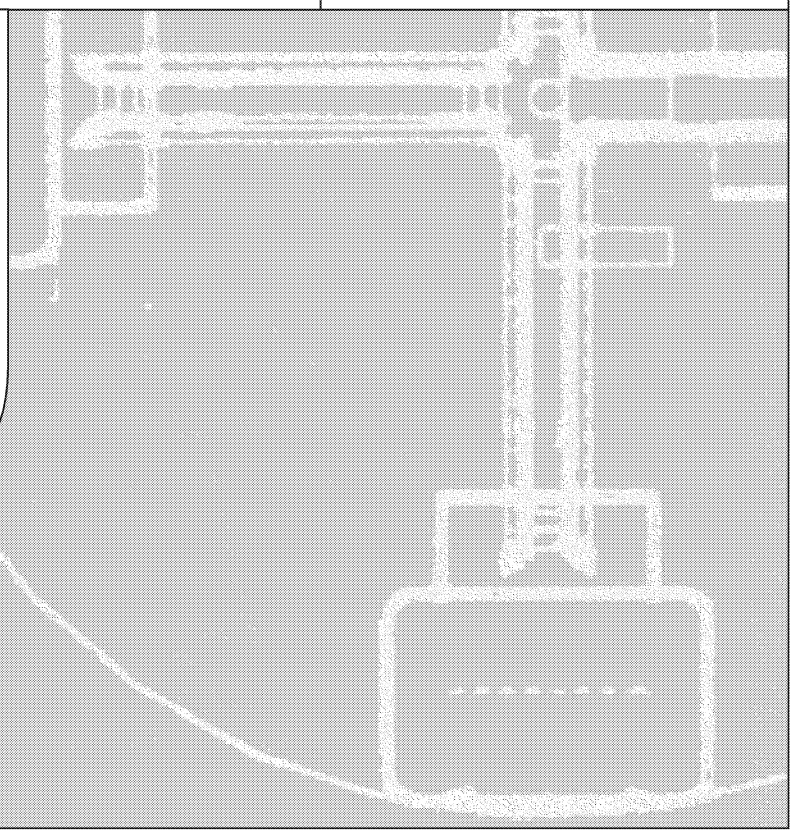
Genie®

Service Manual

First Edition
First Printing
Part No. 31497

Z™-45/22

DC Power
Bi-fuel
Tri-fuel
Diesel
Gasoline/LPG



Genie® Z-45/22

Important

Read, understand and obey the safety rules and operating instructions in the appropriate *Genie Z-45/22 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 an authorized 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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First Edition:
First Printing July, 1993

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These machines comply with the latest issue of ANSI/SIA A92.3-1990 in effect at time of manufacture.

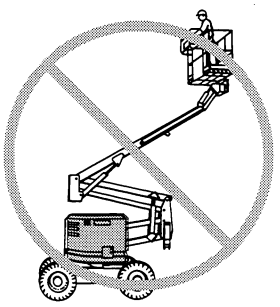
Important

Verify Correct Manual

This service manual covers the Genie Z-45/22 models with the following power options introduced in 1993:

DC POWER
DIESEL BI-FUEL (Diesel/DC)
GAS/LPG TRI-FUEL (Gasoline/LPG/DC)

Look for the power option listed on the turntable cover or the serial number plate.



Do not use this service manual with the Genie Z-45/22 4WD and 2WD models introduced in 1991. Compare turntable cover size and shape.

Do not read any further until you have verified that this is the correct service manual for this machine. Contact Genie Industries if you have any questions.



How To Use This Manual

Many procedures and the steps that go into them are labeled with the model(s) they apply to. If a procedure isn't labeled, it applies to all models.

Engine models: Diesel, Gasoline/LPG, Bi-fuel, Tri-fuel

DC models: DC Power

Kubota Diesel models: Diesel, Bi-fuel

Kubota Gas models: Gasoline/LPG, Tri-fuel

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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 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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Specifications

Machine Specifications All Models

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

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

SPECIFICATIONS

Machine Specifications DC Models

Hydraulic tank capacity	17.7 gallons	67 liters
Hydraulic system capacity (including tank)	24 gallons	90.8 liters
Machine Weight	13910 lbs	6309 kg

Machine Specifications Diesel Models

Hydraulic tank capacity	22.5 gallons	85 liters
Hydraulic system capacity (including tank)	29 gallons	109 liters
Fuel tank capacity	18.2 gallons	68.9 liters
Machine Weight	13651 lbs	6192 kg

Machine Specifications Bi-fuel Models

Hydraulic tank capacity	22.5 gallons	85 liters
Hydraulic system capacity (including tank)	29 gallons	109 liters
Fuel tank capacity	18.2 gallons	68.9 liters
Machine Weight	14770 lbs	6699 kg

Machine Specifications Gasoline/LPG Models

Hydraulic tank capacity	22.5 gallons	85 liters
Hydraulic system capacity (including tank)	29 gallons	109 liters
Fuel tank capacity	8 gallons	30.2 liters
LPG tank capacity	33.5 lbs	15.2 kg
Machine Weight	13531 lbs	6137 kg

Machine Specifications Tri-fuel Models

Hydraulic tank capacity	22.5 gallons	85 liters
Hydraulic system capacity (including tank)	29 gallons	109 liters
Fuel tank capacity	8 gallons	30.2 liters
LPG tank capacity	33.5 lbs	15.2 kg
Machine Weight	14650 lbs	6645 kg

SPECIFICATIONS

Performance Specifications DC Models

Drive speeds, maximum		
Boom stowed, high range	2.5 mph 40 ft/11 sec	4 km/h 12.2 m/11 sec
Boom stowed, low range	1 mph 40 ft/27.3 sec	1.6 km/h 12.2 m/27 sec
Boom raised	0.5 mph 40 ft/52 sec	0.8 km/h 12.2 m/52 sec

Boom function speeds, maximum from platform controls	
Primary boom up	50 to 60 seconds
Primary boom down	45 to 55 seconds
Primary boom extend	80 to 90 seconds
Primary boom retract	50 to 60 seconds
Secondary boom up	55 to 65 seconds
Secondary boom down	25 to 35 seconds
Turntable rotate - 360°	85 to 125 seconds
Platform rotate - 180°	10 to 15 seconds
Platform level up	20 to 30 seconds
Platform level down	15 to 20 seconds

Performance Specifications Engine Models

Drive speeds, maximum		
Boom stowed, high range	3.5 mph 40 ft/7.8 sec	5.6 km/h 12.2 m/7.8 sec
Boom stowed, low range	1.4 mph 40 ft/19.5 sec	2.25 km/h 12.2 m/19.5 sec
Boom raised	0.2 mph 40 ft/150 sec	0.3 km/h 12.2 m/150 sec

Boom function speeds, maximum from platform controls	
Primary boom up	30 to 40 seconds
Primary boom down	50 to 60 seconds
Primary boom extend	50 to 60 seconds
Primary boom retract	30 to 40 seconds
Secondary boom up	25 to 35 seconds
Secondary boom down	25 to 35 seconds
Turntable rotate - 360°	80 to 120 seconds
Platform rotate - 180°	10 to 15 seconds
Platform level up	20 to 30 seconds
Platform level down	15 to 20 seconds

SPECIFICATIONS

Hydraulic Specifications DC Models

Hydraulic fluid	Dexron II equivalent
Drive pump	
Type: 2 section pressure balanced gear pump	
Displacement	9 gallons per minute 34 liters per minute
Maximum drive pressure	3500 psi 241.3 bar
Drive manifold	
Motor shift/brake relief pressure	320 psi 22 bar
Pump unloader pressure	1500 psi 103 bar
Rear drive motors	
Displacement per revolution	
low range	2.8 cu in 45.9 cc
high range	1.1 cu in 18.4 cc
Function pump	
Type: gear	
Displacement - static	0.13 cu in 2.1 cc
Displacement	1.6 gallons per minute 6 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 176 bar
Primary boom down relief valve pressure	1200 psi 83 bar
Secondary boom down relief valve pressure	1200 psi 83 bar

Hydraulic Specifications Engine Models

Hydraulic fluid	Dexron II equivalent
Drive pump	
Type: 3 section pressure balanced gear pump	
Displacement	13.8 gallons per minute 52 liters per minute
Maximum drive pressure	3500 psi 241.3 bar
Drive manifold	
Motor shift/brake relief pressure	320 psi 22 bar
Pump unloader pressure	1500 psi 103 bar
Rear drive motors	
Displacement per revolution	
low range	2.8 cu in 45.9 cc
high range	1.1 cu in 18.4 cc
Function pump	
Type: pressure balanced gear	
Displacement - static	0.37 cu in 6 cc
Displacement - 2950 rpm	4.7 gallons per minute 17.9 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 176 bar
Primary boom down relief valve pressure	1200 psi 83 bar
Secondary boom down relief valve pressure	1200 psi 83 bar

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
	12		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.

SPECIFICATIONS

Kubota WG-750 Engine

Displacement	42.21 cu in 0.74 liters
Number of cylinders	3
Bore & stroke	2.68 x 2.68 inches 68 x 68 mm
Horsepower Gross intermitent	24.5 @ 3600 rpm
Firing order	1 - 2 - 3
Low idle	1250 rpm
High idle	3000 rpm
Governor	centrifugal ball mechanical
Compression ratio	9:1
Compression pressure (approx.)	128 to 185 psi 8.8 to 12.7 bar
Pressure (psi) of lowest cylinder must be at least 90% of highest cylinder	
Valve clearances, cold	0.0057 to 0.0072 inches 0.145 to 0.085 mm
Lubrication system	
Oil pressure (operating temp. @ 3850 rpm)	28 to 64 psi 1.9 to 4.4 bar
Oil capacity (including filter)	3.9 quarts 3.25 liters
Oil viscosity requirements	10W-30
Use oils meeting API classification SF (labeled SF/CC or SF/CD) for improved wear protection.	

Starter motor	
Brush length, new	0.669 in 17 mm
Brush length wear limit	0.453 in 11.5 mm
Brush spring tension	50 to 91 ounces 13.7 to 25.5 Newtons
Battery	
Type	12V, Group 24
Quantity	1
Ampere hour	75AH
Cold cranking ampere	875A
Reserve capacity @ 25A rate	125 minutes
Fuel pump	
Static pressure	2.84 psi 0.19 bar
Minimum volume flow (per minute)	1 pint 500 cc

SPECIFICATIONS

Ignition System	
Ignition spark advance	20° BTDC
Ignition coil primary resistance	1.3 to 1.6Ω @ 75°F / 24°C
Ignition coil secondary resistance	10.7 to 14.5 kΩ @ 75°F / 24°C
Spark plug type	NGKBCP4ES-11
Spark plug gap	0.039 to 0.043 inches 1.0 to 1.1 mm
Engine coolant	
Capacity	3.1 quarts 2.9 liters
Alternator	
Output	30A
Fan belt deflection	1/4 to 3/8 inch 7 to 9 mm

Bolt torque specifications		
Bolt description (size)	torque ft-lbs	torque Nm
Head cover cap nuts (M6)	3 to 4	4 to 6
Head Bolts (M8)	29 to 33	37 to 42
Bearing case bolts 1 (M6)	9 to 12	13 to 16
Bearing case bolts 2 (M7)	19 to 22	26 to 30
Flywheel bolts (M10)	40 to 44	54 to 59
Connecting rod bolts (M6)	11 to 14	26 to 30
Rocker arm bracket nuts (M6)	7 to 8	10 to 11
Idle gear shaft nuts (M6)	7 to 8	10 to 11
Spark plug (M14)	14 to 18	20 to 24
Crankshaft bolt (M12)	72 to 79	98 to 108

SPECIFICATIONS

Kubota D-905 Engine

Displacement	54.86 cu in 0.90 liters
Number of cylinders	3
Bore and stroke	2.83 x 2.90 inches 72 x 73.6 mm
Horsepower Gross intermitent	26 @ 3600 rpm
Firing order	1 - 2 - 3
Compression ratio	22:1
Compression pressure	412 to 469 psi 28.4 to 32.3 bar
Low idle	800 rpm
High idle	3000 rpm
Governor	centrifugal mechanical
Valve clearance, cold	0.0057 to 0.0072 in 0.145 to 0.185 mm
Engine coolant	
Capacity	3.3 quarts 3.1 liters
Lubrication system	
Oil pressure	36 to 64 psi 2.48 to 4.41 bar
Oil capacity (including filter)	5.4 quarts 5.1 liters
Oil viscosity requirements	10W-30
Engine oil should have properties of API classification CC/SE, CD/SE, CC/SF or CD/SF grades.	
Injection system	
Injection pump make	Bosh MD
Injection timing	13° to 25° BTDC
Injection pump pressure	1991 psi 137 bar

Fuel requirement	diesel number 2-D
Alternator Output	30A
Starter motor	
Brush length, new	0.5188 in 13 mm
Brush length, minimum	0.3346 in 8.5 mm
Battery	
Type	12V, Group 24
Quantity	1
Ampere hour	75AH
Cold cranking ampere	875A
Reserve capacity @ 25A rate	125 minutes
Fan belt deflection	1/4 to 3/8 inch 7 to 9 mm

Bolt torque specifications

Bolt description (size, grade)	torque ft-lbs	torque Nm
Head cover cap nuts (M7)	5 to 6	7 to 9
Head Bolts (M10)	47 to 50	64 to 69
Bearing case bolts 1 (M8)	22 to 25	29 to 34
Bearing case bolts 2 (M9)	36 to 40	49 to 54
Flywheel bolts (M10)	40 to 44	54 to 59
Connecting rod bolts (M8)	30 to 35	41 to 46
Rocker arm bracket nuts (M7)	16 to 19	22 to 26
Idle gear shaft nuts (M6)	7 to 8	10 to 11
Glow plugs (M10)	14 to 18	20 to 24
Nozzle holder assembly (M20)	36 to 50	49 to 69
Injection pipe retaining nuts (M12)	18 to 25	25 to 34

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	Warm engine required	Cold engine 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 Engine Oil Level - Engine Models					
A-5	Check the Engine Coolant Level - Engine Models					
A-6	Check for Fuel Leaks - Engine Models					
A-7	Check the Hydraulic Oil Level					
A-8	Check for Hydraulic Leaks					
A-9	Check the Tire Pressure					
A-10	Test the Platform and Ground Controls					
A-11	Test the Tilt Sensor					
A-12	Test the Limit Switches					
Every 100 hours, perform the following three engine maintenance procedures.						
A-13	Replace the Engine Oil and Filter - Engine Models					
A-14	Replace the Engine Air Filter - Engine Models					
A-15	Drain the Fuel Filter/Water Separator - Kubota Diesel Models					

MAINTENANCE TABLES

Table B

		Tools are required	New parts required	Warm engine required	Cold engine required	Dealer service suggested
B-1	Check the Engine Belt - Engine Models					
B-2	Check the Radiator -Engine Models					
B-3	Check the Engine Choke - Kubota Gas Models					
B-4	Check the Exhaust System - Engine Models					
B-5	Check the Battery(s)					
B-6	Check the Hydraulic Tank Filter Condition Indicator					
B-7	Inspect the Electrical Wiring					
B-8	Inspect the Tires and Wheels (including lug nut torque)					
B-9	Confirm the Proper Brake Configuration					
B-10	Check the Oil Level in the Torque Hubs					
B-11	Check the Glow Plugs - Kubota Diesel Models					
B-12	Check and Adjust the Engine RPM - Engine Models					
B-13	Test the Key Switch					
B-14	Test the Emergency Stop Buttons					
B-15	Test the Ground Control Override					
B-16	Test the Manual Controls					
B-17	Test the Platform Self-leveling					

MAINTENANCE TABLES

Table B, continued		Tools are required	New parts required	Warm engine required	Cold engine required	Dealer service suggested
B-18	Test the Service Horn					
B-19	Test the Foot Switch					
B-20	Test the Engine Idle Select - Engine Models					
B-21	Test the Fuel Select Operation - Kubota Gas Models					
B-22	Test the Drive Enable System					
B-23	Test the Drive Brakes					
B-24	Test the Drive Speed - Stowed Position					
B-25	Test the Alarm Package - Optional Equipment					
B-26	Perform Hydraulic Oil Anaysis See D-1 *Test or Replace the Hydraulic Oil*					
B-27	Test the Turntable Rotation Stop					
B-28	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					

MAINTENANCE TABLES

Table C, continued		Tools are required	New parts required	Warm engine required	Cold engine required	Dealer service suggested
C-6	Replace the Hydraulic Tank Filter					
C-7	Replace the Diesel Fuel Filter - Kubota Diesel Models					
C-8	Replace the Gasoline Fuel Filter - Kubota Gas Models					
C-9	Clean or Replace the Distributor Cap and Rotor - Kubota Gas Models					
C-10	Replace the Spark Plugs - Kubota Gas Models					
C-11	Check and Adjust the Air/LPG Mixture - Kubota Gas Models					
C-12	Check and Adjust the Ignition Timing - Kubota Gas Models					
C-13	Check the Engine Valve Clearances - Kubota Gas Models					
C-14	Check the Electric Motor Brushes					
C-15	Bleed the Platform Rotator					

Table D

D-1	Test or Replace the Hydraulic Oil					
D-2	Change or Recondition the Engine Coolant - Engine Models					
D-3	Change the Fuel Lines - Engine Models					

Maintenance Inspection Report

DC Models

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

Comments

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-7 Hydraulic oil level			
A-8 Hydraulic leaks			
A-9 Tire pressure			
A-10 Platform and ground controls			
A-11 Tilt sensor			
A-12 Limit switches			

Checklist B	**Y**	**N**	**R**
Refer to Table B			
B-5 Battery(s)			
B-6 Hydraulic tank filter			
B-7 Electrical wiring			
B-8 Tires and wheels			
B-9 Brake configuration			
B-10 Torque hub oil level			
B-13 Key Switch			
B-14 Emergency Stop			
B-15 Ground control override			
B-16 Manual controls			
B-17 Platform leveling			
B-18 Service horn			
B-19 Foot switch			
B-22 Drive enable system			
B-23 Drive brakes			
B-24 Drive speed-stowed			
B-25 Alarm package			
B-26 Hydraulic oil analysis			
B-27 Turntable stop			
B-28 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-14 Electric motor brushes			
C-15 Platform rotator			

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

Maintenance Inspection Report

Engine Models

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

Comments

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 Engine oil level			
A-5 Engine coolant-gasoline			
A-6 Fuel leaks			
A-7 Hydraulic oil level			
A-8 Hydraulic leaks			
A-9 Tire pressure			
A-10 Platform and ground controls			
A-11 Tilt sensor			
A-12 Limit switches			
Perform every 100 hours:			
A-13 Replace engine oil and filter			
A-14 Replace air filter			
A-15 Drain fuel filter/water separator-diesel			

Checklist B	**Y**	**N**	**R**
Refer to Table B			
B-1 Engine belt			
B-2 Engine radiator			
B-3 Engine choke-gas			
B-4 Exhaust system			
B-5 Battery(s)			
B-6 Hydraulic tank filter			
B-7 Electrical wiring			
B-8 Tires and wheels			
B-9 Brake configuration			
B-10 Torque hub oil level			
B-11 Glow plugs-diesel			
B-12 Engine RPM			
B-13 Key Switch			
B-14 Emergency Stop			
B-15 Ground control override			
B-16 Manual controls			
B-17 Platform leveling			
B-18 Service horn			
B-19 Foot switch			
B-20 Engine idle select			
B-21 Fuel select-gas			
B-22 Drive enable system			
B-23 Drive brakes			
B-24 Drive speed-stowed			
B-25 Alarm package			
B-26 Hydraulic oil analysis			
B-27 Turntable stop			
B-28 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 Fuel filter-diesel			
C-8 Fuel filter-gas			
C-9 Distibutor cap-gas			
C-10 Spark plugs-gas			
C-11 Air/LPG mixture-gas			
C-12 Ignition timing-gas			
C-13 Valves-diesel			
C-14 Electric motor brushes			
C-15 Platform rotator			

Checklist D	**Y**	**N**	**R**
Refer to Table D			
D-1 Hydraulic oil			
D-2 Engine coolant			
D-3 Change fuel lines			

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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 make sure that the operator's and safety manuals are present and complete in the storage box in the platform.

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

3 Always return the manuals to the storage box after use.

4 Check to be sure that the storage container and lid are present and in good condition.

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 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
- fuel and hydraulic tanks
- drive motor
- turntable motors and torque hubs
- boom components and wear pads
- dents or damage to machine
- tires and wheels
- engine and related components
- 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 and latches
- battery packs and connections

A-4
Check the Engine Oil Level - Engine Models

Maintaining the proper engine oil level is essential to good engine performance and service life. Operating the machine with an improper oil level can damage engine components.

NOTICE Check the oil level with the engine off.

1 Check the oil level dipstick. Add oil as needed.

Kubota Engine WG-750 **Oil capacity (including filter)**	3.9 quarts 3.25 liters
Oil viscosity requirements	10W-30
Use oils meeting API classification SF (labeled SF/CC or SF/CD) for improved wear protection.	
Kubota Engine D-905 **Oil capacity (including filter)**	5.4 quarts 5.1 liters
Oil viscosity requirements	10W-30
Engine oil should have properties of API classification CC/SE, CD/SE, CC/SF or CD/SF grades.	

A-5
Check the Engine Coolant Level - Engine Models

Maintaining the engine coolant at the proper level is essential to engine service life. Improper coolant level will affect the engine's cooling capability and damage engine components. Daily checks will allow the inspector to identify changes in coolant level that might indicate cooling system problems.

1 Check the fluid level in the coolant recovery tank. Add fluid as needed.

⊙ Result: The fluid level should be in the NORMAL range.

A-6
Check for Fuel Leaks - Engine Models

Failure to detect and repair fuel leaks will result in an unsafe condition. An explosion or fuel fire may cause death or serious injury.

⚠ DANGER Engine fuels are combustible. Inspect the machine in an open, well-ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

1 Open the shutoff valve on the liquid petroleum gas (LPG) tank by turning it counterclockwise.

TABLE A PROCEDURES

2 Perform a visual inspection around the areas listed below. An LPG detector may be necessary to locate LPG leaks.

Kubota Gas models:

- LPG tank, hoses and fittings, solenoid shutoff valve, LPG regulator and carburetor
- gasoline tank, shutoff valve, solenoid shutoff valve, hoses and fittings, fuel pump and carburetor

Kubota Diesel models:

- fuel tank, shutoff valve, hoses and fittings, fuel pump, fuel filter/water separator, fuel injection pump and fuel injectors

⚠ DANGER If a fuel leak is discovered, keep any additional personnel from entering the area and do not operate the machine. Repair the leak immediately.

A-7
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 II equivalent	
Hydraulic tank capacity		
DC models	17.7 gallons	67 liters
Engine models	22.5 gallons	85 liters
Hydraulic system (including tank)		
DC models	24 gallons	90.8 liters
Engine models	29 gallons	109 liters

A-8
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
- engine compartment—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-9
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-10
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. Operating the manual controls will override the ground and platform Emergency Stop buttons. Each function should activate, operate smoothly and be free of hesitation, jerking and unusual noise.

1 **Engine models:** Start the engine from the ground controls.

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

2 Operate each machine function through a full cycle.

⊙ Result: All machine functions should operate smoothly.

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

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

NOTICE Kubota Diesel models: All functions should stop immediately. The engine will shut off after 2 to 3 seconds.

4 **Engine models:** Start the engine from the platform controls.

DC models: 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.

5 Operate each machine function through a full cycle.

⊙ Result: All machine functions should operate smoothly.

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

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

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

TABLE A PROCEDURES

A-11
Test the Tilt Sensor

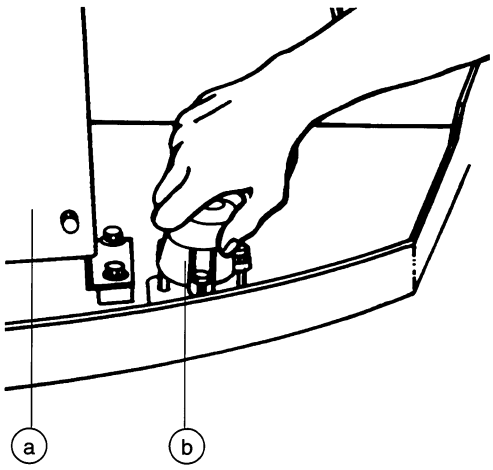
The tilt sensor sounds an alarm in the platform when the incline of the drive chassis exceeds 3 degrees.

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 engine side cover and press down on one side of the tilt sensor.

⊙ Result: After a 1 second delay, the alarm in the platform should sound.



a ground control box
b tilt sensor

A-12
Test the Limit Switches

Detecting limit switch malfunctions is essential to safe machine operation. The drive limit switch is 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.

Drive Limit Switch

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

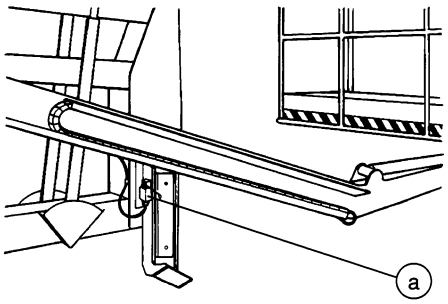
- broken or missing rollers or arms
- missing fasteners
- loose wiring

2 **Engine models**: Start the engine from the ground controls.

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

3 Raise the primary boom above the drive limit switch and turn the engine/machine off.

4 Manually activate the drive limit switch.



a 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.

5 **Engine models**: Start the engine from the ground controls.

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

6 Lower the boom into the stowed position.

7 **Engine models**: Start the engine from the platform controls.

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

8 Slowly move the drive control handle off center.

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

9 Raise the primary boom above the drive limit switch.

10 Slowly move the drive control handle off center.

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

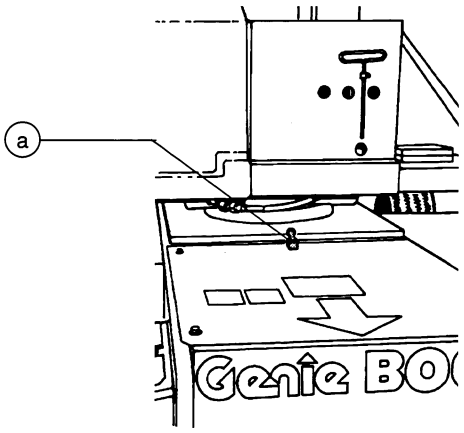
Drive speed, maximum, raised	
DC models	40 feet/52 seconds 12.2 meters/52 seconds
Engine models	40 feet/150 seconds 12.2 meters/150 seconds

Drive Enable Limit Switch

1 With the engine 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 **Engine models**: Start the engine from the platform controls.

DC models: 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.

TABLE A PROCEDURES

A-13
Replace the Engine Oil and Filter - Engine Models

NOTICE Kubota engine specifications require that this procedure be performed every 100 hours. Perform this procedure more often if dusty conditions exist or the machine is subjected to extended low idle operation.

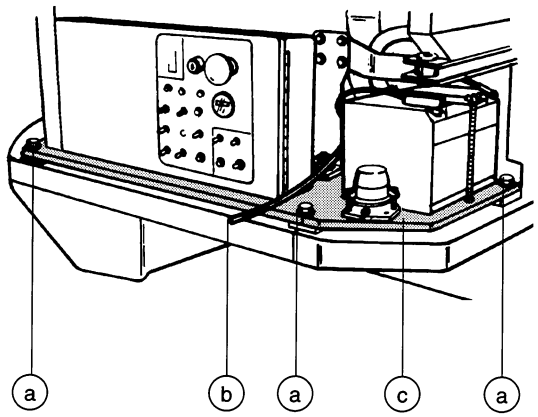
Periodic replacement of the engine oil and filter is essential to good engine performance. Operating the machine with an improper oil level or neglecting periodic oil and filter changes can damage engine components. A daily check of elapsed machine hours against the hours noted on the oil filter will allow the inspector to anticipate and perform oil and filter changes at the 100 hour interval.

NOTICE Perform this procedure after warming the engine to normal operating temperature.

⚠CAUTION Beware of hot engine parts and oil. Contact with hot engine oil and/or engine parts may cause severe burns.

1 Remove the oil filler cap located on the valve cover.

2 Pull the end of the oil drain hose out from under the engine.



a pivot plate retaining bolts
b oil drain hose
c engine pivot plate

3 Open the drain valve on the oil pan and allow all of the oil from the engine to drain into a suitable container. Dispose of oil properly.

4 Close the drain valve.

5 Remove the 3 bolts from the engine pivot plate. Swing the engine pivot plate away from the machine to access the oil filter.

6 Clean the area around the oil filter, then use an oil filter wrench and remove the filter.

7 Apply a thin layer of oil to the new oil filter gasket. Then install the filter and tighten it securely by hand.

8 Use a permanent ink marker to write the date and number of hours from the hour meter on the oil filter.

9 Fill the engine with new oil per specifications and install the filler cap.

10 Start the engine from the ground controls. Allow the engine to run for 30 seconds, then turn the engine off.

11 Check the oil filter and the oil drain valve for leaks.

12 Swing the engine pivot plate back to its original position and replace the three retaining bolts.

13 Check the engine oil level dipstick. Add oil if needed.

Kubota Engine WG-750 **Oil capacity (including filter)**	3.9 quarts 3.25 liters
Oil viscosity requirements	10W-30
Use oils meeting API classification SF (labeled SF/CC or SF/CD) for improved wear protection.	
Oil filter - Genie Part Number	22106
Kubota Engine D-905 **Oil capacity (including filter)**	5.4 quarts 5.1 liters
Oil viscosity requirements	10W-30
Engine oil should have properties of API classification CC/SE, CD/SE, CC/SF or CD/SF grades.	
Oil filter - Genie Part Number	31744

A-14
Replace the Engine Air Filter - Engine Models

NOTICE Kubota specifications require that this procedure be performed every 100 hours. Perform this procedure more often if dusty conditions exist.

Maintaining the engine air filter in good condition is essential to good engine performance and service life. Failure to perform this procedure can lead to poor engine performance and component damage.

NOTICE Perform this procedure with the engine off.

1 Remove the end cap from the air cleaner canister.

2 Remove the mounting fastener from the air filter, then remove the filter.

3 Insert the new filter and replace the mounting fastener.

4 Replace the end cap on the canister.

Air filters - Genie part numbers	
Kubota D-905 Engine	31745
Kubota WG-750 Engine	22107

TABLE A PROCEDURES

A-15
Drain the Fuel Filter/ Water Separator - Kubota Diesel Models

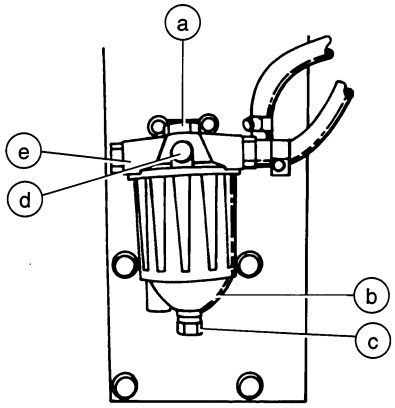
NOTICE Engine specifications require that this procedure be performed every 100 hours. Poor fuel quality or very wet conditions may necessitate performing this procedure more often.

Proper maintenance of the fuel filter/water separator is essential for good engine performance. Failure to perform this procedure can lead to poor engine performance and component damage.

NOTICE Perform this procedure with the engine off.

⚠ DANGER Engine fuels are explosive. Perform this procedure in an open, well-ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

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



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

2 Loosen the drain plug located at the bottom of the bowl. Allow the water to drain into a container until fuel starts to come out. Immediately tighten the drain plug.

3 Tighten the vent plug and clean up any spills or wet surfaces.

NOTICE If the fuel bowl is completely drained, you must prime the fuel filter/water separator before starting the engine. Refer to C-7 in this section, *Replace The Diesel Fuel Filter,* for instructions on how to prime the fuel filter/water separator.

4 Start the engine from the ground controls and check the fuel filter/water separator for leaks.

Table B Procedures

B-1
Check the Engine Belt - Engine Models

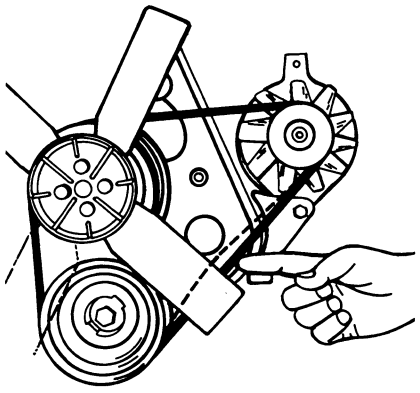
Maintaining the engine belt is essential to good engine performance and service life. The machine will not operate properly with a loose or defective belt and continued use may cause component damage.

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

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

1 Inspect the engine belt for:
- cracking
- glazing
- separation
- breaks

2 Check the engine belt for proper tension.



Belt deflection	1/4 to 3/8 inch 7 to 9 mm

B-2
Check the Radiator - Engine Models

Maintaining the radiator in good condition is essential for good engine performance. Operating a machine with a damaged or leaking radiator may result in engine damage. Also, restricting air flow through the radiator (i.e., dirt or debris) will affect the performance of the cooling system. A frequent check allows the inspector to identify changes in the condition of the radiator that might indicate cooling system problems.

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

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

1 Inspect the radiator for leaks and physical damage.

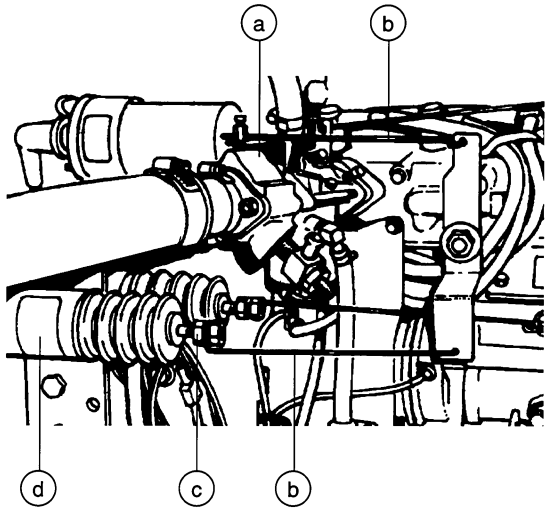
2 Clean the radiator fins of debris and foreign materials.

TABLE B PROCEDURES

B-3
Check the Engine Choke - Kubota Gas Models

A properly functioning choke is essential to good engine performance. An improperly functioning choke will result in difficulty with engine starting.

1 Check the choke linkage connections.



a carburetor
b linkage
c linkage lock nuts
d choke solenoid

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

3 While operating the choke switch, inspect the choke solenoid.

⊙ Result: The choke solenoid should be fully retracted when the choke switch is activated.

4 Turn the key switch to platform control.

5 Pull out the platform control Emergency Stop button to the ON position and then operate the choke switch and listen for choke solenoid operation.

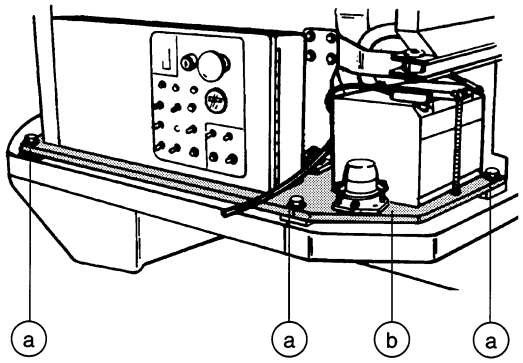
B-4
Check the Exhaust System - Engine Models

Maintaining the exhaust system is essential to good engine performance and service life. Running the engine with a damaged or leaking exhaust system can cause component damage and unsafe operating conditions.

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

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

1 Remove the 3 bolts from the engine pivot plate. Swing the engine pivot plate away from the machine to access the exhaust system.



a pivot plate retaining bolts
b engine pivot plate

2 Be sure that all nuts and bolts are tight.

3 Inspect all welds for cracks.

4 Inspect for exhaust leaks; i.e., carbon buildup around seams and joints.

TABLE B PROCEDURES

B-5
Check the Battery(s)

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.

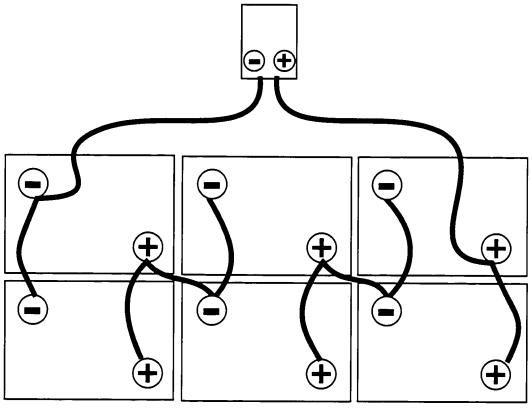
3 Be sure that the battery hold downs and cable connections are tight.

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 **DC models:** Check each battery pack, to be sure the batteries are wired correctly.



B-6
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 **Engine models**: Start the engine from the platform controls and warm to normal operating temperature.

DC models: 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.

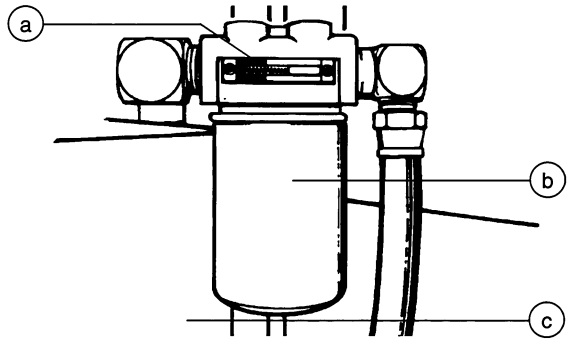
2 **Engine models**: Move the engine speed control switch to high idle (rabbit symbol) at the platform controls.

DC models: 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.

TABLE B PROCEDURES

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.*

B-7
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:

- engine compartment electrical panel
- engine wiring harness
- inside of the ground control box
- turntable manifold wiring

2 **Engine models**: Start the engine from the ground controls.

DC models: 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 engine/machine off.

6 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-8
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.

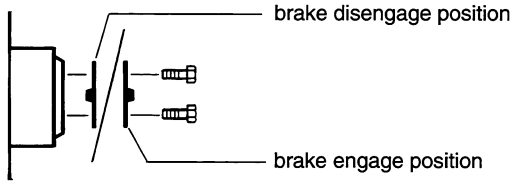
4 Check the pressure in each air-filled tire.

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

B-9 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.

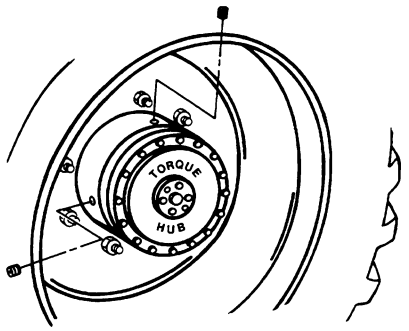
1 Check each torque hub disconnect cap to be sure it is in the engaged position.



B-10 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 - API service classification GL5	

TABLE B PROCEDURES

B-11
Check the Glow Plugs - Kubota Diesel Models

Maintaining the glow plugs in good condition is essential to good engine performance and service life. Improperly functioning glow plugs will cause the engine to perform poorly and may result in component damage.

NOTICE Perform this procedure with the engine turned off.

1 Connect the leads from an ohmmeter between the far left glow plug and machine ground.

⊙ Result: The resistance should be approximately 1.0Ω.

2 If the ohm reading is different than 1.0Ω, remove the wire and connector plate from the three individual glow plugs. Then, one glow plug at a time, check the resistance between the glow plug and machine ground.

⊙ Result: The resistance should be approximately 1.8Ω for each individual glow plug.

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

4 Connect the red (+) lead from a volt meter to the number three glow plug. Connect the black (-) lead to ground.

5 Hold the glow plug switch in the ON position.

⊙ Result: The volt meter should read 12 volts.

B-12
Check and Adjust the Engine RPM - Engine Models

Maintaining the engine rpm at the proper setting for both low and high idle is essential to good engine performance and service life. The machine will not operate properly if the rpm is incorrect and continued use may cause component damage.

Kubota Gas models

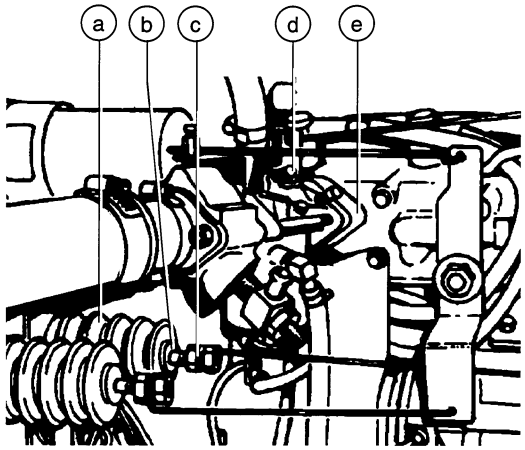
NOTICE Perform this procedure in gasoline mode with the engine at normal operating temperature.

1 Connect an rpm gauge to the engine, then start the engine from the ground controls.

⊙ Result: Low idle should be 1250 rpm.

Skip to step 3 if the low idle rpm is correct.

2 Turn the low idle adjustment screw on the carburetor clockwise to increase rpm or counterclockwise to decrease rpm.



Kubota Gas idle adjustments
a solenoid boot
b high idle adjustment nut
c spring lock nut
d low idle adjustment
e carburetor

TABLE B PROCEDURES

3 Move the engine idle control switch to high idle (rabbit symbol) from the ground controls.

⊙ Result: High idle should be 3000 rpm.

If high idle rpm is correct, disregard adjustment step 4.

4 Loosen the spring lock nut.

5 Turn the high idle adjustment nut and solenoid boot counterclockwise to increase the rpm or clockwise to decrease the rpm.

6 Tighten the spring and lock nut. Then recheck the rpm.

Kubota Gas	
Low idle	1250 rpm
High idle	3000 rpm

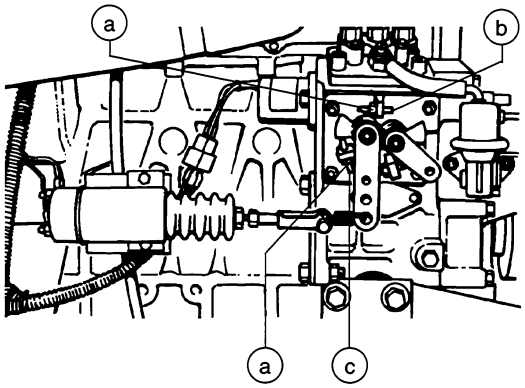
Kubota Diesel models

1 Connect an rpm gauge to the engine, and then start the engine from the ground controls.

Result: Low idle should be 800 rpm.

Skip to step 3 if the low idle rpm is correct.

2 Loosen the lock nut, then turn the low idle adjustment screw clockwise to increase the rpm or counterclockwise to decrease the rpm. Tighten the lock nut and recheck the rpm.



Kubota Diesel idle adjustments
a lock nut
b high idle adjustment nut
c low idle adjustment screw

3 Move the engine idle control switch to high idle (rabbit symbol) from the ground controls.

⊙ Result: High idle should be 3000 rpm.

If high idle rpm is correct, disregard adjustment step 4.

4 Loosen the lock nut, then turn the high idle adjustment screw clockwise to increase the rpm or counterclockwise to decrease the rpm. Tighten the lock nut and recheck the rpm.

Kubota Diesel models	
Low idle	800 rpm
High idle	3000 rpm

TABLE B PROCEDURES

B-13
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 ground control, start the engine and then 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 engine/machine should stop.

NOTICE Kubota Diesel models: All functions should stop immediately. The engine will shut off after 2 to 3 seconds.

B-14
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. Operating the manual controls will override the ground and platform Emergency Stop buttons.

1 **Engine models**: Start the engine from the ground controls.

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

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

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

NOTICE Kubota Diesel models: All functions should stop immediately. The engine will shut off after 2 to 3 seconds.

3 **Engine models**: Start the engine from the platform controls.

DC models: 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 down the Emergency Stop button to the OFF position.

⊙ Result: The engine should shut off and 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-15
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 **Engine models**: Start the engine from the ground controls.

DC models: 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.

NOTICE Operating the manual controls will override the ground and platform Emergency Stop buttons.

B-16
Test the Manual Controls

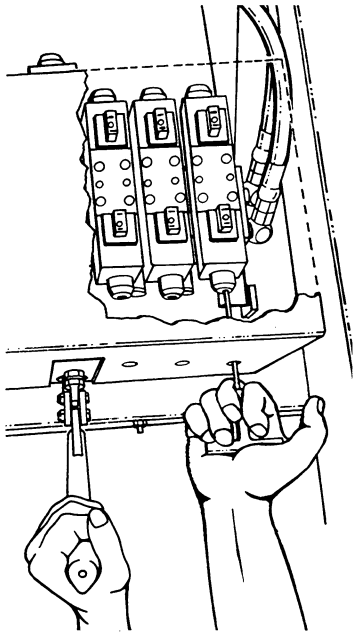
Detection of manual control system malfunctions is essential for safe machine operation. An unsafe working condition exists if the manual controls do not operate in the event of a main power loss.

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

2 Raise the primary and secondary booms 10 feet (3 m) off the ground.

3 Remove the T-handle from the storage position on the function manifold cover.

4 Insert the T-handle into the valve spool to be tested.



5 While holding the T-handle against the valve spool, pump the hand pump.

⊙ Result: Boom function should operate.

6 Repeat steps 4 and 5 to test each boom function.

NOTICE Manual controls will not operate the steer and drive functions.

TABLE B PROCEDURES

B-17
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 **Engine models**: Start the engine from the ground controls.

DC models: 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.

B-18
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-19
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. The foot switch will also shift the engine into high idle if the idle select is switched to the rabbit and foot switch symbol. An improperly functioning foot switch can cause an unsafe working condition.

NOTICE The engine should not start if the foot switch is pressed down.

1 **Engine models**: Start the engine from the platform controls.

DC models: 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-20
Test the Engine Idle Select - Engine Models

A properly operating engine idle select switch is essential to good engine performance and safe machine operation. There are three settings.

Low idle (turtle symbol) allows the operator to control individual boom functions and to drive the machine at a reduced speed.

High idle (rabbit symbol) allows the operator to control multiple boom and/or drive functions simultaneously. This setting maintains a consistent high idle.

Foot switch activated high idle (rabbit and foot switch symbols) should be used for normal machine operation. This selection activates high idle only when the foot switch is pressed down.

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

2 Start the engine from the ground controls. Then move the engine idle control switch to high idle (rabbit symbol) and hold in the ON position.

⊙ Result: The engine should change to high idle.

3 Release the engine idle control switch.

⊙ Result: The engine should return to low idle.

4 Turn the key switch to platform controls.

5 At the platform controls, move the engine idle control switch to high idle (rabbit symbol).

⊙ Result: The engine should change to high idle.

6 Move the engine idle control switch to low idle (turtle symbol).

⊙ Result: The engine should change to low idle.

7 Move the engine idle control switch to foot switch activated high idle (rabbit and foot switch symbol).

⊙ Result: The engine should **not** change to high idle.

8 Press down the foot switch.

⊙ Result: The engine should change to high idle.

TABLE B PROCEDURES

B-21
Test the Fuel Select Operation - Kubota Gas Models

The ability to select and switch between gasoline and LPG fuels as needed is essential to safe machine operation. A fuel selection can be made when the engine is running or not. Switching malfunctions and/or the failure of the engine to start and run properly in both fuel modes and through all idle speeds can indicate fuel system problems that could develop into a hazardous situation.

NOTICE Perform this test after checking the gasoline and LPG fuel levels, and warming the engine to normal operating temperature.

1 Move the fuel select switch to gasoline and then move the engine idle control switch to foot switch activated high idle (rabbit and foot switch symbol).

2 Start the engine from the platform controls and allow it to run at low idle.

3 Press down the foot switch to allow the engine to run at high idle.

⊙ Result: The engine should start promptly and operate smoothly in low and high idle.

4 Release the foot switch and stop the engine.

5 Move the fuel select switch to LPG.

6 Restart the engine and allow it to run at low idle.

7 Press down the foot switch to allow the engine to run at high idle.

⊙ Result: The engine should start promptly and operate smoothly in low and high idle.

NOTICE The engine may hesitate momentarily and then continue to run on the selected fuel if the fuel source is switched while the engine is running.

B-22
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.

1 **Engine models**: Start the engine from the platform controls.

DC models: 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.

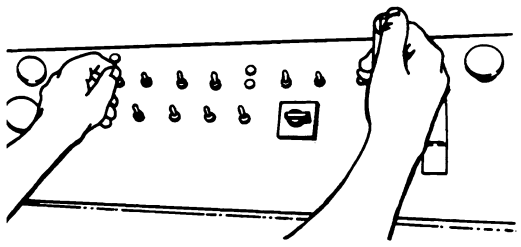
2 Rotate the turntable to the right until the primary boom is past the right steer wheel.

⊙ 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-23
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-9 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 **Engine models**: Start the engine from the platform controls.

DC models: 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 Select high range drive (machine on level surface symbol).

4 **Engine models:** Move the engine idle control switch to foot switch activated high idle (rabbit and foot switch).

5 Lower the boom into the stowed position.

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

7 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.

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

Braking: high range, paved surface	**DC models**	**Engine models**
Stopping distance	1.5 to 2 ft 0.45 to 0.6 m	4.5 to 5 ft 1.37 to 1.52 m

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

TABLE B PROCEDURES

B-24
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 **Engine models**: Start the engine from the platform controls.

DC models: 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 Select high range drive (machine on level surface symbol).

4 **Engine models**: Move the engine idle control switch to foot switch activated high idle (rabbit and foot switch).

5 Lower the boom into the stowed position.

6 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.

7 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.

8 Continue at full speed and note the time when the machine reference point passes over the finish line.

Drive speed: stowed position, high range	
Engine models	40 ft/7.8 sec 12.2m/7.8 sec
DC models	40 ft/11 sec 12.2m/11 sec

B-25
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 engine side turntable counterweight.

NOTICE The alarms and beacon will operate with the engine running or not running.

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.

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-26
Perform Hydraulic Oil Analysis

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

TABLE B PROCEDURES

B-27
Test the Turntable Rotation Stop

The turntable is capable of rotating the boom 359 degrees and is stopped midpoint between the steering 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 **Engine models**: Start the engine from the platform controls.

DC models: 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-28
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 engine side turntable cover and locate the electrical contactor(s) mounted on the component mounting panel.

2 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.

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 **Engine models**: Start the engine from the ground controls.

DC models: 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.

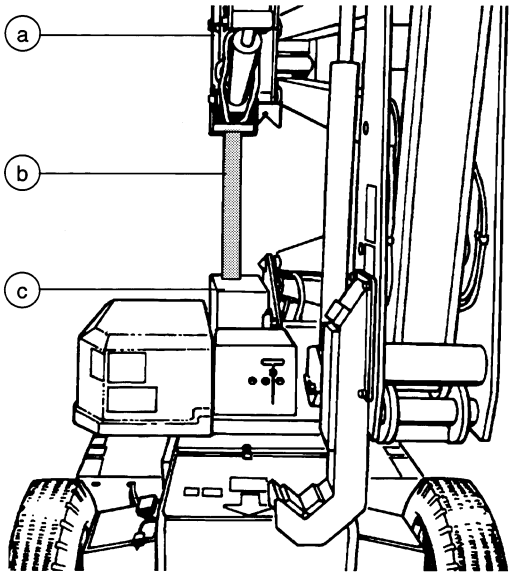
4 Extend and retract the primary boom through the entire range of motion to check for tight spots that could cause binding or scraping.

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.



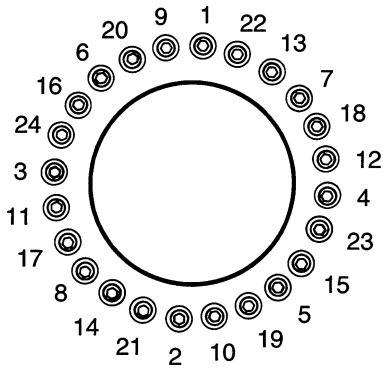
a upper mid-pivot
b 4x4x31 inch block
c counterweight

AWARNING 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.

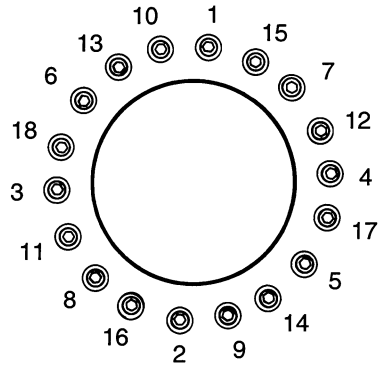
5 **DC models**: Use a forklift and remove both battery packs from the machine.

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.

11 **DC models:** Install the battery packs.

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.

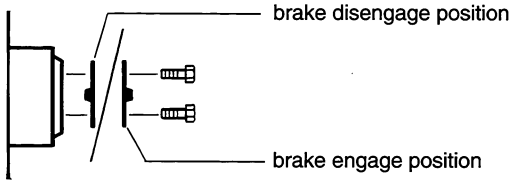
⚠WARNING Collision hazard. Select a work site that is firm and level.

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

2 Center a lifting jack of ample capacity (15000 lbs/6804 kg) under the drive chassis between the non-steering 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-steering wheel.

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

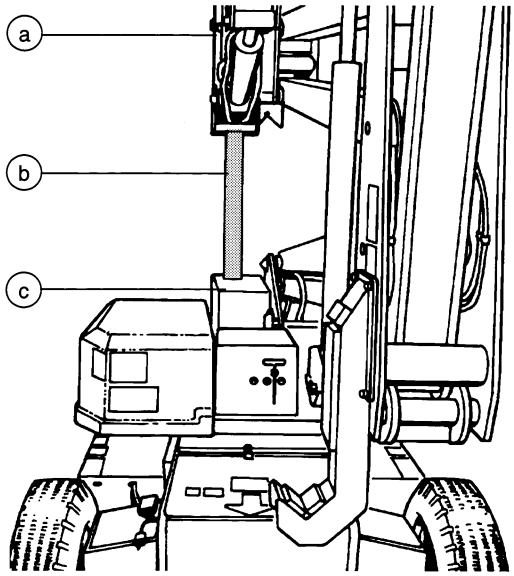
6 Re-engage the torque hubs by turning over the hub disconnect caps. Carefully remove the jack stands, lower the machine and remove the jack.

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

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 Raise the secondary boom and place a 4x4x31 inch (78 cm) block between the drive chassis counter-weight 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.

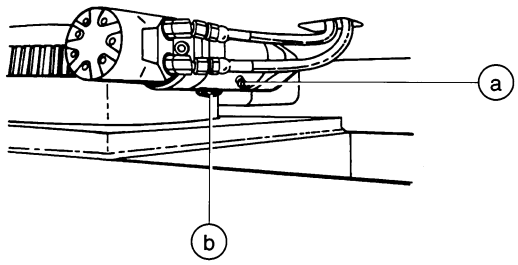
3 Locate the grease fitting on the inside of the bearing in the middle of the turntable.

4 Pump grease into the rotation bearing until you see it coming out of the bearing seal gap. Repeat this step with the platform in the following locations.

- platform over the non-steering wheels
- platform over the left side
- platform over the steering wheels
- platform over the right side

⚠WARNING Crushing hazard. Turn the key switch to the OFF position and remove the key while pumping the grease.

5 Locate the grease fitting on the worm drive housing.



a grease fitting
b grease overflow

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

Lubricant Type	Multipurpose grease

TABLE C PROCEDURES

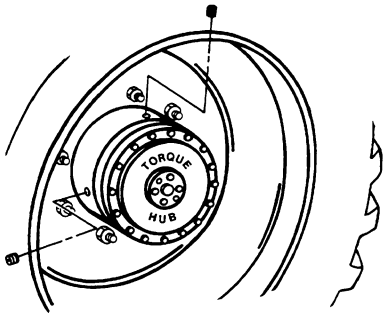
C-5
Replace the Torque Hub Oil

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.

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

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.

NOTICE Perform this procedure with the engine off.

1 Clean the area around the oil filter, the 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 **Engine models**: Start the engine from the ground controls.

DC models: 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.

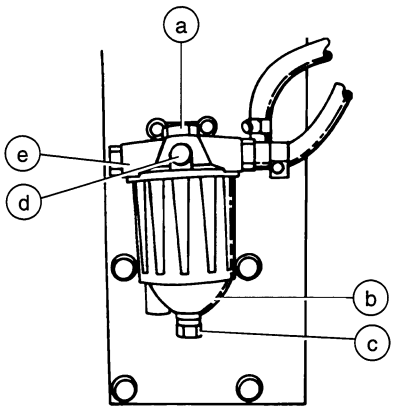
C-7
Replace the Diesel Fuel Filter - Kubota Diesel Models

Replacing the diesel fuel filter is essential to good engine performance and service life. A dirty or clogged filter may cause the engine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the filter be replaced more often.

⚠ DANGER Engine fuels are combustible. Replace the fuel filter in an open, well-ventilated area away from heater, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

NOTICE Perform this procedure with the engine off.

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



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

2 Place a container under the filter bowl. Then loosen the drain plug located at the bottom of the bowl. Completely drain the fuel.

3 Loosen the head bolt then rotate the filter bowl counterclockwise and remove it.

4 Remove the filter element from the bowl.

5 Apply a thin layer of oil onto the bowl gasket and then install the new filter element (Genie part no. 22942).

6 Tighten the drain plug and fill the bowl with clean diesel fuel.

7 Install the bowl onto the filter head, and then tighten the head bolt to 65 inch-pounds (7 Nm).

8 Tighten the vent plug.

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

10 Bleed the fuel system. Complete information to perform this procedure is available in the *Kubota D-905 Operator's Manual* (Kubota code number 16616-8916-1) Genie part number 31743.

10 Start the engine from the ground controls, then inspect the fuel filter/water separator and hoses for leaks.

⚠ DANGER If a fuel leak is discovered, keep any additional personnel from entering the area and do not operate the machine. Repair the leak immediately.

TABLE C PROCEDURES

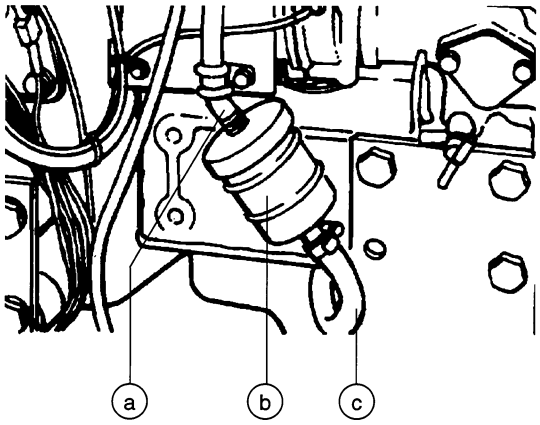
C-8
Replace the Gasoline Fuel Filter - Kubota Gas Models

Replacing the gasoline fuel filter is essential to good engine performance and service life. A dirty or clogged filter may cause the engine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the filter be replaced more often.

⚠ DANGER Engine fuels are combustible. Replace the fuel filter in an open, well-ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

NOTICE Perform this procedure with the engine off.

1 Disconnect the fuel hoses from the filter, then remove the filter.



Kubota Gas models
- a hose from the fuel filter to the carburetor
- b fuel filter
- c hose from the fuel filter to the fuel pump

2 Install the new fuel filter (Genie part no. 23168) with the flow direction arrow on the filter, pointing toward the carburetor. Then connect the fuel hoses to the filter.

3 Clean up any fuel that may have spilled during the replacement procedure.

4 Start the machine from the ground controls, then inspect the fuel filter and hoses for leaks.

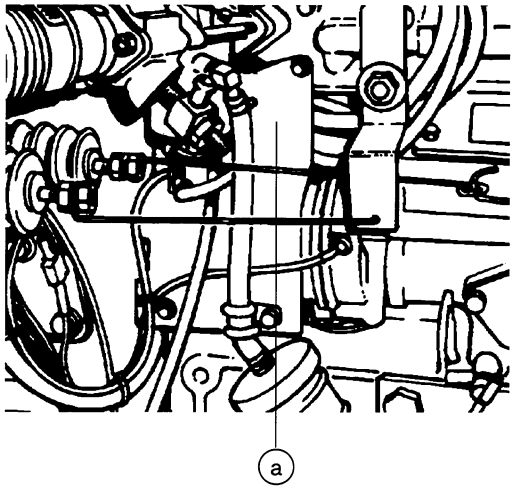
⚠ DANGER If a fuel leak is discovered, keep any additional personnel from entering the area and do not operate the machine. Repair the leak immediately.

C-9
Clean or Replace the Distributor Cap and Rotor - Kubota Gas Models

A distributor cap and rotor that are clean and free of damage, wear and corrosion are essential to good engine performance and service life. A dirty or worn cap and rotor may cause the engine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the cap and rotor be cleaned or replaced more often.

NOTICE Perform this procedure with the engine off.

1 Remove the cover from the side of the engine to access the distributor.



a distributor access cover

2 Label and disconnect the coil and spark plug wires from the distributor cap.

3 Remove the cap and rotor from the distributor.

4 Clean the cap and rotor using electrical contact cleaner or a damp cloth.

5 Completely dry the cap and rotor.

NOTICE Moisture in the distributor cap will cause the engine to run poorly.

6 Inspect the cap and rotor for corrosion, cracks and abrasion. Replace the cap and rotor if they are damaged.

7 Install the rotor and cap, then connect the coil and spark plug wires.

8 Start the engine and check for smooth operation.

TABLE C PROCEDURES

C-10
Replace the Spark Plugs - Kubota Gas Models

Periodic replacement of the spark plugs is essential to good engine performance and service life. Worn, loose or corroded spark plugs will cause the engine to perform poorly and may result in component damage.

NOTICE Perform this procedure with the engine off.

1 Label, then disconnect the plug wires from the spark plugs by grasping the molded boot. Do not pull on the plug wire.

2 Blow out any debris around spark plugs.

3 Remove all the spark plugs from the engine.

4 Adjust the gap on each new spark plug.

5 Install the new spark plugs, then connect the wires. Be sure that each spark plug wire is attached to the correct spark plug.

Spark plug specifications	
Spark plug type	NGKBCP4ES-11
Spark plug gap	0.039 to 0.043 inch 1.0 to 1.1 mm
Spark plug torque	14 to 18 ft-lbs 20 to 24 Nm

C-11
Check and Adjust the Air/LPG Mixture - Kubota Gas Models

Maintaining the proper air-to-fuel mixture during liquid propane gas (LPG) operation is essential to good engine performance.

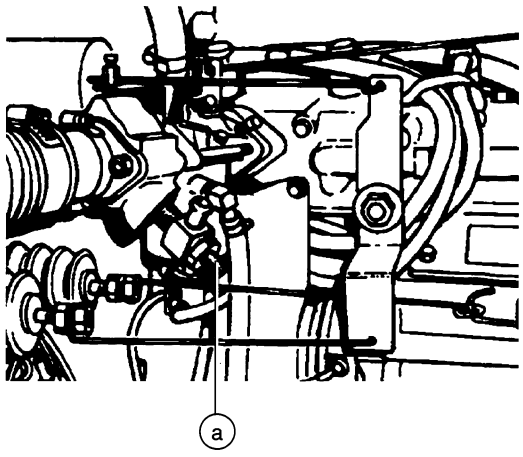
⚠ DANGER Engine fuels are combustible. Perform this procedure in an open, well-ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

NOTICE The engine rpm needs to be preset for gasoline fuel operation before adjusting the LPG idle mixture. Refer to B-12, *Check and Adjust the Engine RPM.*

NOTICE The engine should be warmed to normal operating temperature before performing this procedure.

1 Move the fuel select switch to LPG fuel and start the engine from the ground controls.

2 Loosen the high idle mixture adjustment lock nut.



a high idle mixture adjustment screw

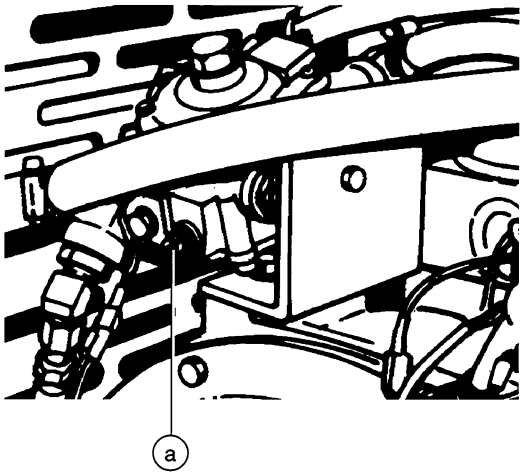
3 Load the system by pressing the primary boom retract switch with the primary boom fully retracted, then move the engine idle control switch to high idle (rabbit symbol).

4 Adjust the high idle adjustment screw to obtain an air-to-fuel mixture ratio of 13.0:1 to 13.2:1, using an exhaust gas analyzer.

NOTICE If an exhaust gas analyzer is not available, adjust to obtain peak or optimum rpm.

5 Hold the adjustment screw and tighten the lock nut.

6 Move the engine idle control switch to low idle (turtle symbol) and adjust the low idle screw to obtain an air-to-fuel mixture ratio of 13.0:1 to 13.2:1.



a low idle mixture adjustment screw

C-12
Check and Adjust the Ignition Timing - Kubota Gas Models

Complete information to perform this procedure is available in the *Kubota WG-750 Workshop Manual* (Kubota number: 07909-602030). Genie part number 31741.

C-13
Check the Engine Valve Clearance - Kubota Gas Models

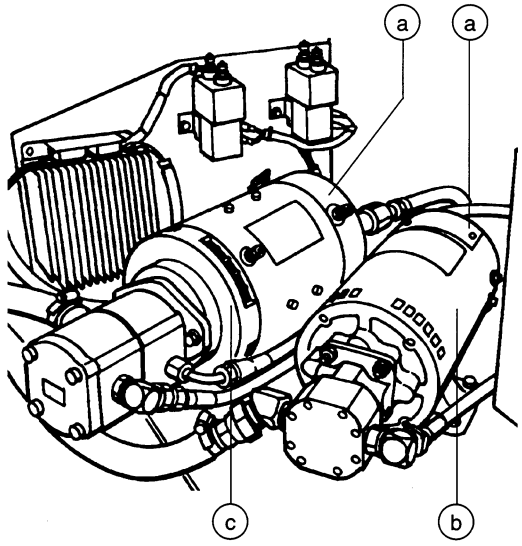
Complete information to perform this procedure is available in the *Kubota WG-750 Workshop Manual* (Kubota number: 07909-602030). Genie part number 31741.

C-14
Check the Electric Motor Brushes

Maintaining the electric motors in good condition is essential to good machine performance and service life. Failure to find and replace damaged brushes could result in unsafe operating conditions and may cause component damage.

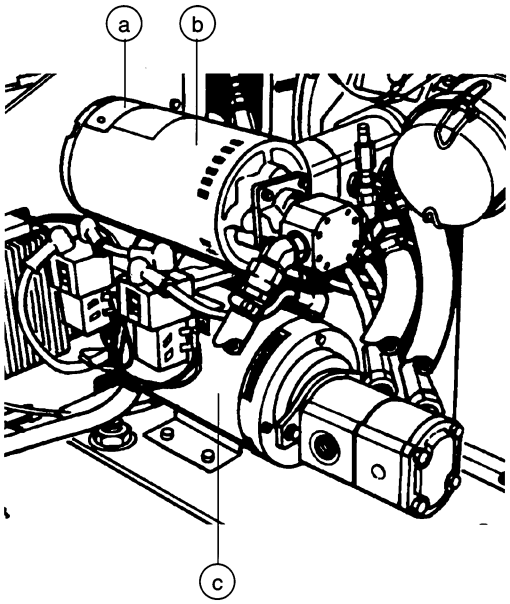
⚠CAUTION The motor brushes are spring loaded during installation. Wear safety glasses when removing springs.

1 Remove the inspection cover from the drive and lift electric motors.



DC models
a inspection cover
b lift motor
c drive motor

TABLE C PROCEDURES



Bi-fuel and Tri-fuel models
a inspection cover
b lift motor
c drive motor

2 Visually inspect the motor brushes for the following:

- excessive burns
- excessive arcs
- excessive pitting
- brushes are in contact with commutator

NOTICE Replace the brushes if any damage is found.

3 Measure the length of each brush. If the length of the brush is less than minimum specification, replace the brush.

Brush length wear limit	Min	Max
Drive motor	0.62 in 16 mm	1.35 in 35 mm
Lift motor	0.62 in 16 mm	1.25 in 32 mm

C-15
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 II 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 container. See capacity specifications listed below.

3 Disconnect and cap the two suction hoses that are attached to the hydraulic tank.

4 Remove the strainer assemblies from the tank.

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

6 Apply pipe thread sealant to the strainer mounting threads, and then install them.

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 II equivalent
Hydraulic tank capacity		
DC models	17.7 gallons	67 liters
Engine models	22.5 gallons	85 liters
Hydraulic system (including tank)		
DC models	24 gallons	90.8 liters
Engine models	29 gallons	109 liters

TABLE D PROCEDURES

D-2
Change or Recondition the Engine Coolant - Engine Models

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

⚠CAUTION Beware of hot engine parts and coolant. Contact with hot engine parts and/or coolant will cause severe burns.

NOTICE Perform this procedure with the engine off and cooled.

1 Put on protective clothing and eye wear.

2 Disconnect the coolant return hose at the radiator and drain the coolant return tank.

3 Remove the radiator cap from the radiator.

4 Open the petcock on the radiator and allow all the coolant to drain into a container.

5 After all the coolant has drained, close the petcock. Connect the coolant return hose to the radiator.

6 Open the petcock on the engine block and allow the coolant to drain into a container. After the fluid is drained, close the petcock.

7 Replace all coolant hoses and clamps.

8 Pour the proper coolant mixture (anti-freeze and water) for your climate into the radiator until it is full.

9 Clean up any coolant spilled during this procedure.

10 Start the engine from the ground controls, run it for 30 seconds, and then turn it off.

11 Inspect for leaks and then check the fluid level in the coolant recovery tank. Add water if needed.

Coolant capacity		
Kubota WG-750	3.1 quarts	2.9 liters
Kubota D-905	3.3 quarts	3.1 liters

12 Start the engine from the ground controls and run it until reaching normal operating temperature.

13 Allow engine to cool and check the fluid level in the coolant recovery tank. Add water if needed.

TABLE D PROCEDURES

D-3
Change the Fuel Lines - Engine Models

Maintaining the fuel lines in good condition is essential to safe operation and good engine performance. Failure to detect a worn, cracked or leaking fuel line may cause an unsafe operating condition.

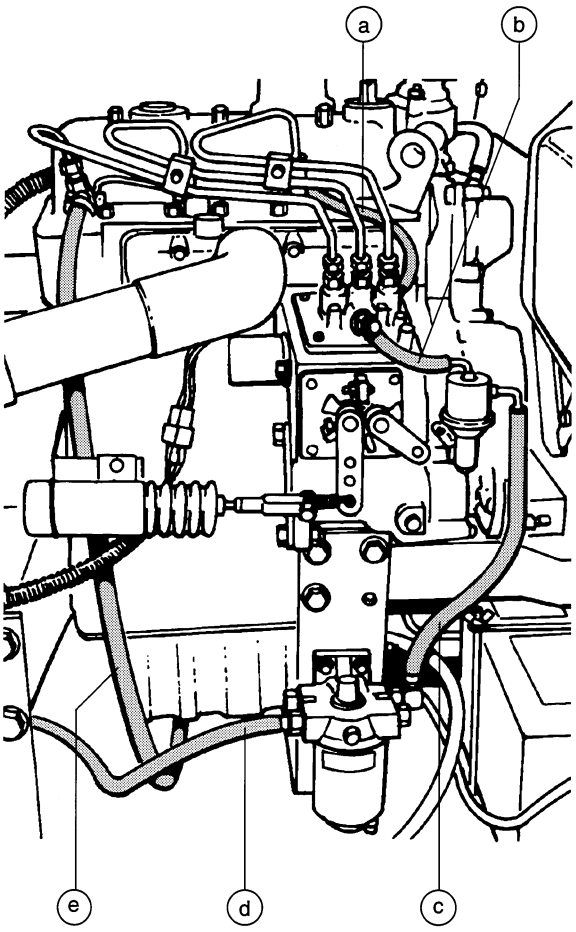
⚠ DANGER Engine fuels are combustible. Replace the fuel lines in an open, well-ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

NOTICE Perform this procedure with the engine off.

1 Close the manual fuel shutoff valve, located next to the fuel tank.

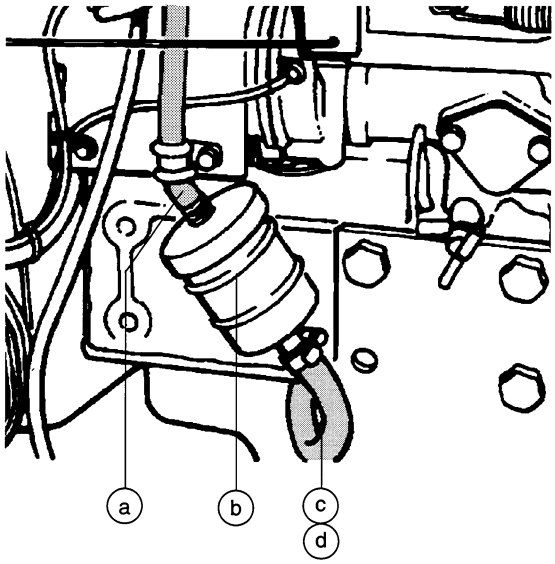
2 Remove and replace the fuel line hoses and clamps according to the following illustrations:

⚠ DANGER Fuel may be expelled under pressure. Wrap a cloth around fuel hoses to absorb leaking fuel before disconnecting them.



Kubota Diesel models
- a hose from the injection pump to the injectors
- b hose from the fuel pump to the injection pump
- c hose from the fuel filter to the fuel pump
- d hose from the fuel tank to the fuel filter
- e hose from the injector to the fuel tank

TABLE D PROCEDURES



Kubota Gas models
- a hose from the fuel filter to the carburetor
- b fuel filter
- c hose from the fuel filter to the fuel pump
- d hose from the fuel pump to the fuel shutoff valve (not shown)

3 Clean up any fuel that may have spilled during this procedure.

4 Start the engine from the ground controls, then inspect the fuel filter and hoses for leaks.

⚠ DANGER If a fuel leak is discovered, keep any additional personnel from entering the area and do not operate the machine. Repair the leak immediately.

NOTICE Once air has been introduced into the diesel fuel injection system, the injectors must be bled before the engine is restarted. Refer to the Kubota Operators Manual (Kubota 16616-8916-1) for information on how to bleed the fuel system (Genie part no. 31743).

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 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

Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions printed in the *Genie Z-45/22 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 primary or secondary boom hydraulic component, always support the structure and secure it from movement.

⚠DANGER Electrocution hazard. Contact with hot or live 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

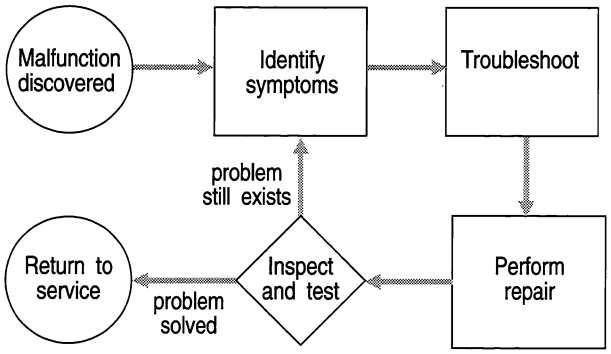


Chart 1

All Functions Will Not Operate - DC models

Be sure the keyswitch is in the appropriate position.

Be sure the emergency stop buttons are pulled up to the on position.

Be sure the circuit breaker(s) are not tripped.

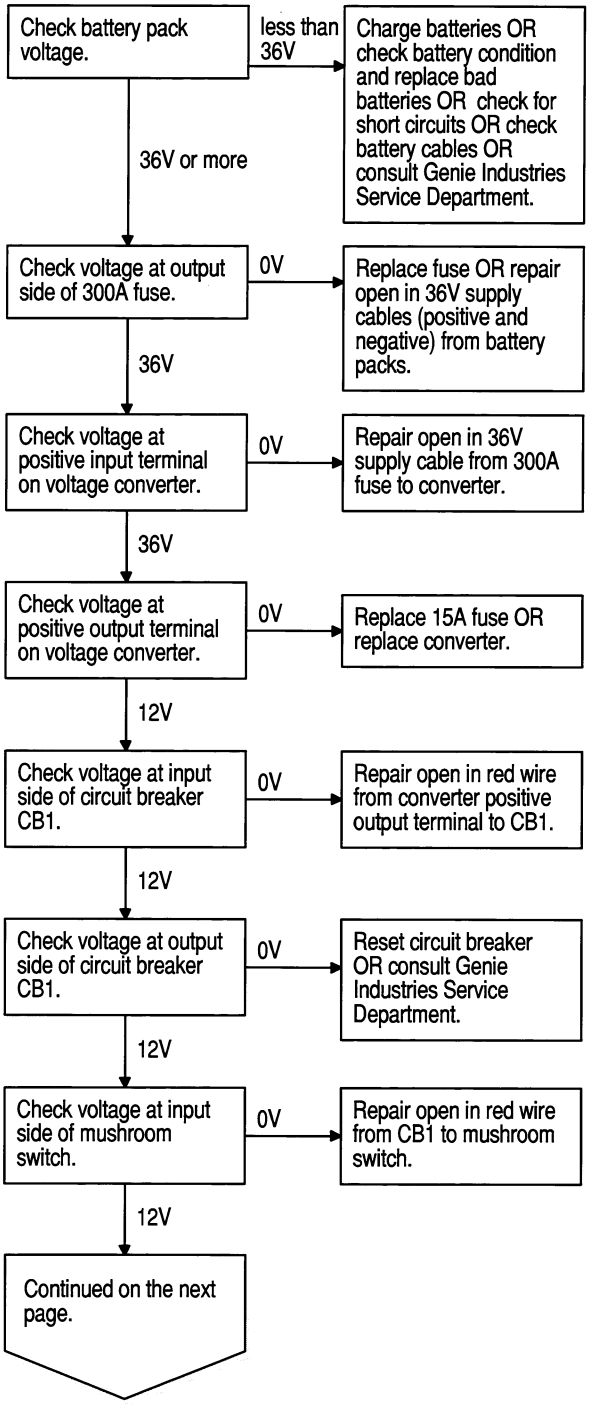


CHART 1

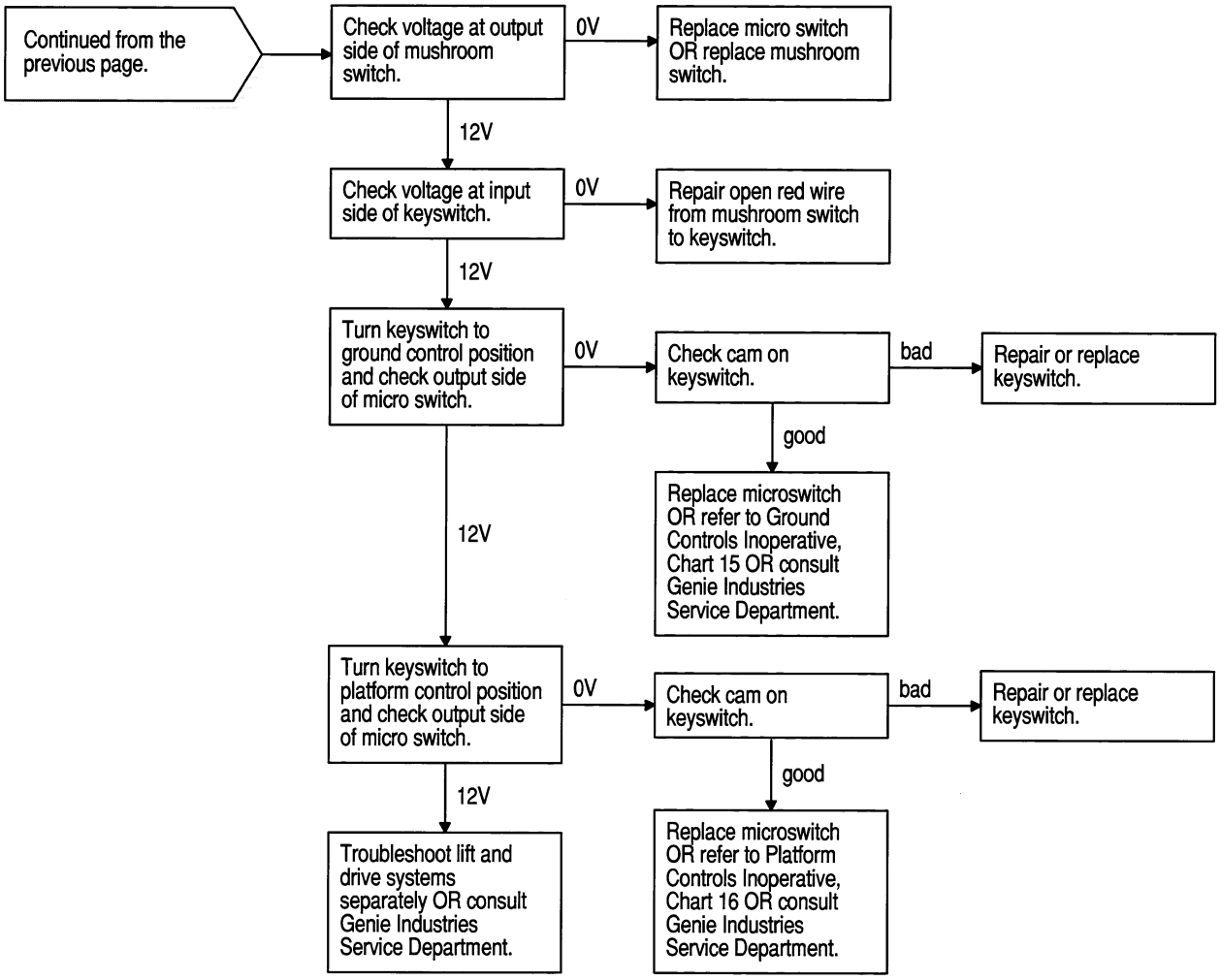

Continued from the previous page.
Check voltage at output side of mushroom switch.
0V
Replace micro switch OR replace mushroom switch.
12V
Check voltage at input side of keyswitch.
0V
Repair open red wire from mushroom switch to keyswitch.
12V
Turn keyswitch to ground control position and check output side of micro switch.
0V
Check cam on keyswitch.
bad
Repair or replace keyswitch.
good
Replace microswitch OR refer to Ground Controls Inoperative, Chart 15 OR consult Genie Industries Service Department.
12V
Turn keyswitch to platform control position and check output side of micro switch.
0V
Check cam on keyswitch.
bad
Repair or replace keyswitch.
good
12V
Troubleshoot lift and drive systems separately OR consult Genie Industries Service Department.
Replace microswitch OR refer to Platform Controls Inoperative, Chart 16 OR consult Genie Industries Service Department.

Chart 2

Lift Pump Motor Will Not Operate - DC Models

Be sure all other functions operate normally.

Be sure key switch is in the appropriate position and the emergency stop buttons are pulled up to the on position.

Be sure engine is not running when using DC power.

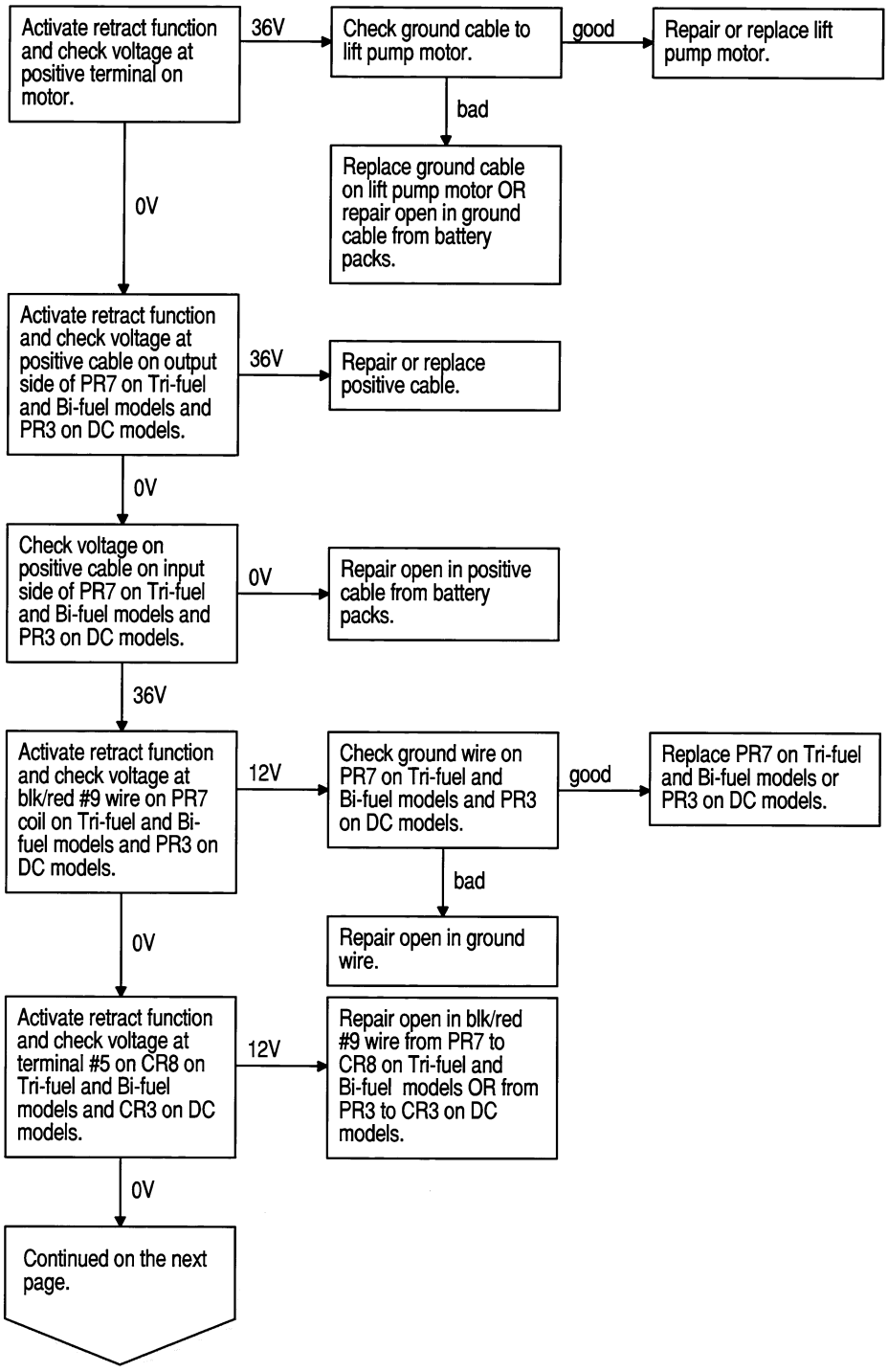


CHART 2

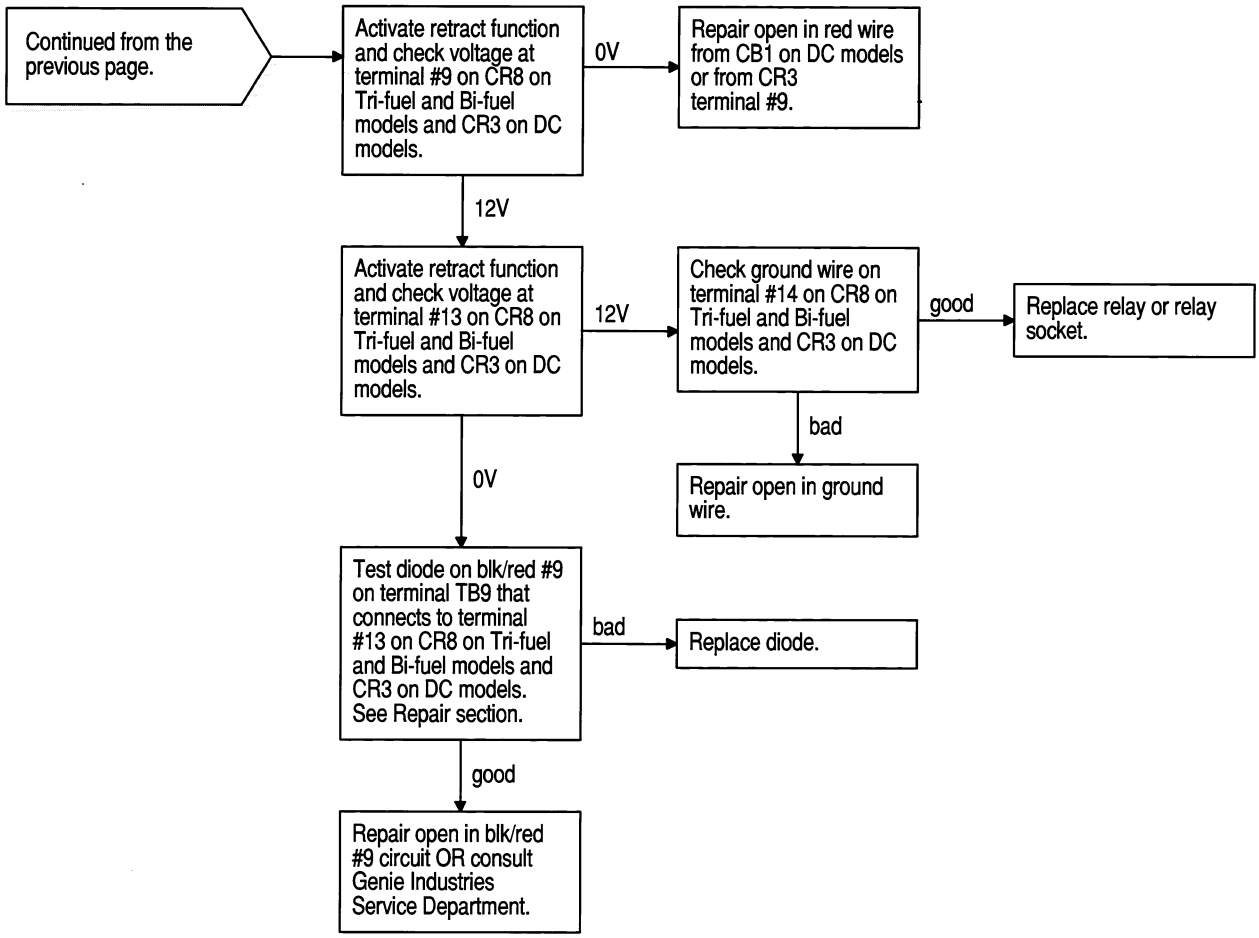

Continued from the previous page.
Activate retract function and check voltage at terminal #9 on CR8 on Tri-fuel and Bi-fuel models and CR3 on DC models.
0V
Repair open in red wire from CB1 on DC models or from CR3 terminal #9.
12V
Activate retract function and check voltage at terminal #13 on CR8 on Tri-fuel and Bi-fuel models and CR3 on DC models.
12V
Check ground wire on terminal #14 on CR8 on Tri-fuel and Bi-fuel models and CR3 on DC models.
good
Replace relay or relay socket.
bad
Repair open in ground wire.
0V
Test diode on blk/red #9 on terminal TB9 that connects to terminal #13 on CR8 on Tri-fuel and Bi-fuel models and CR3 on DC models. See Repair section.
bad
Replace diode.
good
Repair open in blk/red #9 circuit OR consult Genie Industries Service Department.

Chart 3

Drive Pump Motor Will Not Operate - DC Models

Be sure all other functions operate normally.

Be sure keyswitch is in platform position and the emergency stop buttons are pulled up to the on position.

Perform these tests with your foot activating the footswitch.

Be sure engine is not running when using DC power.

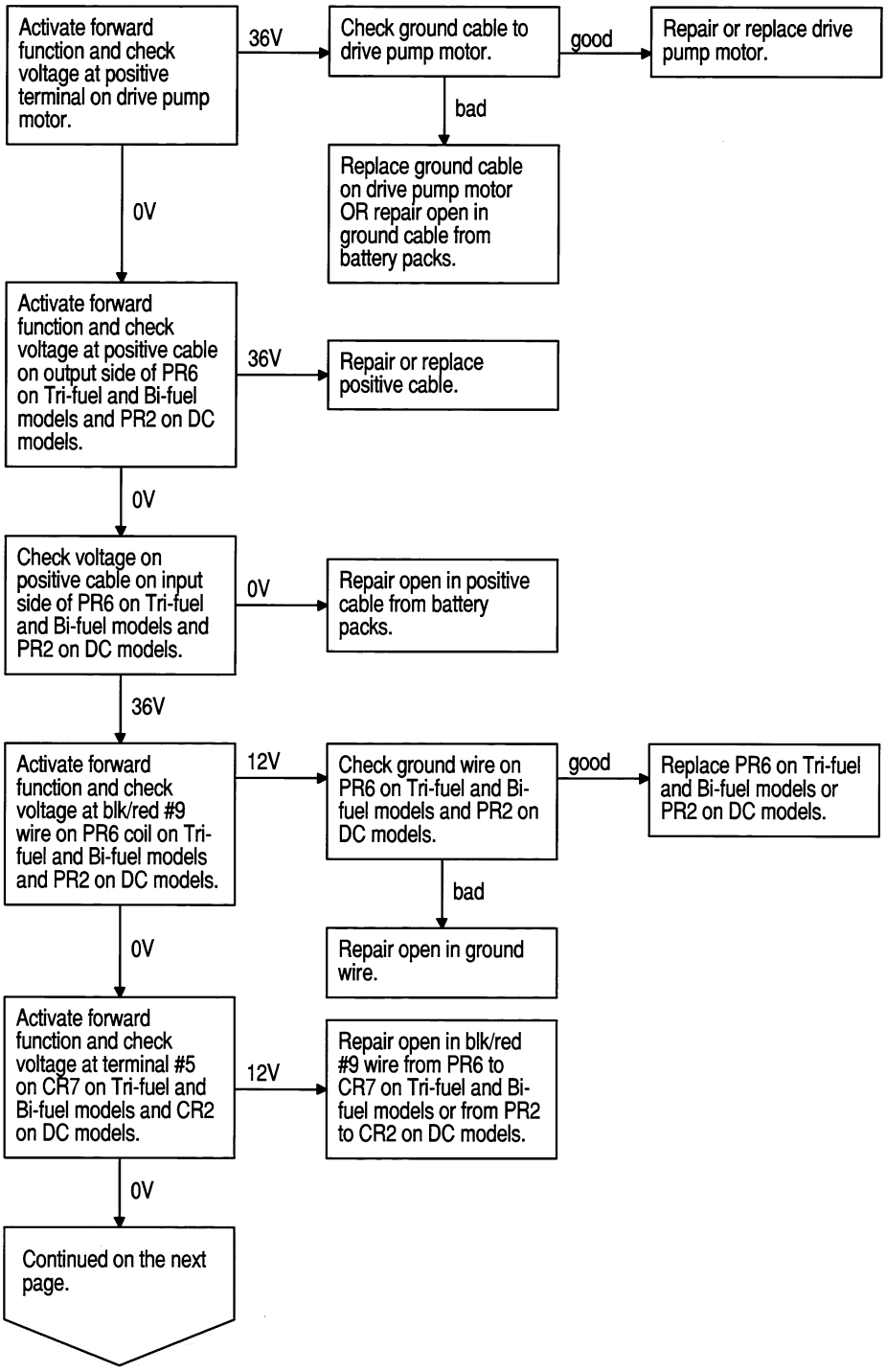


CHART 3

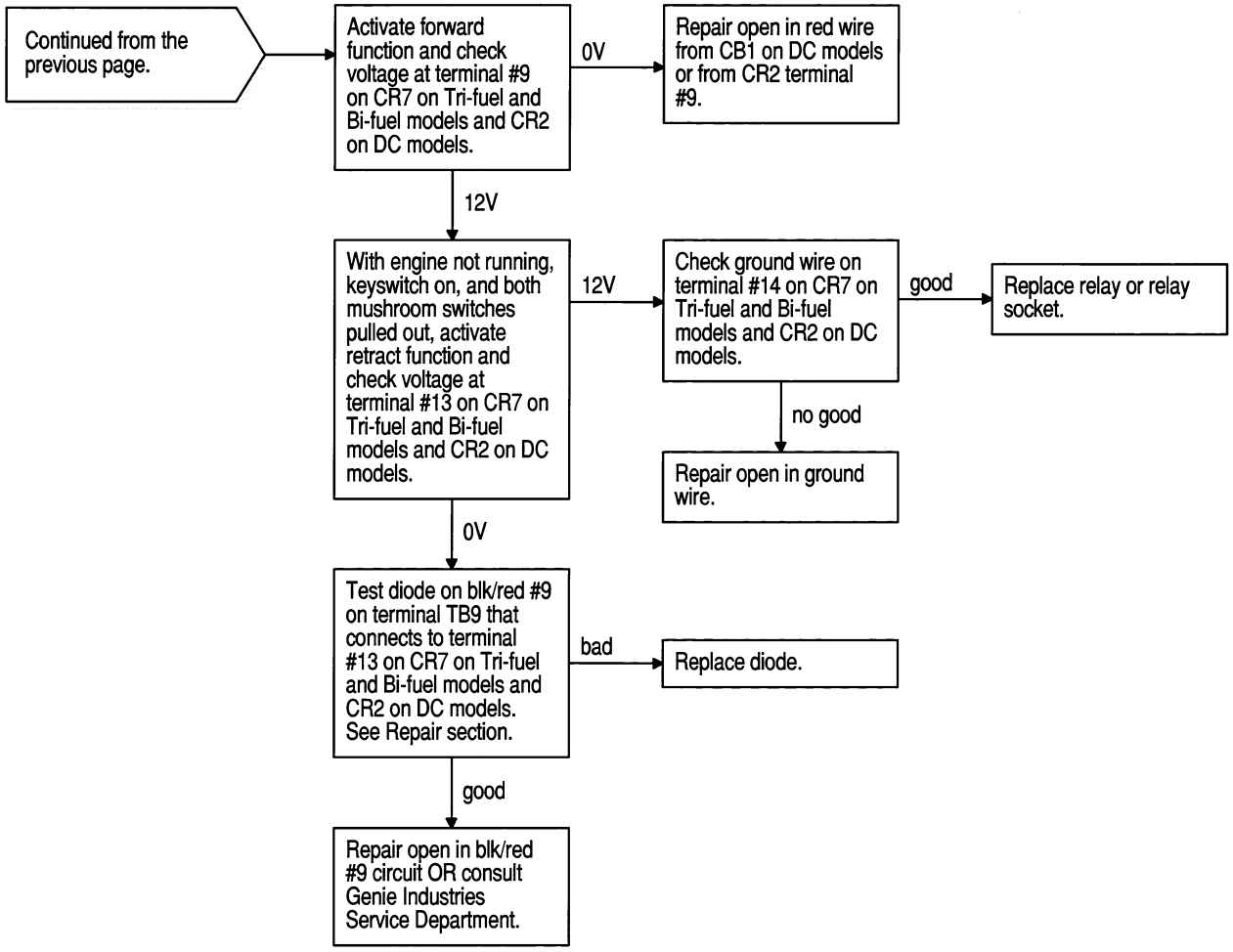

Continued from the previous page.
Activate forward function and check voltage at terminal #9 on CR7 on Tri-fuel and Bi-fuel models and CR2 on DC models.
0V
Repair open in red wire from CB1 on DC models or from CR2 terminal #9.
12V
With engine not running, keyswitch on, and both mushroom switches pulled out, activate retract function and check voltage at terminal #13 on CR7 on Tri-fuel and Bi-fuel models and CR2 on DC models.
12V
Check ground wire on terminal #14 on CR7 on Tri-fuel and Bi-fuel models and CR2 on DC models.
good
Replace relay or relay socket.
no good
Repair open in ground wire.
0V
Test diode on blk/red #9 on terminal TB9 that connects to terminal #13 on CR7 on Tri-fuel and Bi-fuel models and CR2 on DC models. See Repair section.
bad
Replace diode.
good
Repair open in blk/red #9 circuit OR consult Genie Industries Service Department.

Chart 4

Engine Choke Inoperative - Kubota Gasoline/LPG Models

Be sure fuel select switch is in the gasoline position.

Be sure choke solenoid to carburetor linkage is in place and properly attached.

Be sure choke solenoid plunger can be manually pushed into the solenoid and the linkage in turn rotates the choke plate linkage.

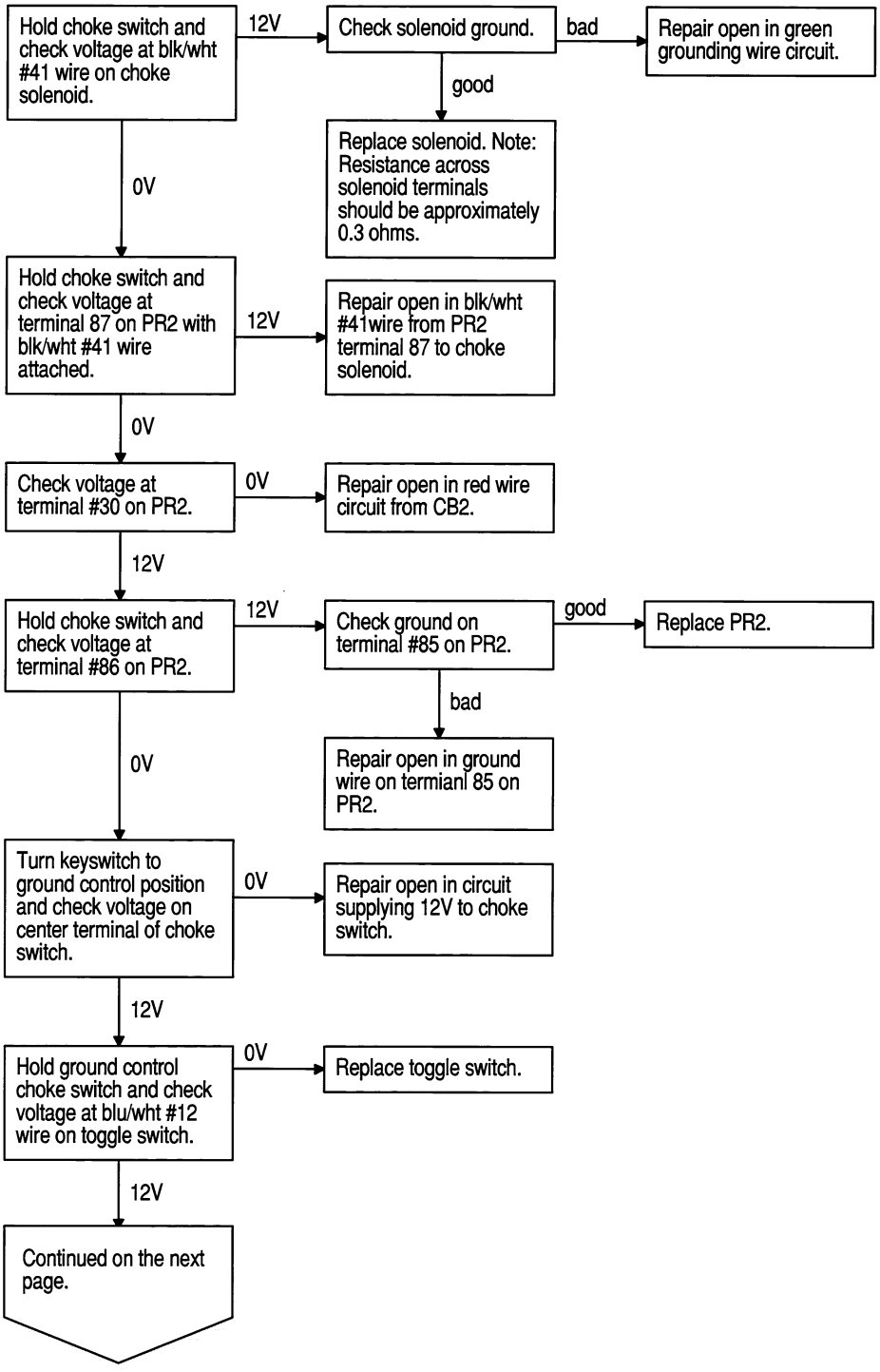


CHART 4

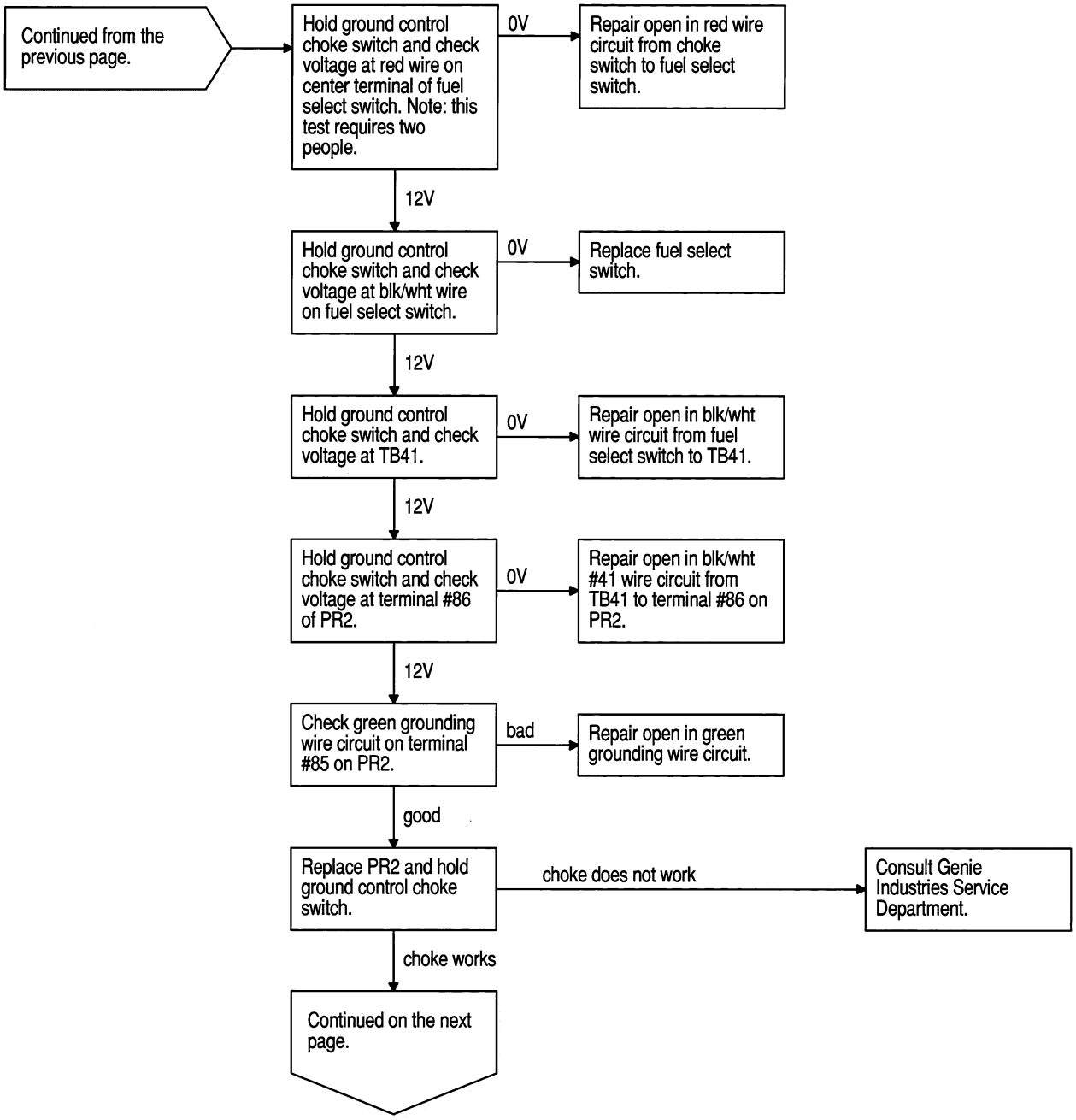

Continued from the previous page.
Hold ground control choke switch and check voltage at red wire on center terminal of fuel select switch. Note: this test requires two people.
0V
Repair open in red wire circuit from choke switch to fuel select switch.
12V
Hold ground control choke switch and check voltage at blk/wht wire on fuel select switch.
0V
Replace fuel select switch.
12V
Hold ground control choke switch and check voltage at TB41.
0V
Repair open in blk/wht wire circuit from fuel select switch to TB41.
12V
Hold ground control choke switch and check voltage at terminal #86 of PR2.
0V
Repair open in blk/wht #41 wire circuit from TB41 to terminal #86 on PR2.
12V
Check green grounding wire circuit on terminal #85 on PR2.
bad
Repair open in green grounding wire circuit.
good
Replace PR2 and hold ground control choke switch.
choke does not work
Consult Genie Industries Service Department.
choke works
Continued on the next page.

CHART 4

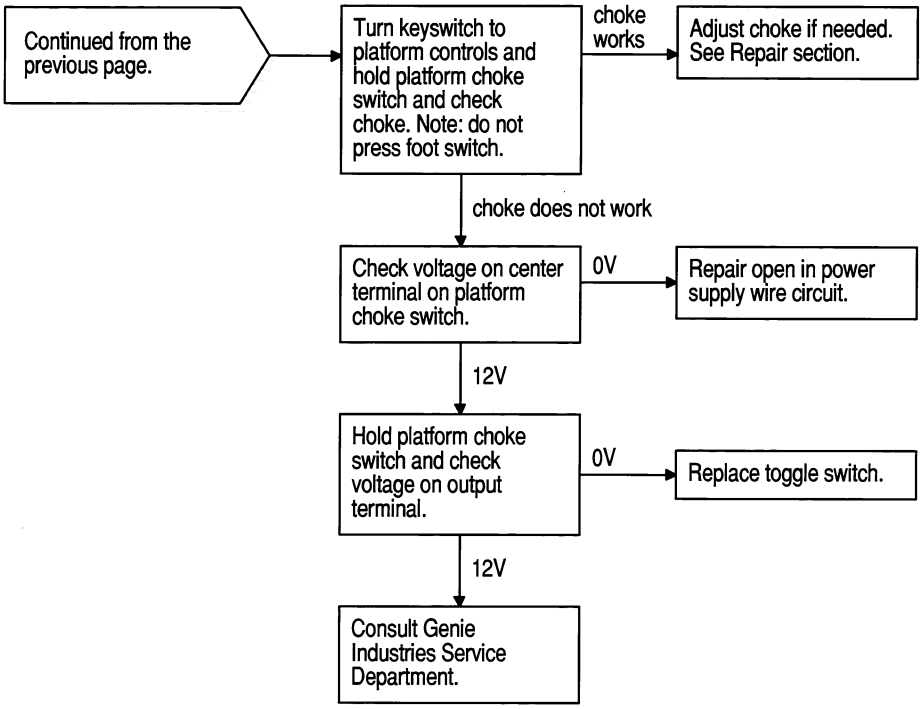

Continued from the previous page.
Turn keyswitch to platform controls and hold platform choke switch and check choke. Note: do not press foot switch.
choke works
Adjust choke if needed. See Repair section.
choke does not work
Check voltage on center terminal on platform choke switch.
0V
Repair open in power supply wire circuit.
12V
Hold platform choke switch and check voltage on output terminal.
0V
Replace toggle switch.
12V
Consult Genie Industries Service Department.

Chart 5

Engine Glow Plug Inoperative - Kubota Diesel Models

Be sure battery is fully charged.

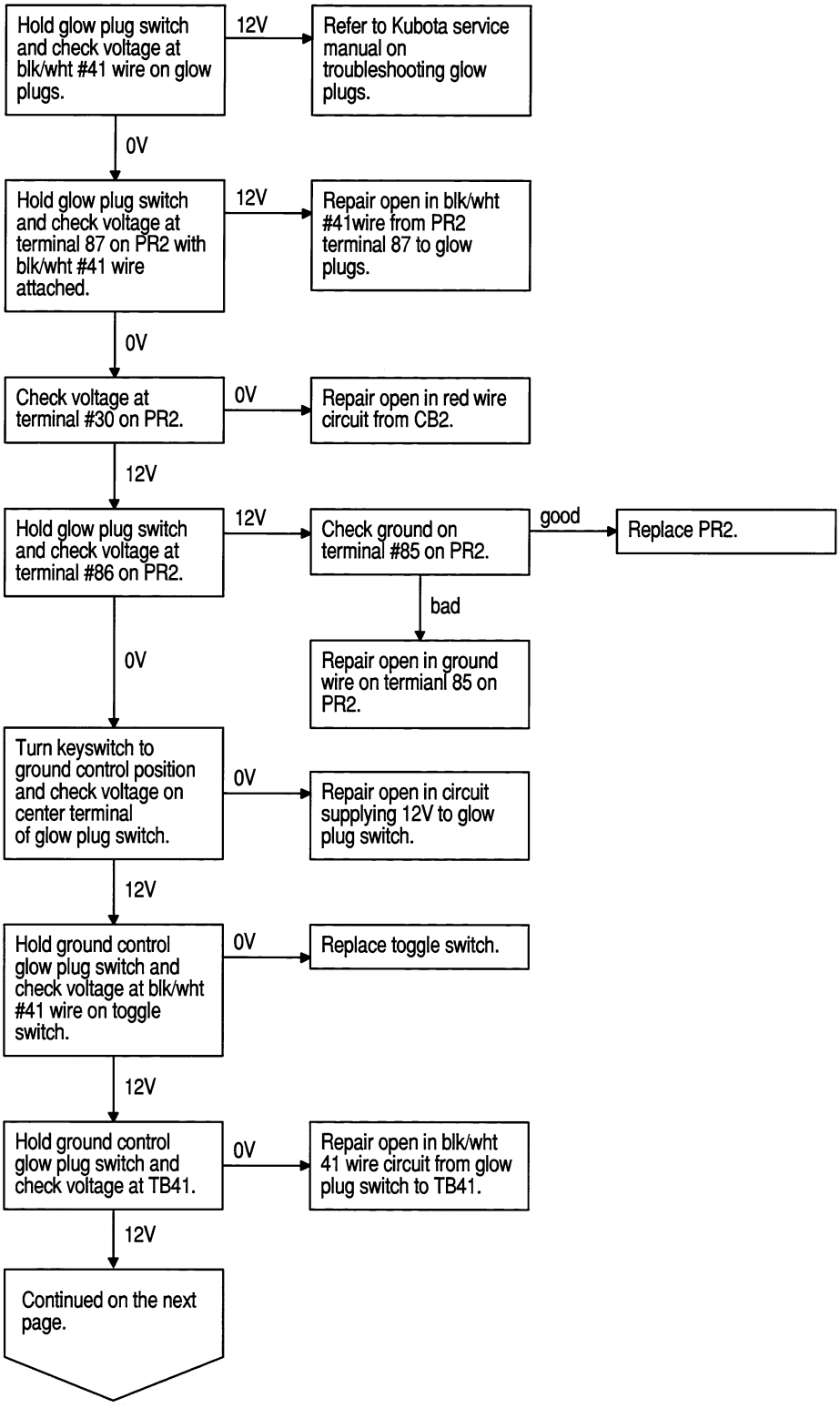


CHART 5

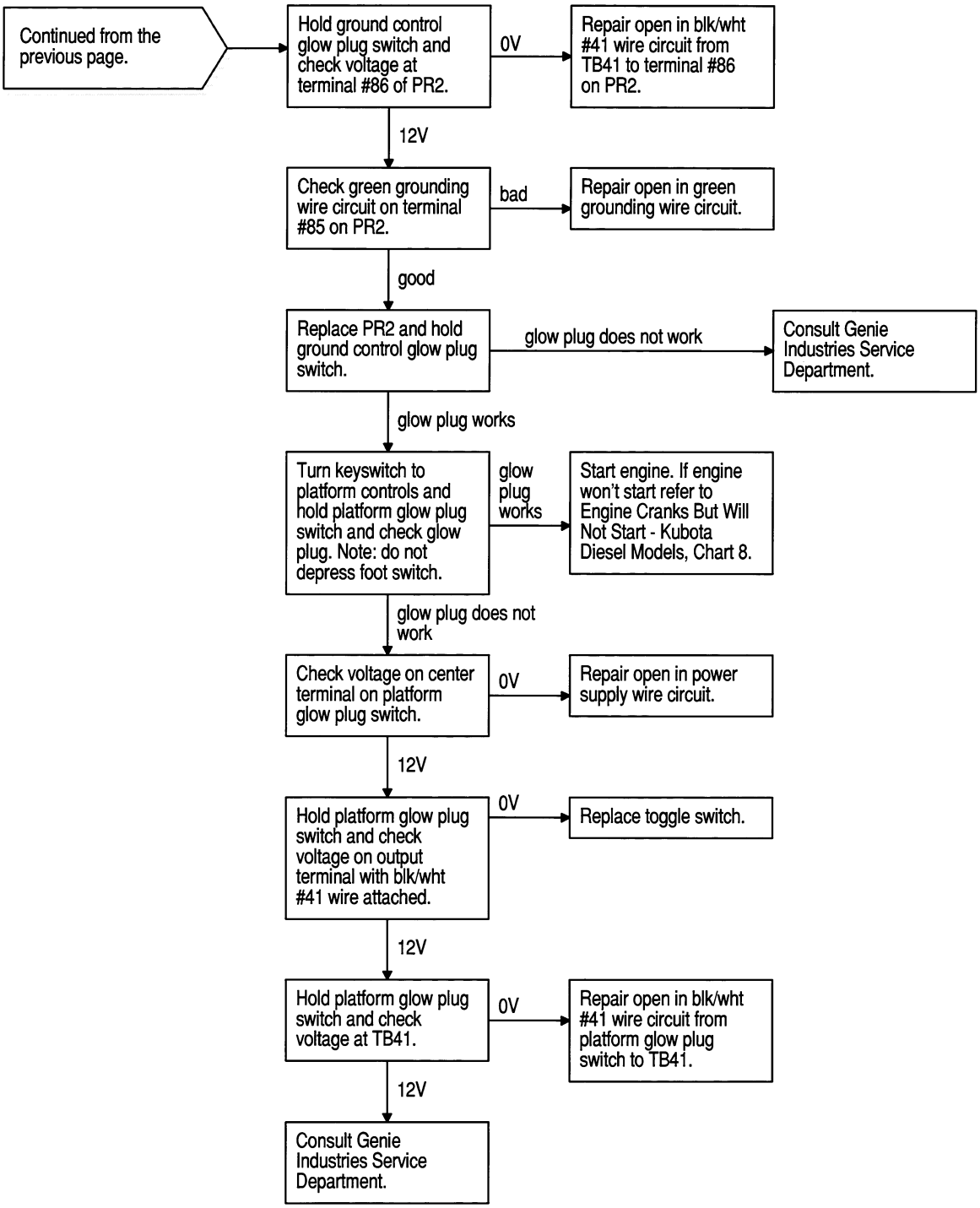

Continued from the previous page.
Hold ground control glow plug switch and check voltage at terminal #86 of PR2.
0V
Repair open in blk/wht #41 wire circuit from TB41 to terminal #86 on PR2.
12V
Check green grounding wire circuit on terminal #85 on PR2.
bad
Repair open in green grounding wire circuit.
good
Replace PR2 and hold ground control glow plug switch.
glow plug does not work
Consult Genie Industries Service Department.
glow plug works
Turn keyswitch to platform controls and hold platform glow plug switch and check glow plug. Note: do not depress foot switch.
glow plug works
Start engine. If engine won't start refer to Engine Cranks But Will Not Start - Kubota Diesel Models, Chart 8.
glow plug does not work
Check voltage on center terminal on platform glow plug switch.
0V
Repair open in power supply wire circuit.
12V
Hold platform glow plug switch and check voltage on output terminal with blk/wht #41 wire attached.
0V
Replace toggle switch.
12V
Hold platform glow plug switch and check voltage at TB41.
0V
Repair open in blk/wht #41 wire circuit from platform glow plug switch to TB41.
12V
Consult Genie Industries Service Department.

Chart 6

Engine Will Not Crank Over - Engine Models

Be sure the keyswitch is in the appropriate position.

Be sure the emergency stop buttons are pulled up to the on position.

Be sure the circuit breaker(s) are not tripped.

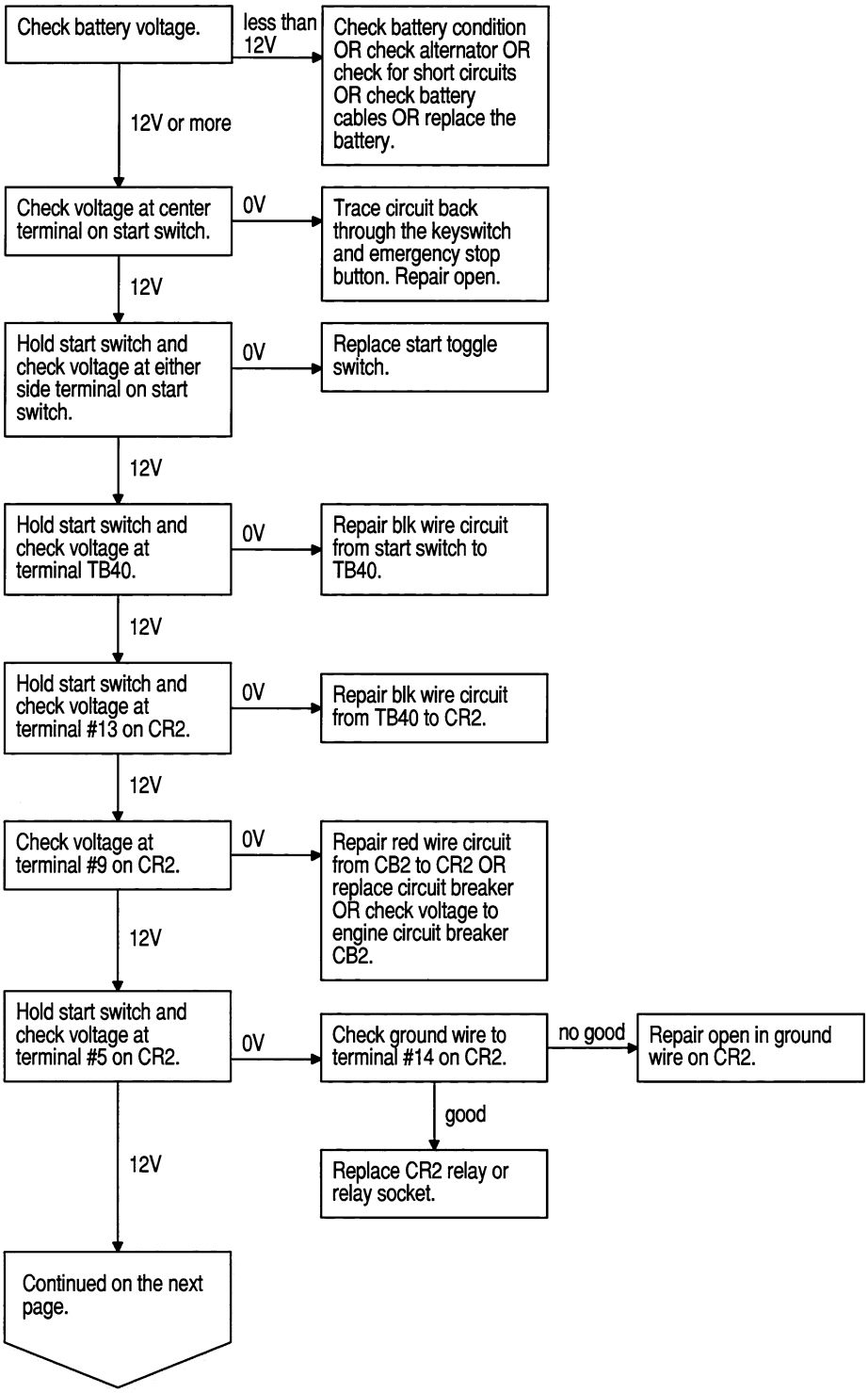


CHART 6

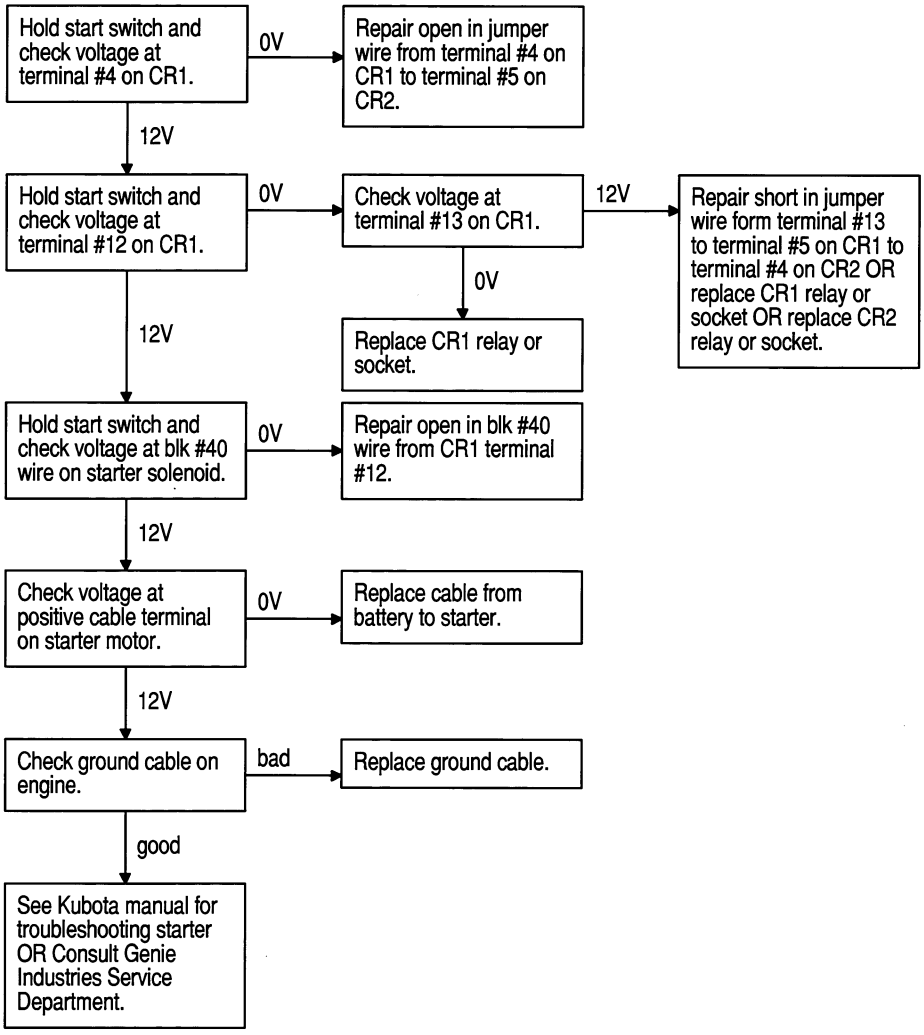

Hold start switch and check voltage at terminal #4 on CR1.
0V
Repair open in jumper wire from terminal #4 on CR1 to terminal #5 on CR2.
12V
Hold start switch and check voltage at terminal #12 on CR1.
0V
Check voltage at terminal #13 on CR1.
12V
Repair short in jumper wire form terminal #13 to terminal #5 on CR1 to terminal #4 on CR2 OR replace CR1 relay or socket OR replace CR2 relay or socket.
0V
Replace CR1 relay or socket.
12V
Hold start switch and check voltage at blk #40 wire on starter solenoid.
0V
Repair open in blk #40 wire from CR1 terminal #12.
12V
Check voltage at positive cable terminal on starter motor.
0V
Replace cable from battery to starter.
12V
Check ground cable on engine.
bad
Replace ground cable.
good
See Kubota manual for troubleshooting starter OR Consult Genie Industries Service Department.

Chart 7

Engine Cranks Over But Will Not Start - Kubota Gasoline/LPG Models

Be sure to check the engine oil level and fill as needed.

Be sure to check fuel levels and engine coolant level.

Be sure the gasoline shut-off valve is in the on position.

Be sure that automatic choke is not sticking closed.

Perform following tests in gasoline mode only.

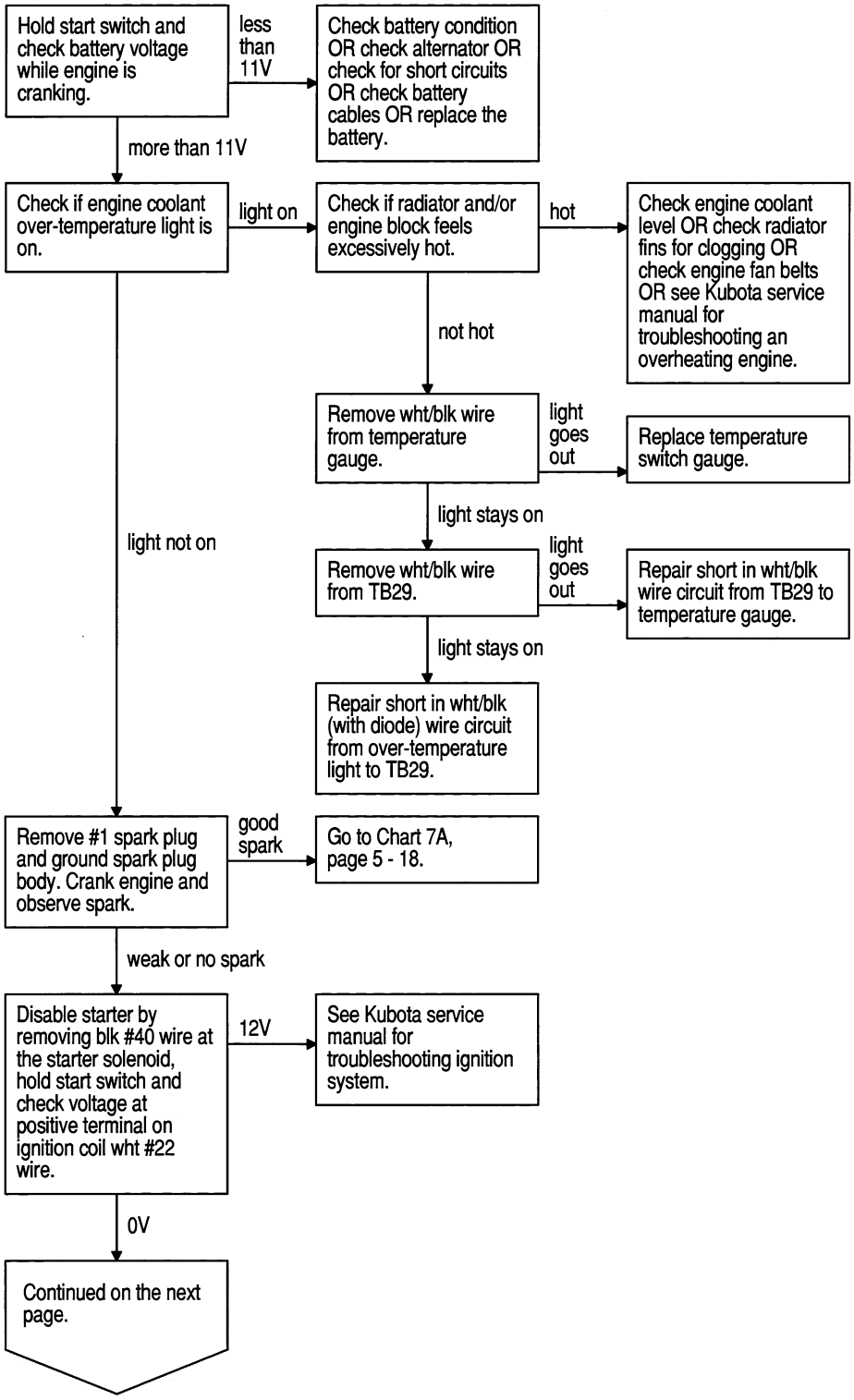


CHART 7

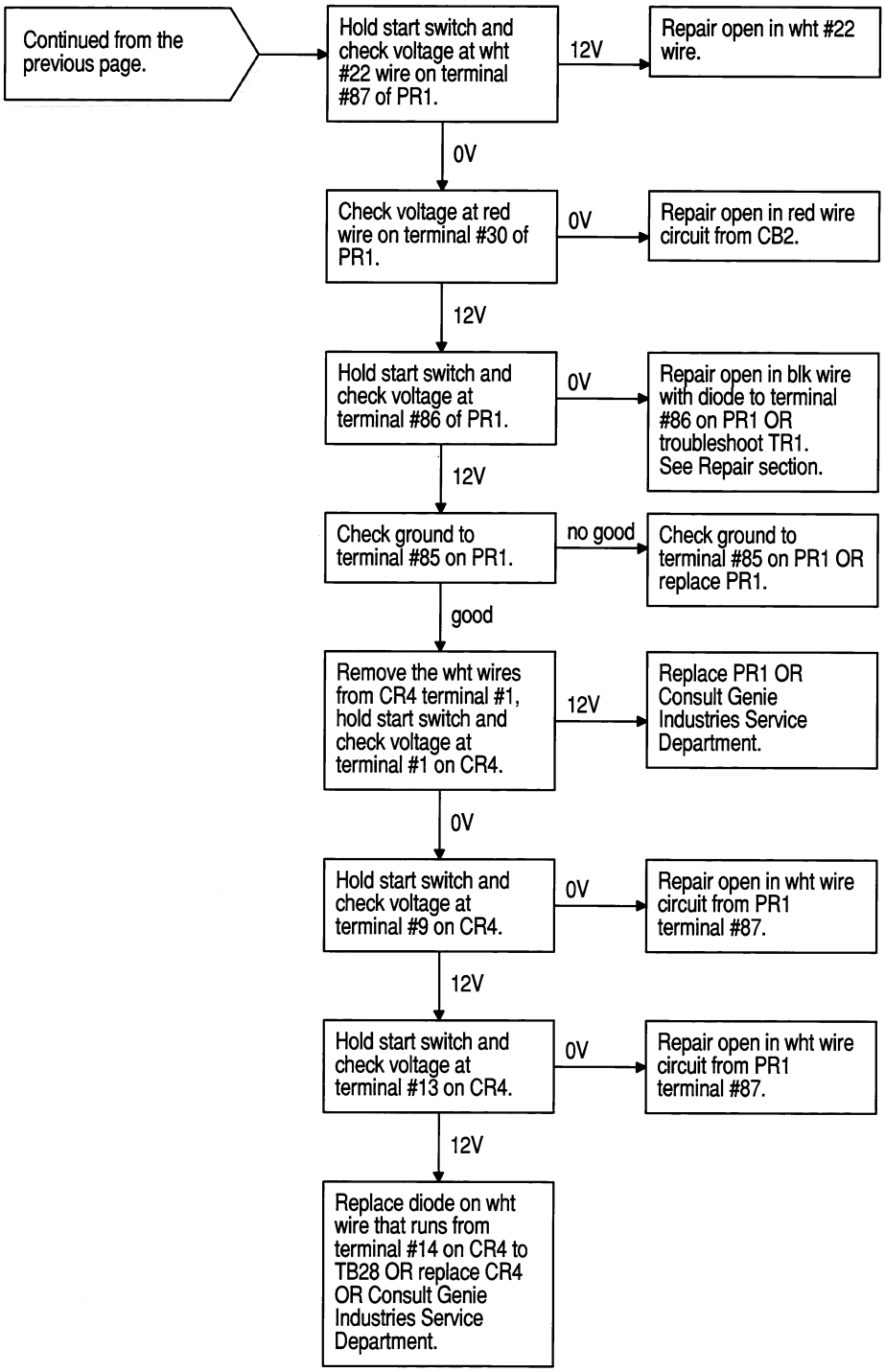

Continued from the previous page.
Hold start switch and check voltage at wht #22 wire on terminal #87 of PR1.
12V
Repair open in wht #22 wire.
0V
Check voltage at red wire on terminal #30 of PR1.
0V
Repair open in red wire circuit from CB2.
12V
Hold start switch and check voltage at terminal #86 of PR1.
0V
Repair open in blk wire with diode to terminal #86 on PR1 OR troubleshoot TR1. See Repair section.
12V
Check ground to terminal #85 on PR1.
no good
Check ground to terminal #85 on PR1 OR replace PR1.
good
Remove the wht wires from CR4 terminal #1, hold start switch and check voltage at terminal #1 on CR4.
12V
Replace PR1 OR Consult Genie Industries Service Department.
0V
Hold start switch and check voltage at terminal #9 on CR4.
0V
Repair open in wht wire circuit from PR1 terminal #87.
12V
Hold start switch and check voltage at terminal #13 on CR4.
0V
Repair open in wht wire circuit from PR1 terminal #87.
12V
Replace diode on wht wire that runs from terminal #14 on CR4 to TB28 OR replace CR4 OR Consult Genie Industries Service Department.

Chart 7A

Engine Cranks Over But Will Not Start - Kubota Gasoline/LPG Models

Continuation of "good spark" fault path from previous flow chart.

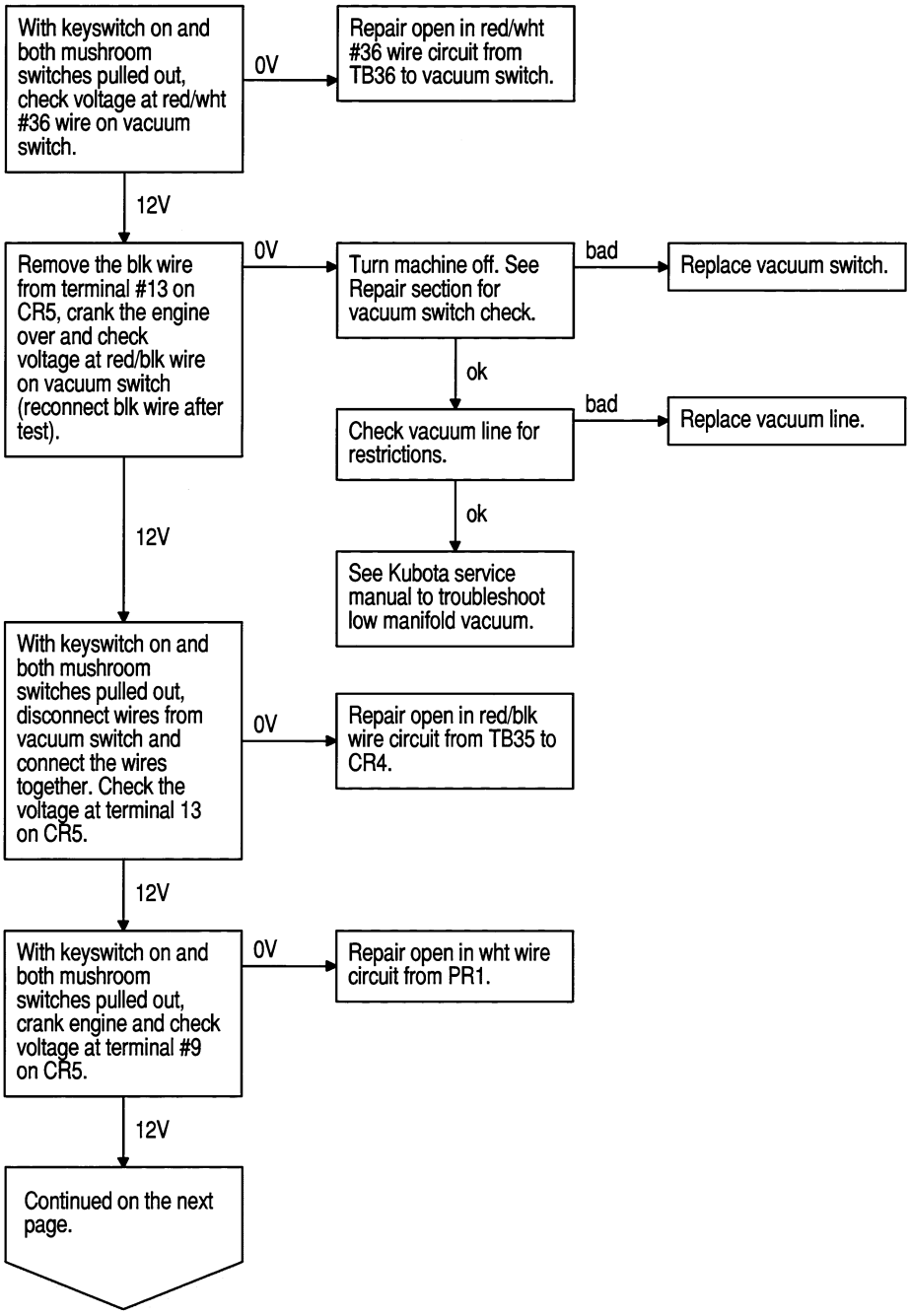


CHART 7A

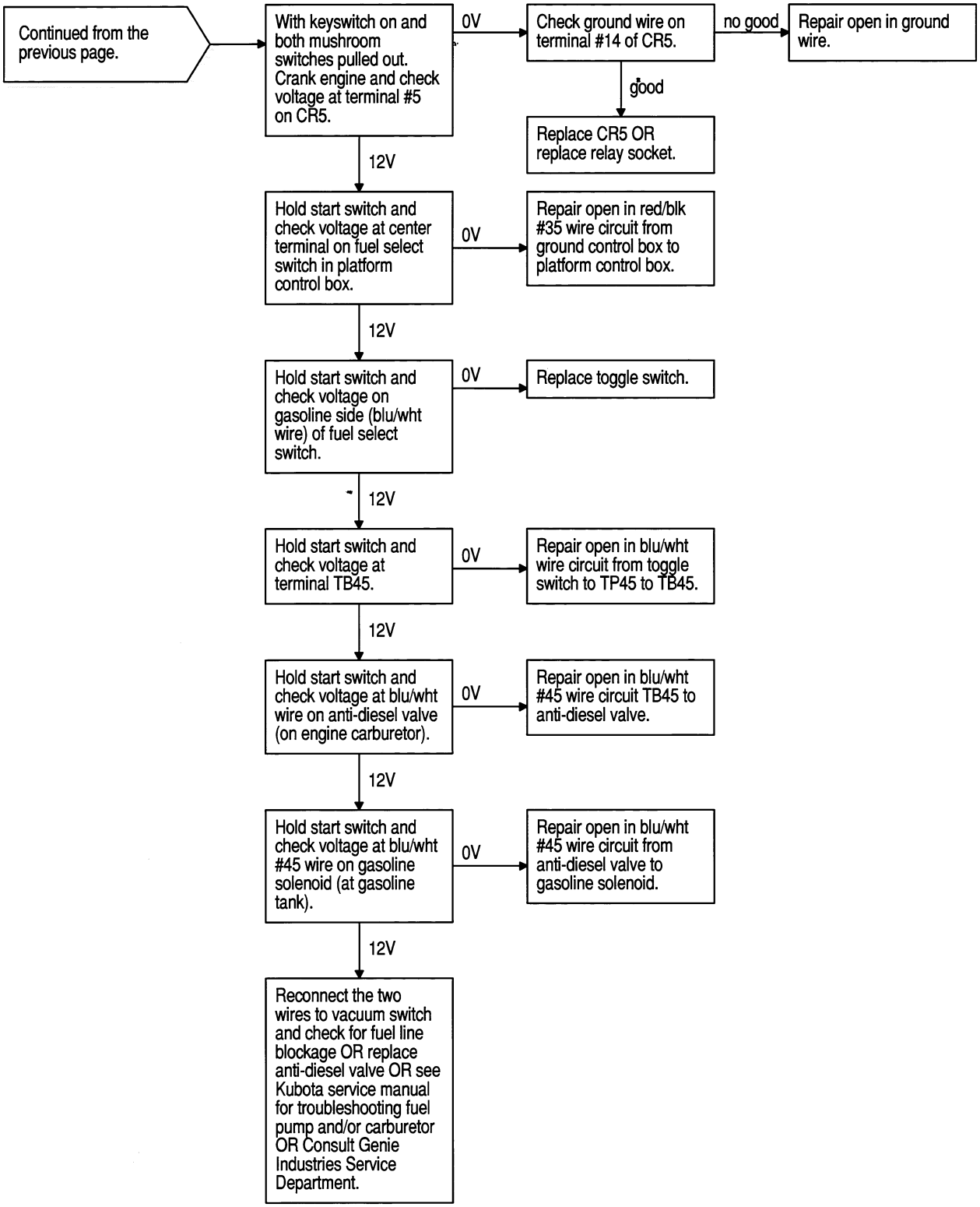

Continued from the previous page.
With keyswitch on and both mushroom switches pulled out. Crank engine and check voltage at terminal #5 on CR5.
0V
Check ground wire on terminal #14 of CR5.
no good
Repair open in ground wire.
good
Replace CR5 OR replace relay socket.
12V
Hold start switch and check voltage at center terminal on fuel select switch in platform control box.
0V
Repair open in red/blk #35 wire circuit from ground control box to platform control box.
12V
Hold start switch and check voltage on gasoline side (blu/wht wire) of fuel select switch.
0V
Replace toggle switch.
12V
Hold start switch and check voltage at terminal TB45.
0V
Repair open in blu/wht wire circuit from toggle switch to TP45 to TB45.
12V
Hold start switch and check voltage at blu/wht wire on anti-diesel valve (on engine carburetor).
0V
Repair open in blu/wht #45 wire circuit TB45 to anti-diesel valve.
12V
Hold start switch and check voltage at blu/wht #45 wire on gasoline solenoid (at gasoline tank).
0V
Repair open in blu/wht #45 wire circuit from anti-diesel valve to gasoline solenoid.
12V
Reconnect the two wires to vacuum switch and check for fuel line blockage OR replace anti-diesel valve OR see Kubota service manual for troubleshooting fuel pump and/or carburetor OR Consult Genie Industries Service Department.

Chart 8

Engine Cranks Over But Will Not Start - Kubota Diesel Models

Be sure to check the engine oil level and fill as needed.

Be sure to check fuel levels and engine coolant level.

Be sure the diesel shut-off valve is in the on position.

Be sure engine glow plugs operate normally. See Maintenance section.

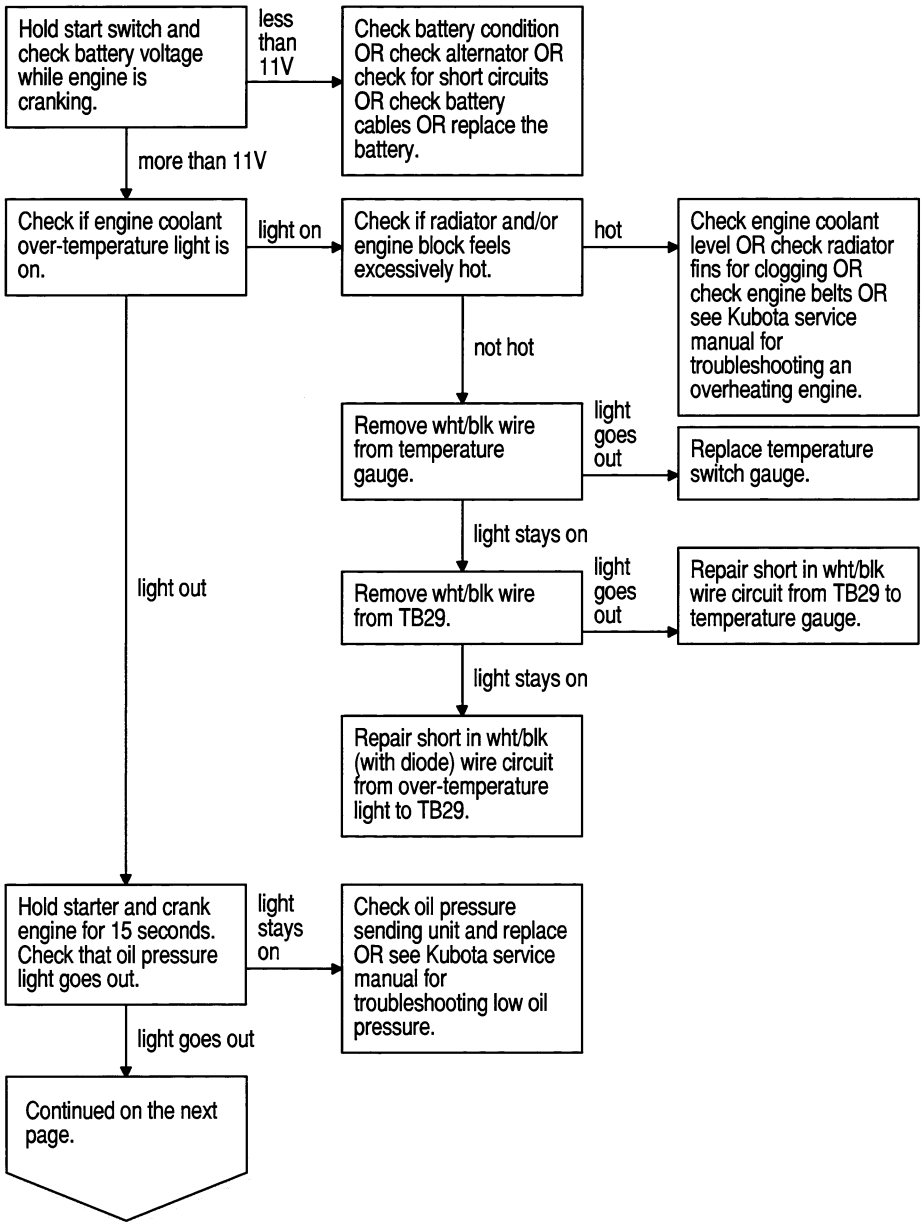


CHART 8

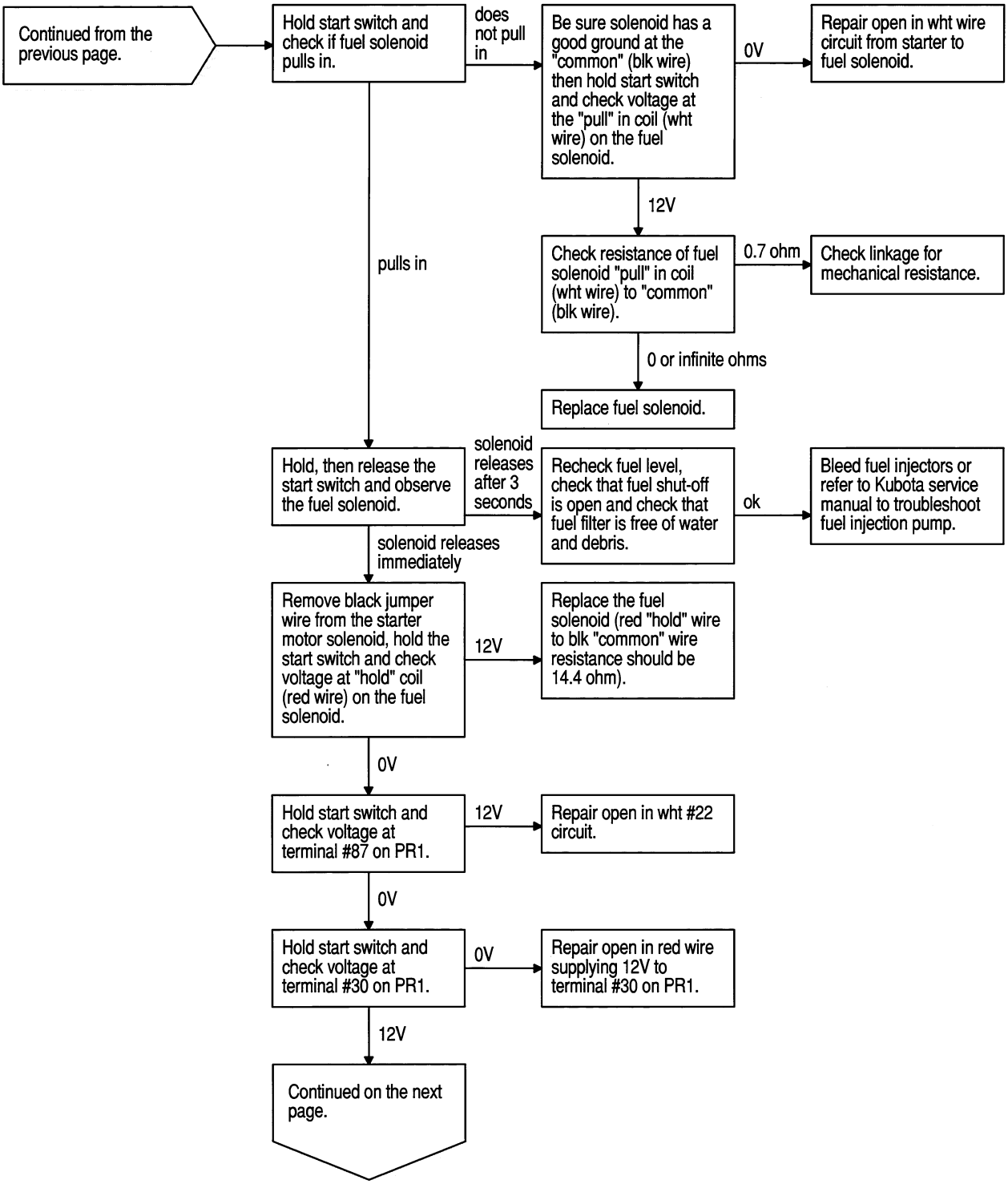

Continued from the previous page.
Hold start switch and check if fuel solenoid pulls in.
does not pull in
Be sure solenoid has a good ground at the "common" (blk wire) then hold start switch and check voltage at the "pull" in coil (wht wire) on the fuel solenoid.
0V
Repair open in wht wire circuit from starter to fuel solenoid.
12V
pulls in
Check resistance of fuel solenoid "pull" in coil (wht wire) to "common" (blk wire).
0.7 ohm
Check linkage for mechanical resistance.
0 or infinite ohms
Replace fuel solenoid.
Hold, then release the start switch and observe the fuel solenoid.
solenoid releases after 3 seconds
Recheck fuel level, check that fuel shut-off is open and check that fuel filter is free of water and debris.
ok
Bleed fuel injectors or refer to Kubota service manual to troubleshoot fuel injection pump.
solenoid releases immediately
Remove black jumper wire from the starter motor solenoid, hold the start switch and check voltage at "hold" coil (red wire) on the fuel solenoid.
12V
Replace the fuel solenoid (red "hold" wire to blk "common" wire resistance should be 14.4 ohm).
0V
Hold start switch and check voltage at terminal #87 on PR1.
12V
Repair open in wht #22 circuit.
0V
Hold start switch and check voltage at terminal #30 on PR1.
0V
Repair open in red wire supplying 12V to terminal #30 on PR1.
12V
Continued on the next page.

CHART 8

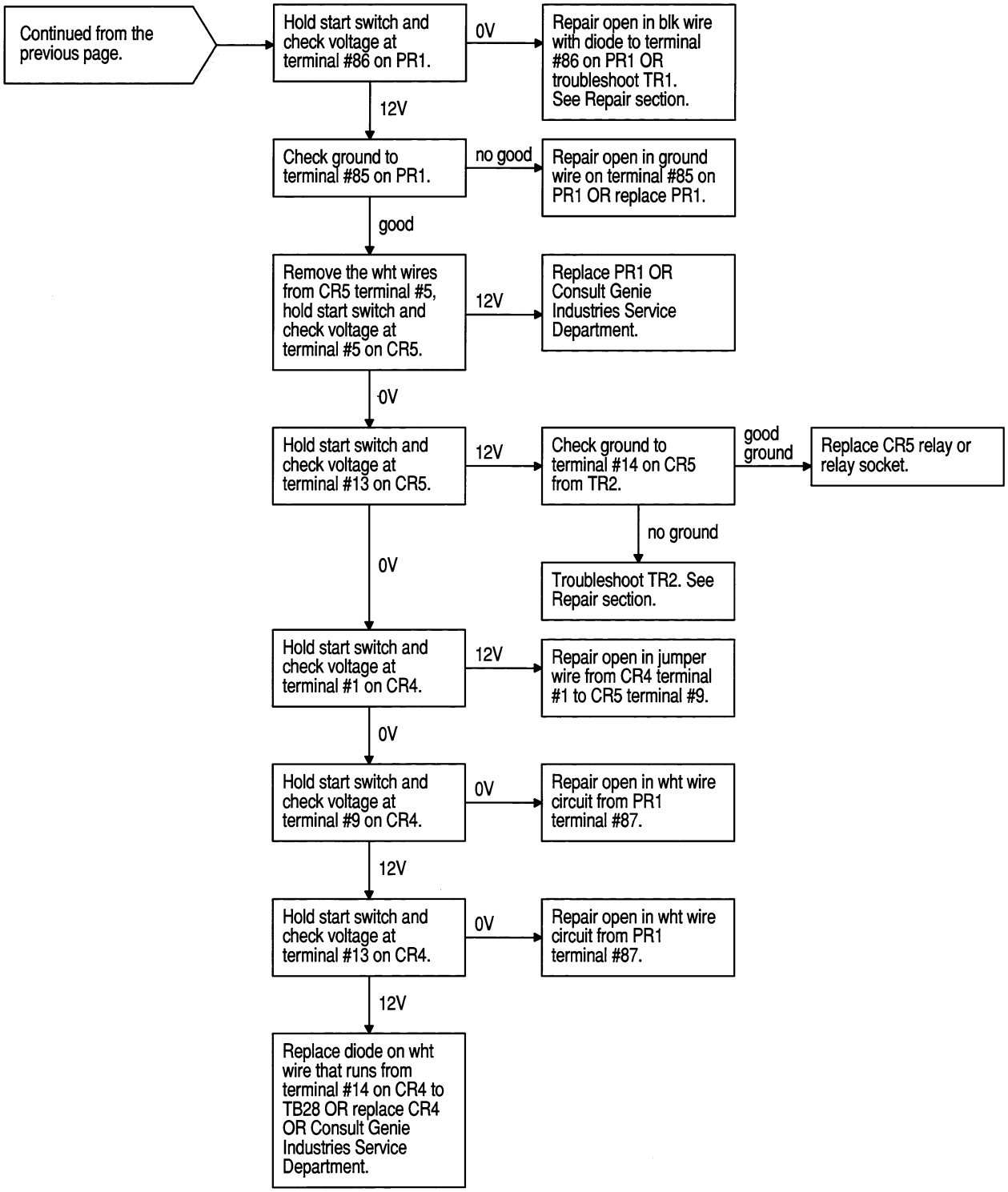

Continued from the previous page.
Hold start switch and check voltage at terminal #86 on PR1.
0V
Repair open in blk wire with diode to terminal #86 on PR1 OR troubleshoot TR1. See Repair section.
12V
Check ground to terminal #85 on PR1.
no good
Repair open in ground wire on terminal #85 on PR1 OR replace PR1.
good
Remove the wht wires from CR5 terminal #5, hold start switch and check voltage at terminal #5 on CR5.
12V
Replace PR1 OR Consult Genie Industries Service Department.
0V
Hold start switch and check voltage at terminal #13 on CR5.
12V
Check ground to terminal #14 on CR5 from TR2.
good ground
Replace CR5 relay or relay socket.
no ground
Troubleshoot TR2. See Repair section.
0V
Hold start switch and check voltage at terminal #1 on CR4.
12V
Repair open in jumper wire from CR4 terminal #1 to CR5 terminal #9.
0V
Hold start switch and check voltage at terminal #9 on CR4.
0V
Repair open in wht wire circuit from PR1 terminal #87.
12V
Hold start switch and check voltage at terminal #13 on CR4.
0V
Repair open in wht wire circuit from PR1 terminal #87.
12V
Replace diode on wht wire that runs from terminal #14 on CR4 to TB28 OR replace CR4 OR Consult Genie Industries Service Department.

Chart 9

Engine Will Not Start On LPG, But Will Start On Gasoline - Kubota Gasoline/LPG Models

Be sure to check LPG fuel level.

Be sure fuel select switch is switched to LPG.

Be sure that engine choke is operating properly.

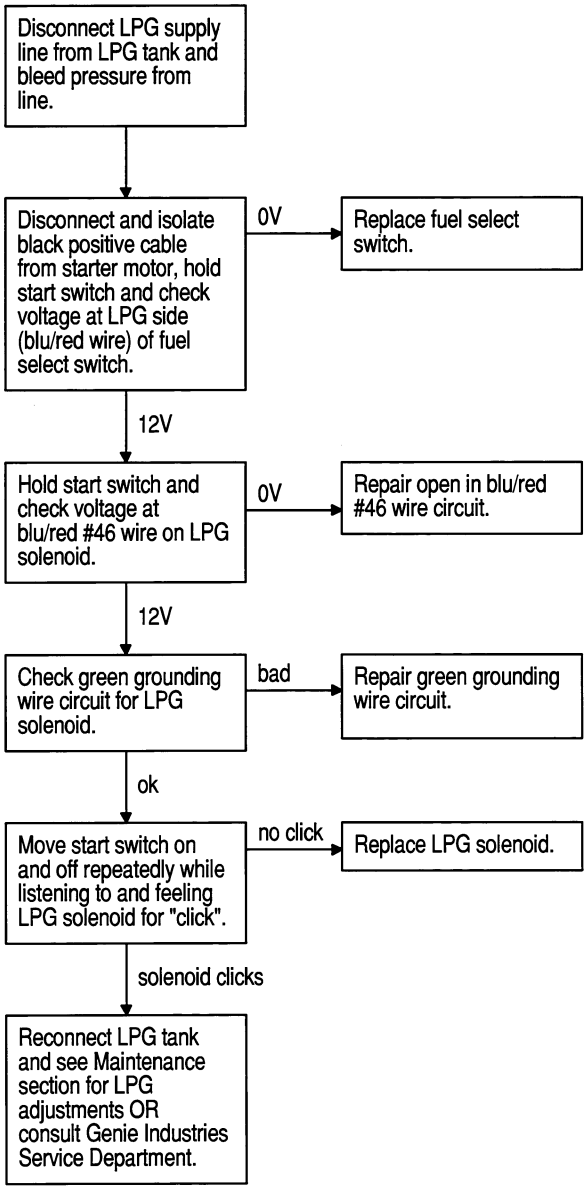


Chart 10

Engine Will Not Start On Gasoline, But Will Start LPG - Kubota Gasoline/LPG Models

Be sure to check gasoline fuel level.

Be sure fuel select switch is switched to gasoline.

Be sure that engine choke is operating properly.

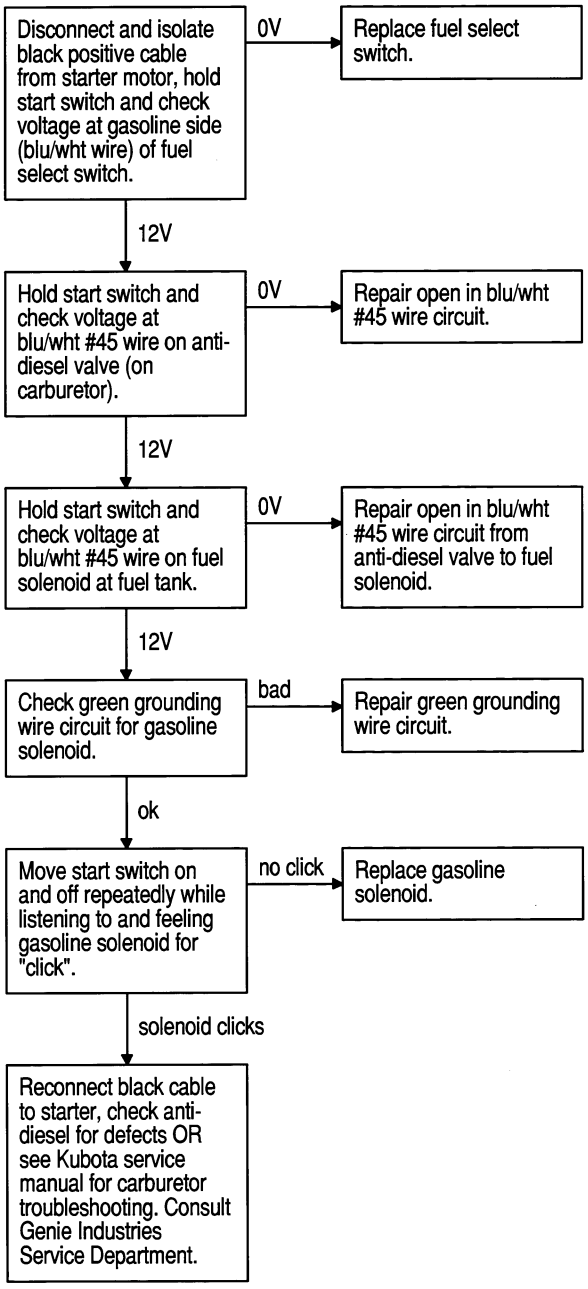


Chart 11

Engine High Idle Inoperative - Engine Models

Be sure mechanical linkage from 2-speed solenoid is not binding or defective.

Be sure PR3 relay, PR4 relay and 2-speed solenoid grounding wires are free of corrosion and have full continuity to ground.

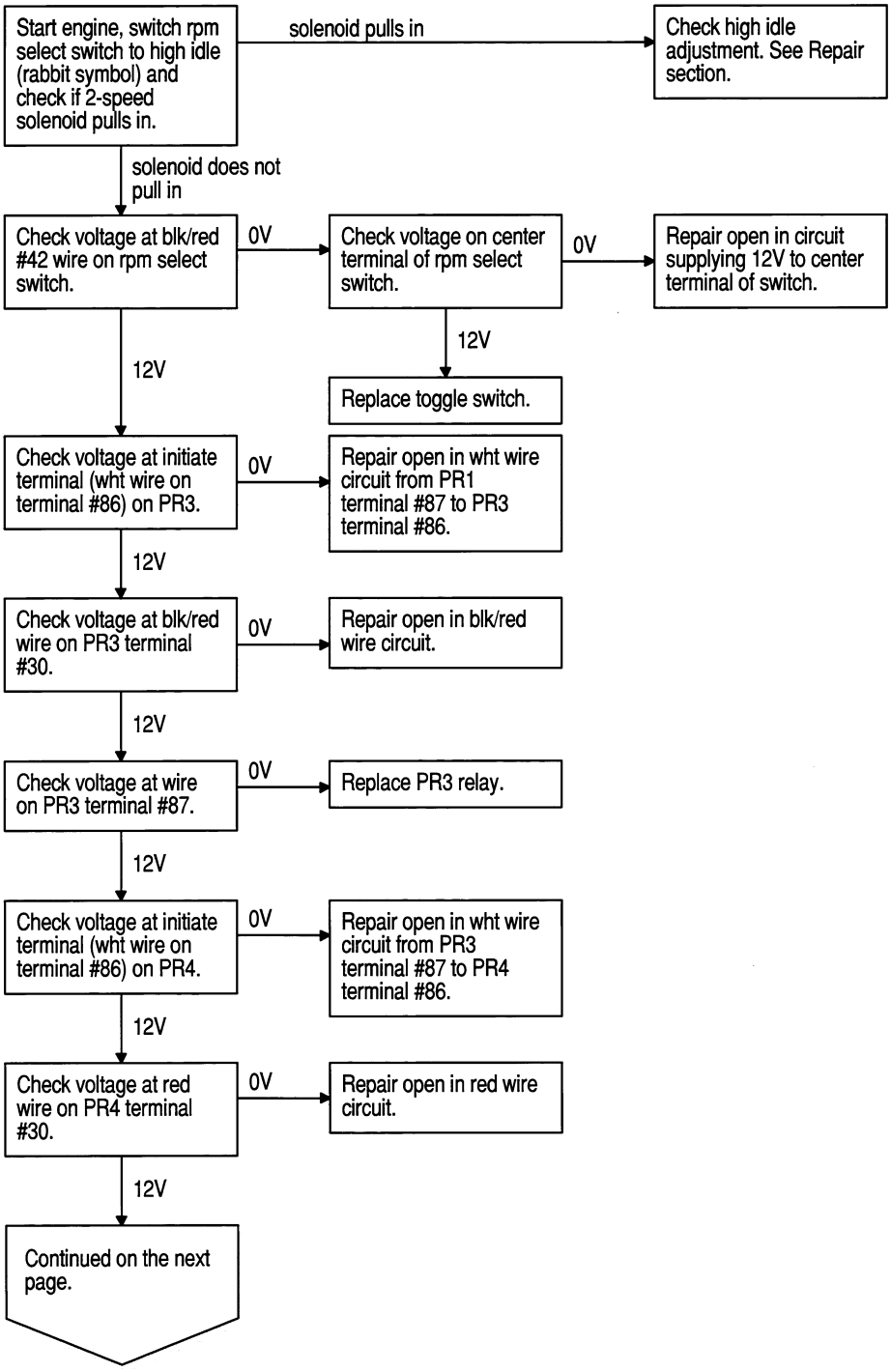


CHART 11

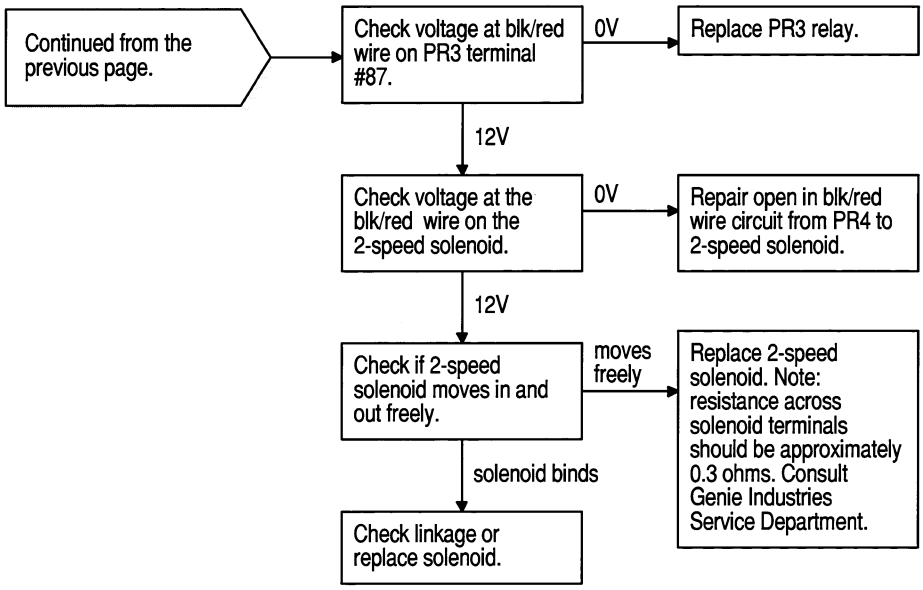

Continued from the previous page.
Check voltage at blk/red wire on PR3 terminal #87.
0V
Replace PR3 relay.
12V
Check voltage at the blk/red wire on the 2-speed solenoid.
0V
Repair open in blk/red wire circuit from PR4 to 2-speed solenoid.
12V
Check if 2-speed solenoid moves in and out freely.
moves freely
Replace 2-speed solenoid. Note: resistance across solenoid terminals should be approximately 0.3 ohms. Consult Genie Industries Service Department.
solenoid binds
Check linkage or replace solenoid.

Chart 12

Engine Low Idle Inoperative - Engine Models

Check if mechanical linkage from 2-speed solenoid is binding or defective.

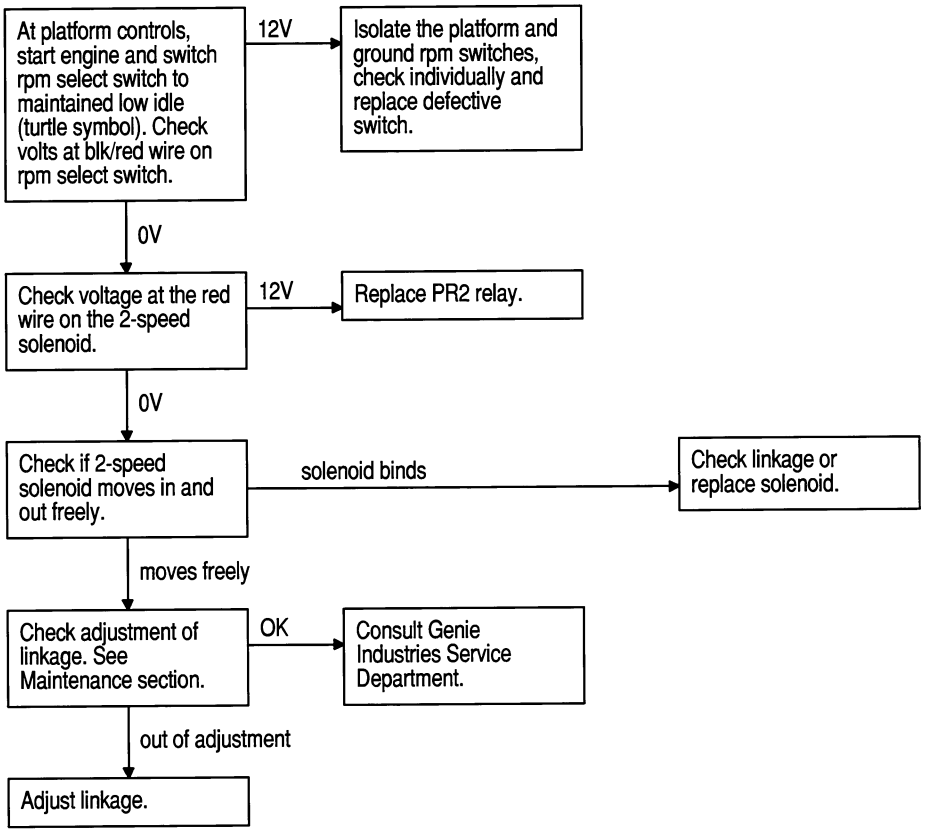


Chart 13

All Functions Inoperative, Engine Starts and Runs - Engine Models

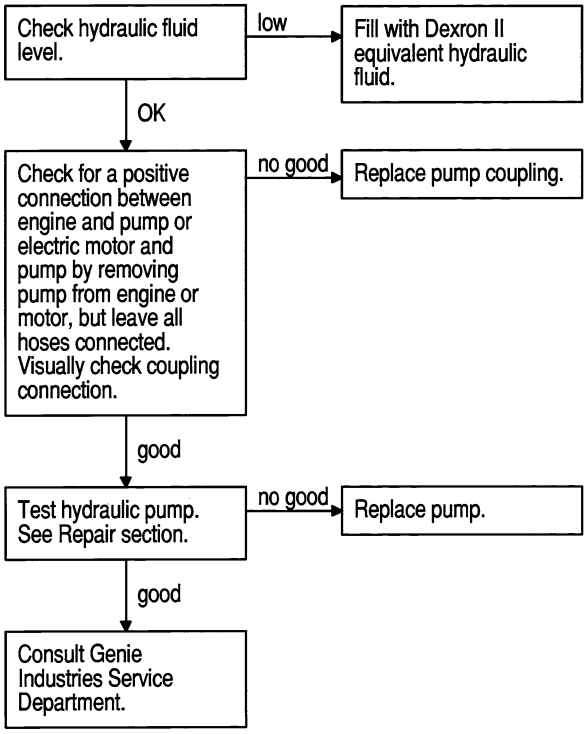


Chart 14

All Lift and Steer Functions Inoperative, Drive Functions Operational

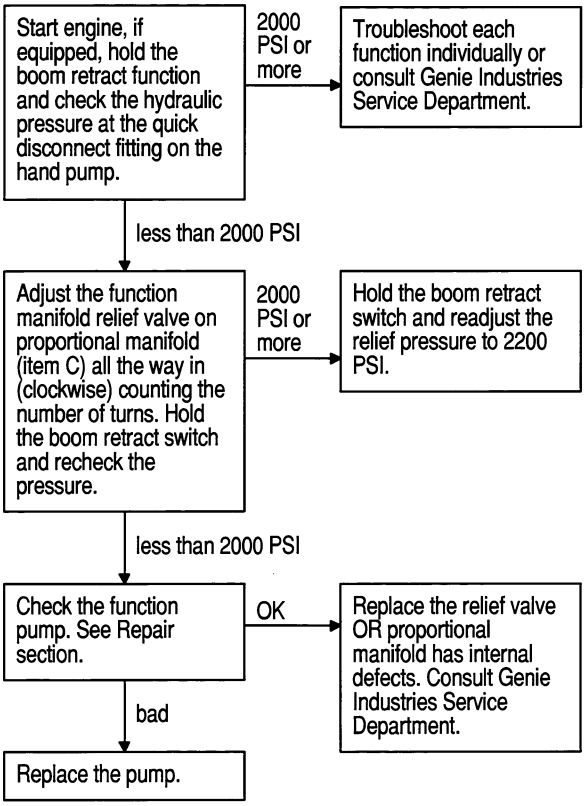


Chart 15

Ground Controls Inoperative, Platform Controls Operate Normally

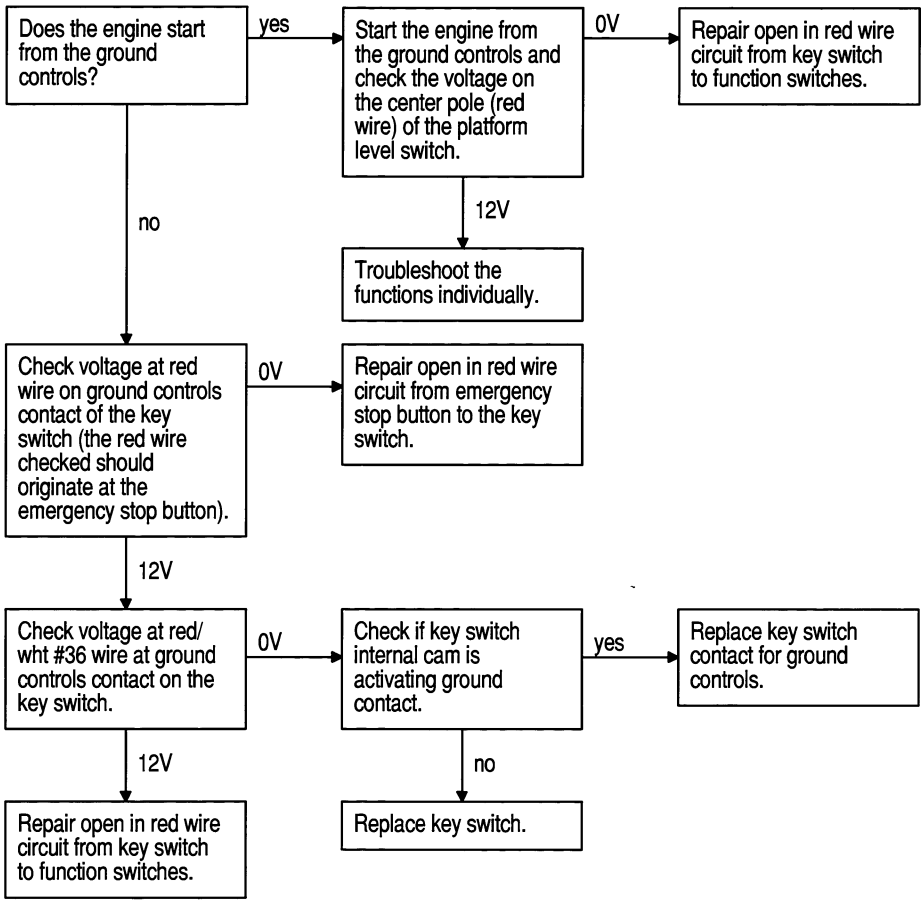


Chart 16

Platform Controls Inoperative, Ground Controls Operate Normally

Ground controls operate normally in DC mode or with engine running.

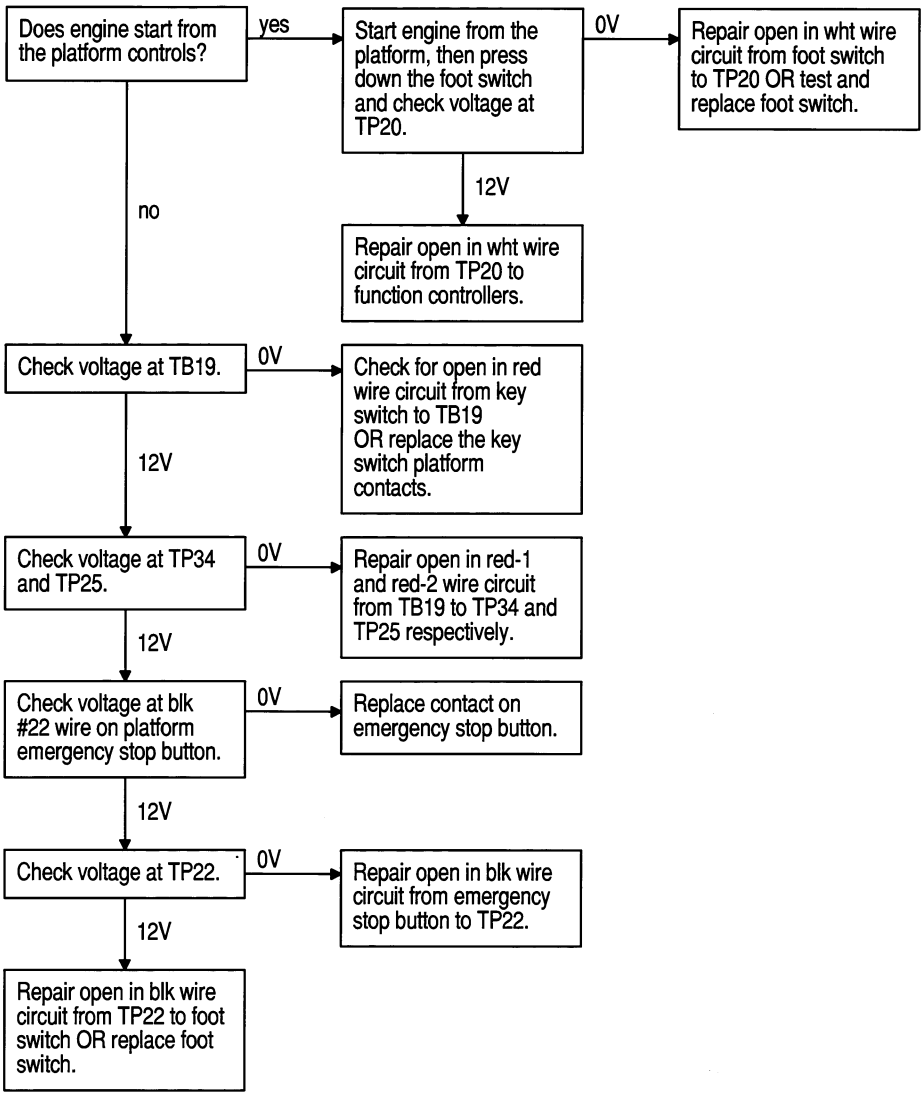


Chart 17

Primary Boom Up Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If boom up function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If boom up function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

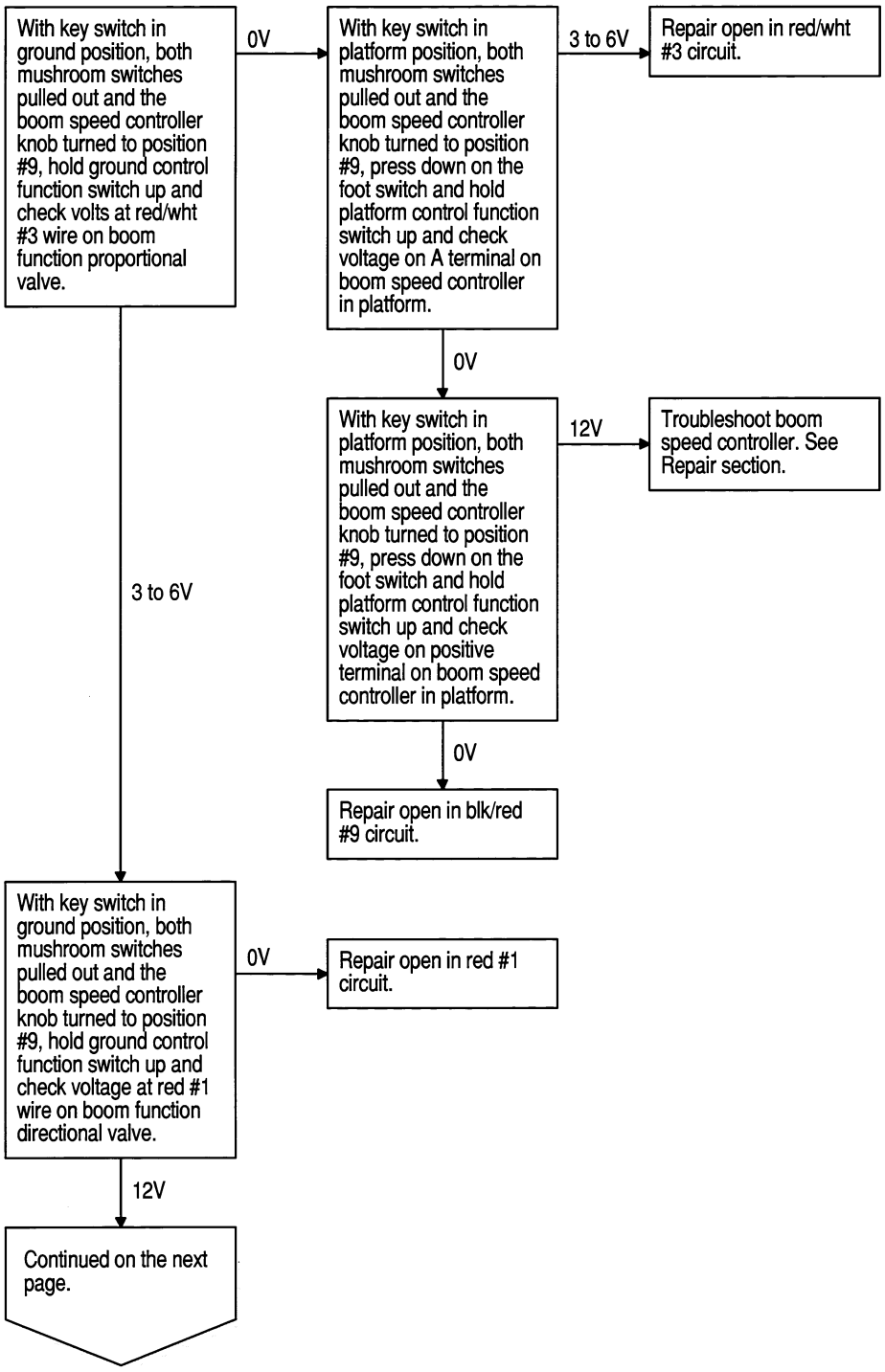


CHART 17

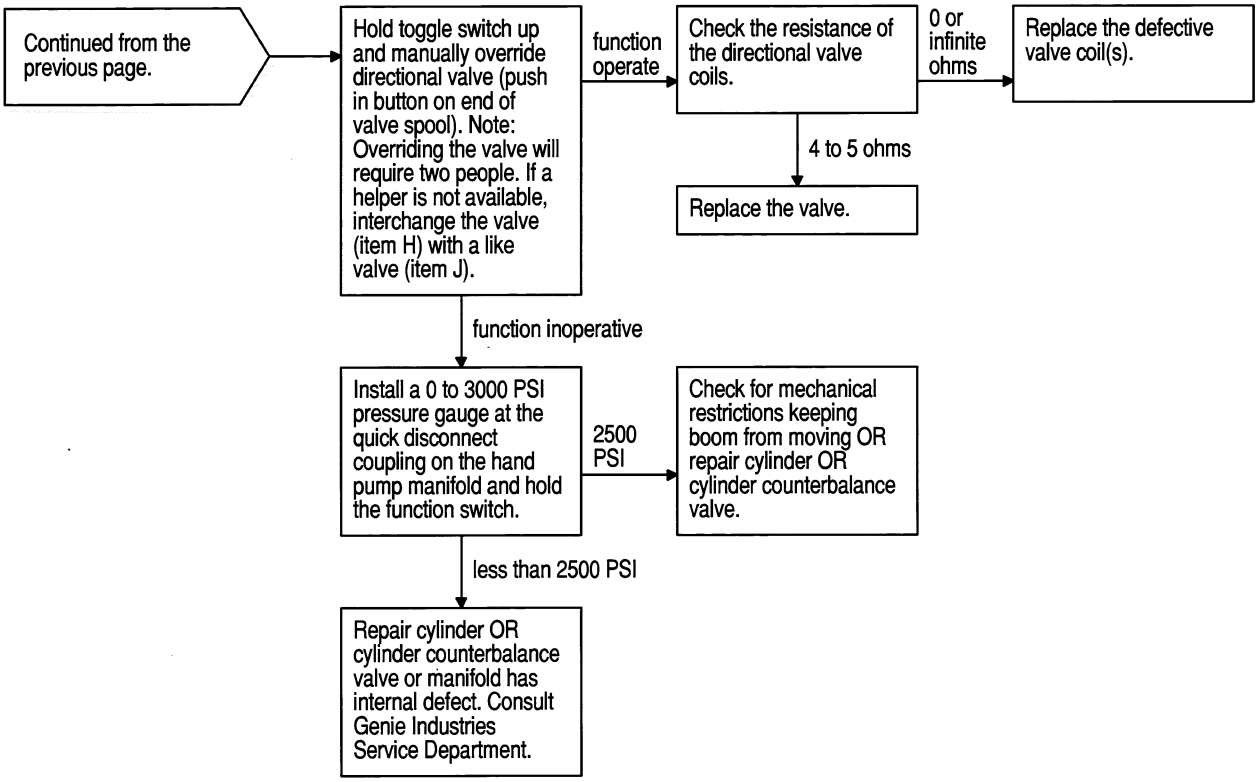

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item H) with a like valve (item J).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the hand pump manifold and hold the function switch.
2500 PSI
Check for mechanical restrictions keeping boom from moving OR repair cylinder OR cylinder counterbalance valve.
less than 2500 PSI
Repair cylinder OR cylinder counterbalance valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 18

Primary Boom Down Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If primary boom down function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If primary boom down function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

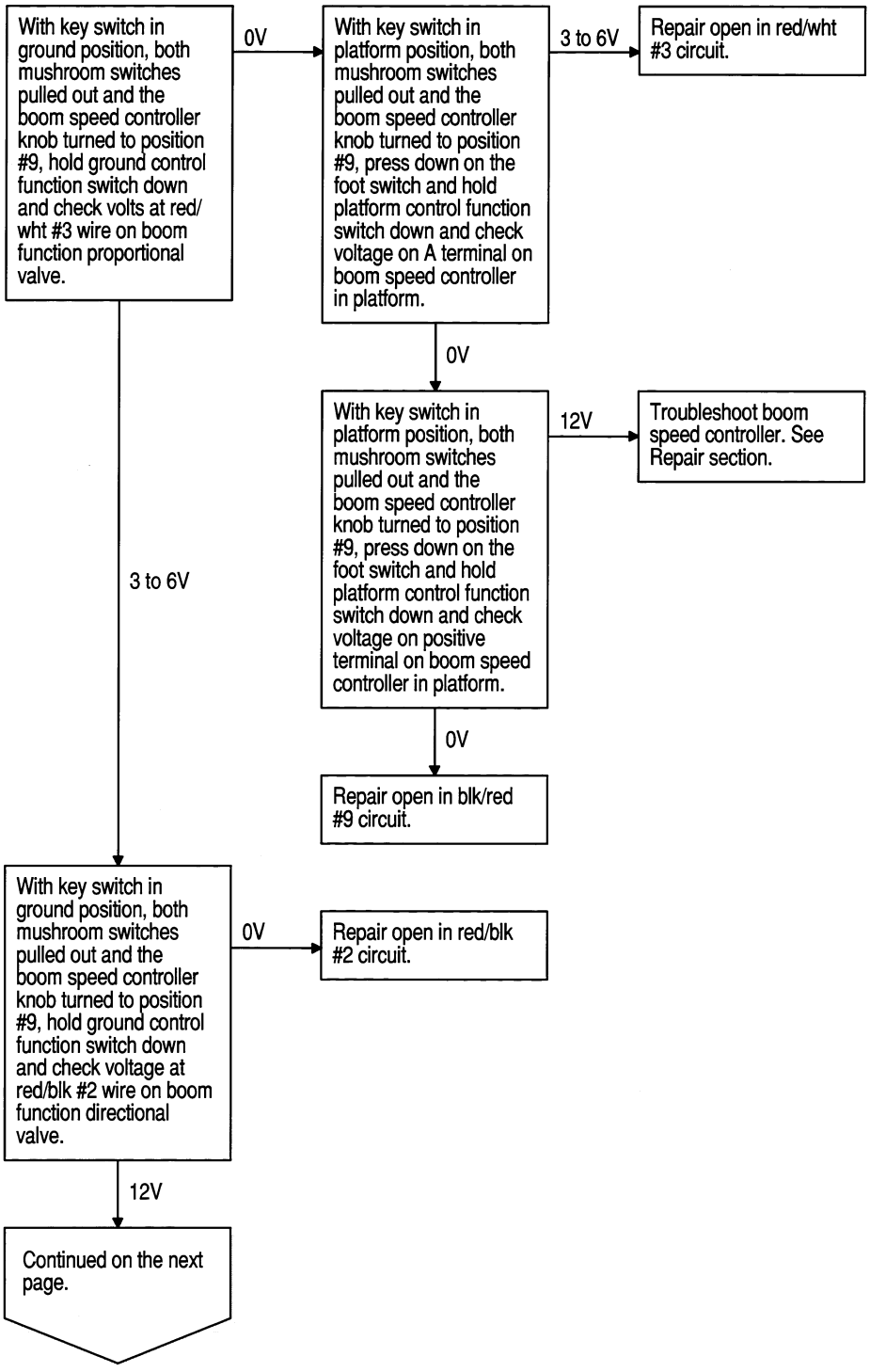


CHART 18

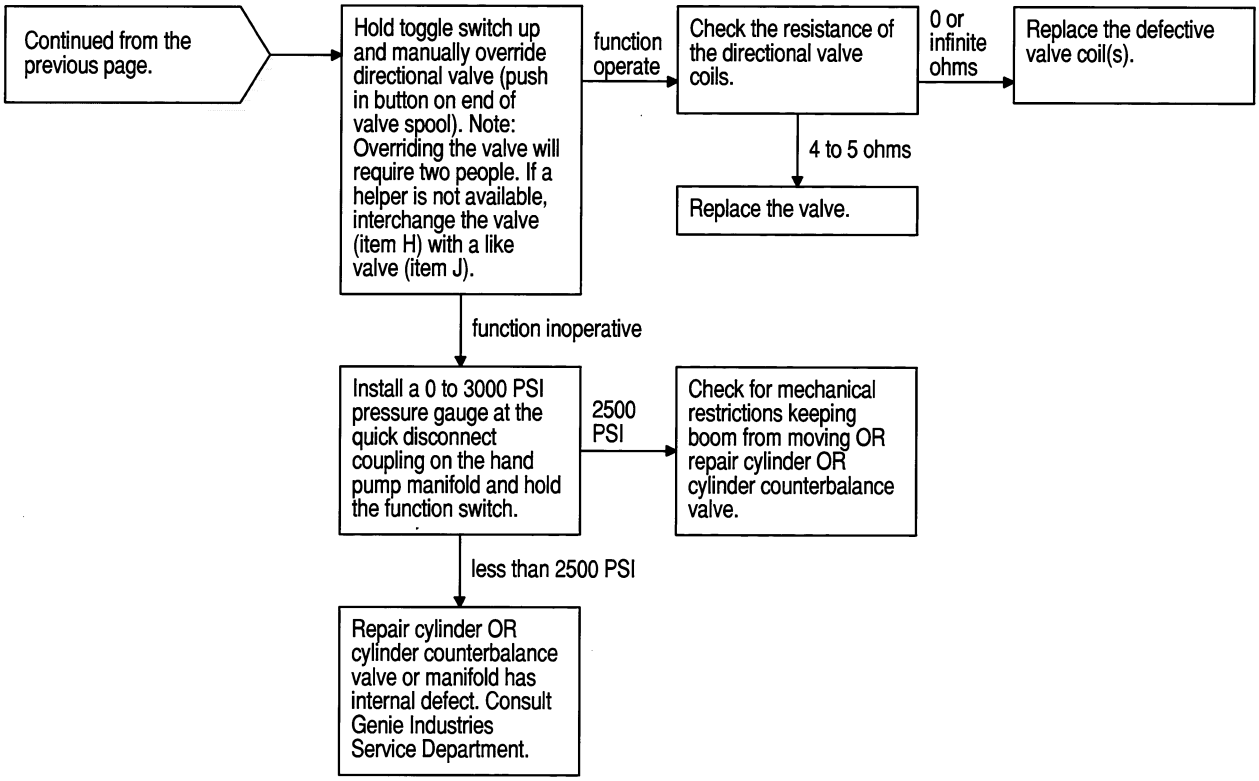

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item H) with a like valve (item J).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the hand pump manifold and hold the function switch.
2500 PSI
Check for mechanical restrictions keeping boom from moving OR repair cylinder OR cylinder counterbalance valve.
less than 2500 PSI
Repair cylinder OR cylinder counterbalance valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 19

Secondary Boom Up Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If secondary boom up function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If secondary boom up function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

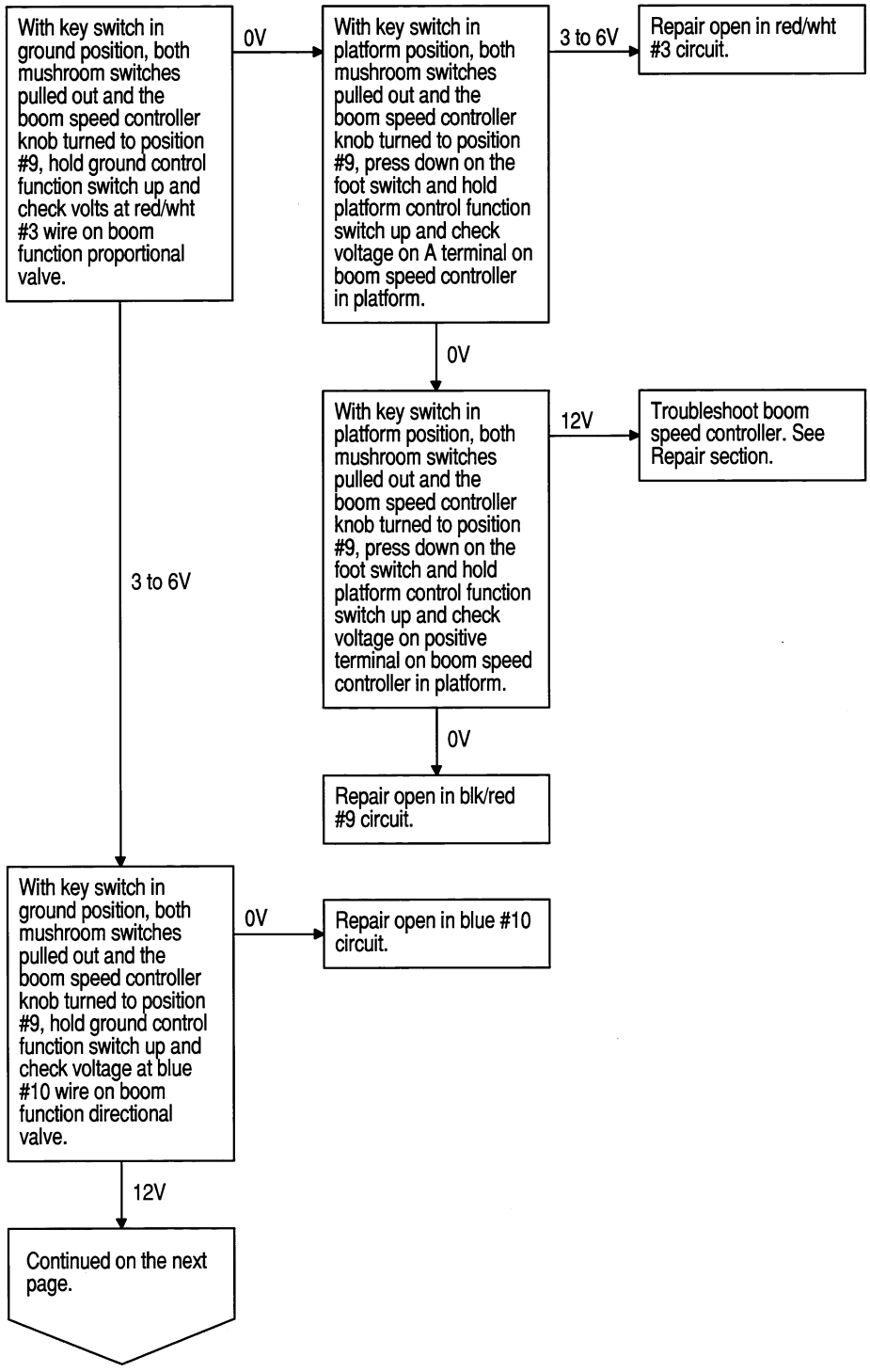


CHART 19

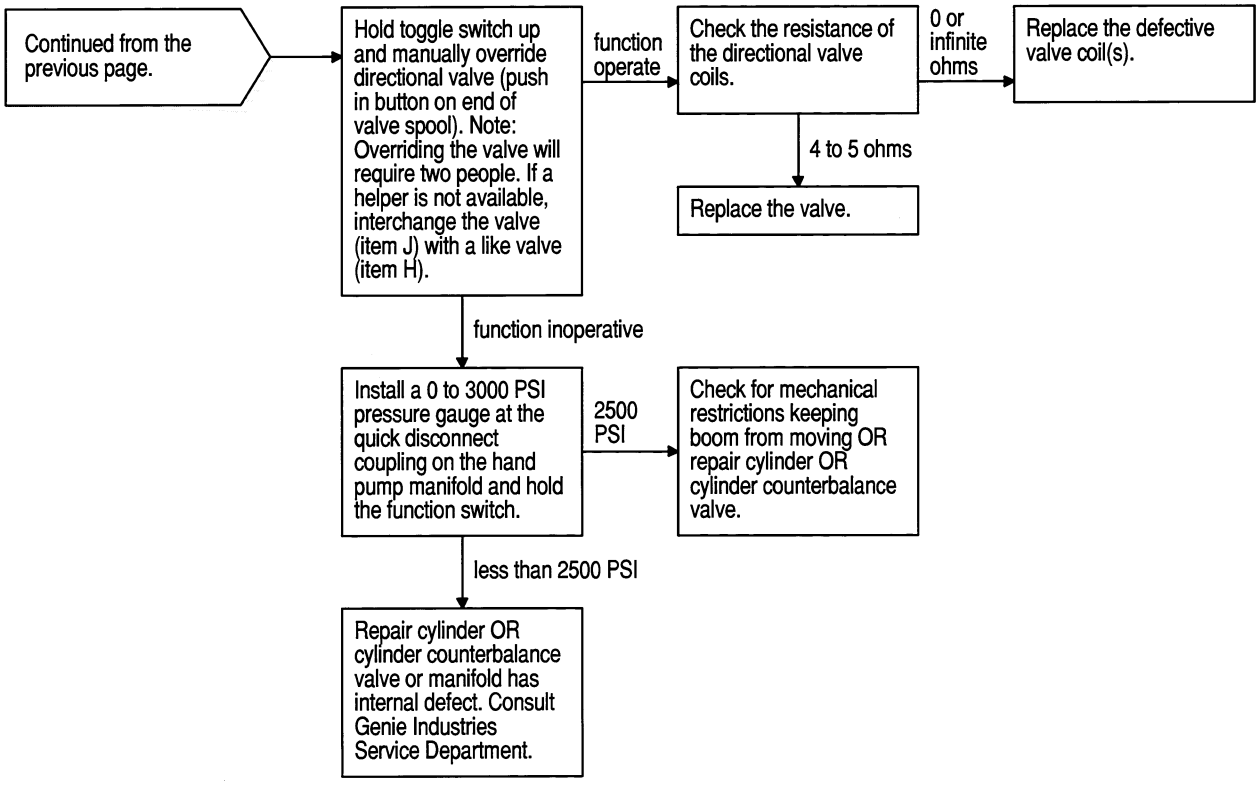

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item J) with a like valve (item H).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the hand pump manifold and hold the function switch.
2500 PSI
Check for mechanical restrictions keeping boom from moving OR repair cylinder OR cylinder counterbalance valve.
less than 2500 PSI
Repair cylinder OR cylinder counterbalance valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 20

Secondary Boom Down Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If secondary boom down function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If secondary boom down function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models:
Perform these tests with the engine running.

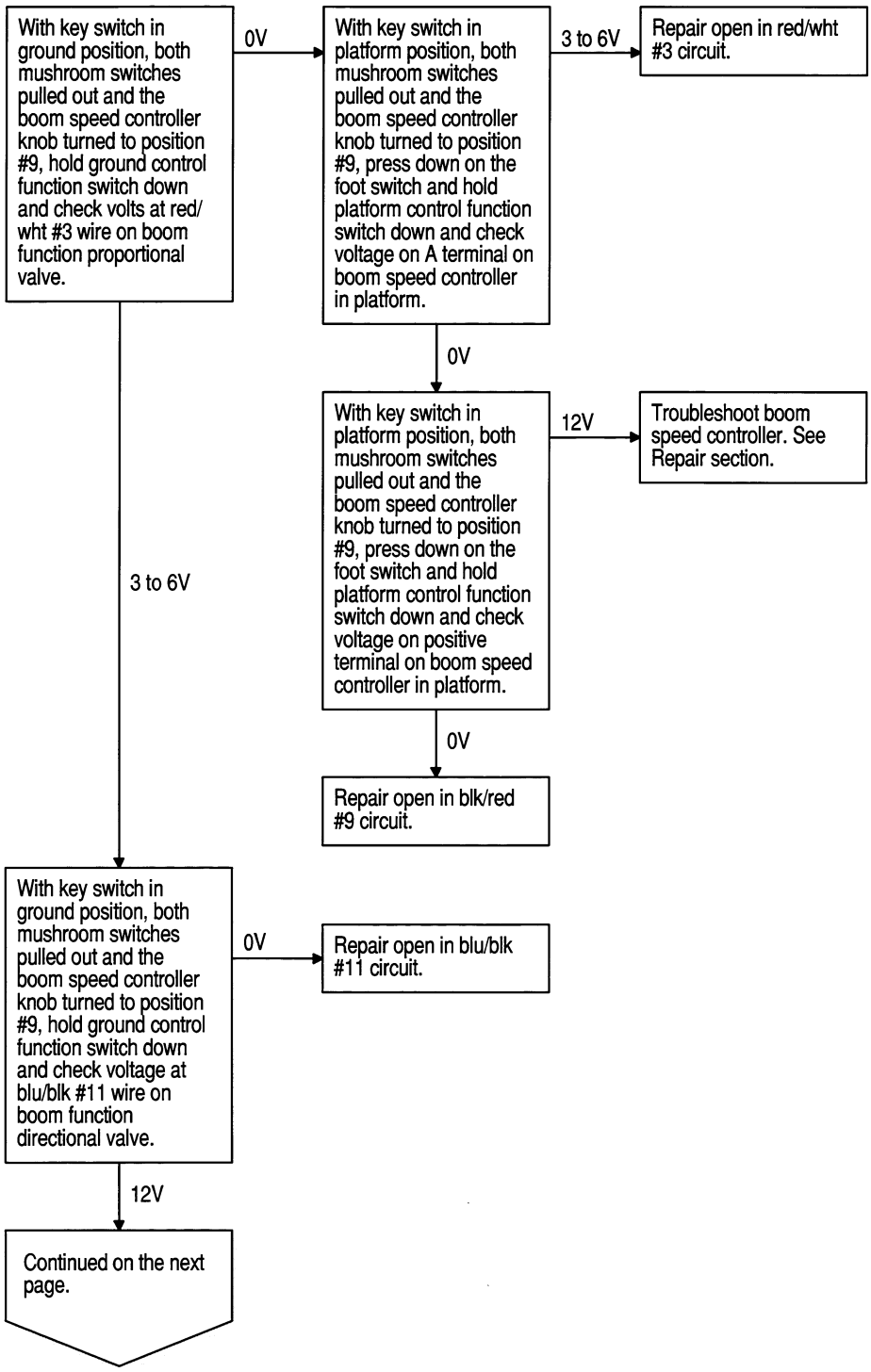


CHART 20

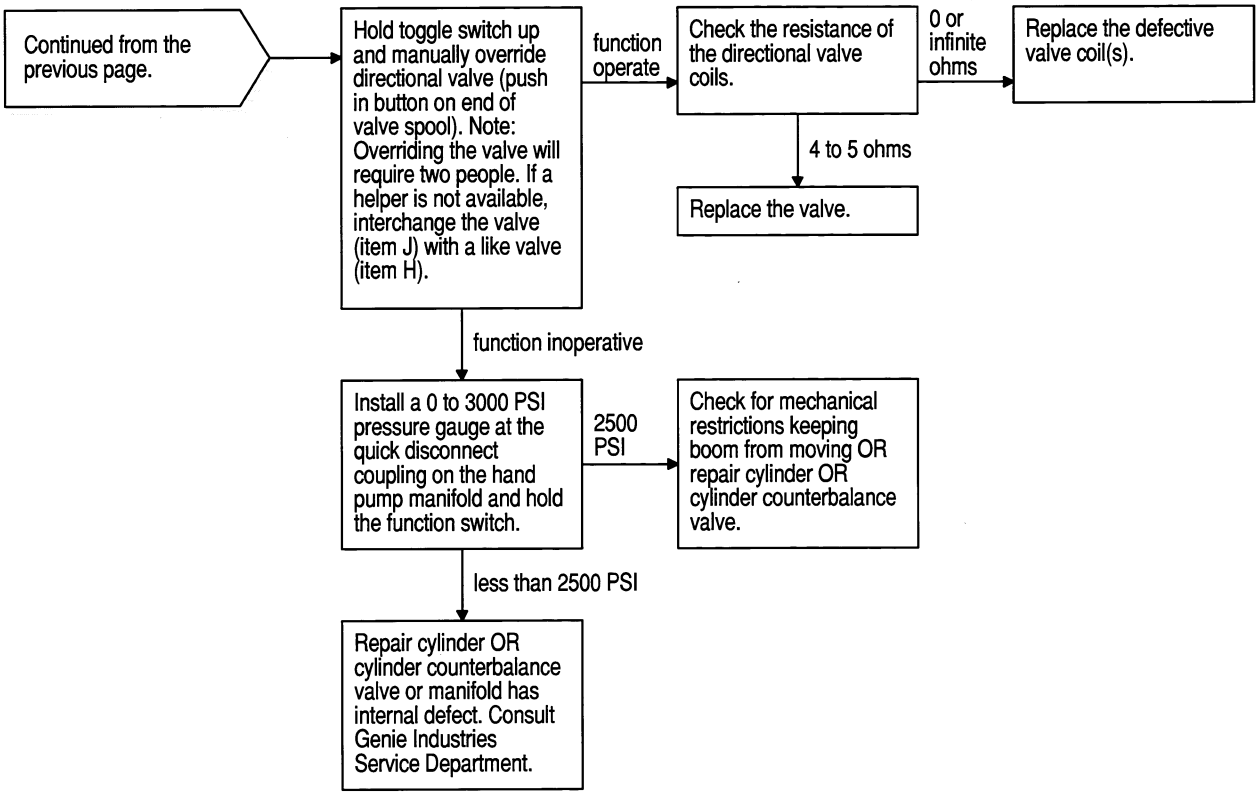

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item J) with a like valve (item H).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the hand pump manifold and hold the function switch.
2500 PSI
Check for mechanical restrictions keeping boom from moving OR repair cylinder OR cylinder counterbalance valve.
less than 2500 PSI
Repair cylinder OR cylinder counterbalance valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 21

Primary Boom Extend Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If primary boom extend function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If primary boom extend function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

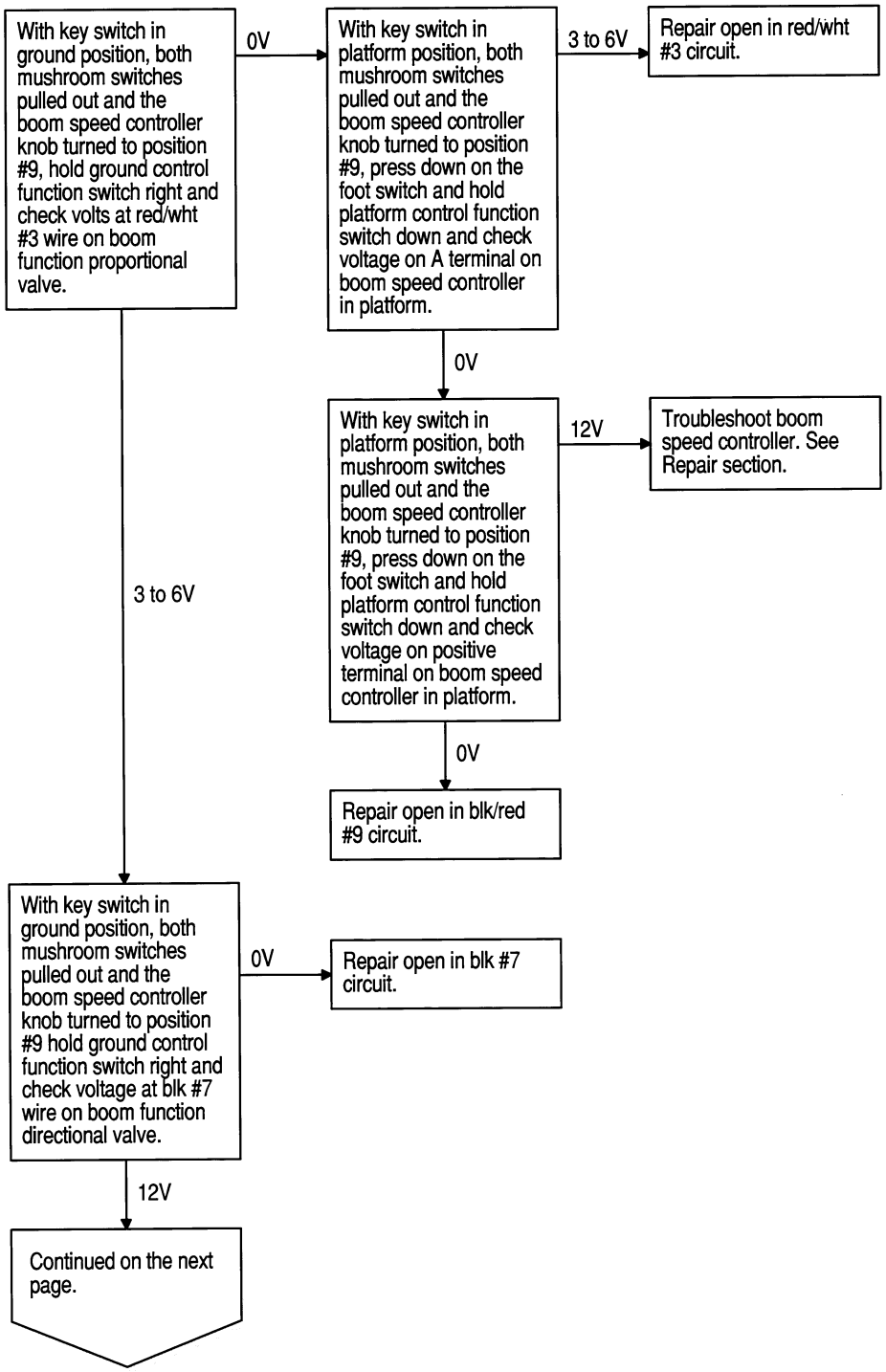


CHART 21

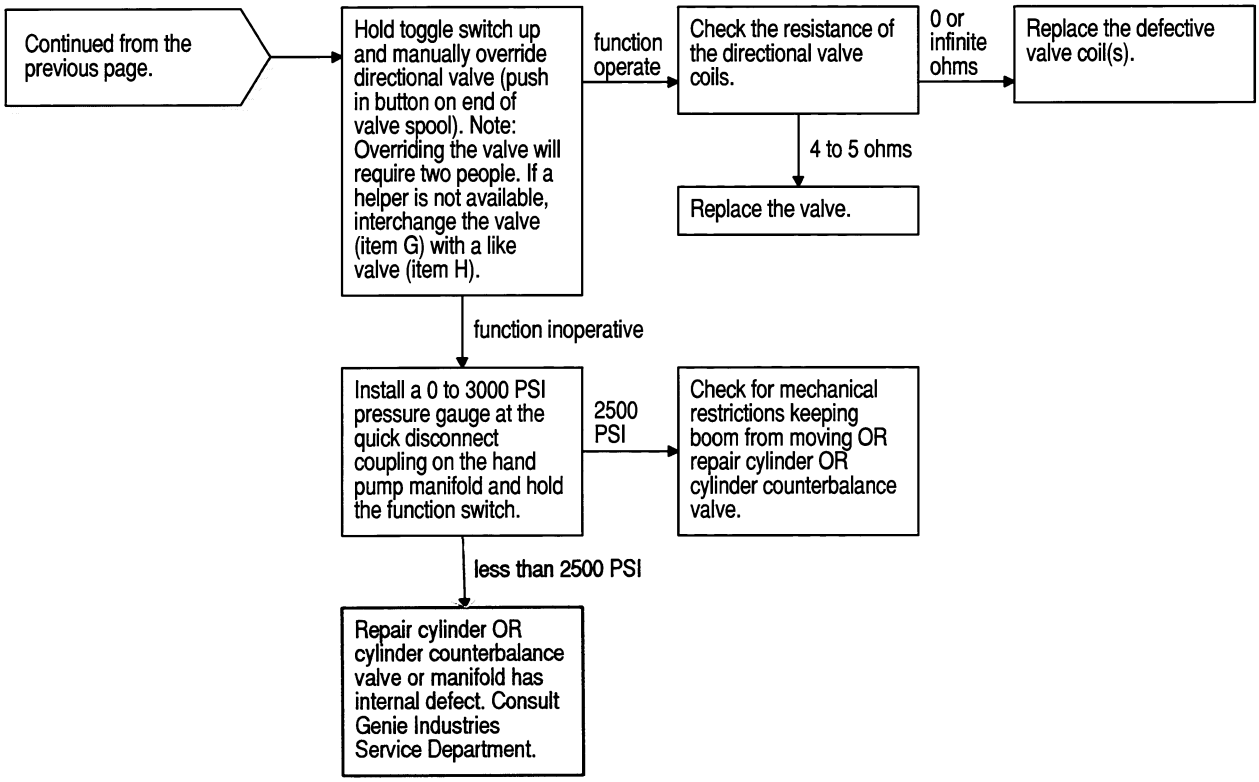

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item G) with a like valve (item H).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the hand pump manifold and hold the function switch.
2500 PSI
Check for mechanical restrictions keeping boom from moving OR repair cylinder OR cylinder counterbalance valve.
less than 2500 PSI
Repair cylinder OR cylinder counterbalance valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 22

Primary Boom Retract Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If primary boom retract function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If primary boom retract function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

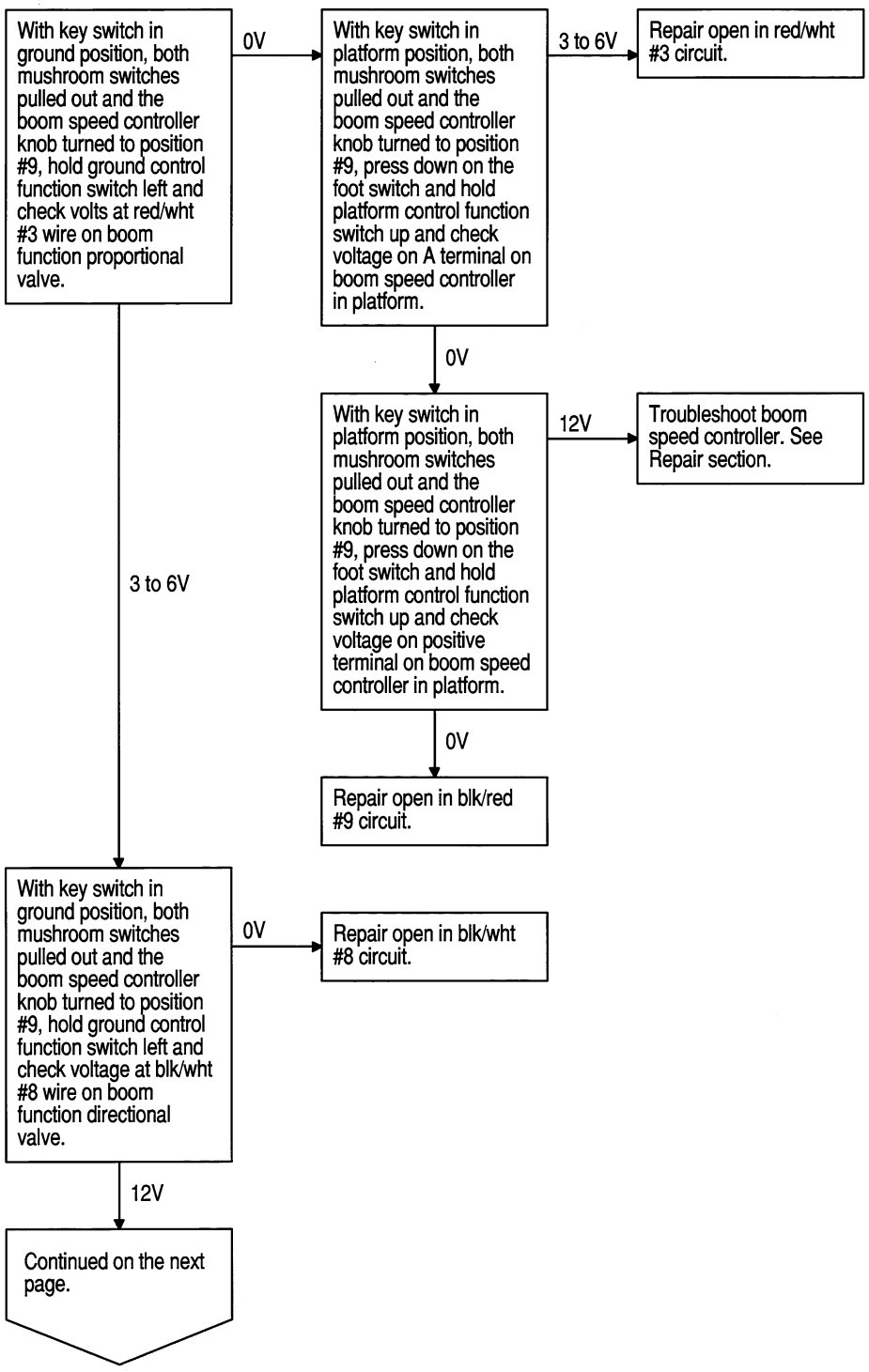


CHART 22

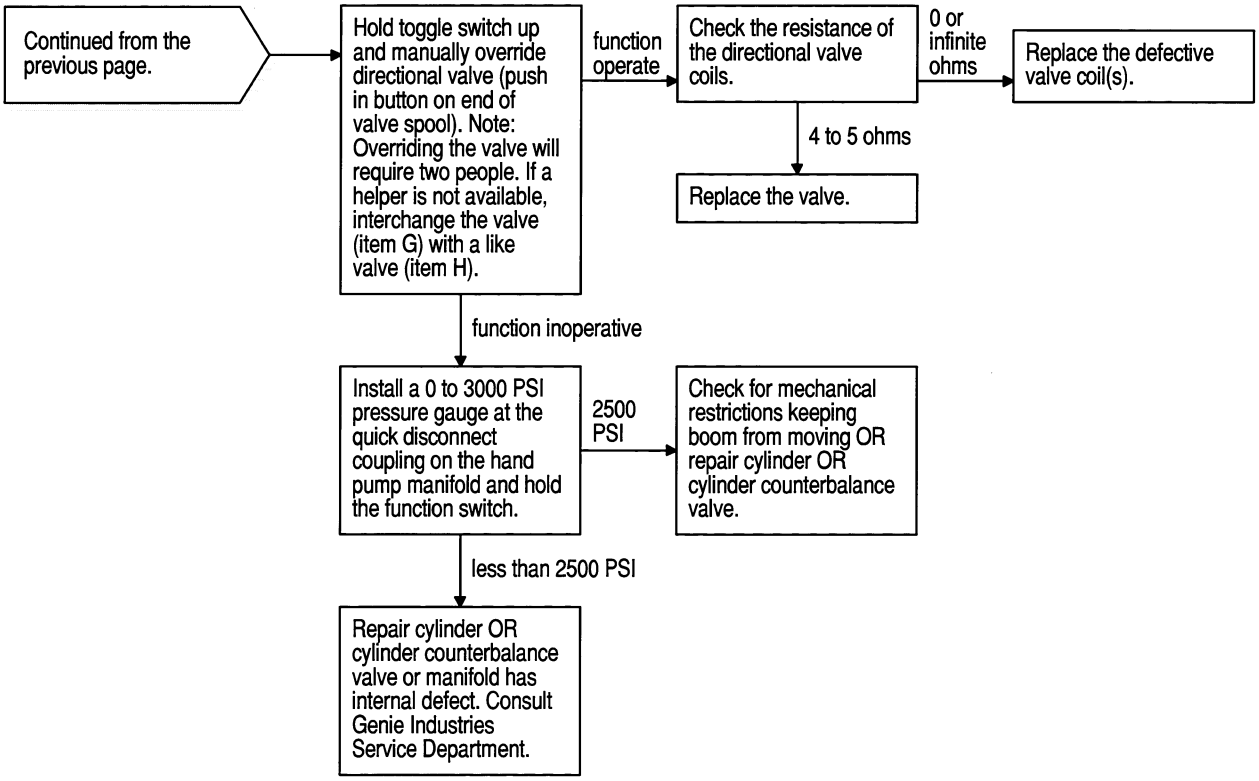

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item G) with a like valve (item H).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the hand pump manifold and hold the function switch.
2500 PSI
Check for mechanical restrictions keeping boom from moving OR repair cylinder OR cylinder counterbalance valve.
less than 2500 PSI
Repair cylinder OR cylinder counterbalance valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 23

Turntable Rotate Left Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If turntable rotate right function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If turntable rotate right function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

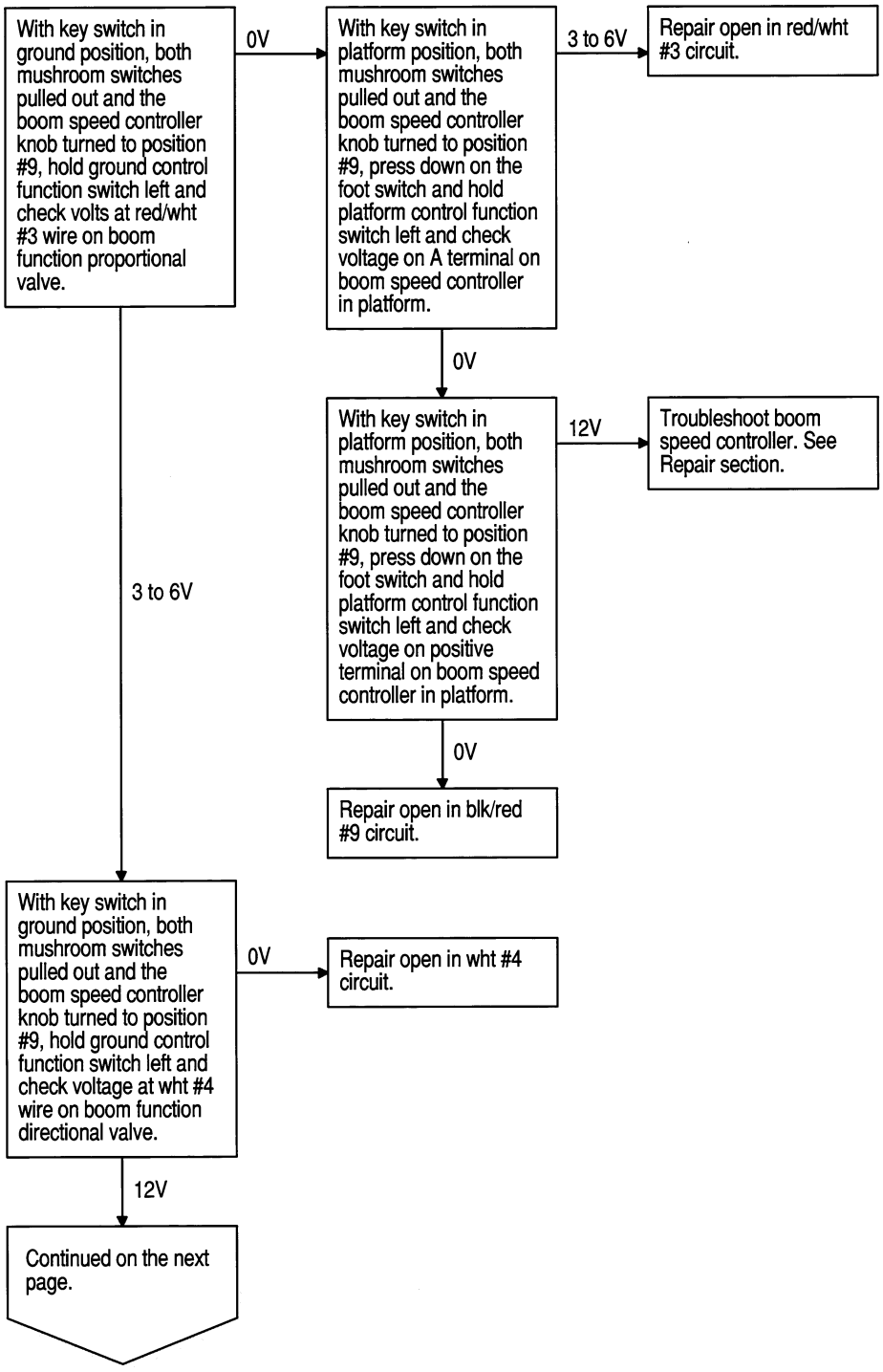


CHART 23

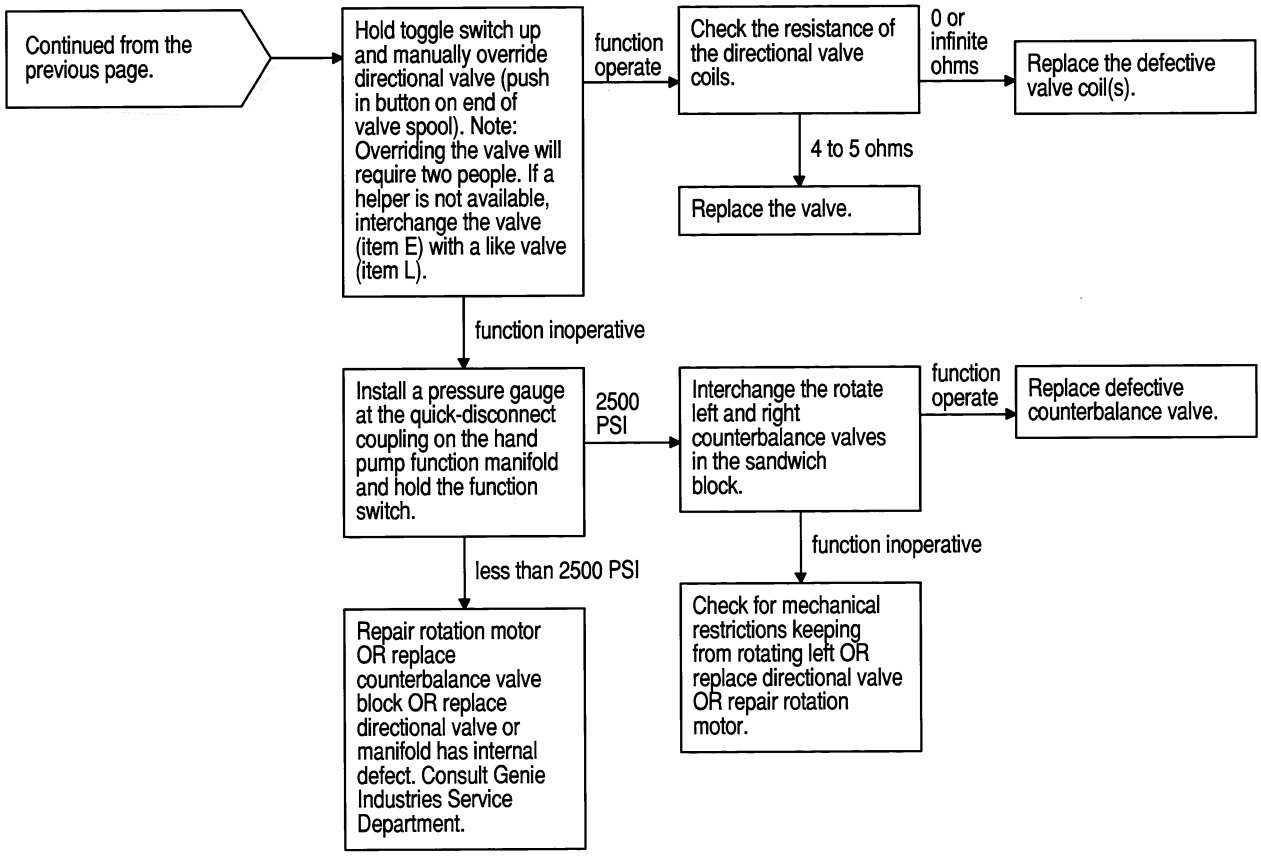

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item E) with a like valve (item L).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a pressure gauge at the quick-disconnect coupling on the hand pump function manifold and hold the function switch.
2500 PSI
Interchange the rotate left and right counterbalance valves in the sandwich block.
function operate
Replace defective counterbalance valve.
function inoperative
Check for mechanical restrictions keeping from rotating left OR replace directional valve OR repair rotation motor.
less than 2500 PSI
Repair rotation motor OR replace counterbalance valve block OR replace directional valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 24

Turntable Rotate Right Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If turntable rotate right function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If turntable rotate right function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

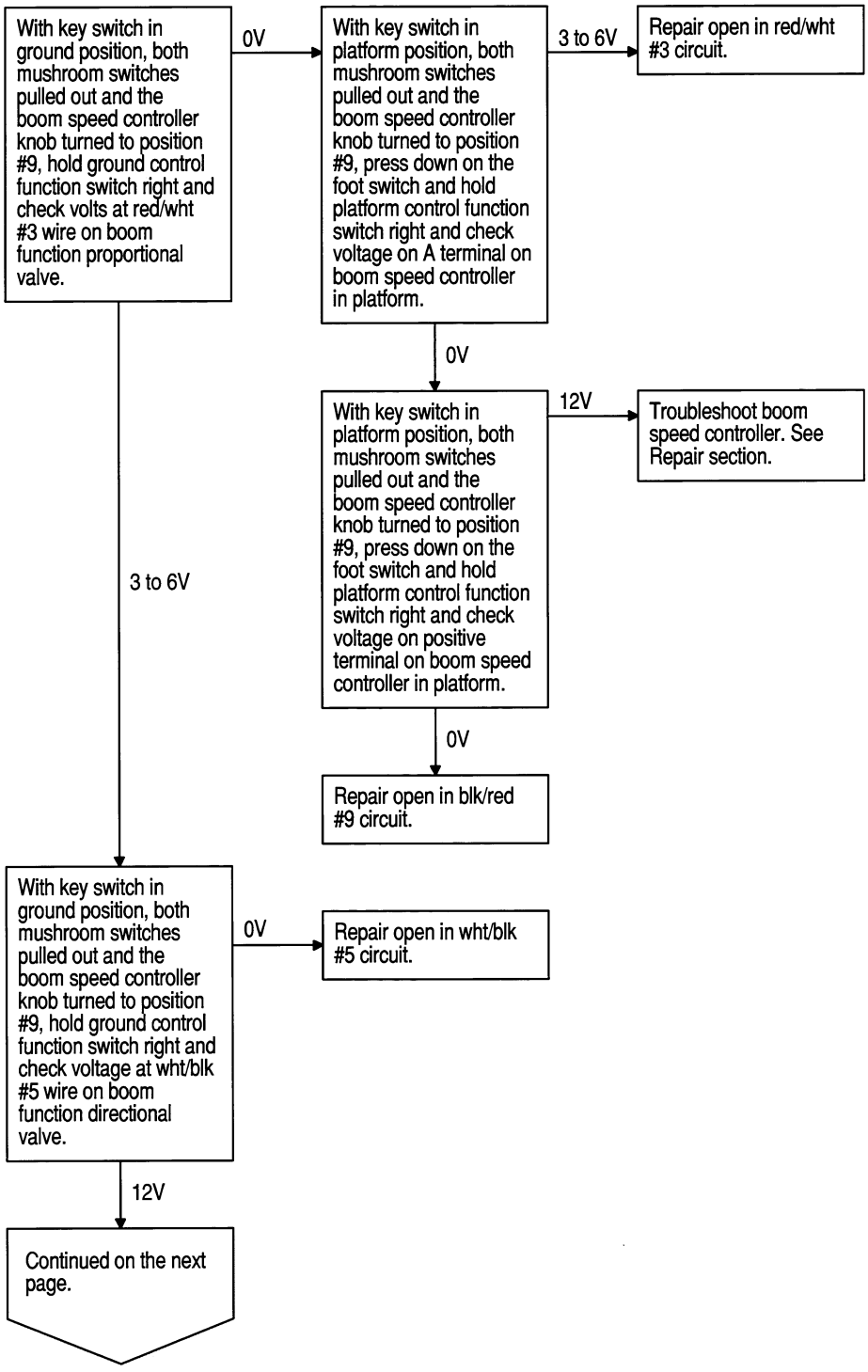


CHART 24

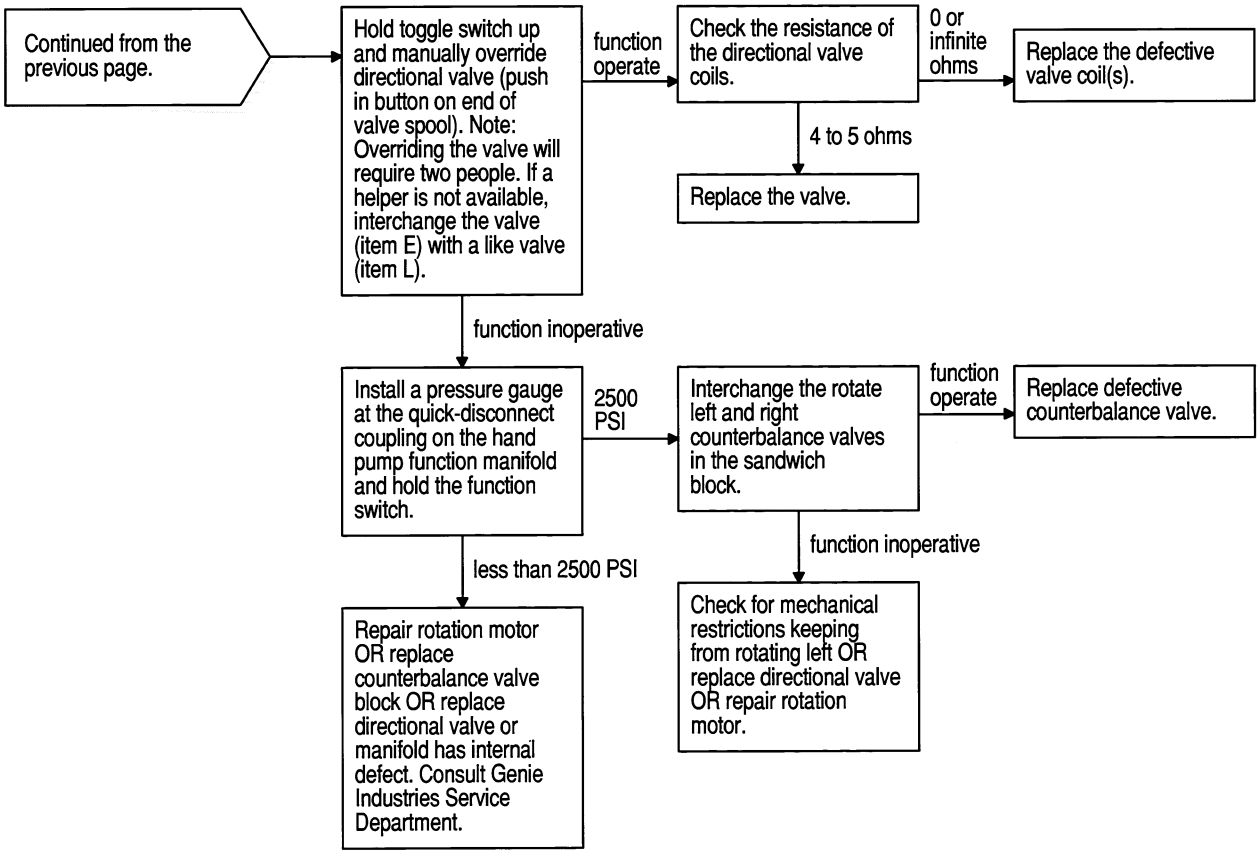

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item E) with a like valve (item L).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a pressure gauge at the quick-disconnect coupling on the hand pump function manifold and hold the function switch.
2500 PSI
Interchange the rotate left and right counterbalance valves in the sandwich block.
function operate
Replace defective counterbalance valve.
function inoperative
Check for mechanical restrictions keeping from rotating left OR replace directional valve OR repair rotation motor.
less than 2500 PSI
Repair rotation motor OR replace counterbalance valve block OR replace directional valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 25

All Platform Leveling Functions Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

Be sure both automatic and manual platform leveling do not operate.

If automatic leveling operates but manual leveling does not, troubleshoot the platform level up function.

Engine models: Perform these tests with the engine running.

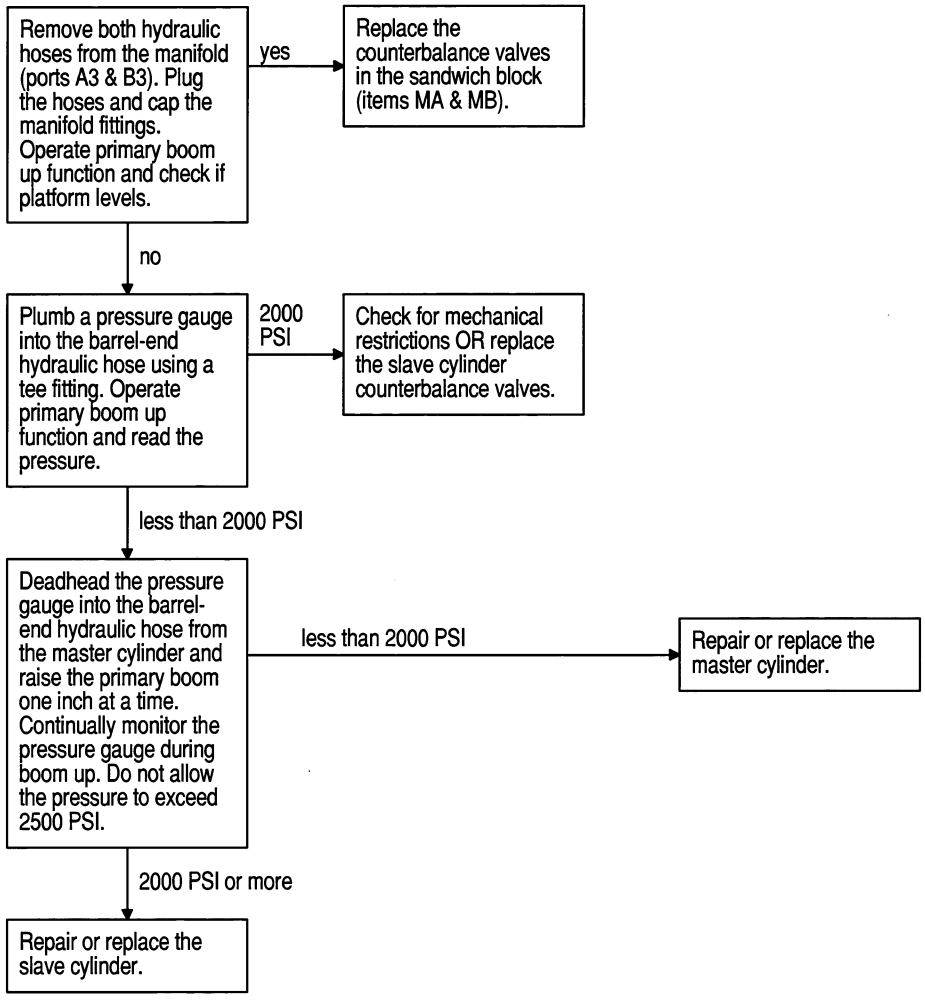


Chart 26

Platform Level Up Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If platform level up function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If platform level up function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models:
Perform these tests with the engine running.

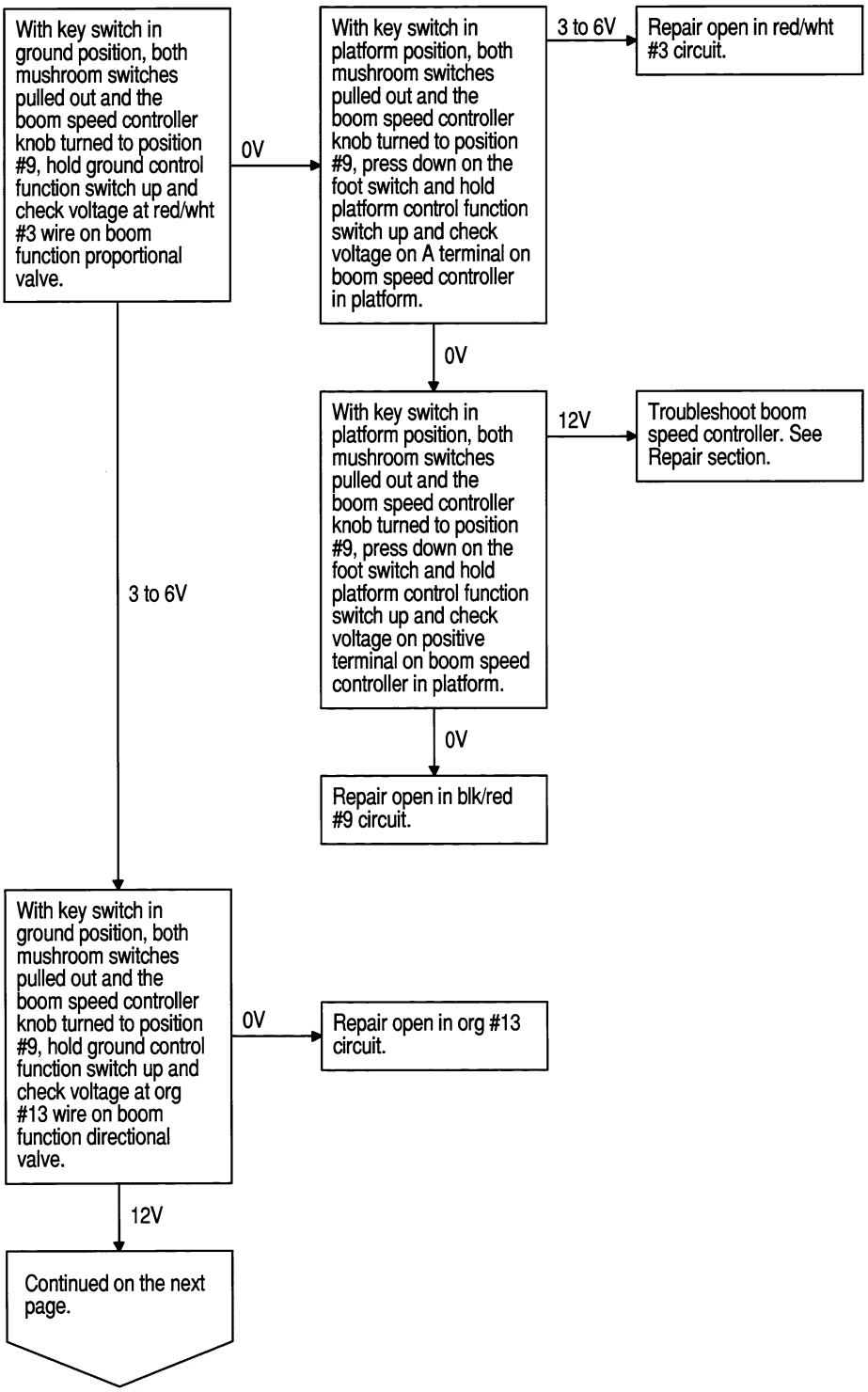


CHART 26

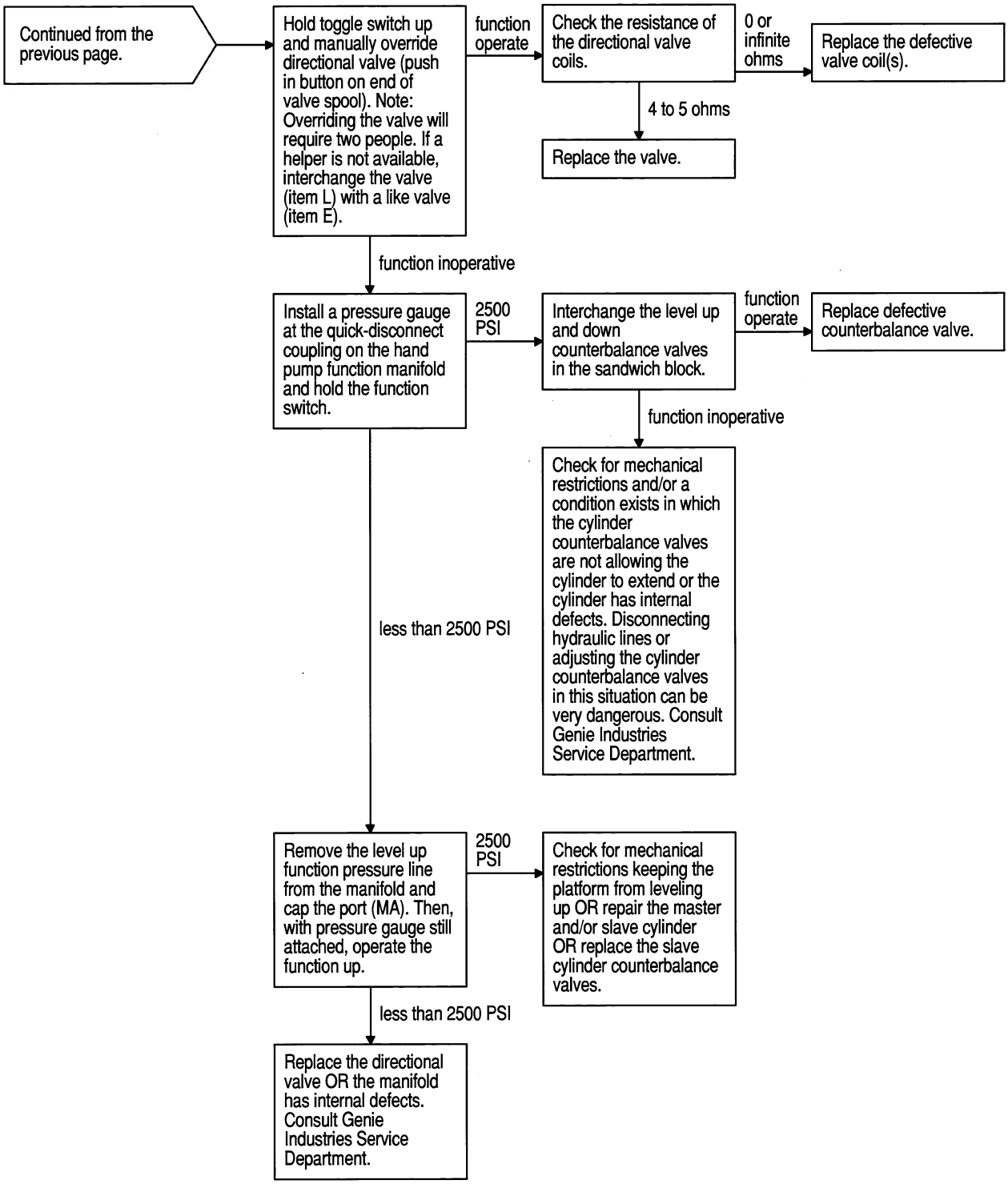

Continued from the previous page.
Hold toggle switch up and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item L) with a like valve (item E).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a pressure gauge at the quick-disconnect coupling on the hand pump function manifold and hold the function switch.
2500 PSI
Interchange the level up and down counterbalance valves in the sandwich block.
function operate
Replace defective counterbalance valve.
function inoperative
Check for mechanical restrictions and/or a condition exists in which the cylinder counterbalance valves are not allowing the cylinder to extend or the cylinder has internal defects. Disconnecting hydraulic lines or adjusting the cylinder counterbalance valves in this situation can be very dangerous. Consult Genie Industries Service Department.
less than 2500 PSI
Remove the level up function pressure line from the manifold and cap the port (MA). Then, with pressure gauge still attached, operate the function up.
2500 PSI
Check for mechanical restrictions keeping the platform from leveling up OR repair the master and/or slave cylinder OR replace the slave cylinder counterbalance valves.
less than 2500 PSI
Replace the directional valve OR the manifold has internal defects. Consult Genie Industries Service Department.

Chart 27

Platform Level Down Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If platform level down function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If platform level down function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

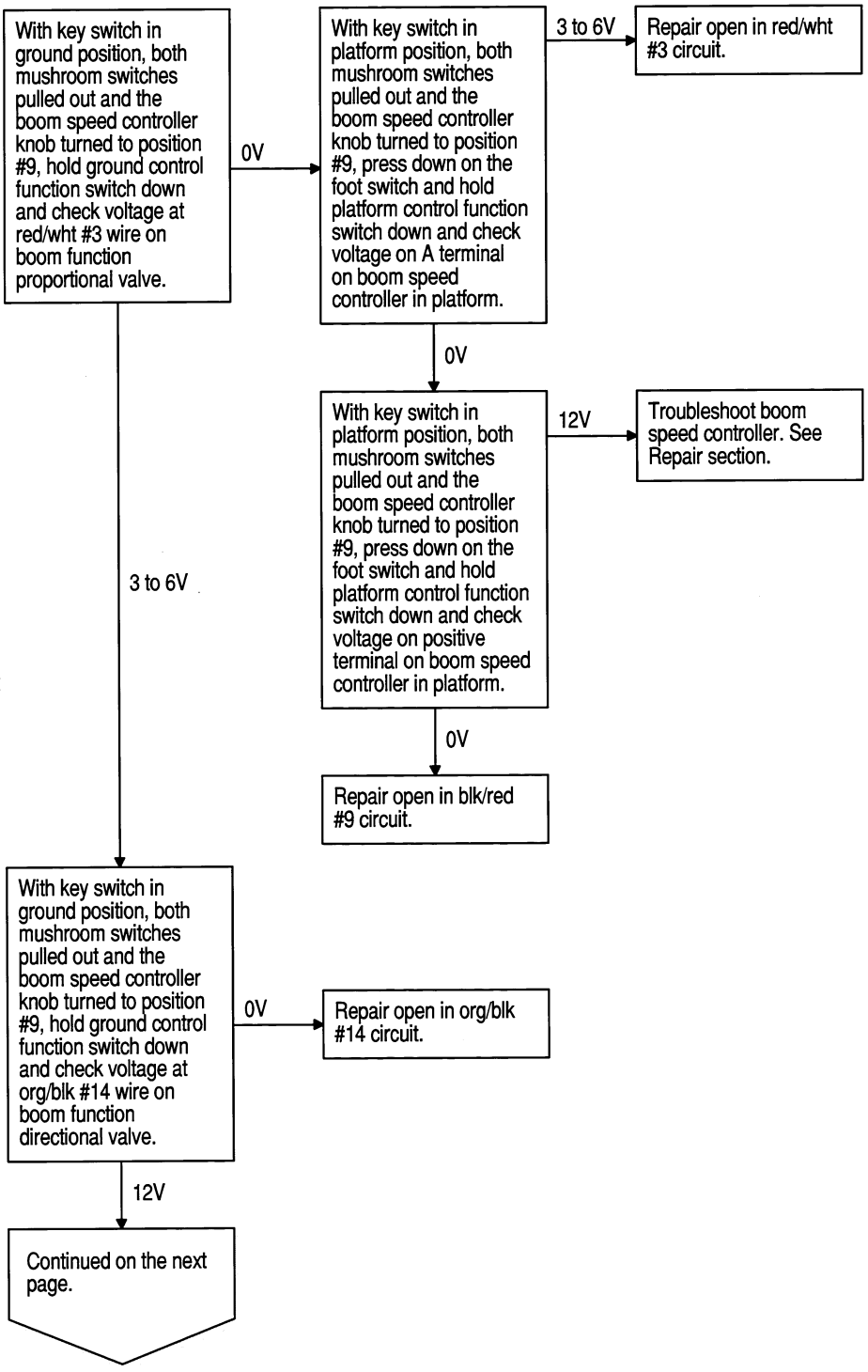


CHART 27

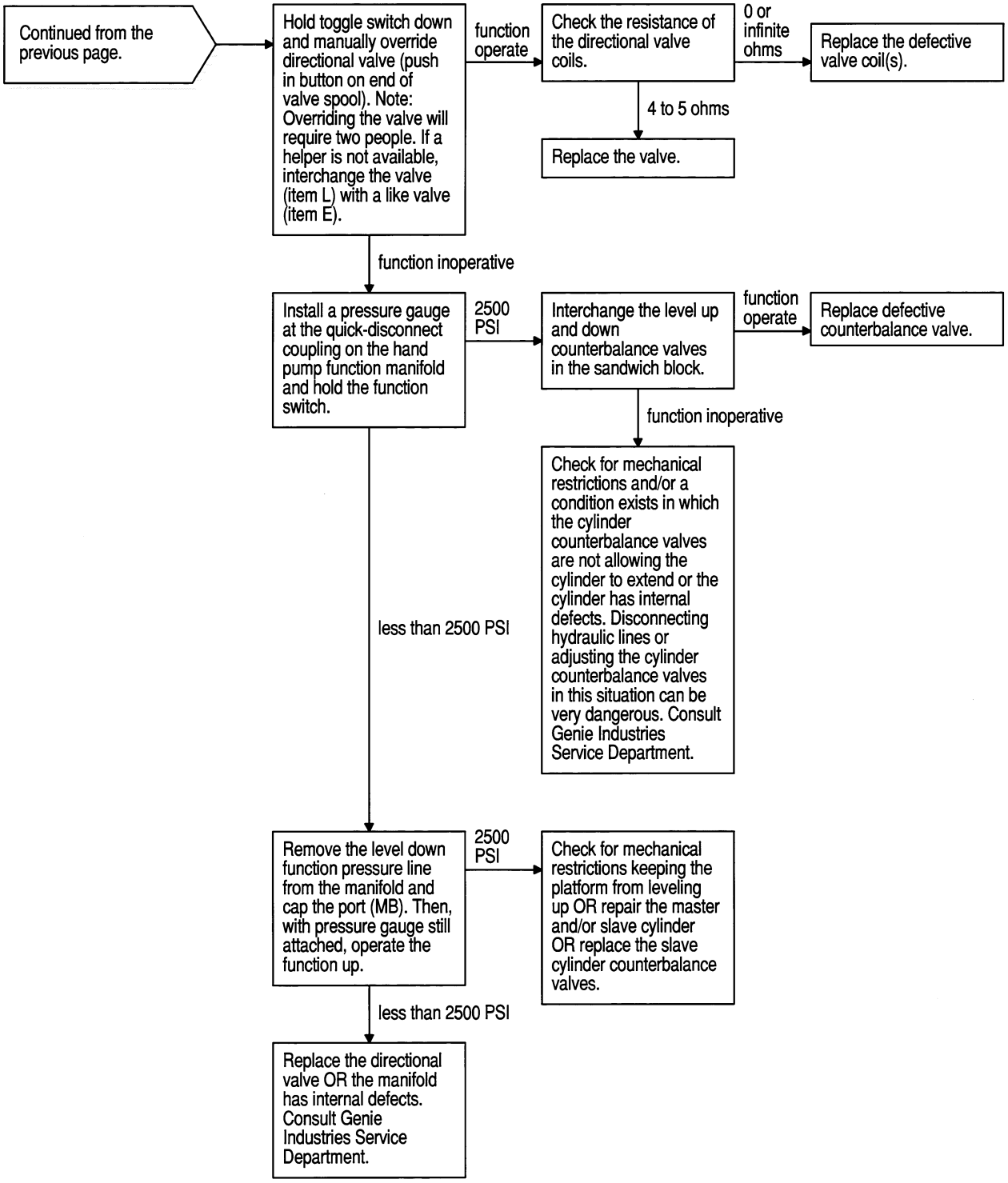

Continued from the previous page.
Hold toggle switch down and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item L) with a like valve (item E).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a pressure gauge at the quick-disconnect coupling on the hand pump function manifold and hold the function switch.
2500 PSI
Interchange the level up and down counterbalance valves in the sandwich block.
function operate
Replace defective counterbalance valve.
function inoperative
Check for mechanical restrictions and/or a condition exists in which the cylinder counterbalance valves are not allowing the cylinder to extend or the cylinder has internal defects. Disconnecting hydraulic lines or adjusting the cylinder counterbalance valves in this situation can be very dangerous. Consult Genie Industries Service Department.
less than 2500 PSI
Remove the level down function pressure line from the manifold and cap the port (MB). Then, with pressure gauge still attached, operate the function up.
2500 PSI
Check for mechanical restrictions keeping the platform from leveling up OR repair the master and/or slave cylinder OR replace the slave cylinder counterbalance valves.
less than 2500 PSI
Replace the directional valve OR the manifold has internal defects. Consult Genie Industries Service Department.

Chart 28

Platform Rotate Left Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If platform rotate left function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If platform rotate left function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

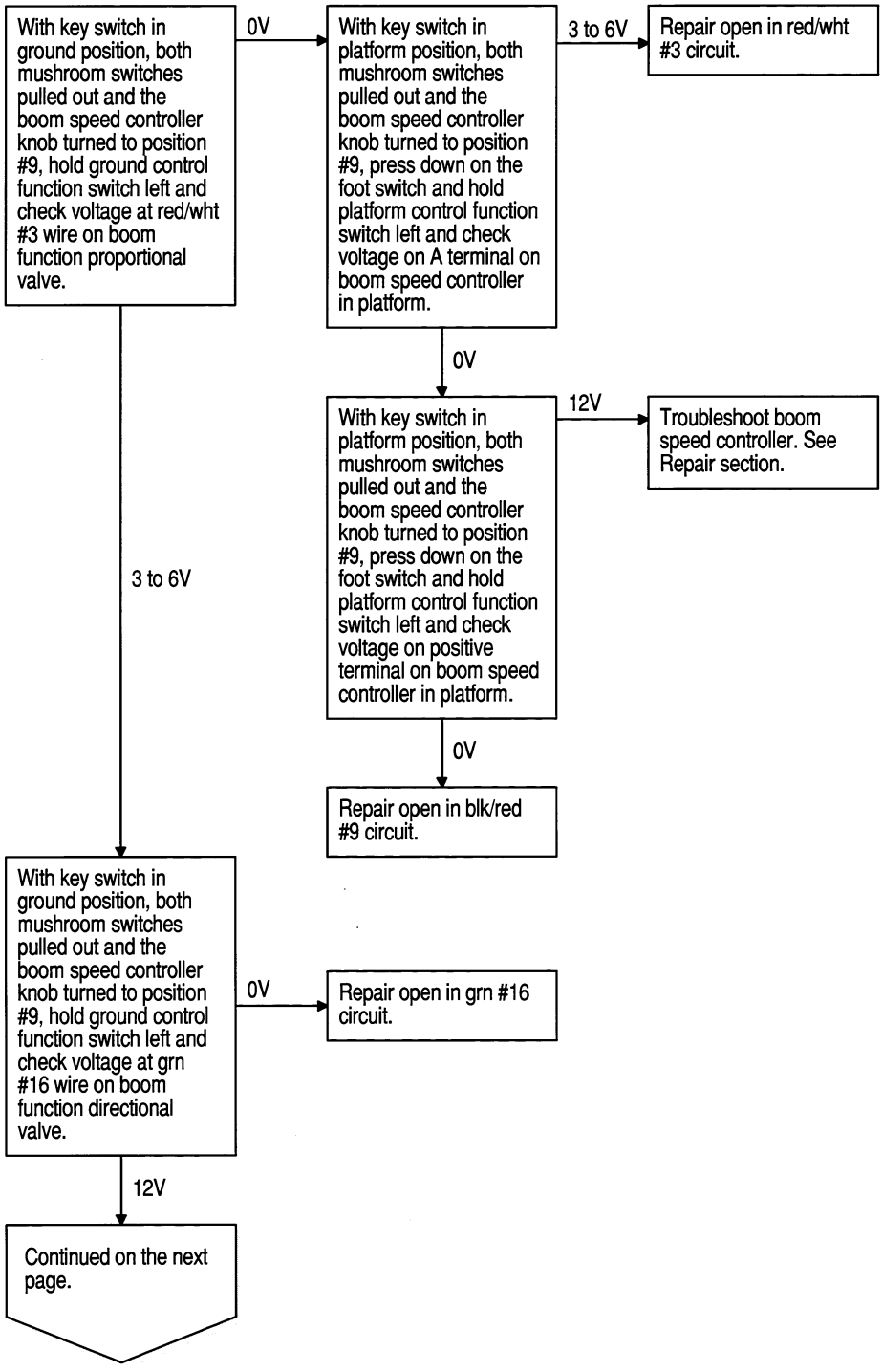


CHART 28

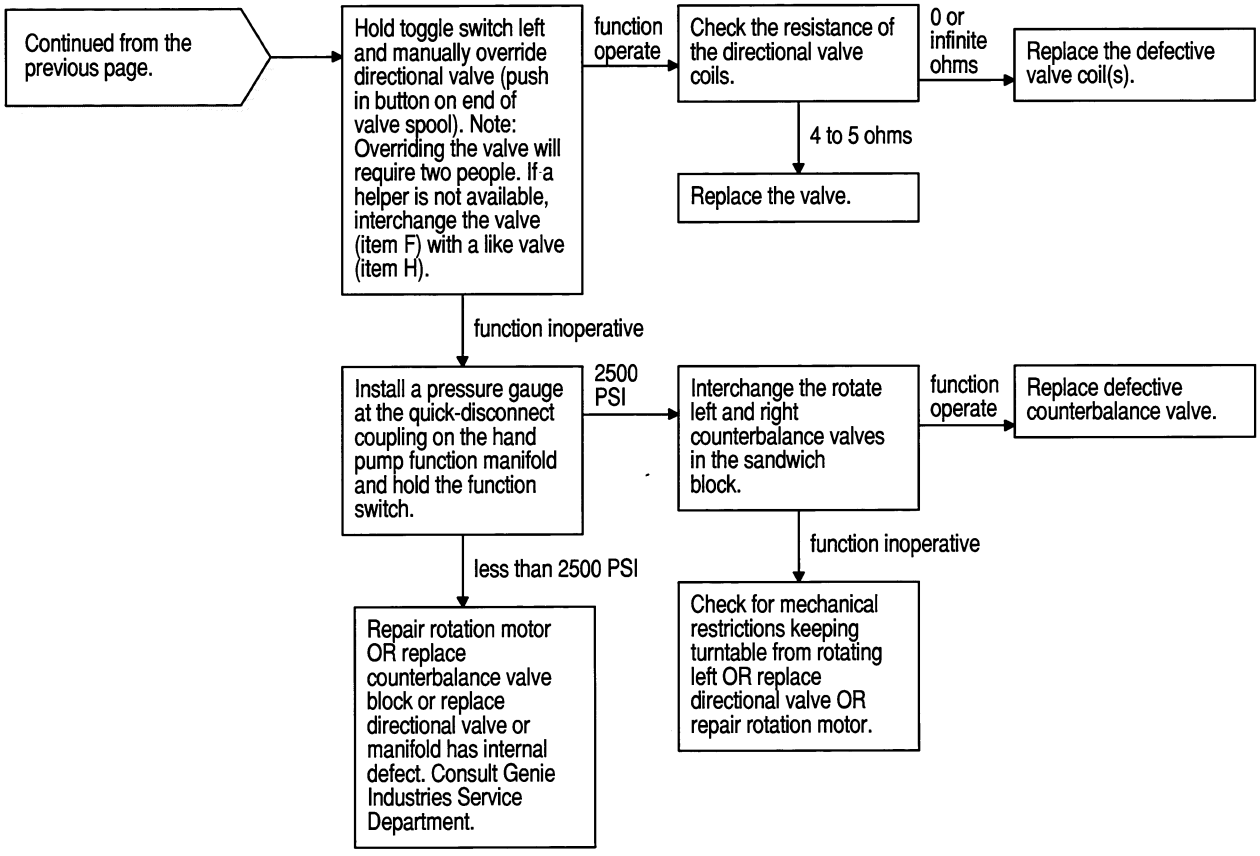

Continued from the previous page.
Hold toggle switch left and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item F) with a like valve (item H).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a pressure gauge at the quick-disconnect coupling on the hand pump function manifold and hold the function switch.
2500 PSI
Interchange the rotate left and right counterbalance valves in the sandwich block.
function operate
Replace defective counterbalance valve.
function inoperative
Check for mechanical restrictions keeping turntable from rotating left OR replace directional valve OR repair rotation motor.
less than 2500 PSI
Repair rotation motor OR replace counterbalance valve block or replace directional valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 29

Platform Rotate Right Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If platform rotate right function operates normally from the ground controls but not from the platform controls, troubleshoot the platform toggle switch. See Repair section.

If platform rotate right function operates normally from the platform controls but not from the ground controls, troubleshoot the ground control toggle switch. See Repair section.

Engine models: Perform these tests with the engine running.

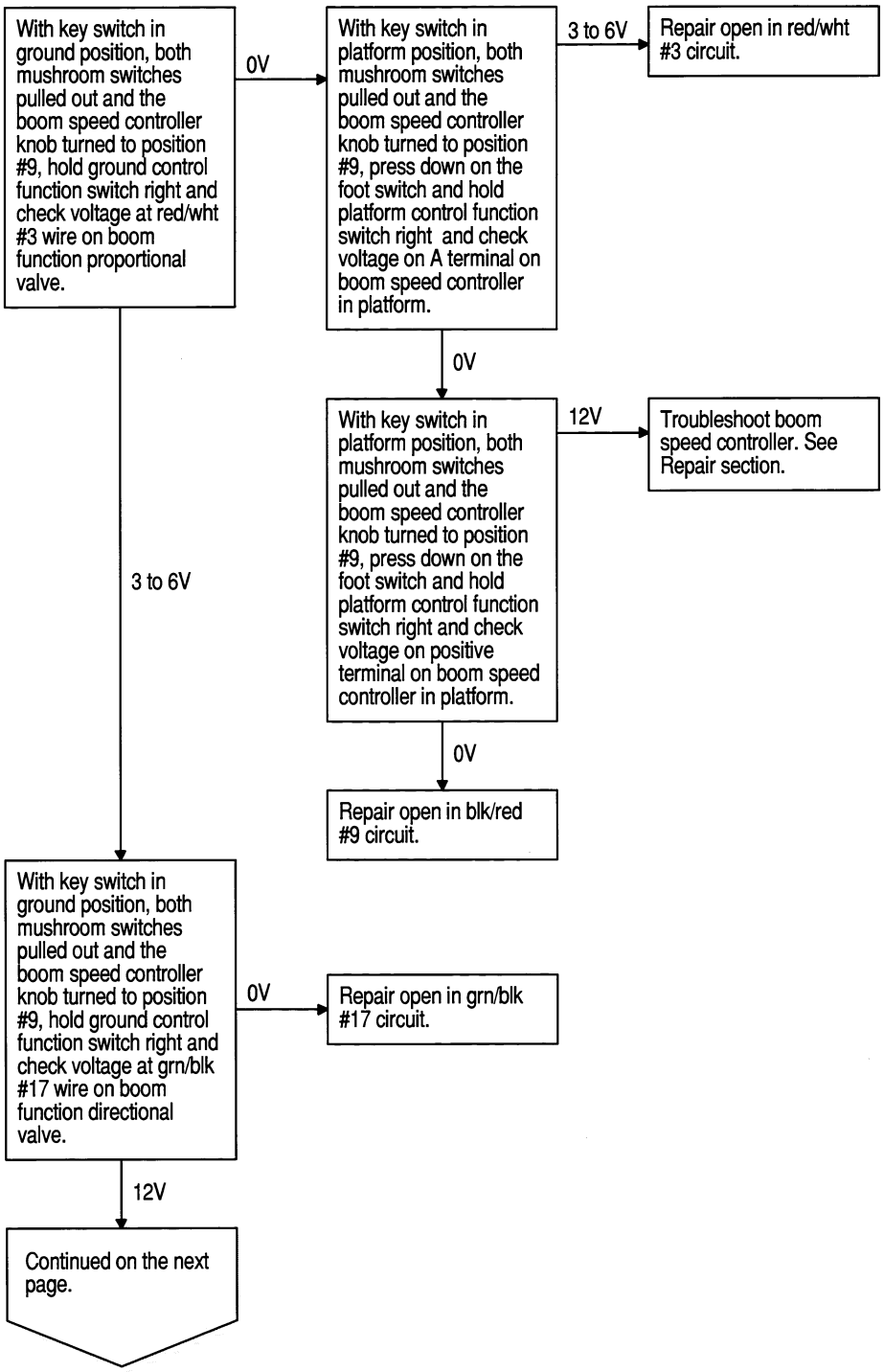


CHART 29

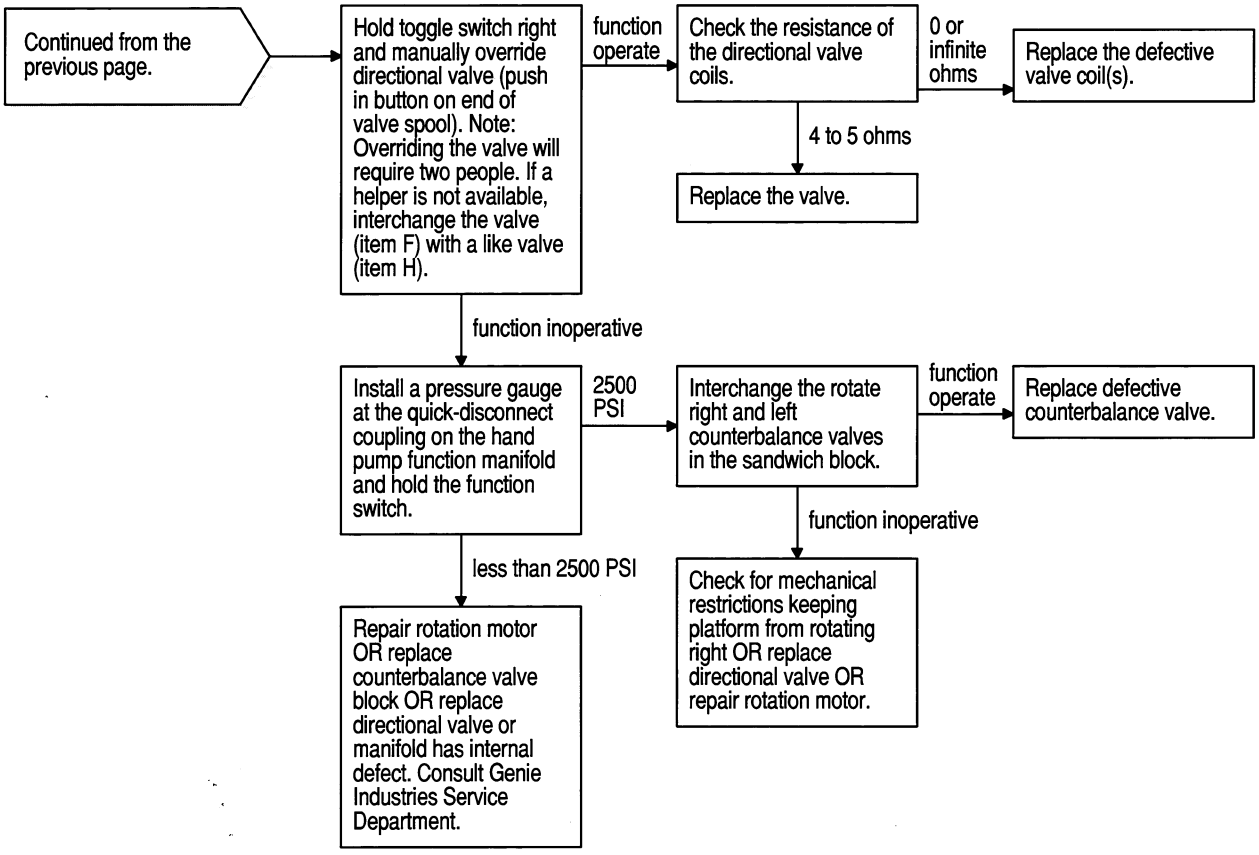

Continued from the previous page.
Hold toggle switch right and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people. If a helper is not available, interchange the valve (item F) with a like valve (item H).
function operate
Check the resistance of the directional valve coils.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a pressure gauge at the quick-disconnect coupling on the hand pump function manifold and hold the function switch.
2500 PSI
Interchange the rotate right and left counterbalance valves in the sandwich block.
function operate
Replace defective counterbalance valve.
function inoperative
Check for mechanical restrictions keeping platform from rotating right OR replace directional valve OR repair rotation motor.
less than 2500 PSI
Repair rotation motor OR replace counterbalance valve block OR replace directional valve or manifold has internal defect. Consult Genie Industries Service Department.

Chart 30

Steer Left Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If steer left function operates with engine running but not in DC mode, check diode connection between TB43 and CR8 terminal #13.

Engine models: Perform these tests with the engine running.

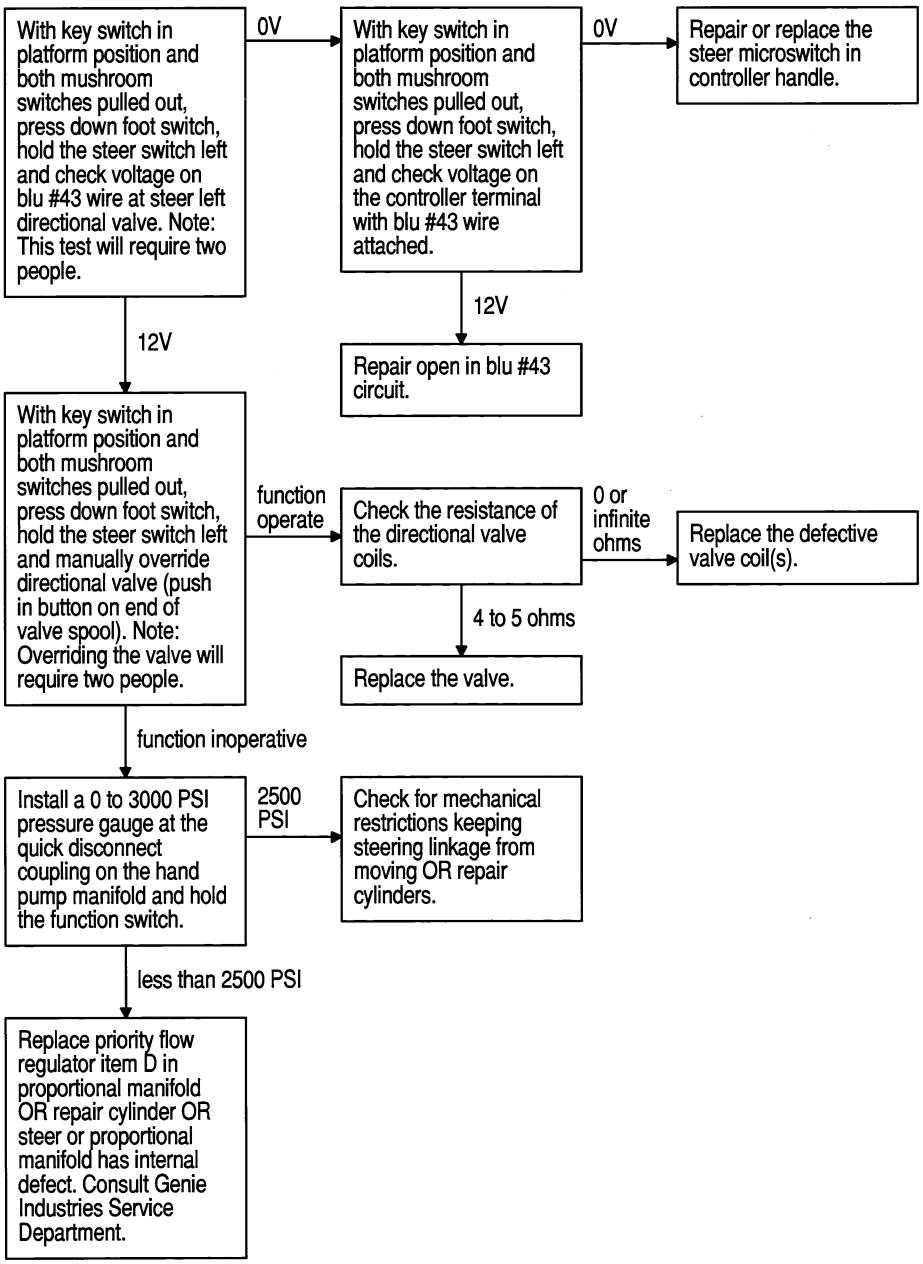


Chart 31

Steer Right Function Inoperative

Be sure all other functions operate normally in DC mode or with engine running.

If steer right function operates with engine running but not in DC mode, check diode connection between TB44 and CR8 terminal #13.

Engine models:
Perform these tests with the engine running.

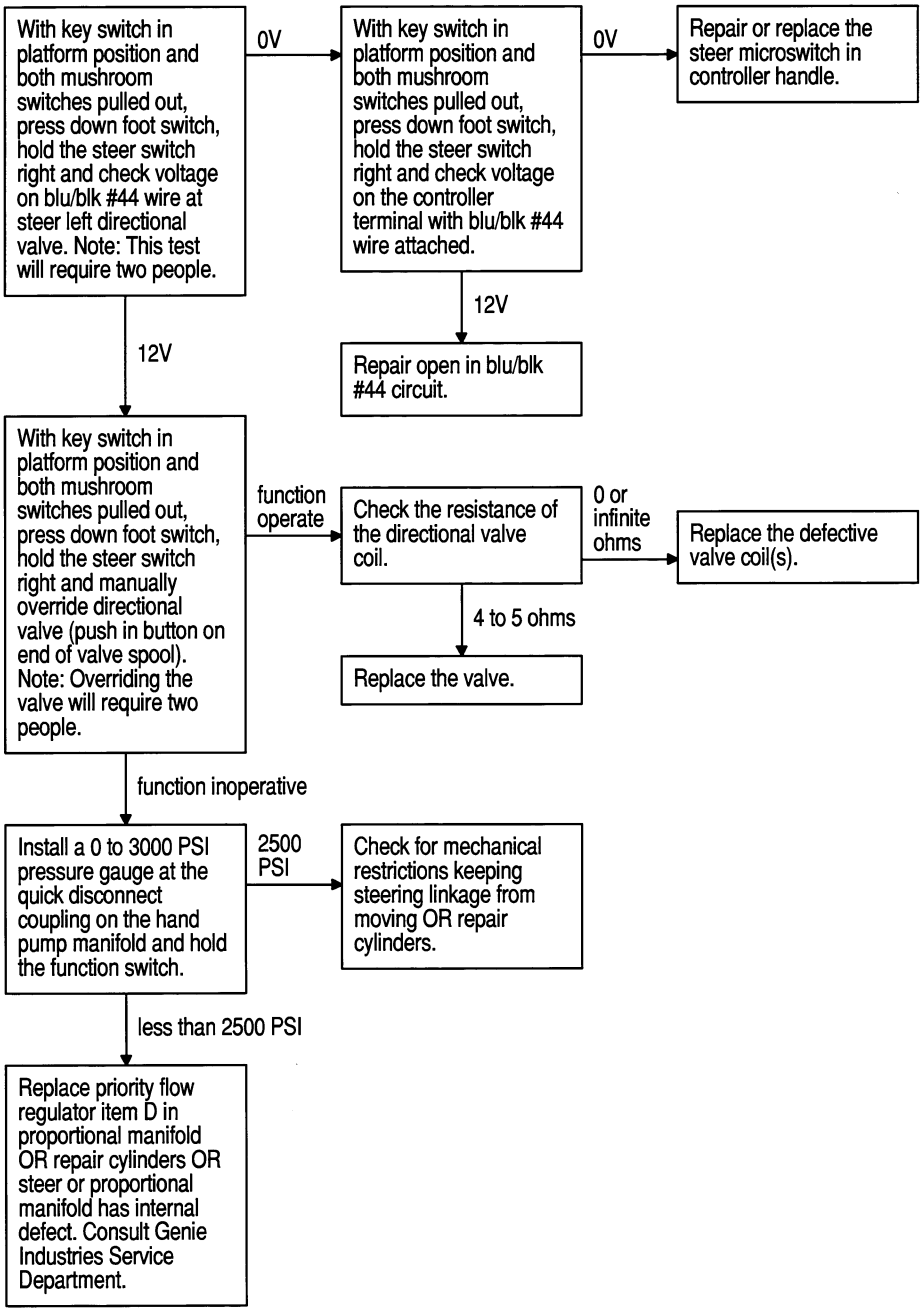


Chart 32

All Drive Functions Inopertive, All Other Functions Operate Normally

Be sure all other functions operate normally in DC mode or with engine running.

If drive functions operate with engine running but not in DC mode, check diode connection between TB37 and TB38 to terminal #13 on CR7 on Tri-fuel and Bi-fuel models or CR2 on DC models.

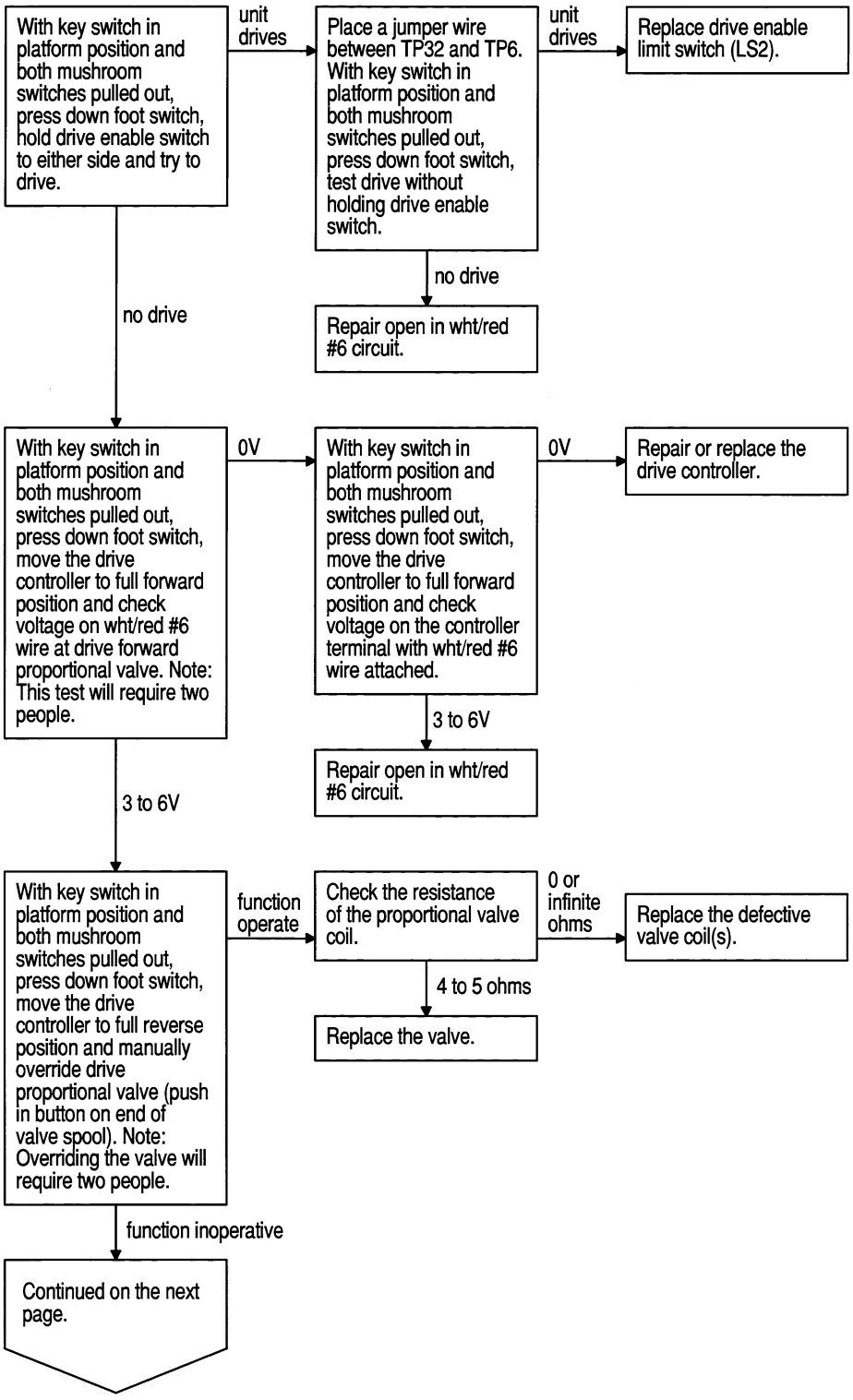


CHART 32

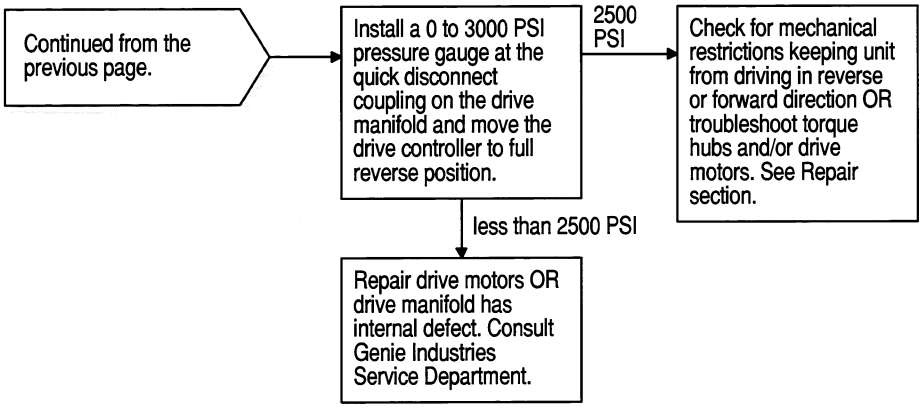

Continued from the previous page.
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the drive manifold and move the drive controller to full reverse position.
2500 PSI
Check for mechanical restrictions keeping unit from driving in reverse or forward direction OR troubleshoot torque hubs and/or drive motors. See Repair section.
less than 2500 PSI
Repair drive motors OR drive manifold has internal defect. Consult Genie Industries Service Department.

Chart 33

Drive Forward Function Inopertive

Be sure all other functions operate normally, including drive in opposite direction of malfunction, in DC mode or with engine running.

If drive forward function operates with engine running but not in DC mode, check diode connection between TB38 to terminal #13 on CR7 on Tri-fuel and Bi-fuel models or #13 on CR2 on DC models.

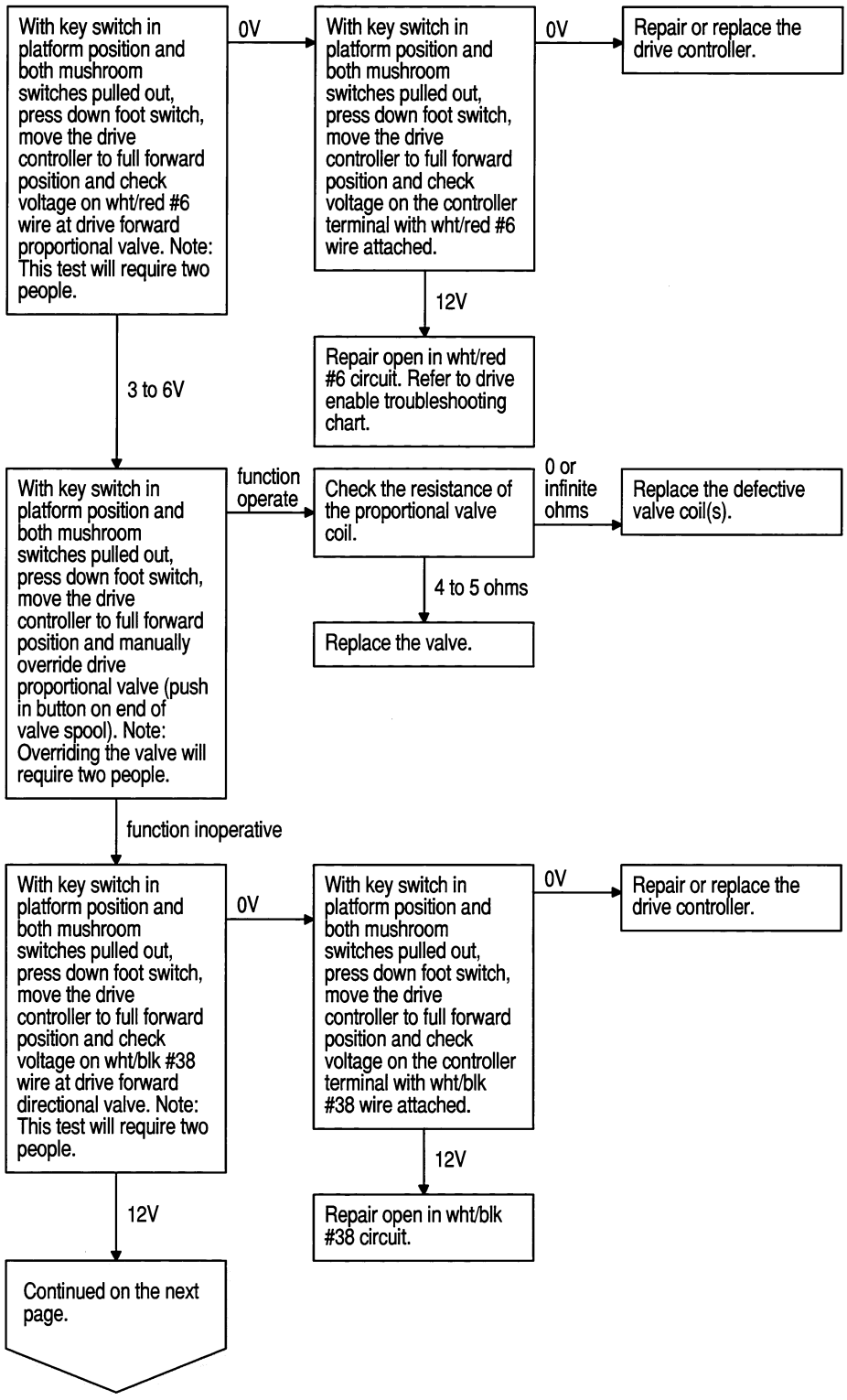


CHART 33

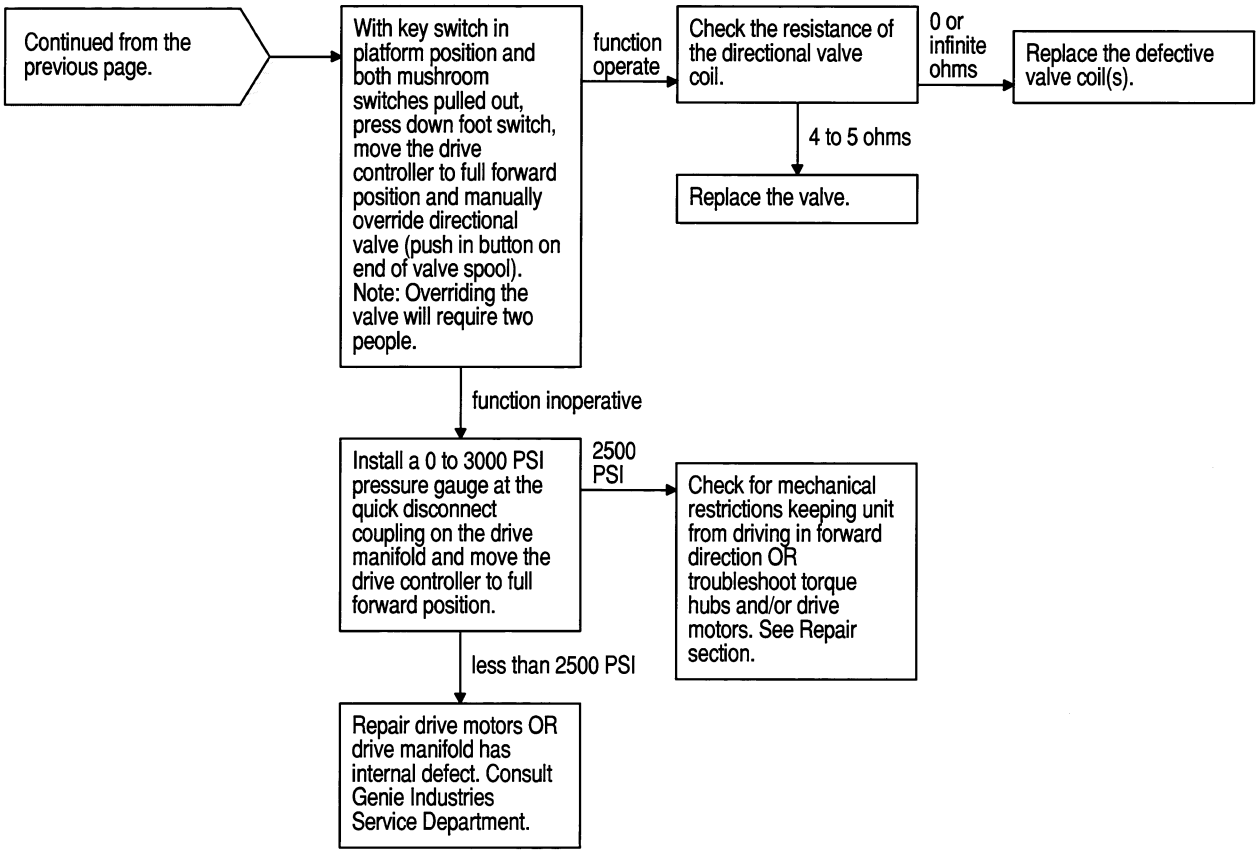

Continued from the previous page.
With key switch in platform position and both mushroom switches pulled out, press down foot switch, move the drive controller to full forward position and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people.
function operate
Check the resistance of the directional valve coil.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the drive manifold and move the drive controller to full forward position.
2500 PSI
Check for mechanical restrictions keeping unit from driving in forward direction OR troubleshoot torque hubs and/or drive motors. See Repair section.
less than 2500 PSI
Repair drive motors OR drive manifold has internal defect. Consult Genie Industries Service Department.

Chart 34

Drive Reverse Function Inoperative

Be sure all other functions operate normally including drive in opposite direction of malfunction in DC mode or with engine running.

If Drive Reverse Function operates with engine running but not in D.C. mode check diode connection between TB37 to terminal #13 on CR7 on Tri-Fuel and Bi-Fuel models or terminal #13 on CR2 on DC models.

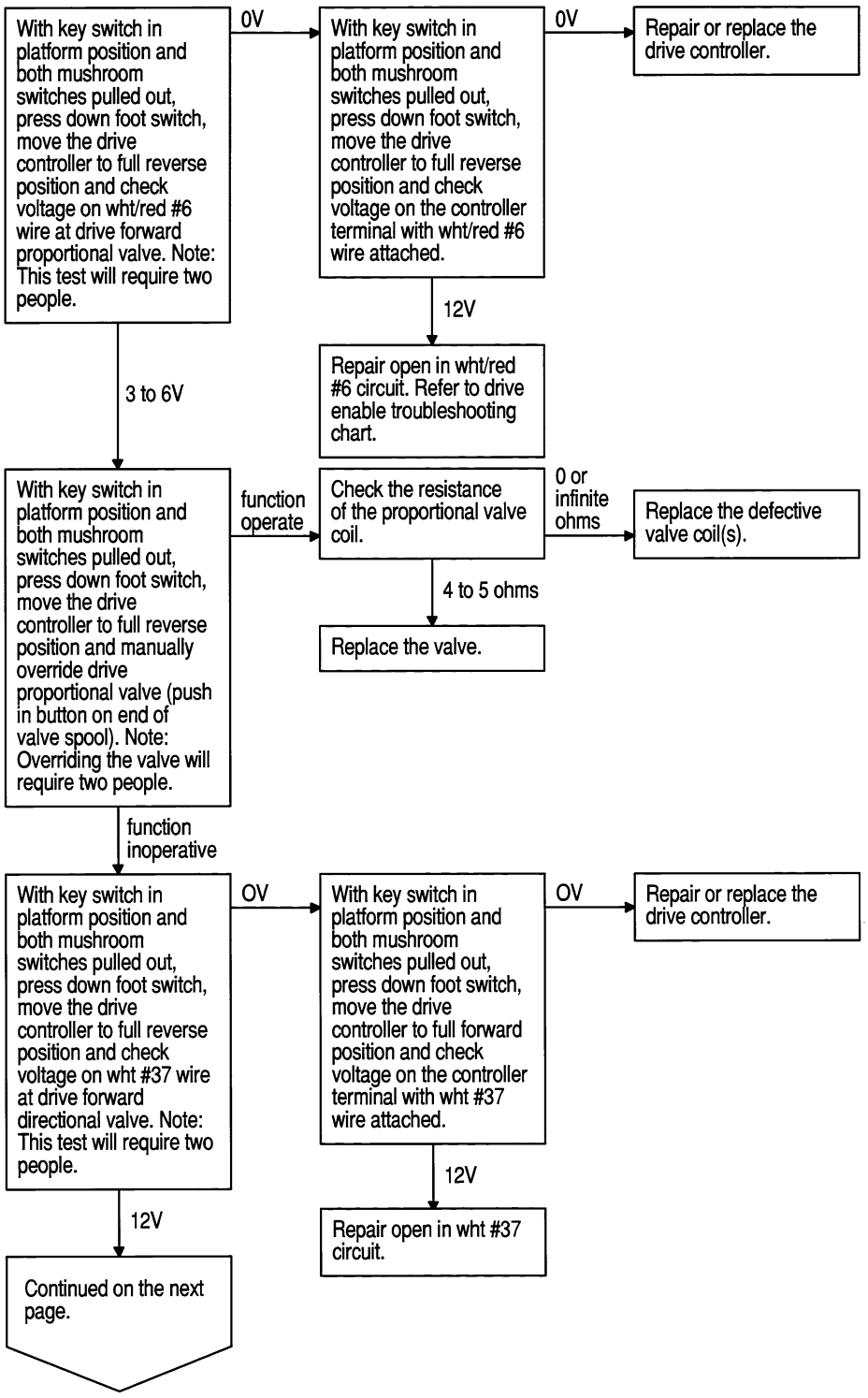


CHART 34

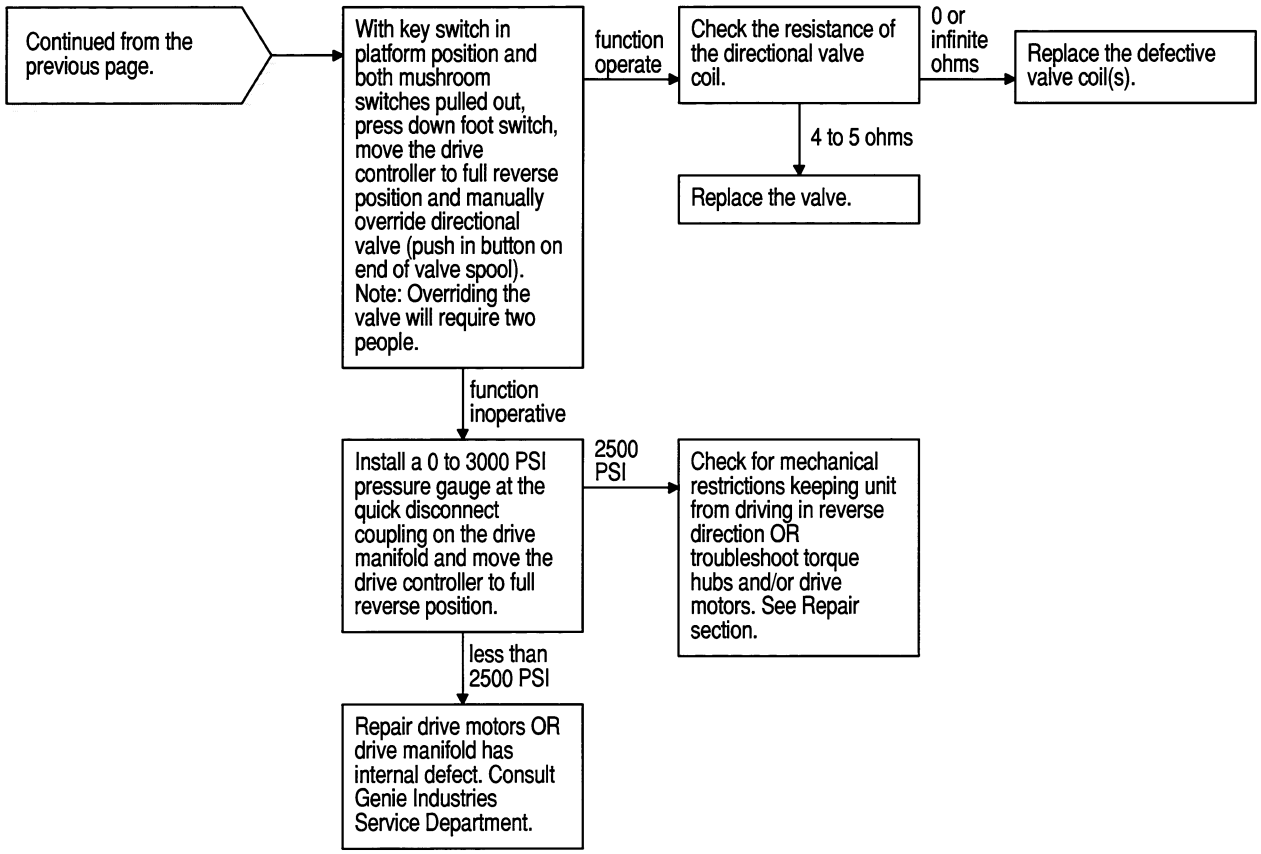

Continued from the previous page.
With key switch in platform position and both mushroom switches pulled out, press down foot switch, move the drive controller to full reverse position and manually override directional valve (push in button on end of valve spool). Note: Overriding the valve will require two people.
function operate
Check the resistance of the directional valve coil.
0 or infinite ohms
Replace the defective valve coil(s).
4 to 5 ohms
Replace the valve.
function inoperative
Install a 0 to 3000 PSI pressure gauge at the quick disconnect coupling on the drive manifold and move the drive controller to full reverse position.
2500 PSI
Check for mechanical restrictions keeping unit from driving in reverse direction OR troubleshoot torque hubs and/or drive motors. See Repair section.
less than 2500 PSI
Repair drive motors OR drive manifold has internal defect. Consult Genie Industries Service Department.

Chart 35

High Range Drive Function Inopertive

Be sure all other functions operate normally in DC mode or with engine running.

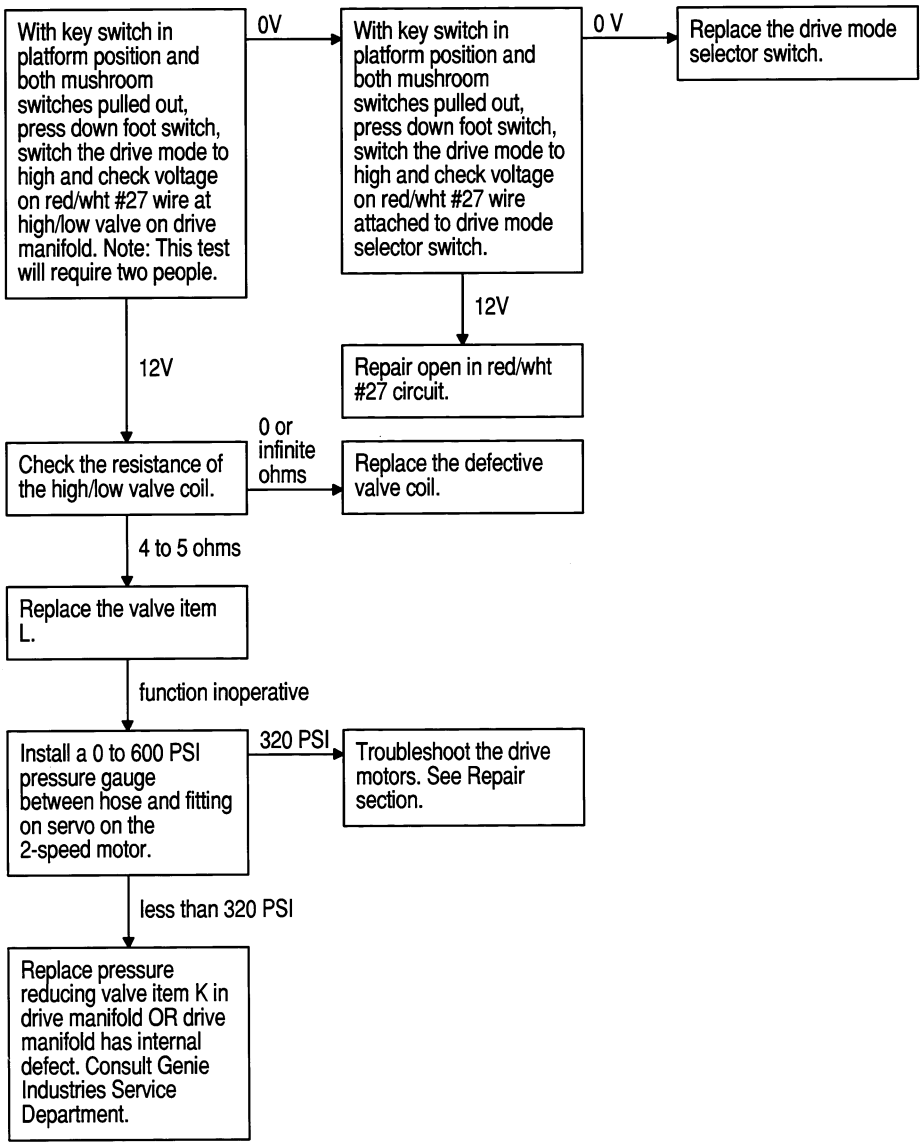


Chart 36

Low Range Drive Function Inopertive

Be sure all other functions operate normally in DC mode or with engine running.

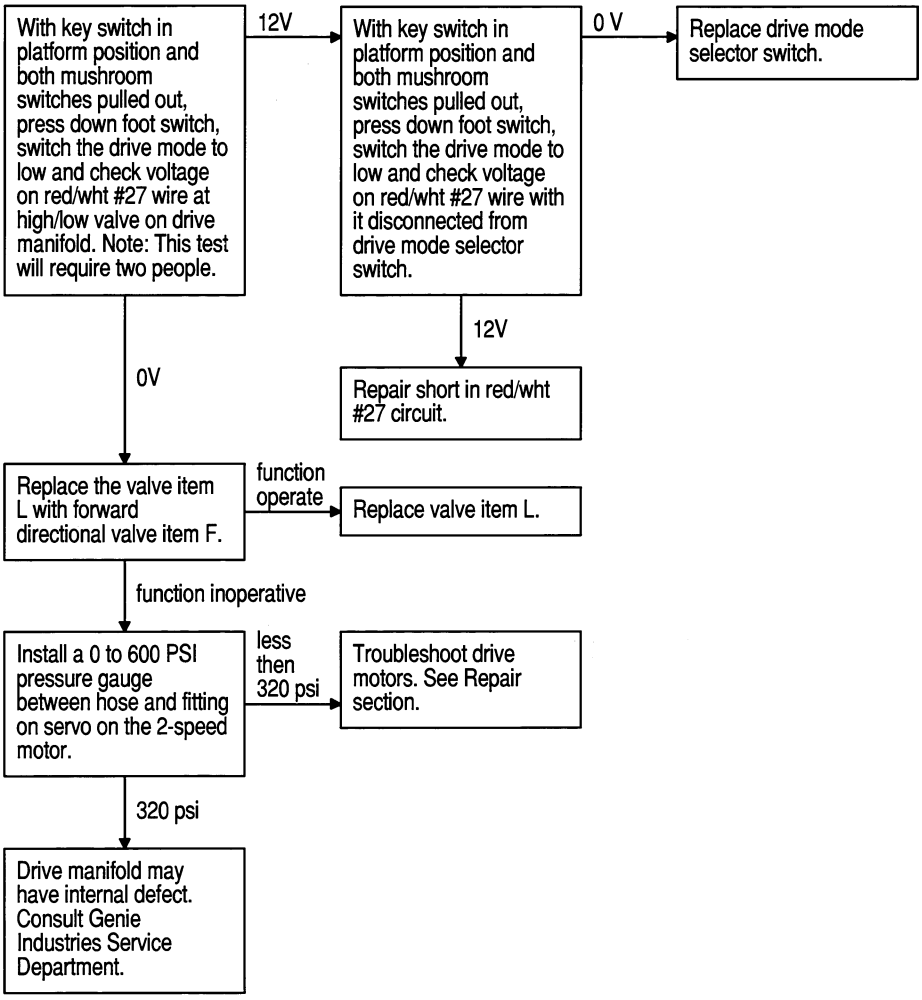


Chart 37

Machine Will Not Drive At Full Speed

Be sure all other functions operate normally in DC mode or with engine running.

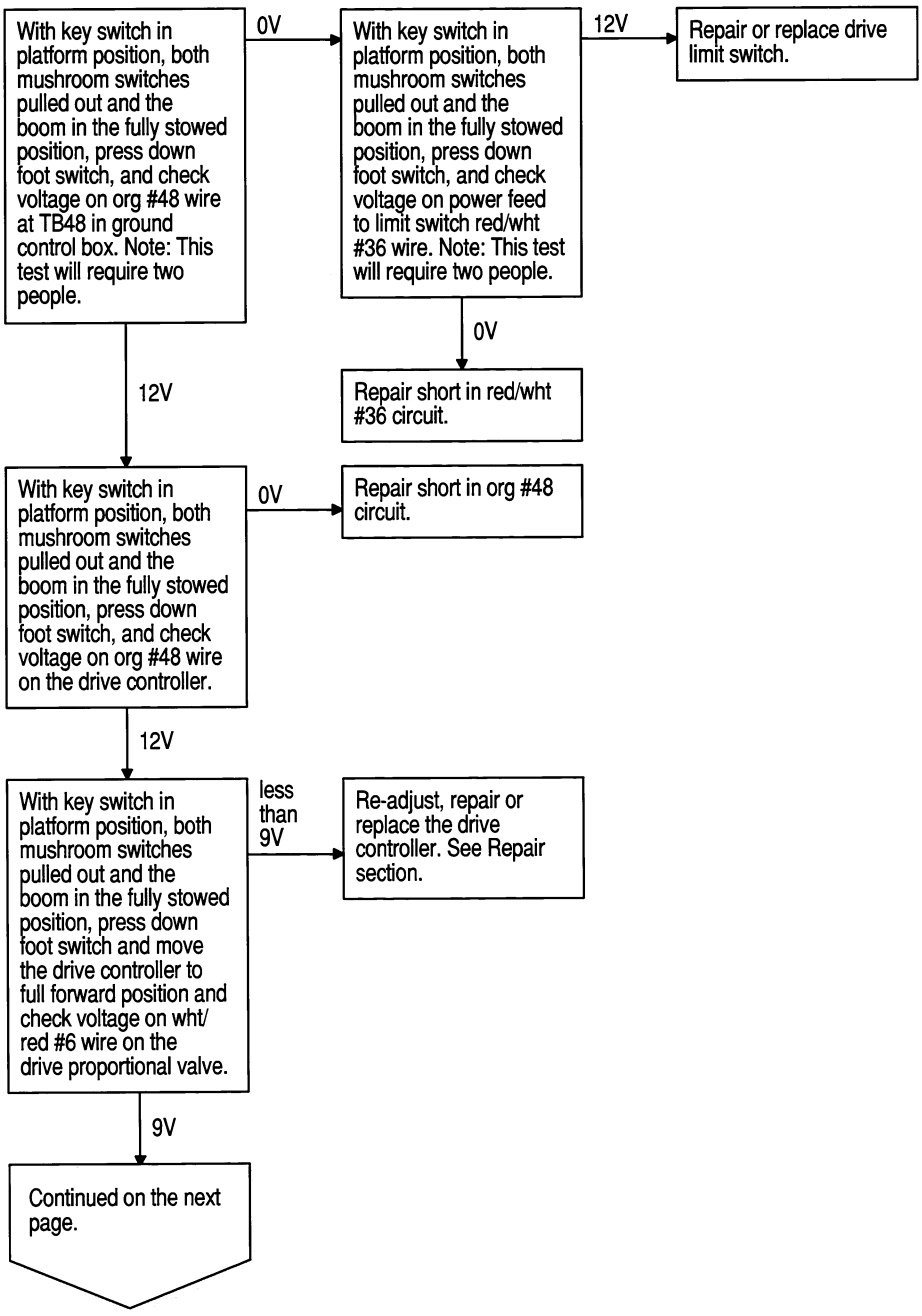


CHART 37

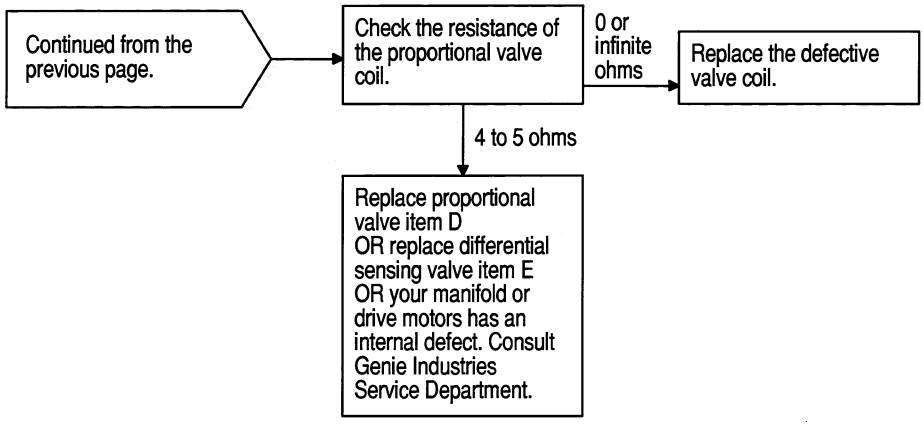

Continued from the previous page.
Check the resistance of the proportional valve coil.
0 or infinite ohms
Replace the defective valve coil.
4 to 5 ohms
Replace proportional valve item D OR replace differential sensing valve item E OR your manifold or drive motors has an internal defect. Consult Genie Industries Service Department.

Chart 38

Machine Drives At Full Speed With Platform Raised

Be sure all other functions operate normally in DC mode or with engine running.

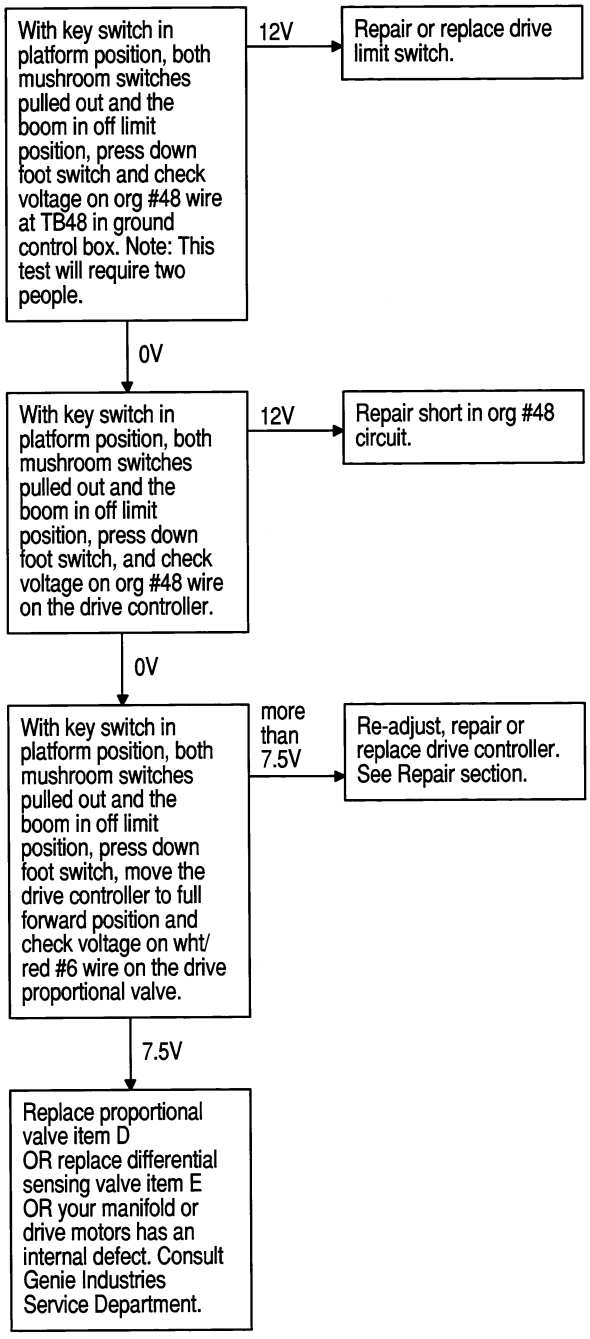
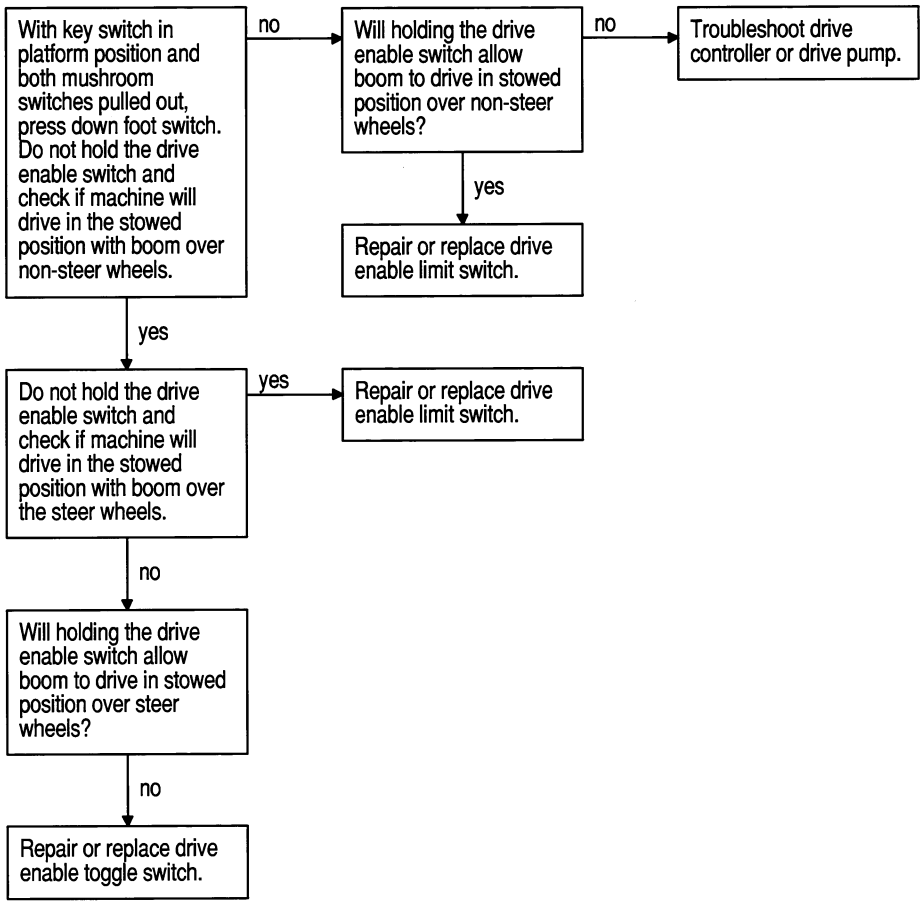


Chart 39

Drive Enable System Is Malfunctioning

Be sure all other functions operate normally in DC mode or with engine running.



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 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.

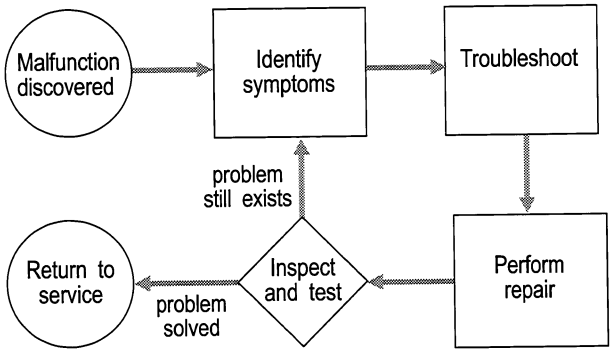
Electrical Schematics

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

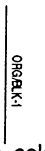
Hydraulic Schematics

⚠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



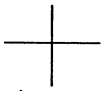
T-circuits connect at terminal



T-circuits connect



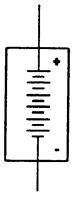
Connection no terminal



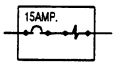
Circuits crossing no connection



Diode



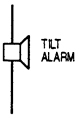
Battery



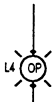
Circuit breaker



Solenoid or relay coil



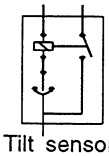
Horn



Light



Resistor

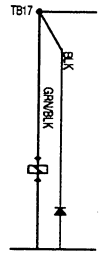


Tilt sensor

Spark plug



Glow plug



Ground supression circuit



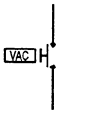
Limit switch



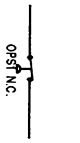
Limit switch normally open held closed



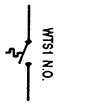
Limit switch normally closed held open



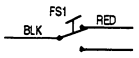
Vacuum switch normally open



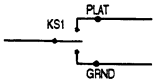
Oil pressure switch normally closed



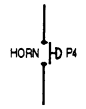
Water temperature switch normally open



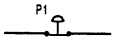
Foot switch



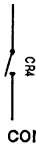
Key switch



Horn button normally open



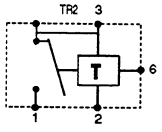
Emergency Stop button normally closed



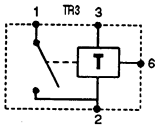
Relay contact normally open



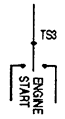
Relay panel contactor



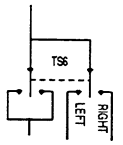
Time delay relay positive switching



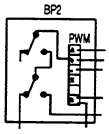
Time delay relay negative switching



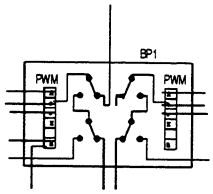
Toggle switch SPDT



Toggle switch DPDT



Single axis proportional controller

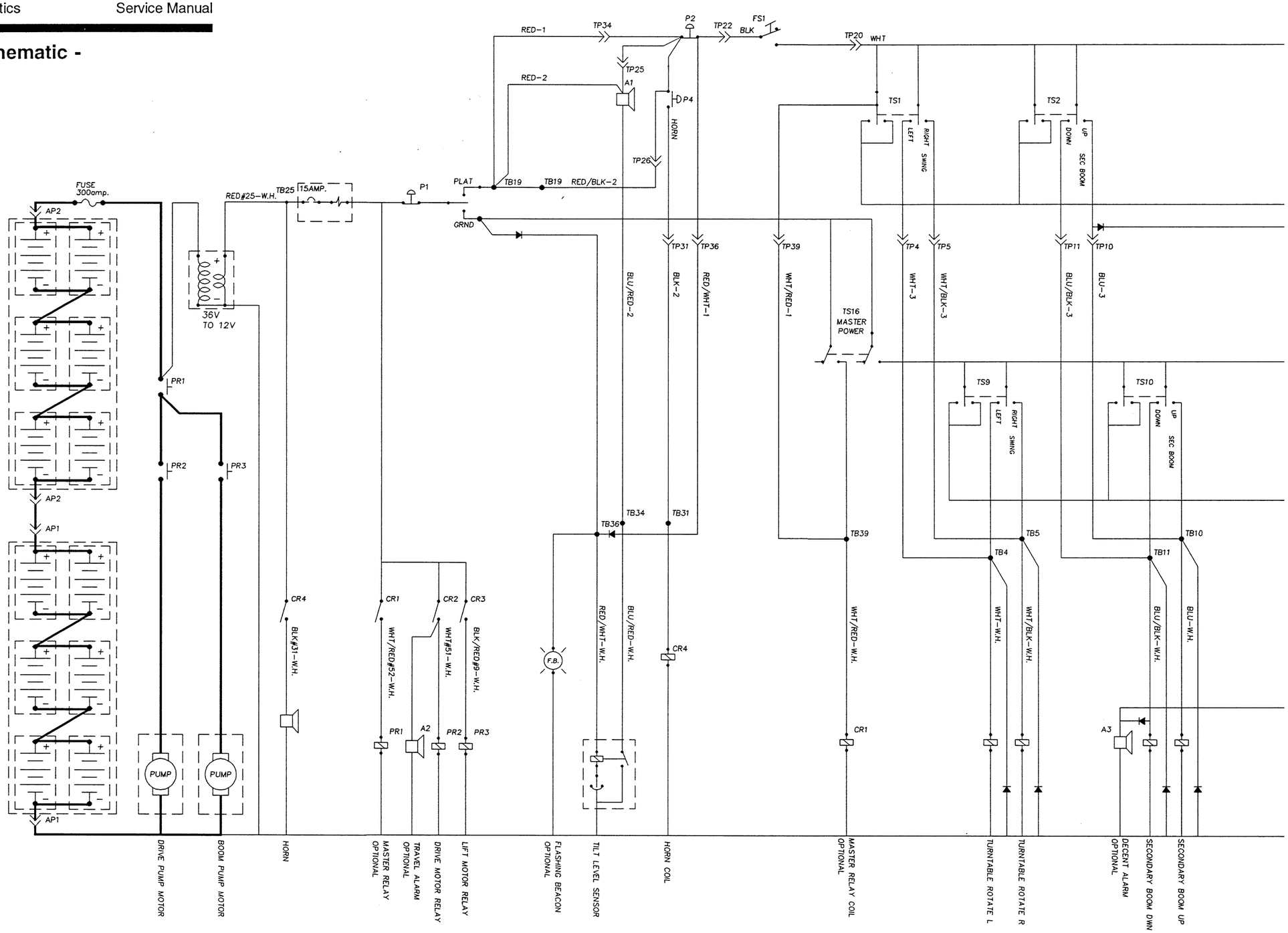


Dual axis proportional controller

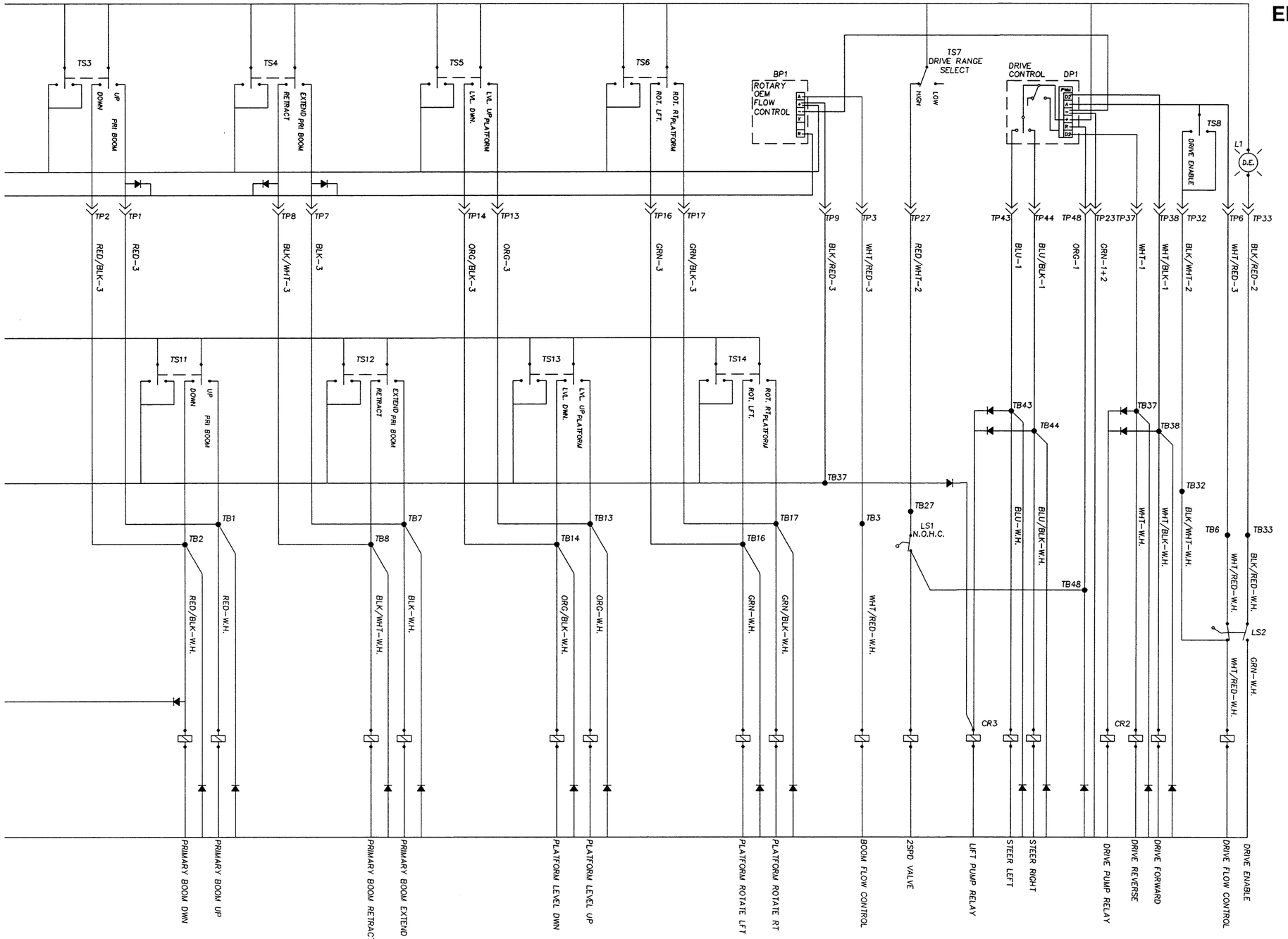




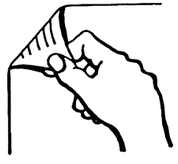
Electrical Schematic - DC Models



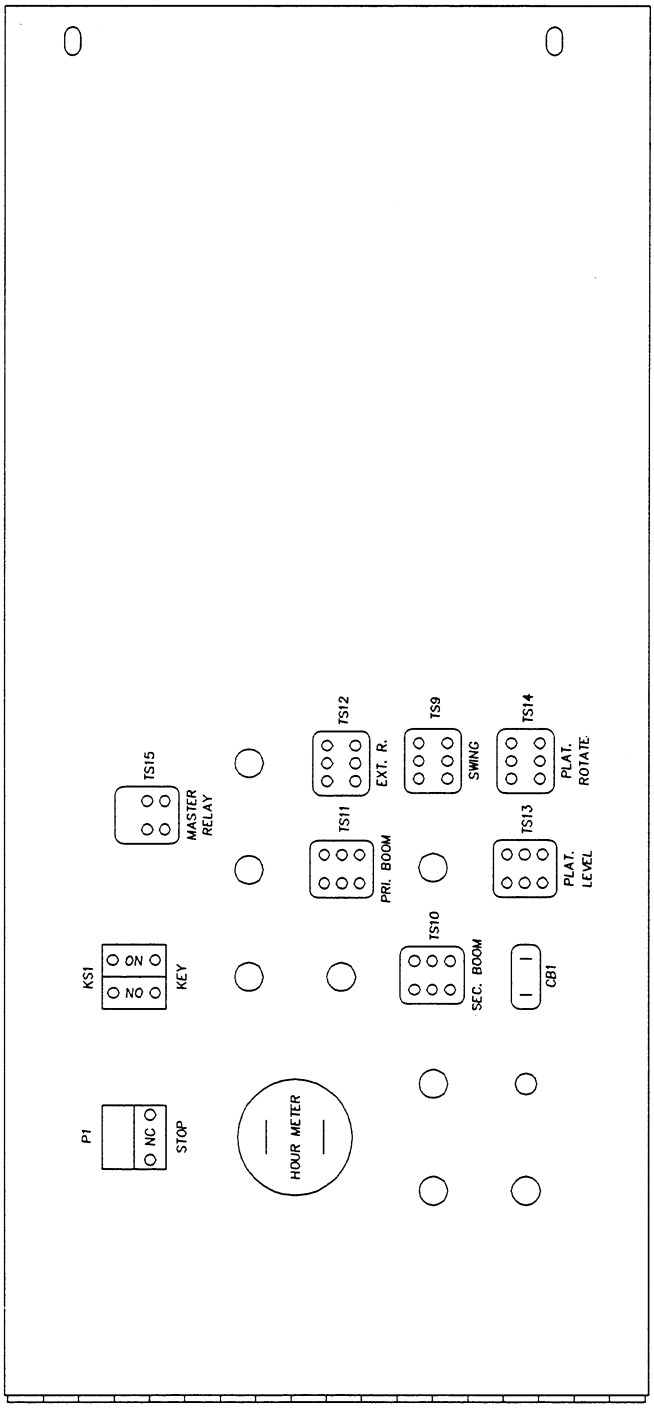
Electrical Schematic - DC Models

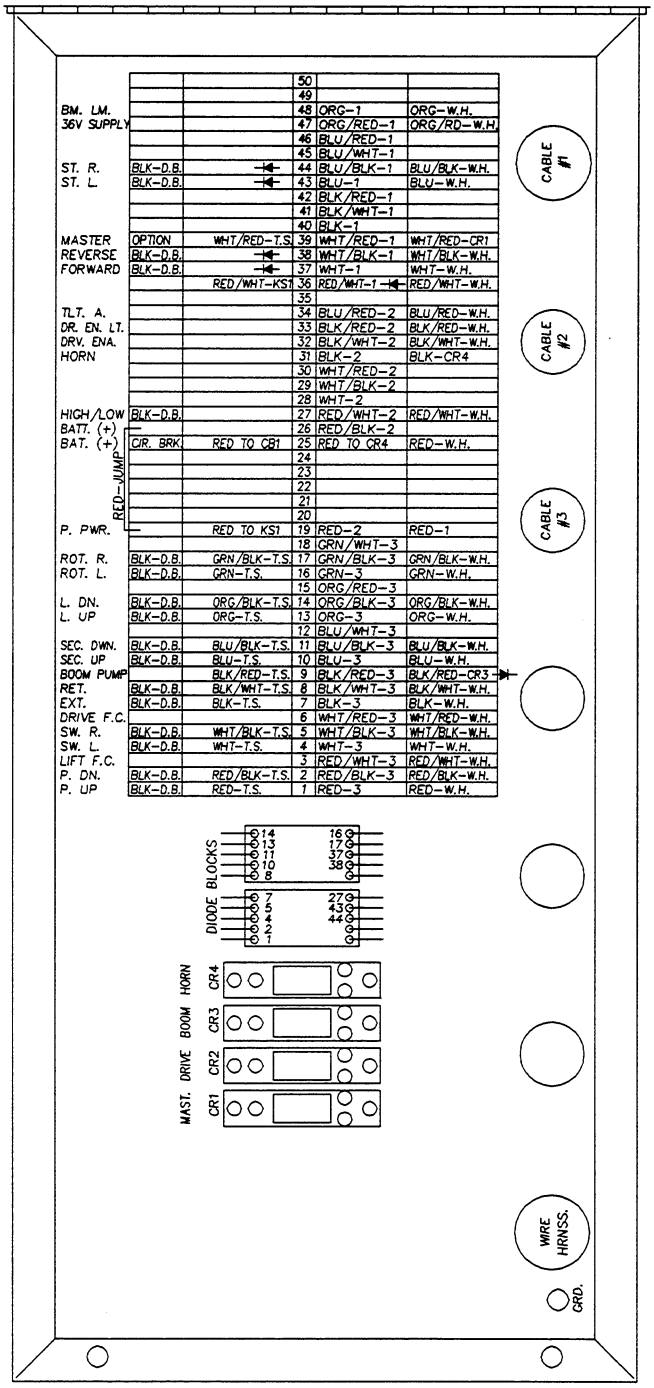


Electrical Schematic - DC Models

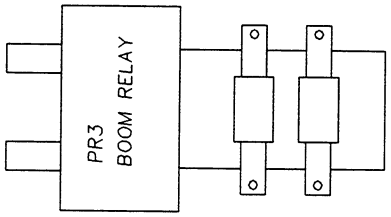


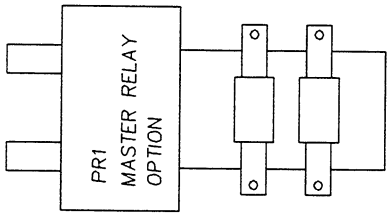
Ground Control Box Legend - DC Models

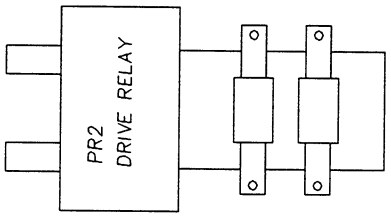


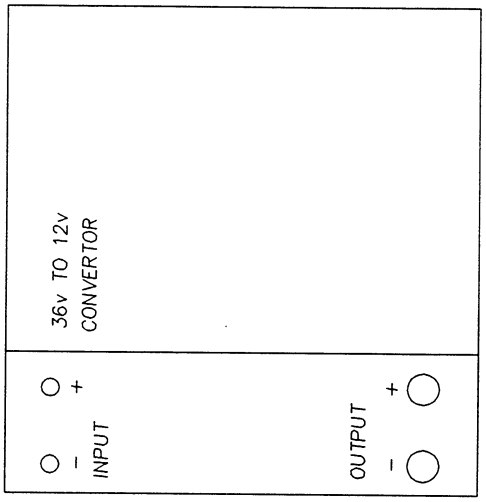


Relay Panel Legend - DC Models

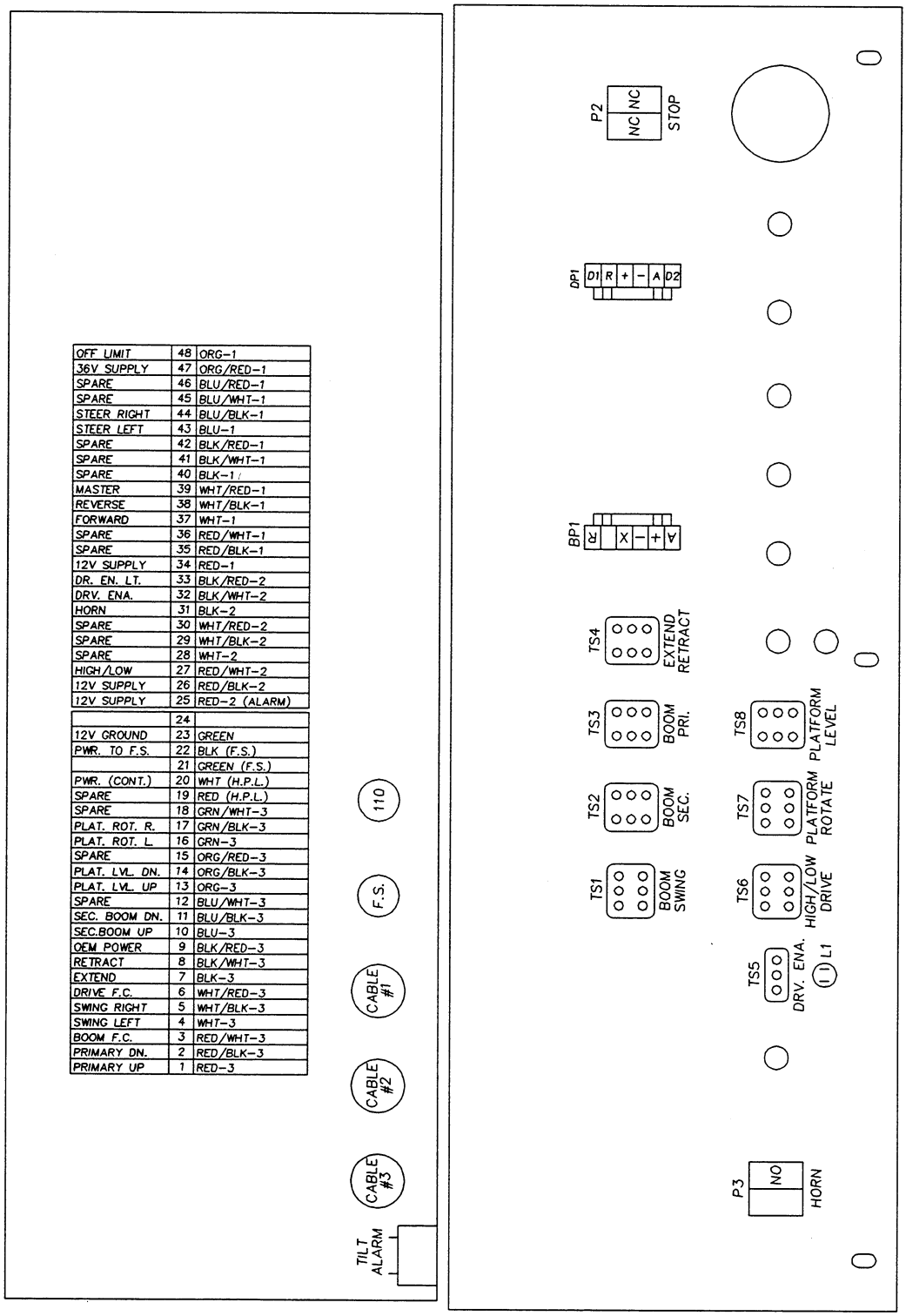








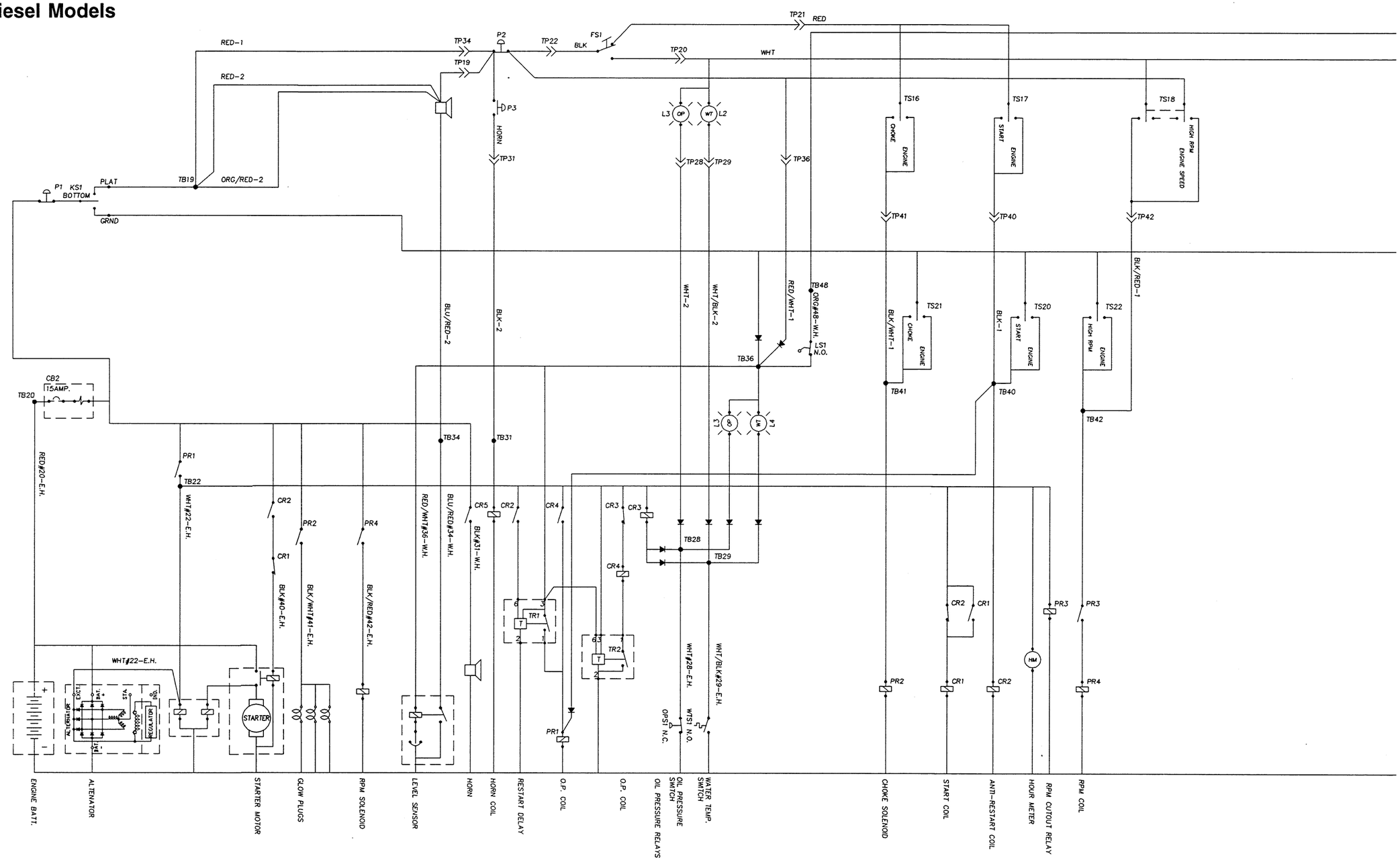
Platform Control Box Legend - DC Models



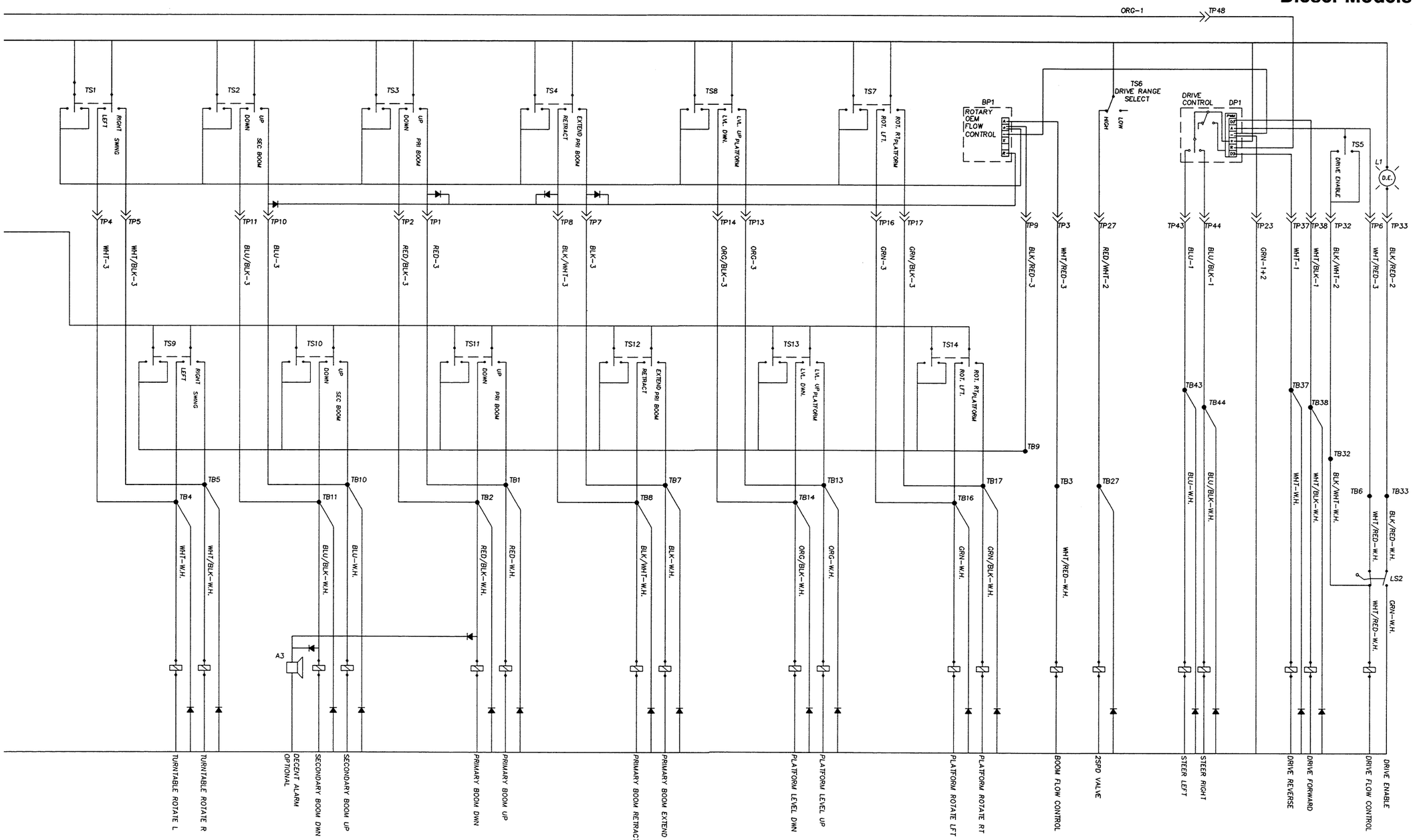




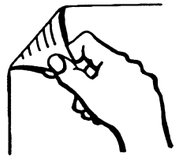
Electrical Schematic - Diesel Models



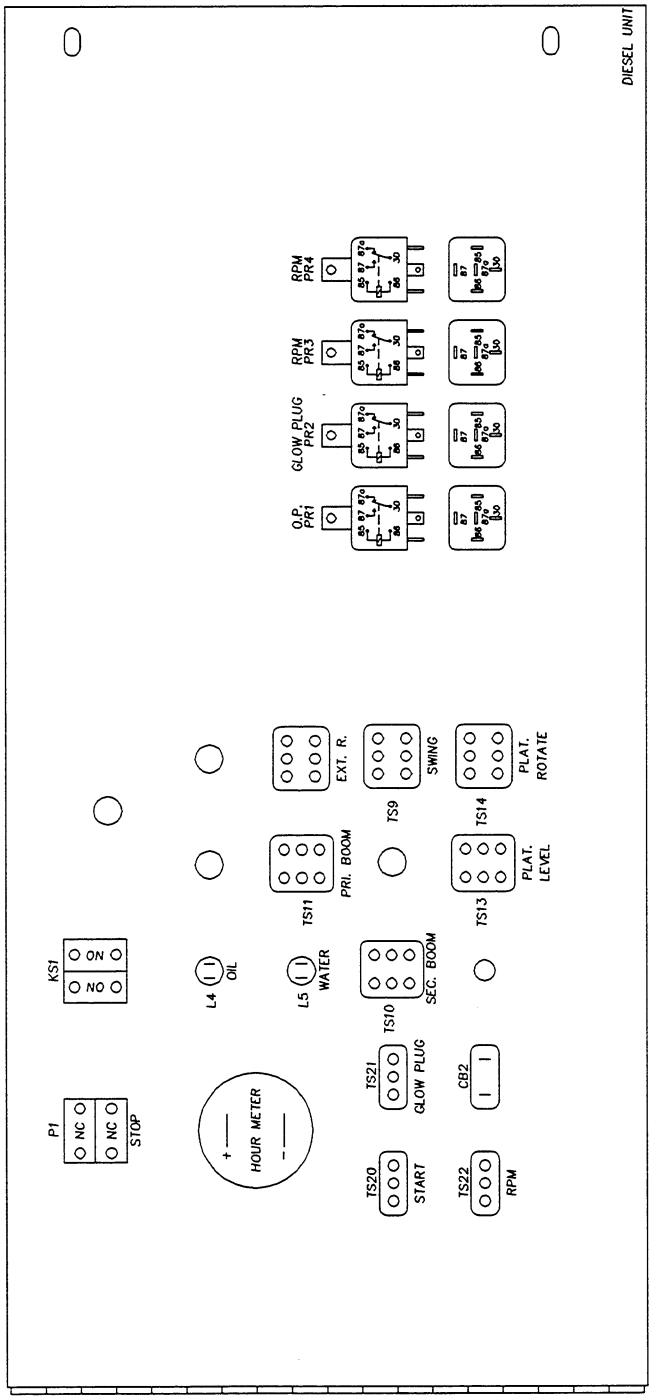
Electrical Schematic - Diesel Models

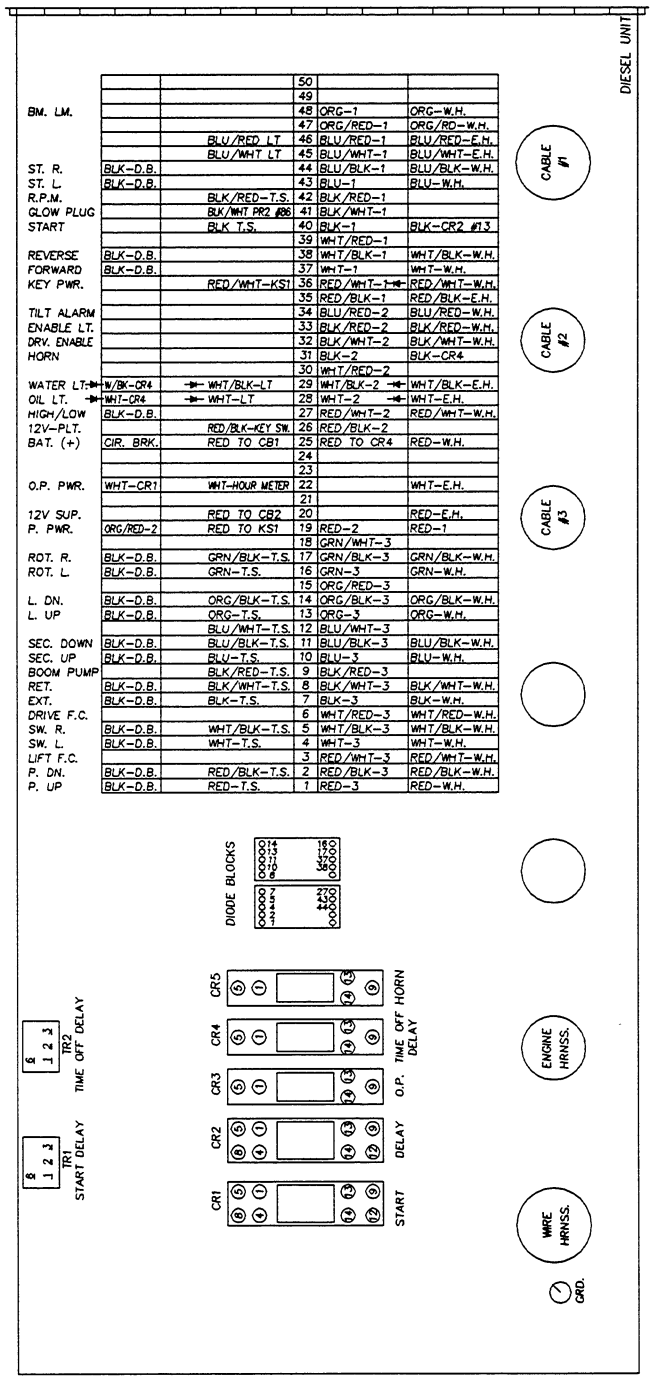


Electrical Schematic - Diesel Models



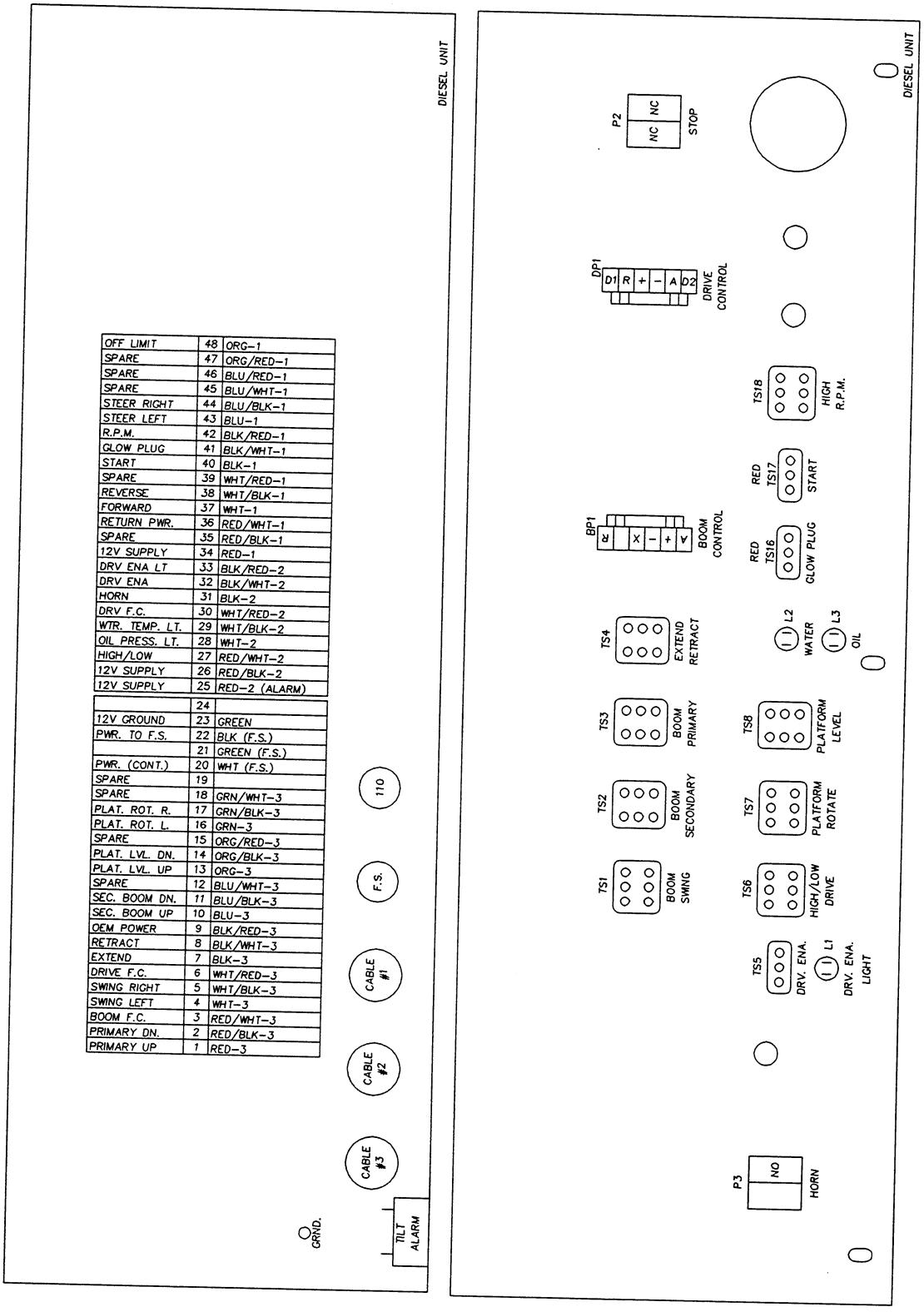
Ground Control Box Legend - Diesel Models



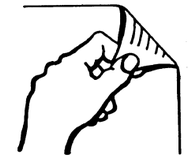


			50		
			49		
BM. LM.			48	ORG-1	ORG-W.H.
			47	ORG/RED-1	ORG/RD-W.H.
		BLU/RED LT	46	BLU/RED-1	BLU/RED-E.H.
		BLU/WHT LT	45	BLU/WHT-1	BLU/WHT-E.H.
ST. R.	BLK-D.B.		44	BLU/BLK-1	BLU/BLK-W.H.
ST. L	BLK-D.B.		43	BLU-1	BLU-W.H.
R.P.M.		BLK/RED-T.S.	42	BLK/RED-1	
GLOW PLUG		BLK/WHT PR2 #86	41	BLK/WHT-1	
START		BLK T.S.	40	BLK-1	BLK-CR2 #13
			39	WHT/RED-1	
REVERSE	BLK-D.B.		38	WHT/BLK-1	WHT/BLK-W.H.
FORWARD	BLK-D.B.		37	WHT-1	WHT-W.H.
KEY PWR.		RED/WHT-KS1	36	RED/WHT-1	RED/WHT-W.H.
			35	RED/BLK-1	RED/BLK-E.H.
TILT ALARM			34	BLU/RED-2	BLU/RED-W.H.
ENABLE LT.			33	BLK/RED-2	BLK/RED-W.H.
DRV. ENABLE			32	BLK/WHT-2	BLK/WHT-W.H.
HORN			31	BLK-2	BLK-CR4
			30	WHT/RED-2	
WATER LT.	W/BK-CR4	WHT/BLK-LT	29	WHT/BLK-2	WHT/BLK-E.H.
OIL LT.	WHT-CR4	WHT-LT	28	WHT-2	WHT-E.H.
HIGH/LOW	BLK-D.B.		27	RED/WHT-2	RED/WHT-W.H.
12V-PLT.		RED/BLK-KEY SW.	26	RED/BLK-2	
BAT. (+)	CIR. BRK.	RED TO CB1	25	RED TO CR4	RED-W.H.
			24		
			23		
O.P. PWR.	WHT-CR1	WHT-HOUR METER	22		WHT-E.H.
			21		
12V SUP.		RED TO CB2	20		RED-E.H.
P. PWR.	ORG/RED-2	RED TO KS1	19	RED-2	RED-1
			18	GRN/WHT-3	
ROT. R.	BLK-D.B.	GRN/BLK-T.S.	17	GRN/BLK-3	GRN/BLK-W.H.
ROT. L	BLK-D.B.	GRN-T.S.	16	GRN-3	GRN-W.H.
			15	ORG/RED-3	
L. DN.	BLK-D.B.	ORG/BLK-T.S.	14	ORG/BLK-3	ORG/BLK-W.H.
L. UP	BLK-D.B.	ORG-T.S.	13	ORG-3	ORG-W.H.
		BLU/WHT-T.S.	12	BLU/WHT-3	
SEC. DOWN	BLK-D.B.	BLU/BLK-T.S.	11	BLU/BLK-3	BLU/BLK-W.H.
SEC. UP	BLK-D.B.	BLU-T.S.	10	BLU-3	BLU-W.H.
BOOM PUMP		BLK/RED-T.S.	9	BLK/RED-3	
RET.	BLK-D.B.	BLK/WHT-T.S.	8	BLK/WHT-3	BLK/WHT-W.H.
EXT.	BLK-D.B.	BLK-T.S.	7	BLK-3	BLK-W.H.
DRIVE F.C.			6	WHT/RED-3	WHT/RED-W.H.
SW. R.	BLK-D.B.	WHT/BLK-T.S.	5	WHT/BLK-3	WHT/BLK-W.H.
SW. L.	BLK-D.B.	WHT-T.S.	4	WHT-3	WHT-W.H.
LIFT F.C.			3	RED/WHT-3	RED/WHT-W.H.
P. DN.	BLK-D.B.	RED/BLK-T.S.	2	RED/BLK-3	RED/BLK-W.H.
P. UP	BLK-D.B.	RED-T.S.	1	RED-3	RED-W.H.

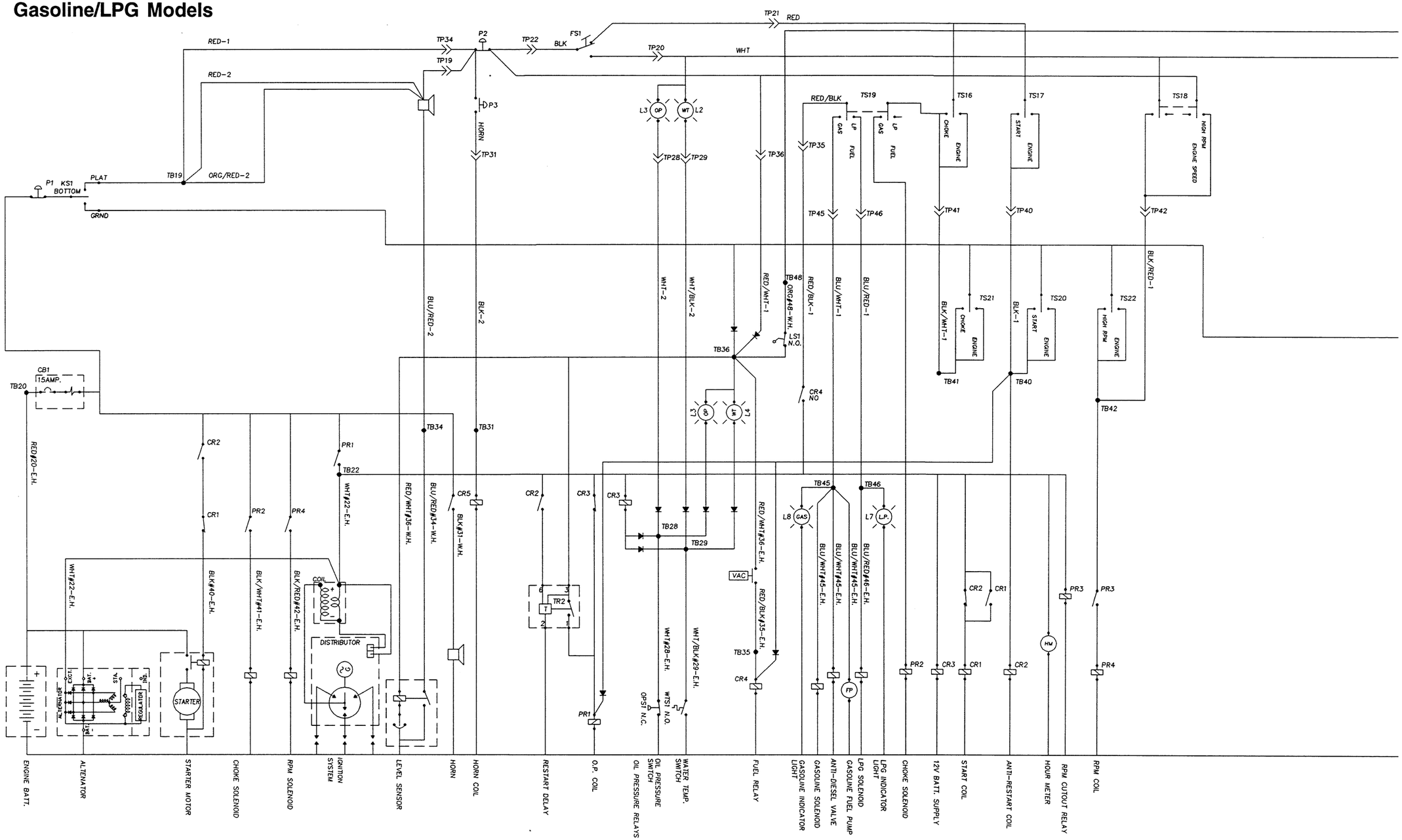
Platform Control Box Legend - Diesel Models



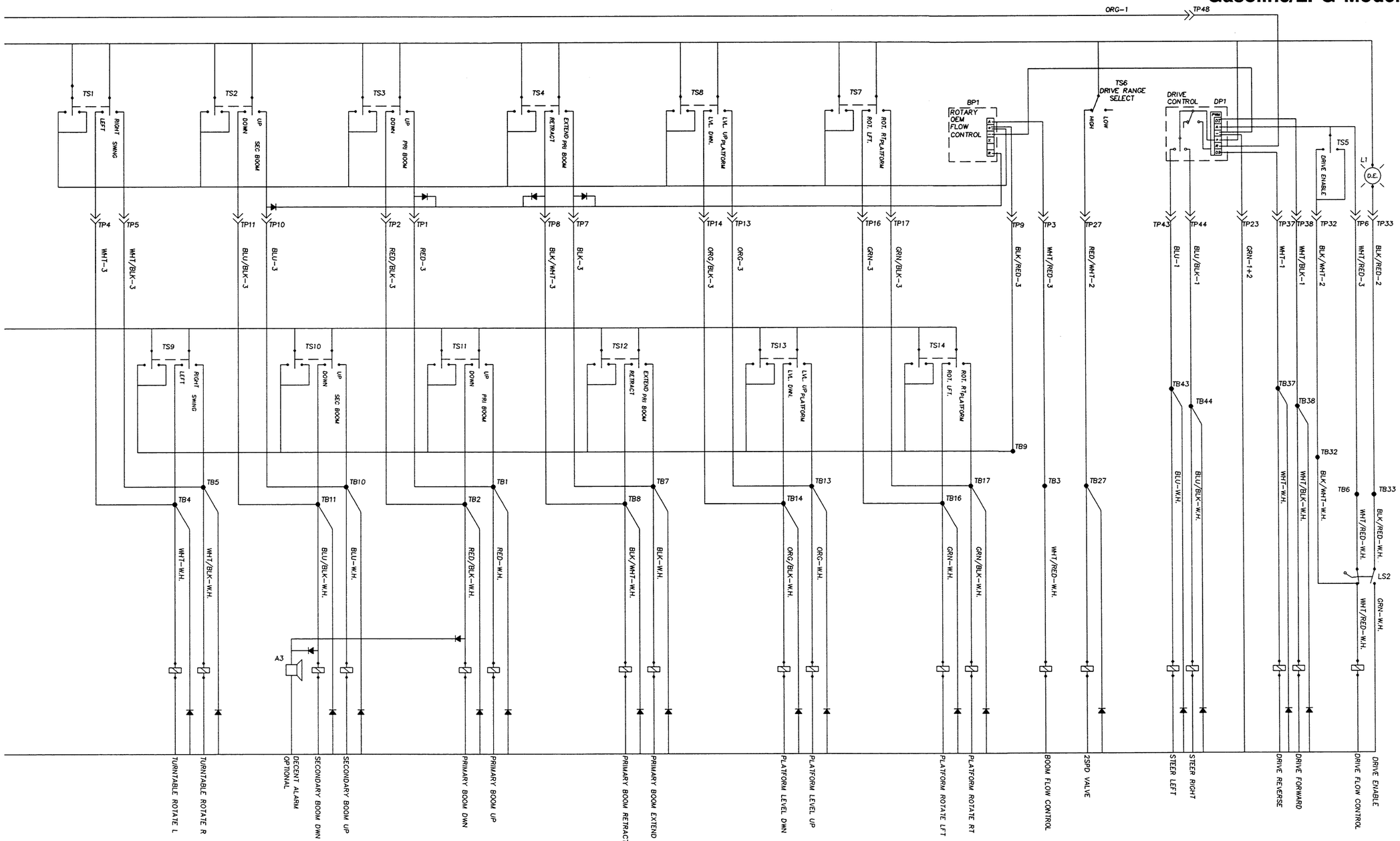




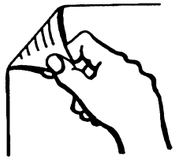
Electrical Schematic - Gasoline/LPG Models



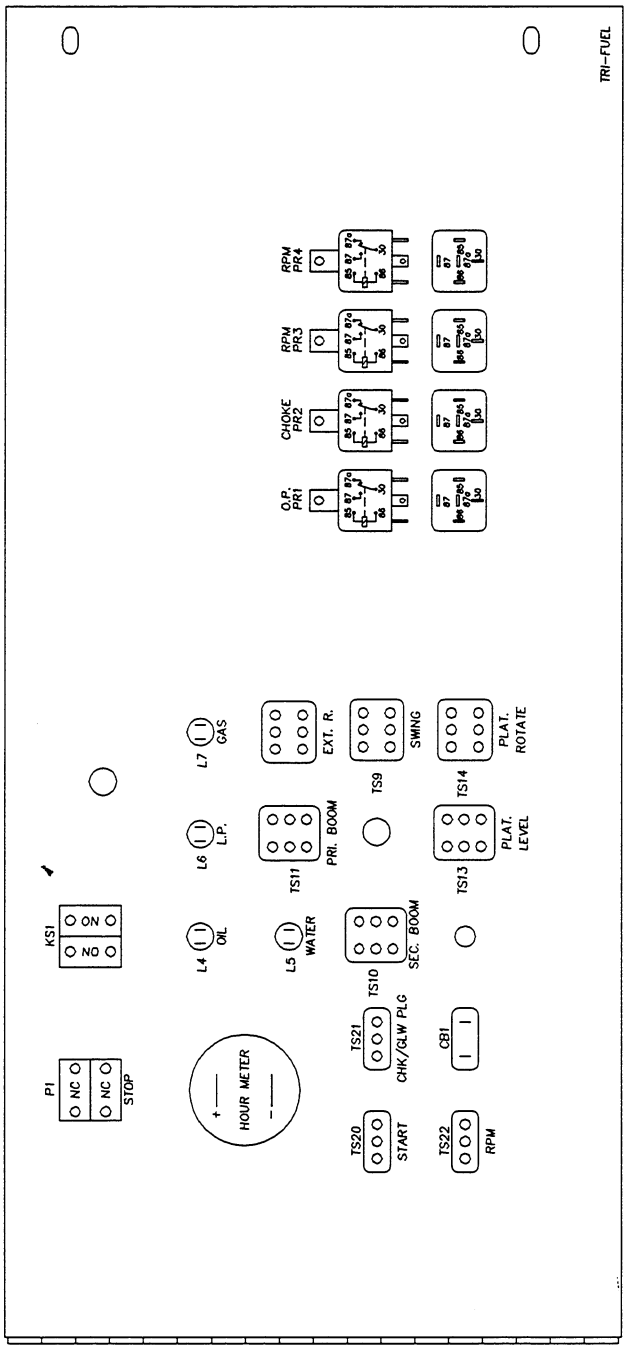
Electrical Schematic - Gasoline/LPG Models

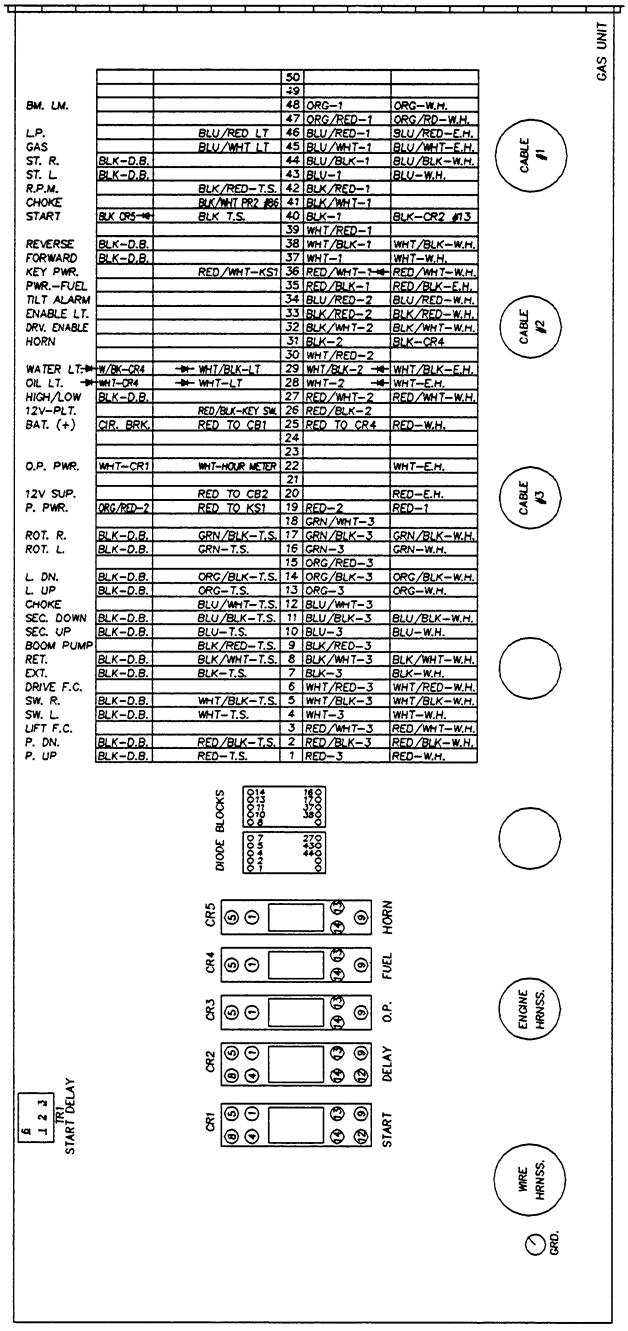


Electrical Schematic - Gasoline/LPG Models



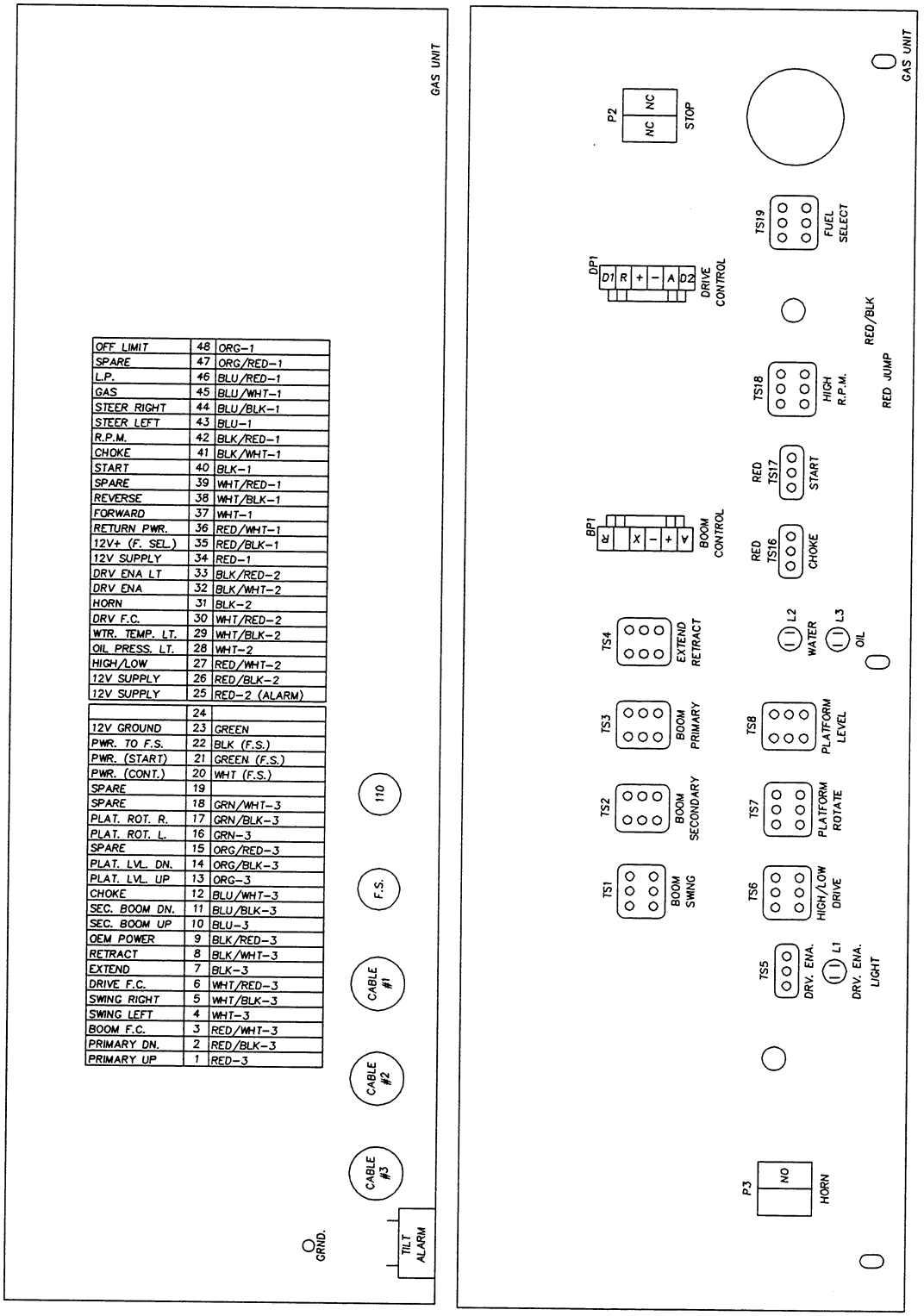
Ground Control Box Legend - Gasoline/LPG Models





			50		
			49		
BM. LW.			48	ORG-1	ORG-W.H.
			47	ORG/RED-1	ORG/RD-W.H.
L.P.		BLU/RED LT	46	BLU/RED-1	BLU/RED-E.H.
GAS		BLU/WHT LT	45	BLU/WHT-1	BLU/WHT-E.H.
ST. R.	BLK-D.B.		44	BLU/BLK-1	BLU/BLK-W.H.
ST. L	BLK-D.B.		43	BLU-1	BLU-W.H.
R.P.M.		BLK/RED-T.S.	42	BLK/RED-1	
CHOKE		BLK/WHT PR2 #86	41	BLK/WHT-1	
START	BLK CR5	BLK T.S.	40	BLK-1	BLK-CR2 #13
			39	WHT/RED-1	
REVERSE	BLK-D.B.		38	WHT/BLK-1	WHT/BLK-W.H.
FORWARD	BLK-D.B.		37	WHT-1	WHT-W.H.
KEY PWR.		RED/WHT-KS1	36	RED/WHT-1	RED/WHT-W.H.
PWR.-FUEL			35	RED/BLK-1	RED/BLK-E.H.
TILT ALARM			34	BLU/RED-2	BLU/RED-W.H.
ENABLE LT.			33	BLK/RED-2	BLK/RED-W.H.
DRV. ENABLE			32	BLK/WHT-2	BLK/WHT-W.H.
HORN			31	BLK-2	BLK-CR4
			30	WHT/RED-2	
WATER LT.	W/BK-CR4	WHT/BLK-LT	29	WHT/BLK-2	WHT/BLK-E.H.
OIL LT.	WHT-CR4	WHT-LT	28	WHT-2	WHT-E.H.
HIGH/LOW	BLK-D.B.		27	RED/WHT-2	RED/WHT-W.H.
12V-PLT.		RED/BLK-KEY SW.	26	RED/BLK-2	
BAT. (+)	CIR. BRK.	RED TO CB1	25	RED TO CR4	RED-W.H.
			24		
			23		
O.P. PWR.	WHT-CR1	WHT-HOUR METER	22		WHT-E.H.
			21		
12V SUP.		RED TO CB2	20		RED-E.H.
P. PWR.	ORG/RED-2	RED TO KS1	19	RED-2	RED-1
			18	GRN/WHT-3	
ROT. R.	BLK-D.B.	GRN/BLK-T.S.	17	GRN/BLK-3	GRN/BLK-W.H.
ROT. L.	BLK-D.B.	GRN-T.S.	16	GRN-3	GRN-W.H.
			15	ORG/RED-3	
L. DN.	BLK-D.B.	ORG/BLK-T.S.	14	ORG/BLK-3	ORG/BLK-W.H.
L. UP	BLK-D.B.	ORG-T.S.	13	ORG-3	ORG-W.H.
CHOKE		BLU/WHT-T.S.	12	BLU/WHT-3	
SEC. DOWN	BLK-D.B.	BLU/BLK-T.S.	11	BLU/BLK-3	BLU/BLK-W.H.
SEC. UP	BLK-D.B.	BLU-T.S.	10	BLU-3	BLU-W.H.
BOOM PUMP		BLK/RED-T.S.	9	BLK/RED-3	
RET.	BLK-D.B.	BLK/WHT-T.S.	8	BLK/WHT-3	BLK/WHT-W.H.
EXT.	BLK-D.B.	BLK-T.S.	7	BLK-3	BLK-W.H.
DRIVE F.C.			6	WHT/RED-3	WHT/RED-W.H.
SW. R.	BLK-D.B.	WHT/BLK-T.S.	5	WHT/BLK-3	WHT/BLK-W.H.
SW. L	BLK-D.B.	WHT-T.S.	4	WHT-3	WHT-W.H.
LIFT F.C.			3	RED/WHT-3	RED/WHT-W.H.
P. DN.	BLK-D.B.	RED/BLK-T.S.	2	RED/BLK-3	RED/BLK-W.H.
P. UP	BLK-D.B.	RED-T.S.	1	RED-3	RED-W.H.

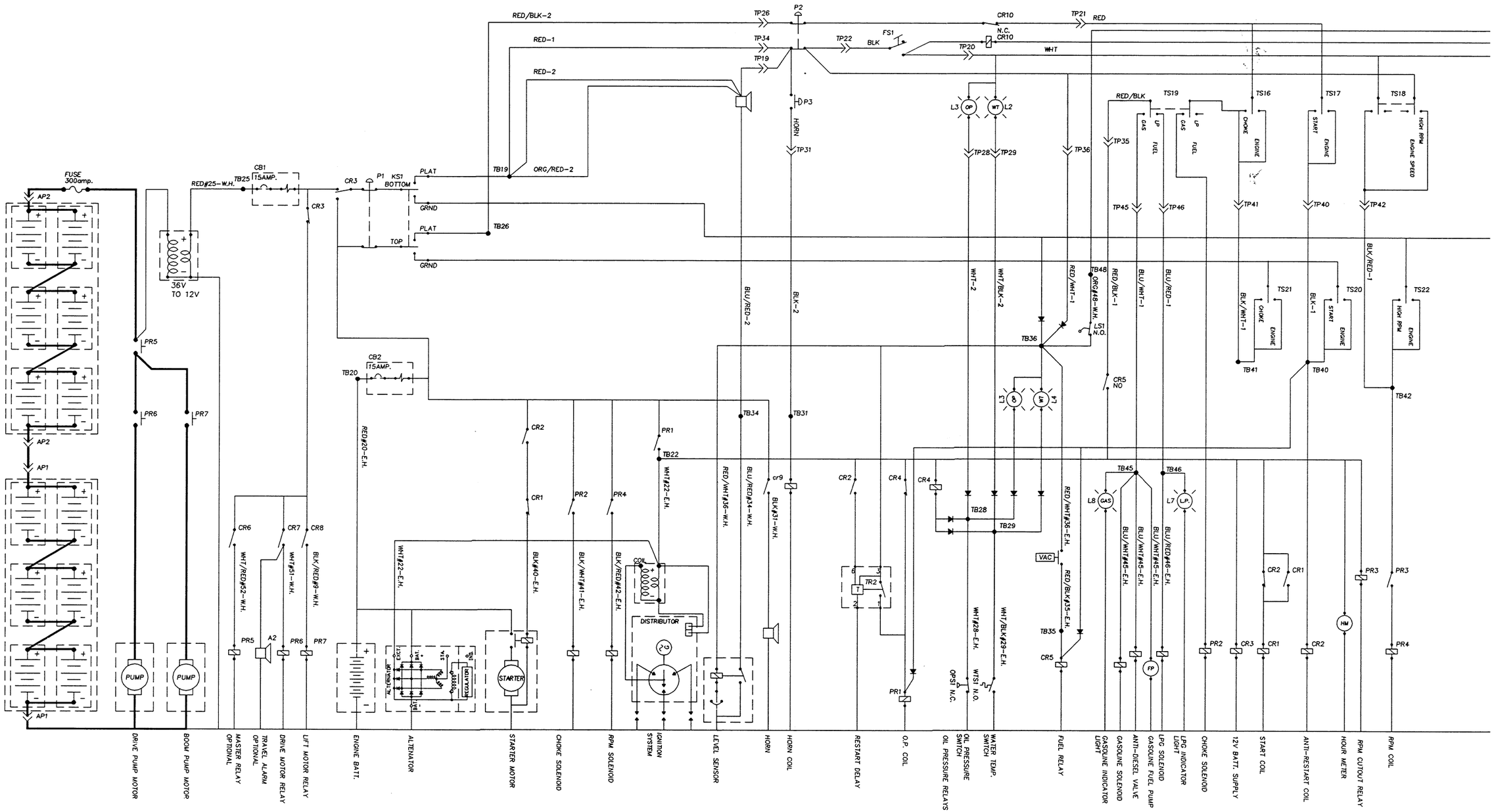
Platform Control Box Legend - Gasoline/LPG Models



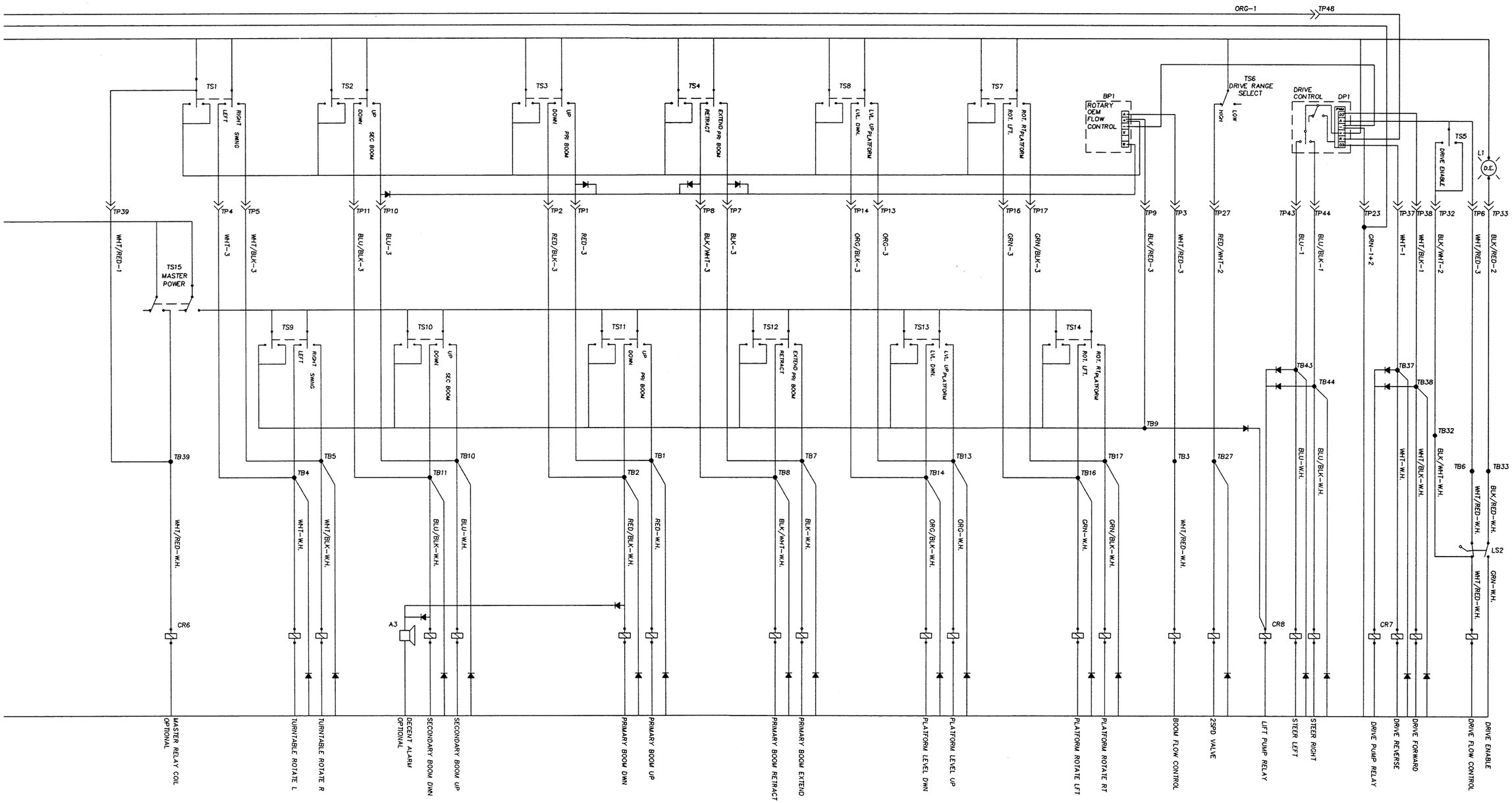




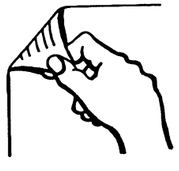
Electrical Schematic - Tri-fuel Models



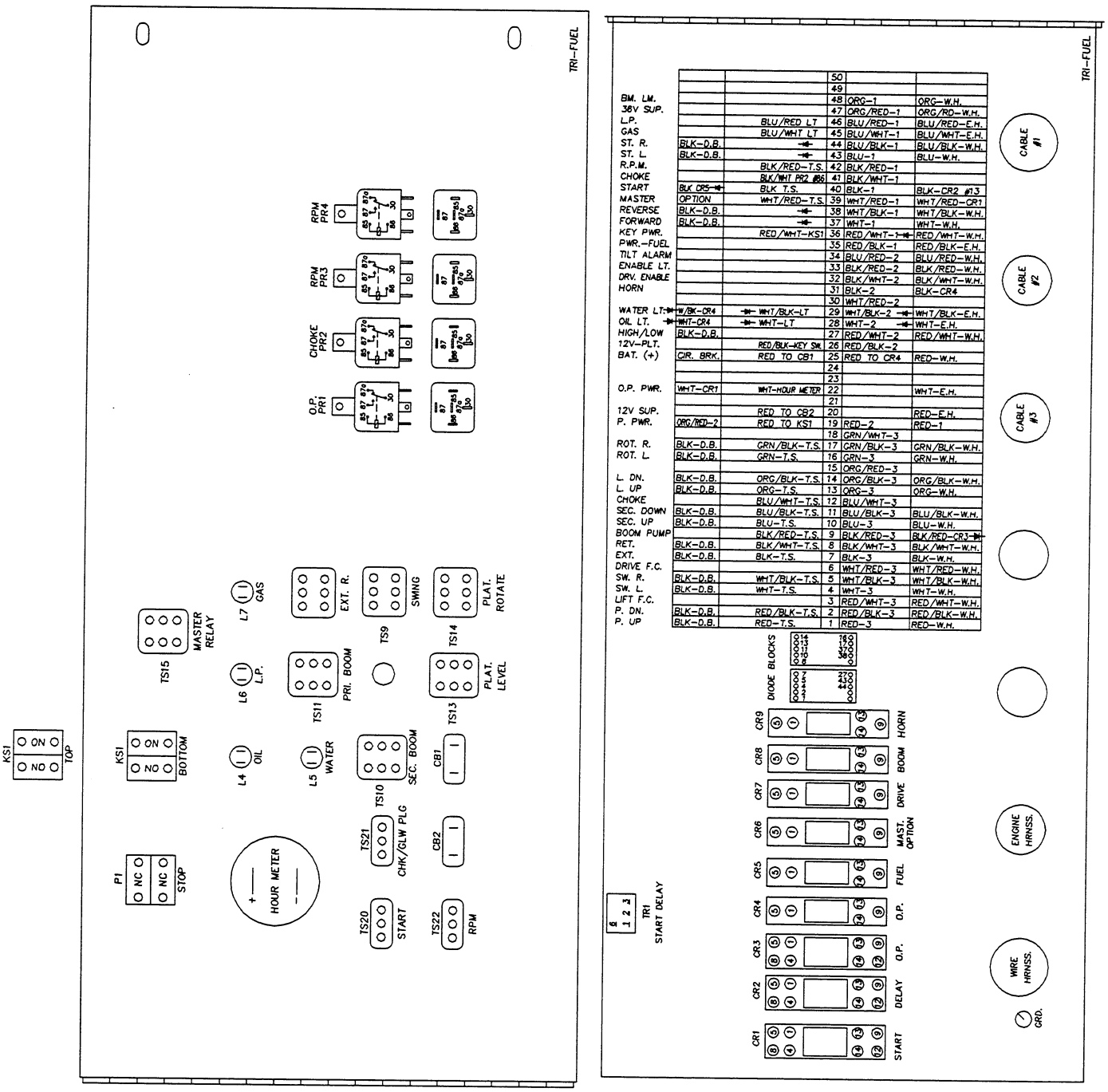
Electrical Schematic - Tri-fuel Models



Electrical Schematic - Tri-fuel Models

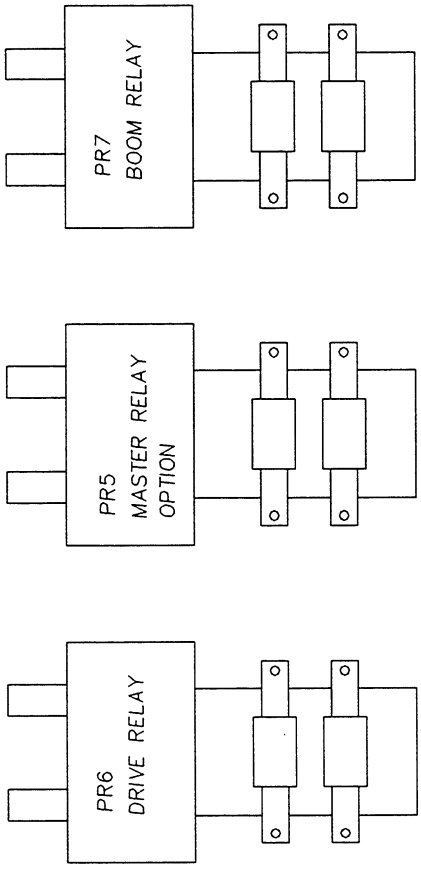


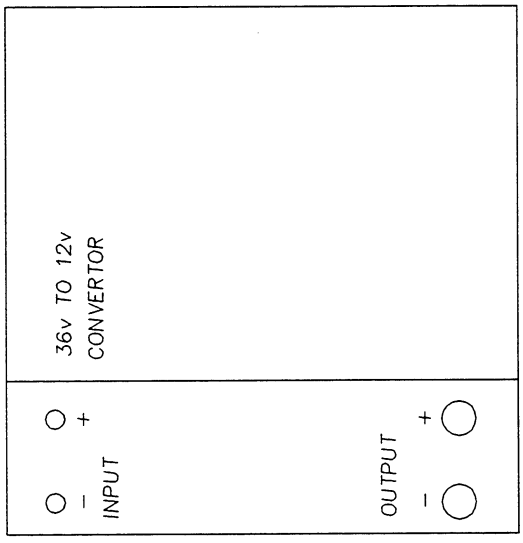
Ground Control Box Legend - Tri-fuel Models



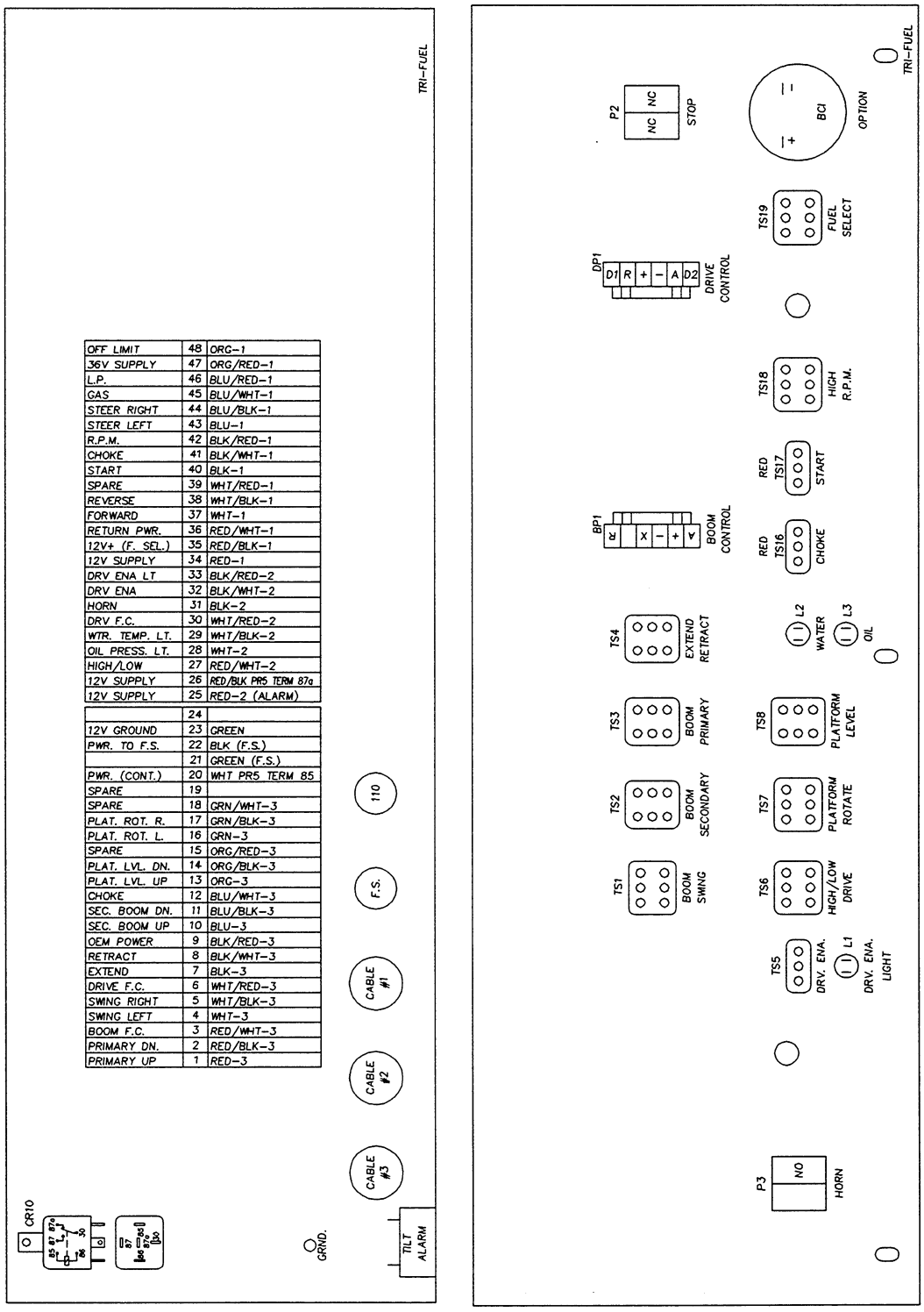
			50		
			49		
BM. LM.			48	ORG-1	ORG-W.H.
36V SUP.			47	ORG/RED-1	ORG/RD-W.H.
L.P.		BLU/RED LT	46	BLU/RED-1	BLU/RED-E.H.
GAS		BLU/WHT LT	45	BLU/WHT-1	BLU/WHT-E.H.
ST. R.	BLK-D.B.		44	BLU/BLK-1	BLU/BLK-W.H.
ST. L	BLK-D.B.		43	BLU-1	BLU-W.H.
R.P.M.		BLK/RED-T.S.	42	BLK/RED-1	
CHOKE		BLK/WHT PR2 #86	41	BLK/WHT-1	
START	BLK CR5	BLK T.S.	40	BLK-1	BLK-CR2 #13
MASTER	OPTION	WHT/RED-T.S.	39	WHT/RED-1	WHT/RED-CR1
REVERSE	BLK-D.B.		38	WHT/BLK-1	WHT/BLK-W.H.
FORWARD	BLK-D.B.		37	WHT-1	WHT-W.H.
KEY PWR.		RED/WHT-KS1	36	RED/WHT-1	RED/WHT-W.H.
PWR.-FUEL			35	RED/BLK-1	RED/BLK-E.H.
TILT ALARM			34	BLU/RED-2	BLU/RED-W.H.
ENABLE LT.			33	BLK/RED-2	BLK/RED-W.H.
DRV. ENABLE			32	BLK/WHT-2	BLK/WHT-W.H.
HORN			31	BLK-2	BLK-CR4
			30	WHT/RED-2	
WATER LT.	W/BK-CR4	WHT/BLK-LT	29	WHT/BLK-2	WHT/BLK-E.H.
OIL LT.	WHT-CR4	WHT-LT	28	WHT-2	WHT-E.H.
HIGH/LOW	BLK-D.B.		27	RED/WHT-2	RED/WHT-W.H.
12V-PLT.		RED/BLK-KEY SW.	26	RED/BLK-2	
BAT. (+)	CIR. BRK.	RED TO CB1	25	RED TO CR4	RED-W.H.
			24		
			23		
O.P. PWR.	WHT-CR1	WHT-HOUR METER	22		WHT-E.H.
			21		
12V SUP.		RED TO CB2	20		RED-E.H.
P. PWR.	ORG/RED-2	RED TO KS1	19	RED-2	RED-1
			18	GRN/WHT-3	
ROT. R.	BLK-D.B.	GRN/BLK-T.S.	17	GRN/BLK-3	GRN/BLK-W.H.
ROT. L	BLK-D.B.	GRN-T.S.	16	GRN-3	GRN-W.H.
			15	ORG/RED-3	
L. DN.	BLK-D.B.	ORG/BLK-T.S.	14	ORG/BLK-3	ORG/BLK-W.H.
L. UP	BLK-D.B.	ORG-T.S.	13	ORG-3	ORG-W.H.
CHOKE		BLU/WHT-T.S.	12	BLU/WHT-3	
SEC. DOWN	BLK-D.B.	BLU/BLK-T.S.	11	BLU/BLK-3	BLU/BLK-W.H.
SEC. UP	BLK-D.B.	BLU-T.S.	10	BLU-3	BLU-W.H.
BOOM PUMP		BLK/RED-T.S.	9	BLK/RED-3	BLK/RED-CR3
RET.	BLK-D.B.	BLK/WHT-T.S.	8	BLK/WHT-3	BLK/WHT-W.H.
EXT.	BLK-D.B.	BLK-T.S.	7	BLK-3	BLK-W.H.
DRIVE F.C.			6	WHT/RED-3	WHT/RED-W.H.
SW. R.	BLK-D.B.	WHT/BLK-T.S.	5	WHT/BLK-3	WHT/BLK-W.H.
SW. L.	BLK-D.B.	WHT-T.S.	4	WHT-3	WHT-W.H.
LIFT F.C.			3	RED/WHT-3	RED/WHT-W.H.
P. DN.	BLK-D.B.	RED/BLK-T.S.	2	RED/BLK-3	RED/BLK-W.H.
P. UP	BLK-D.B.	RED-T.S.	1	RED-3	RED-W.H.

Relay Panel Legend - Tri-fuel Models





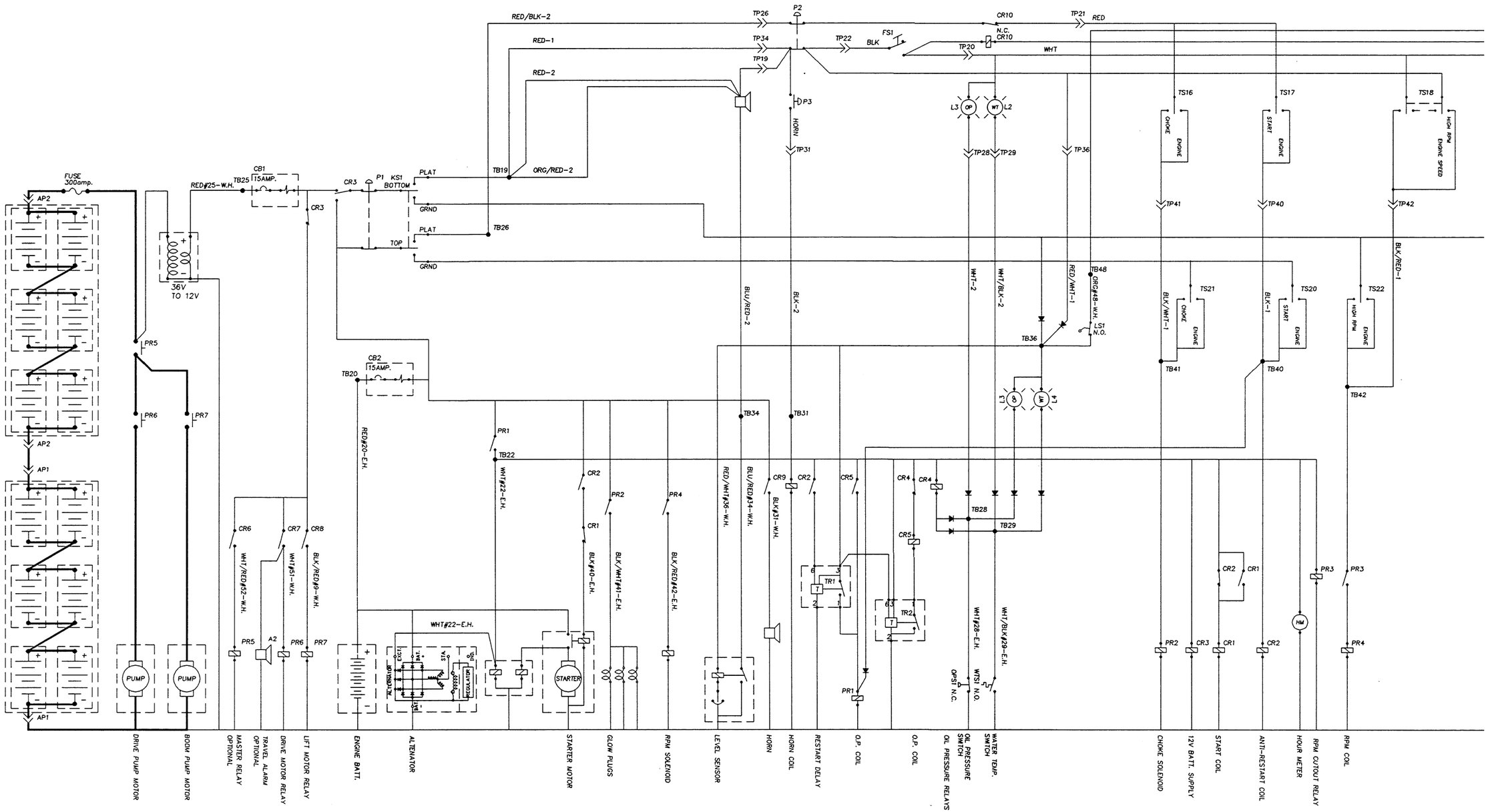
Platform Control Box Legend - Tri-fuel Models



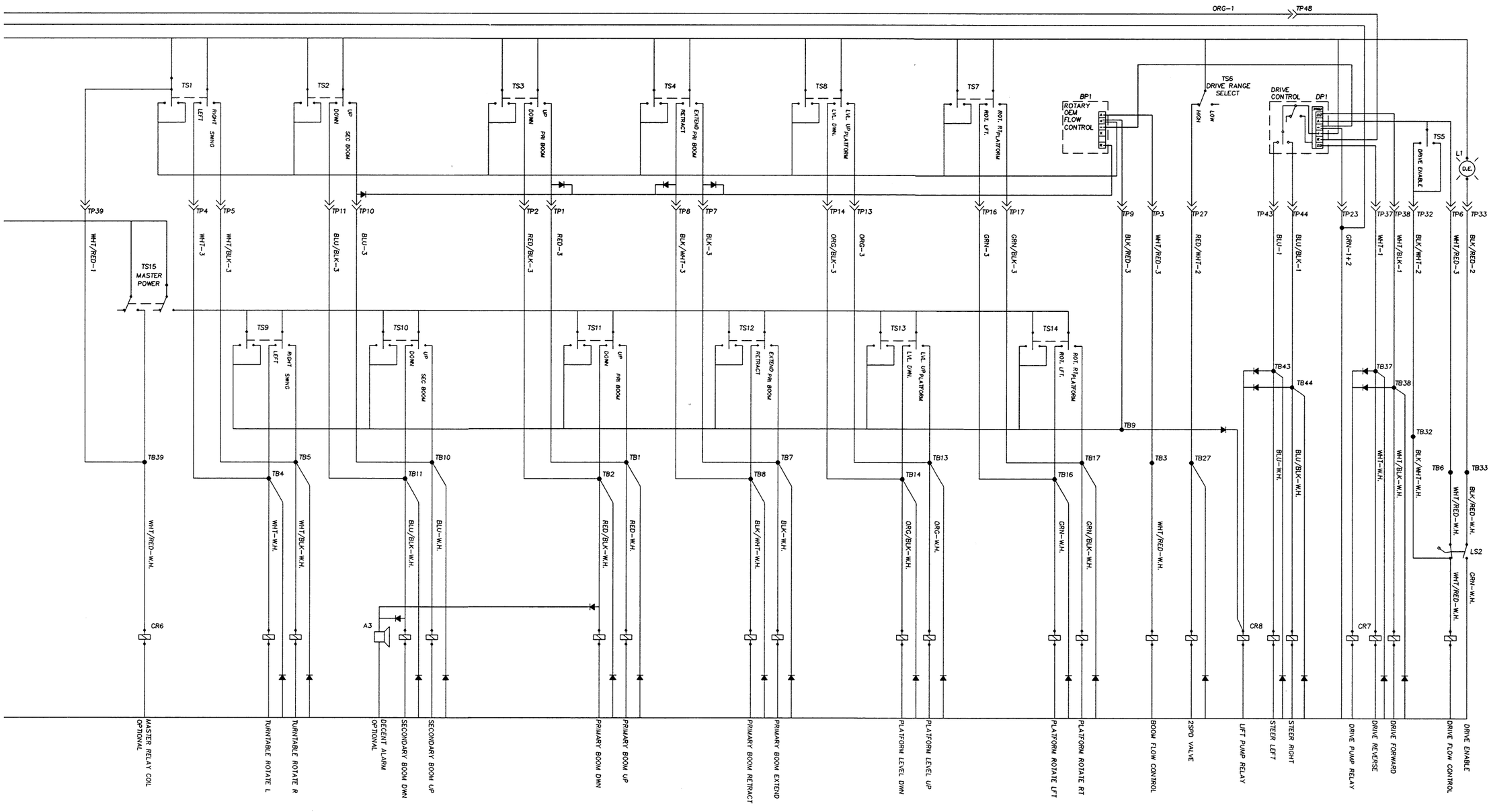




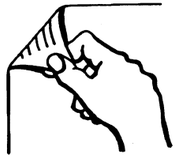
Electrical Schematic - Bi-fuel Models



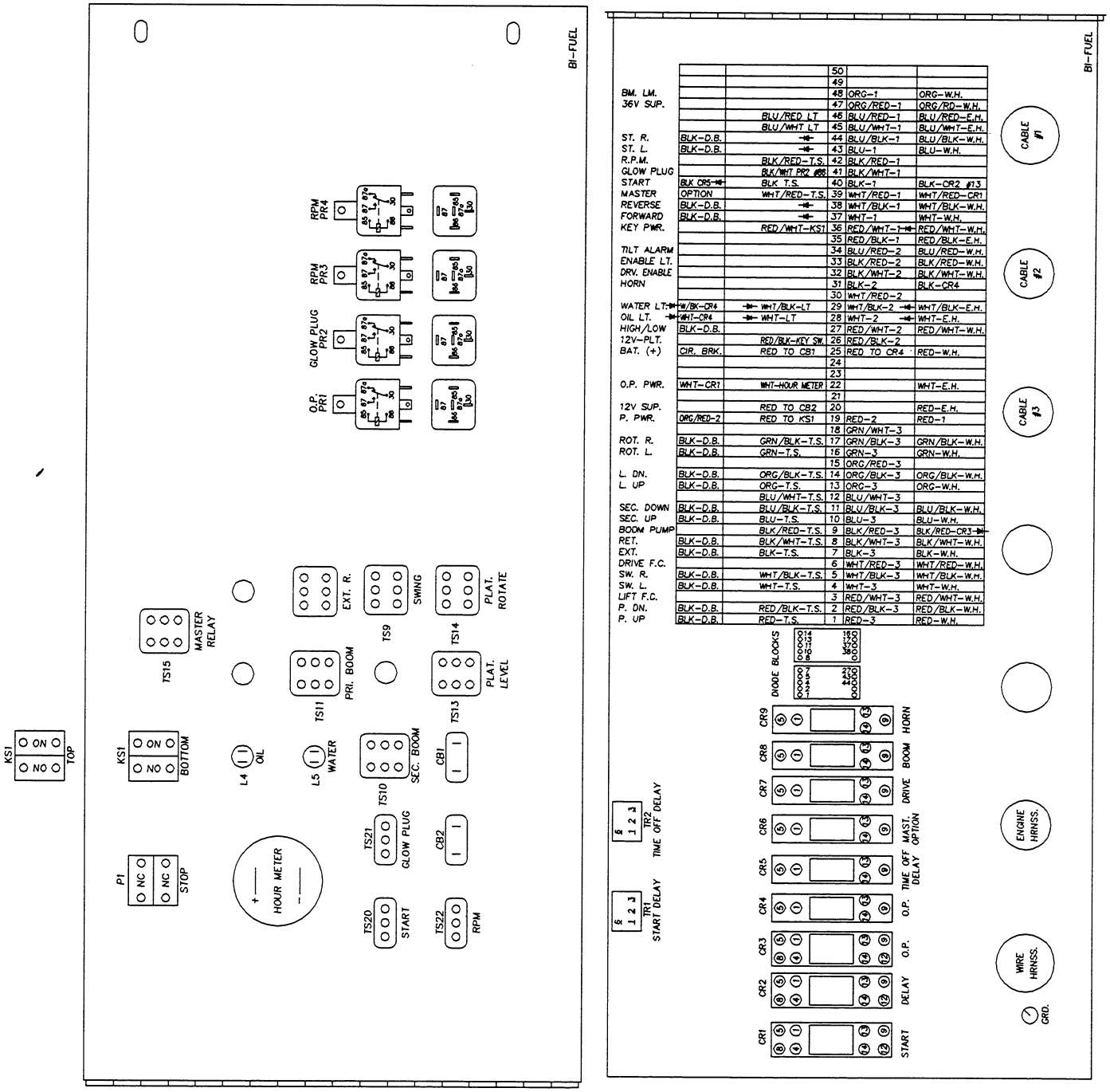
Electrical Schematic - Bi-fuel Models



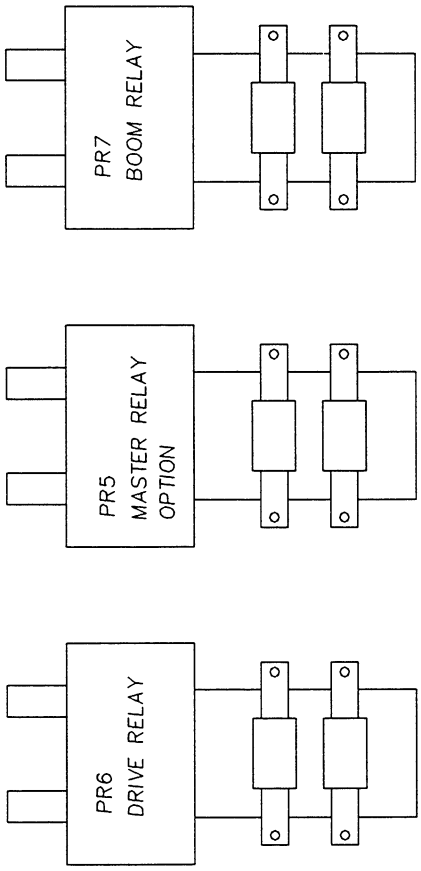
Electrical Schematic - Bi-fuel Models

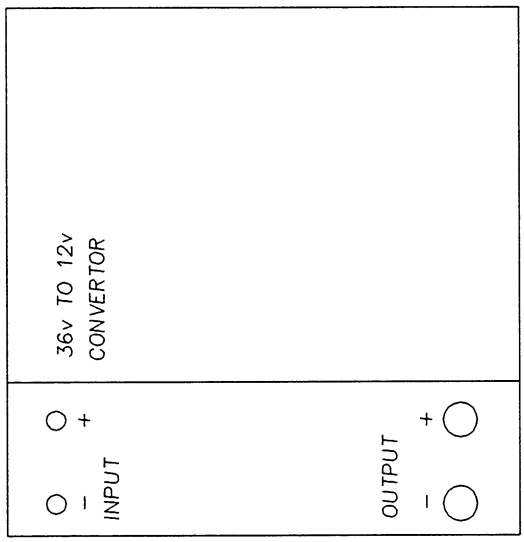


Ground Control Box Legend - Bi-fuel Models

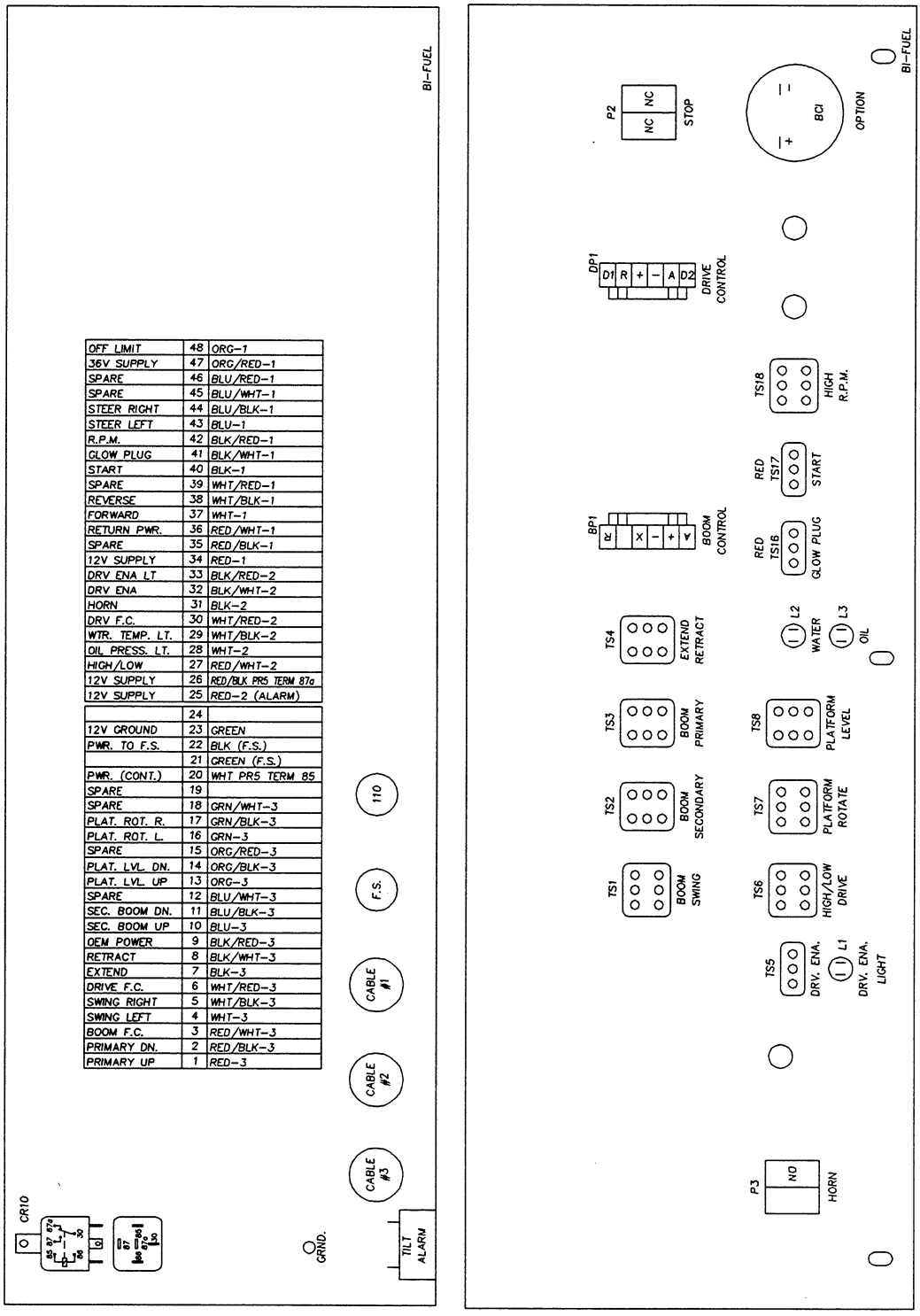


Relay Panel Legend - Bi-fuel Models

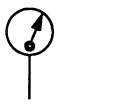


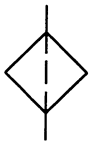


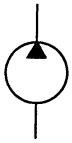
Platform Control Box Legend - Bi-fuel Models

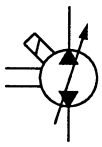


Hydraulic Symbols Legend


Pressure gauge


Filter


Fixed displacement pump

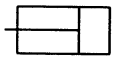

Bi-directional, variable displacement pump

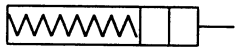

Bi-directional motor


2-speed, bi-directional motor



Pump prime mover (engine or motor)

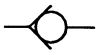

Cylinder

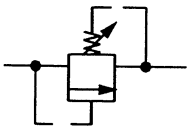

Accumulator

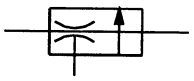


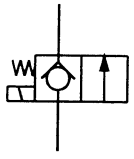
Orifice with size

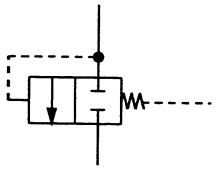

Variable orifice or shut-off valve

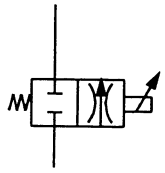

Check valve

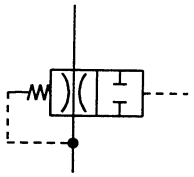

Relief valve

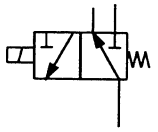

Priority flow regulator

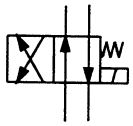

Solenoid operated dump valve

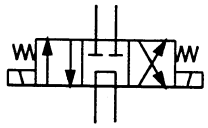

Differential sensing valve

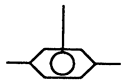

Solenoid operated proportional valve

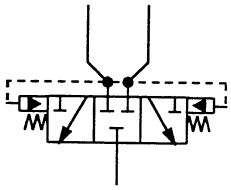

Flow regulator valve

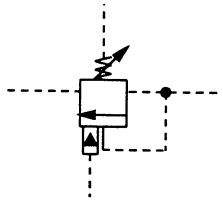

Solenoid operated 2 pos., 3 way, directional valve

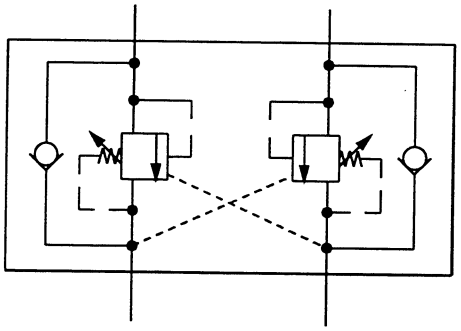

Solenoid operated 2 pos., 4 way, directional valve


Solenoid operated 3 pos 4 way, directional valve (DO1)

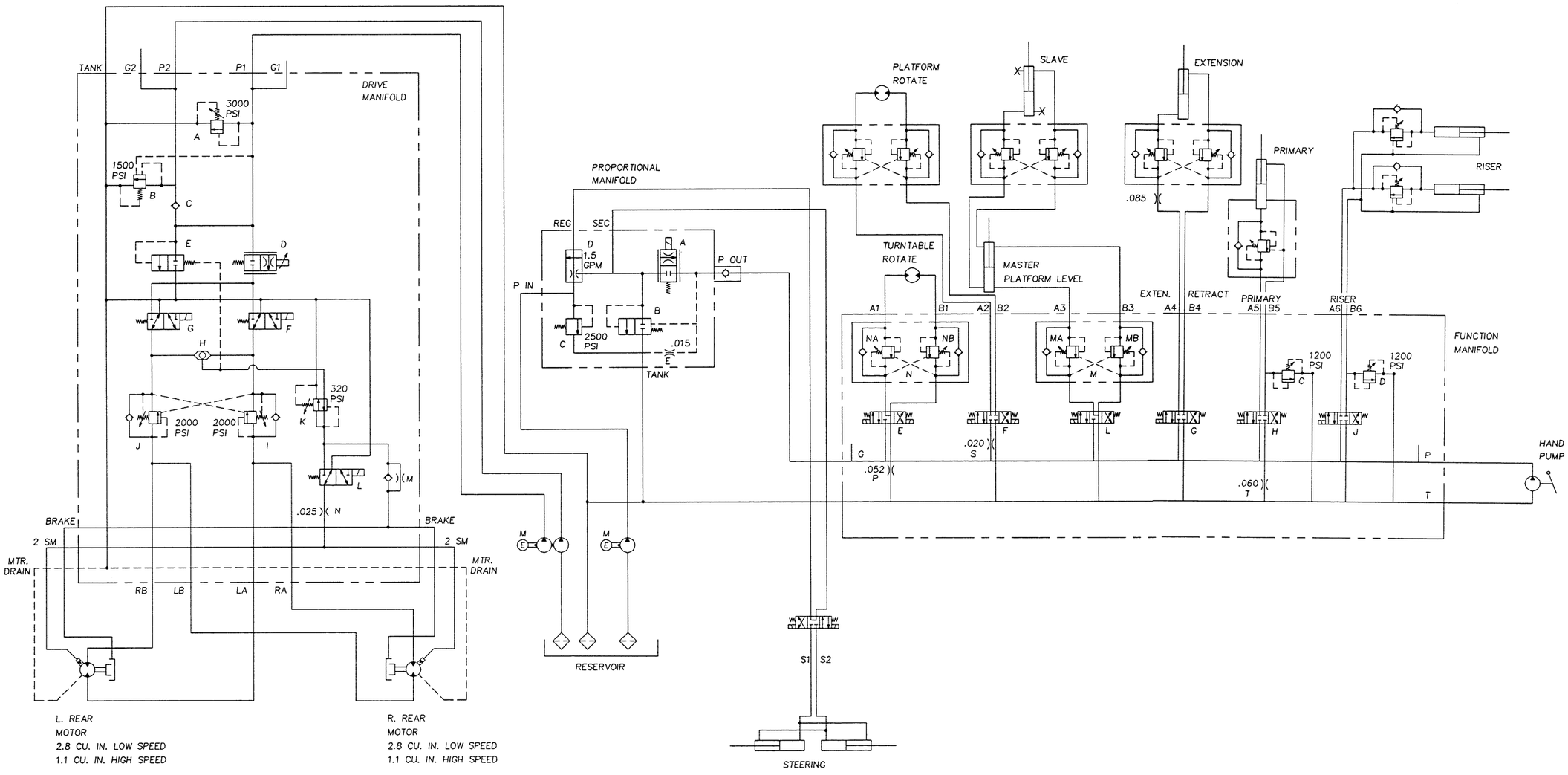

2 pos 3 way, shuttle valve


3 pos 4 way, pilot operated shuttle valve

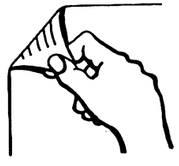

Sequencing valve


Counterbalance valves

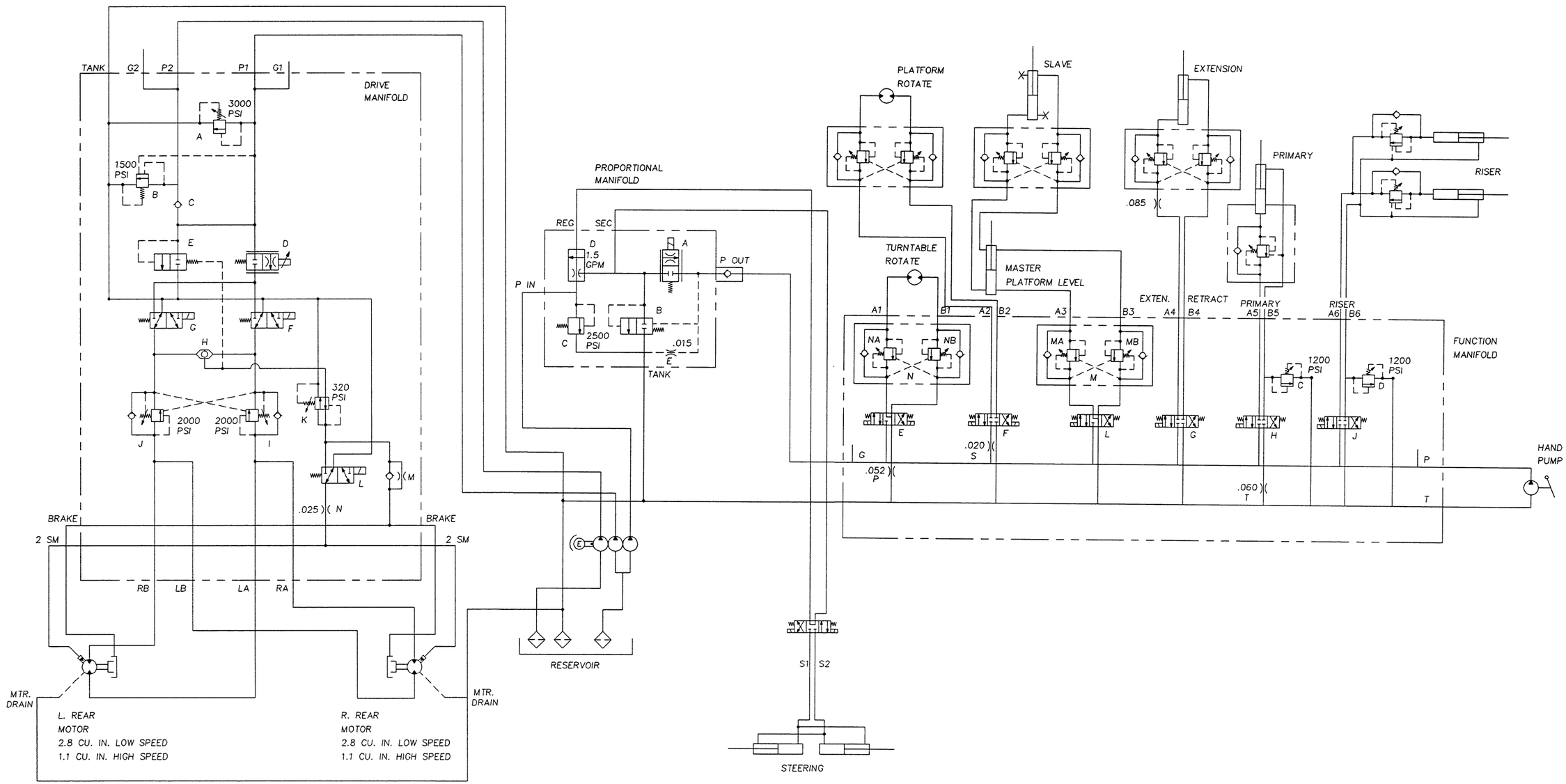
Hydraulic Schematic - DC Models



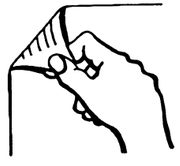
Hydraulic Schematic - DC Models



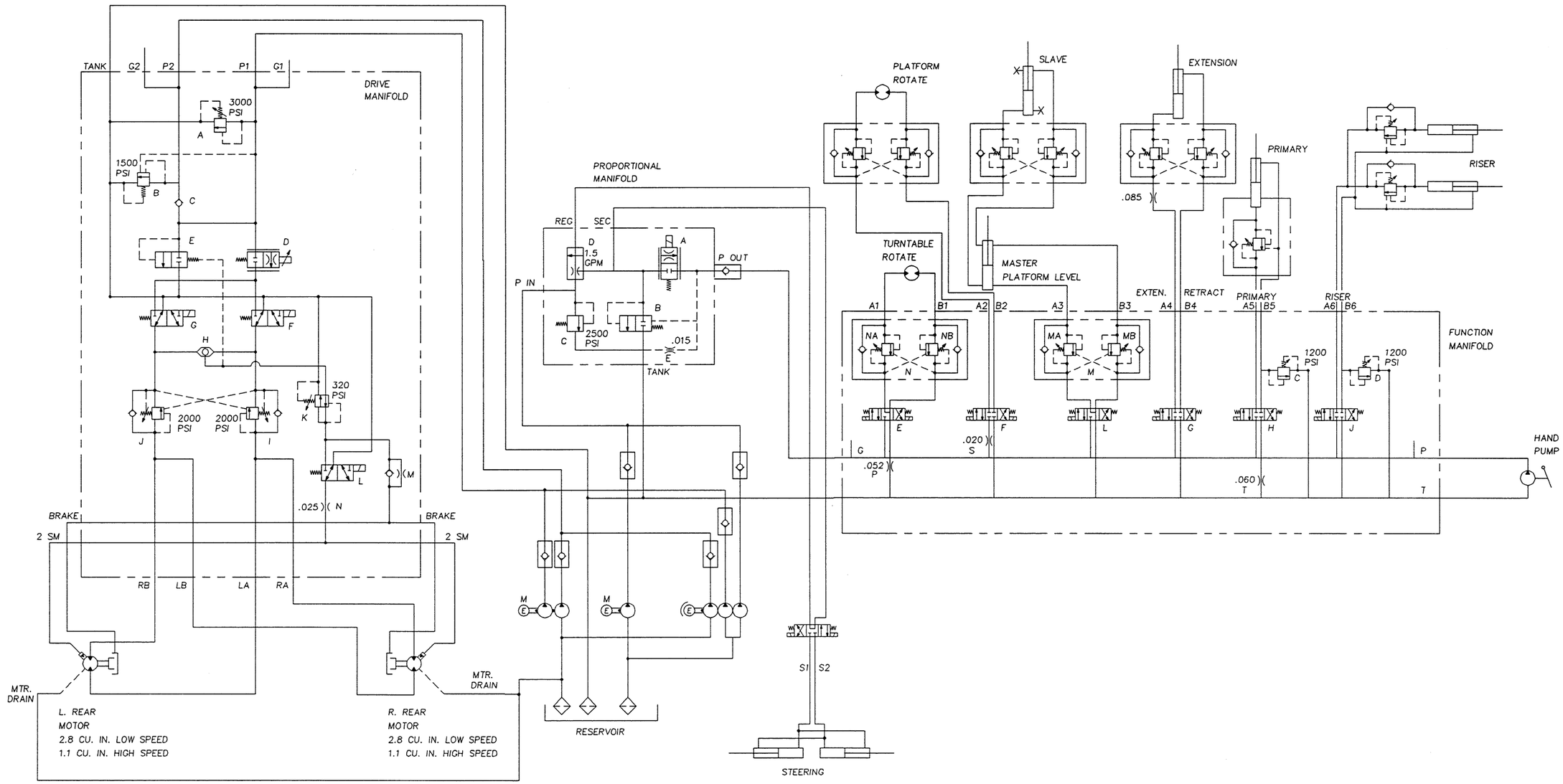
Hydraulic Schematic - Gasoline/LPG & Diesel Models



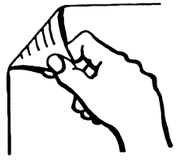
Hydraulic Schematic - Gasoline/LPG & Diesel Models



Hydraulic Schematic - Tri-fuel & Bi-fuel Models



Hydraulic Schematic - Tri-fuel & Bi-fuel 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:

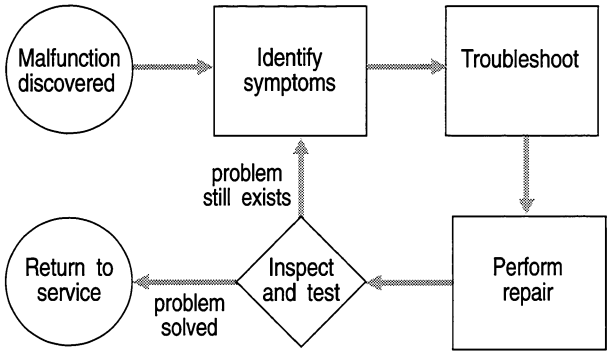
- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate *Genie Z-45/22 Operator's Manual.*
- ☑ Be sure that all necessary tools and parts are available and ready for use.
- ☑ Read each procedure completely and adhere to the instructions. Attempting shortcuts may produce 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-steering wheels
  - key switch in the OFF position with the key removed
  - 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.

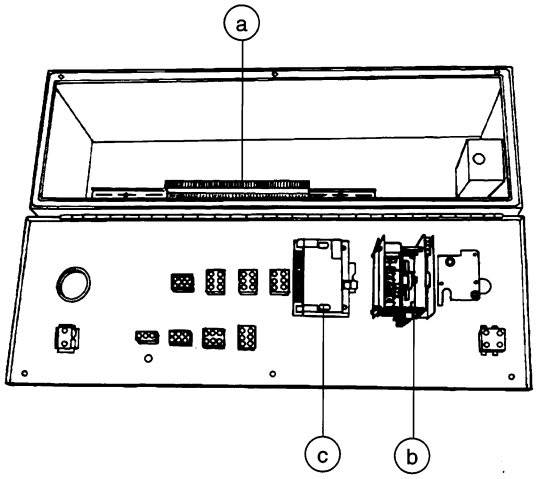
NOTICE Indicates special operation or maintenance information.

⊙ 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 quick disconnect terminal strip
b drive controller
c boom function speed controller

Drive Controller Adjustments

NOTICE Do not adjust the controllers unless the static battery voltage is above 12V DC. On engine models the alternator should be operating properly with 12.5 to 14.5V DC output.

NOTICE Engine models: Perform this procedure in the engine mode.

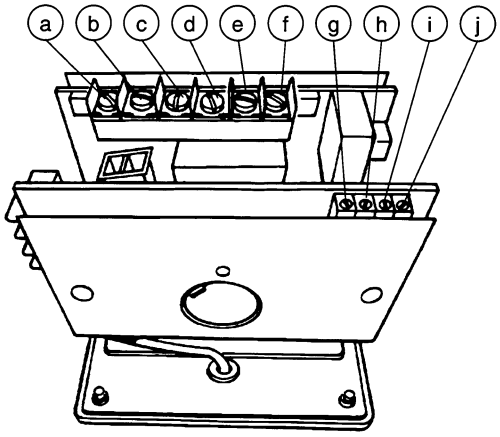
⚠WARNING Electrocution hazard. Contact with electrically charged circuits may result in death or serious injury. Remove all rings, watches and other jewelry.

1 **Engine models:** Check the battery condition with a volt meter. The reading should be 12V DC or more to accurately adjust the controller.

DC models: Check the voltage output from the voltage converter located on the component panel. The reading should be 12V DC or more to accurately adjust the controller. Disconnect the black/red and the white wires from the motor contactors. Do not disconnect the ground wires.

2 Turn the key switch to platform control and pull the Emergency Stop button to the ON position at both the ground and platform controls. Select high range (machine on level surface symbol) drive mode. Do not start the engine.

3 Open the platform control box lid and locate the drive controller.



a terminal "D2", forward 12V output
b terminal "A", proportional output
c terminal "-", ground
d terminal "+", battery positive
e terminal "R", activates max-out range
f terminal "D1", reverse 12V output
g ramp rate adjustable trimpot
h dual (lo) range adjustable trimpot
i threshold adjustable trimpot
j max-out adjustable trimpot

4 Connect the red(+) lead from a volt meter to the positive (+) terminal on the controller printed circuit board. Connect the black(-) lead to ground.

PLATFORM CONTROLS

5 Check the voltage. The voltage should be 12V DC or more to accurately adjust the controller.

6 Re-connect the red(+) lead from the volt meter to the "A" terminal on the controller printed circuit board.

7 Set the preliminary ramp rate: Turn the trimpot adjustment screw clockwise 15 turns or until you hear a click.

8 Set the threshold: Press down the foot switch, then slowly move the control handle off center until the moment a voltage reading appears. Adjust the voltage to 3.00V DC. Turn the threshold trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

9 Set the max-out: Press down the foot switch, then move the control handle all the way to the UP position. Adjust the voltage to specification. Turn the max-out trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

10 Select low range (machine on incline symbol) drive mode.

11 Set the dual (lo) range: Press down the foot switch, then move the control handle all the way to the DOWN position. Adjust the voltage to specification. Turn the dual range trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

12 **DC models:** Connect the black/red and the white wires to the motor contactors.

13 **Engine models:** Start the engine and move the engine speed control switch to foot switch activated high idle (rabbit and foot switch symbol).

NOTICE Engine should be at normal operating temperature.

14 Select high range (machine on level surface symbol) drive mode. Lower the boom to the stowed position.

15 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.

16 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.

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

18 Adjust the max-out trimpot to achieve a 12 second drive speed time. Turn the trimpot clockwise to increase the time or counterclockwise to decrease the time.

19 Raise the primary boom above the drive limit switch.

20 Repeat steps 15 through 17. Adjust the dual (lo) range trimpot to achieve the specified raised drive speed time. Turn the trimpot clockwise to increase the time or counterclockwise to decrease the time.

21 **DC models:** Disconnect the black/red and the white wires from the motor contactors.

22 Press down the foot switch and then move the control handle all the way to the UP position. Record the maximum voltage reading.

23 Start a timer and simultaneously move the control handle all the way to the UP position. Note how long it takes to reach the maximum voltage recorded in step 22. This is the ramp rate.

24 Set the ramp rate: Turn the trimpot to obtain a 2 to 3 second ramp speed. Turn the trimpot clockwise to increase the time or counterclockwise to decrease the time.

25 **DC models**: Connect the black/red and the white wires to the motor contactors.

PLATFORM CONTROLS

Drive controller specifications	DC	Engine
Threshold	3.00V DC	3.00V DC
Max-out	9.30V DC	8.20V DC
Dual (lo) range	7.50V DC	4.00V DC
Ramp rate	2 to 3 seconds	
Drive speed: stowed position, high range, all models	40 ft/12 seconds 12.2 m/12 seconds	
Drive speed: boom raised		
DC models	40 feet/52 seconds 12.2 meters/52 seconds	
Engine models	40 feet/150 seconds 12.2 meters/150 seconds	

Boom Function Speed Controller Adjustments

NOTICE Do not adjust the controllers unless the static battery voltage is above 12V DC. On engine models the alternator should be operating properly with 12.5 to 14.5V DC output.

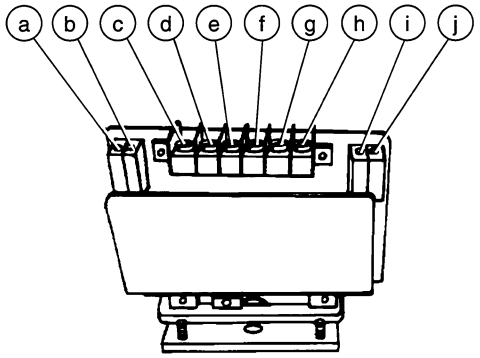
⚠WARNING Electrocution hazard. Contact with electrically charged circuits may result in death or serious injury. Remove all rings, watches and other jewelry.

1 **Engine models:** Check the battery condition with a volt meter. The reading should be 12V DC or more to accurately adjust the controller.

DC models: Check the voltage output from the voltage converter located on the component panel. The reading should be 12V DC or more to accurately adjust the controller. Disconnect the black/red and the white wires from the motor contactors. Do not disconnect the ground wires.

2 Turn the key switch to platform control and pull the Emergency Stop button to the ON position at both the ground and platform controls. Do not start the engine.

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



a ramp rate adjustable trimpot
b dual (lo) range ajustable trimpot
c terminal "R", activates max-out range
d terminal unused
e terminal "X", auxiliary
f terminal "-", ground
g terminal "+", battery positive
h terminal "A", proportional output
i threshold adjustable trimpot
j max-out adjustable trimpot

4 Connect the red(+) lead from a volt meter to the positive (+) terminal on the controller printed circuit board. Connect the black(-) lead to ground.

5 Check the voltage. The voltage should be 12V DC or more to accurately adjust the controller.

6 Re-connect the red(+) lead from the volt meter to the "A" terminal on the controller printed circuit board.

7 Set the preliminary ramp rate: Turn the trimpot adjustment screw clockwise 15 turns or until you hear a click.

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

9 Set the threshold: Press down the foot switch, then move the primary boom switch to the UP position until the moment a voltage reading appears. Adjust the voltage to 3.00V DC. Turn the threshold trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

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

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

12 Set the dual (lo) range: Press down the foot switch, then move the primary boom switch to the DOWN position. Adjust the voltage to specification. Turn the dual range trimpot adjustment screw clockwise to increase the voltage or counterclockwise to decrease the voltage.

13 Press down the foot switch and then move the primary boom switch to the UP position. Record the maximum voltage reading.

14 Start a timer and simultaneously move the primary boom switch to the UP position. Note how long it takes to reach the maximum voltage recorded in step 13. This is the ramp rate.

15 Set the ramp rate: Turn the trimpot to obtain a 4 to 5 second ramp speed. Turn the trimpot clockwise to increase the time or counterclockwise to decrease the time.

16 **DC models:** Connect the black/red and the white wires to the motor contactors

Boom function speed controller specifications	**DC**	**Engine**
Threshold	3.00V DC	3.00V DC
Max-out	5.80V DC	6.00V DC
Dual (lo) range	4.50V DC	4.8V DC
Ramp rate		4 to 5 seconds

PLATFORM CONTROLS

1-2 Control Relays

Relays used for single function switching are single pole double throw (SPDT) relays. Dual function switching requires a double pole double throw (DPDT) relay.

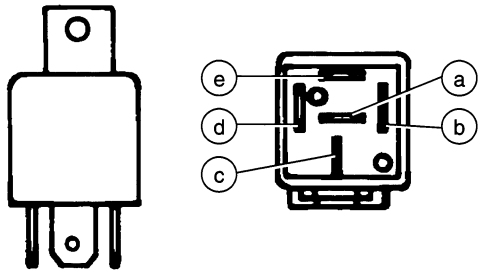
How to Test a Single Pole Double Throw Relay

⚠WARNING Electrocution hazard. Contact with electrically charged circuits may result in 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 Label and then disconnect all the wiring from the relay to be tested.

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



a terminal no. 87a
b terminal no. 85
c terminal no. 30
d terminal no. 86
e terminal no. 87

Test	Desired result
terminal 85 to 86	85 to 95Ω
terminal 87 to 87a & 30	no continuity (infinite Ω)
terminal 87a to 30	continuity (zero Ω)

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

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

1-3 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.

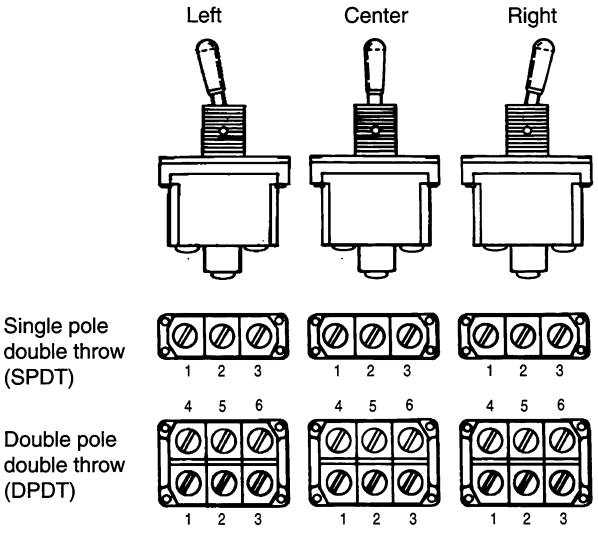
How to Test a Toggle Switch

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 (infinite Ω)
terminal 1 to 3, 4, 5 & 6	no continuity (zero 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 CONTROLS

1-4
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 Components

2-1 Platform

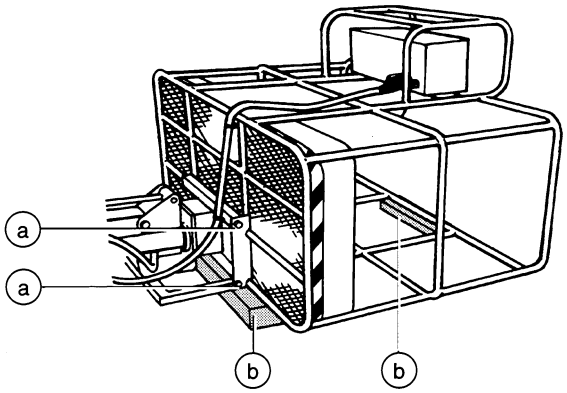
How to Remove the Platform

⚠ 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 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.

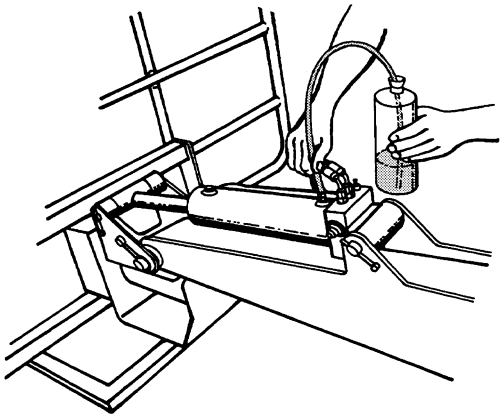
PLATFORM COMPONENTS

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 to the right 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 to the right for 5 seconds, then release it.

6 Close the bleed valve, then remove the hose.

7 Hold the platform level switch to the left 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 Disconnect and plug the hydraulic hoses from the platform rotator.

⚠ 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 top nut from the threaded rod. Then pull the rod out the bottom of the platform rotator and remove the platform pivot weldment.

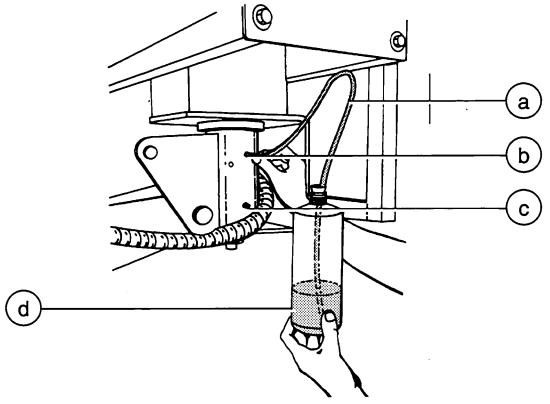
5 Support the platform rotator, but do not apply any lifting pressure.

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 **Engine models**: Start the engine from the ground controls.

DC models: 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 5 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.

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

10 Close the bleed valve and remove the hose.

11 Turn off the engine/machine and clean up any hydraulic oil that may have spilled.

12 **Engine models**: Start the engine from the ground controls.

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

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

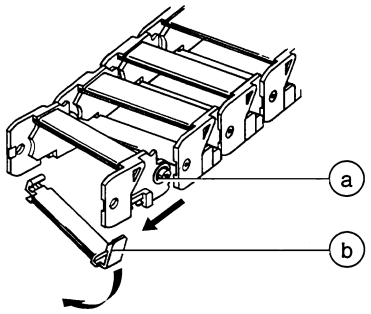
Primary Boom Components

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.

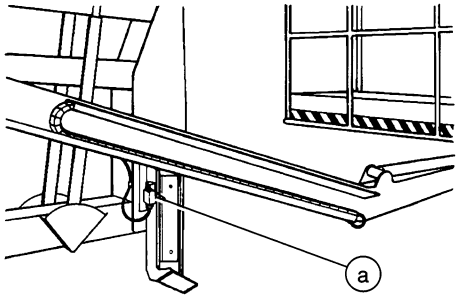
3 To remove a single link, open the lower clip and then use a screw driver to pry the link to the side.

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.

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.

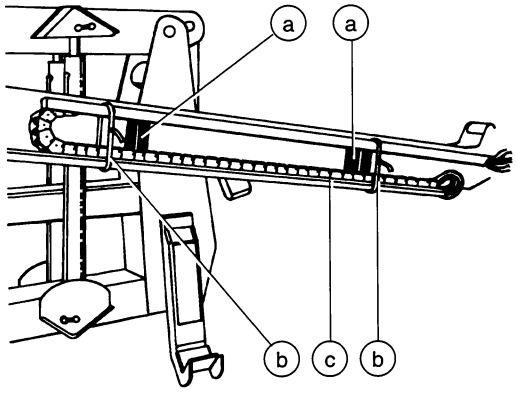
1 Remove the platform. See 2-1, *How to Remove the Platform.*

2 Disconnect and plug the hydraulic hoses from the slave cylinder and the platform rotator counterbalance valves.

⚠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.

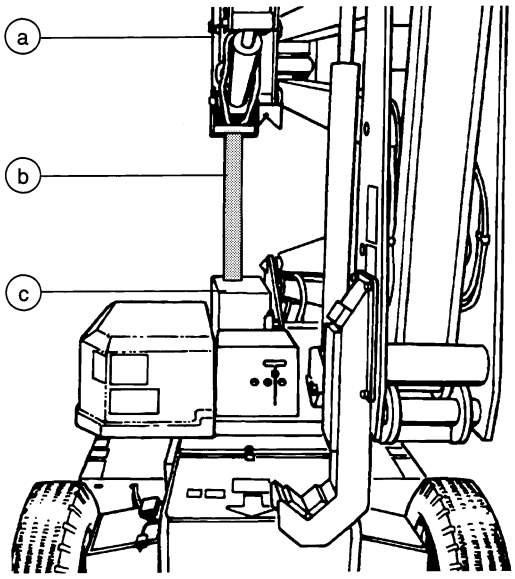
4 Loosen the fasteners that secure the lower cable track tray. Tie the upper and lower cable tracks together with wire ties. Remove the cable track assembly from the primary boom.



a wood block
b tie-wrap
c plastic cable track

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

5 Raise the secondary boom and place a 4x4x31 inch (78 cm) block between the drive chassis 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.

PRIMARY BOOM COMPONENTS

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

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

13 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.

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

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

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 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.

10 Remove the extension boom end cap.

11 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.

12 Remove and label the wear pads from the primary boom inner and outer tubes.

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

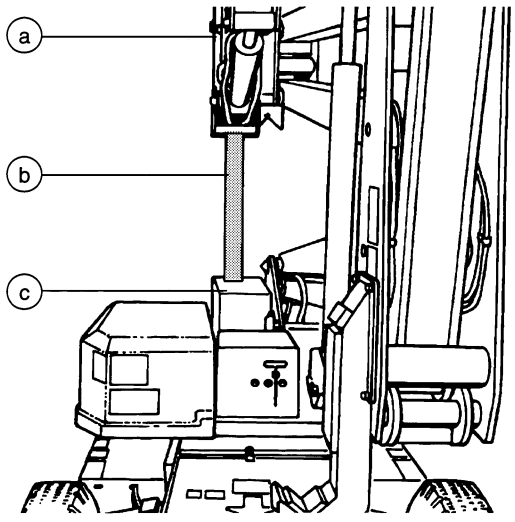
3-3
Primary Boom Lift Cylinder

The lift cylinder raises and lowers the primary boom.

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 drive 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

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.

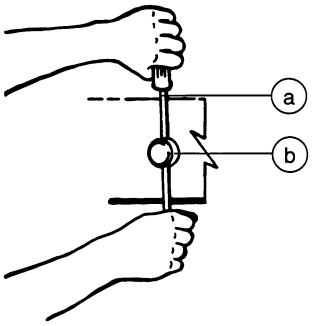
⚠CAUTION Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

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 or ropes 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.

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

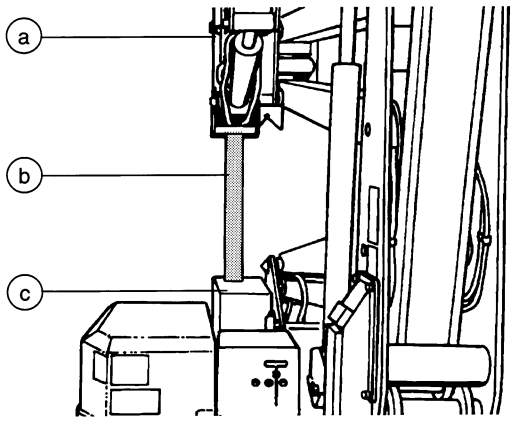
3-4
Extension Cylinder

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

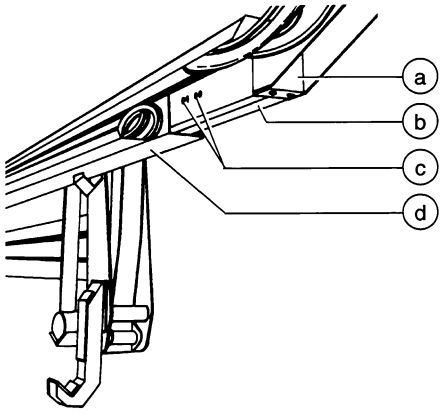
⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is strongly recommended.

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.



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.

PRIMARY BOOM COMPONENTS

7 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).

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.

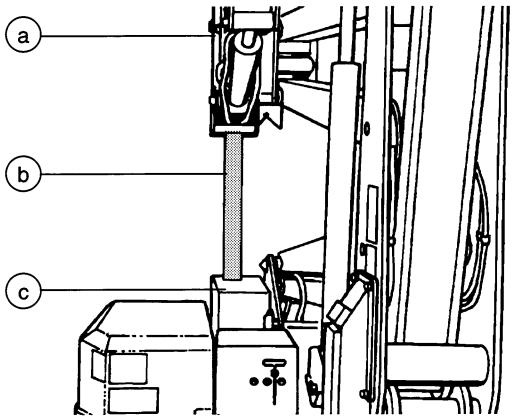
How to Remove the Platform Leveling Master Cylinder

⚠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.*

PRIMARY BOOM COMPONENTS

1 Raise the secondary boom and place a 4x4x31 inch (78 cm) block between the drive 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.

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

3 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.

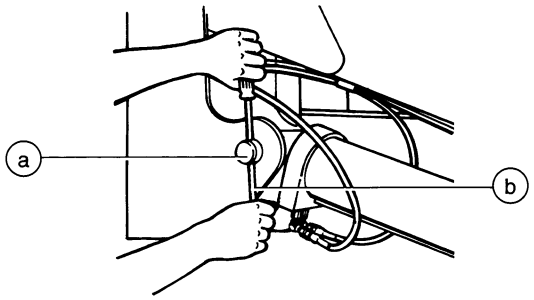
5 Disconnect and plug the primary boom lift cylinder hydraulic hoses. Cap the ports on the primary boom lift cylinder.

⚠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 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.

PRIMARY BOOM COMPONENTS

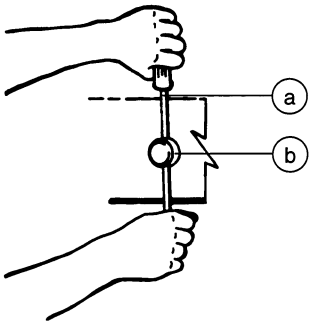
11 Remove the pin retainer from the platform leveling master cylinder rod-end pivot pin, then use a slide hammer to remove the pin.

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.

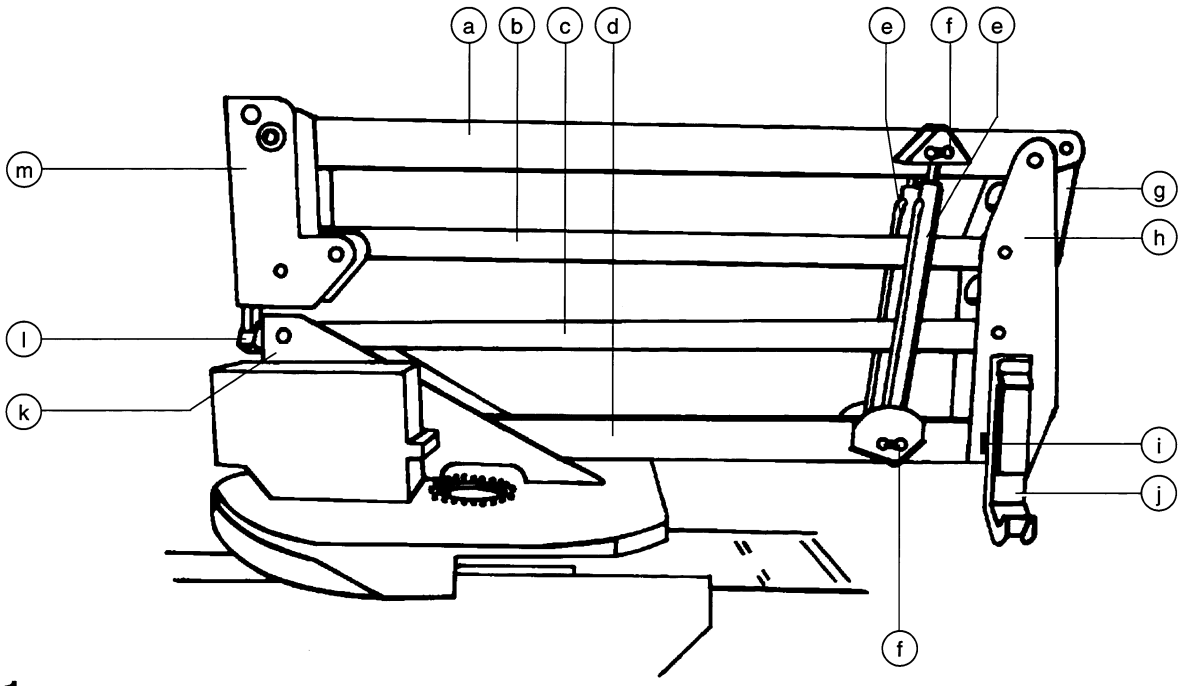
⚠CAUTION Crushing hazard. The cylinder will fall if it is not supported when the pivot pin is removed.



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



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

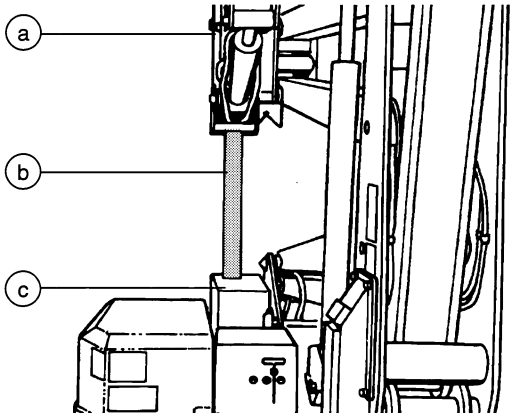
a upper secondary boom (number 1 arm)
b upper tension link (number 2 arm)
c lower tension link (number 3 arm)
d lower secondary boom (number 4 arm)
e secondary lift cylinder
f pin retainer
g compression link
h lower mid-pivot
i drive limit switch
j primary boom rest
k turntable pivot
l upper mid-pivot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

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.



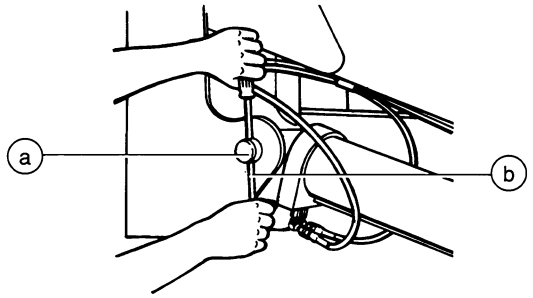
a upper mid-pivot
b 4x4x31 inch block
c counterweight

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 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 irreparably 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 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.

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

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

28 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.

29 Carefully remove the number 2 arm from the machine.

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

31 Disconnect and remove the drive speed limit switch from the primary boom rest.

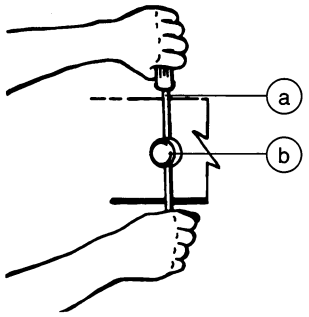
32 Disconnect and plug the hydraulic hoses at the secondary boom lift cylinders.

⚠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.

SECONDARY BOOM COMPONENTS

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

34 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.

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

36 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 irreparably damaged if they are kinked or pinched.

37 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.

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

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

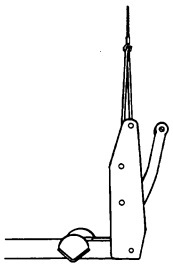
40 Position the lifting strap from an overhead crane at the center of the number 3 arm.

41 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.

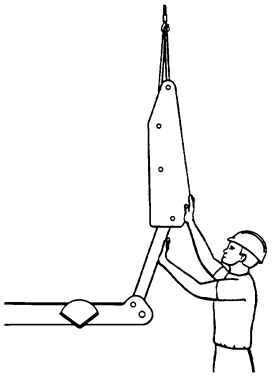
42 Carefully remove the number 3 arm from the machine.

43 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.



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

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



46 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.

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

48 Remove the compression link.

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

50 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.

51 Carefully remove the number 4 arm.

SECONDARY BOOM COMPONENTS

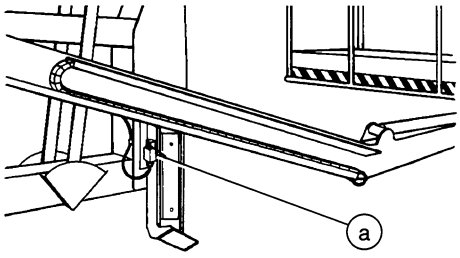
4-2
Secondary Boom Lift Cylinders

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 full rest, then raise the primary boom just above the drive speed limit switch.



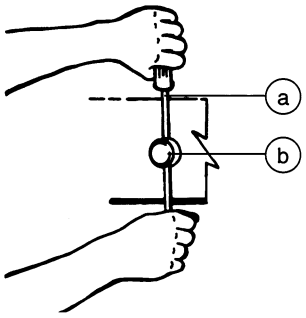
a drive speed limit switch

2 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.

Kubota D-905 Engine

5-1 Timing Adjustment

Complete information to perform this procedure is available in the *Kubota D-905 Workshop Manual* (Kubota code number: 97897-00870). Genie part number 31742.

5-2 Glow Plugs

How to Check the Glow Plugs

See the scheduled maintenance procedure B-11, *Check The Glow Plugs - Kubota Diesel Models.*

5-3 RPM Adjustment

See the scheduled maintenance procedure B-12, *Check and Adjust the Engine RPM.*

5-4 Flex Plate

The flex plate acts as a coupler between the engine and the pump. It is bolted to the engine flywheel and has a splined center to drive the pump.

How to Remove the Flex Plate

1 **Bi-fuel models:** Remove the mounting fasteners from the lift motor. Move the lift motor to the side and secure it from moving.

2 Support the drive pump with an appropriate lifting device. Then remove all of the pump mounting plate to engine bell housing bolts.

3 Carefully pull the pump away from the engine and secure it from moving.

4 Remove the flex plate mounting fasteners, then remove the flex plate from the engine.

How to Install the Flex Plate

1 Install the flex plate onto the flywheel with the raised spline against the flywheel.

2 Install the coupler onto the pump shaft with the set screw towards the pump. Leave a 1/2 inch (1.25 cm) gap between the coupler and pump end plate.

3 Apply Loctite® removable thread sealant to the coupler set screw. Torque the set screw to 36 ft-lbs (49 Nm).

⚠CAUTION Component damage hazard. Do not force the drive pump during installation or the flex plate teeth may become damaged.

KUBOTA D-905 ENGINE

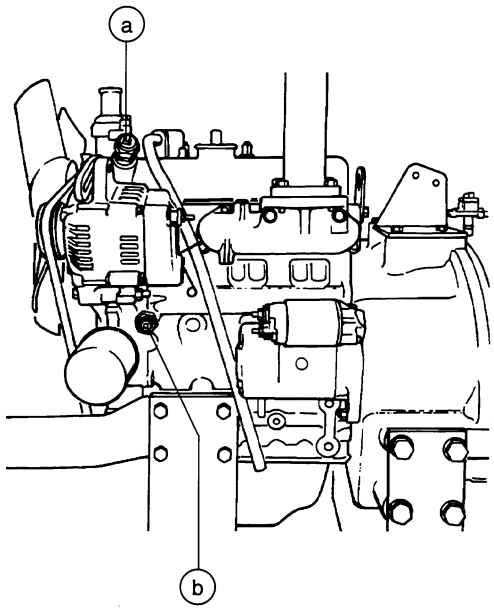
5-5
Water Temperature and Oil Pressure Switches

The water temperature switch is a normally open switch that closes at approximately 225° F (107° C). When this switch closes, the engine is shut off to prevent damage and will not restart until the temperature drops below the switch point. An over-temperature indicator light at the ground at platform controls should turn on when the switch closes.

⚠CAUTION Component damage hazard. Do not crank the engine with the over-temperature light on.

The oil pressure switch is a normally closed switch that opens at approximately 7.1 psi (0.5 bar). If the oil pressure drops below the switch point, the switch closes and shuts off the engine. A low oil pressure indicator light at the ground and platform controls should turn on when the switch closes.

⚠CAUTION Component damage hazard. Do not start or continue to run the engine with the low oil pressure light on.

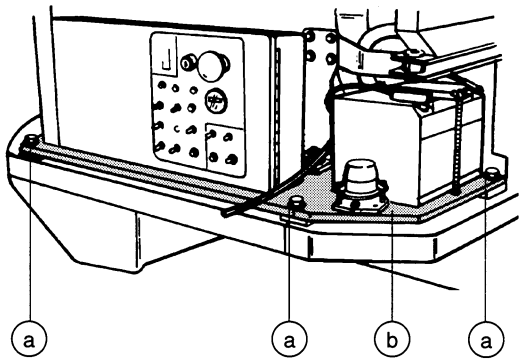


a water temperature switch
b oil pressure switch

How to Replace the Water Temperature and Oil Pressure Switches

NOTICE Perform this procedure with the engine off.

1 Remove the 3 bolts from the engine pivot plate. Swing the engine pivot plate away from the machine to access both switches.



a pivot plate bolts
b engine pivot plate

2 Disconnect the wiring from the desired switch.

3 Remove the switch from the engine block, and then install the new switch using pipe thread sealant. Do not over tighten.

⚠CAUTION Burn hazard. Contact with hot engine fluids or components may cause severe burns.

Specifications		
Water temperature switch		
Torque	8-18 ft-lbs	11-24 Nm
Hex size		13/16 inch
Temperature switch point		225°F ±2% 107°C ±2%
Oil pressure switch		
Torque	8-18 ft-lbs	11-24 Nm
Hex size		1 1/16 inch
Oil pressure switch point	7.1 psi	0.5 bar

Kubota WG-750 Engine

6-1 Choke Adjustments

The manual choke is solenoid operated and is only operational in the gasoline mode. This choke will not operate in propane mode.

NOTICE Choke adjustments are affected by climate. Richer adjustment will be necessary in colder climates, leaner adjustment in warmer climates.

6-2 Timing Adjustment

Complete information to perform this procedure is available in the *Kubota WG-750 Workshop Manual* (Kubota number: 07909-602030). Genie part number 31741.

6-3 Carburetor Adjustment

Complete information to perform this procedure is available in the *Kubota WG-750 Workshop Manual* (Kubota number: 07909-602030). Genie part number 31741.

6-4 RPM Adjustment

See the scheduled maintenance procedure B-12, *Check and Adjust the Engine RPM.*

6-5 Flex Plate

The flex plate acts as a coupler between the engine and the pump. It is bolted to the engine flywheel and has a splined center to drive the pump.

Flex Plate Removal

1 **Tri-fuel models:** Remove the mounting fasteners from the lift motor. Move the lift motor to the side and secure it from moving.

2 Support the drive pump with an appropriate lifting device. Then remove all of the pump mounting plate to engine bell housing bolts.

3 Carefully pull the pump away from the engine and secure it from moving.

4 Remove the flex plate mounting fasteners, then remove the flex plate from the engine.

How to Install the Flex Plate

1 Install the flex plate onto the flywheel with the raised spline against the flywheel.

2 Install the coupler onto the pump shaft with the set screw towards the pump. Leave a 1/2 inch (1.25 cm) gap between the coupler and pump end plate.

3 Apply removable Loctite® thread sealant to the coupler set screw. Torque the set screw to 36 ft-lbs (49 Nm).

⚠CAUTION Component damage hazard. Do not force the drive pump during installation or the flex plate teeth may become damaged.

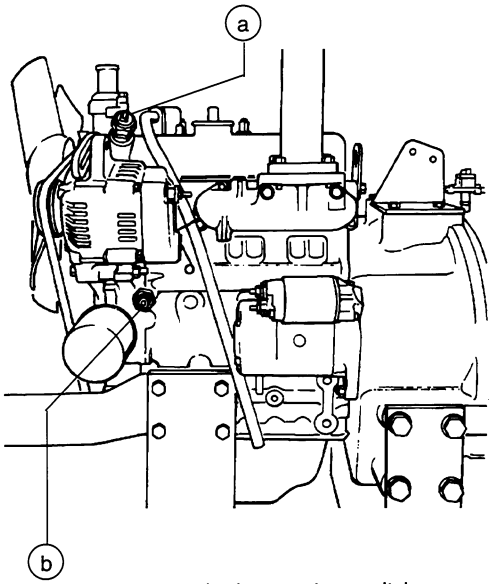
6-6 Water Temperature and Oil Pressure Switches

The water temperature switch is a normally open switch that closes at approximately 225° F (107° C). When this switch closes, the engine is shut off to prevent damage and will not restart until the temperature drops below the switch point. An over-temperature indicator light at the ground and platform controls should turn on when the switch closes.

⚠CAUTION Component damage hazard. Do not crank the engine with the over-temperature on.

The oil pressure switch is a normally closed switch that opens at approximately 7.1 psi (0.5 bar). If the oil pressure drops below the switch point, the switch closes and shuts off the engine. A low oil pressure indicator light at the ground and platform controls should turn on when the switch closes.

⚠CAUTION Component damage hazard. Do not start or continue to run the engine with the low oil pressure light on.

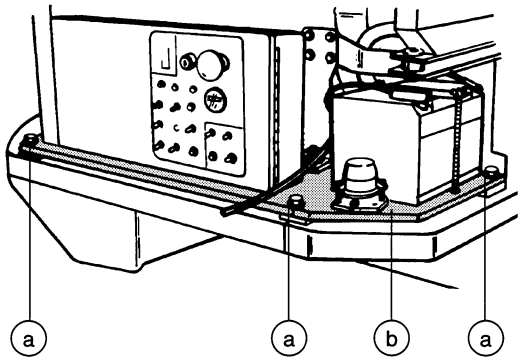


a water temperature switch
b oil pressure switch

How to Replace the Water Temperature and Oil Pressure Switches

NOTICE Perform this procedure with the engine off.

1 Remove the 3 bolts from the engine pivot plate. Swing the engine pivot plate away from the machine to access both switches.



a engine pivot plate bolts
b engine pivot plate

2 Disconnect the wiring from the desired switch.

3 Remove the switch from the engine block, and then install the new switch using pipe thread sealant. Do not over tighten.

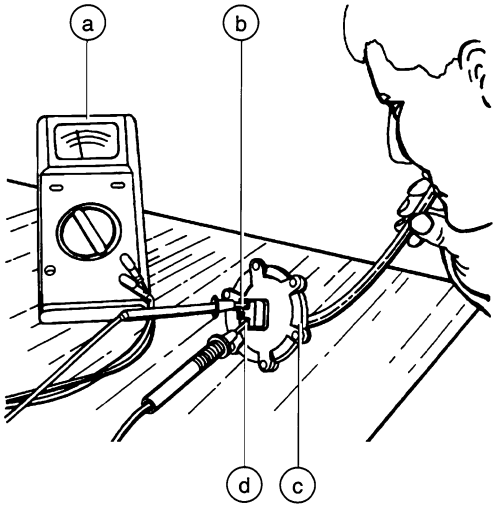
⚠CAUTION Burn hazard. Contact with hot engine fluids or components may cause severe burns

KUBOTA WG-750 ENGINE

Specifications		
Water temperature switch		
Torque	8-18 ft-lbs	11-24 Nm
Hex size		13/16 inch
Temperature switch point		225° F ±2% 107° C ±2%
Oil pressure switch		
Torque	8-18 ft-lbs	11-24 Nm
Hex size		1 1/16 inch
Oil pressure switch point	7.1 psi	0.5 bar

6-7
Vacuum Switch

How to Test the Vacuum Switch



a ohmmeter
b common terminal (SOL.)
c vacuum switch
d normally open terminal (ING.)

1 Connect the leads from an ohmmeter or continuity tester to the common and normally open terminals.

⊙ Result: There should be no continuity (infinite Ω).

2 Apply mild suction to the vacuum port.

⊙ Result: The switch should close and show full continuity (zero Ω).

⚠CAUTION Component damage hazard. Do not short vacuum switch terminals to ground.

Ground Controls

7-1 Control Relays

Relays used for single function switching are single pole double throw (SPDT) relays. (There are two types of single pole double throw relays used for ground controls.) Dual function switching requires a double pole double throw (DPDT) relay.

How to Test a Double Pole Double Throw Relay

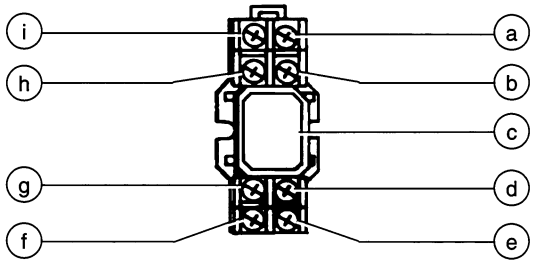
⚠WARNING Electrocution hazard. Contact with electrically charged circuits may cause death or serious injury. Remove all rings, watches and other jewelry.

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 13 and 14 represent the coil and should not be tested in any other combination.



a terminal no. 5
b terminal no. 1
c relay
d terminal no. 13
e terminal no. 9
f terminal no. 12
g terminal no. 14
h terminal no. 4
i terminal no. 8

Test	Desired result
terminal 13 to 14	160 to 170Ω
terminal 8 to 5, 4, 1,12 & 9	no continuity (infinite Ω)
terminal 5 to 4, 1, 12 & 9	no continuity
terminal 4 to 1 & 9	no continuity
terminal 1 to 12	no continuity
terminal 4 to 12	continuity (zero Ω)
terminal 1 to 9	continuity

4 Connect 12V DC to terminal 14 and a ground wire to terminal 13, then test the following terminal combinations.

Test	Desired result
terminal 8 to 1, 5, 9 & 4	no continuity (infinite Ω)
terminal 5 to 1, 4 & 12	no continuity
terminal 4 to 1, 9 & 12	no continuity
terminal 1 to 9 & 12	no continuity
terminal 8 to 12	continuity (zero Ω)
terminal 5 to 9	continuity (zero Ω)

GROUND CONTROLS

How to Test a Single Pole Double Throw Relay

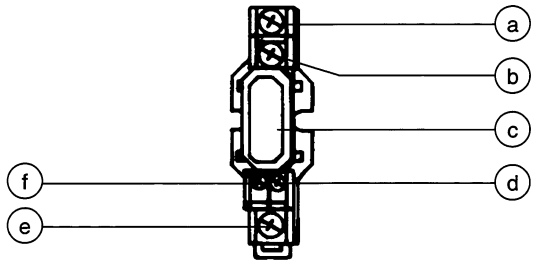
This procedure covers fundamental relay testing and does not specifically apply to all varieties of relays.

Socket Connection Relay

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 or continuity tester to each terminal combination and check for continuity. Terminals 13 and 14 represent the coil and should not be tested in any other combination.



a terminal no. 5
b terminal no. 1
c relay
d terminal no. 13
e terminal no. 9
f terminal no. 14

Test	Desired result
terminal 13 to 14	190 to 200Ω
terminal 5 to 1 & 9	no continuity (infinite Ω)
terminal 1 to 9	continuity (zero Ω)

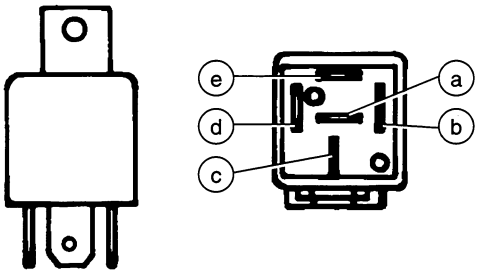
4 Connect 12V DC to terminal 14 and a ground wire to terminal 13, then test the following terminal combinations.

Test	Desired result
terminal 1 to 5 & 9	no continuity (infinite Ω)
terminal 5 to 9	continuity (zero Ω)

Direct Connection Relay

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

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



a terminal no. 87a
b terminal no. 85
c terminal no. 30
d terminal no. 86
e terminal no. 87

Test	Desired result
terminal 85 to 86	85 to 95Ω
terminal 87 to 87a & 30	no continuity (infinite Ω)
terminal 87a to 30	continuity (zero Ω)

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

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

7-2 Toggle Switches

See 1-3, *Toggle Switches*.

7-3 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 and then disconnect the wiring from the component to be removed.

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

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

Component Panel

8-1
Electrical Contactors

Refer to Maintenance Procedure B-28, *Check the Electrical Contactors.*

8-2
Voltage Converter

The voltage converter reduces the 36V DC output of the battery packs down to 12V DC for the control circuit.

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

1 Be sure both battery packs are properly connected.

2 Visually inspect the L.E.D. light, to be sure the light is on.

3 Connect the red(+) lead from a volt meter to the positive (+) terminal on the input side of the voltage converter. Connect the black(-) lead to the negative (-) terminal. The input voltage should be 36V DC.

4 Remove the fuse from the converter. Connect the leads from an ohmmeter to the ends of the fuse to check for continuity. The fuse should have continuity.

5 Connect the red(+) lead from a volt meter to the positive (+) terminal on the output side of the voltage converter. Connect the black(-) lead to the negative (-) terminal. The output voltage should be 14V DC.

Hydraulic Pumps

9-1
Lift/Steer Pump - Engine Models

How to Test the Lift/Steer Pump

1 Disconnect and plug the high pressure hydraulic hose from the lift/steer 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 **Kubota Gas models:** Remove the high tension lead from the center of the ignition coil.

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

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

5 **Kubota Diesel models:** Hold the manual fuel shutoff valve counterclockwise to the CLOSED position.

All models: Observe the pressure gauge while cranking the engine. Immediately stop cranking if the pressure reaches or exceeds 3000 psi (206 bar).

⚠CAUTION Component damage hazard. Hydraulic pressure in excess of 3000 psi (206 bar) will cause severe component damage.

⊙ Result: If the pressure gauge reads 3000 psi (206 bar), immediately stop cranking the engine. The pump is good.

⊙ Result: If pressure fails to reach 3000 psi (206 bar), the pump is bad and will need to be serviced or replaced.

6 Remove the pressure gauge and reconnect the hydraulic hose.

7 **Kubota Gas models:** Reconnect the high tension lead to the ignition coil.

How to Remove the Lift/Steer Pump

1 Disconnect and cap the hydraulic hoses from the pump.

⚠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 pump mounting bolts. Carefully remove the pump.

HYDRAULIC PUMPS

9-2
Drive Pump - Engine Models

How to Test the Drive Pump

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

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

3 **Kubota Gas models:** Remove the high tension lead from the center of the ignition coil.

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

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

5 **Kubota Diesel models:** Hold the manual fuel shutoff valve counterclockwise to the CLOSED position.

All models: Observe the pressure gauge while cranking the engine. Immediately stop cranking if the pressure reaches or exceeds 3000 psi (206 bar).

⚠CAUTION Component damage hazard. Hydraulic pressure in excess of 3000 psi (206 bar) will cause severe component damage.

⊙ Result: If the pressure gauge reads 3000 psi (206 bar), immediately stop cranking the engine. The pump is good.

⊙ Result: If pressure fails to reach 3000 psi (206 bar), the pump is bad and will need to be serviced or replaced.

6 Remove the pressure gauge and reconnect the hydraulic hose.

7 **Kubota Gas models:** Reconnect the high tension lead to the ignition coil.

How to Remove the Drive Pump

1 Disconnect and cap the hydraulic hoses from the pump.

⚠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 pump mounting bolts. Carefully remove the pump.

9-3
Lift/Steer Pump - DC Power Unit

How to Test the Lift/Steer Pump

1 Disconnect and plug the high pressure hydraulic hose from the lift/steer pump.

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

3 **Kubota Gas models:** Remove the high tension lead from the center of the ignition coil.

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

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

5 **Kubota Diesel models:** Hold the manual fuel shutoff valve counterclockwise to the CLOSED position.

All models: Observe the pressure gauge while cranking the engine. Immediately stop cranking if the pressure reaches or exceeds 3000 psi (206 bar).

⚠CAUTION Component damage hazard. Hydraulic pressure in excess of 3000 psi (206 bar) will cause severe component damage.

⊙ Result: If the pressure gauge reads 3000 psi (206 bar), immediately stop cranking the engine. The pump is good.

⊙ Result: If pressure fails to reach 3000 psi (206 bar), the pump is bad and will need to be serviced or replaced.

6 Remove the pressure gauge and reconnect the hydraulic hose.

7 **Kubota Gas models:** Reconnect the high tension lead to the ignition coil.

How to Remove the Lift/Steer Pump

1 Disconnect and cap the hydraulic hoses from the pump.

⚠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 pump mounting bolts. Carefully remove the pump.

HYDRAULIC PUMPS

9-4
Drive Pump - DC Power Unit

How to Test the Drive Pump

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

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

3 **Kubota Gas models:** Remove the high tension lead from the center of the ignition coil.

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

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

5 **Kubota Diesel models:** Hold the manual fuel shutoff valve counterclockwise to the CLOSED position.

All models: Observe the pressure gauge while cranking the engine. Immediately stop cranking if the pressure reaches or exceeds 3000 psi (206 bar).

⚠CAUTION Component damage hazard. Hydraulic pressure in excess of 3000 psi (206 bar) will cause severe component damage.

⊙ Result: If the pressure gauge reads 3000 psi (206 bar), immediately stop cranking the engine. The pump is good.

⊙ Result: If pressure fails to reach 3000 psi (206 bar), the pump is bad and will need to be serviced or replaced.

6 Remove the pressure gauge and reconnect the hydraulic hose.

7 **Kubota Gas models:** Reconnect the high tension lead to the ignition coil.

How to Remove the Drive Pump

1 Disconnect and cap the hydraulic hoses from the pump.

⚠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 pump mounting bolts. Carefully remove the pump.

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Function Manifolds

10-1
Function Manifold Components

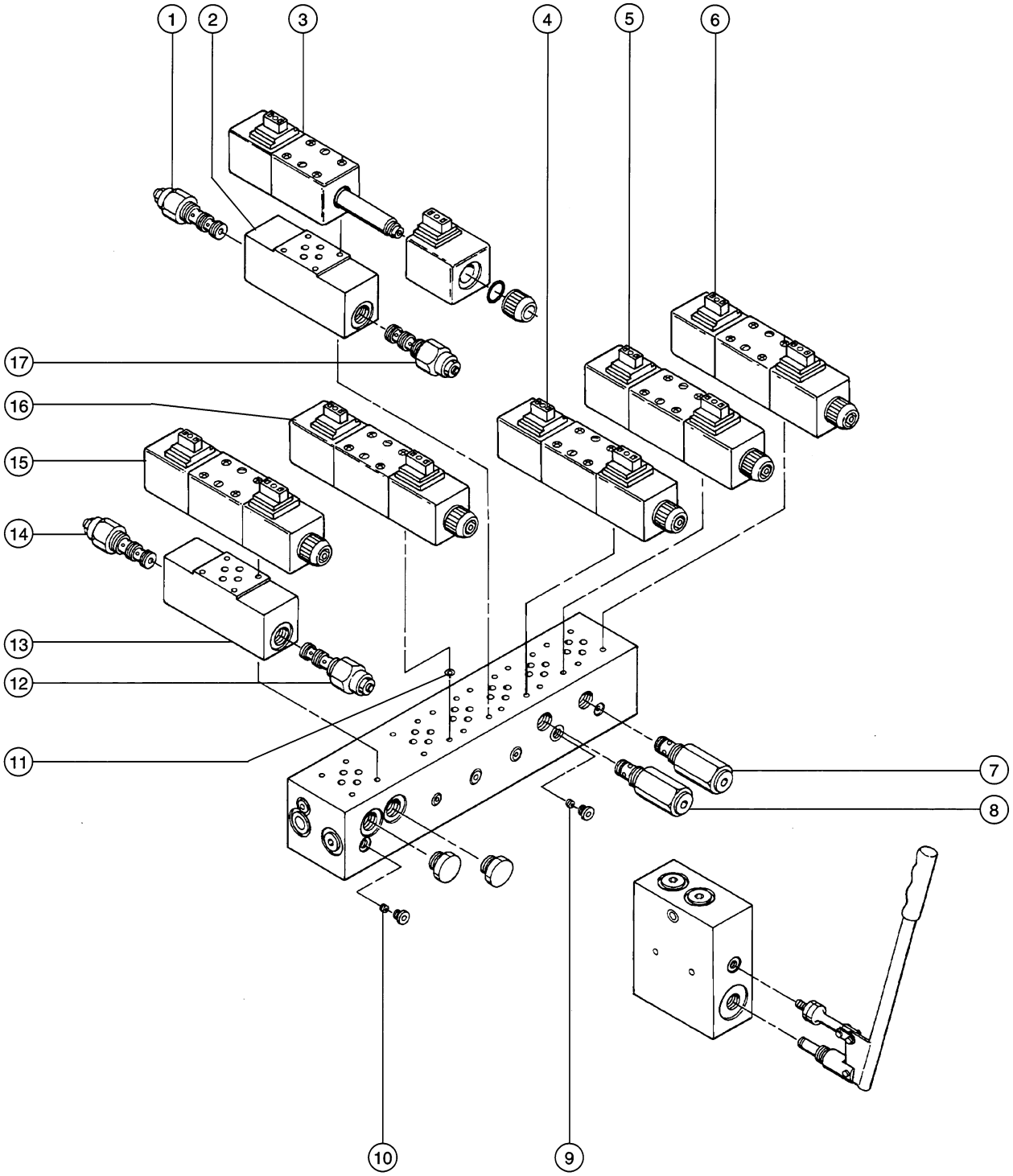
Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve	MA	Platform level up	35-40 ft-lbs / 47-54 Nm
2	Sandwich valve manifold	M	Platform level counterbalance valves	
3	3 position 4 way D01 valve	L	Platform level	30-35 in-lbs / 3-4 Nm
4	3 position 4 way D01 valve	G	Primary boom extend/retract	30-35 in-lbs / 3-4 Nm
5	3 position 4 way D01 valve	H	Primary boom up/down	30-35 in-lbs / 3-4 Nm
6	3 position 4 way D01 valve	J	Secondary boom up/down	30-35 in-lbs / 3-4 Nm
7	Relief valve, 1200 psi (83 bar)	D	Secondary boom down	35-40 ft-lbs / 47-54 Nm
8	Relief valve, 1200 psi (83 bar)	C	Primary boom down	35-40 ft-lbs / 47-54 Nm
9	Orifice 0.060 in / 1.52 mm	T	Primary boom up/down	
10	Orifice 0.052 in / 1.32 mm	P	Turntable rotate	
11	Orifice 0.020 in / 0.50 mm	S	Platform rotate	
12	Counterbalance valve	NB	Turntable rotate left	35-40 ft-lbs / 47-54 Nm
13	Sandwich valve manifold	N	Turntable rotate counterbalance valves	
14	Counterbalance valve	NA	Turntable rotate right	35-40 ft-lbs / 47-54 Nm
15	3 position 4 way D01 valve	E	Turntable rotate	30-35 in-lbs / 3-4 Nm
16	3 position 4 way D01 valve	F	Platform rotate	30-35 in-lbs / 3-4 Nm
17	Counterbalance valve	MB	Platform level down	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

FUNCTION MANIFOLDS



FUNCTION MANIFOLDS

10-2 Valve Adjustments - Function Manifold

How to Adjust the Primary 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 **Engine models**: Start the engine from the ground controls.

DC models: 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 engine off. Hold the relief valve and remove the cap (item 8, 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 3 and recheck the valve pressure.

Primary boom down relief valve specifications

Pressure	1200 psi 83 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 **Engine models**: Start the engine from the ground controls.

DC models: 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 engine 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 3 and recheck the valve pressure.

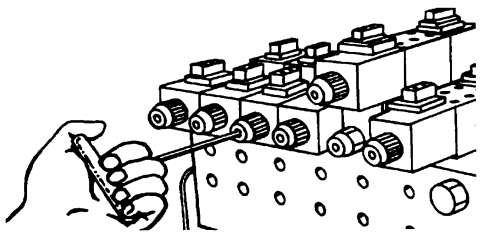
Secondary boom down relief valve specifications

Pressure	1200 psi 83 bar

How to Override a Valve

A hydraulic valve may need to be manually overridden to troubleshoot a malfunction. The proportional boom functions use a variable position proportional valve and a three position four way directional valve.
Example: one position for boom up, one position for neutral and one position for boom down. The three position valves and the proportional valves can be manually overridden.
To identify the manifold valves
see 10-1, *Function Manifolds,* in this section.

1 Push the button on the end of the valve in ¼ inch (6 mm).



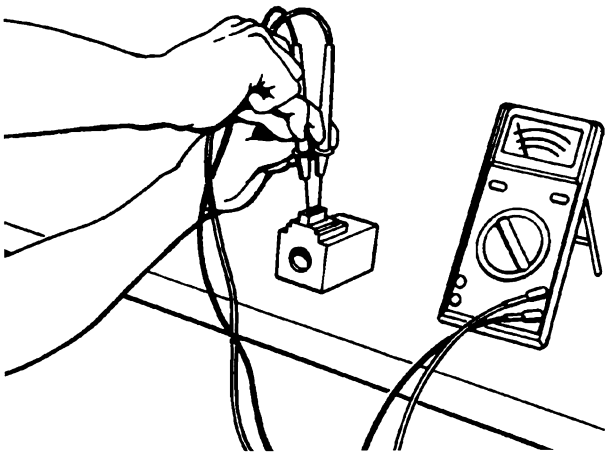
2 Move the ground control function switch for the function being overridden to operate function.

⚠WARNING Collision hazard. Impact with moving boom components may cause death or serious injury. Use extreme caution when overriding a machine function. Identify the direction of machine movement before overriding a valve.

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 Connect the leads from an ohmmeter to the valve coil terminals.

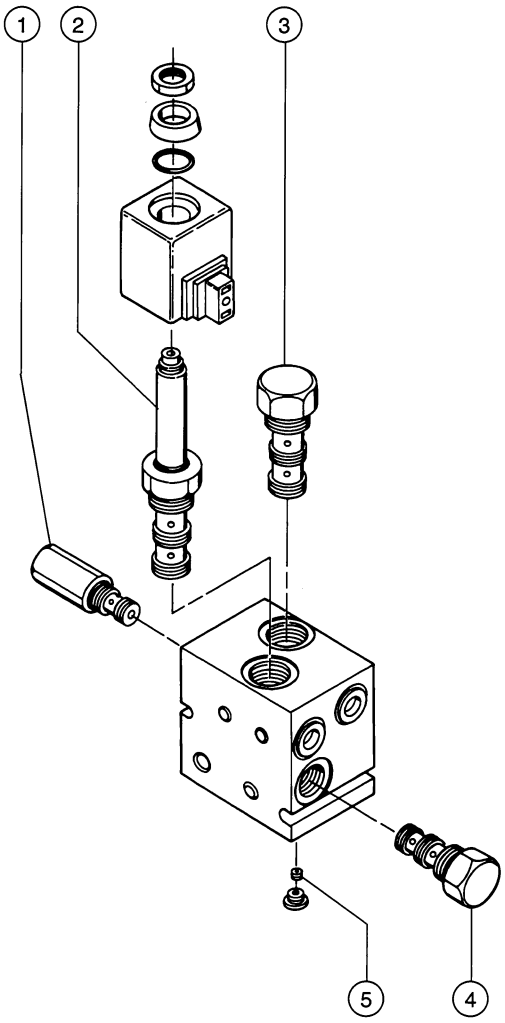


Valve coil specifications	
3 position 4 way directional valve	4.5Ω
Proportional solenoid valve	5Ω

FUNCTION MANIFOLDS

10-3
Proportional Manifold Components

Index No.	Description	Schematic Item	Function	Torque
1	Relief valve, 2500 psi (172 bar)	C	System relief	35-40 ft-lbs / 47-54 Nm
2	Proportional valve	A	Boom functions	10-12 ft-lbs / 15-18 Nm
3	Priority flow regulator valve	D	Steering	10-12 ft-lbs / 15-18 Nm
4	Differential sensing valve	B	Differential sensing circuit	10-12 ft-lbs / 15-18 Nm
5	Orifice 0.015 in / 0.38 mm	E	Differential sensing 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
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

10-4
Valve Adjustments - Proportional Manifold

How to Adjust the Main 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 **Engine models**: Start the engine from the ground controls.

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

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

4 Turn the engine off. Hold the relief valve and remove the cap (item 1, proportional 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 3 and recheck the valve pressure.

Main relief valve specifications	
Pressure	2500 psi 172 bar

Fuel and Hydraulic Tanks

11-1 Hydraulic Tank

The primary functions of the hydraulic tank are to cool, clean and deaerate the hydraulic fluid during operation. It utilizes internal suction strainers for the pump supply suction lines and has an external return line filter with condition indicator.

How to Remove the Hydraulic Tank

⚠CAUTION Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system.

1 Raise the primary boom until it is horizontal to access the anchor hook.

2 Completely drain the oil from the tank by removing the drain plug located on the side of the tank.

⚠CAUTION Burn hazard. Contact with hot oil may cause severe burns.

3 Disconnect the hydraulic hoses from the hydraulic tank.

4 **Engine models:** Remove the tank anchor hooks from the back of the tank. Then remove the mounting fasteners from the tank strap.

5 Remove the mounting fasteners from the side of the tank.

6 Use an appropriate lifting device to remove the tank from the machine.

NOTICE Always use pipe thread sealant when installing the drain plug.

NOTICE Use only Dexron II equivalent hydraulic fluid.

11-2 Fuel Tank

How to Remove the Fuel Tank

⚠DANGER Explosion hazard. Engine fuels are combustible. Remove the fuel tank in an open, well-ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

⚠DANGER Explosion hazard. When transferring fuel, connect a grounding wire between the machine and pump or container.

1 Raise the secondary boom enough to access the back of the fuel tank.

2 Turn the manual fuel shutoff valve to the CLOSED position.

3 **Kubota Gas models:** Disconnect the wiring from the fuel shutoff solenoid. Disconnect, drain and plug the fuel hose.

Kubota Diesel models: Disconnect, drain and plug the supply and return fuel hoses. Cap the fuel return fitting on the fuel tank.

4 Remove the mounting fasteners from the bottom of the tank. Then remove the mounting fasteners from the tank strap.

5 Use an appropriate lifting device to remove the tank from the machine.

NOTICE Clean the fuel tank and inspect for rust and corrosion before installing.

Turntable Rotation Components

12-1 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 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.

12-2 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.

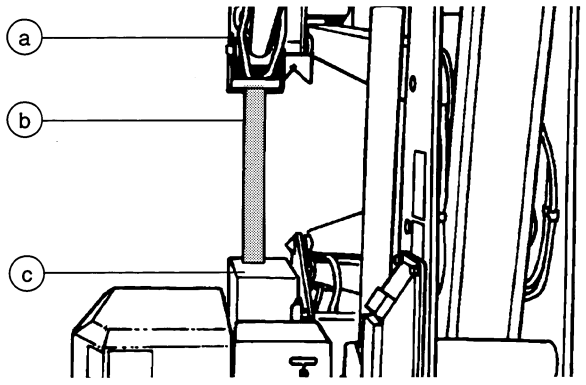
⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is required.

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.



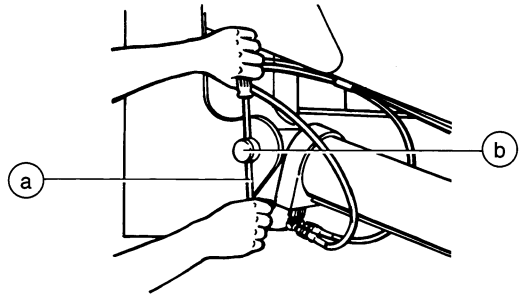
a upper mid-pivot
b 4x4x31 inch block
c counterweight

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 Disconnect and plug the three 3/4 inch hydraulic hoses from the main pump.

⚠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.

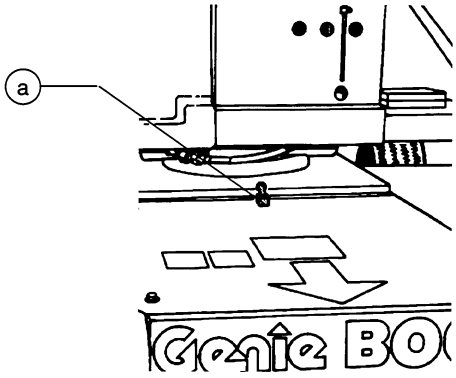
8 Disconnect the same three 3/4 inch hydraulic hoses from the drive manifold and plug them. Pull these hoses up through the turntable and remove them from the machine.

9 Disconnect and plug the "in" and "return" hydraulic hoses from the steer manifold. Pull these hoses up through the turntable.

10 Disconnect and plug the hydraulic hoses from the turntable rotation motor. Pull these hoses up through the turntable.

11 Label and then disconnect all the wiring from the drive manifold and the steer manifold.

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

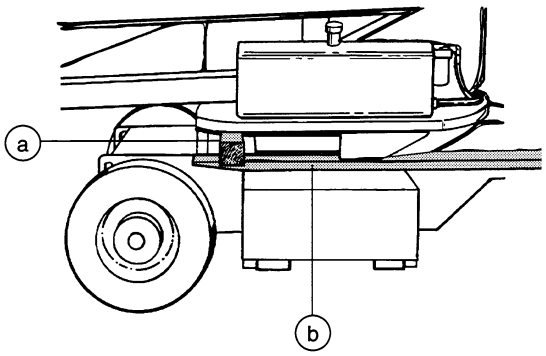
15 Center a lifting jack under the steering axle. Lift the drive chassis until the tires are just off the ground.

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

17 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).

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

19 Place a 5 inch (13 cm) tall block near the end of the forks for support.



a support block
b fork

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

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

22 Remove the turntable mounting bolts.

23 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.

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

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

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

27 Loosen the counterweight positioning bolt.

28 Remove the fasteners from the counterweight.

29 Carefully lower the counterweight from the machine.

30 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.

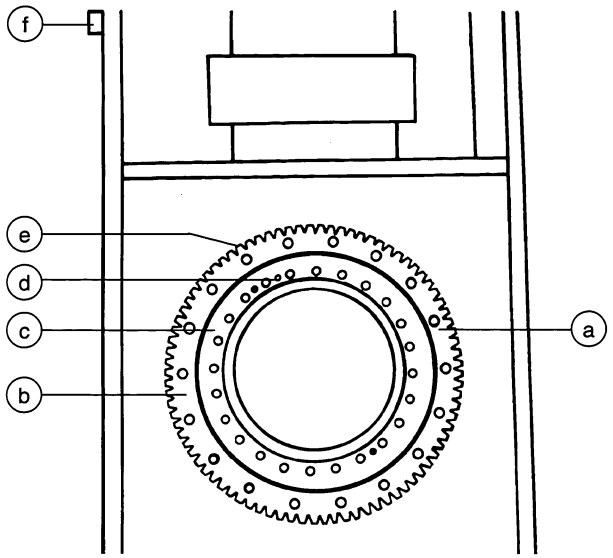
⚠WARNING This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools may result in death or serious injury and significant component damage. Dealer service is required.

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.

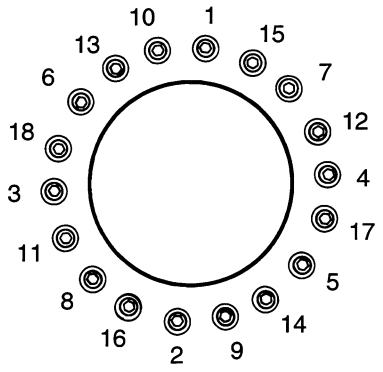
2 Locate the "red" mark on the outside bearing race. Align the mark with the rotation stop block on the chassis.

TURNTABLE ROTATION COMPONENTS



a "O" mark
b outer bearing
c inner bearing
d dowel
e red 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 "0" mark stamped in the outside bearing and the dowel on the inside bearing.

5 Position the inside bearing dowel 90 degrees counterclockwise from the "0" 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 "0" mark on the outside bearing.

8 Center the worm drive over the "0" 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).

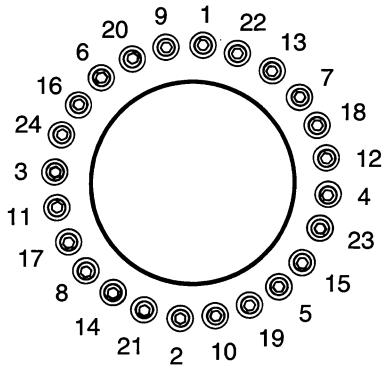
11 Tighten the two 5/16 fasteners. Observe the dial indicator to be sure that the worm drive does not move.

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

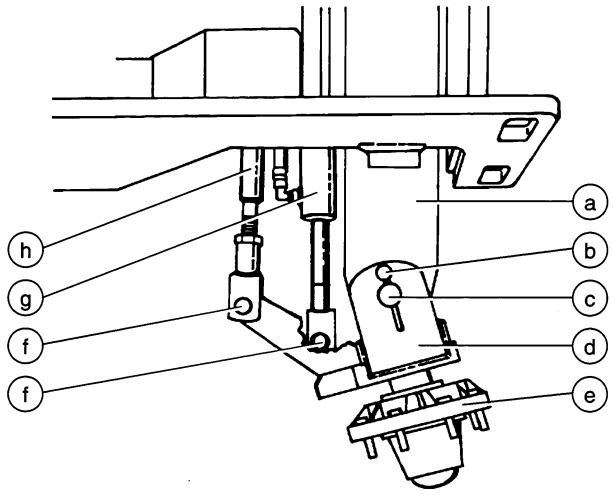
NOTICE After complete assembly, the turntable should rotate smoothly without jerking or grinding.

Steering Axle Components

13-1 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.

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).

13-2 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 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

13-3
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.

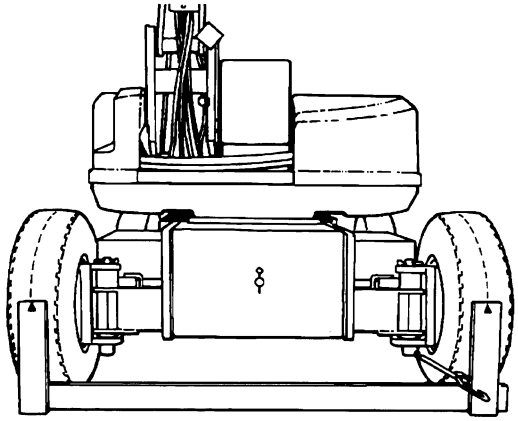
2 Remove the tie rod.

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 pivot pin, then install the retaining bolt.

8 Tighten the jam nut against the tie rod.

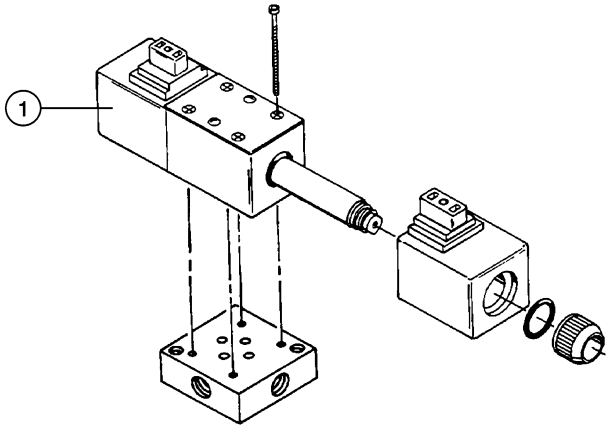
9 Lower the machine and recheck the front and back measurements (step 2). If further adjustment is needed, repeat steps 3 through 8.

Toe-in specification	0 ± 1/4 inch (6.35 mm)

Steer Manifold

14-1
Steer Manifold Components

Index No.	Description	Function	Torque
1	3 position 4 way D01 valve	Steering	30-35 in-lbs / 3-4 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

Non-steering Axle Components

15-1 Drive Motor

⚠CAUTION Component damage hazard. Repairs to the drive motor should only be performed by an authorized Sundstrand-Sauer dealer.

How to Remove a Drive Motor

A drive motor can only be removed from the inside of the chassis.

⚠CAUTION Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system and cause severe component damage. Dealer service is recommended.

1 Disconnect the hydraulic hoses from the drive motor and plug them.

⚠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 drive motor mounting bolts.

3 Guide the drive motor shaft out of the brake and then remove the drive motor.

15-2 Torque Hub

How to Remove a Drive Torque Hub

The drive motor must be removed in order to access the torque hub mounting bolts.

1 Remove the drive motor. See 15-1, *How to Remove a Drive Motor.*

2 Disconnect the hydraulic hose from the brake and plug it. Then remove the hydraulic fitting and the bleed valve.

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

4 Center a lifting jack under the non-steering axle. Raise the machine and place blocks under the chassis for support.

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

6 Place a second lifting jack under the torque hub for support.

7 Remove the bolts that attach the torque hub to the chassis, then remove the torque hub.

⚠CAUTION Crushing hazard. The torque hub will fall if it is not properly supported when the mounting bolts are removed.

Torque specifications

Lug nuts	125 foot-pounds 169.5 Newton meters
Drive torque hub mounting bolts	210 ft-lbs 285 Nm

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Drive Manifold

16-1
Drive Manifold Components

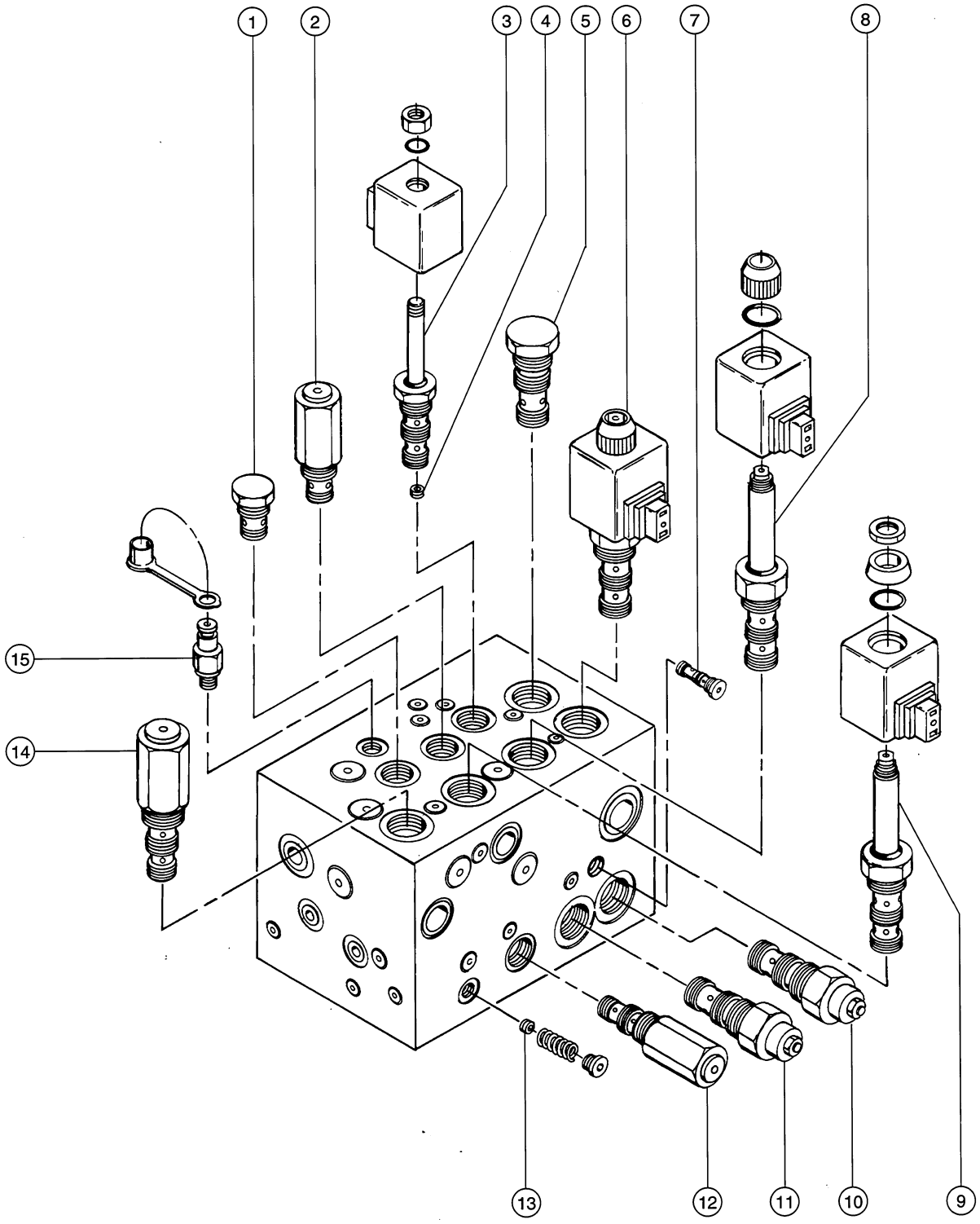
Index No.	Description	Schematic Item	Function	Torque
1	Check valve	C	Pressure inlet number two check valve	35-40 ft-lbs / 47-54 Nm
2	Relief valve, 3500 psi (240 bar)	A	System relief	35-40 ft-lbs / 47-54 Nm
3	2 position 3 way valve	L	Two-speed wheel motors (energized in high range to destroke the rear motor swash plates)	10-12 ft-lbs / 15-18 Nm
4	Orifice 0.025 in (06.35 mm)	N	Motor shift circuit	
5	Differential sensing valve	E	Differential sensing	15-18 ft-lbs / 20-24 Nm
6	2 position 3 way valve	F	Forward	10-12 ft-lbs / 15-18 Nm
7	Shuttle valve 2 position 3 way	H	Motor shift/brake release circuit	10-12 ft-lbs / 15-18 Nm
8	2 position 3 way valve	G	Reverse	10-12 ft-lbs / 15-18 Nm
9	Proportional solenoid valve	D	Drive	10-12 ft-lbs / 15-18 Nm
10	Counterbalance valve	I	Reverse	35-40 ft-lbs / 47-54 Nm
11	Counterbalance valve	J	Forward	35-40 ft-lbs / 47-54 Nm
12	Pressure reducing valve, 320 psi (22 bar)	K	Motor shift/brake release circuit	10-12 ft-lbs / 14-16 Nm
13	Orifice 0.030 in (0.76 mm)	M	Brake circuit	
14	Unloader valve, 1500 psi (103 bar)	B	Pressure inlet number two unloader valve	10-12 ft-lbs / 14-16 Nm
15	Diagnostic fitting		System testing	

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

DRIVE MANIFOLD



DRIVE MANIFOLD

16-2 Valve Adjustments - Drive Manifold

How to Adjust the Main Relief Valve

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

1 Connect a 0 to 5000 psi (0 to 345 bar) pressure gauge to the test port on the drive manifold.

2 **Engine Models**: Start the engine from the ground controls.

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

3 Place chocks against all 4 wheels.

4 Drive the machine against the chocks and observe the pressure reading on the pressure gauge.

5 Turn the engine off. Hold the relief valve and remove the cap (item 2, drive manifold).

6 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.

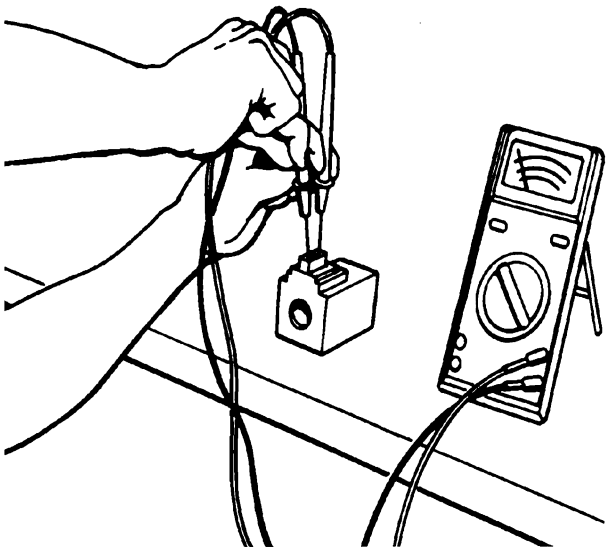
7 Repeat steps 2 through 3 and recheck the valve pressure.

Main relief valve specifications	
Pressure	3500 psi 240 bar

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 Connect the leads from an ohmmeter to the valve coil terminals.



Valve coil specifications	
Proportional solenoid valve	5Ω
2 position 3 way valve	4.5Ω

California Proposition 65

WARNING

The exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

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