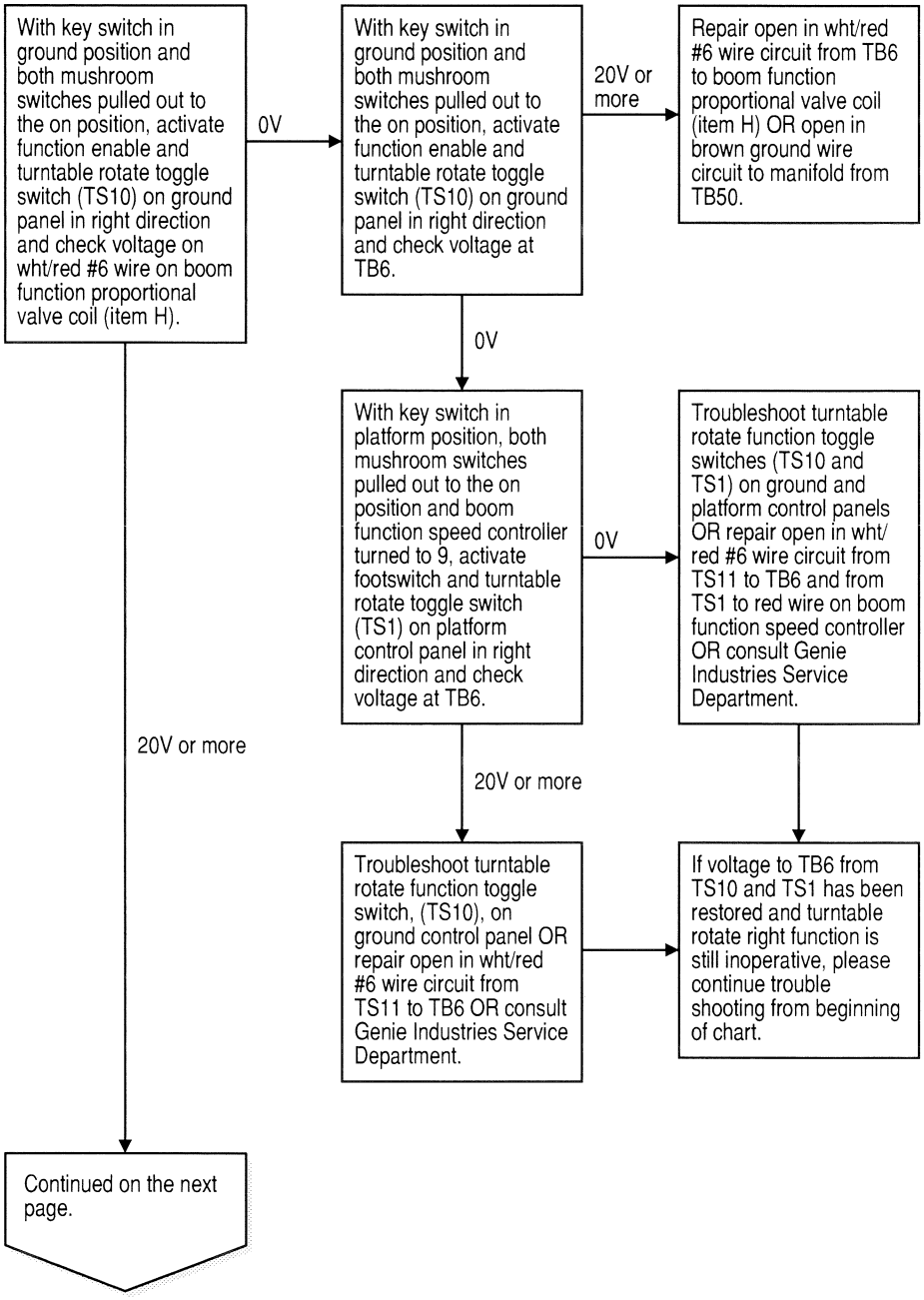


CHART 15

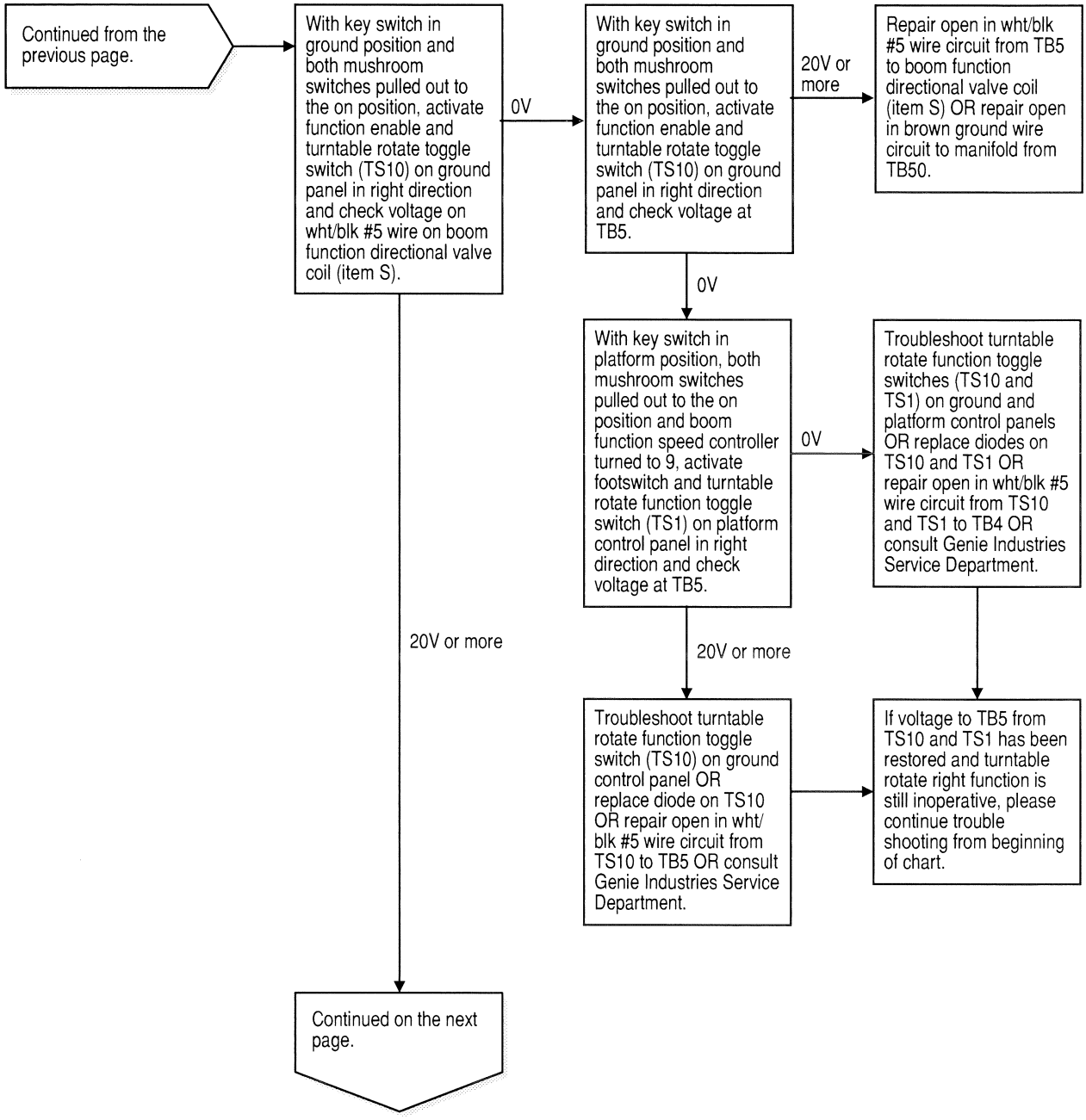

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and turntable rotate toggle switch (TS10) on ground panel in right direction and check voltage on wht/blk #5 wire on boom function directional valve coil (item S).
0V
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and turntable rotate toggle switch (TS10) on ground panel in right direction and check voltage at TB5.
20V or more
Repair open in wht/blk #5 wire circuit from TB5 to boom function directional valve coil (item S) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and turntable rotate function toggle switch (TS1) on platform control panel in right direction and check voltage at TB5.
0V
Troubleshoot turntable rotate function toggle switches (TS10 and TS1) on ground and platform control panels OR replace diodes on TS10 and TS1 OR repair open in wht/blk #5 wire circuit from TS10 and TS1 to TB4 OR consult Genie Industries Service Department.
20V or more
20V or more
Troubleshoot turntable rotate function toggle switch (TS10) on ground control panel OR replace diode on TS10 OR repair open in wht/blk #5 wire circuit from TS10 to TB5 OR consult Genie Industries Service Department.
If voltage to TB5 from TS10 and TS1 has been restored and turntable rotate right function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 15

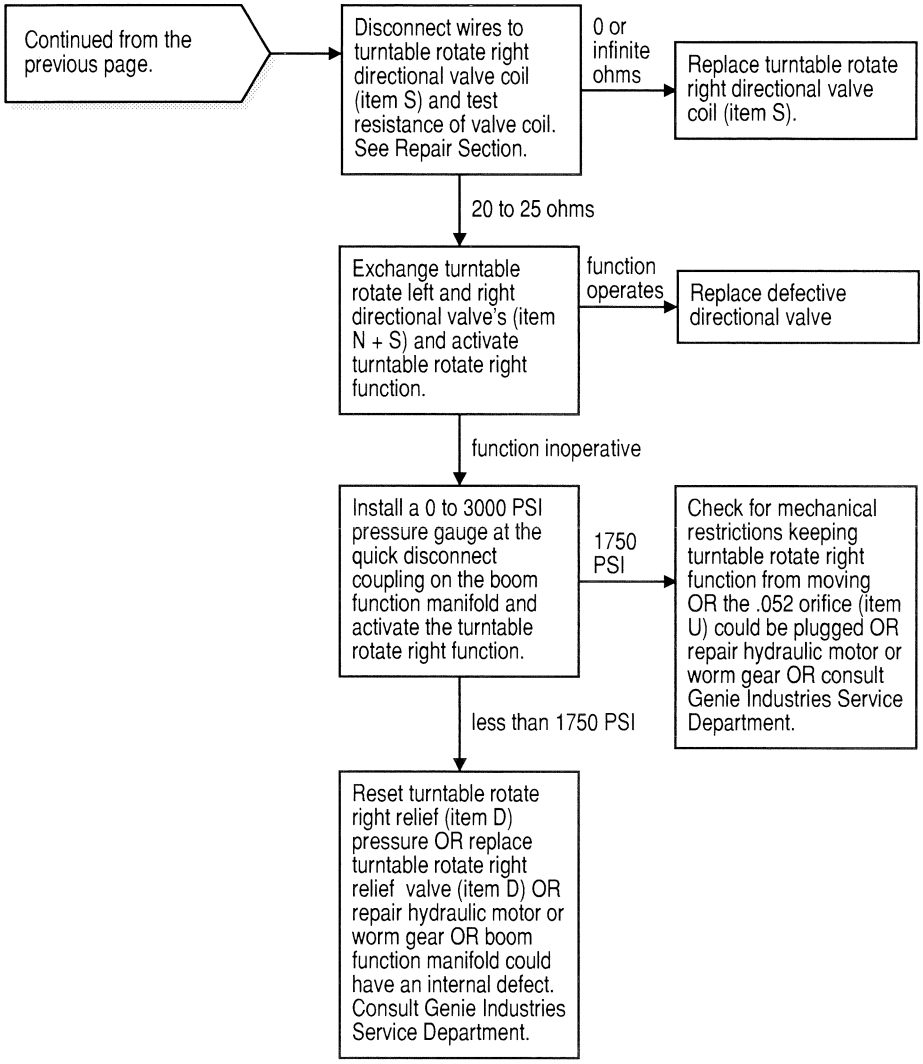

Continued from the previous page.
Disconnect wires to turntable rotate right directional valve coil (item S) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace turntable rotate right directional valve coil (item S).
20 to 25 ohms
Exchange turntable rotate left and right directional valve's (item N + S) and activate turntable rotate right function.
function operates
Replace defective directional valve
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the turntable rotate right function.
1750 PSI
Check for mechanical restrictions keeping turntable rotate right function from moving OR the .052 orifice (item U) could be plugged OR repair hydraulic motor or worm gear OR consult Genie Industries Service Department.
less than 1750 PSI
Reset turntable rotate right relief (item D) pressure OR replace turntable rotate right relief valve (item D) OR repair hydraulic motor or worm gear OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 16

All Platform Level Functions Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

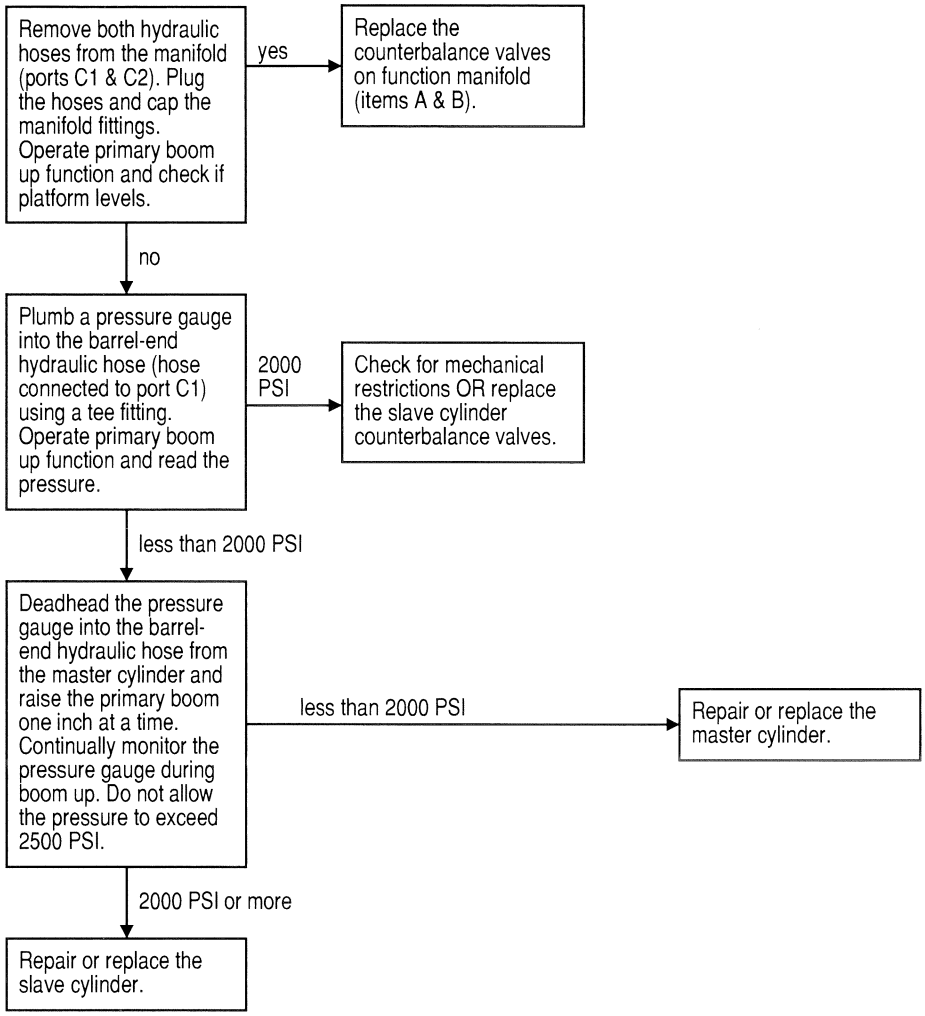


Chart 17

Platform Level Up Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

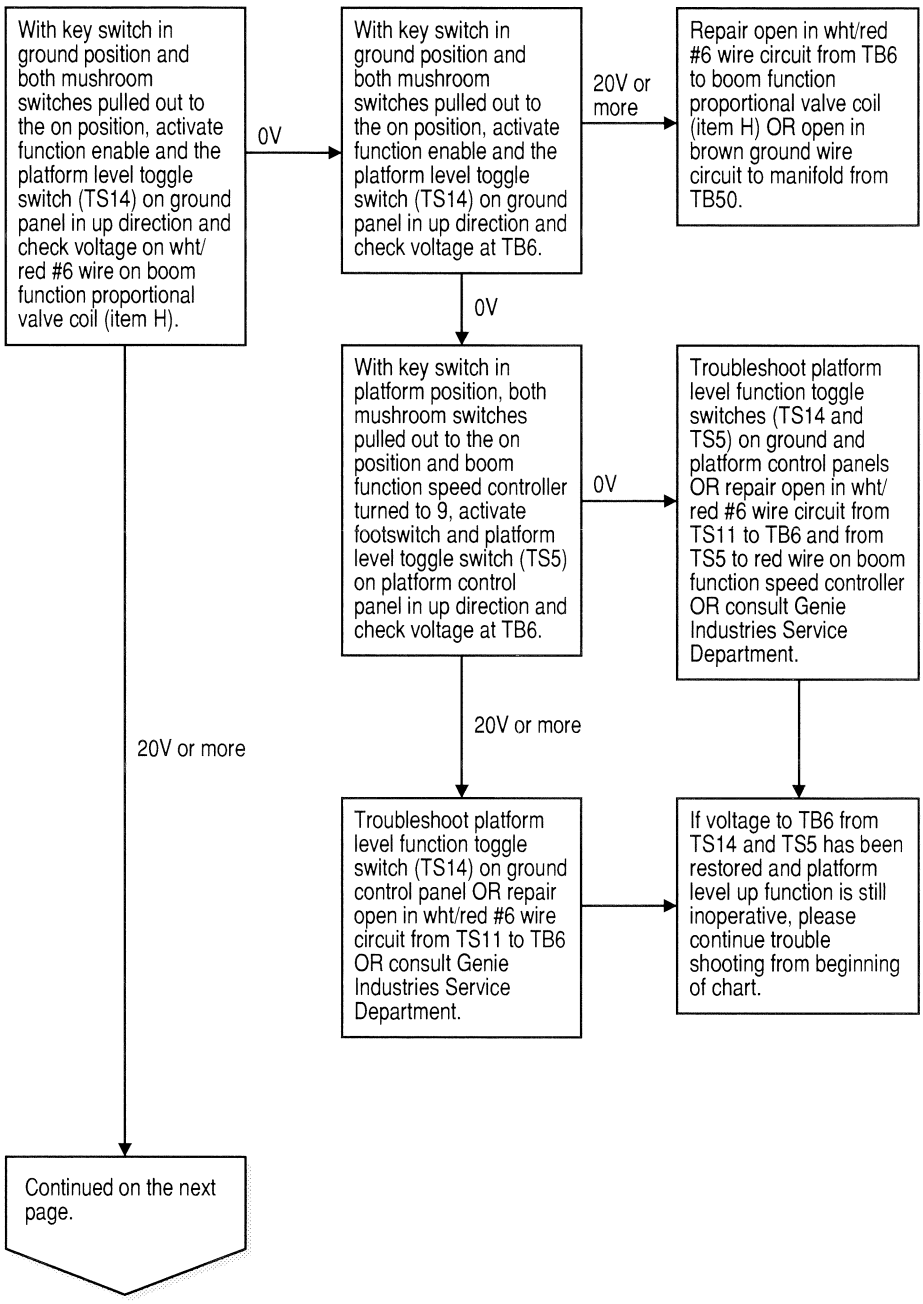


CHART 17

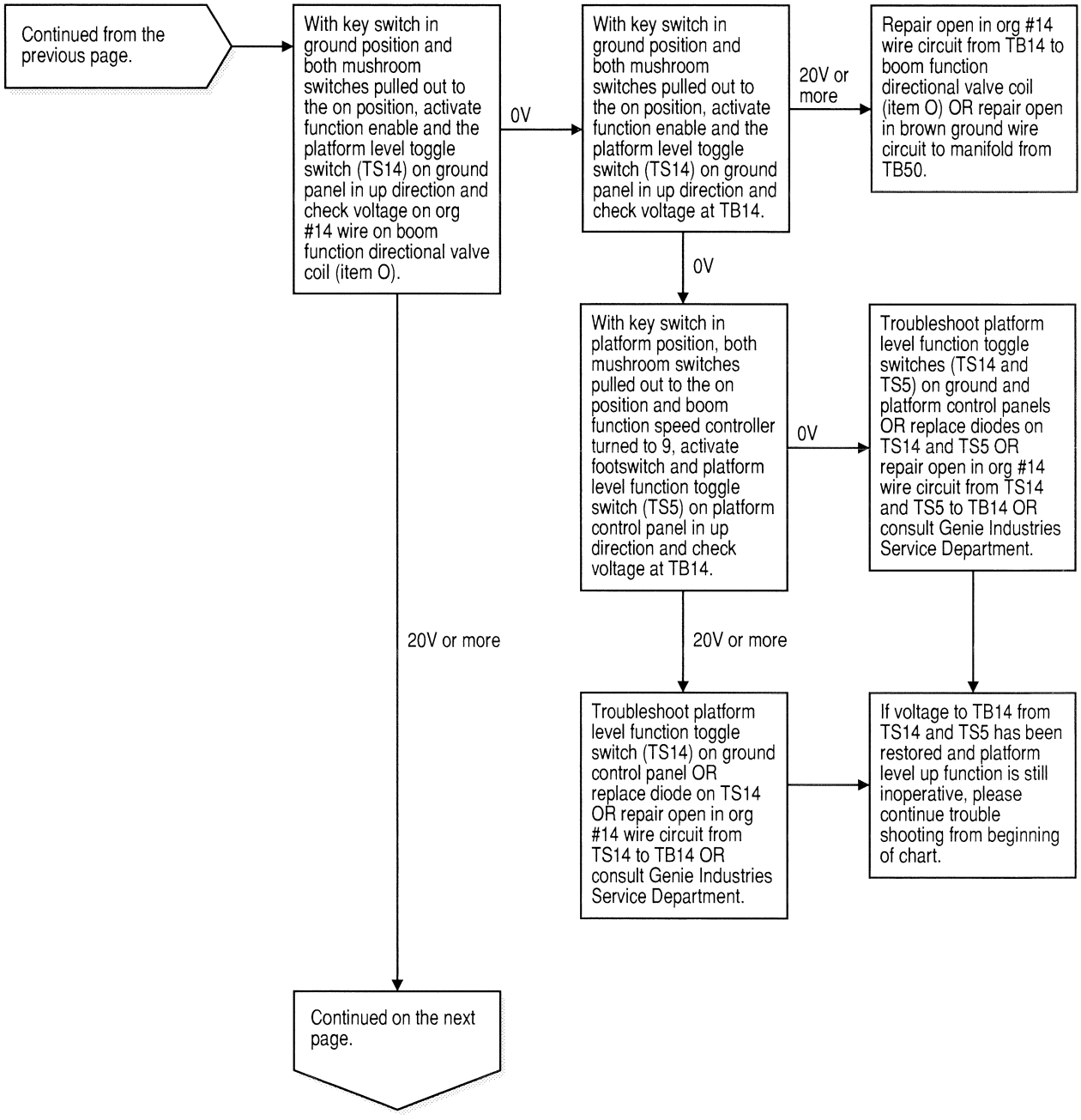

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and the platform level toggle switch (TS14) on ground panel in up direction and check voltage on org #14 wire on boom function directional valve coil (item O).
0V
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and the platform level toggle switch (TS14) on ground panel in up direction and check voltage at TB14.
20V or more
Repair open in org #14 wire circuit from TB14 to boom function directional valve coil (item O) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and platform level function toggle switch (TS5) on platform control panel in up direction and check voltage at TB14.
0V
Troubleshoot platform level function toggle switches (TS14 and TS5) on ground and platform control panels OR replace diodes on TS14 and TS5 OR repair open in org #14 wire circuit from TS14 and TS5 to TB14 OR consult Genie Industries Service Department.
20V or more
20V or more
Troubleshoot platform level function toggle switch (TS14) on ground control panel OR replace diode on TS14 OR repair open in org #14 wire circuit from TS14 to TB14 OR consult Genie Industries Service Department.
If voltage to TB14 from TS14 and TS5 has been restored and platform level up function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 17

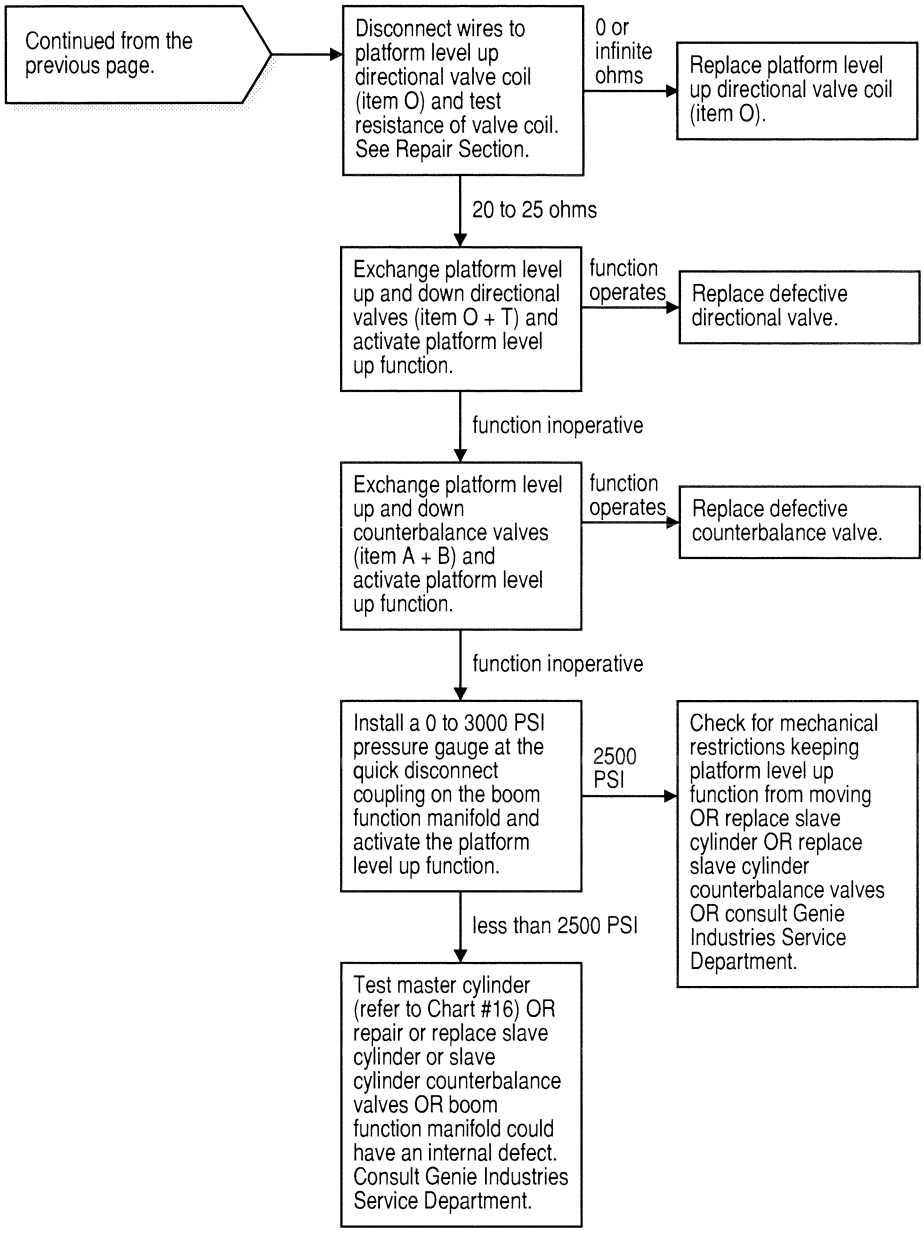

Continued from the previous page.
Disconnect wires to platform level up directional valve coil (item O) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace platform level up directional valve coil (item O).
20 to 25 ohms
Exchange platform level up and down directional valves (item O + T) and activate platform level up function.
function operates
Replace defective directional valve.
function inoperative
Exchange platform level up and down counterbalance valves (item A + B) and activate platform level up function.
function operates
Replace defective counterbalance valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the platform level up function.
2500 PSI
Check for mechanical restrictions keeping platform level up function from moving OR replace slave cylinder OR replace slave cylinder counterbalance valves OR consult Genie Industries Service Department.
less than 2500 PSI
Test master cylinder (refer to Chart #16) OR repair or replace slave cylinder or slave cylinder counterbalance valves OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 18

Platform Level Down Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

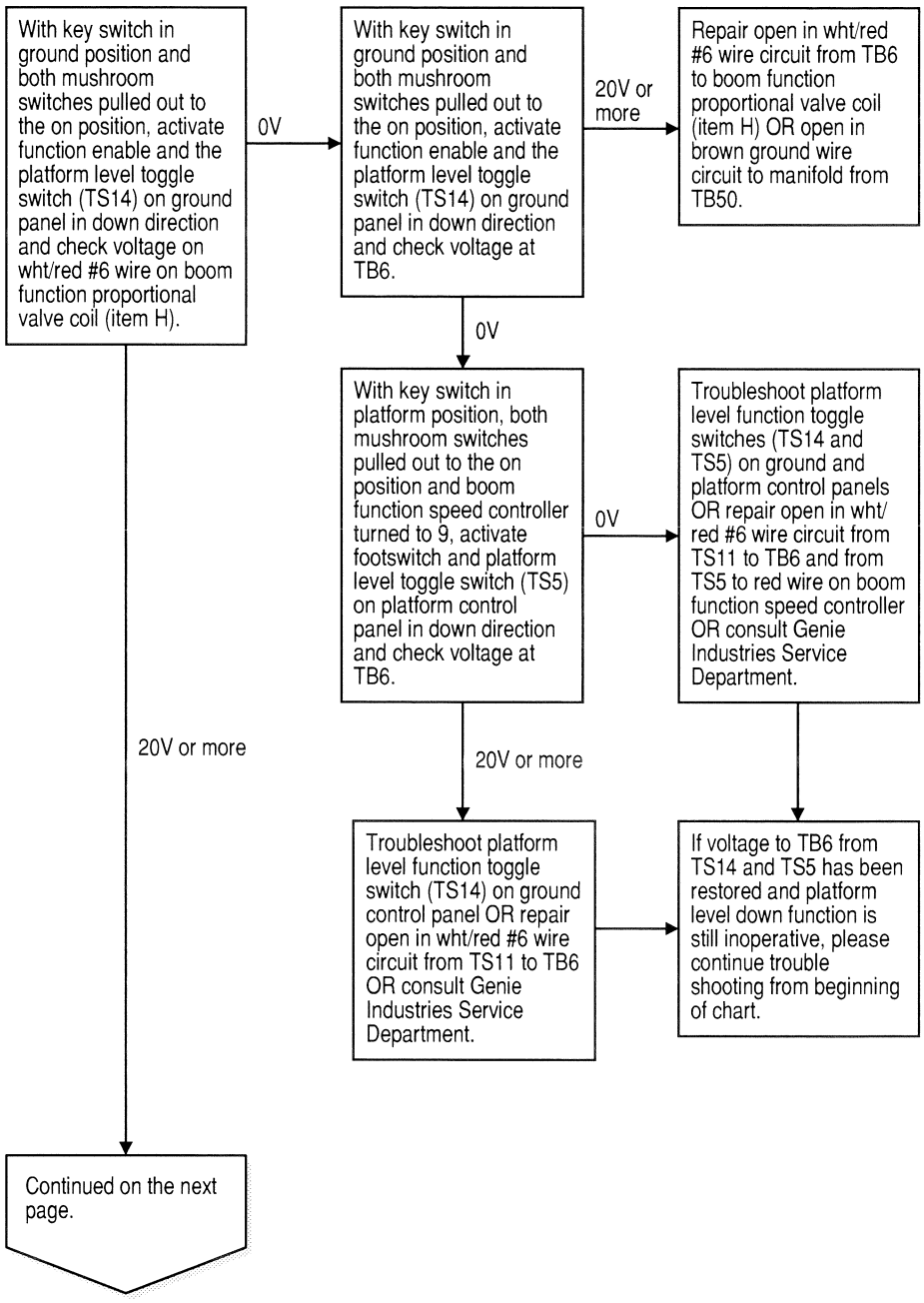


CHART 18

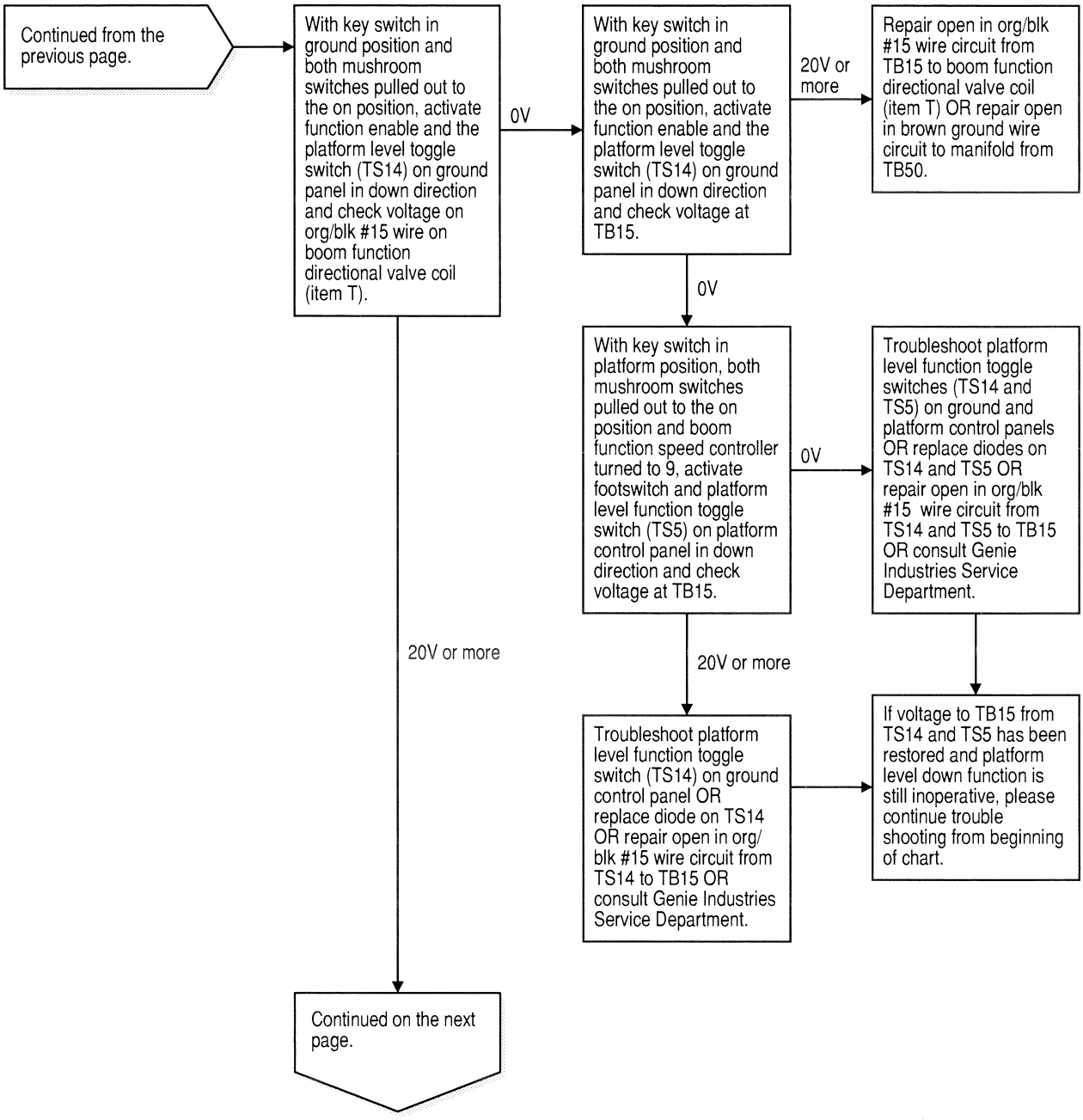

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and the platform level toggle switch (TS14) on ground panel in down direction and check voltage on org/blk #15 wire on boom function directional valve coil (item T).
0V
With key switch in ground position and both mushroom switches pulled out to the on position, activate function enable and the platform level toggle switch (TS14) on ground panel in down direction and check voltage at TB15.
20V or more
Repair open in org/blk #15 wire circuit from TB15 to boom function directional valve coil (item T) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and platform level function toggle switch (TS5) on platform control panel in down direction and check voltage at TB15.
0V
Troubleshoot platform level function toggle switches (TS14 and TS5) on ground and platform control panels OR replace diodes on TS14 and TS5 OR repair open in org/blk #15 wire circuit from TS14 and TS5 to TB15 OR consult Genie Industries Service Department.
20V or more
20V or more
Troubleshoot platform level function toggle switch (TS14) on ground control panel OR replace diode on TS14 OR repair open in org/blk #15 wire circuit from TS14 to TB15 OR consult Genie Industries Service Department.
If voltage to TB15 from TS14 and TS5 has been restored and platform level down function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 18

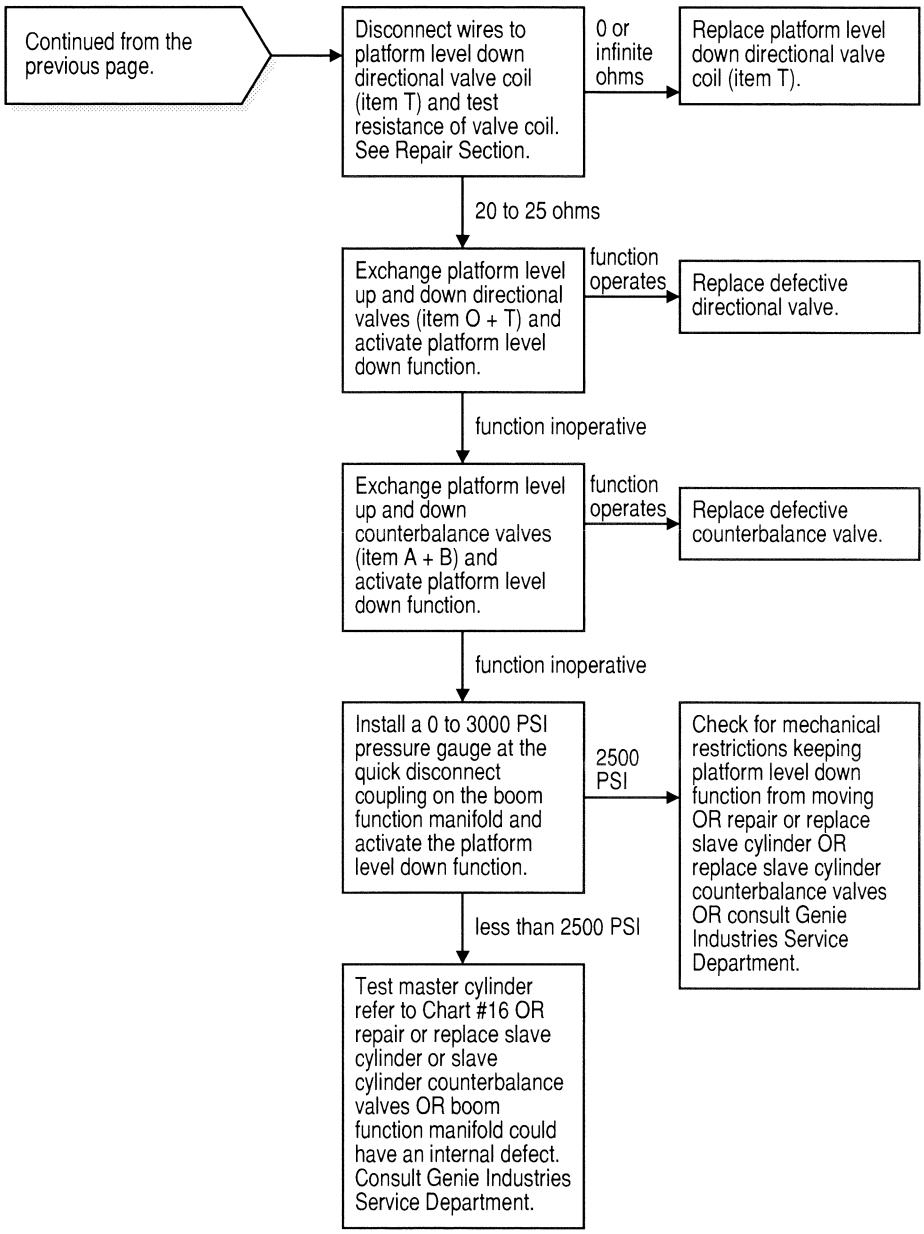

Continued from the previous page.
Disconnect wires to platform level down directional valve coil (item T) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace platform level down directional valve coil (item T).
20 to 25 ohms
Exchange platform level up and down directional valves (item O + T) and activate platform level down function.
function operates
Replace defective directional valve.
function inoperative
Exchange platform level up and down counterbalance valves (item A + B) and activate platform level down function.
function operates
Replace defective counterbalance valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the platform level down function.
2500 PSI
Check for mechanical restrictions keeping platform level down function from moving OR repair or replace slave cylinder OR replace slave cylinder counterbalance valves OR consult Genie Industries Service Department.
less than 2500 PSI
Test master cylinder refer to Chart #16 OR repair or replace slave cylinder or slave cylinder counterbalance valves OR boom function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 19

Platform Rotate Left Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

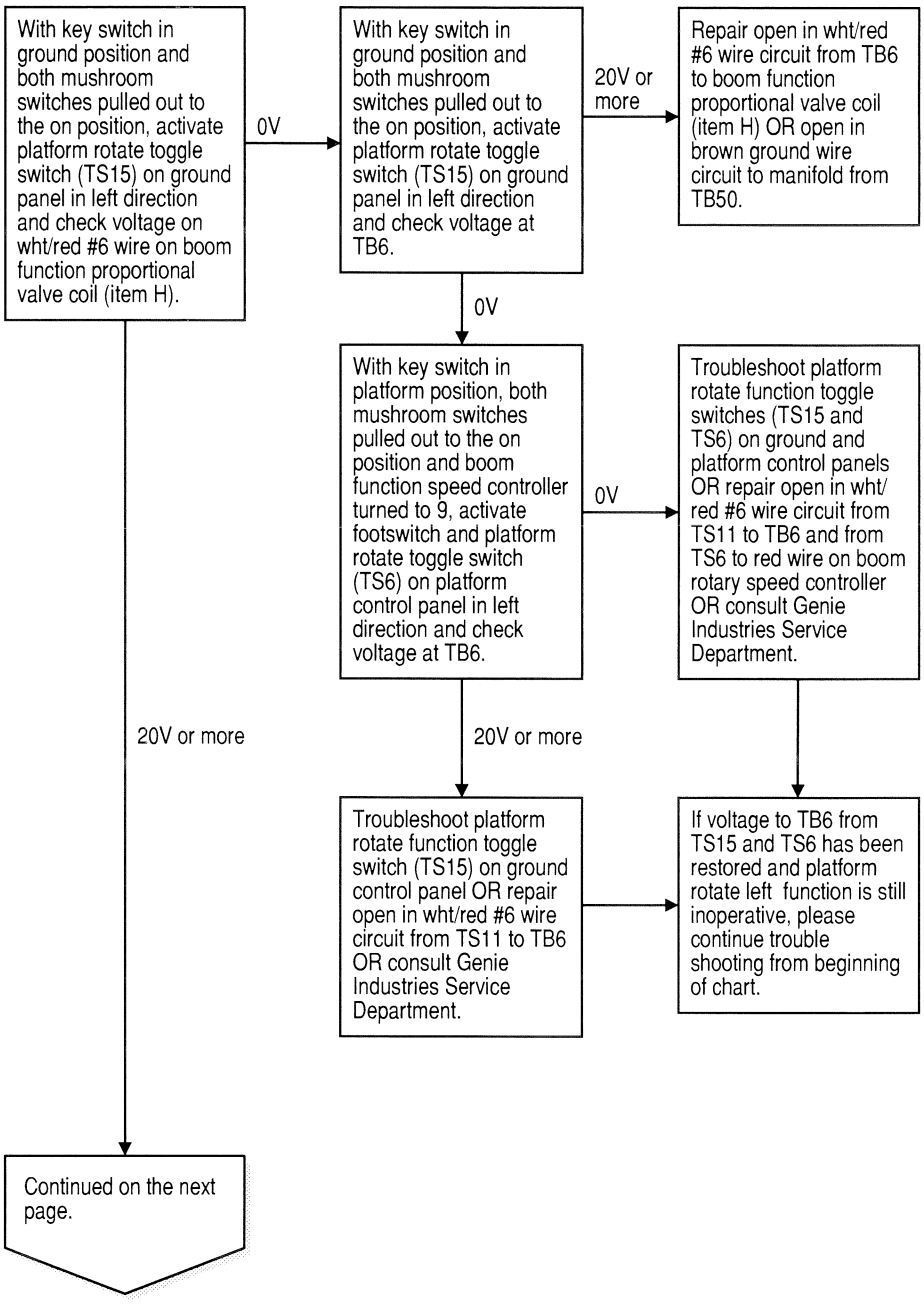


CHART 19

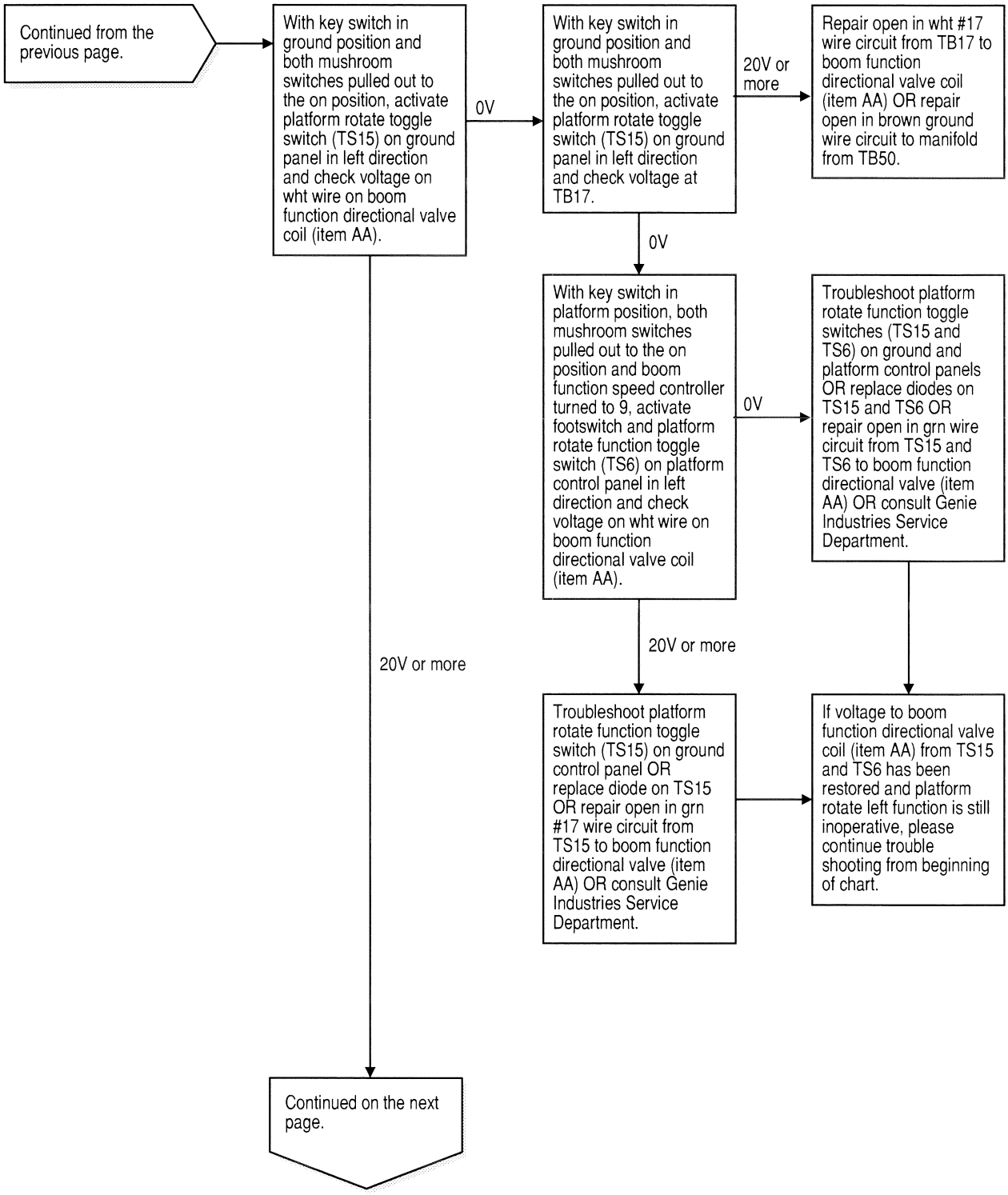

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate platform rotate toggle switch (TS15) on ground panel in left direction and check voltage on wht wire on boom function directional valve coil (item AA).
0V
With key switch in ground position and both mushroom switches pulled out to the on position, activate platform rotate toggle switch (TS15) on ground panel in left direction and check voltage at TB17.
20V or more
Repair open in wht #17 wire circuit from TB17 to boom function directional valve coil (item AA) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and platform rotate function toggle switch (TS6) on platform control panel in left direction and check voltage on wht wire on boom function directional valve coil (item AA).
0V
Troubleshoot platform rotate function toggle switches (TS15 and TS6) on ground and platform control panels OR replace diodes on TS15 and TS6 OR repair open in grn wire circuit from TS15 and TS6 to boom function directional valve (item AA) OR consult Genie Industries Service Department.
20V or more
20V or more
Troubleshoot platform rotate function toggle switch (TS15) on ground control panel OR replace diode on TS15 OR repair open in grn #17 wire circuit from TS15 to boom function directional valve (item AA) OR consult Genie Industries Service Department.
If voltage to boom function directional valve coil (item AA) from TS15 and TS6 has been restored and platform rotate left function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 19

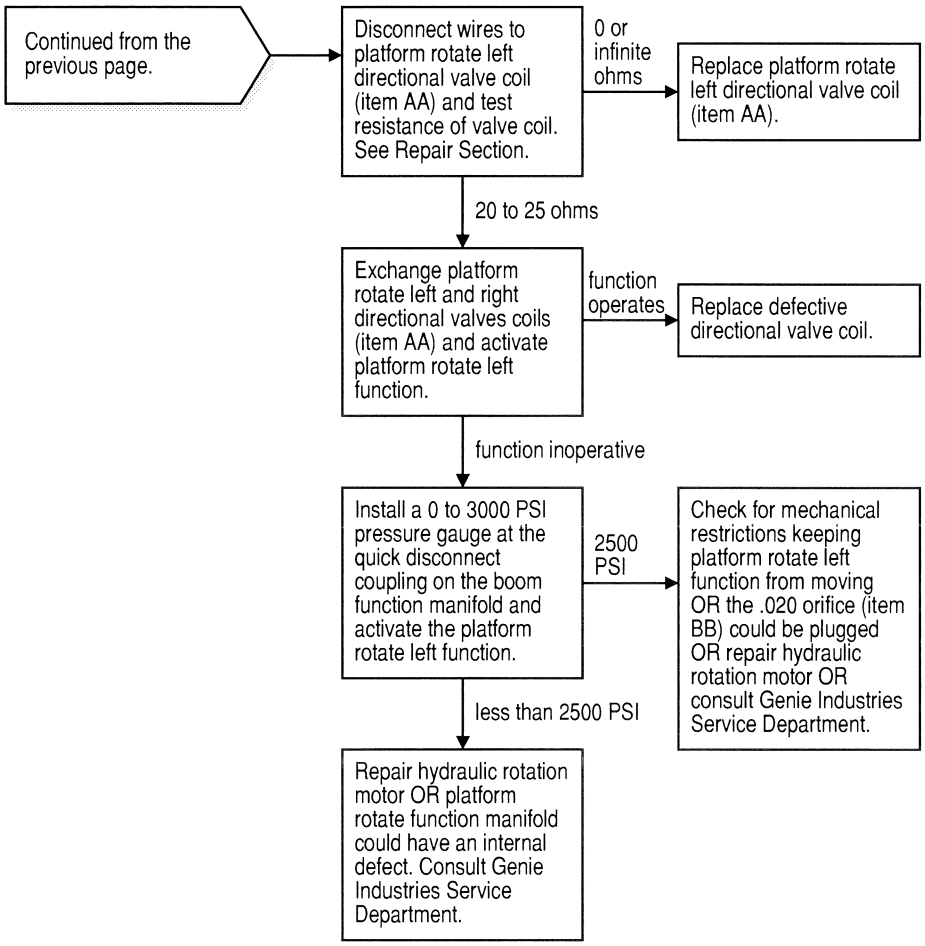

Continued from the previous page.
Disconnect wires to platform rotate left directional valve coil (item AA) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace platform rotate left directional valve coil (item AA).
20 to 25 ohms
Exchange platform rotate left and right directional valves coils (item AA) and activate platform rotate left function.
function operates
Replace defective directional valve coil.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the platform rotate left function.
2500 PSI
Check for mechanical restrictions keeping platform rotate left function from moving OR the .020 orifice (item BB) could be plugged OR repair hydraulic rotation motor OR consult Genie Industries Service Department.
less than 2500 PSI
Repair hydraulic rotation motor OR platform rotate function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 20

Platform Rotate Right Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

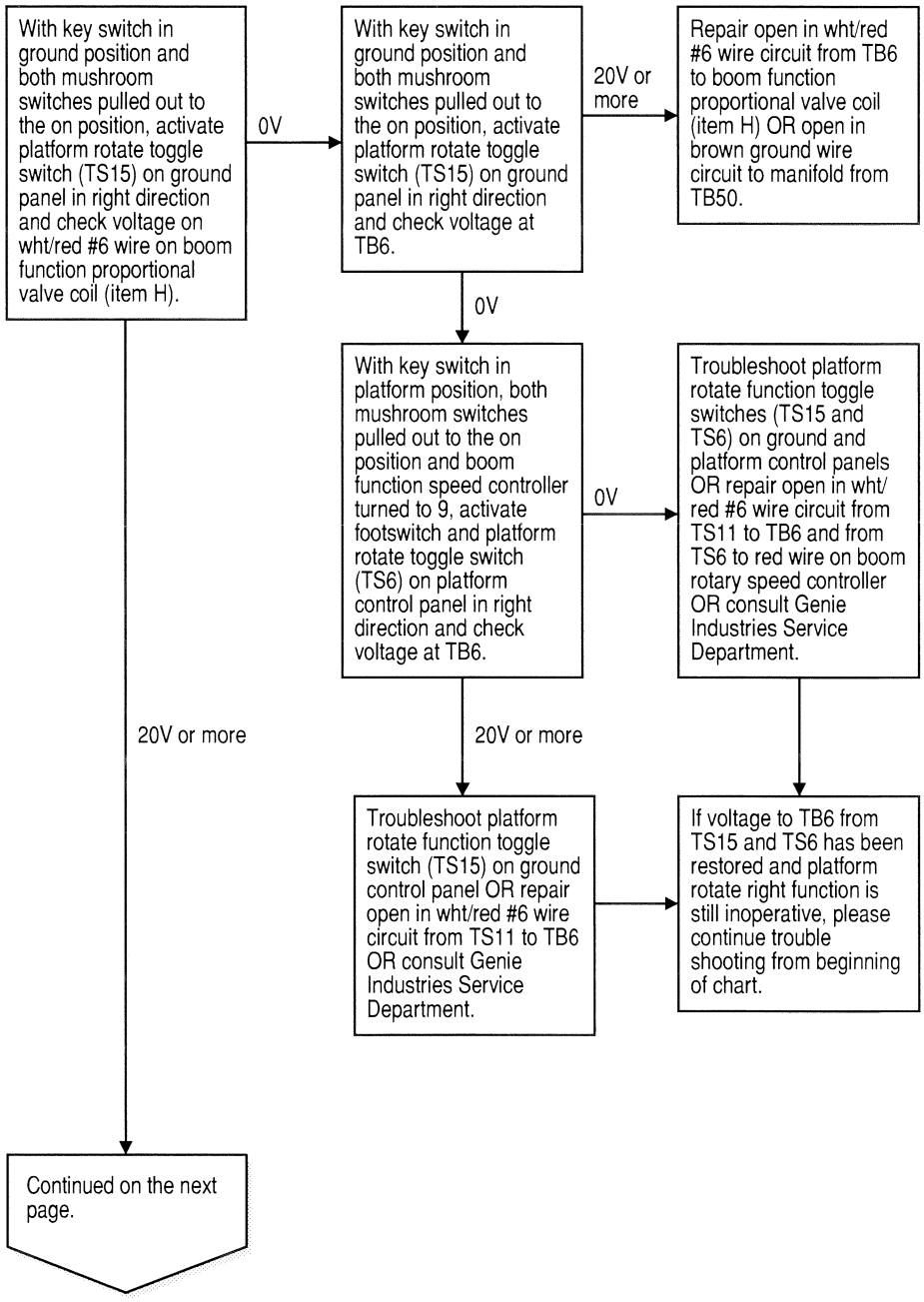


CHART 20

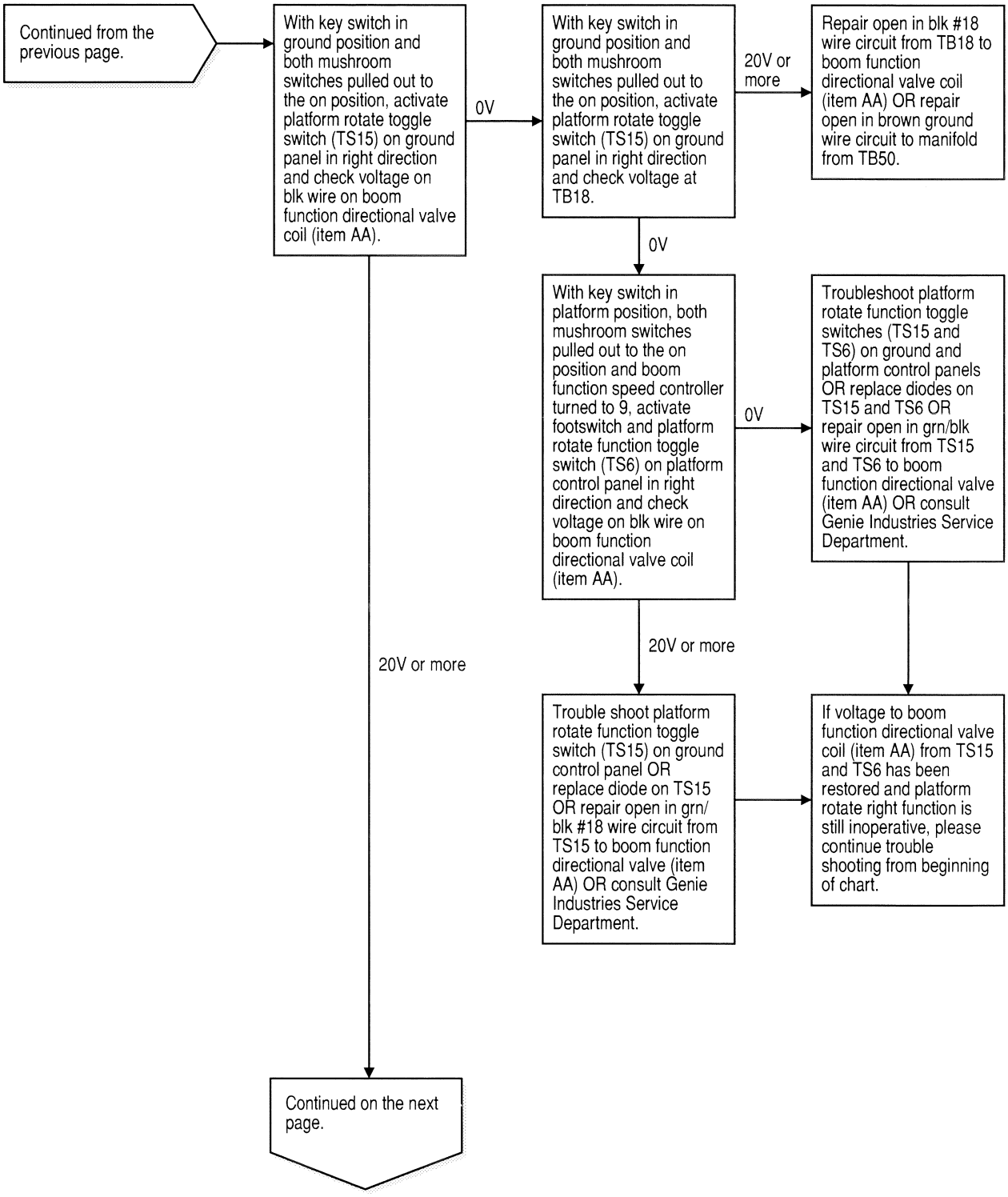

Continued from the previous page.
With key switch in ground position and both mushroom switches pulled out to the on position, activate platform rotate toggle switch (TS15) on ground panel in right direction and check voltage on blk wire on boom function directional valve coil (item AA).
0V
With key switch in ground position and both mushroom switches pulled out to the on position, activate platform rotate toggle switch (TS15) on ground panel in right direction and check voltage at TB18.
20V or more
Repair open in blk #18 wire circuit from TB18 to boom function directional valve coil (item AA) OR repair open in brown ground wire circuit to manifold from TB50.
0V
With key switch in platform position, both mushroom switches pulled out to the on position and boom function speed controller turned to 9, activate footswitch and platform rotate function toggle switch (TS6) on platform control panel in right direction and check voltage on blk wire on boom function directional valve coil (item AA).
0V
Troubleshoot platform rotate function toggle switches (TS15 and TS6) on ground and platform control panels OR replace diodes on TS15 and TS6 OR repair open in grn/blk wire circuit from TS15 and TS6 to boom function directional valve (item AA) OR consult Genie Industries Service Department.
20V or more
20V or more
Trouble shoot platform rotate function toggle switch (TS15) on ground control panel OR replace diode on TS15 OR repair open in grn/ blk #18 wire circuit from TS15 to boom function directional valve (item AA) OR consult Genie Industries Service Department.
If voltage to boom function directional valve coil (item AA) from TS15 and TS6 has been restored and platform rotate right function is still inoperative, please continue trouble shooting from beginning of chart.
Continued on the next page.

CHART 20

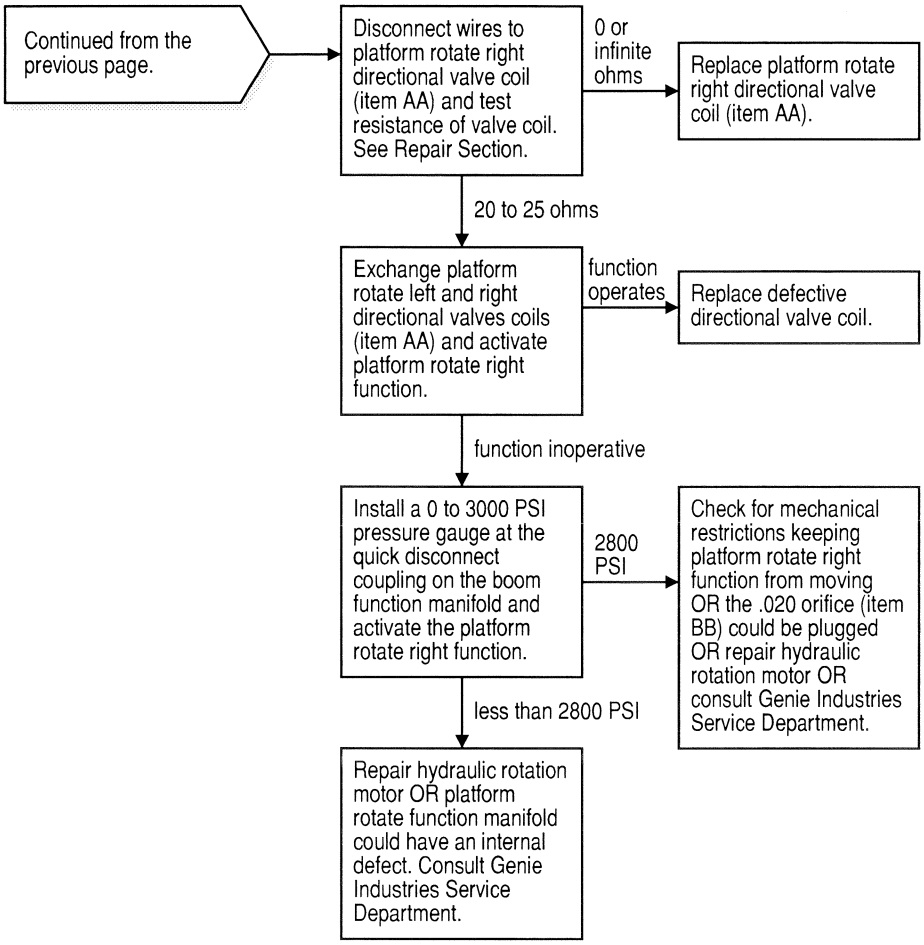

Continued from the previous page.
Disconnect wires to platform rotate right directional valve coil (item AA) and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace platform rotate right directional valve coil (item AA).
20 to 25 ohms
Exchange platform rotate left and right directional valves coils (item AA) and activate platform rotate right function.
function operates
Replace defective directional valve coil.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the platform rotate right function.
2800 PSI
Check for mechanical restrictions keeping platform rotate right function from moving OR the .020 orifice (item BB) could be plugged OR repair hydraulic rotation motor OR consult Genie Industries Service Department.
less than 2800 PSI
Repair hydraulic rotation motor OR platform rotate function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 21

Steer Left Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

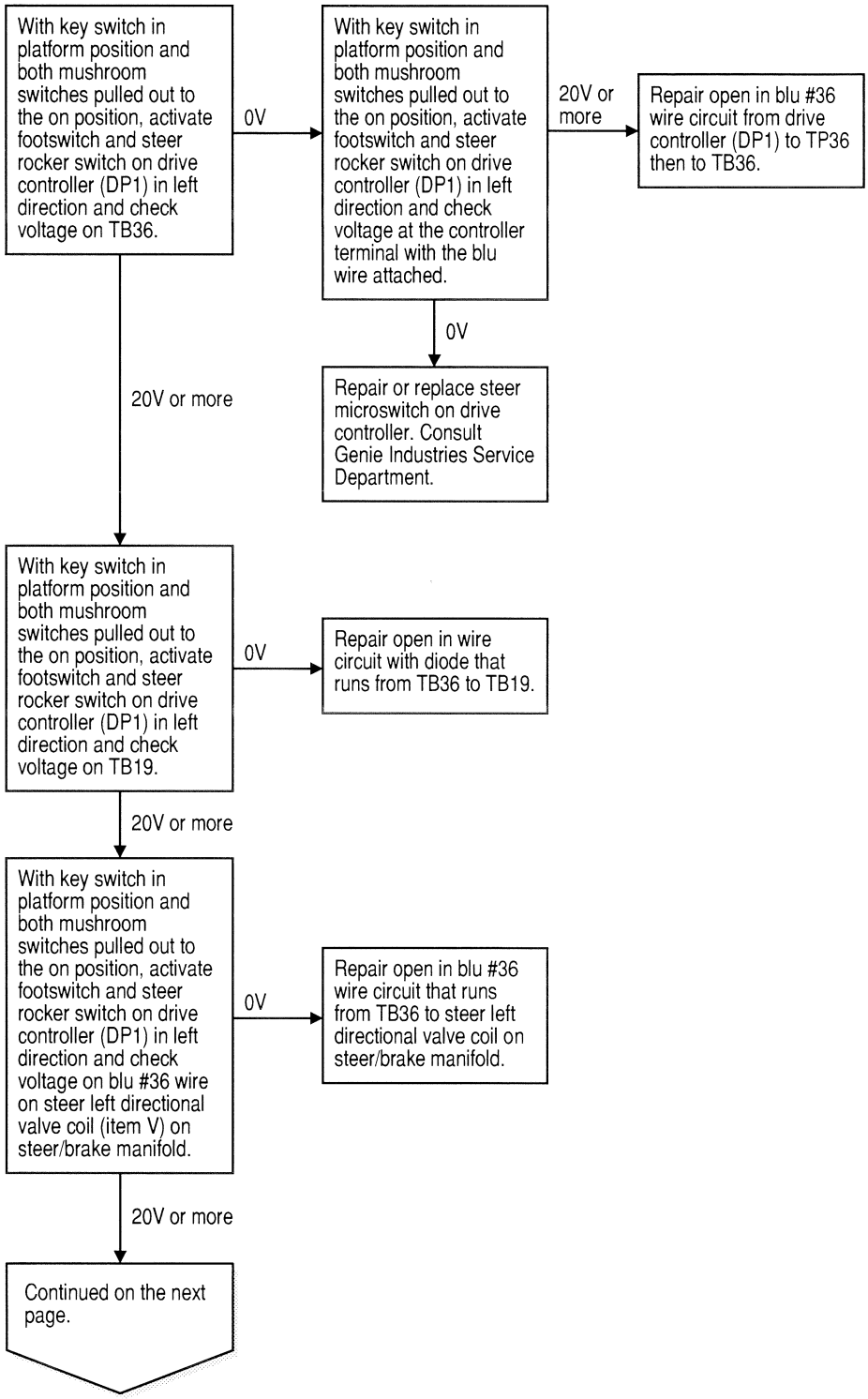


CHART 21

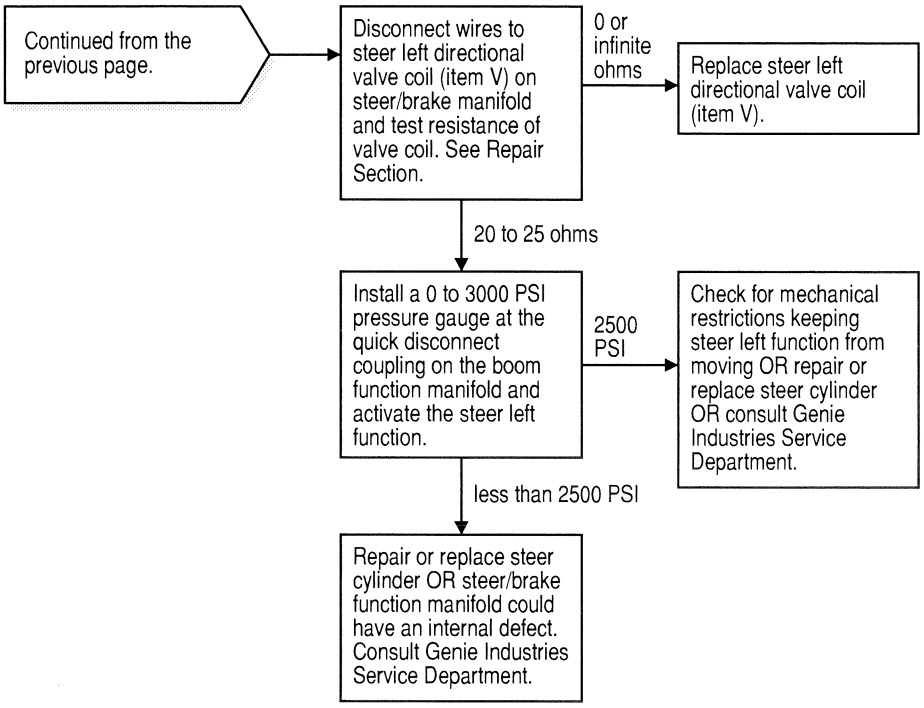

Continued from the previous page.
Disconnect wires to steer left directional valve coil (item V) on steer/brake manifold and test resistance of valve coil. See Repair Section.
0 or infinite ohms
Replace steer left directional valve coil (item V).
20 to 25 ohms
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the steer left function.
2500 PSI
Check for mechanical restrictions keeping steer left function from moving OR repair or replace steer cylinder OR consult Genie Industries Service Department.
less than 2500 PSI
Repair or replace steer cylinder OR steer/brake function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 22

Steer Right Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

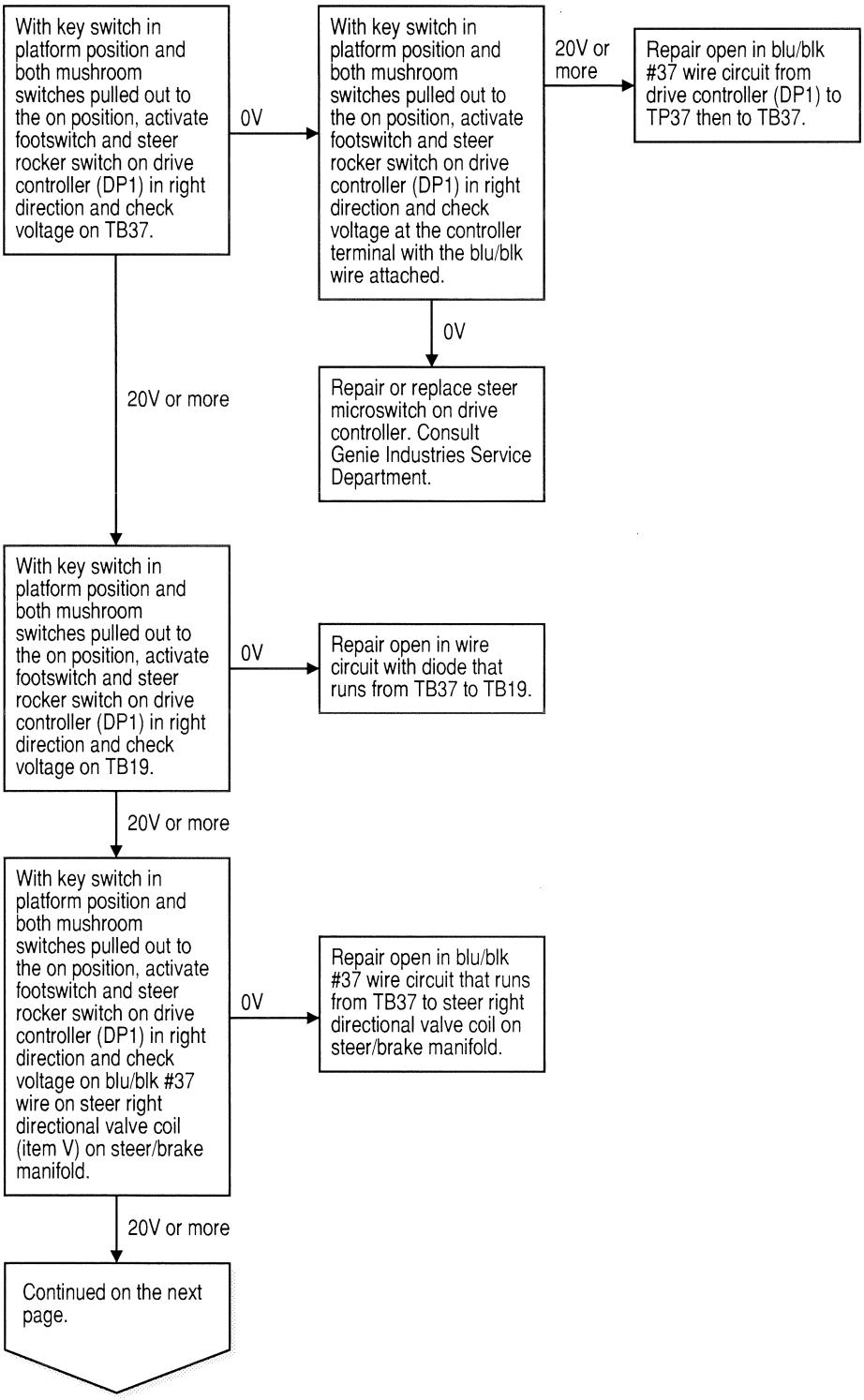


CHART 22

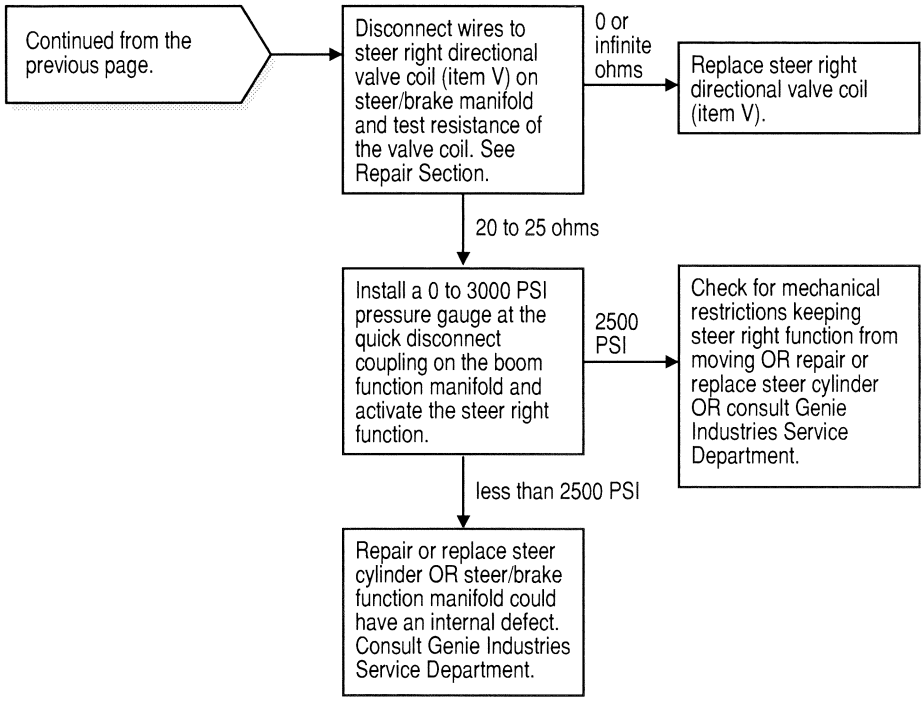

Continued from the previous page.
Disconnect wires to steer right directional valve coil (item V) on steer/brake manifold and test resistance of the valve coil. See Repair Section.
0 or infinite ohms
Replace steer right directional valve coil (item V).
20 to 25 ohms
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the boom function manifold and activate the steer right function.
2500 PSI
Check for mechanical restrictions keeping steer right function from moving OR repair or replace steer cylinder OR consult Genie Industries Service Department.
less than 2500 PSI
Repair or replace steer cylinder OR steer/brake function manifold could have an internal defect. Consult Genie Industries Service Department.

Chart 23

All Drive Functions Inoperative, all Other Functions Operate Normally

Be sure the unit is in the fully stowed position with the boom located between the drive tires.

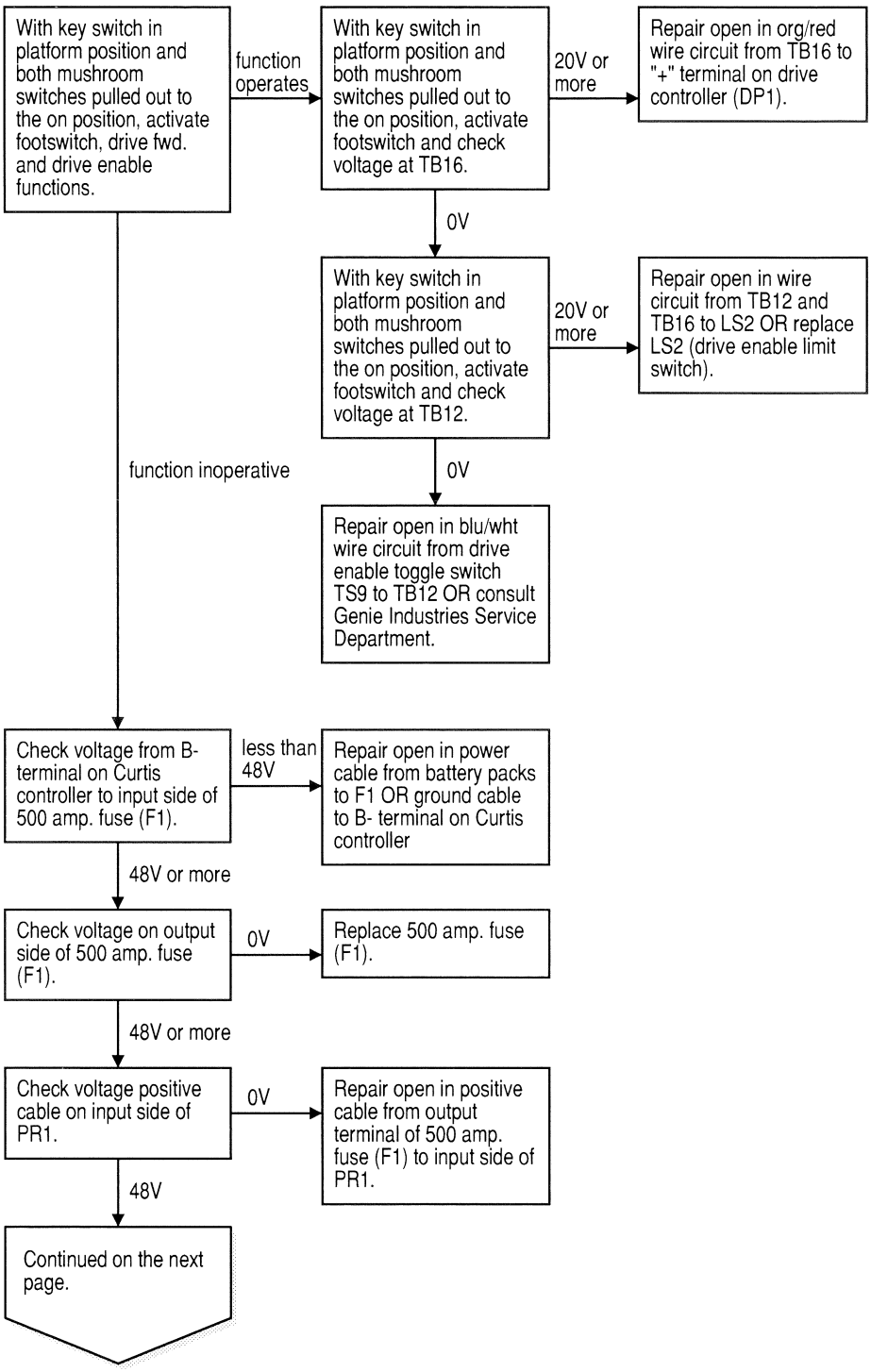


CHART 23

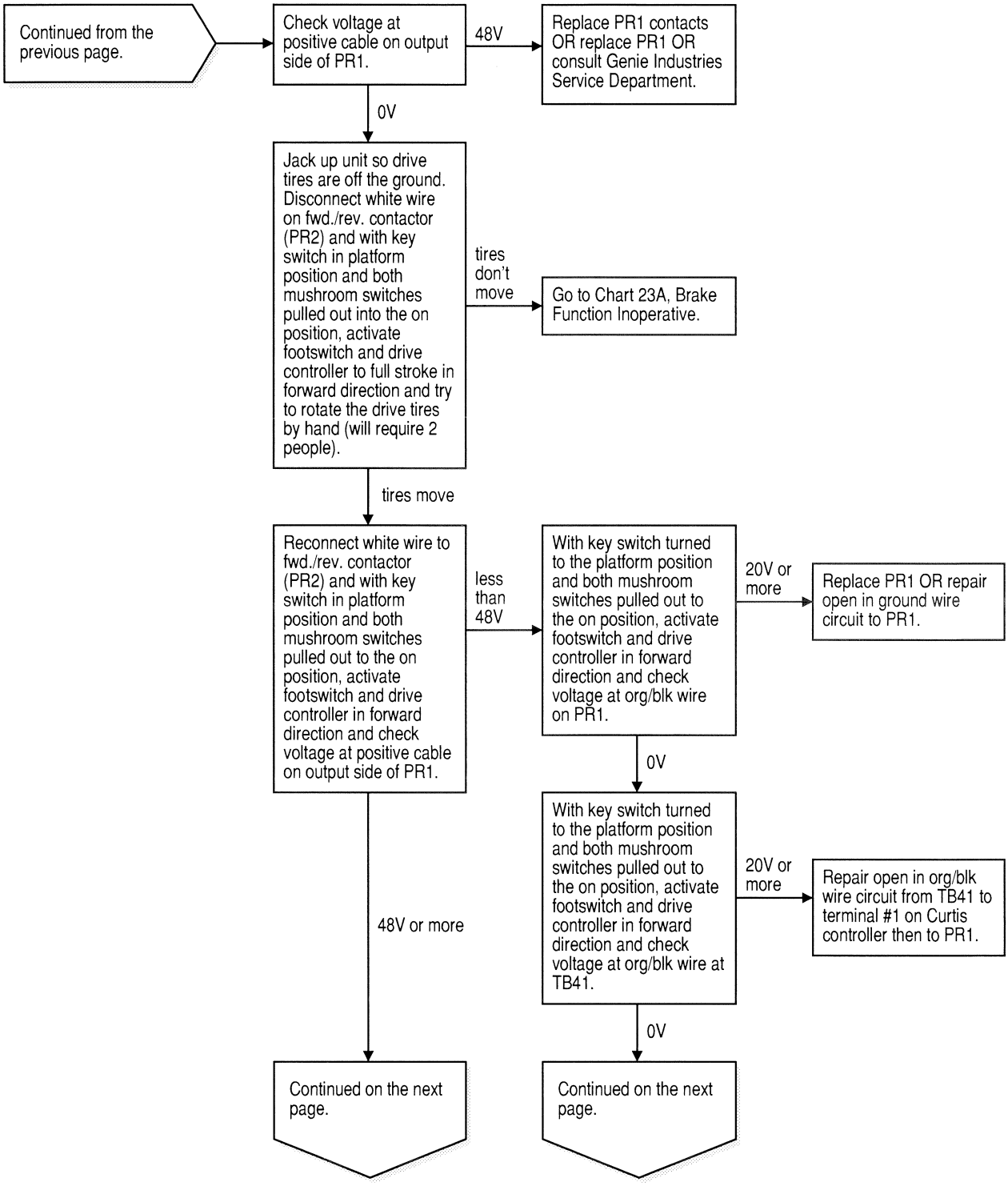

Continued from the previous page.
Check voltage at positive cable on output side of PR1.
48V
Replace PR1 contacts OR replace PR1 OR consult Genie Industries Service Department.
0V
Jack up unit so drive tires are off the ground. Disconnect white wire on fwd./rev. contactor (PR2) and with key switch in platform position and both mushroom switches pulled out into the on position, activate footswitch and drive controller to full stroke in forward direction and try to rotate the drive tires by hand (will require 2 people).
tires don't move
Go to Chart 23A, Brake Function Inoperative.
tires move
Reconnect white wire to fwd./rev. contactor (PR2) and with key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check voltage at positive cable on output side of PR1.
less than 48V
With key switch turned to the platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check voltage at org/blk wire on PR1.
20V or more
Replace PR1 OR repair open in ground wire circuit to PR1.
0V
With key switch turned to the platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check voltage at org/blk wire at TB41.
20V or more
Repair open in org/blk wire circuit from TB41 to terminal #1 on Curtis controller then to PR1.
48V or more
0V
Continued on the next page.
Continued on the next page.

CHART 23

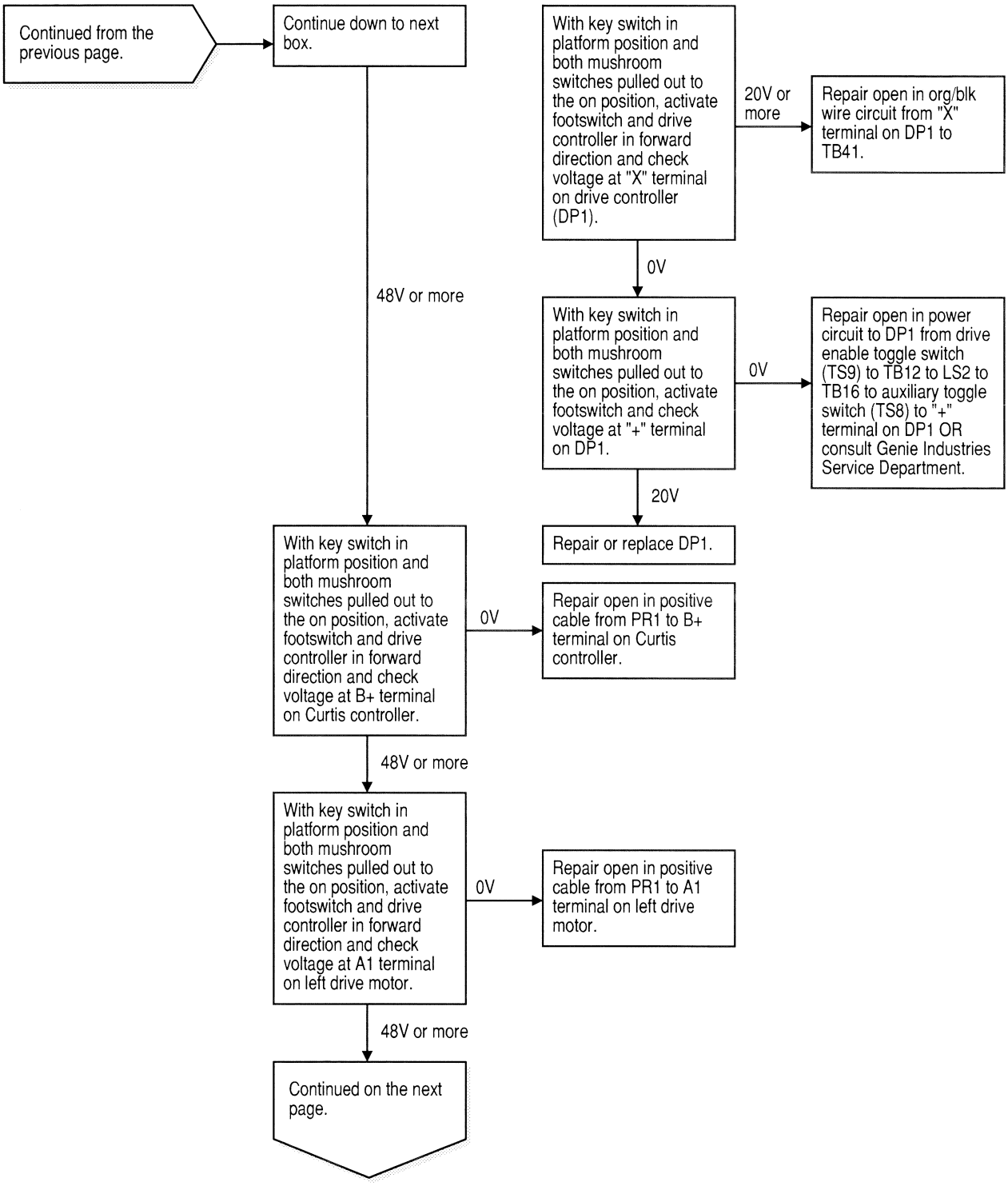

Continued from the previous page.
Continue down to next box.
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check voltage at "X" terminal on drive controller (DP1).
20V or more
Repair open in org/blk wire circuit from "X" terminal on DP1 to TB41.
0V
48V or more
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and check voltage at "+" terminal on DP1.
0V
Repair open in power circuit to DP1 from drive enable toggle switch (TS9) to TB12 to LS2 to TB16 to auxiliary toggle switch (TS8) to "+" terminal on DP1 OR consult Genie Industries Service Department.
20V
Repair or replace DP1.
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check voltage at B+ terminal on Curtis controller.
0V
Repair open in positive cable from PR1 to B+ terminal on Curtis controller.
48V or more
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check voltage at A1 terminal on left drive motor.
0V
Repair open in positive cable from PR1 to A1 terminal on left drive motor.
48V or more
Continued on the next page.

CHART 23

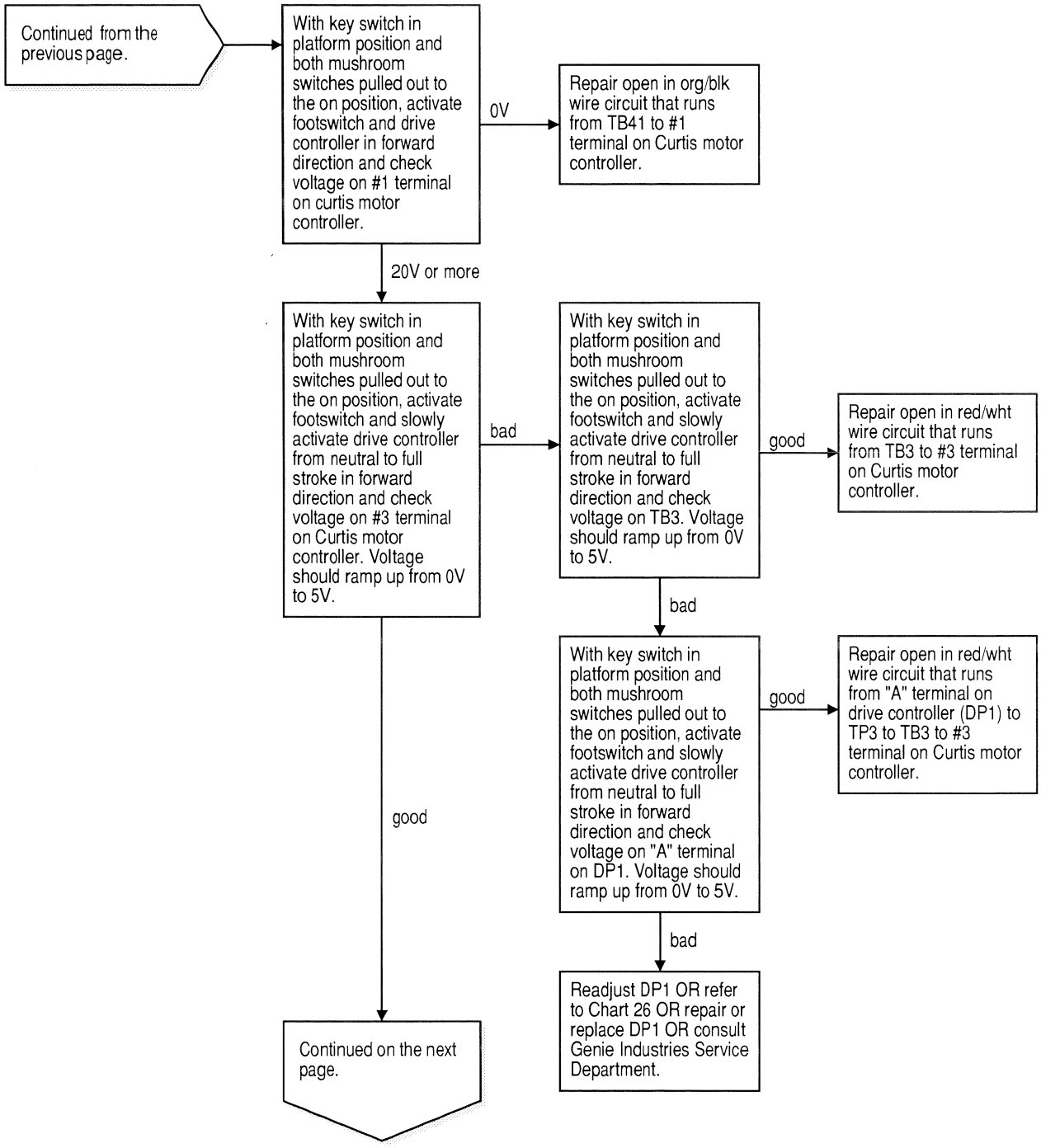

Continued from the previous page.
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check voltage on #1 terminal on curtis motor controller.
0V
Repair open in org/blk wire circuit that runs from TB41 to #1 terminal on Curtis motor controller.
20V or more
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and slowly activate drive controller from neutral to full stroke in forward direction and check voltage on #3 terminal on Curtis motor controller. Voltage should ramp up from 0V to 5V.
bad
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and slowly activate drive controller from neutral to full stroke in forward direction and check voltage on TB3. Voltage should ramp up from 0V to 5V.
good
Repair open in red/wht wire circuit that runs from TB3 to #3 terminal on Curtis motor controller.
bad
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and slowly activate drive controller from neutral to full stroke in forward direction and check voltage on "A" terminal on DP1. Voltage should ramp up from 0V to 5V.
good
Repair open in red/wht wire circuit that runs from "A" terminal on drive controller (DP1) to TP3 to TB3 to #3 terminal on Curtis motor controller.
bad
Readjust DP1 OR refer to Chart 26 OR repair or replace DP1 OR consult Genie Industries Service Department.
good
Continued on the next page.

CHART 23

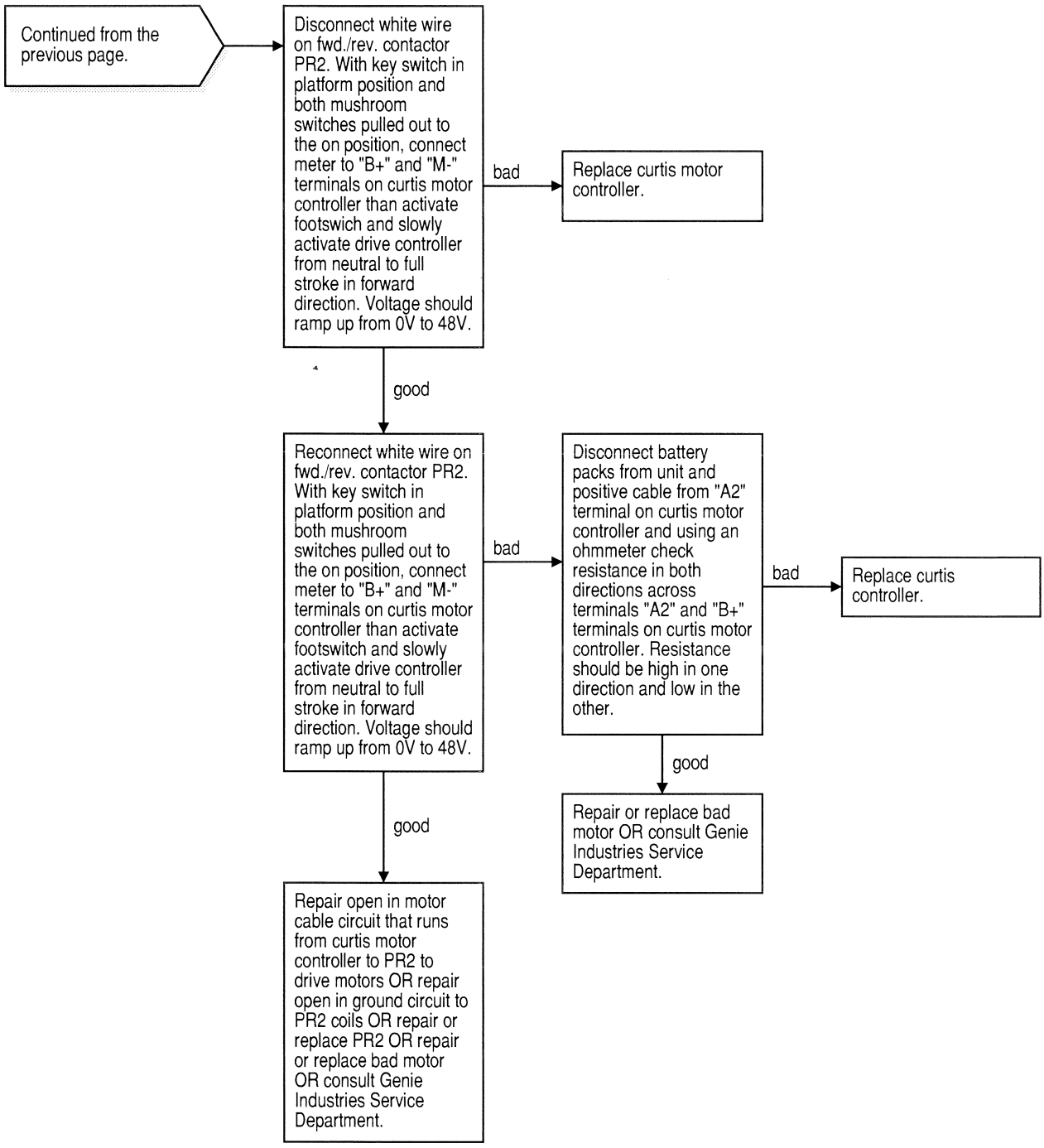

Continued from the previous page.
Disconnect white wire on fwd./rev. contactor PR2. With key switch in platform position and both mushroom switches pulled out to the on position, connect meter to "B+" and "M-" terminals on curtis motor controller than activate footswich and slowly activate drive controller from neutral to full stroke in forward direction. Voltage should ramp up from 0V to 48V.
bad
Replace curtis motor controller.
good
Reconnect white wire on fwd./rev. contactor PR2. With key switch in platform position and both mushroom switches pulled out to the on position, connect meter to "B+" and "M-" terminals on curtis motor controller than activate footswitch and slowly activate drive controller from neutral to full stroke in forward direction. Voltage should ramp up from 0V to 48V.
bad
Disconnect battery packs from unit and positive cable from "A2" terminal on curtis motor controller and using an ohmmeter check resistance in both directions across terminals "A2" and "B+" terminals on curtis motor controller. Resistance should be high in one direction and low in the other.
bad
Replace curtis controller.
good
Repair or replace bad motor OR consult Genie Industries Service Department.
good
Repair open in motor cable circuit that runs from curtis motor controller to PR2 to drive motors OR repair open in ground circuit to PR2 coils OR repair or replace PR2 OR repair or replace bad motor OR consult Genie Industries Service Department.

Chart 23A

Brake Function Inoperative

Be sure torque hubs are not disengaged.

Be sure remote brake release is removed.

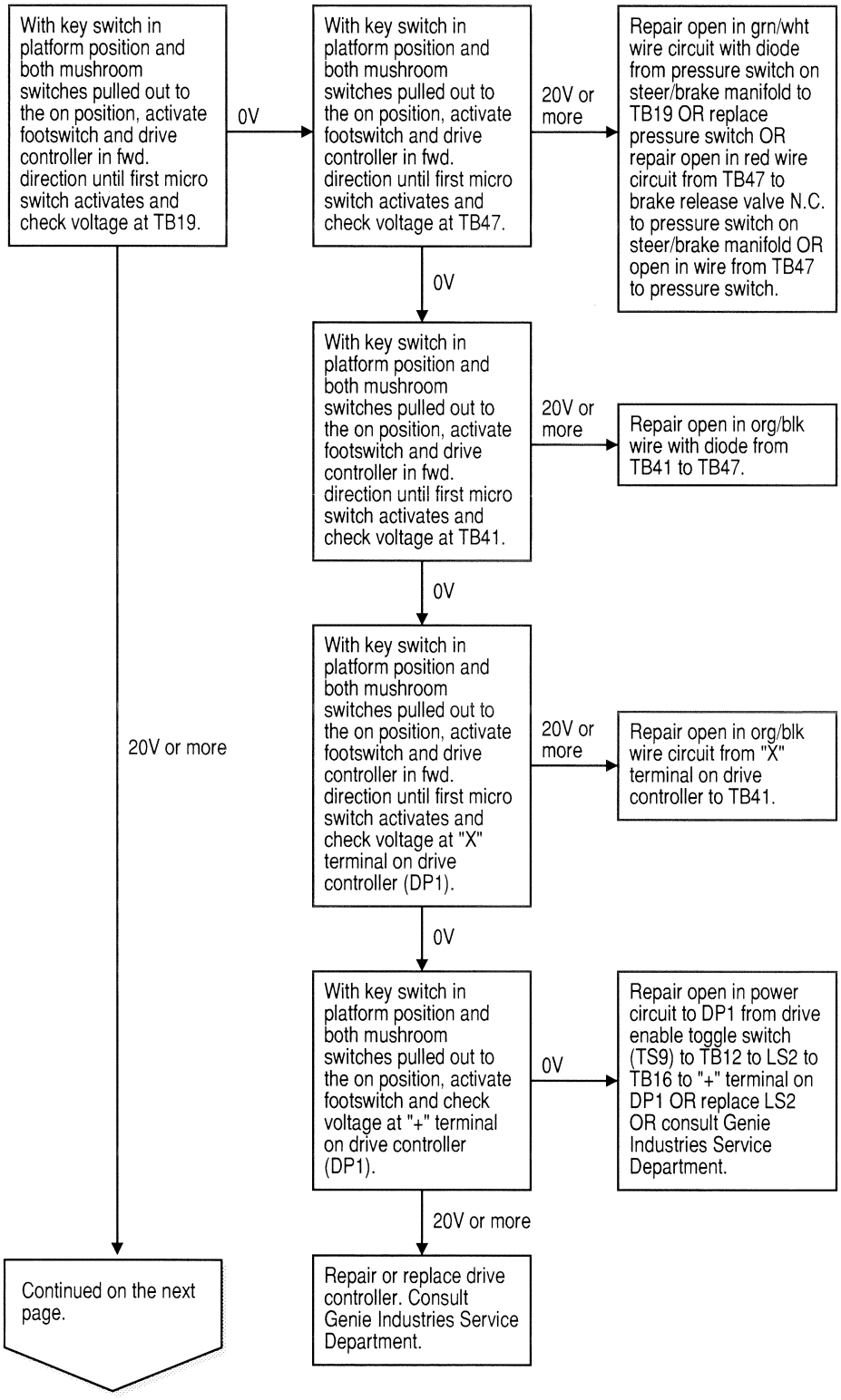


CHART 23A

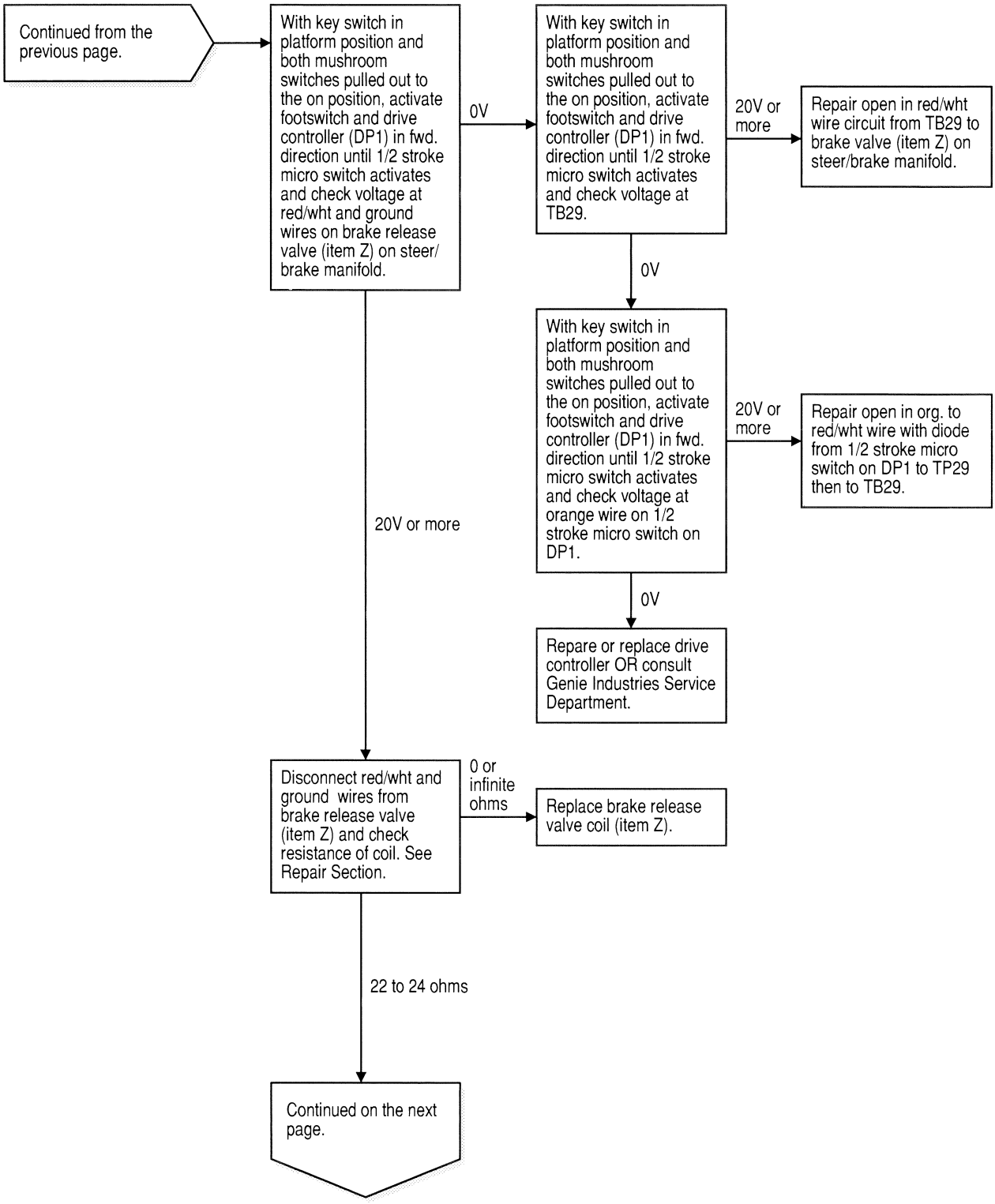

Continued from the previous page.
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller (DP1) in fwd. direction until 1/2 stroke micro switch activates and check voltage at red/wht and ground wires on brake release valve (item Z) on steer/ brake manifold.
0V
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller (DP1) in fwd. direction until 1/2 stroke micro switch activates and check voltage at TB29.
20V or more
Repair open in red/wht wire circuit from TB29 to brake valve (item Z) on steer/brake manifold.
0V
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller (DP1) in fwd. direction until 1/2 stroke micro switch activates and check voltage at orange wire on 1/2 stroke micro switch on DP1.
20V or more
Repair open in org. to red/wht wire with diode from 1/2 stroke micro switch on DP1 to TP29 then to TB29.
0V
Repare or replace drive controller OR consult Genie Industries Service Department.
20V or more
Disconnect red/wht and ground wires from brake release valve (item Z) and check resistance of coil. See Repair Section.
0 or infinite ohms
Replace brake release valve coil (item Z).
22 to 24 ohms
Continued on the next page.

CHART 23A

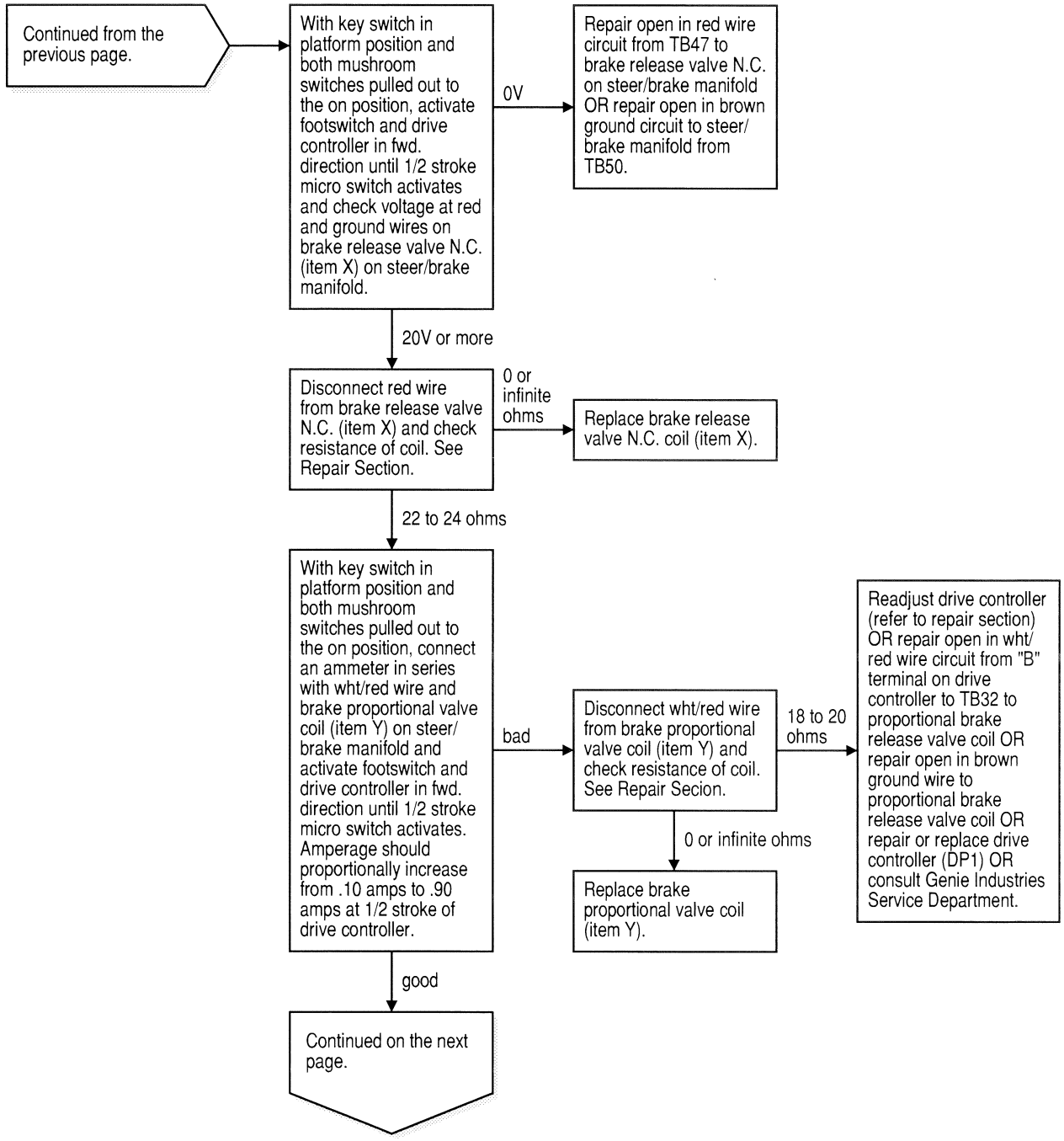

Continued from the previous page.
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in fwd. direction until 1/2 stroke micro switch activates and check voltage at red and ground wires on brake release valve N.C. (item X) on steer/brake manifold.
0V
Repair open in red wire circuit from TB47 to brake release valve N.C. on steer/brake manifold OR repair open in brown ground circuit to steer/ brake manifold from TB50.
20V or more
Disconnect red wire from brake release valve N.C. (item X) and check resistance of coil. See Repair Section.
0 or infinite ohms
Replace brake release valve N.C. coil (item X).
22 to 24 ohms
With key switch in platform position and both mushroom switches pulled out to the on position, connect an ammeter in series with wht/red wire and brake proportional valve coil (item Y) on steer/ brake manifold and activate footswitch and drive controller in fwd. direction until 1/2 stroke micro switch activates. Amperage should proportionally increase from .10 amps to .90 amps at 1/2 stroke of drive controller.
bad
Disconnect wht/red wire from brake proportional valve coil (item Y) and check resistance of coil. See Repair Secion.
18 to 20 ohms
Readjust drive controller (refer to repair section) OR repair open in wht/ red wire circuit from "B" terminal on drive controller to TB32 to proportional brake release valve coil OR repair open in brown ground wire to proportional brake release valve coil OR repair or replace drive controller (DP1) OR consult Genie Industries Service Department.
0 or infinite ohms
Replace brake proportional valve coil (item Y).
good
Continued on the next page.

CHART 23A

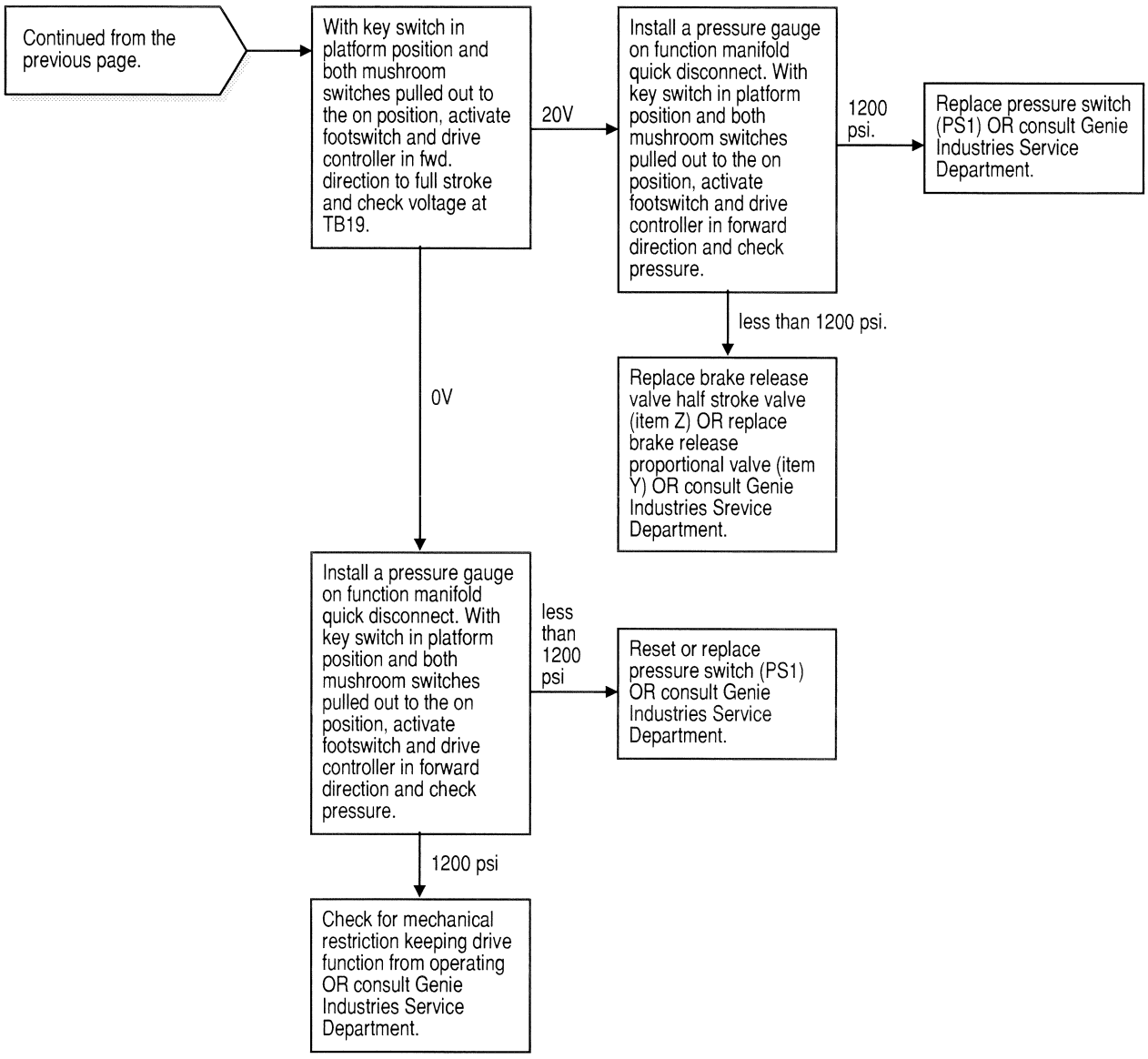

Continued from the previous page.
With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in fwd. direction to full stroke and check voltage at TB19.
20V
Install a pressure gauge on function manifold quick disconnect. With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check pressure.
1200 psi.
Replace pressure switch (PS1) OR consult Genie Industries Service Department.
less than 1200 psi.
Replace brake release valve half stroke valve (item Z) OR replace brake release proportional valve (item Y) OR consult Genie Industries Srevice Department.
0V
Install a pressure gauge on function manifold quick disconnect. With key switch in platform position and both mushroom switches pulled out to the on position, activate footswitch and drive controller in forward direction and check pressure.
less than 1200 psi
Reset or replace pressure switch (PS1) OR consult Genie Industries Service Department.
1200 psi
Check for mechanical restriction keeping drive function from operating OR consult Genie Industries Service Department.

Chart 24

Drive Forward Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

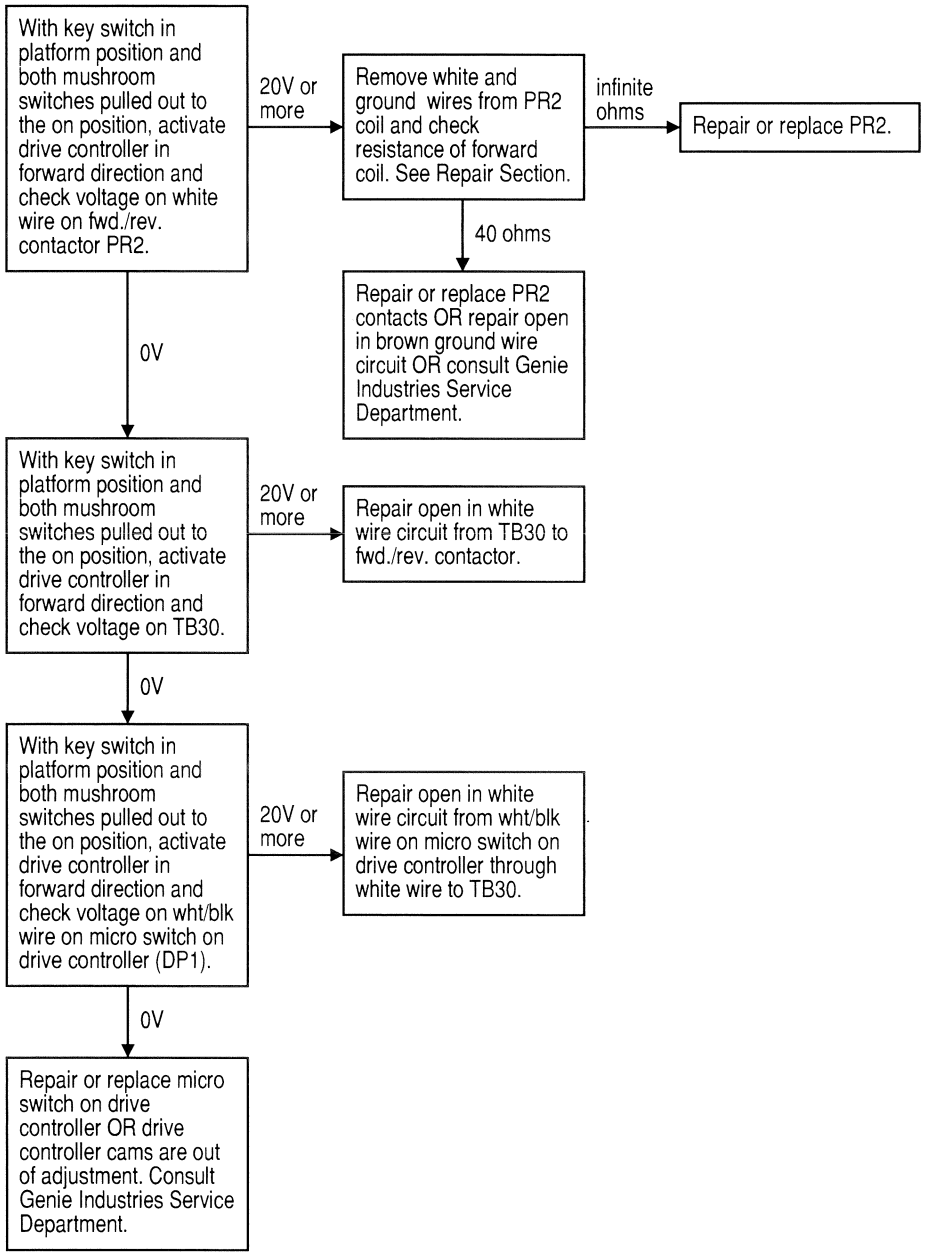


Chart 25

Drive Reverse Function Inoperative

Be sure key switch is in the appropriate position.

Be sure the Emergency Stop buttons are pulled out to the ON position.

Be sure the batteries are fully charged.

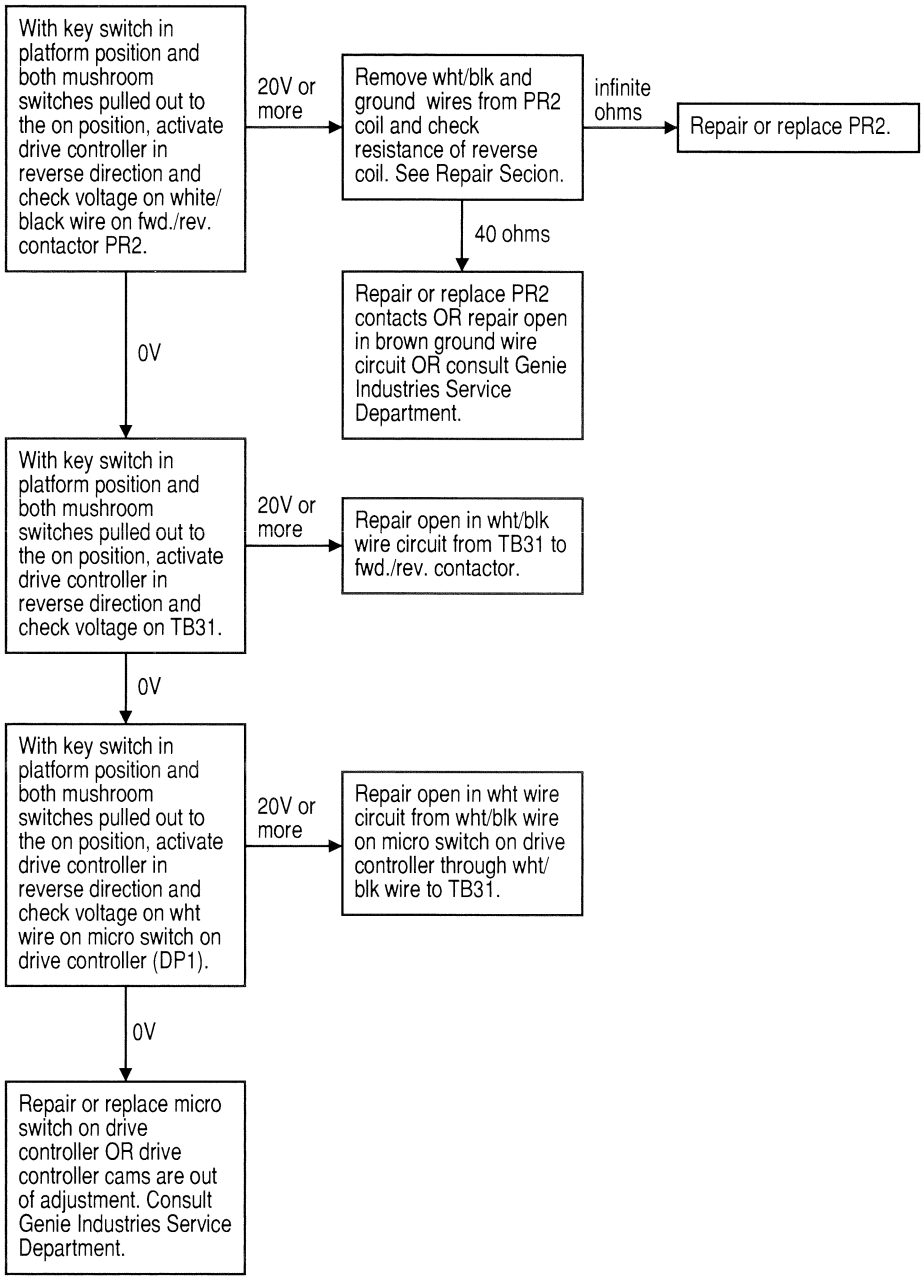


Chart 26

Machine Will Not Drive At Full Speed

Be sure machine is in fully stowed position.

Be sure the batteries are fully charged.

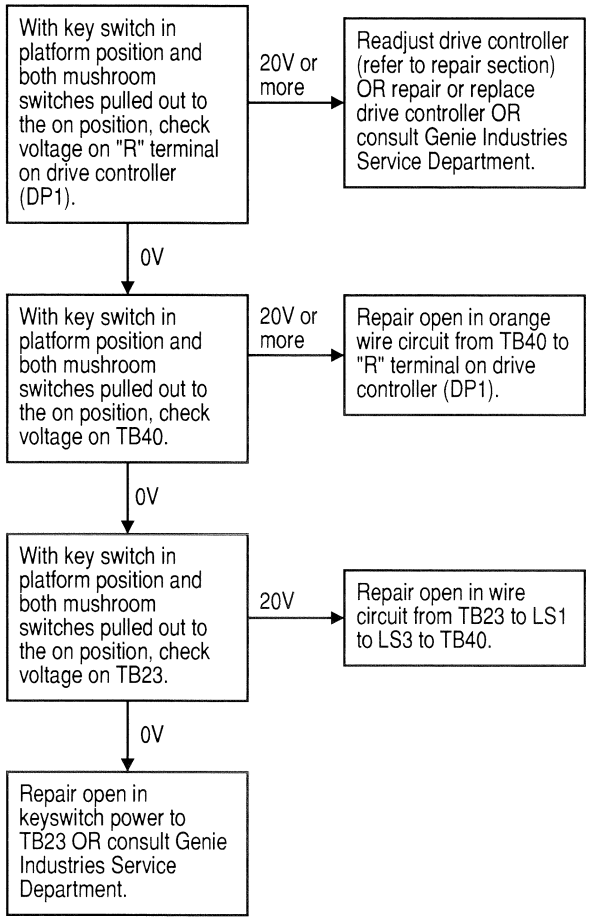


Chart 27

Machine Drives At Full Speed With Platform Raised

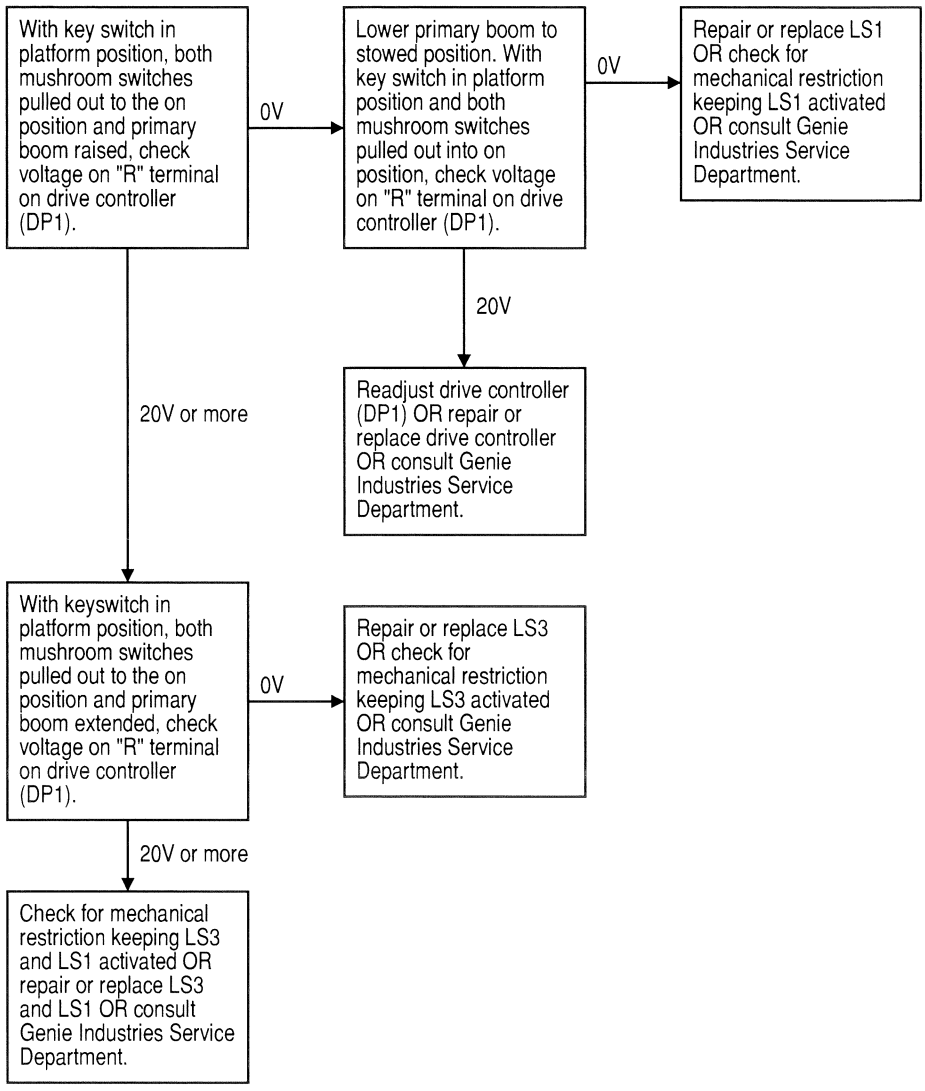


Chart 28

Drive Enable System Is Malfunctioning

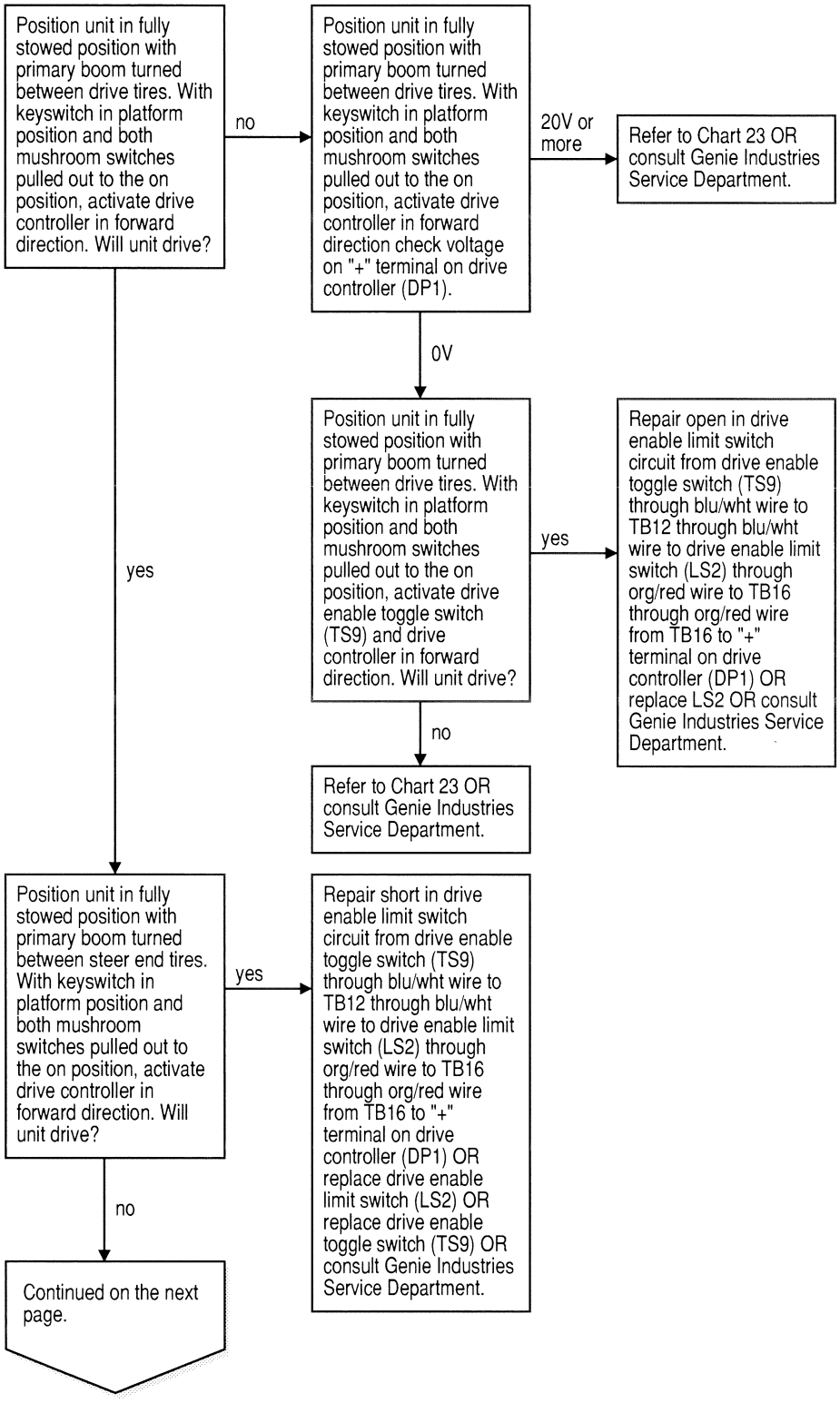


CHART 28

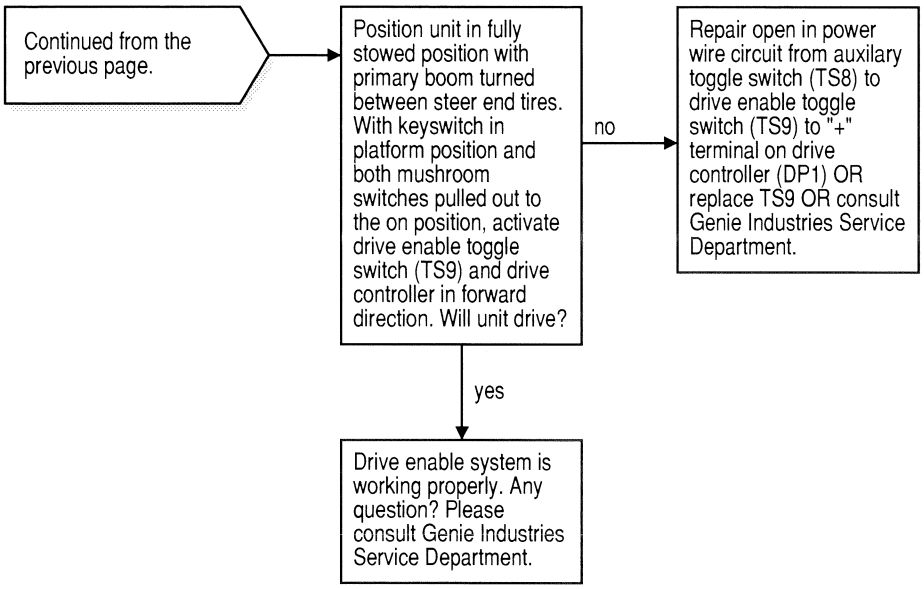

Continued from the previous page.
Position unit in fully stowed position with primary boom turned between steer end tires. With keyswitch in platform position and both mushroom switches pulled out to the on position, activate drive enable toggle switch (TS9) and drive controller in forward direction. Will unit drive?
no
Repair open in power wire circuit from auxilary toggle switch (TS8) to drive enable toggle switch (TS9) to "+" terminal on drive controller (DP1) OR replace TS9 OR consult Genie Industries Service Department.
yes
Drive enable system is working properly. Any question? Please consult Genie Industries Service Department.

Chart 29

Remote Brake Release Inoperative

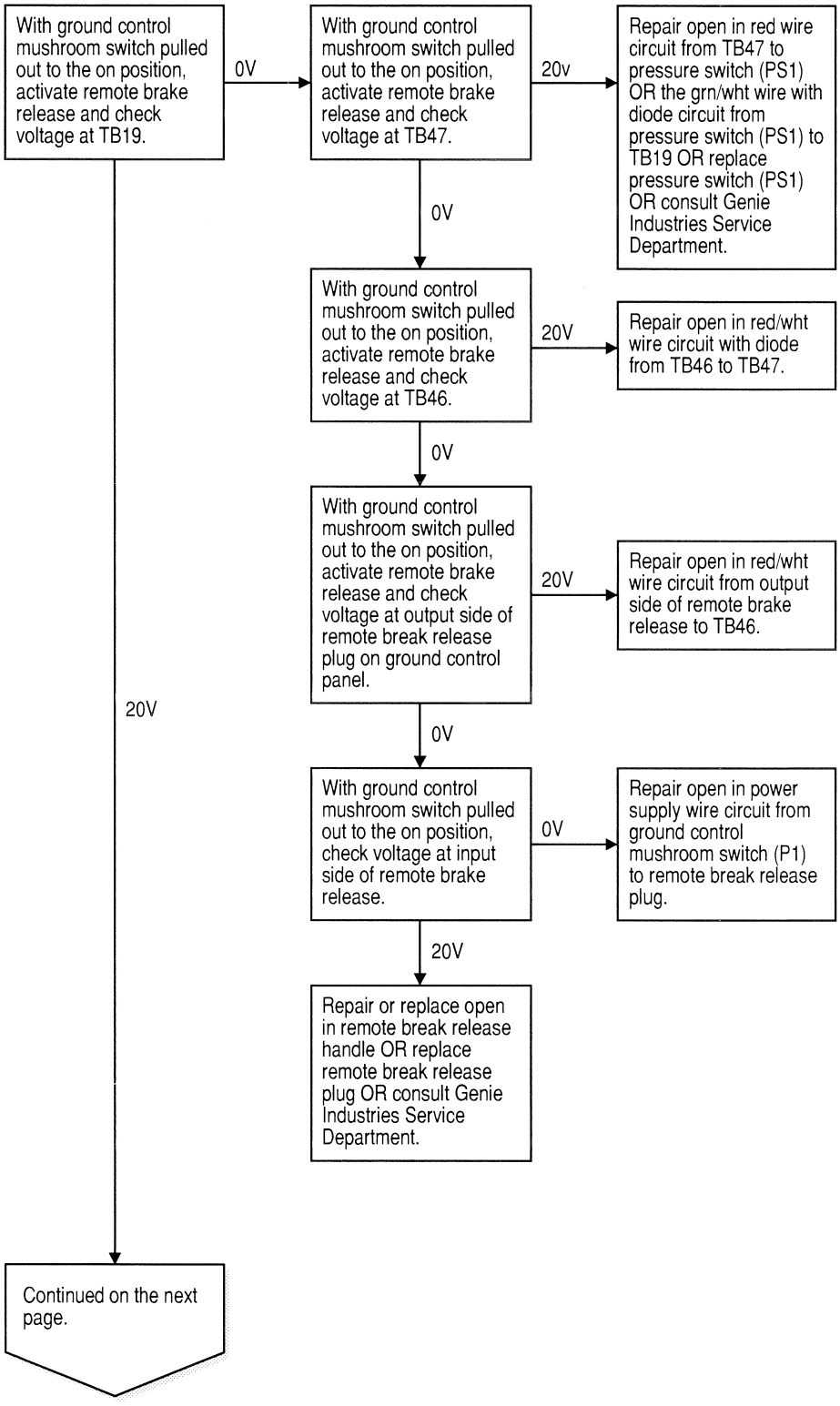


CHART 29

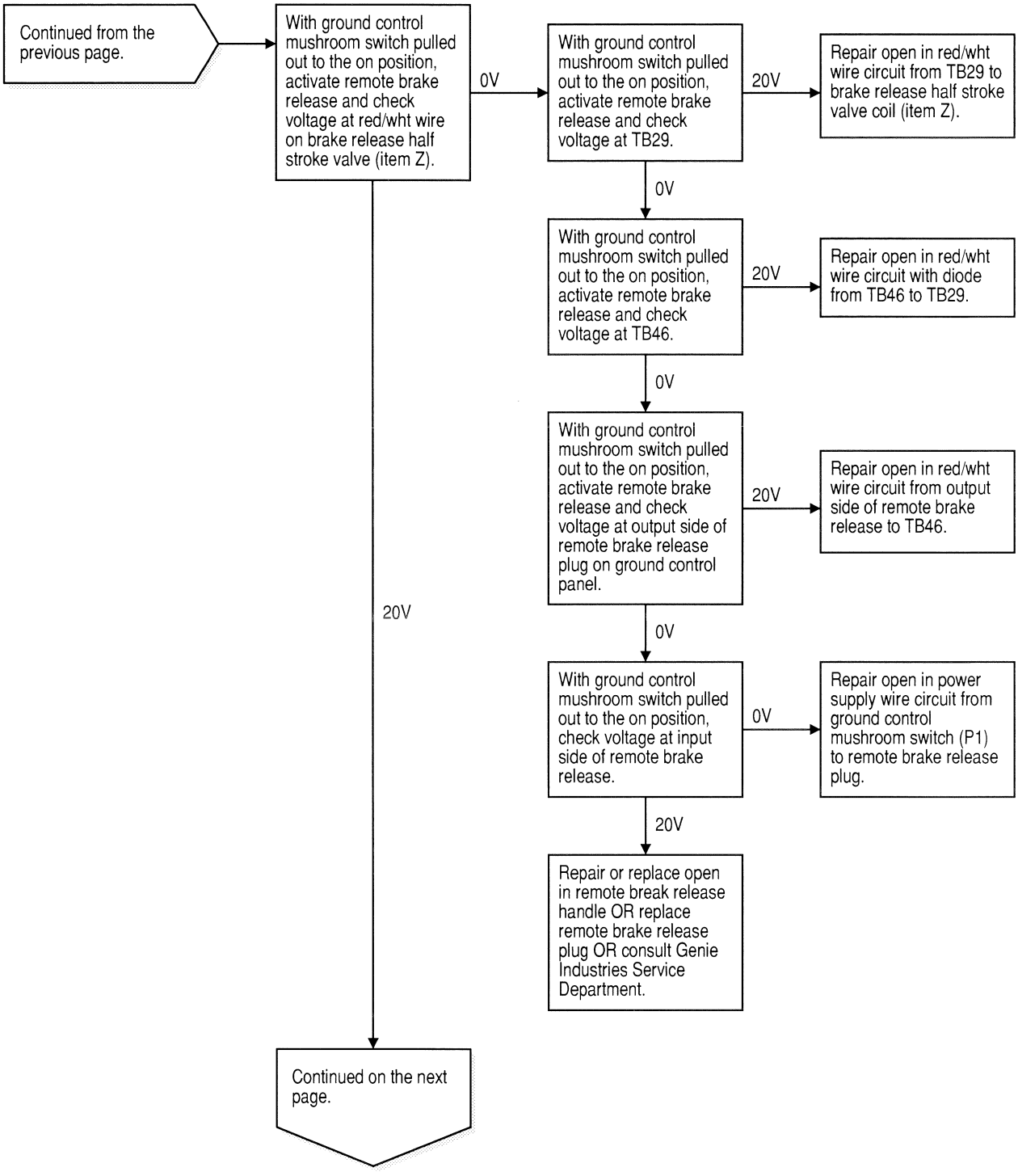
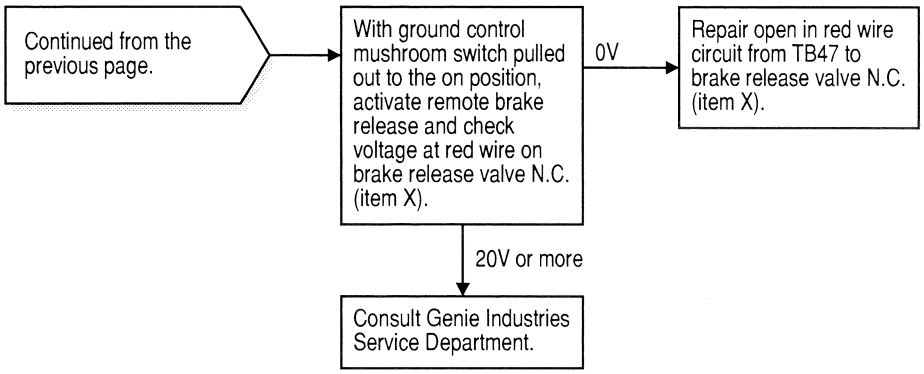
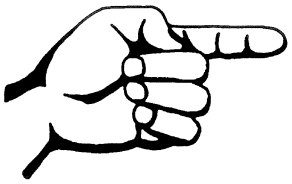

Continued from the previous page.
With ground control mushroom switch pulled out to the on position, activate remote brake release and check voltage at red/wht wire on brake release half stroke valve (item Z).
0V
With ground control mushroom switch pulled out to the on position, activate remote brake release and check voltage at TB29.
20V
Repair open in red/wht wire circuit from TB29 to brake release half stroke valve coil (item Z).
0V
With ground control mushroom switch pulled out to the on position, activate remote brake release and check voltage at TB46.
20V
Repair open in red/wht wire circuit with diode from TB46 to TB29.
0V
With ground control mushroom switch pulled out to the on position, activate remote brake release and check voltage at output side of remote brake release plug on ground control panel.
20V
Repair open in red/wht wire circuit from output side of remote brake release to TB46.
0V
With ground control mushroom switch pulled out to the on position, check voltage at input side of remote brake release.
0V
Repair open in power supply wire circuit from ground control mushroom switch (P1) to remote brake release plug.
20V
Repair or replace open in remote break release handle OR replace remote brake release plug OR consult Genie Industries Service Department.
20V
Continued on the next page.

CHART 29


Continued from the previous page.
With ground control mushroom switch pulled out to the on position, activate remote brake release and check voltage at red wire on brake release valve N.C. (item X).
0V
Repair open in red wire circuit from TB47 to brake release valve N.C. (item X).
20V or more
Consult Genie Industries Service Department.



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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 Z-45/22 Series 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.

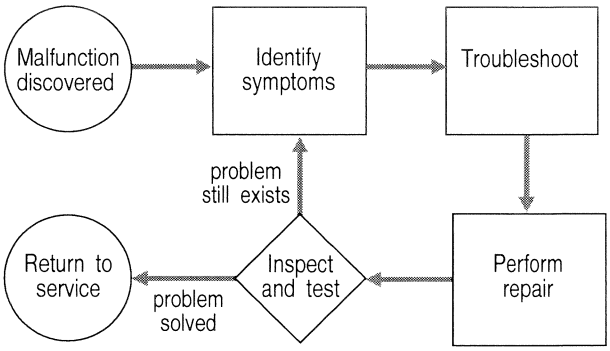
Electrical Schematics

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

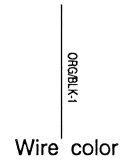
Hydraulic Schematics

⚠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 Symbols Legend



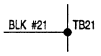
Wire color with cable number



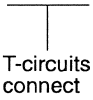
Terminal



Quick disconnect terminal



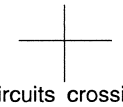
T-circuits connect at terminal



T-circuits connect



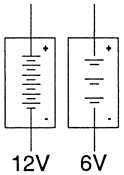
Connection no terminal



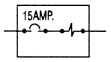
Circuits crossing no connection



Diode



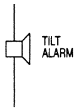
Battery



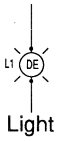
Circuit breaker



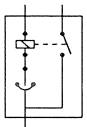
Solenoid or relay coil



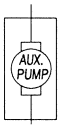
Horn



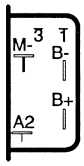
Light



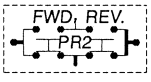
Tilt sensor



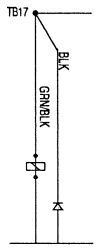
Auxiliary pump



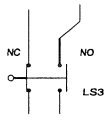
Curtis motor controller



Dual pole relay controller



Ground supression circuit



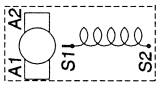
Limit switch



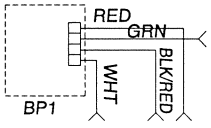
Limit switch normally closed held open



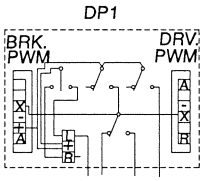
Limit switch normally open held closed



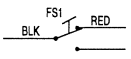
Drive motor



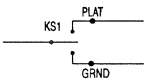
Rotary OEM flow control



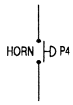
Drive control



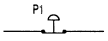
Foot switch



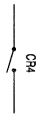
Key switch



Horn button normally open



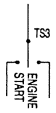
Emergency Stop button normally closed



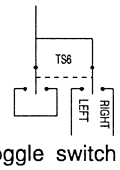
Relay contact normally open



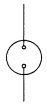
Relay panel contactor



Toggle switch SPDT



Toggle switch DPDT



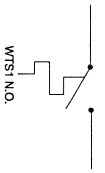
Brake release plug



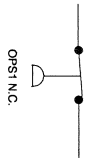
Pressure switch



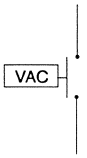
Spark plug



Water temperature switch, normally open



Oil pressure switch, normally closed

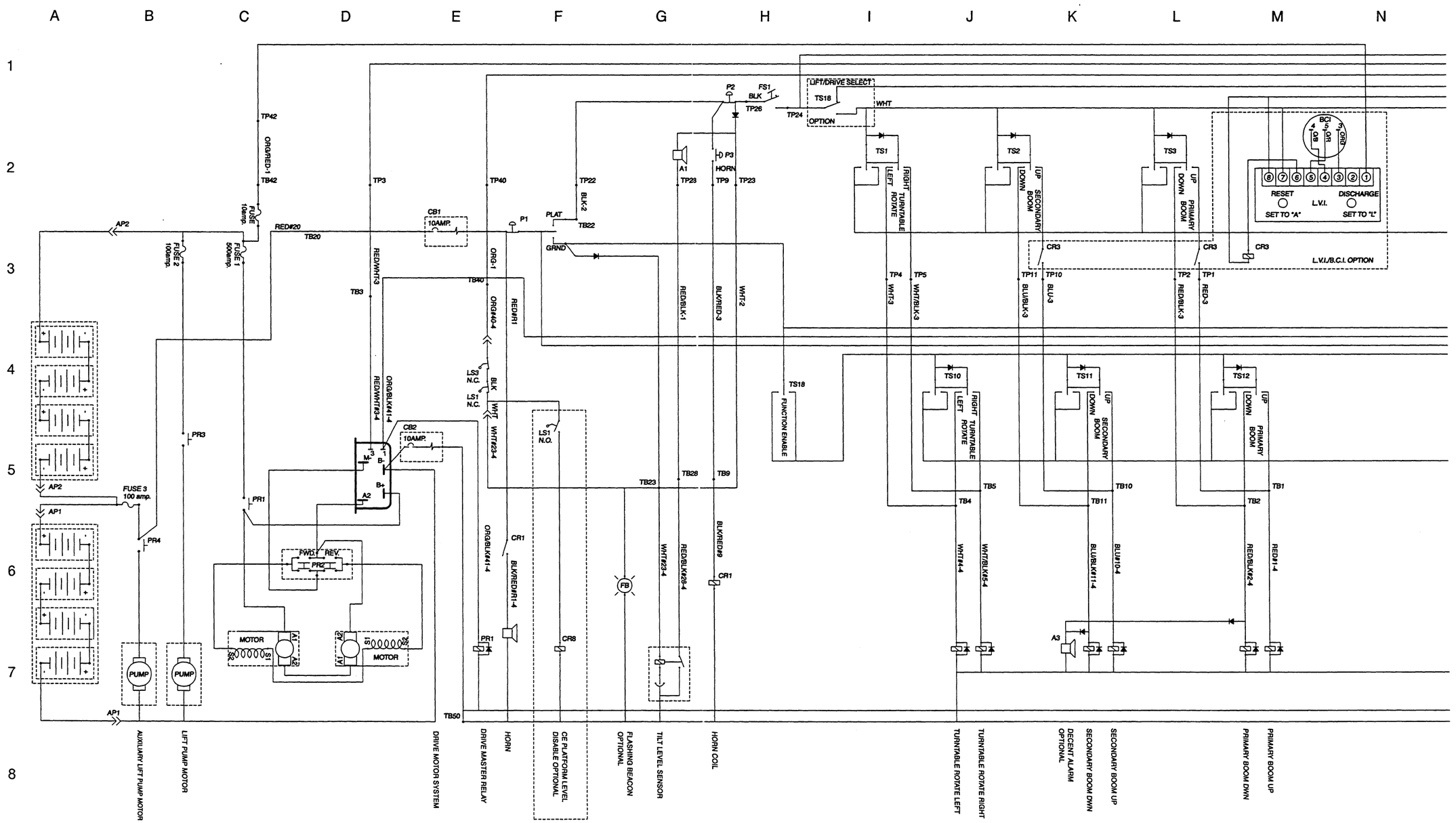


Vacuum switch normaly open



Resistor

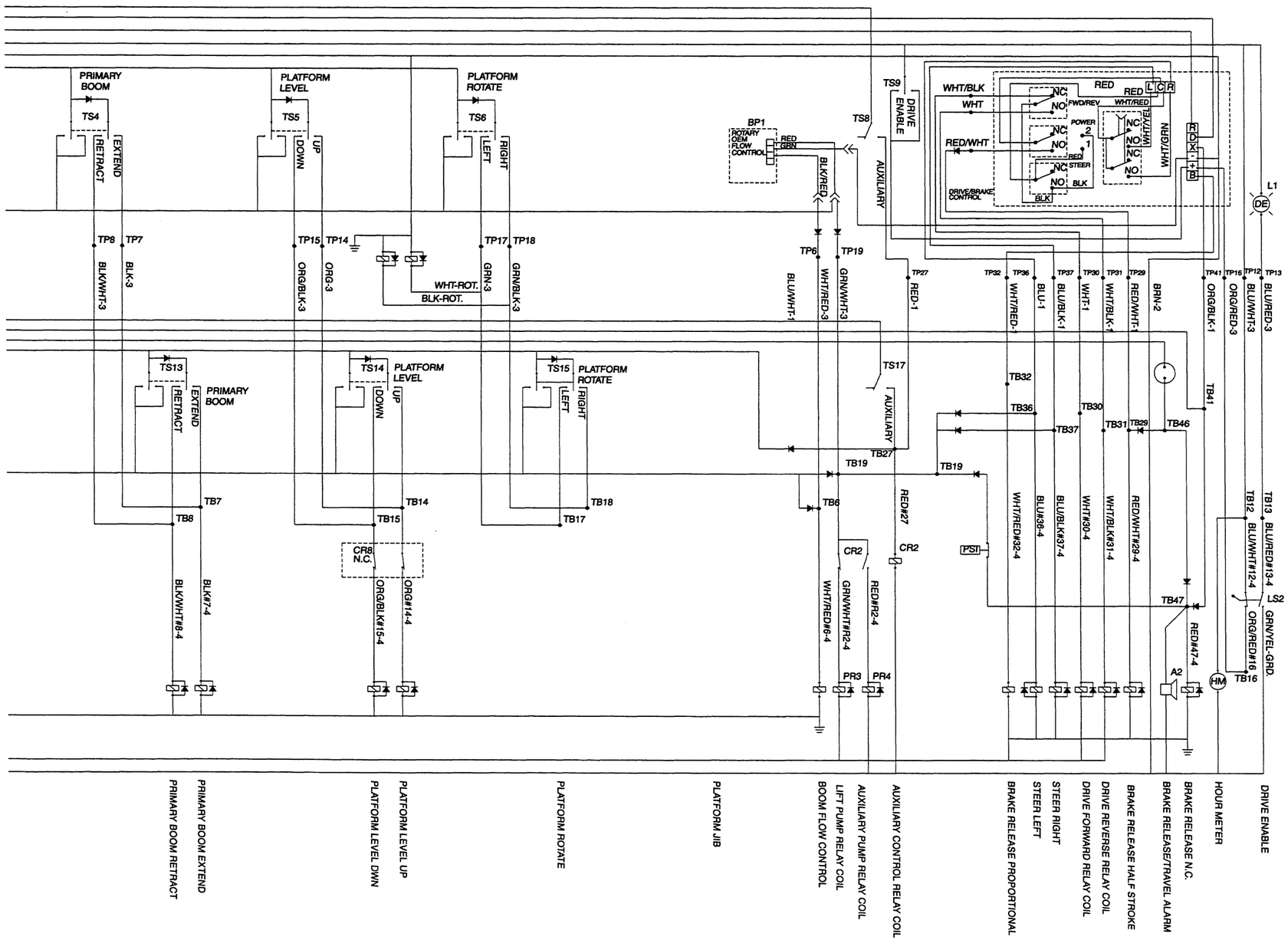
Electrical Schematic
DC Models





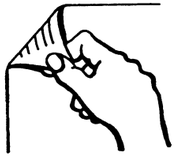


Electrical Schematic
DC Models

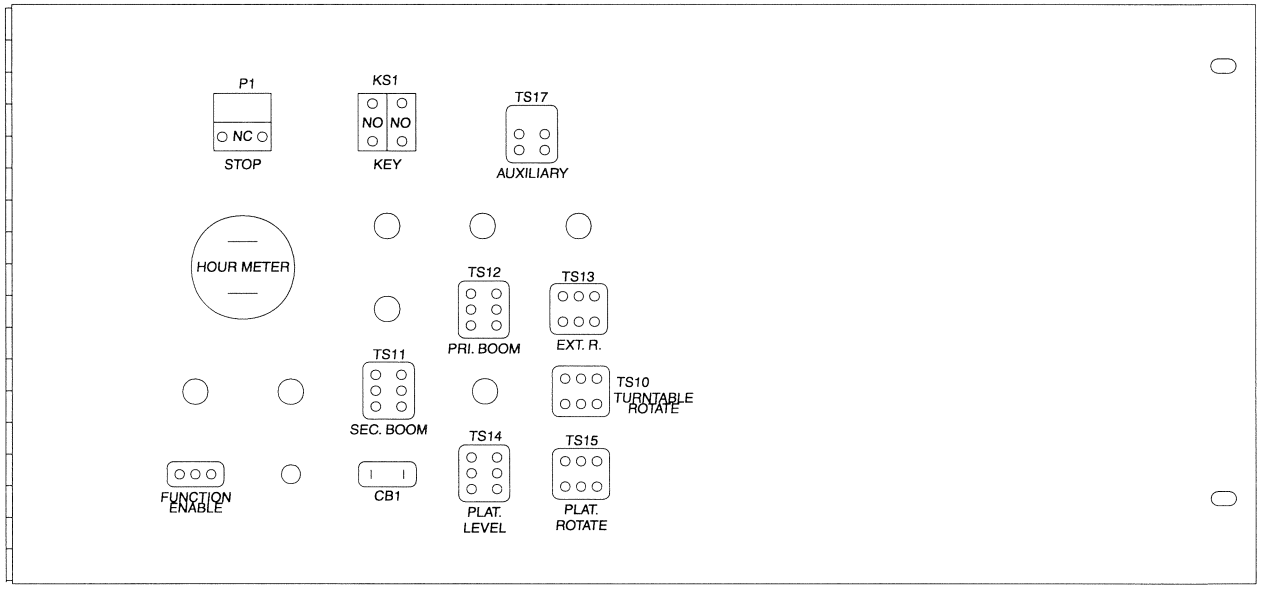


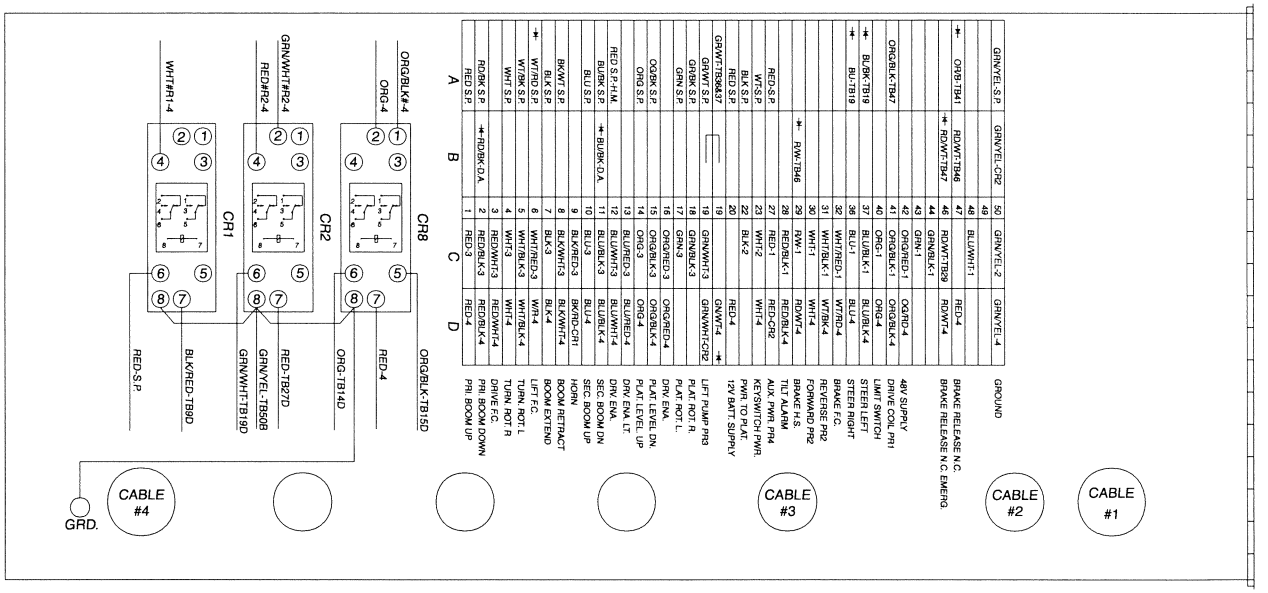
LABEL	DESCRIPTION
A	ALARM
AP	ANDERSON PLUG
BP	BOOM PROPORTIONAL CONTROLLER
CB	CIRCUIT BREAKER
CR	CONTROL RELAY
DE	DRIVE ENABLE
DP	DRIVE PROPORTIONAL CONTROLLER
FB	FLASHING BEACON
FS	FOOT SWITCH
HM	HOUR METER
LS	LIMIT SWITCH
P	POWER SWITCH
PR	POWER RELAY
PS	PRESSURE SWITCH
TB	TERMINAL BASE LOCATION
TS	TOGGLE SWITCH
B.C.I.	BATTERY CHARGE INDICATOR
L.V.I.	LOW VOLTAGE INTERRUPT

Electrical Schematic
Z-45 DC Models

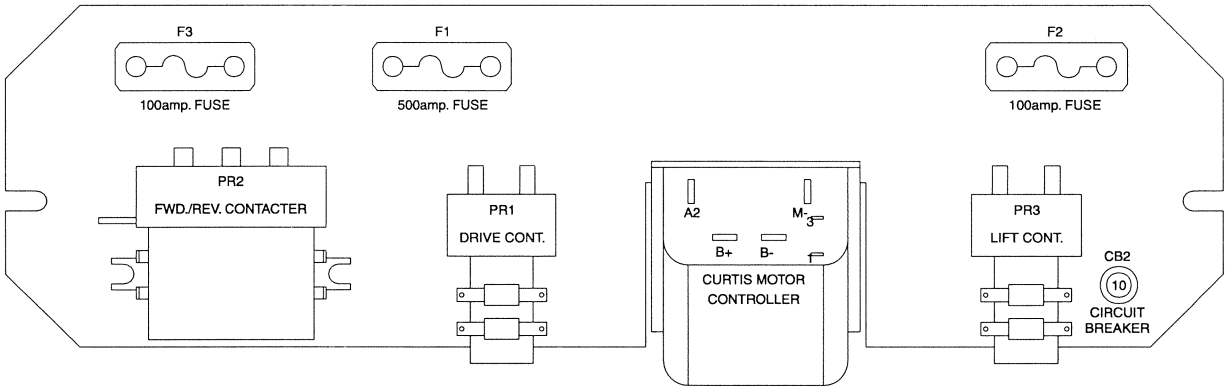


Ground Control Panel Legend
DC Models



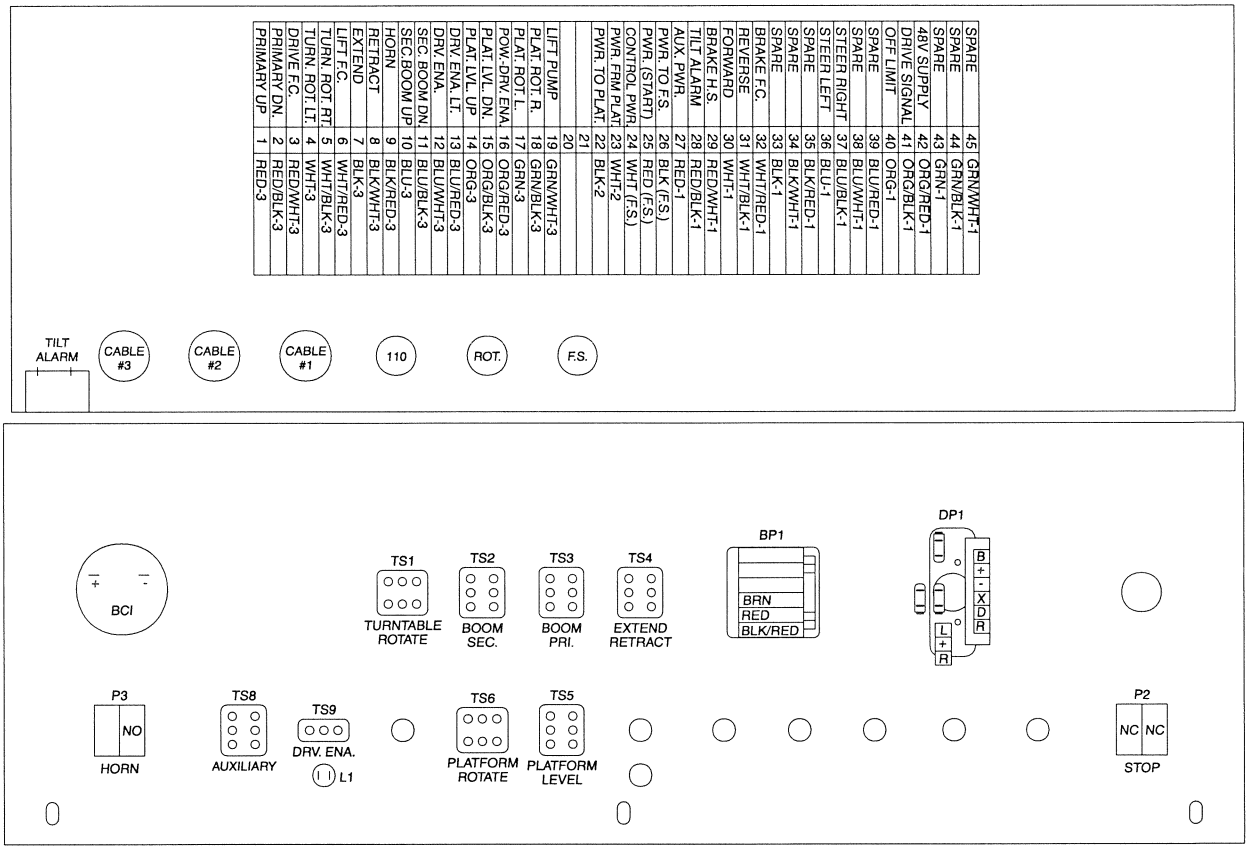


Power Panel Legend
DC Models



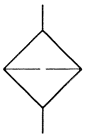
Platform Control Panel Legend
DC Models

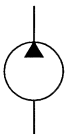
PRIMARY UP	1	RED-3
PRIMARY DN.	2	RED/BLK-3
DRIVE F.C.	3	RED/WHT-3
TURN. ROT. LT.	4	WHT-3
TURN. ROT. RT.	5	WHT/BLK-3
LIFT F.C.	6	WHT/RED-3
EXTEND	7	BLK-3
RETRACT	8	BLK/WHT-3
HORN	9	BLK/RED-3
SEC. BOOM UP	10	BLU-3
SEC. BOOM DN.	11	BLU/BLK-3
DRV. ENA.	12	BLU/WHT-3
DRV. ENA. LT.	13	BLU/RED-3
PLAT. LVL. UP	14	ORG-3
PLAT. LVL. DN.	15	ORG/BLK-3
POW.-DRV. ENA.	16	ORG/RED-3
PLAT. ROT. L.	17	GRN-3
PLAT. ROT. R.	18	GRN/BLK-3
LIFT PUMP	19	GRN/WHT-3
	20	
PWR. TO PLAT.	21	
	22	BLK-2
PWR. FRM PLAT.	23	WHT-2
CONTROL PWR.	24	WHT (F.S.)
PWR. (START)	25	RED (F.S.)
PWR. TO F.S.	26	BLK (F.S.)
AUX. PWR.	27	RED-1
TILT ALARM	28	RED/BLK-1
BRAKE H.S.	29	RED/WHT-1
FORWARD	30	WHT-1
REVERSE	31	WHT/BLK-1
BRAKE F.C.	32	WHT/RED-1
SPARE	33	BLK-1
SPARE	34	BLK/WHT-1
SPARE	35	BLK/RED-1
STEER LEFT	36	BLU-1
STEER RIGHT	37	BLU/BLK-1
SPARE	38	BLU/WHT-1
SPARE	39	BLU/RED-1
OFF LIMIT	40	ORG-1
DRIVE SIGNAL	41	ORG/BLK-1
48V SUPPLY	42	ORG/RED-1
SPARE	43	GRN-1
SPARE	44	GRN/BLK-1
SPARE	45	GRN/WHT-1



Hydraulic Symbols Legend


Pressure gauge


Filter


Fixed displacement pump

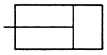

Bi-directional motor


Bi-directional, variable displacement pump


2-speed, bi-directional motor



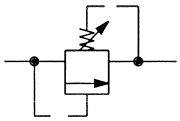
Pump prime mover engine or motor

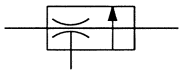

Double acting cylinder

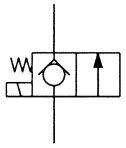


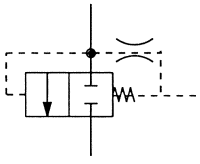
Orifice with size

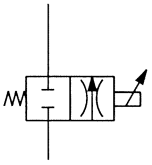

Check valve

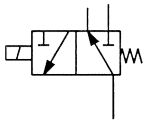

Relief valve

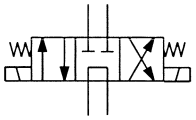

Priority flow divider

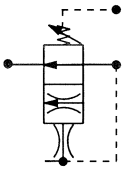

Solenoid operated dump valve

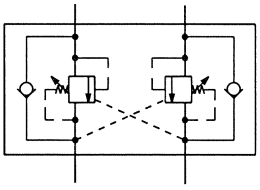

Differential sensing valve

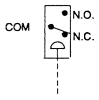

Solenoid operated proportional valve


Solenoid operated 2 pos., 3 way, directional valve


Solenoid operated 3 pos., 4 way, directional valve (D01)


Pilot operated flow control valve

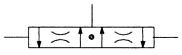

Counterbalance valve

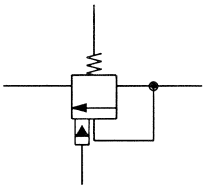


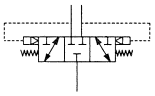
Pressure switch


Brake

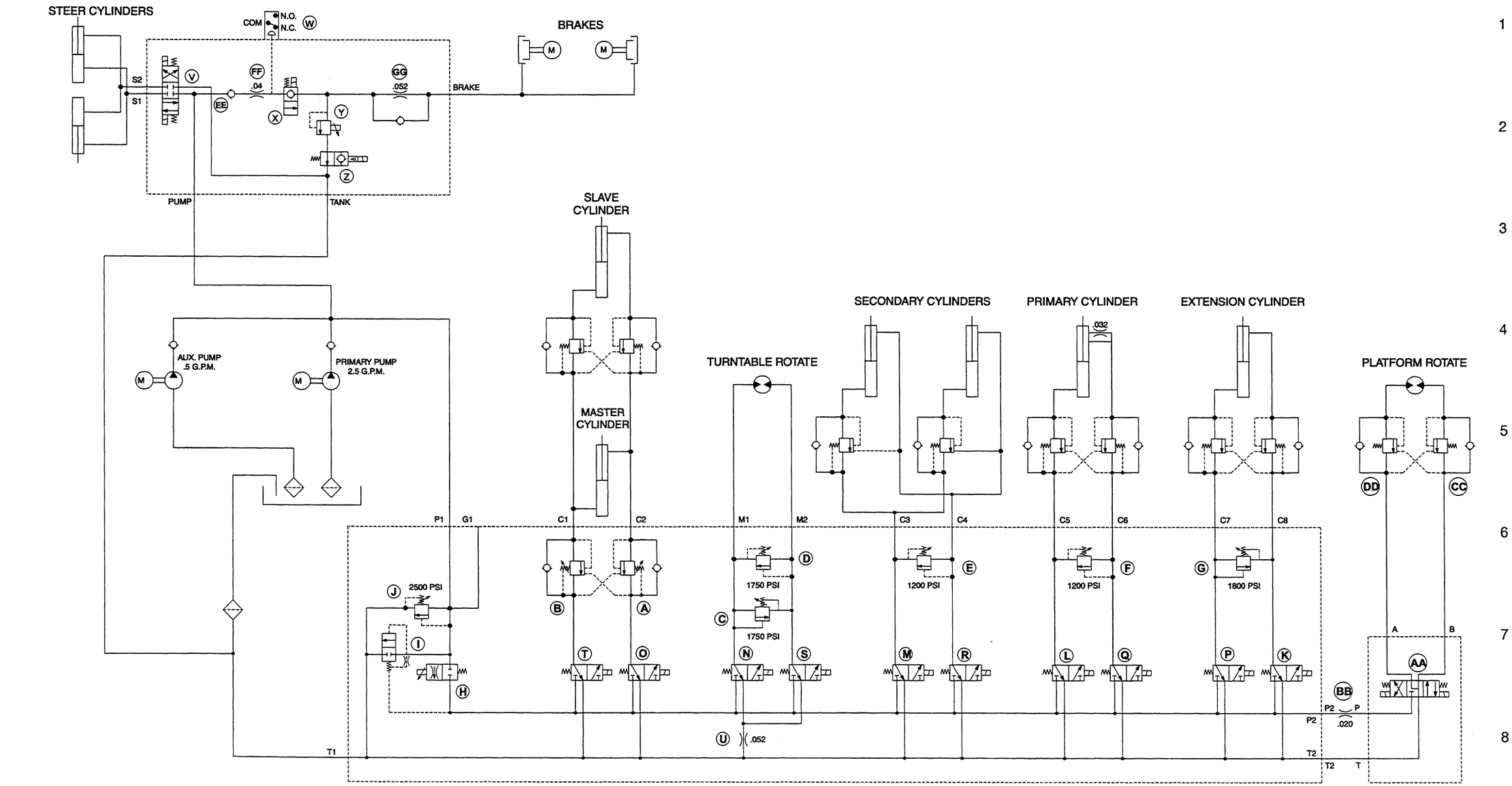

Variable orifice or shut off valve


Flow divider combiner

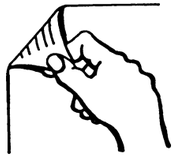

Sequencing valve


Shuttle valve

Hydraulic Schematic
DC Models



Hydraulic Schematic
DC Models



Repair Procedures

Observe and Obey:

- ☑ 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 Repairs Start:

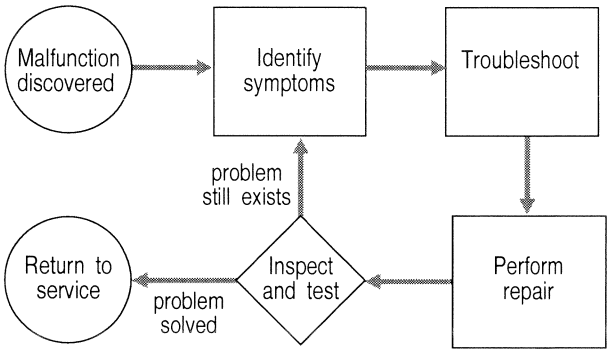
- ☑ Read, understand and obey the safety rules and operating instructions in the *Genie Z-45/22 Series Operator's Manual*.
- ☑ Be sure that all necessary tools and parts are available and ready for use.
- ☑ Read each procedure completely and adhere to the instructions. Attempting shortcuts may produce hazardous conditions.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - Machine parked on a flat, level surface
  - Boom in the stowed position
  - Turntable rotated with the boom between the non-steer wheels
  - Key switch in the OFF position with the key removed
  - Battery packs disconnected
  - Wheels chocked

About This Section

Most of the procedures in this section should only be performed by a trained service professional in a suitably equipped workshop. Select the appropriate repair procedure after troubleshooting the problem.

Perform disassembly procedures to the point where repairs can be completed. Then to re-assemble, perform the disassembly steps in reverse order.

General Repair Process



Symbols Legend

⚠DANGER Indicates the presence of a hazard that **will** cause death or serious injury.

⚠WARNING Indicates the presence of a hazard that **may** cause death or serious injury.

⚠CAUTION Indicates the presence of a hazard that **will** or **may** cause serious injury or damage to the machine.

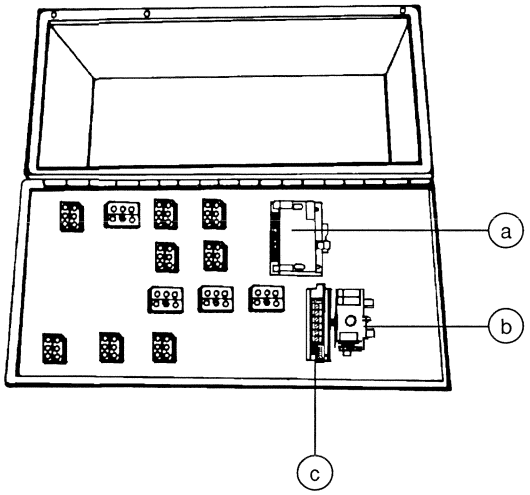
NOTICE Indicates special operation or maintenance information.

⊙ Indicates that a specific result is expected after performing a series of steps.

Platform Controls

1-1 Controllers

Maintaining the controllers at the proper setting is essential to safe machine operation. Each controller should operate smoothly and provide proportional speed control through its entire range of motion.



a boom function speed controller
b drive controller
c drive and brake printed circuit board

Drive Controller Adjustments

NOTICE Do not adjust the controllers unless the static battery supply voltage is above 24V DC.

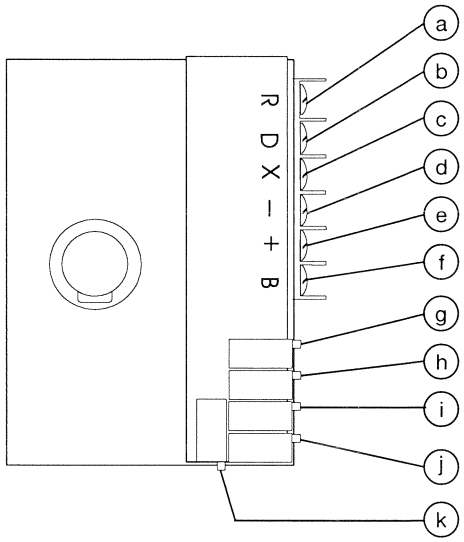
NOTICE This procedure will require the use of two multi-meters. One will be used for measuring amps and the other for voltage.

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

1 Block the steering wheels, and then center a lifting jack under the drive chassis between the non-steer tires.

2 Raise the drive chassis 1 to 2 inches (2.54 to 5.0 cm) off the ground and place jack stands under the chassis.

3 Open the platform control box lid and locate the printed circuit board on the drive controller.



a terminal "R", activates max-out range
b terminal "D", drive output
c terminal "X"
d terminal "-", ground
e terminal "+", positive
f terminal "B", brake output
g drive lo range adjustable trimpot
h drive threshold adjustable trimpot
i drive hi range adjustable trimpot
j brake threshold adjustable trimpot
k brake max out adjustable trimpot

4 Disconnect the white/red wire from the "B" terminal on the printed circuit board.

5 Connect the black (-) lead from an amp meter to the white/red wire that was removed from the circuit board. Connect the red (+) lead to the "B" terminal on the printed circuit board.

7 Connect the red (+) lead from a volt meter to the "D" terminal on the drive controller printed circuit board. Connect the black (-) lead to ground.

8 Turn the key switch to platform control and pull the Emergency Stop button to the ON position at both the ground and platform controls.

9 Set the brake threshold on the circuit board: Press down the foot switch, then slowly move the control handle off center until you hear the pump motor turn on. Adjust the amps to 0.16 amps. Turn the threshold trimpot adjustment screw clockwise to increase the amps or counterclockwise to decrease the amps.

10 Set the brake max-out on the circuit board: Press down the foot switch, then slowly move the control handle off center until you hear the pump motor dis-engage. Adjust the amps to 0.91 amps. Turn the max-out trimpot adjustment screw clockwise to increase the amps or counterclockwise to decrease the amps.

11 Set the drive threshold on the circuit board: Press down the foot switch, then slowly move the control handle off center until you see 0.28 to 0.30 amps on the amp meter, then adjust the drive threshold trimpot on the circuit board to 0.80 to 0.90V DC. Turn the threshold trimpot adjustment screw clockwise to increase the volts or counterclockwise to decrease the volts.

12 Set the drive high range on the circuit board: Press down the foot switch, then slowly move the control handle all the way to the FORWARD position. Adjust the high range trimpot on the circuit board to 5.00 to 5.20V DC. Turn the high range trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

13 Raise the primary boom above the drive limit switch.

14 Set the drive lo range on the circuit board: Press down the foot switch, then move the control handle all the way to the FORWARD position. Adjust the drive lo range trimpot on the circuit board to 2.40 to 2.70V DC. Turn the lo range trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

15 Lower the boom to the stowed position and remove the lifting jacks from under the drive chassis.

16 Raise the primary boom off the drive limit switch.

17 Create start and finish lines by marking two lines on the ground 40 feet (12.2 m) apart. Choose a reference point on the machine, as a reference for use when crossing the start and finish lines.

18 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.

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

20 Adjust drive lo range trimpot on the circuit board to achieve a 45.5 second drive speed time. Turn the trimpot clockwise to increase the time or counterclockwise to decrease the time.

21 Lower the primary boom to the stowed position.

22 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.

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

PLATFORM CONTROLS

24 Adjust drive high range trimpot on the circuit board to achieve a 7.8 second drive speed time. Turn the trimpot clockwise to increase the time or counterclockwise to decrease the time.

Drive controller specifications		
Brake		
Threshold	0.16 amps when pump motor turns ON	
Max-out	0.91 amps when pump motor turns OFF	
Drive		
Threshold	0.8 to 0.9V DC when amp output is 0.28 to 0.30 amps	
High range	5.0 to 5.2V DC when control handle is in full forward position	
Lo range	2.4 to 2.7V DC when control handle is in full forward position	
Drive speed, boom raised	40 feet/45.5 seconds 12.2 meters/45.5 seconds	
Drive speed, boom stowed	3.5 mph 40 ft/7.8 sec	5.6 km/h 12.2 m/7.8 sec

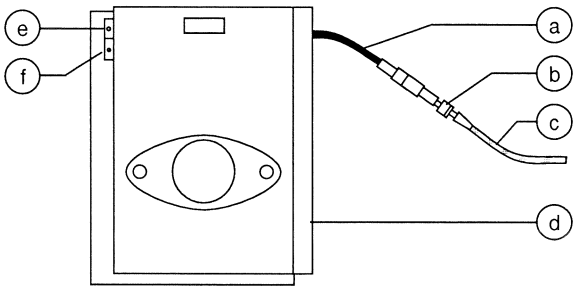
Boom Function Speed Controller Adjustments

NOTICE Do not adjust the controllers unless the static battery supply voltage is above 24V DC.

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

1 Turn the key switch to platform control and pull the Emergency Stop button to the ON position at both the ground and platform controls.

2 Open the platform control box lid and locate the boom function speed controller.



a black wire
b diode
c white/red wire
d boom function speed controller
e max-out adjustable trimpot
f threshold adjustable trimpot

3 Locate the diode between the black wire from the boom function speed controller and the white/red wire.

4 Connect the red (+) lead from a volt meter to the wire connector of the white/red wire next to the diode. Connect the black (-) lead to ground.

5 Turn the boom function speed controller to the CREEP position.

6 Set the threshold: Press down the foot switch, then move the primary boom switch to the UP position until the voltage reading appears. Adjust the voltage to 6.00 to 6.50V DC. Turn the threshold trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

7 Turn the boom function speed controller to the 9 position.

8 Set the max-out: Press down the foot switch, then move the primary boom switch to the UP position. Adjust the voltage to 14.5 to 15.0V DC. Turn the max-out trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

Boom function speed controller specifications	
Threshold	6.00 to 6.50V DC
Max-out	14.5 to 15.0V DC

1-2 Diodes

How to Test a Diode

1 Connect the leads from an ohmmeter to each end of the diode.

2 Re-connect the leads from the ohmmeter to the opposite ends (from step 1) of the diode. The diode should have resistance in one direction and not the other.

1-3 Foot Switch

How to Test the Foot Switch

1 Turn the key switch to the OFF position and separate the wiring quick disconnect plug from the platform toe board.

2 Do not press down the foot switch. Connect the leads from an ohmmeter or continuity tester to each wire combination listed below and check for continuity.

Test	Desired result
red to black	continuity (zero Ω)
red to white	no continuity (infinite Ω)
black to white	no continuity

NOTICE Do not use the color of the connector as a guide for these tests. Use the actual wire color to identify which connector to use for testing.

3 Press down the foot switch. Connect the leads from an ohmmeter or continuity tester to each wire combination listed below and check for continuity.

Test	Desired result
red to black	no continuity (infinite Ω)
red to white	no continuity
black to white	continuity (zero Ω)

PLATFORM CONTROLS

1-4 Toggle Switches

Toggle switches used for single function switching are single pole double throw (SPDT) switches. Dual function switching requires a double pole double throw (DPDT) switch.

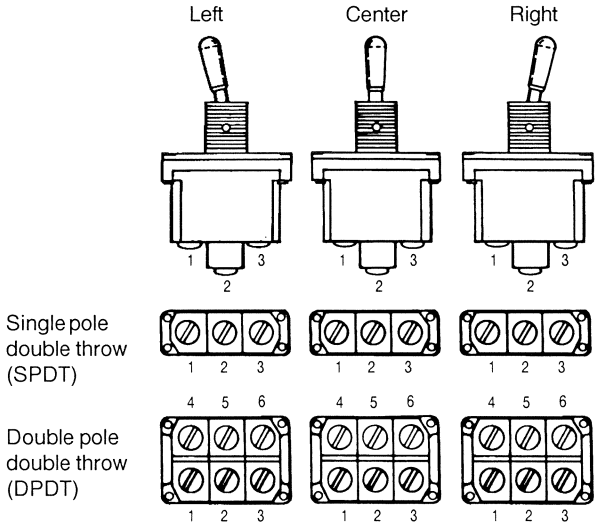
How to Test a Toggle Switch

NOTICE Continuity is the equivalent of 0 to 3 ohms. A simple continuity tester may not accurately test the switch.

This procedure covers fundamental switch testing and does not specifically apply to all varieties of toggle switches.

1 Turn the key switch to the OFF position. Tag and disconnect all wiring from the toggle switch to be tested.

2 Connect the leads of an ohmmeter to the switch terminals in the following combinations listed below to check for continuity.



Test	Desired result
Left position	
terminal 1 to 2, 3, 4, 5 & 6	no continuity (infinite Ω)
terminal 2 to 3	continuity (zero Ω)
terminal 2 to 4, 5 & 6	no continuity
terminal 3 to 4, 5 & 6	no continuity
terminal 4 to 5 & 6	no continuity
terminal 5 to 6	continuity
Center position	There are no terminal combinations that will produce continuity (infinite Ω)
Right position	
terminal 1 to 2	continuity (zero Ω)
terminal 1 to 3, 4, 5 & 6	no continuity (infinite Ω)
terminal 2 to 3, 4, 5 & 6	no continuity
terminal 3 to 4, 5 & 6	no continuity
terminal 4 to 5	continuity
terminal 4 to 6	no continuity
terminal 5 to 6	no continuity

Platform Components

2-1 Platform

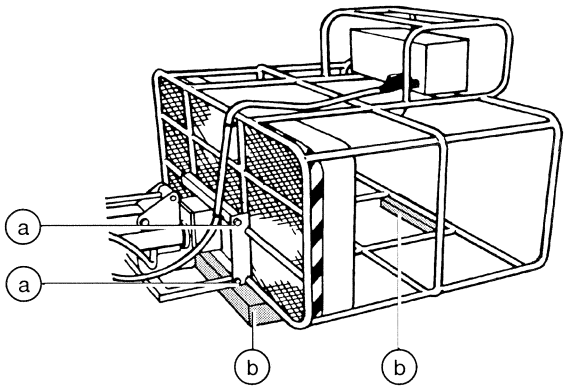
How to Remove the Platform

DANGER Tip-over hazard. Do not change the top-mounted platform to an end-mount configuration.

1 Remove the cable harness from the cable clamps located on the platform and separate the foot switch wiring quick disconnect plug from the platform toeboard.

2 Remove the platform control box mounting bolts, then lower the control box.

3 Tilt the platform with the ground controls platform leveling switch until the platform lays horizontal.



a platform mounting bolts
b block

4 Place blocks under the platform railing for support. Then carefully rest the platform on the blocks.

5 Remove the platform mounting bolts and remove the platform.

2-2 Platform Leveling Slave Cylinder

The slave cylinder and the rotator pivot are the two primary supports for the platform. The slave cylinder keeps the platform level through the entire range of primary boom motion. It operates in a closed-circuit hydraulic loop with the master cylinder. The slave cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

How to Remove the Slave Cylinder

NOTICE Before cylinder removal is considered, bleed the slave cylinder to be sure there is no air in the closed loop.

1 Tilt the platform with the ground controls platform leveling switch until the platform is horizontal.

2 Place blocks under the platform railing for support. Then carefully rest the platform on the blocks.

3 Tag and disconnect the hydraulic hoses from the slave cylinder and connect them together with a straight line connector.

CAUTION 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.

4 Remove the pin retainer from both the barrel-end and rod-end pins.

5 Use a soft metal drift to remove the pins.

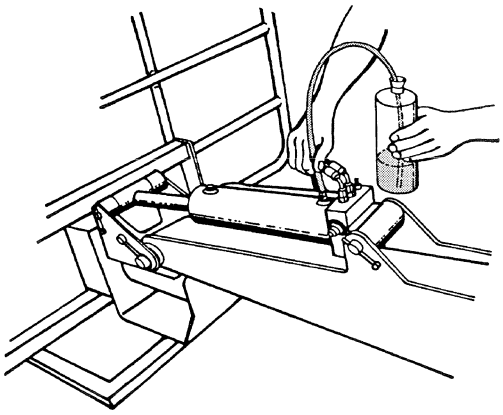
PLATFORM COMPONENTS

How to Bleed the Slave Cylinder

1 Raise the primary boom 6 inches (15 cm) above the primary boom rest.

2 Move the platform level switch down until the slave cylinder is fully extended. Continue to hold the platform level switch for 10 seconds.

3 Connect a clear hose to the bleed valve on the cylinder barrel. Place the other end of the hose in a container to collect any discharge.



4 Open the bleed valve, but do not remove it.

5 Hold the platform level switch down for 5 seconds, then release it.

6 Close the bleed valve, then remove the hose.

7 Hold the platform level switch up until the slave cylinder is fully retracted.

8 Connect the clear hose to the bleed valve on the slave cylinder block.

9 Open the bleed valve and allow the slave cylinder to extend using gravity, until the cylinder is fully extended. Close the bleed valve.

2-3 Platform Rotator

The platform rotator is a hydraulically-activated helical gear assembly used to rotate the platform 180 degrees. It is equipped with external counterbalance valves to hold platform in place and to provide pressure relief.

⚠ DANGER Tip-over hazard. Do not change the top-mounted platform to an end-mount configuration.

How to Remove the Platform Rotator

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

2 Tag, disconnect and plug the hydraulic hoses from the platform rotator counterbalance valve manifold.

⚠ CAUTION 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 6 mounting bolts from the platform pivot weldment.

4 Remove the nut from the center bolt. Then pull the bolt out the bottom of the platform rotator and remove the platform pivot weldment.

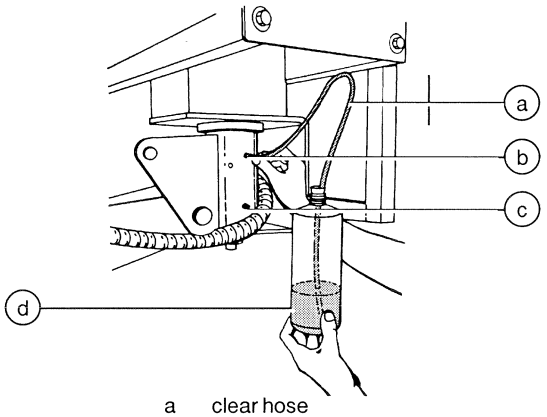
5 Support the platform rotator, but do not apply any lifting pressure.

6 Remove the pin retainers from the slave cylinder rod-end pivot pin and the rotator pivot pin.

7 Use a soft metal drift to remove the pins, then remove the platform rotator.

How to Bleed the Platform Rotator

1 Connect a clear hose to the top bleed valve. Place the other end of the hose in a container to collect any discharge.



a clear hose
b top bleed valve
c bottom bleed valve
d container

2 Open the top bleed valve, but do not remove it.

3 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

4 Hold the platform rotate switch to the right for approximately 5 seconds, then release it. Repeat three times.

⚠CAUTION Crushing hazard. Keep hands clear of the platform pivot weldment during rotation.

5 Hold the platform rotate switch to the left for approximately 10 seconds, then release it.

6 Fully rotate the platform to the left and continue holding the platform rotate switch until air stops coming out of the bleed valve. Immediately release the platform rotate switch and close the bleed valve.

7 Rotate the platform to the right until it is centered.

8 Connect the clear hose to the bottom bleed valve and open the valve.

9 Rotate the platform to the right and continue holding the platform rotate switch until air stops coming out of the bleed valve.

10 Rotate the platform to the left and continue holding the platform rotate switch until air stops coming out of the bleed valve.

⚠CAUTION Crushing hazard. Keep hands clear of the platform pivot weldment during rotation.

11 Close the bleed valve and remove the hose.

12 Turn off the machine and clean up any hydraulic oil that may have spilled.

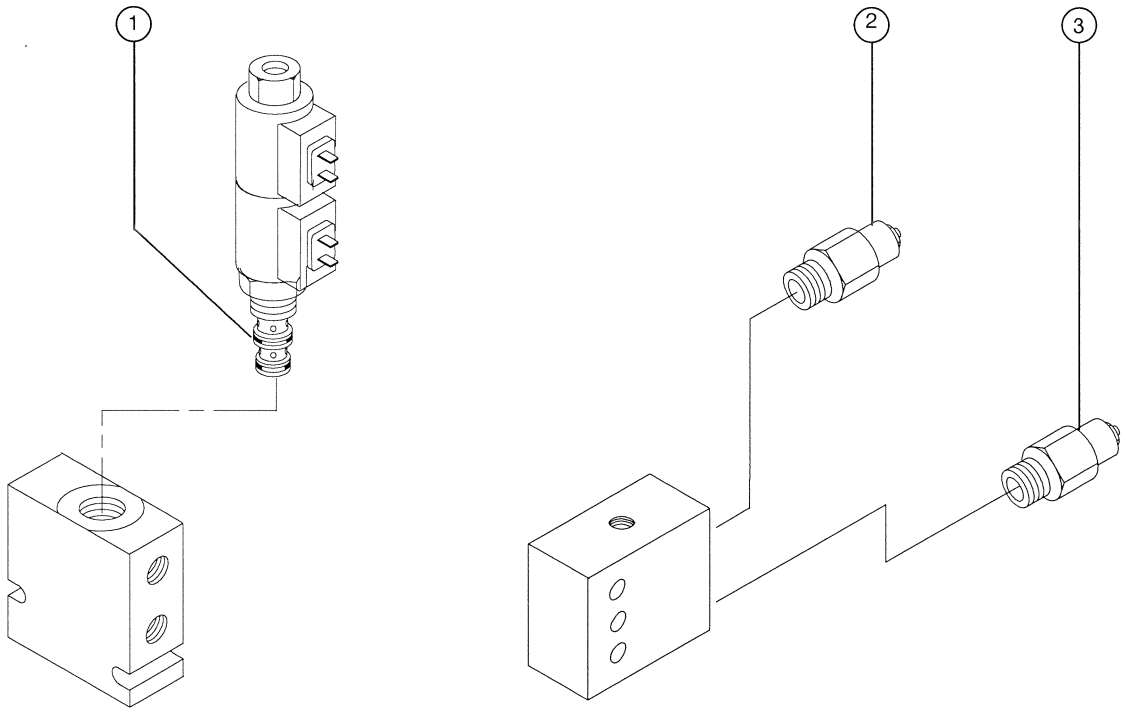
13 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

14 Rotate the platform full left and right and inspect the bleed valves for leaks.

PLATFORM COMPONENTS

2-4
Platform Rotate Manifold Components

Index No.	Description	Schematic Item	Function	Torque
1	3 position 4 way spool valve	AA	Platform rotate left/right	10-12 ft-lbs (11-14 Nm)
2	Counterbalance valve	CC	Platform rotate left	35-40 ft-lbs (47-54 Nm)
3	Counterbalance valve	DD	Platform rotate right	35-40 ft-lbs (47-54 Nm)



Plug Torque Specifications

Description	Hex Size	Torque
SAE No. 2	1/8	50 in-lbs / 6 Nm
SAE No. 4	3/16	13 ft-lbs / 18 Nm
SAE No. 6	1/4	18 ft-lbs / 24 Nm

Description	Hex Size	Torque
SAE No. 8	5/16	50 ft-lbs / 68 Nm
SAE No. 10	9/16	55 ft-lbs / 75 Nm
SAE No. 12	5/8	75 ft-lbs / 102 Nm

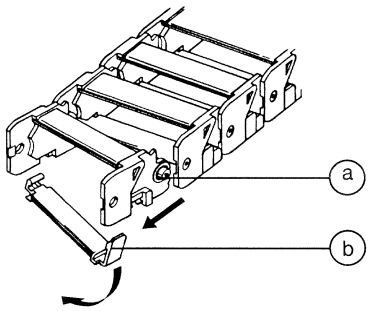
Primary Boom Components

3-1 Plastic Cable Track

The primary boom cable track guides the cables and hoses running up the boom. It can be repaired link by link without removing the cables and hoses that run through it. Removing the entire primary boom cable track is only necessary when performing major repairs that involve removing the primary boom.

How to Repair the Plastic Cable Track

⚠CAUTION Component damage hazard. The primary boom cable track can be damaged if it is twisted.



a link separation point
b lower clip

1 Use a slotted screwdriver to pry down on the lower clip.

2 Repeat step 1 for each link.

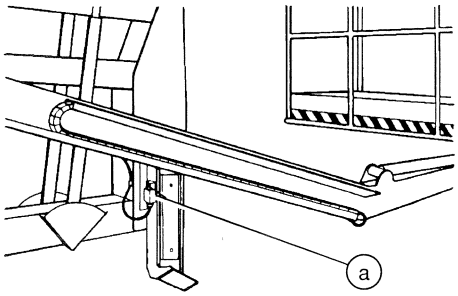
3 To remove a single link, open the lower clip and then use a screw driver to pry the link to the side.

3-2 Primary Boom

How to Shim the Primary Boom Wear Pads

NOTICE Measure each wear pad. Replace the pad if it is less than 0.41 inches (1 cm) thick. If the pad is more than 0.41 inches (1 cm) thick, perform the following procedure.

1 Raise the primary boom above the drive limit switch.



a drive limit switch

2 Extend the primary boom 10 inches (25 cm).

3 Remove the wear pad mounting fasteners.

4 Install the new shims under the wear pad to obtain zero clearance and zero drag.

5 Using a round punch, align the holes in the shim to the wear pad and install the mounting fasteners.

6 Extend and retract the primary boom through the entire range of motion to check for tight spots that could cause binding or scraping.

NOTICE Always maintain squareness between the primary boom outer and inner tubes.

PRIMARY BOOM COMPONENTS

How to Remove the Primary Boom

⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is strongly recommended.

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

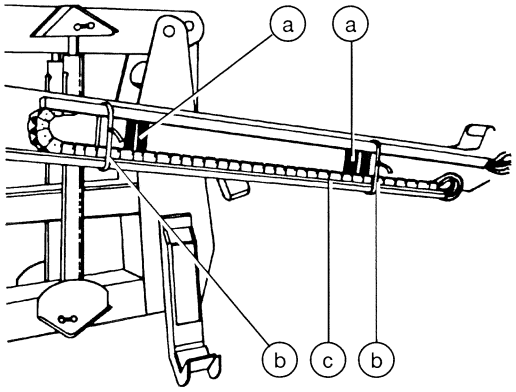
2 Tag, disconnect and plug the hydraulic hoses from the slave cylinder and the valve block mounted on the end of the primary boom.

⚠CAUTION 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 fasteners that secure the upper cable track tray to the primary boom.

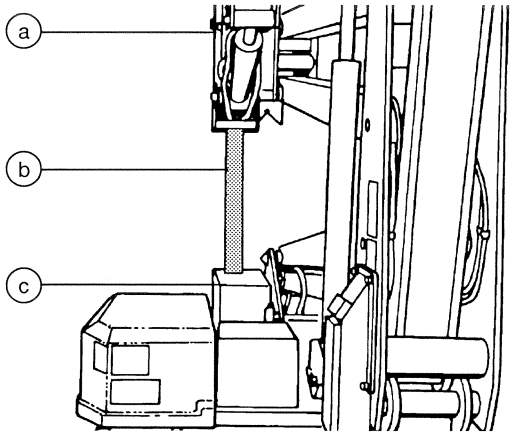
4 Loosen the fasteners that secure the lower cable track tray. Insert two 3 inch (7.6 cm) wood blocks in between the upper and lower cable tracks and tie together with wire ties. Remove the cable track assembly from the primary boom.

⚠CAUTION Component damage hazard. The primary boom cable track can be damaged if it is twisted.



a wood block
b tie-wrap
c plastic cable track

5 Raise the secondary boom and place a 4x4x31 inch (78 cm) block between the turntable counterweight and upper mid-pivot. Carefully lower the secondary boom onto the block.



a upper mid-pivot
b 4x4x31 inch block
c counterweight

⚠WARNING Crushing hazard. Keep hands away from the block and all moving parts when lowering the secondary boom.

6 Raise the end of the primary boom 8 feet (2.5 m) off the ground, then extend the primary boom 5 inches (12.5 cm).

7 Attach an overhead crane to the primary boom. Do not lift the primary boom.

⚠WARNING Crushing hazard. If the overhead crane is not properly attached, the primary boom may become unbalanced and fall when it is removed from the upper mid-pivot.

8 Tag, disconnect and plug the extension cylinder and the platform leveling master cylinder hydraulic hoses. Cap the extension cylinder fittings.

⚠CAUTION 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.

9 Remove the pin retainer from the master cylinder barrel-end pivot pin. Use a soft metal drift to remove the pin.

NOTICE Leave the master cylinder attached to the primary boom.

10 Remove the pin retainer from the primary boom pivot pin. Do not remove the pin.

11 Mark the position of the primary boom limit switch. Remove the limit switch fasteners and lay the switch off to the side.

⚠CAUTION Component damage hazard. The primary boom limit switch can be damaged if it is not kept clear of the boom while removing the boom from the machine.

12 Remove the hose clamp bolt on the primary boom, next to the upper mid-pivot.

13 Support the primary boom lift cylinder with a lifting device.

14 Remove the pin retainer from the lift cylinder rod-end pivot pin. Use a soft metal drift to remove the pin.

⚠CAUTION The primary boom lift cylinder will fall unless it is supported.

15 Remove the hose and cable clamps from the underside of the primary boom.

16 Use a slide hammer to remove the primary boom pivot pin, then carefully lift the primary boom off the machine.

PRIMARY BOOM COMPONENTS

How to Disassemble the Primary Boom

NOTICE Complete disassembly of the primary boom is only necessary if the outer or inner primary boom tube must be replaced. The extension cylinder can be removed without completely disassembling the primary boom. See 3-4, *How to Remove the Extension Cylinder.*

1 Remove the primary boom. See above, *How to Remove the Primary Boom.*

2 Remove the pin retainer from the slave cylinder rod-end pivot pin. Use a soft metal drift to remove the pin.

3 Remove the pin retainer from the slave cylinder barrel-end pivot pin. Use a soft metal drift to remove the pin, then remove slave cylinder from the primary boom.

4 Support the platform rotator with a lifting device.

5 Remove the pin retainer from the platform rotator pivot pin. Use a soft metal drift to remove the pin, then remove the platform rotator from primary boom.

6 Support the master cylinder with a lifting device.

7 Remove the retaining bolt from the master cylinder pivot pin. Use a soft metal drift to remove the pin, then remove the master cylinder from the primary boom.

8 Remove the retaining bolts from the extension cylinder pivot pin. Use a soft metal drift to remove the pin.

9 Remove the wear pads from the platform end of the outer boom tube.

NOTICE Pay careful attention to the location and amount of shims used with each wear pad.

10 Support and slide the extension boom out of the primary boom weldment.

⚠CAUTION Crushing hazard. The extension tube will fall when it is removed from the primary boom if it is not properly supported.

11 Remove the extension boom end cap.

12 Remove the mounting fasteners from the extension cylinder rod-end weldment, then support and slide the extension cylinder out of the extension boom.

NOTICE The bolts that secure the cylinder rod-end weldment are installed with Loctite® removable thread sealant. It may be necessary to heat the bolts and the surrounding area to remove them. Do not reuse the bolts.

13 Remove and label the wear pads from the primary boom outer tube.

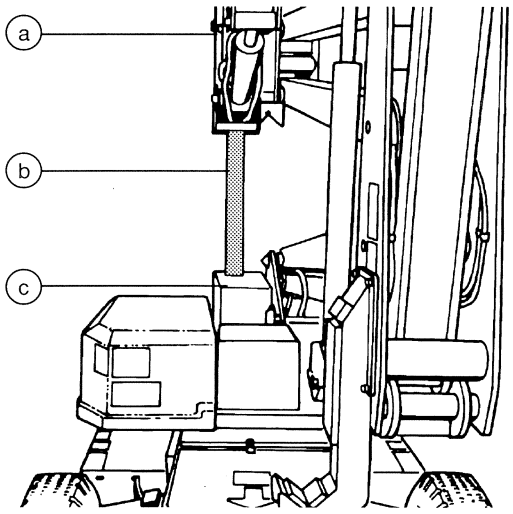
NOTICE Pay careful attention to the location and amount of shims used with each wear pad.

3-3
Primary Boom Lift Cylinder

How to Remove the Primary Boom Lift Cylinder

⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is strongly recommended.

1 Raise the secondary boom and place a 4x4x31 inch (78 cm) block between the turntable counterweight and the upper mid-pivot. Carefully lower the secondary boom onto the block.



a upper mid-pivot
b 4x4x31 inch block
c counterweight

⚠WARNING Crushing hazard. Keep hands away from the block and all moving parts when lowering the secondary boom.

2 Raise the primary boom until the end of the boom is 8 feet (2.5 m) off the ground.

3 Support the primary boom with an overhead crane. Do not lift the primary boom.

4 Disconnect and plug the primary boom lift cylinder hydraulic hoses.

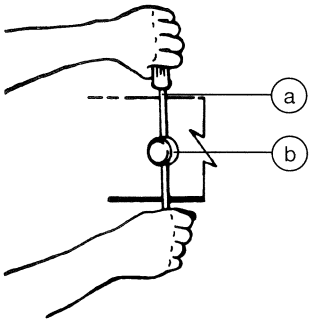
⚠CAUTION Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

5 Remove the pin retainer from the pivot pin at the barrel end of the primary boom lift cylinder.

6 Use an overhead crane to lift the primary boom 1 inch (2.5 cm). This will relieve pressure on the barrel-end pivot pin.

7 Support the primary boom lift cylinder with straps to restrict it from swinging freely.

8 Place a rod through the barrel-end pivot pin and twist to remove the pin.



a 10 to 12 inch (30 cm) rod
b pivot pin

⚠CAUTION Crushing hazard. When the barrel-end pivot pin is removed, the primary boom lift cylinder will swing down if it is not properly supported.

9 Carefully loosen the straps and allow the primary boom lift cylinder to slowly swing down. Attach an overhead crane or similar lifting device to the rod end of the primary boom lift cylinder.

10 Remove the pin retainer from the rod-end pivot pin, then use a soft metal drift to remove the pin. Remove the cylinder from the machine.

⚠WARNING Crushing hazard. The primary boom lift cylinder will fall if it is not properly supported.

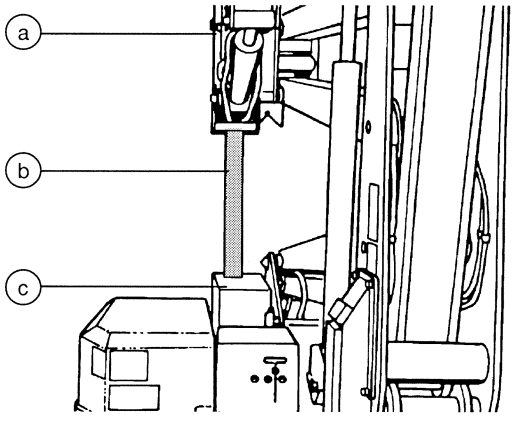
3-4 Extension Cylinder

The extension cylinder extends and retracts the primary boom steel extension tube. It can only be removed from the platform end of the primary boom. The extension cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line loss.

How to Remove the Extension Cylinder

⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is strongly recommended.

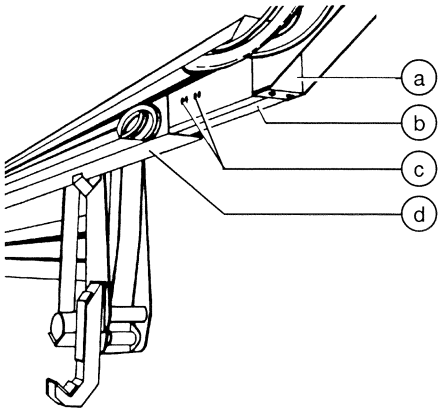
1 Raise the secondary boom and place a 4x4x31 inch (78 cm) block between the chassis counterweight and the upper mid-pivot. Carefully lower the secondary boom onto the block.



a upper mid-pivot
b 4x4x31 inch block
c counterweight

⚠WARNING Crushing hazard. Keep hands away from the block and all moving parts when lowering the secondary boom.

PRIMARY BOOM COMPONENTS



a extension boom end cap
b extension boom
c extension cylinder rod-end weldment mounting fasteners
d primary boom

2 Raise the primary boom until the extension boom end cap is 5 feet (1.5 m) off the ground.

3 Extend the extension tube from the primary boom tube 17 inches (43 cm). Then secure it to prevent any additional movement

4 Remove the extension boom end cap.

5 Remove the fasteners from the cylinder rod-end weldment.

NOTICE The bolts that secure the cylinder rod-end weldment are installed with Loctite® removable thread sealant. It may be necessary to heat the bolts and the surrounding area to remove them. Do not reuse the bolts.

6 Extend the extension cylinder until the rod-end weldment clears the end of the extension tube.

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

⚠CAUTION 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.

8 Remove the retaining bolts from the extension cylinder pivot pin, then use a soft metal drift to remove the pin.

9 Carefully pull out and properly support the extension cylinder from the platform end of the primary boom.

⚠CAUTION Crushing hazard. The cylinder will fall if it is not properly supported when it is pulled out of the extension tube.

NOTICE To make installation of the extension cylinder easier, be sure that the cylinder rod is extended 3 to 4 feet (1 m).

PRIMARY BOOM COMPONENTS

3-5
Platform Leveling Master Cylinder

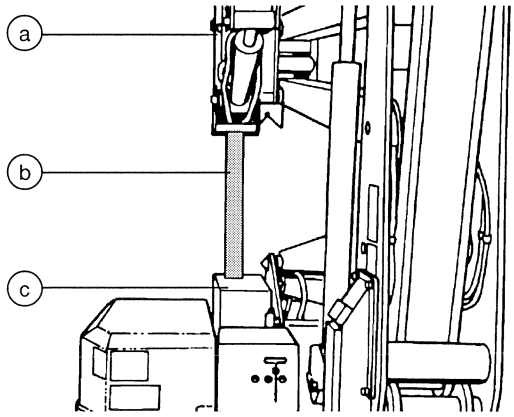
The master cylinder acts as a pump for the slave cylinder. It is part of the closed circuit hydraulic loop that keeps the platform level through the entire range of primary boom motion. The master cylinder is located inside the upper mid-pivot at the base of the primary boom.

How to Remove the Platform Leveling Master Cylinder

⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is strongly recommended.

NOTICE Before cylinder removal is considered, bleed the cylinder to be sure that there is no air in the closed loop. See 2-2, *How to Bleed the Slave Cylinder.*

1 Raise the secondary boom and place a 4x4x31 inch (78 cm) block between the turntable counterweight and the upper mid-pivot. Carefully lower the secondary boom onto the block.



a upper mid-pivot
b 4x4x31 inch block
c counterweight

⚠WARNING Crushing hazard. Keep hands away from the block and all moving parts when lowering the secondary boom.

2 Extend the primary boom 6 inches (15 cm), then raise the primary boom until it is level.

3 Tag, disconnect and plug the extension cylinder hydraulic hoses. Cap the ports on the extension cylinder.

⚠CAUTION 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.

4 Lower the boom to the stowed position.

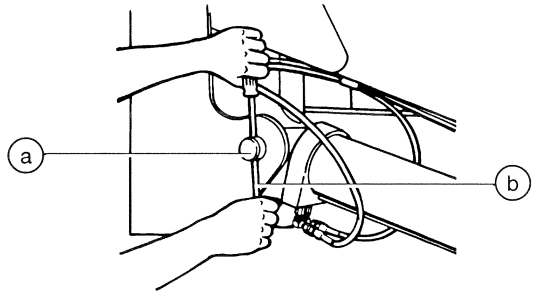
5 Tag, disconnect and plug the primary boom lift cylinder hydraulic hoses. Cap the ports on the primary boom lift cylinder.

⚠CAUTION 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 Support the barrel end of the primary boom lift cylinder with a strap.

7 Remove the pin retainer from the primary boom lift cylinder barrel-end pivot pin.

8 Place a rod through the barrel-end pivot pin and twist to remove the pin.



a pivot pin
b 10 to 12 inch (30 cm) rod

9 Carefully lower and rest the barrel end of the primary boom lift cylinder on the turntable counterweight.

10 Tag, disconnect and plug the platform leveling master cylinder hydraulic hoses. Cap the fittings on the master cylinder.

⚠CAUTION 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.

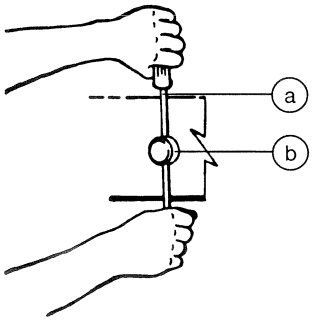
11 Remove the pin retainer from the platform leveling master cylinder rod-end pivot pin, then use a slide hammer to remove the pin.

12 Attach a strap to the rod end of the platform leveling master cylinder.

13 Remove the pin retainer from the platform leveling master cylinder barrel-end pivot pin. Then support the cylinder with the strap.

14 Place a rod through the barrel-end pivot pin and twist to remove the pin.

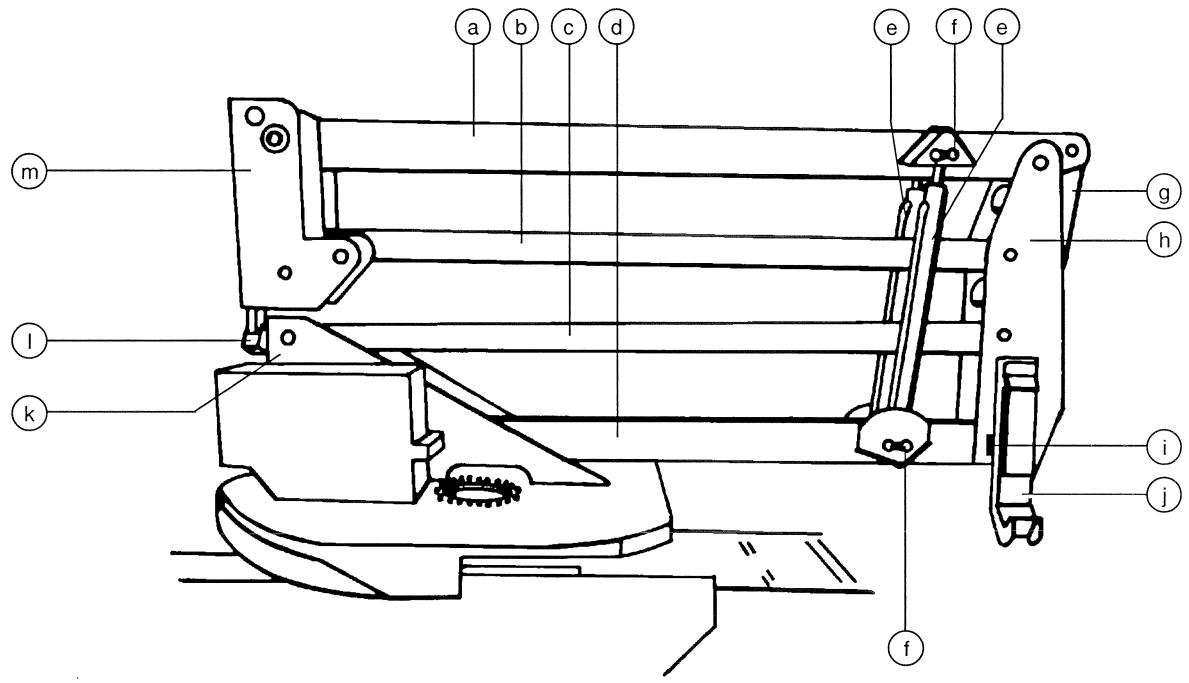
⚠CAUTION Crushing hazard. The cylinder will fall if it is not supported when the pivot pin is removed.



a 10 to 12 inch (30 cm) rod
b pivot pin

15 Carefully lower the platform leveling master cylinder down and out of the upper mid-pivot.

Secondary Boom Components



Secondary Boom

a upper secondary boom (number 1 arm)
b upper tension link (number 2 arm)
c lower tension link (number 3 arm)
d lower secondary boom (number 4 arm)
e secondary lift cylinder
f pin retainer
g compression link
h lower mid-pivot
i drive limit switch
j primary boom rest
k turntable pivot
l upper mid-pivot rest
m upper mid-pivot

4-1 Secondary Boom

How to Disassemble the Secondary Boom

⚠WARNING The procedures in this section require specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is required.

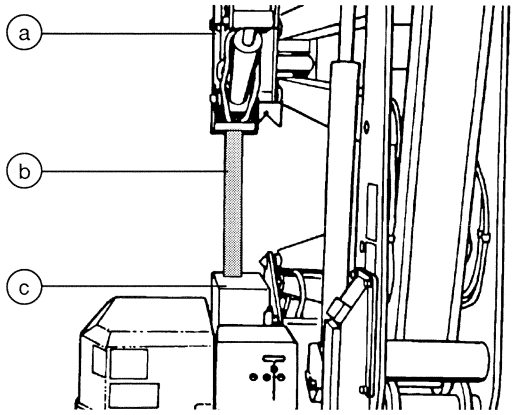
Follow the disassembly steps to the point required to complete the repair. Then re-assemble the secondary boom by following the disassembly steps in reverse order.

SECONDARY BOOM COMPONENTS

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

2 Remove the primary boom. See 3-2, *How to Remove the Primary Boom*.

⚠WARNING Crushing hazard. Do not remove the 4x4x31 inch (78 cm) support block installed during primary boom removal.



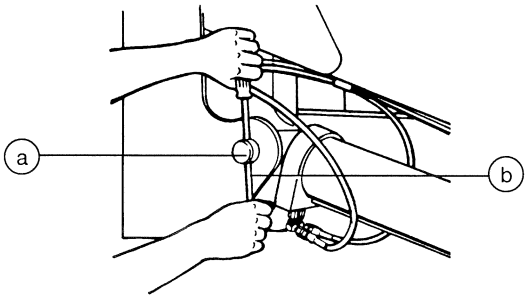
a upper mid-pivot
b 4x4x31 inch block
c counterweight

3 Use an overhead crane to attach a lifting strap to the rod end of the primary boom lift cylinder. Then raise the primary boom lift cylinder with the crane, to a vertical position.

4 Remove the pin retainer from the pivot pin at the barrel end of the primary lift cylinder.

5 Place a rod through the barrel-end pivot pin and twist to remove the pin. Remove the primary boom lift cylinder from the machine.

⚠WARNING Crushing hazard. The primary boom lift cylinder will fall if it is not properly supported when the barrel-end pivot pin is removed.



a pivot pin
b 10 to 12 inch (30 cm) rod

6 Attach the lifting strap from an overhead crane to the number 1 arm at the end nearest the upper mid-pivot and lift to support.

7 Remove the pin retainers from the two secondary boom lift cylinder rod-end pivot pins.

8 Place a rod through each rod-end pivot pin and twist to remove the pins.

9 Lift the number 1 arm until the secondary boom lift cylinders can swing forward to rest on the lower mid-pivot.

10 Remove the block between the drive chassis counterweight and the upper mid-pivot.

11 Lower the arms enough to relieve the pressure on the compression link upper pivot pin.

Specification: to remove pressure on the compression link

The upper mid-pivot rest should be approximately 1 inch (2.5 cm) above the rest block.

12 Remove the pin retainer from the compression link to number 1 arm pivot pin. Use a soft metal drift to remove the pin.

13 Lower the arms to full rest and re-position the lifting strap to the center of the number 1 arm.

14 Remove the pin retainer from the lower mid-pivot to number 1 arm pivot pin. Use a soft metal drift to remove the pin.

SECONDARY BOOM COMPONENTS

15 Remove the pin retainer from the upper mid-pivot to number 1 arm pivot pin. Use a slide hammer to remove the pin.

⚠WARNING Crushing hazard. If the overhead crane is not properly attached, the number 1 arm may become unbalanced and fall when it is removed from the upper mid-pivot.

16 Carefully remove the number 1 arm from the machine.

17 Number each electrical cable and its entry location at the platform control box.

18 Open the platform control box and label each wire termination from the cables. Disconnect all control cable wiring from the platform control box.

19 Pull all of the electrical cables out of the plastic cable track. Do not pull out the hydraulic hoses.

20 Tag, disconnect and plug the platform rotator hydraulic hoses at the union, located near the upper mid-pivot. Remove the cable track assembly from the machine.

⚠CAUTION 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.

21 Remove the upper and lower cable trays from the number 2 arm. Then remove the upper cable tray from the number 3 arm.

22 Pull all of the cables and hoses down through the upper mid-pivot.

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

23 Attach a lifting strap from an overhead crane to the upper mid-pivot. Then place a hydraulic jack between arm numbers 2 and 3 at the end nearest the upper mid-pivot end of the arms.

24 Adjust the hydraulic jack and overhead crane to relieve the pressure on the pivot pin connecting the number 2 arm to the upper mid-pivot.

25 Remove the limit switch cam mounting fastener from the upper mid-pivot to number 3 arm pivot pin.

26 Remove the pin retainer from the upper mid-pivot to number 2 arm pivot pin. Use a slide hammer to remove the pin.

⚠WARNING Crushing hazard. The upper mid-pivot will fall if it is not properly supported when the pivot pin is removed.

27 Carefully lift and remove the upper mid-pivot from the machine.

28 Position the lifting strap from an overhead crane at the center of the number 2 arm.

29 Remove the pin retainer from the lower mid-pivot to number 2 arm pivot pin. Use a soft metal drift to remove the pin.

⚠WARNING Crushing hazard. If the overhead crane is not properly attached, the number 2 arm may become unbalanced and fall when it is removed from the mid-pivot.

30 Carefully remove the number 2 arm from the machine.

31 Remove the two cable clamps from the inside of the lower mid-pivot.

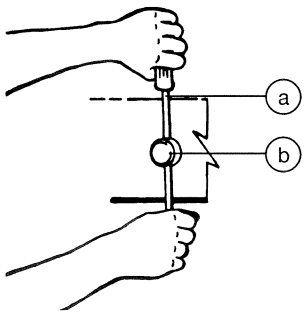
32 Tag, disconnect and remove the drive speed limit switch from the primary boom rest.

33 Disconnect and plug the hydraulic hoses at the secondary boom lift cylinders.

⚠CAUTION 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.

34 Remove the pin retainers from each secondary boom lift cylinder barrel-end pivot pin.

35 Place a rod through each barrel-end pivot pin and twist to remove the pin. Remove each secondary boom lift cylinder from the machine.



a 10 to 12 inch (30 cm) rod
b pivot pin

⚠WARNING Crushing hazard. The secondary boom lift cylinders will fall when the barrel-end pivot pins are removed if they are not properly supported.

36 Remove the lower cable tray from the number 3 arm.

37 Pull all of the cables and hoses through the lower mid-pivot and out of the turntable pivot.

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

38 Attach the strap from an overhead crane to the top tube of the lower mid-pivot. Then place a hydraulic jack between arm numbers 3 and 4 at the end nearest the lower mid-pivot.

39 Remove the pin retainer from the lower mid-pivot to number 3 arm pivot pin. Use a soft metal drift to remove the pin.

NOTICE Note the position of the dowel pin locating hole in the end of the pin for the limit switch cam before the pin is removed.

40 Carefully lower the lower mid-pivot and compression link away from the machine to a resting position.

41 Position the lifting strap from an overhead crane at the center of the number 3 arm.

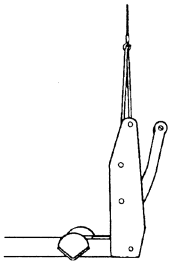
42 Remove the pin retaining fastener from the turntable pivot to number 3 arm pivot pin. Use a slide hammer to remove the pin.

⚠WARNING Crushing hazard. If the overhead crane is not properly attached, the number 3 arm may become unbalanced and fall when it is removed from the turntable pivot.

43 Carefully remove the number 3 arm from the machine.

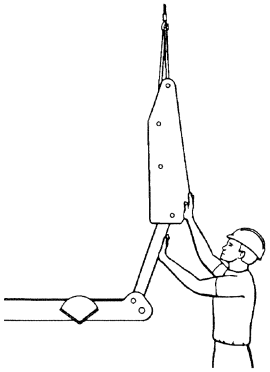
SECONDARY BOOM COMPONENTS

44 Position the strap from an overhead crane around the top tube of the lower mid-pivot and then carefully lift the lower mid-pivot until it is in a vertical position.



45 Remove the pin retainer from the lower mid-pivot to number 4 arm pivot pin. Use a soft metal drift to remove the pin.

46 Support the compression link by hand, then carefully lift the lower mid-pivot up and over the compression link and off of the machine.



47 Lower the compression link to a resting position. Then attach the lifting strap from an overhead crane to the compression link and raise it to a vertical position.

48Remove the pin retainer from the compression link to number 4 arm pivot pin. Use a soft metal drift to remove the pin

49 Remove the compression link.

50 Position the lifting strap from an overhead crane at the center of the number 4 arm.

51 Remove the pin retainer from the turntable pivot to number 4 arm pivot pin. Use a slide hammer to remove the pin.

⚠WARNING Crushing hazard. If the overhead crane is not properly attached, the number 4 arm may become unbalanced and fall when it is removed from the turntable pivot.

52 Carefully remove the number 4 arm.

4-2
Secondary Boom Lift Cylinders

There are two boom lift cylinders incorporated in the structure of the secondary boom assembly. These cylinders operate in parallel and require hydraulic pressure to extend and retract. Each secondary boom lift cylinder is equipped with a counterbalance valve to prevent movement in the event of a hydraulic line failure. A 1200 psi (83 bar) relief valve for the down function is located on the function manifold.

How to Remove the Secondary Lift Cylinders

⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is strongly recommended.

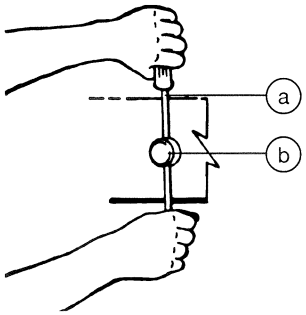
1 Lower the secondary boom to the stowed position, then raise the primary boom so the platform is 5 feet (1.2 m) off the ground.

2 Tag, disconnect and plug the hydraulic hose and steel lines from each secondary boom lift cylinder.

⚠CAUTION 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 pin retainers from each secondary boom lift cylinder rod-end pivot pin.

4 Place a rod through the rod-end pivot pin and twist to remove the pin.



a 10 to 12 inch (30 cm) rod
b pivot pin

5 Loosen, but do not remove, the counterbalance valve to fully retract the cylinder.

NOTICE The counterbalance valve is pre-set from the factory. Do not adjust this valve.

6 Remove the pin retainer from the pivot pins at the barrel end of each secondary boom lift cylinder.

7 Place a rod through each barrel-end pivot pin and twist to remove the pins. Remove the secondary boom lift cylinders from the machine.

⚠WARNING Crushing hazard. The secondary lift cylinders will fall when the barrel-end pivot pins are removed if they are not properly supported.

Ground Controls

5-1 Control Relays

Relays used for dual function switching are double pole double throw (DPDT) relays.

How to Test a Double Pole Double Throw Relay

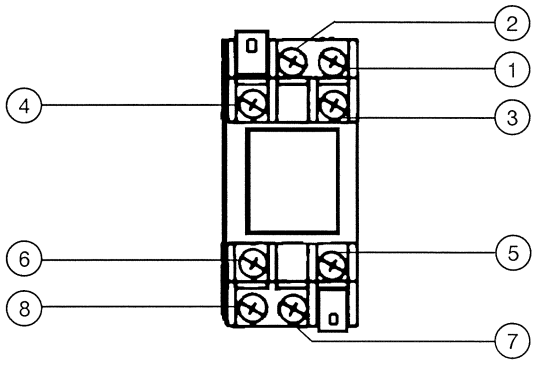
⚠WARNING Electrocution hazard. Contact with electrically charged circuits may cause death or serious injury. Remove all rings, watches and other jewelry.

This procedure covers fundamental relay testing and does not specifically apply to all varieties of relays.

1 Turn the key switch to the OFF position and remove the key.

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

3 Connect the leads from an ohmmeter to each terminal combination and check for continuity. Terminals 7 and 8 represent the coil and should not be tested in any other combination.

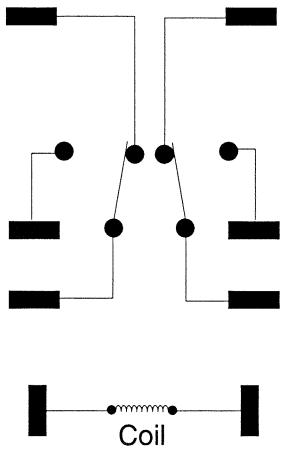


Bubble number represents the terminal number

Test	Desired result
terminal 7 to 8	640 to 650Ω
terminal 1 to 2, 3, 4 & 6	no continuity (infinite Ω)
terminal 2 to 3, 4 & 5	no continuity
terminal 3 to 6	no continuity
terminal 2 to 6	continuity (zero Ω)
terminal 1 to 5	continuity

4 Connect 24V DC to terminal 8 and a ground wire to terminal 7, then test the following terminal combinations.

Test	Desired result
terminal 1 to 2, 4, 5 & 6	no continuity (infinite Ω)
terminal 2 to 3, 5 & 6	no continuity
terminal 1 to 3	continuity (zero Ω)
terminal 2 to 4	continuity (zero Ω)



Relay Schematic

5-2
Toggle Switches

See 1-4, *Toggle Switches.*

5-3
Wago® Components

How to Remove a Wago® Component

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

NOTICE A small screwdriver is provided and should be used when removing a Wago® component. This screwdriver is located in the operator's manual storage box in the platform.

1 Label the wiring from the component to be removed.

2 Use the provided screwdriver to push in and release the wire from the component.

3 Locate the removal tab on the bottom or top side of the component.

4 Use the provided screwdriver to gently pry up on the tab of the component and remove it.

Hydraulic Pumps

6-1 Auxiliary Pump

How to Test the Auxiliary Pump

1 Disconnect and plug the high pressure hydraulic hose from the auxiliary pump.

⚠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.

2 Connect a 0 to 5000 psi (0 to 350 bar) pressure gauge to the high pressure port on the pump.

3 Turn the key switch to ground control and pull the Emergency Stop button to the ON position.

4 Activate any function using auxiliary power.

⊙ Result: If the pressure gauge reads 2800 psi (193 bar), immediately stop. The pump is good.

⊙ Result: If pressure fails to reach 2800 psi (193 bar), the pump is bad and will need to be serviced or replaced.

5 Remove the pressure gauge and reconnect the hydraulic hose.

How to Remove the Auxiliary Pump

1 Remove the power cables from the pump.

2 Tag, disconnect and plug the hydraulic hoses from the pump.

⚠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 pump mounting bolts. Carefully remove the pump.

6-2 Main Function Pump

How to Test the Main Function Pump

1 Disconnect and plug the high pressure hydraulic hose from the main function pump.

⚠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.

2 Connect a 0 to 5000 psi (0 to 350 bar) pressure gauge to the high pressure port on the pump.

3 Turn the key switch to ground control and pull the Emergency Stop button to the ON position.

4 Activate function enable and any lift function from the ground controls.

⊙ Result: If the pressure gauge reads 2800 psi (193 bar), immediately stop. The pump is good.

⊙ Result: If pressure fails to reach 2800 psi (193 bar), the internal relief valve setting is incorrect or the pump is bad and will need to be serviced or replaced.

5 Remove the pressure gauge and reconnect the hydraulic hose.

How to Remove the Main Function Pump

1 Tag, disconnect and plug the hydraulic hoses from the pump.

⚠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.

2 Remove the pump mounting bolts. Carefully remove the pump.

Function Manifolds

7-1
Function Manifold Components

The function manifold is mounted to the turntable under the primay boom.

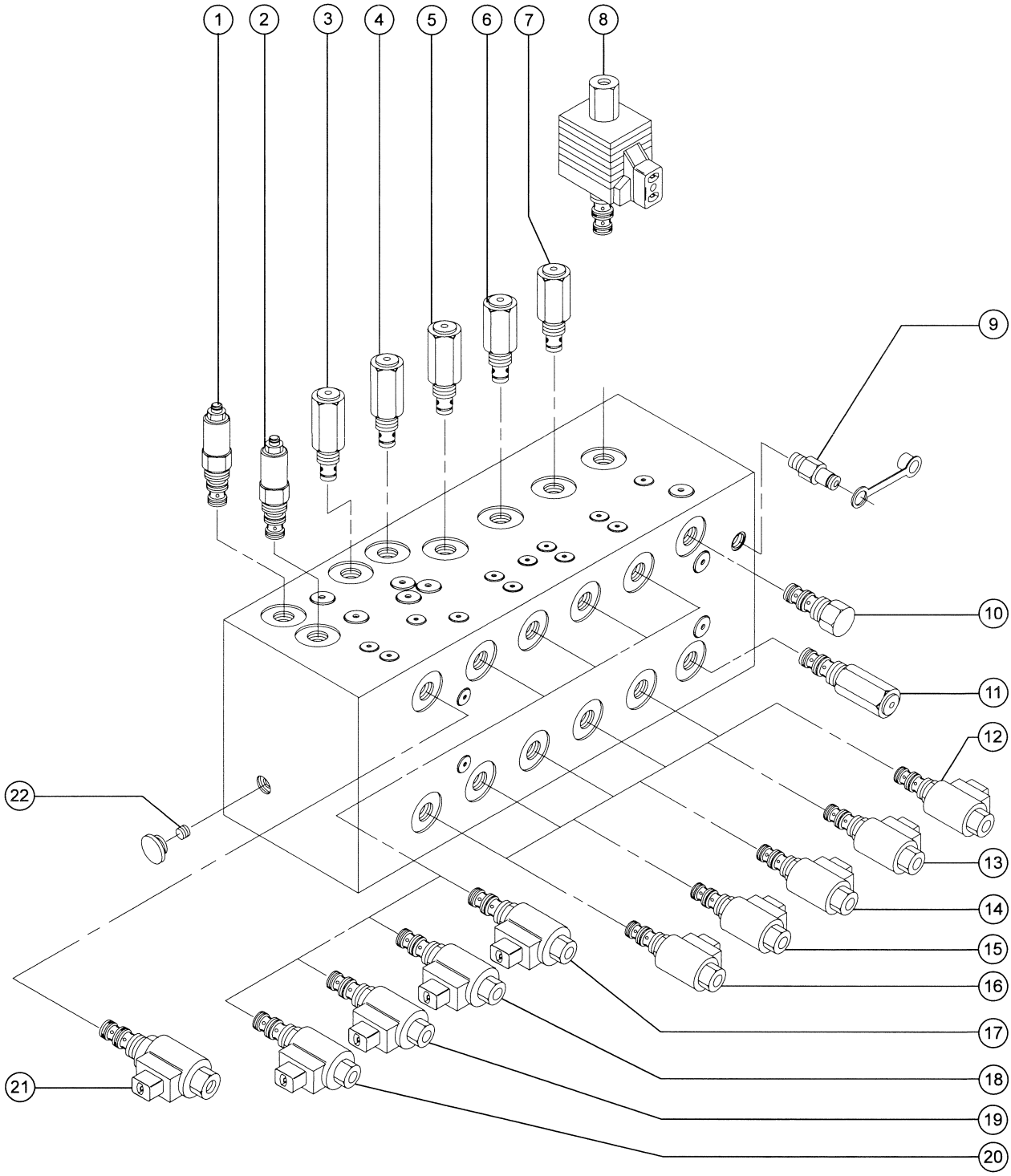
Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve	A	Platform level up	35-40 ft-lbs (47-54 Nm)
2	Counterbalance valve	B	Platform level down	35-40 ft-lbs (47-54 Nm)
3	Relief valve, 1750 psi (121 bar)	C	Turntable rotate left	25-30 ft-lbs (34-41 Nm)
4	Relief valve, 1750 psi (121 bar)	D	Turntable rotate right	25-30 ft-lbs (34-41 Nm)
5	Relief valve, 1600 psi (110 bar)	E	Secondary boom down	25-30 ft-lbs (34-41 Nm)
6	Relief valve, 1400 psi (97 bar)	F	Primary boom down	25-30 ft-lbs (34-41 Nm)
7	Relief valve, 1800 psi (124 bar)	G	Boom extend	25-30 ft-lbs (34-41 Nm)
8	Proportional solenoid valve	H	System flow regulating circuit	10-12 ft-lbs (14-16 Nm)
9	Diagnostic fitting		Testing	
10	Differential sensing valve	I	All functions	10-12 Ft-lbs (14-16 Nm)
11	Relief valve, 2800 psi (193 bar)	J	System relief	25-30 ft-lbs (34-41 Nm)
12	2 position 3 way solenoid valve	K	Boom retract	8-10 ft-lbs (11-14 Nm)
13	2 position 3 way solenoid valve	L	Primary boom up	8-10 ft-lbs (11-14 Nm)
14	2 position 3 way solenoid valve	M	Secondary boom up	8-10 ft-lbs (11-14 Nm)
15	2 position 3 way solenoid valve	N	Turntable rotate left	8-10 ft-lbs (11-14 Nm)
16	2 position 3 way solenoid valve	O	Platform level up	8-10 ft-lbs (11-14 Nm)
17	2 position 3 way solenoid valve	P	Boom extend	8-10 ft-lbs (11-14 Nm)
18	2 position 3 way solenoid valve	Q	Primary boom down	8-10 ft-lbs (11-14 Nm)
19	2 position 3 way solenoid valve	R	Secondary boom down	8-10 ft-lbs (11-14 Nm)
20	2 position 3 way solenoid valve	S	Turntable rotate right	8-10 ft-lbs (11-14 Nm)
21	2 position 3 way solenoid valve	T	Platform level down	8-10 ft-lbs (11-14 Nm)
22	Orifice, 0.050 in (1.27 mm)	U	Turntable rotate circuit	

Plug Torque Specifications

Description	Hex Size	Torque
SAE No. 2	1/8	50 in-lbs / 6 Nm
SAE No. 4	3/16	13 ft-lbs / 18 Nm
SAE No. 6	1/4	18 ft-lbs / 24 Nm

Description	Hex Size	Torque
SAE No. 8	5/16	50 ft-lbs / 68 Nm
SAE No. 10	9/16	55 ft-lbs / 75 Nm
SAE No. 12	5/8	75 ft-lbs / 102 Nm

FUNCTION MANIFOLDS



FUNCTION MANIFOLDS

7-2 Valve Adjustments - Function Manifold

How to Adjust the Primary Boom Down Relief Valve

1 Connect a 0 to 3000 psi (0 to 206 bar) pressure gauge to the test port on the function manifold.

2 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

3 Hold the primary boom down switch with the primary boom fully lowered, and observe the pressure reading on the pressure gauge.

4 Turn the machine off. Hold the relief valve and remove the cap (item 6, function manifold).

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

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

6 Repeat steps 2 through 5 and recheck the valve pressure.

Primary boom down relief valve specifications

Pressure	1200 psi 82.8 bar

How to Adjust the Turntable Rotate Relief Valves

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

1 Connect a 0 to 3000 psi (0 to 206 bar) pressure gauge to the test port on the function manifold.

2 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

3 Hold the turntable rotate right switch with the turntable rotated to the right (until it is against the rotation stop), and observe the pressure reading on the pressure gauge.

4 Turn the machine off. Hold the relief valve and remove the cap (item 4, function manifold).

NOTICE If adjusting the turntable rotate left, hold switch to the left and adjust the left relief valve (item 3, function manifold).

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

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

6 Repeat steps 2 through 5 and recheck the valve pressure.

Turntable rotate relief valve specifications

Pressure	1750 psi 121 bar

How to Adjust the Primary Boom Extend Relief Valve

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

1 Connect a 0 to 3000 psi (0 to 206 bar) pressure gauge to the test port on the function manifold.

2 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

3 Hold the primary boom extend switch with the primary boom fully extended, and observe the pressure reading on the pressure gauge.

4 Turn the machine off. Hold the relief valve and remove the cap (item 7, function manifold).

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

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

6 Repeat steps 2 through 5 and recheck the valve pressure.

Primary boom extend relief valve specifications	
Pressure	1800 psi 124 bar

How to Adjust the Secondary Boom Down Relief Valve

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

1 Connect a 0 to 3000 psi (0 to 206 bar) pressure gauge to the test port on the function manifold.

2 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

3 Hold the secondary boom down switch with the secondary boom fully lowered, and observe the pressure reading on the pressure gauge.

4 Turn the machine off. Hold the relief valve and remove the cap (item 5, function manifold).

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

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

6 Repeat steps 2 through 5 and recheck the valve pressure.

Secondary boom down relief valve specifications	
Pressure	1200 psi 82.8 bar

FUNCTION MANIFOLDS

How to Check the Resistance of a Valve Coil

1 Turn the key switch to the OFF position and disconnect the wires from the valve coil to be tested.

2 **Coils with 2 terminals**: Connect the leads from the ohmmeter to the valve coil terminals.

Coils with 1 terminal: Connect the positive lead from the ohmmeter to the valve coil terminal, then connect the negative lead from the ohmmeter to the internal ring of the valve coil.

Valve coil specifications	
2 position 3 way solenoid valve - 20V	23 - 25Ω
Proportional solenoid valve - 24V	19 - 21Ω

How to Adjust the System Relief Valve

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

1 Connect a 0 to 3000 psi (0 to 206 bar) pressure gauge to the test port on the function manifold.

2 Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

3 Hold the primary boom retract switch with the primary boom fully retracted, and observe the pressure reading on the pressure gauge.

4 Turn the machine off. Hold the relief valve and remove the cap (item 10, function manifold).

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

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

6 Repeat steps 2 through 5 and recheck the valve pressure.

System relief valve specifications	
Pressure	2500 psi 172.4 bar

Turntable Rotation Components

8-1 Rotation Hydraulic Motor

The rotation hydraulic motor is the only serviceable component of the turntable rotation assembly. The worm gear may not be removed from the housing. In order to remove the housing, the turntable has to be removed.

How to Remove the Turntable Rotation Motor

1 Tag, disconnect and plug the hydraulic hoses from the turntable rotation motor.

⚠CAUTION 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.

2 Remove the turntable rotation motor mounting bolts, then remove the motor.

NOTICE Do not allow the turntable to rotate until the hydraulic motor is installed.

8-2 Rotation Bearing and Worm Drive

How to Remove the Rotation Bearing or Worm Drive

The turntable and all components above it must be removed prior to removing the rotation bearing or worm drive.

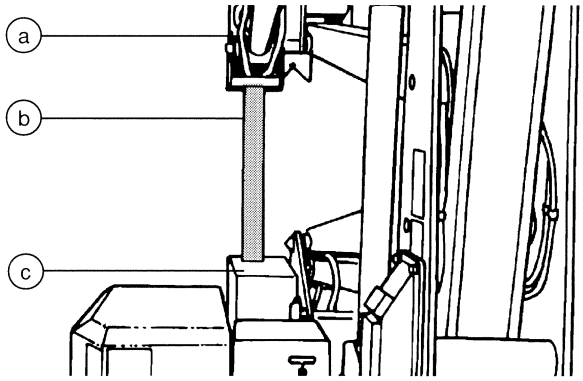
⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is required.

NOTICE Be sure that the drive chassis is level.

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

2 Remove the primary boom. See 3-2, *How to Remove the Primary Boom*.

⚠WARNING Crushing hazard. Do not remove the 4x4x31 inch (78 cm) support block installed during primary boom removal.



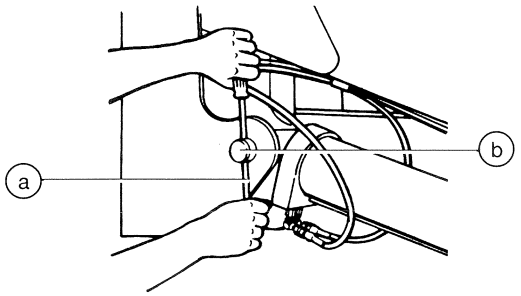
a upper mid-pivot
b 4x4x31 inch block
c counterweight

TURNTABLE ROTATION COMPONENTS

3 Attach a lifting strap from an overhead crane to to the rod end of the primary boom lift cylinder. Then raise the primary lift cylinder with the crane, to a vertical position.

4 Remove the pin retainer from the pivot pin at the barrel end of the primary boom lift cylinder.

5 Place a rod through the barrel-end pivot pin and twist to remove the pin. Remove the primary lift cylinder from the machine.



a 10 to 12 inch (30 cm) rod
b pivot pin

⚠WARNING Crushing hazard. The primary boom lift cylinder will fall when the barrel-end pivot pin is removed if it is not properly supported.

6 Raise the secondary boom. Remove the block from the turntable counterweight and lower the secondary boom to the stowed position.

7 Tag and disconnect the power cables from the hydraulic pumps.

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

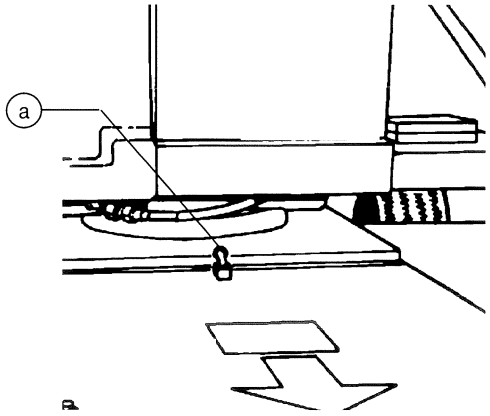
8 Tag, disconnect and plug the "in" and "return" hydraulic hoses from the steer/brake manifold. Pull these hoses up through the turntable.

9 Tag, disconnect and plug the hydraulic hoses from the turntable rotation motor. Pull these hoses up through the turntable.

10 Label and then disconnect all the wiring from the steer/brake manifold.

11 Label and then disconnect all the wiring from the drive chassis electrical panel.

12 Disconnect and remove the drive enable limit switch.



a drive enable limit switch

13 Pull the wiring harness along with the limit switch up through the turntable.

14 Label and disconnect the wiring from the charger ammeter and the AC power cord that are located on the function manifold cover.

15 Pull the wiring and power cord down through the turntable.

16 Loosen the lug nuts on both steer tires. Do not remove them.

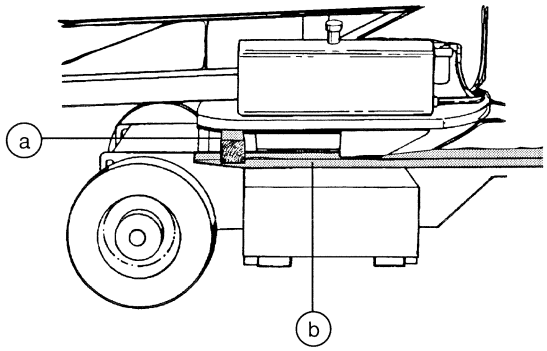
17 Center a lifting jack under the steering axle. Lift the drive chassis until the tires are just off the ground.

18 Support the drive chassis on blocks, then remove both steer tire and wheel assemblies to improve access when removing the turntable.

19 Prepare a forklift with a minimum rating of 18,000 pounds (8165 kg) by spreading the forks to an inside width of 3 feet (0.9 m).

20 Position the forklift at the counterweight end of the turntable. Center the forks underneath the turntable and above the chassis. Do not lift it.

21 Place a 5 x 60 inch (13 x 152 cm) block near the end of the forks for support.



a support block
b fork

22 Raise the forks up against the turntable. Do not lift. Be sure that the support block is still in its proper location.

23 Place a safety strap around the upper mid-pivot, then secure the strap to the forklift carriage.

24 Remove the turntable mounting bolts.

25 Carefully lift the turntable off the drive chassis. Set the turntable on blocks for support.

⚠DANGER Crushing hazard. If the turntable is not properly support by the forklift, it may become unbalanced and fall during removal.

26 Place reference marks on the drive chassis to note the position of the worm drive housing for proper re-alignment during installation.

27 Remove the fasteners from the worm drive, then remove the worm drive.

28 Center the forklift forks under the drive chassis counterweight for support.

29 Loosen the counterweight positioning bolt.

30 Remove the fasteners from the counterweight.

31 Carefully lower the counterweight from the machine.

32 Remove the fasteners from the underside of the rotate bearing, then remove the rotate bearing.

How to Install the Rotation Bearing and Worm Drive

The rotation bearing is a structural component. It attaches the drive chassis to the turntable. The turntable is bolted to the inner race, with the worm gear housing sandwiched in between. This housing has to be correctly positioned to provide the correct gear lash between the worm gear and the ring gear. The outside bearing race is bolted to the drive chassis from the underside.

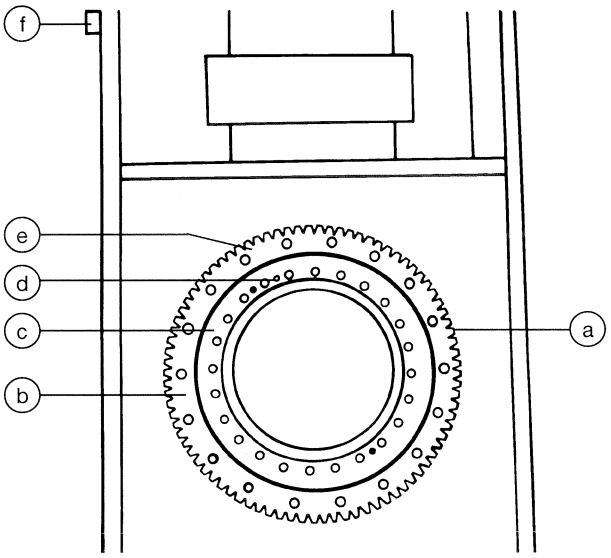
⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is required.

NOTICE If a repair requires that the turntable be removed from the drive chassis, installing a new rotation bearing is recommended. Consider the service life of the rotation bearing before installing a used bearing.

1 Position the rotation bearing on the drive chassis. Use appropriate lifting techniques.

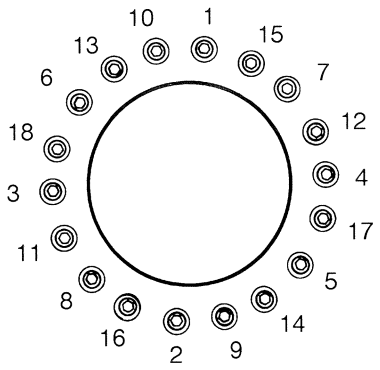
2 Locate the “G” mark stamped on the outside bearing race. Align the mark with the rotation stop block on the chassis.

TURNTABLE ROTATION COMPONENTS



a yellowmark
b outer bearing
c inner bearing
d dowel
e "G" mark
f rotation stop block

3 Install the mounting fasteners from underneath the chassis. Use a torque wrench to tighten the fasteners in sequence to specifications.



Specifications - torque

First rotation	95 foot pounds 129 Newton meters
Second rotation	190 foot pounds 258 Newton meters

4 Locate the yellow mark on the outside bearing and the dowel on the inside bearing.

5 Position the inside bearing dowel 90 degrees counterclockwise from the yellow mark on the outside bearing.

6 Install a grease fitting on the inside bearing and apply grease until it comes out of the inner seal.

7 Apply grease to 10 gear teeth on each side of the yellow mark on the outside bearing.

8 Center the worm drive over the yellow mark on the outside bearing and install the two $^{5}/_{16}$ inch fasteners. Hand tighten the bolts.

9 Push the worm drive towards the rotation bearing to be as close as possible.

10 Position a dial indicator to measure the worm drive in relation to the ring gear. Pull the worm drive away from the rotate bearing 0.035 inches (0.889 mm) ±0.020 inches (0.508 mm).

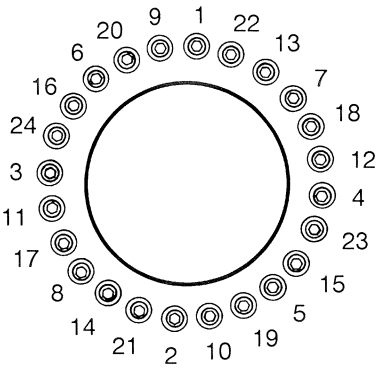
11 Tighten the two $^{5}/_{16}$ fasteners. Observe the dial indicator to be sure that the worm drive does not move.

12 Locate the 1 inch hex head on the end of the worm gear housing. Turn the hex head to rotate the worm drive until it is positioned within the original reference marks on the drive chassis.

13 Position the turntable so that the flat side of the turntable is parallel with the worm drive gear.

14 While lowering the turntable onto the drive chassis, be sure that the milled area on the bottom surface of the turntable does not contact the top of the worm drive gear housing. If it is, remove the turntable and grind the worm drive gear housing until clearance is established.

15 Install the turntable mounting fasteners. Use a torque wrench to tighten the fasteners in sequence to specifications.



Specifications - torque	
First rotation	95 foot-pounds 129 Newton meters
Second rotation	190 foot-pounds 258 Newton meters

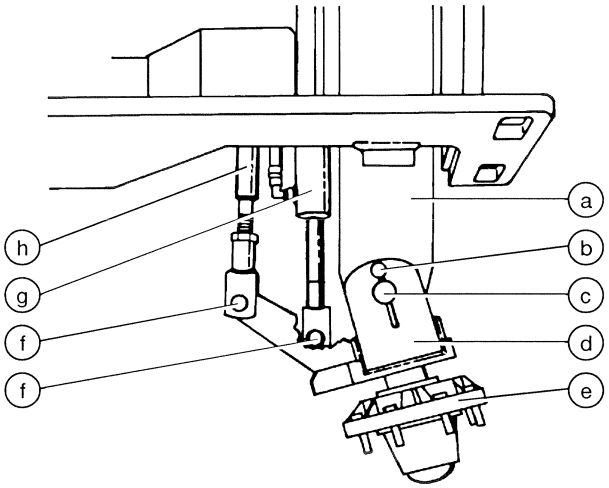
NOTICE After complete assembly, the turntable should rotate smoothly without jerking or grinding.

Steering Axle Components

9-1
Yoke and Hub

How to Remove the Yoke and Hub

1 Remove the cotter pin, and the clevis pin from both the steering cylinder and the tie rod.



a axle
b retaining bolt
c king pin
d yoke
e hub
f clevis pin
g steering cylinder
h tie rod

2 Loosen the wheel lug nuts. Do not remove them.

3 Block the non-steering wheels, and then center a lifting jack under the steering axle.

4 Raise the machine 6 inches (15 cm) and place blocks under the chassis for support.

5 Remove the lug nuts, then the tire and wheel assembly.

6 Remove the retaining bolt from the king pin.

7 Attach a strap from a lifting device to the yoke/hub assembly for support.

8 Use a soft metal drift to drive the king pin down and out.

⚠WARNING Crushing hazard. The yoke/hub assembly will fall when the king pin is removed if it is not properly supported.

NOTICE Always use a new cotter pin when installing a clevis pin.

Torque specifications	
Lug nuts	125 foot-pounds 169.5 Newton meters

How to Remove the Hub and Bearings

1 Loosen the wheel lug nuts. Do not remove them.

2 Block the non-steering wheels and place a lifting jack under the steering axle.

3 Raise the machine and place blocks under the chassis for support.

4 Remove the lug nuts. Then remove the tire and wheel assembly.

5 Remove the dust cap, cotter pin and slotted nut.

6 Pull the hub off the spindle. The washer and outer bearing should fall loose from the hub.

7 Place the hub on a flat surface and gently pry the bearing seal out of the hub. Remove the rear bearing.

How to Install the Hub and Bearings

NOTICE When replacing a wheel bearing, both the inner and outer bearings, including the pressed-in races, must be replaced. The bearing seal must also be replaced.

1 Be sure that both bearings are packed with grease.

2 Place the large inner bearing into the rear of the hub.

3 Press the bearing seal evenly into the hub until it is flush.

4 Slide the hub onto the yoke spindle.

⚠CAUTION Component damage. Do not apply excessive force or damage to the lip of the seal may occur.

5 Place the outer bearing into the hub.

6 Install the washer and slotted nut.

7 Tighten the slotted nut to 35 foot-pounds (47 Nm).

8 Loosen the slotted nut, then re-tighten to 8 foot-pounds (11 Nm).

9 Install a new cotter pin. Bend the cotter pin to lock it in.

10 Install the dust cap, then the tire and wheel assembly. Torque the wheel lug nuts to 125 foot-pounds (169.5 Nm).

9-2 Steering Cylinders

How to Remove a Steering Cylinder

There are two identical steering cylinders that work in parallel. They are part of the same hydraulic circuit, but move in opposite directions. The tie rod maintains equal movement of the tires. Bushings are used at both ends of each steering cylinder clevis.

1 Tag, disconnect and plug the hydraulic hoses from the steering cylinder. Cap the fittings.

⚠CAUTION 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.

2 Remove the cotter pin. Then remove the clevis pin from each end of the steering cylinder.

3 Remove the steering cylinder.

NOTICE Always use a new cotter pin when installing a clevis pin.

STEERING AXLE COMPONENTS

9-3
Tie Rod

How to Remove the Tie Rod

1 Remove the cotter pin, then remove the clevis pin from each end of the tie rod.

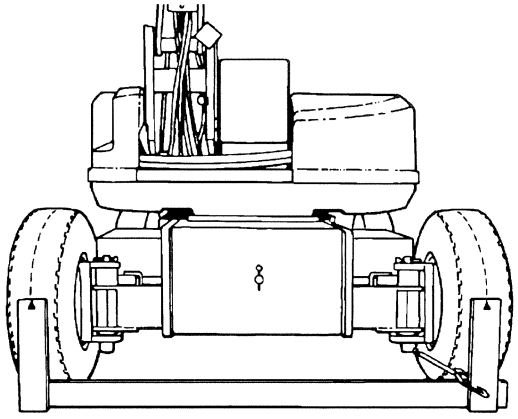
2 Remove the tie rod.

How to Perform the Toe-in Adjustment

NOTICE Perform this procedure on a firm level surface. Block the non-steering tires and be sure that the machine is in the stowed position.

1 Straighten the steer wheels.

2 Measure the steer tires, front to front and back to back, using a measuring fixture .



3 Center a lifting jack under the steering axle, then raise the machine.

4 Loosen the jam nut on the adjustable end of the tie rod.

5 Remove the cotter pin, then remove the clevis pin from the adjustable end of the tie rod.

6 Slide the tie rod off the yoke and adjust it by turning the end.

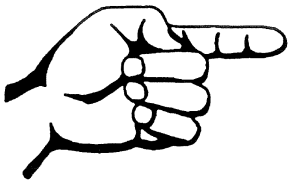
NOTICE One turn on the adjustable end equals approximately 3/16 inch (4.7 mm) change in the front and rear measurements.

7 Slide the tie rod onto the yoke. Install the clevis pin, then install a new cotter pin.

8 Tighten the jam nut against the tie rod.

9 Lower the machine and recheck the front and back measurements (step 2). If further adjustment is needed, repeat steps 3 through 8.

Toe-in specification	0 ± 1/4 inch (6.35 mm)



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Steer/Brake Manifold

10-1
Steer/Brake Manifold Components

The steer/ brake manifold is mounted in the drive chassis at steer end of the chassis.

Index No.	Description	Schematic Item	Function	Torque
1	Check valve	EE	Brake circuit	25-30 ft-lbs (34-41 Nm)
2	Normally open poppet valve	Z	Brake circuit	25-30 ft-lbs (34-41 Nm)
3	3 position 4 way spool valve	V	Steer left/right	10-12 ft-lbs (14-16 Nm)
4	Orifice, 0.040 in (1.02 mm)	FF	Brake circuit	
5	Pressure switch	W	Brake circuit	
6	Normally closed poppet valve	X	Brake circuit	25-30 ft-lbs (34-41 Nm)
7	Orifice washer, 0.052 in (1.32 mm)	GG	Brake circuit	
8	Proportional solenoid valve	Y	Brake circuit	10-12 ft-lbs (14-16 Nm)

Plug Torque Specifications

Description	Hex Size	Torque
SAE No. 2	1/8	50 in-lbs / 6 Nm
SAE No. 4	3/16	13 ft-lbs / 18 Nm
SAE No. 6	1/4	18 ft-lbs / 24 Nm
SAE No. 8	5/16	50 ft-lbs / 68 Nm
SAE No. 10	9/16	55 ft-lbs / 75 Nm
SAE No. 12	5/8	75 ft-lbs / 102 Nm

How to Check the Resistance of a Valve Coil

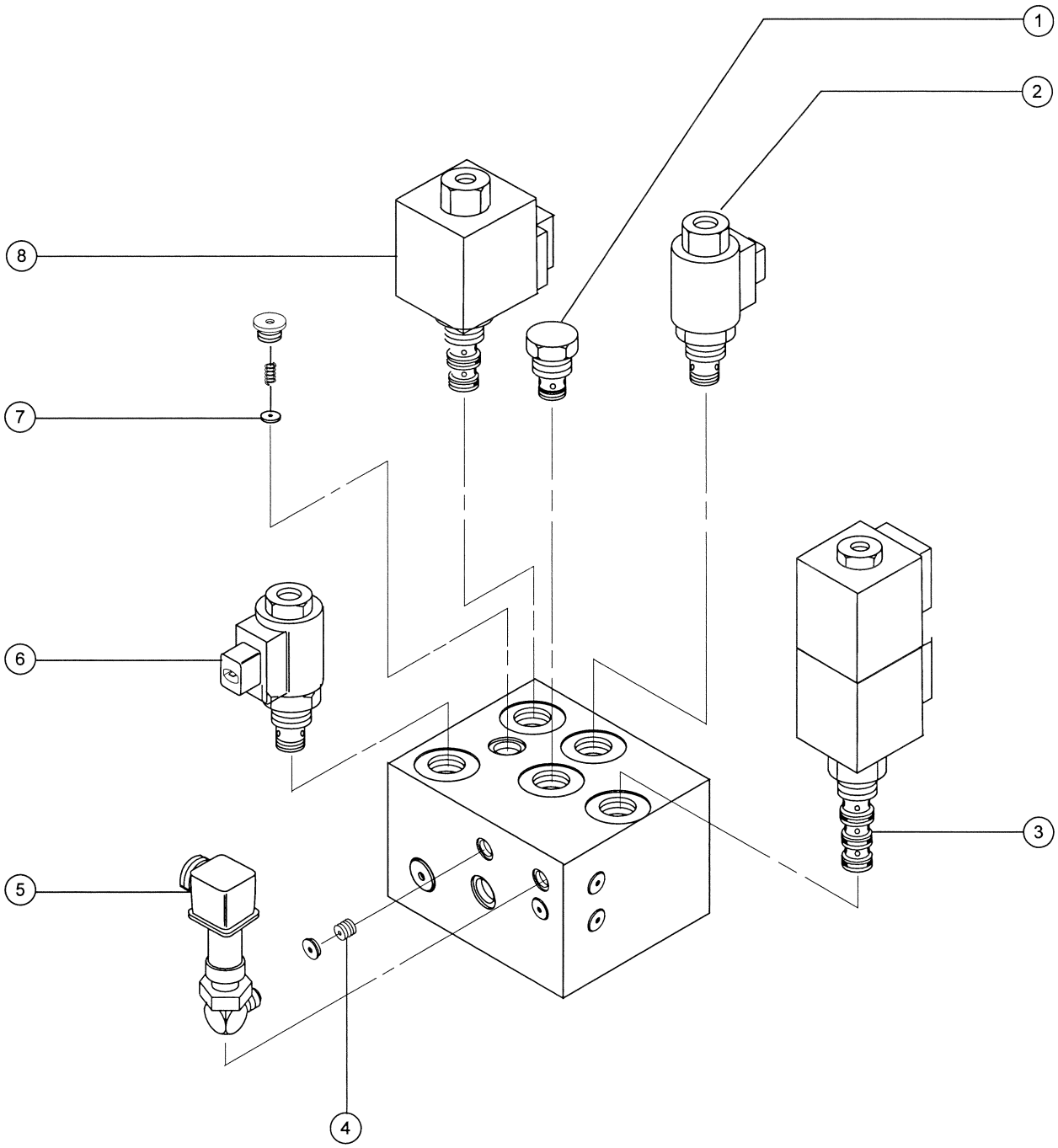
1 Turn the key switch to the OFF position and disconnect the wires from the valve coil to be tested.

2 **Coils with 2 terminals**: Connect the leads from the ohmmeter to the valve coil terminals.

Coils with 1 terminal: Connect the positive lead from the ohmmeter to the valve coil terminal, then connect the negative lead from the ohmmeter to the internal ring of the valve coil.

Valve coil specification	
Normally open poppet valve - 20V	23 to 25Ω
3 position 4 way spool valve - 20V	21 to 23Ω
Normally closed poppet valve - 20V	22 to 24Ω
Proportional solenoid valve - 24V	19 to 21Ω

STEER/BRAKE MANIFOLD



Non-steering Axle Components

11-1 Drive Motor

How to Remove a Drive Motor

A drive motor can only be removed from the inside of the drive chassis.

1 Disconnect the battery packs.

2 Remove the fasteners on the bottom drive chassis cover and remove the cover.

3 Tag and disconnect the power cables from the drive motor that is being removed.

4 Remove the drive motor mounting fasteners.

5 Guide the drive motor shaft out of the brake and then remove the drive motor out the bottom of the chassis.

11-2 Torque Hub

How to Remove a Drive Torque Hub

1 Remove the drive motor. See 11-1, *How to Remove a Drive Motor*.

2 Disconnect the hydraulic hose from the brake and plug it. Cap the fitting on the brake.

⚠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 2 brake mounting fasteners. Then slide the brake out of the torque hub.

4 Loosen the wheel lug nuts. Do not remove them.

5 Center a lifting jack under the non-steering axle. Raise the machine and place blocks under the drive chassis for support.

6 Remove the wheel lug nuts, then the tire and wheel assembly.

7 Place a second lifting jack under the torque hub for support.

8 Remove the fasteners that attach the torque hub to the drive chassis, then remove the torque hub.

⚠CAUTION Crushing hazard. The torque hub will fall if it is not properly supported when the mounting fasteners are removed.

Torque specifications	
Lug nuts	125 ft-lbs 169.5 Nm
Drive torque hub mounting fasteners	210 ft-lbs 285 Nm