Genie®
A TEREX BRAND

Service and Repair Manual

Serial Number Range

S-100HD
S-120HD

from S100HD14D - 200
to S-100HD16D-229

from S120HD14D - 201
to S-120HD16D-229

from S-100HDD-230
from S-120HDD-230

This manual includes:
Repair procedures
Fault Codes
Electrical and Hydraulic Schematics

For detailed maintenance procedures, Refer to the appropriate Maintenance Manual for your machine.

Part No. 1268495
Rev A1
September 2016

Introduction

Important

Read, understand and obey the safety rules and operating instructions in the *Genie S-100HD Operator's Manual* or the *Genie S-120HD Operator's Manual* before attempting any maintenance or repair procedure.

This manual 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.

Compliance

Machine Classification
Group B/Type 3 sa defined by ISO 16368

Machine Design Life
Unrestricted with proper operation, inspection and scheduled maintenance.

Technical Publications

Genie 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 all other manuals.

Contact Us:

http://www.genielift.com
e-mail: awp.techpub@terex.com

Find a Manual for this Model

Go to http://www.genielift.com

Use the links to locate Operator's, Parts or Service Manuals.

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1268495 Rev A1 September 2016
First Edition, Third Printing

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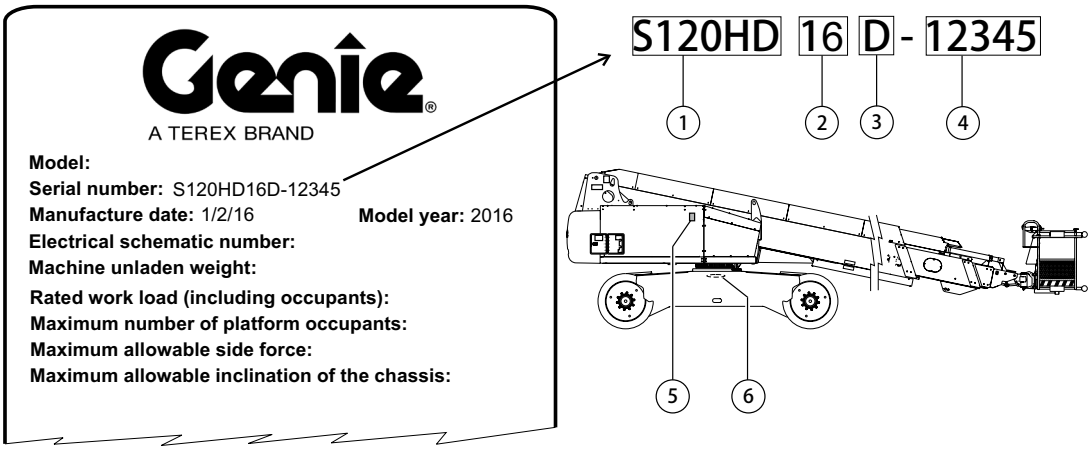
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Revision History

Revision	Date	Section	Procedure / Page / Description
A	9/2015		Release
A1	9/2016	Introduction	Serial Number Legend
Reference Examples:			**Electronic Version** Click on any content or procedure in the Table of Contents to view the update.
Section - Repair Procedure, 4-2			
Section - Fault Codes, All charts			
Section - Schematics, Legends and schematics			

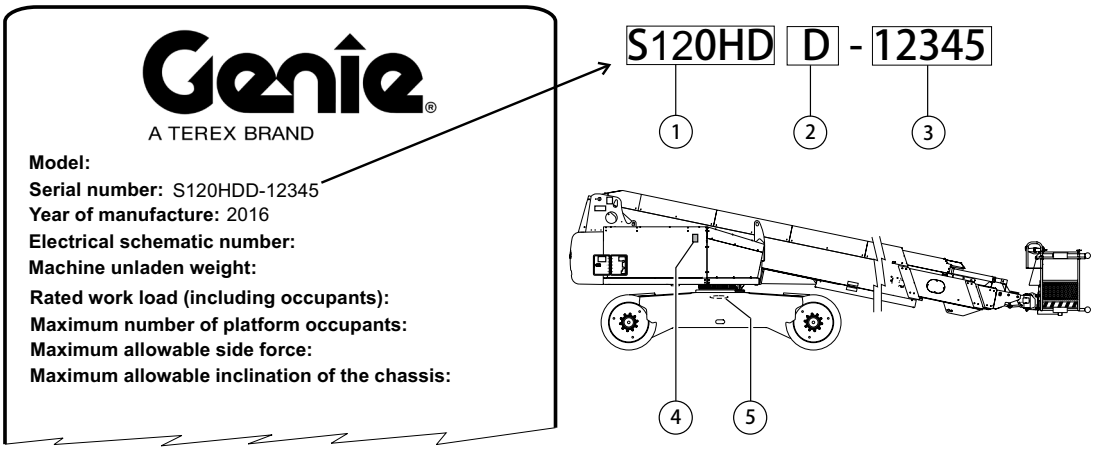
Serial Number Legend

To August 31, 2016



1 Model
2 Model year
3 Facility code
4 Sequence number
5 Serial label (located under cover)
6 Serial number (stamped on chassis)

From September 1, 2016



1 Model
2 Facility code
3 Sequence number
4 Serial label (located under cover)
5 Serial number (stamped on chassis)

Safety Rules



Danger

Failure to obey the instructions and safety rules in this manual, and the *Genie S-100DH Operator's Manual* or the *Genie S-120HD 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:



Safety alert symbol—used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠DANGER Used to indicate the presence of an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING Used to indicate the presence of a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION With safety alert symbol—used to indicate the presence of a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.

NOTICE Used to indicate the presence of a potentially hazardous situation which, if not avoided, may result in property damage.



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 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.



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

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Specifications

Machine Specifications, S-100HD and S-120HD Models

Stowed dimensions	S-100HD	S-120HD
Length, transport position	40 ft 8 in 12.4 m	40 ft 8 in 12.4 m
Length, stowed	43 ft 0 in 13.1 m	43 ft 0 in 13.1 m
Width, axles retracted	8 ft 2 in 2.49 m	8 ft 2 in 2.49 m
Width, axles extended	11 ft 3.35 m	11 ft 3.35 m
Height, stowed maximum	10 ft 3 in 3.13 m	10 ft 6 in 3.2 m
Weight	39,760 lbs 18,035 kg	45,300 lbs 20,548 kg
Ground clearance, axle	14 in 35.6 cm	14 in 35.6 cm

Tires and wheels	S-100HD	S-120HD
Tire size, solid rubber	365/65D22.5	445/65D22.5
Overall tire diameter	43 in 1.09 m	46.5 in 1.18 m
Wheel diameter	30.4 in 77.3 cm	33.8 in 85.9 cm
Wheel width	14.5 in 36.8 cm	17.8 in 45 cm
Wheel lugs		10 @ 3/4 -16
Lug nut torque, dry		420 ft-lbs 570 Nm
Lug nut torque, lubricated		320 ft-lbs 434 Nm

Operational dimensions	S-100HD	S-120HD
Platform height, maximum	100 ft 30.48 m	120 ft 36.58 m
Working height, maximum	106 ft 32.48 m	126 ft 38.58 m
Horizontal reach maximum	73 ft 22.25 m	73 ft 22.25 m
Maximum load capacity	750 lb 340 kg	750 lb 340 kg
Turntable tailswing, axles retracted	5 ft 6 in 1.68 m	5 ft 6 in 1.68 m
Turntable tailswing axles extended	4 ft 1.22 m	4 ft 1.22 m
Wheelbase	12 ft 3.66 m	12 ft 3.66 m
Turning radius, outside, axles retracted (2WD)	46 ft 5 in 14.15 m	62 ft 3 in 18.98 m
Turning radius, inside, axles retracted (2WD)	36 ft 6 in 11.13 m	42 ft 4 in 12.90 m
Turning radius, outside, axles extended (2WD)	30 ft 6 in 9.30 m	32 ft 1 in 9.78 m
Turning radius, inside, axles extended (2WD)	16 ft 10 in 5.13 m	18 ft 6 in 5.62 m
urning radius, outside, axles retracted (4WD)	21 ft 7 in 6.58 m	22 ft 2 in 6.75 m
Turning radius, inside, axles retracted (4WD)	13 ft 7 in 4.14 m	13 ft 2 in 4.01 m
Turning radius, outside, axles extended (4WD)	19 ft 10 in 6.05 m	18 ft 10 in 5.74 m
Turning radius, inside, axles extended (4WD)	9 ft 2.74 m	8 ft 6 in 2.59 m
Turntable rotation (degrees)		360° continuous
Platform rotation		160°
Maximum allowable side force (ANSI and CSA)		150 lbs 667 N
Maximum allowable side force (CE)		90 lbs 400 N
Controls		12V DC proportional

SPECIFICATIONS

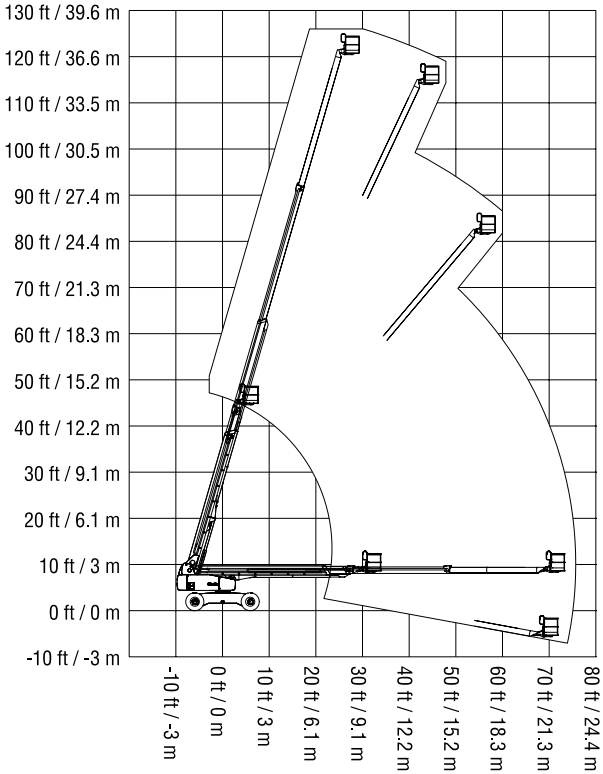
Platform dimensions	
Length	60 in 152 cm
Width	30 in 76 cm
Fluid capacities	
Hydraulic tank	55 gallons 208 liters
Hydraulic system (including tank)	80 gallons 303 liters
Fuel tank	63 gallons 240 liters
Coolant capacity	9.1 quarts 8.6 liters
Drive hubs	47 oz 1.4 liters
Turntable rotation drive hub	93 oz 2.8 liters
Drive hub oil type: SAE 90 multipurpose hypoid gear oil API service classification GL5	

For operational specifications, refer to the Operator's Manual.

Performance Specifications, S-120HD Models

Drive speeds		
High drive speed, stowed	8.0 - 8.4 sec	36 ft / 11 m
Low drive speed, stowed	14.4 - 16.4 sec	18 ft / 5.5 m
High drive speed, non-stowed < 80 ft	18 - 20 sec	18 ft / 5.5 m
High drive speed, non-stowed > 80 ft	32.6 - 36.6 sec	18 ft / 5.5 m
Braking distance, maximum		
High range on paved surface		4 to 6 ft 1.2 to 1.8 m
Gradeability (boom stowed)	See Operators Manual	
Boom up		
Boom fully retracted		80 to 88 seconds
Boom extended to >4 ft / >1.2 m (time between fully lowered and a fully raised position)		100 to 110 seconds
Boom extended to >80 ft / >24.4 m (time between 53° envelope limit and a fully raised position)		50 to 55 seconds
Boom extended to >100 ft / >30.5 m (time between 68° envelope limit and a fully raised position)		24 to 28 seconds
Boom down		
Boom fully retracted		80 to 88 seconds
Boom extended to >4 ft / >1.2 m (time between fully raised and a fully lowered position)		100 to 110 seconds
Boom extended to >80 ft / >24.4 m (time between fully raised and the 50° envelope limit)		50 to 55 seconds
Boom extended to >100 ft / >30.5 m (time between fully raised and the 65° envelope limit)		24 to 28 seconds

Boom extend	
vertical, 0 to 120 ft / 0 to 36.6 m	170 to 190 seconds
Boom retract	
vertical, 120 ft to 0 / 36.6 m to 0	170 to 190 seconds
Turntable rotate, 360°	
boom horizontal and fully retracted	170 to 190 seconds
Turntable rotate, 360°	
boom horizontal and extended >0 ft / >0 m	63 to 70 seconds drive enable to drive enable
Turntable rotate, 360°	
boom fully raised and extended >80 ft / >24.4 m	109 to 120 seconds drive enable to drive enable
Platform rotate, 160°	18 to 22 seconds



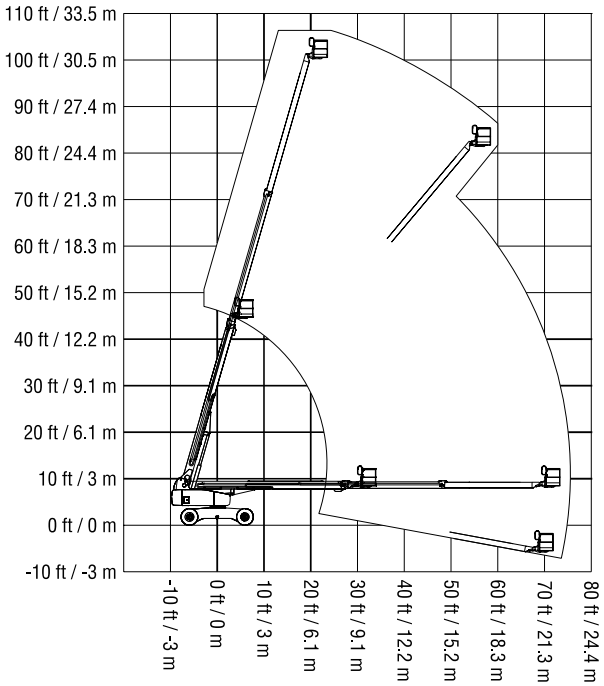
Performance Specifications, S-100HD Models

Drive speeds		
High drive speed, stowed	8.0 - 8.4 sec	36 ft / 11 m
Low drive speed, stowed	14.4 - 16.4 sec	18 ft / 5.5 m
High drive speed, non-stowed < 80 ft	18 - 20 sec	18 ft / 5.5 m
High drive speed, non-stowed > 80 ft	32.6 - 36.6 sec	18 ft / 5.5 m
Braking distance, maximum		
High range on paved surface		4 to 6 ft 1.2 to 1.8 m
Gradeability (boom stowed)		See Operator's Manual

Boom up	
Boom fully retracted	80 to 88 seconds
Boom extended to >4 ft / >1.2 m (time between fully lowered and a fully raised position)	100 to 110 seconds
Boom extended to >80 ft / >24.4 m (time between 53° envelope limit and a fully raised position)	50 to 55 seconds
Boom down	
Boom fully retracted	80 to 88 seconds
Boom extended to >4 ft / >1.2 m (time between fully raised and a fully lowered position)	100 to 110 seconds
Boom extended to >80 ft / >24.4 m (time between fully raised and the 50° envelope limit)	50 to 55 seconds

SPECIFICATIONS

Boom extend, boom fully raised 0 to 100 ft / 0 to 30.5 m	120 to 140 seconds
Boom retract, boom fully raised 100 ft to 0 / 30.5 m to 0	120 to 140 seconds
Turntable rotate, 360° boom horizontal and fully retracted	170 to 190 seconds
Turntable rotate, 360° boom horizontal and extended >0 ft / >0 m	63 to 70 seconds drive enable to drive enable
Turntable rotate, 360° boom fully raised and extended >80 ft / >24.4 m	109 to 120 seconds drive enable to drive enable
Platform rotate, 160°	18 to 22 seconds



Hydraulic Specifications

Hydraulic Fluid Specifications	
Genie specifications require hydraulic oils which are designed to give maximum protection to hydraulic systems, have the ability to perform over a wide temperature range, and the viscosity index should exceed 140. They should provide excellent antiwear, oxidation prevention, corrosion inhibition, seal conditioning, and foam and aeration suppression properties.	
Cleanliness level, minimum	ISO 15/13
Water content, maximum	250 ppm
Recommended Hydraulic Fluid	
Hydraulic oil type	Chevron Rando HD Premium
Viscosity grade	32
Viscosity index	200
Optional Hydraulic fluids	
Mineral based	Shell Tellus S2 V 32 Shell Tellus S2 V 46 Chevron 5606A
Biodegradable	Petro Canada Environ MV 46
Fire resistant	UCON Hydrolube HP-5046

Note: Genie specifications require additional equipment and special installation instructions for the approved optional fluids. Consult the Genie Product Support before use.

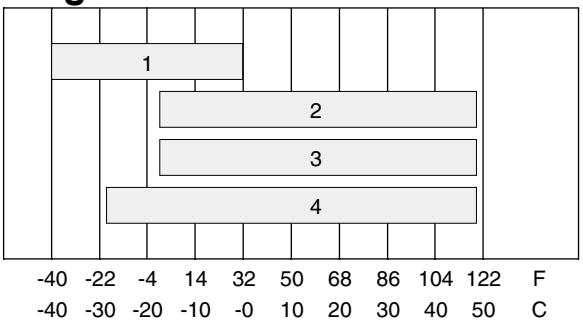
⚠ DANGER Optional fluids may not have the same hydraulic lifespan and may result in component damage.

Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond it's maximum allowable range. if the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

NOTICE Do not top off with incompatible hydraulic fluids. Hydraulic fluids may be incompatible due to the differences in base additive chemistry. When incompatible fluids are mixed, insoluble materials may form and deposit in the hydraulic system, plugging hydraulic lines, filters, control valves and may result in component damage.

Note: Do not operate the machine when the ambient air temperature is consistently above 120°F / 49°C.

Hydraulic Fluid Temperature Range



Ambient air temperature

1 Chevron hydraulic oil 5606A

2 Petro-Canada Environ MV 46

3 UCON Hydrolube HP-5046D

4 Chevron Rando HD premium oil MV

SPECIFICATIONS

Hydraulic Component Specifications

Drive pump	
Type: bi-directional variable displacement piston pump	
Displacement	0 to 2.8 cu in 0 to 46 cc
Flow rate @ 2350 rpm, maximum	28.5 gpm 108 L/min
Drive pressure, maximum	3625 psi 250 bar

Charge pump	
Type:	gerotor
Displacement	0.85 cu in 13.9 cc
Flow rate @ 2350 rpm	9 gpm 34 L/min
Charge pressure @ 2350 rpm Neutral position	313 psi 21.5 bar

Function pump	
Type: variable displacement piston pump	
Front Section	
Displacement	0 to 1.77 cu in 0 to 29 cc
Flow rate @ 2350 rpm, maximum	17.4 gpm 65.9 L/min
Rear Section	
Displacement	0 to 1.16 cu in 0 to 19 cc
Flow rate @ 2350 rpm, maximum	11.2 gpm 42.4 L/min
Pressure, maximum continuous	3350 psi 231 bar
Standby pressure	250 psi 17 bar

Auxiliary pumps	
Type: fixed displacement gear pump	
Displacement	0.15 cu in 2.47 cc
Section 1	
Flow rate @1600 rpm	1.7 gpm 6.4 L/min
Section 2	
Flow rate @ 1600 rpm	0.3 gpm 1.14 L/min

Function manifold	
Function relief pressure (measured at TEST port)	2600 psi 179.3 bar
Platform relief pressure (measured at TEST port 2)	3000 psi 207 bar

Platform manifolds	
Platform rotate and platform level flow regulator	0.3 gpm 1.14 L/min

SPECIFICATIONS

Steer/Axle manifold	
Axle extend relief pressure	1800 psi 124 bar
Drive manifold	
Hot oil relief pressure:	280 psi 19.3 bar
Brakes	
Brake release pressure	145-189 psi 10-13 bar
Drive motors	
Displacement per revolution, high speed	1.2 cu in 19 cc
Displacement per revolution, low speed	2.7 cu in 45 cc
Hydraulic filters	
High pressure filter	Beta 3 ≥ 200
High pressure filter bypass pressure	102 psi 7 bar
Medium pressure filter	Beta 3 ≥ 200
Medium pressure filter bypass pressure	25 psi 1.7 bar
Hydraulic tank return filter	10 micron with 25 psi / 1.7 bar bypass
Drive motor case drain return filter	Beta 10 ≥ 2

Deutz TD2011L04i Engine

Displacement	220.9 cu in 3.62 liters
Number of cylinders	4
Bore and stroke	3.78 x 4.92 inches 96 x 125 mm
Horsepower Net intermittent @ 2400 rpm	74 / 55 kW
Induction system	turbocharged
Firing order	1 - 3 - 4 - 2
Low idle	1500 rpm 450 Hz
High idle	2350 rpm 704.8 Hz
Compression ratio	17.5:1

Compression pressure
Pressure (psi or bar) of the lowest cylinder must be at least 75% of the highest cylinder.

Governor	centrifugal mechanical
Valve clearance, cold	
Intake	0.012 in 0.3 mm
Exhaust	0.020 in 0.5 mm
Lubrication system	
Oil pressure, hot (at 2000 rpm)	40 to 60 psi 2.8 to 4.1 bar
Oil capacity (including filter)	12.8 quarts 12.1 liters
Oil viscosity requirements	
-22°F to 86°F / -30°C to 30°C	5W-30 (synthetic)
-4°F to 104°F / -20°C to 40°C	10W-40
Above 5°F / -15°C	15W-40

Units ship with 15W-40.
Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Handbook on your machine.

SPECIFICATIONS

Oil temperature switch	
Installation torque	8-18 ft-lbs 11-24 Nm
Oil temperature switch point	275°F 135°C
Oil pressure switch	
Installation torque	8-18 ft-lbs 11-24 Nm
Oil pressure switch point	22 psi 1.5 bar

Fuel injection system	
Injection pump make	Motorpal
Injection pump pressure, maximum	15,000 psi 1034 bar
Injector opening pressure	3046 psi 210 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator's Manual on your machine.	
Starter motor	
Current draw, normal load	140-200A
Cranking speed	250-350 rpm
Battery - Auxiliary power units	
Type	6V DC
Quantity	2
AH rating	285AH
Reserve capacity @ 25A rate	745 minutes
Battery - Engine starting and control system	
Type	12V DC, Group 31
Quantity	1
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	200 minutes
Alternator output	80A @ 14V DC
Fan belt deflection	3/8 to 1/2 inch 9 to 12 mm

Deutz TD 2.9 Engine

Displacement	177 cu in 2.9 liters
Number of cylinders	4
Bore and stroke	3.6 x 4.3 inches 92 x 110 mm
Horsepower net intermittent @ 2600 rpm	74.2hp 55KW
Induction system	turbocharged
Firing order	1 - 3 - 4 - 2
Low idle	1000 rpm
High idle	2500 rpm
Compression ratio	17.4:1
Compression pressure pressure (psi or bar) of the lowest cylinder must be at least 75% of the highest cylinder.	
Governor	electronic
Lubrication system	
Oil pressure, hot (@ 2000 rpm)	40 to 60 psi 2.8 to 4.1 bar
Oil capacity (including filter)	9.4 quarts 8.9 liters
Oil viscosity requirements	
-22°F to 86°F / -30°C to 30°C	5W-30 (synthetic)
-4°F to 104°F / -20°C to 40°C	10W-40
Above 5°F / -15°C	15W-40
Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine.	

SPECIFICATIONS

Oil temperature switch	
Installation torque	8-18 ft-lbs 11-24 Nm
Temperature switch point	275°F 135°C
Oil pressure switch	
Installation torque	8-18 ft-lbs 11-24 Nm
Pressure switch point	22 psi 1.5 bar
Fuel injection system	Motorpal
Injection pump pressure, maximum	15,000 psi 1034 bar
Injector opening pressure	3046 psi 210 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator Manual for your engine.	
Starter motor	
Current draw, normal load	140-200 A
Cranking speed	250-350 rpm
Battery - Engine starting and control system	
Type	12V DC, Group 31
Quantity	1
Battery capacity, maximum	1000A
Reserve capacity @ 25A rate	200 Minutes
Alternator output	95A @ 14V DC
Fan belt deflection	3/8 to 1/2 inch 9 to 12 mm

Perkins 854F-34T

Displacement	207 cu in 3.4 liters
Number of cylinders	4
Bore and stroke	3.89 x 4.33 inches 99 x 110 mm
Horsepower net intermittent @ 2500 rpm	74 hp / 55.2 KW
Induction system	turbocharged
Firing order	1 - 3 - 4 - 2
Standby speed	1000 rpm
Low idle	1500 rpm
High idle	2500 rpm
Compression ratio	17.0:1
Compression pressure pressure (psi or bar) of the lowest cylinder must be at least 75% of the highest cylinder.	
Governor	Electronic
Lubrication system	
Oil pressure, hot (@ 2000 rpm)	40 to 60 psi 2.8 to 4.1 bar
Minimum oil pressure	12 psi 0.82 bar
Oil capacity (including filter)	7.7 quarts 7.3 liters
Oil viscosity requirements	
-22°F to 86°F / -30°C to 30°C	5W-20
-4°F to 104°F / -20°C to 40°C	10W-40
Above 5°F / -15°C	15W-40
Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine.	

Oil temperature switch	
Installation torque	18.4 ft-lbs 25 Nm
Pressure switch point	12 psi 0.82 bar
Oil Sensor Settings	
0 psi	10 ohms
50 psi	120 ohms
Fuel injection system	
Transfer pump pressure	10-12 psi / 0.69-0.83 bar
Injector pressure	23000 psi / (1600 bar)
Fuel requirement	
For fuel requirements, refer to the engine Operator Manual for your engine.	
Glow plugs	
Initial load (0-10 sec)	80A
Continuous load (>10 sec)	40A
Starter motor	
Current draw, normal load	68 A
Cranking speed	130-200 rpm
Battery - Auxiliary power units	
Type	6V DC
Quantity	2
Battery capacity, maximum	285AH
Reserve capacity @ 25A rate	745 Minutes
Battery - Engine starting and control system	
Type	12V DC, Group 31
Quantity	1
Battery capacity, maximum	1000A
Reserve capacity @ 25A rate	200 Minutes

Perkins 854F-34T cont.	
Engine coolant	
Capacity (50/50 extended life)	16.5 quarts 15.6 liters
Coolant temperature switch	
Installation torque	18.4 ft-lbs 25 Nm
Maximum continuous temperature	226°F 108°C
Temperature Sensor Settings	
215°F 102°C	37 ohms
170°F 82°C	78 ohms
Alternator output	120A @ 12V DC
Fan belt deflection	3/8 to 1/2 in 9 to 12 mm

SPECIFICATIONS

Cummins B3.3T C80 Engine

Displacement	199 cu in 3.3 liters
Number of cylinders	4
Bore and stroke	3.74 x 4.528 inches 95 x 115 mm
Horsepower	80 hp @ 2200 rpm 60 kW @ 2200 rpm
Firing order	1 - 3 - 4 - 2
Compression ratio	17.3:1
Compression pressure pressure (psi or bar) of the lowest cylinder must be at least 75% of the highest cylinder.	
Low idle rpm Frequency	1300 rpm 229.7 Hz
High idle rpm Frequency	2350 rpm 415.1 Hz
Valve clearance, cold	
Intake	0.014 in 0.35 mm
Exhaust	0.020 in 0.50 mm
Lubrication system	
Oil pressure, hot @ 2000 rpm	31 - 72.5 psi 2.14 - 4.99 bar
Oil capacity (including filter)	9 quarts 8.5 liters
Oil viscosity requirements	
Extreme operating temperatures my require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Handbook on your machine.	

Injection system	
Injection pump make	Zexel
Injection pump pressure	12,000 psi 827 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator's Manual on your machine.	
Alternator output	120A, 12V DC
Battery - System	
Type	12V, Group 31
Quantity	1
AH rating	109AH
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	160 minutes
Starter Motor	
Current draw, maximum	550A
Engine cranking speed, minimum	130 rpm
Battery - Engine starting	
Type	12V, Group 4D
Quantity	1
AH rating	190AH
Cold cranking ampere	1020A
Reserve capacity @ 25A rate	325 minutes
Cooling system	
Engine capacity	4.75 quarts 4.5 liters
System capacity	9.1 quarts 8.6 liters

SPECIFICATIONS

Machine Torque Specifications

Platform rotator	
1-8 center bolt, GR 5, dry	640 ft-lbs 868 Nm
1-8 center bolt, GR 5, lubricated	480 ft-lbs 651 Nm
3/8 -16 bolts, GR 8, lubricated *use blue thread-locking compound	35 ft-lbs* 47.5 Nm
Turntable rotate assembly	
Rotate bearing mounting bolts, lubricated	180 ft-lbs 244 Nm
Rotate drive hub mounting bolts, dry	380 ft-lbs 515 Nm
Rotate drive hub mounting bolts, lubricated *use blue thread-locking compound	280 ft-lbs* 380 Nm
Rotate drive motor mounting bolts, dry	110 ft-lbs 149 Nm
Rotate drive motor mounting bolts, lubricated	80 ft-lbs 108 Nm
Drive motor and hubs	
Drive hub mounting bolts, dry	269 ft-lbs 365 Nm
Drive hub mounting bolts, lubricated	202 ft-lbs 274 Nm
Drive motor mounting bolts, dry	110 ft-lbs 149 Nm
Drive motor mounting bolts, lubricated	80 ft-lbs 108 Nm
Drive hub oil plug, O-ring seal	13 ft-lbs 18 Nm

Manifold Plug Torque Specifications

Plug torque	
SAE No. 2	50 in-lbs / 6 Nm
SAE No. 4	14 ft-lbs / 18.9 Nm
SAE No. 6	23 ft-lbs / 31.2 Nm
SAE No. 8	36 ft-lbs / 48.8 Nm
SAE No. 10	62 ft-lbs / 84.1 Nm
SAE No. 12	84 ft-lbs / 113.9 Nm

Hydraulic Hose and Fitting Torque Specifications

Your machine is equipped with Parker Seal-Lok™ ORFS or 37° JIC fittings and hose ends. Genie specifications require that fittings and hose ends be torqued to specification when they are removed and installed or when new hoses or fittings are installed.

Seal-Lok™ Fittings

(hose end - ORFS)

SAE Dash size	Torque
-4	10 ft-lbs / 13.6 Nm
-6	30 ft-lbs / 40.7 Nm
-8	40 ft-lbs / 54.2 Nm
-10	60 ft-lbs / 81.3 Nm
-12	85 ft-lbs / 115 Nm
-16	110 ft-lbs / 150 Nm
-20	140 ft-lbs / 190 Nm
-24	180 ft-lbs / 245 Nm

JIC 37° Fittings

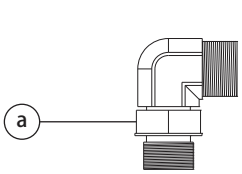
(swivel nut or hose connection)

SAE Dash size	Thread Size	Flats
-4	7/16-20	2
-6	9/16-18	1 1/4
-8	3/4-16	1
-10	7/8-14	1
-12	1 1/16-12	1
-16	1 5/16-12	1
-20	1 5/8-12	1
-24	1 7/8-12	1

SAE O-ring Boss Port

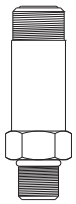
(tube fitting - installed into Aluminum)

SAE Dash size	Torque
-4	14 ft-lbs / 19 Nm
-6	23 ft-lbs / 31.2 Nm
-8	36 ft-lbs / 54.2 Nm
-10	62 ft-lbs / 84 Nm
-12	84 ft-lbs / 114 Nm
-16	125 ft-lbs / 169.5 Nm
-20	151 ft-lbs / 204.7 Nm
-24	184 ft-lbs / 249.5 Nm



Adjustable Fitting

a jam nut



Non-adjustable fitting

SAE O-ring Boss Port

(tube fitting - installed into Steel)

SAE Dash size		Torque
-4	ORFS / 37°	15 ft-lbs / 20.3 Nm
	ORFS (Non-adj)	26 ft-lbs / 35.3 Nm
	37° (Non-adj)	22 ft-lbs / 30 Nm
-6	ORFS (Adj / Non-adj)	35 ft-lbs / 47.5 Nm
	37° (Adj / Non-adj)	29 ft-lbs / 39.3 Nm
-8	ORFS (Adj / Non-adj)	60 ft-lbs / 81.3 Nm
	37° (Adj / Non-adj)	52 ft-lbs / 70.5 Nm
-10	ORFS (Adj / Non-adj)	100 ft-lbs / 135.6 Nm
	37° (Adj / Non-adj)	85 ft-lbs / 115.3 Nm
-12	(All types)	135 ft-lbs / 183 Nm
-16	(All types)	200 ft-lbs / 271.2 Nm
-20	(All types)	250 ft-lbs / 339 Nm
-24	(All types)	305 ft-lbs / 413.5 Nm

SPECIFICATIONS

Torque Procedure

Seal-Lok™ fittings

1 Replace the O-ring. The O-ring must be replaced anytime the seal has been broken. The O-ring cannot be re-used if the fitting or hose end has been tightened beyond finger tight.

Note: The O-rings used in the Parker Seal Lok™ fittings and hose ends are custom-size O-rings. They are not standard SAE size O-rings. They are available in the O-ring field service kit (Genie part number 49612).

2 Lubricate the O-ring before installation.

3 Be sure that the face seal O-ring is seated and retained properly.

4 Position the tube and nut squarely on the face seal end of the fitting and tighten the nut finger tight.

5 Tighten the nut or fitting to the appropriate torque per given size as shown in the table.

6 Operate all machine functions and inspect the hoses and fittings and related components to confirm that there are no leaks.

JIC 37° fittings

1 Align the tube flare (hex nut) against the nose of the fitting body (body hex fitting) and tighten the hex nut to the body hex fitting to hand tight, approximately 30 in-lbs / 3.4 Nm.

2 Using a permanent ink marker, make a reference mark on one the flats of the hex nut and continue the mark onto the body of the hex fitting. Refer to Illustration 1.

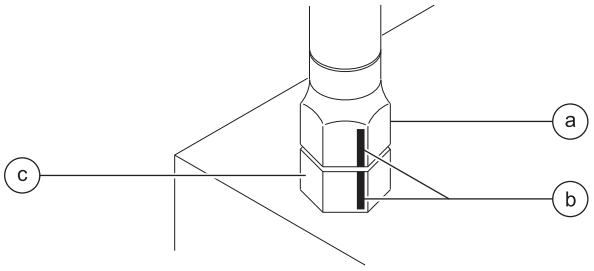


Illustration 1

a hex nut
b reference mark
c body hex fitting

3 Working clockwise on the body hex fitting, make a second mark with a permanent ink marker to indicate the proper tightening position. Refer to Illustration 2.

Note: Use the JIC 37° Fitting table in this section to determine th ecorrect number of flats, for the proper tightening position.

Note: The marks indicate the correct tightening positions have been determined. Use the second mark on the body hex fittting to properly tighten the joint after it has been loosened.

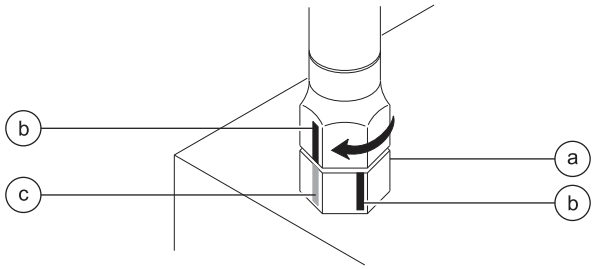


Illustration 2

a body hex fitting
b reference mark
c second mark

4 Tighten the hex nut until the mark on the hex nut is aligned with th esecond mark on the body hex fitting.

5 Operate all machine functions and inspect the hose, fittings and related components to confirm there are no leaks.

SPECIFICATIONS

SAE FASTENER TORQUE CHART

• This chart is to be used as a guide only unless noted elsewhere in this manual •

SIZE	THREAD	Grade 5				Grade 8				A574 High Strength Black Oxide Bolts	
		LUBED		DRY		LUBED		DRY		LUBED	
		in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
1/4	20	80	9	100	11.3	110	12.4	140	15.8	130	14.7
	28	90	10.1	120	13.5	120	13.5	160	18	140	15.8
		LUBED		DRY		LUBED		DRY		LUBED	
		ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
5/16	18	13	17.6	17	23	18	24	25	33.9	21	28.4
	24	14	19	19	25.7	20	27.1	27	36.6	24	32.5
3/8	16	23	31.2	31	42	33	44.7	44	59.6	38	51.5
	24	26	35.2	35	47.4	37	50.1	49	66.4	43	58.3
7/16	14	37	50.1	49	66.4	50	67.8	70	94.7	61	82.7
	20	41	55.5	55	74.5	60	81.3	80	108.4	68	92.1
1/2	13	57	77.3	75	101.6	80	108.4	110	149	93	126
	20	64	86.7	85	115	90	122	120	162	105	142
9/16	12	80	108.4	110	149	120	162	150	203	130	176
	18	90	122	120	162	130	176	170	230	140	189
5/8	11	110	149	150	203	160	217	210	284	180	244
	18	130	176	170	230	180	244	240	325	200	271
3/4	10	200	271	270	366	280	379	380	515	320	433
	16	220	298	300	406	310	420	420	569	350	474
7/8	9	320	433	430	583	450	610	610	827	510	691
	14	350	474	470	637	500	678	670	908	560	759
1	8	480	650	640	867	680	922	910	1233	770	1044
	12	530	718	710	962	750	1016	990	1342	840	1139
1 1/8	7	590	800	790	1071	970	1315	1290	1749	1090	1477
	12	670	908	890	1206	1080	1464	1440	1952	1220	1654
1 1/4	7	840	1138	1120	1518	1360	1844	1820	2467	1530	2074
	12	930	1260	1240	1681	1510	2047	2010	2725	1700	2304
1 1/2	6	1460	1979	1950	2643	2370	3213	3160	4284	2670	3620
	12	1640	2223	2190	2969	2670	3620	3560	4826	3000	4067

METRIC FASTENER TORQUE CHART

• This chart is to be used as a guide only unless noted elsewhere in this manual •

Size (mm)	Class 4.6				Class 8.8				Class 10.9				Class 12.9			
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
5	16	1.8	21	2.4	41	4.63	54	6.18	58	6.63	78	8.84	68	7.75	91	10.3
6	19	3.05	36	4.07	69	7.87	93	10.5	100	11.3	132	15	116	13.2	155	17.6
7	45	5.12	60	6.83	116	13.2	155	17.6	167	18.9	223	25.2	1.95	22.1	260	29.4
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
8	5.4	7.41	7.2	9.88	14	19.1	18.8	25.5	20.1	27.3	26.9	36.5	23.6	32	31.4	42.6
10	10.8	14.7	14.4	19.6	27.9	37.8	37.2	50.5	39.9	54.1	53.2	72.2	46.7	63.3	62.3	84.4
12	18.9	25.6	25.1	34.1	48.6	66	64.9	88	69.7	94.5	92.2	125	81	110	108	147
14	30.1	40.8	40	54.3	77.4	105	103	140	110	150	147	200	129	175	172	234
16	46.9	63.6	62.5	84.8	125	170	166	226	173	235	230	313	202	274	269	365
18	64.5	87.5	86.2	117	171	233	229	311	238	323	317	430	278	377	371	503
20	91	124	121	165	243	330	325	441	337	458	450	610	394	535	525	713
22	124	169	166	225	331	450	442	600	458	622	612	830	536	727	715	970
24	157	214	210	285	420	570	562	762	583	791	778	1055	682	925	909	1233

Repair Procedures



Observe and Obey:

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

Before Repairs Start:

- ☑ Read, understand and obey the safety rules and operating instructions in the *Genie S-100HD Operator's Manual and the Genie S-120HD 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.
- ☑ Use only Genie approved replacement parts.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - · Machine parked on a firm, level surface
  - · Boom in the stowed position
  - · Turntable rotated with the boom between the circle-end wheels
  - · Turntable secured with the turntable rotation lock pin
  - · Key switch in the OFF position with the key removed
  - · Wheels chocked
  - · All external AC power supply disconnected from the machine

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.

Symbols Legend



Safety alert symbol—used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠DANGER Used to indicate the presence of an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING Used to indicate the presence of a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION With safety alert symbol—used to indicate the presence of a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.

NOTICE Used to indicate the presence of a potentially hazardous situation which, if not avoided, may result in property damage.

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

⊠ Indicates that an incorrect result has occurred after performing a series of steps.

Display Module

This table lists the various screens and menu options of the operating software. Some display menus are for informational purpose only, while others can be changed to alter the machine operating parameters.

The key switch must be in the OFF position before entering the programming mode.

Use the ↓ or ↵ buttons to scroll through the screens.

To change parameter values, use the + button (to increase) or the − button (to decrease) or to select a setting. Press the ↵ button to save the new value to memory. An audible beep will indicate a save to memory.

You must exit the programming mode for the changes to take effect.

To Exit Programming Mode:

Use the scroll button ↓ to scroll through the menu until the screen displays EXIT, then press the plus button + once, and change NO to YES, then press the enter button ↵ once to accept change.

Note: If Programming mode is not exited properly, all machine programming may be lost.

Screen or Menu	Procedure	Description	Range or Selection
Boom Function Speeds	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press + + − −	Boom up speed stowed %	120% max and 10% min, 100% (default)
		Boom down speed stowed %	120% max and 10% min, 100% (default)
		Boom up speed % <75 ft	80% max and 10% min, 80% (default)
		Boom down speed % <75 ft	80% max and 10% min, 80% (default)
		Boom up speed % >75 ft	35% max and 10% min, 29% (default)
		Boom down speed % >75 ft	35% max and 10% min, 29% (default)
		Boom up speed % >100 ft	25% max and 10% min, 20% (default)
		Boom down speed % >100 ft	25% max and 10% min, 20% (default)
		Boom extend speed %	60% max and 10% min, 60% (default)
		Boom retract speed %	40% max and 10% min, 35% (default)
		Turntable rotate speed % <75 ft	120% max and 75% min, 100% (default)
		Turntable rotate speed % >75 ft	120% max and 50% min, 100% (default)

DISPLAY MODULE

Screen or Menu	Procedure	Description	Range or Selection
Operator	Default	Hour meter (on power up) Engine speed Engine oil pressure PSI (English) Engine oil pressure kPa (metric) Engine temperature °F (English) Engine temperature °C (metric) Primary boom angle sensor Turntable level sensor X° Turntable level sensor Y° Platform angle Battery voltage	Engine temperature is not displayed until engine is above 100°F / 38°C
Machine Status	With key switch ON, press the ↵ and + and at − the same time.	Hydraulic pressure PSI (English) Hydraulic pressure kPa (metric) Boom angle Axle status	
Unit of Measure and Language	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press + − − +	Metric/English measurements Language selection	Use +/- buttons to change English, German, French, Spanish, Portuguese, Italian, Dutch and Swedish. Deutz 2.9L Turbo (D2.9T) Deutz TD2011L0.4i (DL04i) Perkins 854F (P854T)
Drive Functions	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press + + ↵ ↵.	Drive output max forward Drive output max reverse Elevated drive (>75 ft / 24 m) % Elevated drive (<75 ft / 24 m) % Stowed drive % Drive acceleration % Drive deceleration % Speed limit on steer angle	100% max and 10% min, 100 % (default) 100% max and 10% min, 90% (default) 120% max and 50% min, 100% (default) 120% max and 50% min, 100% (default) 120% max and 50% min, 100% (default) 125% max and 25% min, 100% (default) 125% max and 25% min, 100% (default) 100% max and 0% min, 50% (default)

DISPLAY MODULE

Screen or Menu	Procedure	Description	Range or Selection
Lift Function Ramp Settings	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press + + ↓ ↓	Boom up/down ramp acceleration % Boom up/down ramp deceleration % Boom extend/retract ramp acceleration % Turntable rotate ramp acceleration % Turntable rotate ramp deceleration %	5000 max and 100 min, 5000 (5.0 sec) (default) 2600 max and 100 min, 500 (0.50 sec) (default) 1600 max and 100 min, 500 (0.50 sec) (default) 5000 max and 100 min, 2000 (2.0 sec) (default) 3000 max and 100 min, 250 (0.25 sec) (default)
Valve Calibration	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press − − ↵ ↵	Reset drive valve defaults Reset boom up/down valve defaults Reset boom extend/retract valve defaults Reset turntable rotate valve defaults Allow boom up/down speed calibration Allow turntable rotate speed calibration Reset drive joystick defaults Reset boom up/down joystick defaults Reset boom extend/retract joystick defaults reset turntable rotate joystick defaults Reset steer joystick defaults	(YES/NO) (YES/NO) (YES/NO) (YES/NO) (YES/NO) (YES/NO) (YES/NO) (YES/NO) (YES/NO) (YES/NO) (YES/NO)

DISPLAY MODULE

Screen or Menu	Procedure	Description	Range or Selection
Level Sensor Calibration	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press + ↵ ↵ +	Set unit level to gravity Turntable Y-axis millivolts per degree Turntable X-axis millivolts per degree Platform level to gravity Platform millivolts per degree	(YES/NO) (YES/NO)
Default Reset	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press − − ↓ ↓	Reset drive functions Reset boom function speeds Reset lift function ramps Reset all (Contact Genie Product Support before using this option) Clear all safety switch faults	(YES/NO) (YES/NO) (YES/NO) (YES/NO) (YES/NO)
Overload Recovery	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press + − − +	Clear Overload Recovery	A passcode is required to clear the message

DISPLAY MODULE

Screen or Menu	Procedure	Description	Range or Selection
Options	With key switch OFF, press and hold the ↵ button and turn the key switch to the ON position. Release the ↵ button and press − − + +	Limit boom height to 100 ft / 80 ft	(100 FT / 80 FT)
		AC generator	(NONE, BELT, HYD)
		Alarm	(NO, MOTION, TRAVEL, DESCENT, TRAVEL AND DESCENT)(0, 1, 2, 3, 4, 5)
		Lift / drive cutouts	(NO, DRIVE CUTOUT WHILE NOT STOWED, LIFTING OR DRIVING)
		Auxiliary drive	(YES/NO)
		Proximity kill switch	(NONE/PROX)
		Platform overload sensing	(NONE/PLTFS)
		Work lights	(YES/NO)
		Flashing beacon	(YES/NO)
		Drive lights	(YES/NO)
		Disable steer mode change while driving	(YES/NO)
		Rocker joystick steering	(YES/NO)
		Generator off delay (0-10 sec)	(0 TO 10 SECONDS, 2 IS THE DEFAULT. SHOWN ONLY WHEN HYD GEN IS SELECTED)

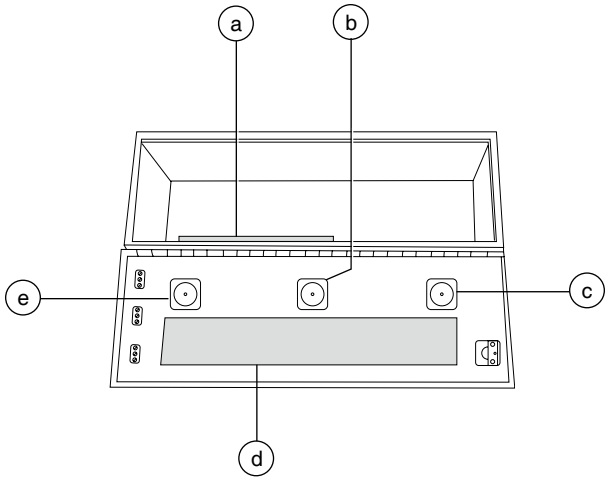
Platform Controls

The platform controls contains two printed circuit boards:

The **membrane circuit board** is mounted to the underside of the control box lid which contains the LEDs and touch-sensitive buttons for machine functions. The membrane circuit board sends the input from the operator to the platform controls ECM circuit board. The ECM circuit board sends the data to the turntable control box for processing.

The **platform controls ECM circuit board** communicates with the turntable controls. The joystick controllers at the platform controls utilize Hall Effect technology and require no adjustment. The operating parameters of the joysticks are stored in memory at the turntable controls. If a joystick controller error occurs or if a joystick is replaced, it will need to be calibrated before that particular machine function will operate. Refer to Repair Procedure, *How to Calibrate a Joystick Controller.*

Each joystick controller should operate smoothly and provide proportional speed control over its entire range of motion.



a platform ECM circuit board
b boom extend/retract joystick controller
c drive/steer joystick controller
d membrane circuit board
e boom up/down and turntable rotate left/right joystick controller

PLATFORM CONTROLS

1-1
Circuit Boards

Note: When an ECM circuit board is replaced, the joystick controllers will need to be calibrated. Refer to Repair Procedure, *How to Calibrate a Joystick Controller.*

How to Remove the ECM Circuit Board

1 Push in the Emergency Stop button to the OFF position at both the ground and platform controls.

2 Remove the platform control box mounting fasteners. Remove the platform control box from the machine.

NOTICE Component damage hazard. Cables can be damaged if they are kinked or pinched.

3 Locate the cables that connect to the bottom of the control box. Number each cable and its location at the control box.

4 Disconnect the cables from the bottom of the platform control box.

5 Remove the control cable plug retaining fasteners from the bottom of the platform control box.

6 Remove the platform control box lid retaining fasteners. Open the control box lid.

7 Locate the ECM circuit board mounted to the inside of the platform control box.

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

NOTICE Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

8 Remove the ECM circuit board mounting fasteners.

9 Carefully remove the ECM circuit board from the platform control box.

How to Remove the Membrane Circuit Board

1 Push in the Emergency Stop button to the OFF position at both the ground and platform controls.

2 Remove the platform control box lid retaining fasteners. Open the control box lid.

3 Locate the membrane circuit board mounted to the inside of the platform control box lid.

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

Note: Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

4 Carefully disconnect the two ribbon cables from the membrane circuit board.

5 Remove the membrane circuit board retaining fasteners.

6 Carefully remove the membrane circuit board from the platform control box lid.

1-2 Membrane Decal

How to Replace the Membrane Decal

The membrane decal is a special decal that consists of a decal with an electronic membrane on the backside. The membrane contains touch sensitive areas that, when pushed, activates the machine functions. The membrane buttons activate machine functions similar to toggle switches, but do not have any moving parts.

1 Push in the Emergency Stop button to the OFF position at both the ground and platform controls.

2 Remove the platform control box lid retaining fasteners. Open the control box lid.

3 Carefully disconnect the two ribbon cables from the membrane circuit board.

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

Note: Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

PLATFORM CONTROLS

4 Close the control box lid.

5 Remove the decal from the platform control box.

6 Carefully remove the membrane decal from the platform control box while guiding the ribbon cables out of the control box lid.

7 Remove any decal adhesive from the control box lid with a mild solvent.

Note: Do not allow any solvent to come in contact with the membrane circuit board.

8 Install the new membrane decal (Genie part number 50810) while guiding the ribbon cables through the control box lid.

Note: Be sure that all LED locations on the membrane decal align with the LED's on the membrane circuit board.

9 Install a new platform controls decal (Genie part number 65182) over the membrane decal.

10 Open the control box lid and carefuly connect the ribbon cables from the membrane decal to the membrane circuit board.

1-3 Joysticks

How to Calibrate a Joystick

The joystick controllers on this machine utilize digital Hall Effect technology for proportional control. If a joystick controller is disconnected or replaced, it must be calibrated before that particular machine function will operate.

Note: The joystick must be calibrated before the threshold, max-out or ramp rate can be set.

Note: It is possible to reset multiple joystick defaults before exiting the programming mode.

Note: After each joystick is calibrated, check the display at the ground control box. There should be no calibration faults shown on the display. If calibration faults exist, repeat steps 1 through 8 for that joystick controlled function.

Note: Contact Genie Product Support before using the reset all joystick default option.

Note: Perform this procedure with the engine off.

The calibration procedure for each joystick begins on the next page.

PLATFORM CONTROLS

Drive functions:

Note: If the calibration fault is already displayed at the ground box begin with step 6.

1 Turn the key switch to the off position. Confirm the red Emergency Stop button at the platform and ground controls is in the on position.

2 Press and hold the enter button [↵] on the ground control panel while turning the key switch to platform controls. Hold the enter button for approximately 5 seconds.

3 Press the minus button [−] twice, then press the enter button [↵] twice.

4 Use the scroll button [↓] to scroll through the menu until RESET DRIVE JOYSTICK DEFAULTS is displayed. Press the [+] button to select YES, then press the [↵] button.

5 Exit programming mode.

Note: To exit programming mode, use the scroll button [↓] to scroll through the menu until the screen displays exit, then press the plus button [+] once, change the NO to YES, and press the enter button [↵].

6 Do not start the engine.

7 Locate the drive/steer joystick.

8 Move the drive/steer joystick full stroke in the forward direction and hold for 5 seconds, then return to the center or neutral position.

9 Move the drive/steer joystick full stroke in the reverse direction and hold for 5 seconds, then return to the center or neutral position.

⊙ Result: The alarm at the ground controls should sound for a successful calibration.

⊠ Result: If the alarm does not sound, repeat the calibration procedure, beginning with step 1.

Steer functions:

Note: If the calibration fault is already displayed at the ground box begin with step 6.

1 Turn the key switch to the off position. Confirm the red Emergency Stop button at the platform and ground controls is in the on position.

2 Press and hold the enter button [↵] on the ground control panel while turning the key switch to platform controls. Hold the enter button for approximately 5 seconds.

3 Press the minus button [−] twice, then press the enter button [↵] twice.

4 Use the scroll button [↓] to scroll through the menu until RESET STEER JOYSTICK DEFAULTS is displayed. Press the [+] button to select YES, then press the [↵] button.

5 Exit programming mode.

Note: To exit programming mode, use the scroll button [↓] to scroll through the menu until the screen displays exit, then press the plus button [+] once, change the NO to YES, and press the enter button [↵].

6 Do not start the engine.

7 Locate the drive/steer joystick.

8 Move the drive/steer joystick full stroke in the left direction and hold for 5 seconds, then return to the center or neutral position.

9 Move the drive/steer joystick full stroke in the right direction and hold for 5 seconds, then return to the center or neutral position.

⊙ Result: The alarm at the ground controls should sound for a successful calibration.

⊠ Result: If the alarm does not sound, repeat the calibration procedure, beginning with step 1.

PLATFORM CONTROLS

Primary boom extend/retract functions:

Note: If the calibration fault is already displayed at the ground box begin with step 6.

1 Turn the key switch to the off position. Confirm the red Emergency Stop button at the platform and ground controls is in the on position.

2 Press and hold the enter button [↵] on the ground control panel while turning the key switch to platform controls. Hold the enter button for approximately 5 seconds.

3 Press the minus button [−] twice, then press the enter button [↵] twice.

4 Use the scroll button [↓] to scroll through the menu until RESET PRIMARY BOOM EXTEND/RETRACT JOYSTICK DEFAULTS is displayed. Press the [+] button to select YES, then press the [↵] button.

5 Exit programming mode.

Note: To exit programming mode, use the scroll button [↓] to scroll through the menu until the screen displays exit, then press the plus button [+] once, change the NO to YES, and press the enter button [↵].

6 Do not start the engine.

7 Locate the primary boom/turntable rotate joystick.

8 Move the primary boom extend/retract joystick full stroke in the extend direction and hold for 5 seconds, then return to the center or neutral position.

9 Move the primary boom extend/retract joystick full stroke in the retract direction and hold for 5 seconds, then return to the center or neutral position.

⊙ Result: The alarm at the ground controls should sound for a successful calibration.

⊠ Result: If the alarm does not sound, repeat the calibration procedure, beginning with step 1.

Primary boom up/down functions:

Note: If the calibration fault is already displayed at the ground box begin with step 6.

1 Turn the key switch to the off position. Confirm the red Emergency Stop button at the platform and ground controls is in the on position.

2 Press and hold the enter button [↵] on the ground control panel while turning the key switch to platform controls. Hold the enter button for approximately 5 seconds.

3 Press the minus button [−] twice, then press the enter button [↵] twice.

4 Use the scroll button [↓] to scroll through the menu until RESET PRIMARY BOOM UP/DOWN JOYSTICK DEFAULTS is displayed. Press the [+] button to select YES, then press the [↵] button.

5 Exit programming mode.

Note: To exit programming mode, use the scroll button [↓] to scroll through the menu until the screen displays exit, then press the plus button [+] once, change the NO to YES, and press the enter button [↵].

6 Do not start the engine.

7 Locate the primary boom/turntable rotate joystick.

8 Move the boom/turntable rotate joystick full stroke in the up direction and hold for 5 seconds, then return to the center or neutral position.

9 Move the boom/turntable rotate joystick full stroke in the down direction and hold for 5 seconds, then return to the center or neutral position.

⊙ Result: The alarm at the ground controls should sound for a successful calibration.

⊠ Result: If the alarm does not sound, repeat the calibration procedure, beginning with step 1.

Turntable rotate functions:

Note: If the calibration fault is already displayed at the ground box begin with step 6.

1 Turn the key switch to the off position. Confirm the red Emergency Stop button at the platform and ground controls is in the on position.

2 Press and hold the enter button [↵] on the ground control panel while turning the key switch to platform controls. Hold the enter button for approximately 5 seconds.

3 Press the minus button [−] twice, then press the enter button [↵] twice.

4 Use the scroll button [↓] to scroll through the menu until RESET TURNTABLE ROTATE JOYSTICK DEFAULTS is displayed. Press the [+] button to select YES, then press the [↵] button.

5 Exit programming mode.

Note: To exit programming mode, use the scroll button [↓] to scroll through the menu until the screen displays exit, then press the plus button [+] once, change the NO to YES, and press the enter button [↵].

6 Do not start the engine.

7 Locate the primary boom/turntable rotate joystick.

8 Move the boom/turntable joystick full stroke in the left direction and hold for 5 seconds, then return to the center or neutral position.

9 Move the boom/turntable joystick full stroke in the right direction and hold for 5 seconds, then return to the center or neutral position.

⊙ Result: The alarm at the ground controls should sound for a successful calibration.

⊠ Result: If the alarm does not sound, repeat the calibration procedure, beginning with step 1.

How to Reset a Proportional Valve Coil Default (software version 2.00 and above)

Note: Software version 2.00 requires the use of Web GPI to perform this procedure.
Refer to Diagnostic Codes*, Web GPI*.

Note: This procedure only needs to be performed if a proportional valve has been replaced.

Note: After the valve coil defaults have been set, each machine function threshold and default function speed must be set. Refer to Repair Procedure, *How to Set the Function Thresholds and Default Function Speeds.*

1 Open Web GPI and connect to the TCON.

2 Select the valve screen of the proportional valve you want to reset.

Note: Choices are: Propel (drive) valve reset; Boom up/down valve reset; Boom extend/retract valve reset; or TT rotate valve reset.

3 Press "set Defaults" and enter the level 2 password (obtained from field service personnel).

4 Enter "0" (zero) into the threshold boxes.

5 Press "send" and enter the level 2 password (obtained from field service personnel).

6 Disconnect from the TCON and proceed with calibration.

PLATFORM CONTROLS

How to Set the Function Thresholds and Function Speeds

Note: Before the threshold and default function speeds can be set, the boom function proportional valve coil defaults must be set first.
Refer to Repair Procedure, *How to Reset a Proportional Valve Coil Default.*

Note: If a boom function proportional valve coil has not been replaced and just want to reset the function speed to original factory settings, begin with step 10.

1 Start the engine from the platform controls.

2 Press down the foot switch.

Note: Be sure the engine rpm is set to foot switch activated high idle.

Function threshold:

3 Select a joystick controlled function that needs to have the threshold set.

4 Slowly move the joystick off center in either direction just until the machine function starts to move, then move the joystick very slowly towards the neutral or center position just before the machine function stops.
Do not let go of the joystick.

5 While holding the joystick in position, press the engine start button  at the platform controls to set the joystick controller threshold.

6 Slowly move the joystick off center in the opposite direction just until the machine function starts to move, then move the joystick very slowly towards the neutral or center position just before the machine function stops.
Do not let go of the joystick.

7 While holding the joystick in position, press the engine start button  at the platform controls to set the joystick controller threshold.

8 Repeat steps 3 through 7 for each joystick controlled machine function (boom up/down and turntable rotate left/right, boom extend/retract, and drive forward/reverse).

9 Once all the joystick controllers have been calibrated, push in the Emergency Stop button at the platform controls to save the settings in memory.

Note: The red Emergency Stop button at the platform controls must be pushed in to the off position following calibration of the joystick controllers to save the settings in memory.

10 At the ground controls, turn the key switch to the off position, wait a moment and then turn the key switch to platform controls.

11 Check the display at the ground controls to be sure there are no calibration faults.

Note: There should be no calibration faults shown on the display. If calibration faults exist, repeat this procedure.

Function speeds:

Note: Be sure the machine is in the stowed position and the boom is rotated between the circle end tires.

Note: Perform this procedure with the machine parked on a firm, level surface which is free of obstructions.

12 Start the engine from the platform controls.

13 Select a boom function that needs the function speed set.

14 **Boom up/down functions:** Starting in the stowed position, move the joystick full stroke in the up direction. When the alarm sounds, move the joystick in the opposite direction full stroke until the alarm sounds again. Return the joystick to center.

Boom extend/retract functions: Raise the boom until the low-speed drive function is enabled. Move the joystick full stroke in the extend direction. When the alarm sounds, move the joystick in the opposite direction full stroke until the alarm sounds again. Return the joystick to center.

Turntable rotate functions: Raise the boom until the low-speed drive function is enabled. Move the joystick full stroke to the left (cw) until the drive enable light turns on. Then move the joystick full stroke to the right (ccw). When the alarm sounds, move the joystick in the opposite direction full stroke until the alarm sounds again. Return the joystick to center.

15 Once all the joystick controllers have been calibrated, push in the red Emergency Stop button at the platform controls to save the settings in memory.

Note: The red Emergency Stop button at the platform controls must be pushed in to the off position following calibration of the joystick controllers to save the settings in memory.

16 At the ground controls, turn the key switch to the off position, wait a moment and then turn the key switch to platform controls.

17 Check the display at the ground controls to be sure there are no calibration faults.

Note: There should be no calibration faults shown on the display. If calibration faults exist, repeat this procedure.

How to Adjust the Function Speeds

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

2 Press and hold the enter button [↵] on the ground control panel while turning the key switch to ground controls. Hold the enter button for approximately 5 seconds.

3 Press the plus button [+] twice, then press the minus button [−] twice.

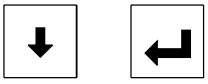
4 Press the scroll button [↓] until the function to be adjusted is displayed.

PLATFORM CONTROLS

5 Press the plus button [+] to increase the speed or press the minus button [−] to decrease the speed.

6 Press the enter button [↵] to save the setting in memory.

7 Push one of the LCD screen buttons shown until EXIT is displayed.



8 Press the plus [+] button to select YES and then press the enter button [↵].

9 Continue to perform this procedure until the machine function speed meets specification. Refer to Specifications, *Performance Specifications*.

How to Adjust the Function Ramp Rate Setting

The ramp rate setting of a joystick controls the time at which it takes for the joystick to reach maximum output, when moved out of the neutral position. The ramp rate settings of a joystick can be changed to compensate for hydraulic pump wear to maintain peak performance from the machine.

Note: Perform this procedure with the boom in the stowed position.

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

2 Press and hold the enter button [↵] on the ground control panel while turning the key switch to ground controls. Hold the enter button for approximately 5 seconds.

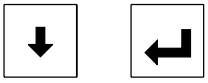
3 Press the plus button [+] twice, then press the scroll button [↓] twice.

4 Press the scroll button [↓] until the function to be adjusted is displayed.

5 Press the plus button [+] to increase the ramp rate or press the minus button [−] to decrease the ramp rate.

6 Press the enter button [↵] to save the setting in memory.

7 Push one of the LCD screen buttons shown until EXIT is displayed.



8 Press the plus [+] button to select YES and then press the enter button [↵].

Specifications

Ramp rate (factory settings)	
Turntable rotate	
accelerate	2 seconds
decelerate	0.25 second
Primary boom up/down	
accelerate	5 seconds
decelerate	0.5 second
Primary boom extend/retract	
accelerate	4 seconds
decelerate	0.5 second
Drive	
accelerate	2 seconds

Platform Components

2-1 Platform

How to Remove the Platform

1 Separate the foot switch quick disconnect plug.

2 Support the platform with an appropriate lifting device.

3 Locate the cables that connect to the bottom of the control box. Number each cable and its location at the platform control box.

4 Disconnect the cables from the bottom of the platform control box.

5 Remove the platform control box mounting fasteners. Remove the platform control box and set it aside.

6 Remove the air line to platform bracket retaining fasteners (if equipped).

7 Remove the weld cables from the platform (if equipped).

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

8 Remove the platform mounting fasteners and remove the platform from the machine.

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

2-2 Platform Leveling Cylinder

The platform leveling cylinder keeps the platform level through the entire range of boom motion. The platform is maintained level to the turntable. The ECM at the ground controls compares the difference in readings between the platform angle sensor and the turntable level sensor. The ECM at the ground controls sends a signal to the platform controls to open or close the appropriate platform level proportional valve on the platform manifold to maintain a level platform. The platform leveling cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

How to Remove the Platform Leveling Cylinder

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

1 Extend the boom until the platform leveling cylinder barrel-end pivot pin is accessible.

2 Raise the boom slightly and place blocks under the platform.

3 Lower the boom until the platform is resting on the blocks just enough to support the platform.

Note: Do not rest the entire weight of the boom on the blocks.

PLATFORM COMPONENTS

4 Tag, disconnect and plug the hydraulic hoses from the platform leveling cylinder at the bulkhead fittings located inside the boom tube at the platform end and connect them together using a connector. Cap the bulkhead fittings on the boom tube.

⚠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.

5 Remove the pin retaining fastener from the platform leveling cylinder rod-end pivot pin. Do not remove the pin.

6 Remove the external snap ring from the barrel-end pivot pin. Do not remove the pin.

7 Support the platform leveling cylinder with a suitable lifting device. Protect the cylinder rod from damage.

8 Use a soft metal drift to remove the rod-end pivot pin.

⚠WARNING Crushing hazard. The platform (S-100 and S-120 models) or jib boom (S-105 and S-125 models) will fall when the platform leveling cylinder rod-end pivot pin is removed if it is not properly supported.

⚠CAUTION Crushing hazard. The platform leveling cylinder will fall if it is not properly supported when the rod-end pivot pin is removed.

NOTICE Component damage hazard. The platform leveling cylinder rod can become damaged if it is allowed to fall.

9 Use a soft metal drift to remove the barrel-end pivot pin.

10 Carefully pull the platform leveling cylinder out of the boom.

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

How to Bleed the Platform Leveling Cylinder

Note: Do not start the engine. Use auxiliary power for all machine functions in this procedure.

Note: The boom must remain below 10° to properly perform this procedure.

1 Raise the boom to a horizontal position.

2 Activate auxiliary power.

3 Push the platform level up and down buttons through two complete platform leveling cycles to remove any air that might be in the system.

2-3 Platform Rotator

The platform rotator is a hydraulically activated helical gear assembly used to rotate the platform 160 degrees.

How to Remove the Platform Rotator

NOTICE Component damage hazard. Mark the platform mounting weldment and the rotator flange before removing the platform mounting weldment. The platform mounting weldment must be replaced in the exact same position on the rotator flange as it was before removal. If a new rotator is installed or the rotator is disassembled, proper alignment can be achieved by rotating the rotator all the way to the left and then installing the platform mounting weldment all the way in the left position.

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

1 Remove the platform. Refer to Repair Procedure, *How to Remove the Platform*.

2 Disconnect the electrical connector from the platform angle sensor.

3 Tag, disconnect and plug the hydraulic hoses from the "V1" and "V2" ports on platform rotator manifold. Cap the fittings on the manifold.

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

4 Remove the platform manifold mounting fasteners. Lay the platform manifold to the side.

NOTICE Component damage hazard. Cables can be damaged if they are kinked or pinched.

5 Remove the power to platform cover plate from the electrical outlet box. Do not disconnect the wiring.

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

6 Remove the power to platform electrical outlet box from the platform and lay it to the side.

7 Remove the weld cable from the platform (if equipped).

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

8 Support the platform mounting weldment, but do not apply any lifting pressure.

9 Remove the eight mounting bolts from the platform mounting weldment.

PLATFORM COMPONENTS

10 Remove the center bolt and slide the platform mounting weldment off of the platform rotator.

⚠WARNING Crushing hazard. The platform mounting weldment may become unbalanced and fall if it is not properly supported.

11 Support the platform rotator. Do not apply any lifting pressure.

12 Support the rod end of the platform leveling cylinder. Protect the cylinder rod from damage.

13 Remove the pin retaining fastener from the platform level cylinder rod-end connecting link pivot pin and the platform rotator pivot pin. Do not remove the pins.

14 Use a soft metal drift to remove both pins and remove the platform rotator from the machine.

⚠WARNING Crushing hazard. The platform rotator may become unbalanced and fall if it is not properly supported.

NOTICE Component damage hazard. The platform angle sensor is a very sensitive instrument. It can be damaged internally if the platform rotator is dropped or sustains any physical shock, even if the damage is not visible.

How to Bleed the Platform Rotator

Note: Do not start the engine. Use auxiliary power for all machine functions in this procedure.

1. Rotate the platform full right, then full left until air is completely out of the rotator. Bleeding the valve is not necessary.

2-4 Platform Level Sensor

The platform level sensor is mounted to the side of the platform rotator. The platform level sensor is monitored by the control system to maintain a level platform throughout boom range of motion. If a platform level sensor is replaced, it must be calibrated prior to machine operation.

How to Calibrate the Platform Level Sensor

Note: Perform this procedure with the machine on a firm, level surface and in the stowed position.

1 Secure a digital level to one of the side railings of the platform.

2 Start the machine and level the platform to gravity. Push the red Emergency stop button in to stop the engine.

2 Press and hold the enter button ↵ on the ground control panel while pulling out the red Emergency Stop button.

3 Press the plus button +, then press the enter button ↵ twice before again pressing the plus button +.

4 Press the enter button ↵ three timees until PLATFORM LEVEL TO GRAVITY is displayed on the LCD screen.

5 Press the plus button + once.

6 Press the enter button ↵ to save the setting in memory.

7 Push one of the LCD screen buttons shown until PLATFORM LEVEL SENSOR MV PER DEGREE is displayed.





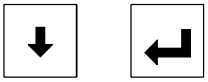
8 Confirm that the number shown on the display is the same as that shown on the data sheet supplied with the new platform level sensor.

⊙ Result: If the number shown on the display is the same as that shown on the data sheet supplied with the new platform level sensor, continue to step 10.

⊠ Result: If the number shown on the display is **not** the same as that shown on the data sheet supplied with the new platform level sensor, continue to step 9.

9 Press the plus [+] button or the minus [−] button to correct the display to match the data sheet. Then press the enter button [↵] to save the setting in memory.

10 Push one of the LCD screen buttons shown until EXIT is displayed.



11 Press the plus [+] button to select YES and then press the enter button [↵].

2-5
Platform Overload System

The platform overload system is designed to prevent the machine from continuing to operate when the load in the platform exceeds maximum rated capacity. Refer to the machine serial label for maximum capacity information.

If maximum platform capacity is exceeded, the alarm will sound at the platform controls and the platform overload indicator lights will flash at both the ground and platform controls. The ground and platform controls will become disabled. Before normal machine operation can continue, the excess load will need to be removed from the platform.

If the excess load cannot be removed or if the operator at the platform controls is unable to correct the overloaded condition, another person at the ground controls can operate the machine using auxiliary power. There will be limited control of boom functions from the ground controls when using auxiliary power. Auxiliary power can be used to correct the overloaded platform condition in order to resume normal, safe operation of the machine.

How to Calibrate the Platform Overload System (if equipped)

Calibration of the platform overload system is essential to safe machine operation. Continued use of an improperly calibrated platform overload system could result in the system failing to sense an overloaded platform. The stability of the machine is compromised and it could tip over.

Note: Perform this procedure with the machine on a firm, level surface.

1 Turn the key switch to platform control. Start the engine and level the platform.

PLATFORM COMPONENTS

2 Determine the maximum platform capacity. Refer to the machine serial plate.

3 Remove all weight, tools and accessories from the platform.

Note: Failure to remove all weight, tools and accessories from the platform will result in an incorrect calibration.

4 Using a suitable lifting device, place a test weight equal to the maximum platform capacity at the enter of the platform floor.

5 Move the platform up and down by hand, so it bounces approximately 2.5 to 5 cm / 1 to 2 inches. Allow the platform to settle.

Result: The alarm should be off. The platform overload indicator light should be off at the platform controls and there should be no error message on the LCD display at the ground controls. Proceed to step 6.

Result: The alarm is sounding. The platform overload indicator light is flashing at the platform controls and “PLATFORM OVERLOAD” should be displayed on the LCD screen at the ground controls. Slowly tighten the load spring adjustment nut in a clockwise direction in 10° increments until the overload indicator light turns off, and the alarm does not sound. Proceed to step 8.

Note: The platform will need to be moved up and down and allowed to settle between each adjustment.

Note: There may be a 2 second delay before the platform overload indicator light and alarm responds.

6 Move the platform up and down by hand, so it bounces approximately 2.5 to 5 cm / 1 to 2 inches. Allow the platform to settle.

Result: The alarm should be off. The platform overload indicator light should be off at the platform controls and there should be no error message on the LCD display at the ground controls. Slowly loosen the load spring adjustment nut in a counterclockwise direction in 10° increments until the overload indicator light flashes at both the platform and ground controls, and the alarm sounds. Proceed to step 7.

Result: The alarm should be sounding. The platform overload indicator light should be flashing at the platform controls and “PLATFORM OVERLOAD” should be displayed on the LCD screen at the ground controls. Repeat this procedure beginning with step 5.

Note: The platform will need to be moved up and down and allowed to settle between each adjustment.

Note: There may be a 2 second delay before the platform overload indicator lights and alarm responds.

7 Move the platform up and down by hand, so it bounces approximately 2.5 to 5 cm / 1 to 2 inches. Allow the platform to settle.

Result: The alarm should be off. The platform overload indicator light should be off at the platform controls and there should be no error message on the LCD display at the ground controls. Proceed to step 8.

Result: The overload indicator lights are flashing at the platform and ground controls, and the alarm is sounding. Repeat this procedure beginning with step 5.

Note: There may be a 2 second delay before the platform overload indicator light and alarm responds.

8 Add an additional test weight to the platform: 12 lb / 5.4 kg.

Result: The alarm should be sounding. The platform overload indicator light should be flashing at the platform controls and “PLATFORM OVERLOAD” should be displayed on the LCD screen at the ground controls. Proceed to step 9.

Result: The alarm should be off. The platform overload indicator light should be off at the platform controls and there should be no error message on the LCD display at the ground controls. Remove the additional 12 lb / 5.4 kg test weight. Repeat this procedure beginning with step 6.

Note: There may be a 2 second delay before the platform overload indicator light and alarm responds.

9 Test all machine functions from the platform controls.

Result: All platform control functions should not operate.

10 Turn the key switch to ground control.

11 Test all machine functions from the ground controls.

Result: All ground control functions should not operate.

12 Using a suitable lifting device, lift the test weight off the platform floor.

Result: The alarm should be off. The platform overload indicator light should be off at the platform controls and there should be no error message on the LCD display at the ground controls.

Note: There may be a 2 second delay before the overload indicator lights and alarm turn off.

13 Test all machine functions from the ground controls.

Result: All ground control functions should operate normally.

14 Turn the key switch to platform control.

15 Test all machine functions from the platform controls.

Result: All platform control functions should operate normally.

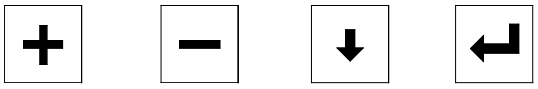
2-6
Platform Overload Recovery Message (software V3.14 and later)

If the ground controls LCD screen displays OVERLOAD RECOVERY, the emergency lowering system has been used while the platform was overloaded.

How to Clear the Platform Overload Recovery Message

Note: This message shall be cleared by a person trained and qualified on the troubleshooting and repair of this machine.

Note: Use the following chart to identify the description of each LCD screen control button used in this procedure.



Plus Minus Previous Enter

1 Turn the key switch to platform control. Start the engine and level the platform.

2 Press and hold the **enter** button on the ground sontrol panel while turning the key switch to ground controls. Hold the **enter** button for approximately 5 seconds.

3 Press the buttons on the ground controls in the following sequence: **(plus)(minus)(minus)(plus)**.

4 Press the **enter** or **previous** button on the LCD screen until CLEAR OVERLOAD RECOVERY is displayed.

5 Press the **plus** button or **minus** button to select YES. Then press the buttons in following sequence: **(plus)(plus)(plus)(minus)** and press the **enter** button to accept.

Note: The passcode buttons **(plus)(plus)(plus)(minus)** must be entered in the proper sequence before the **enter** button is pressed.

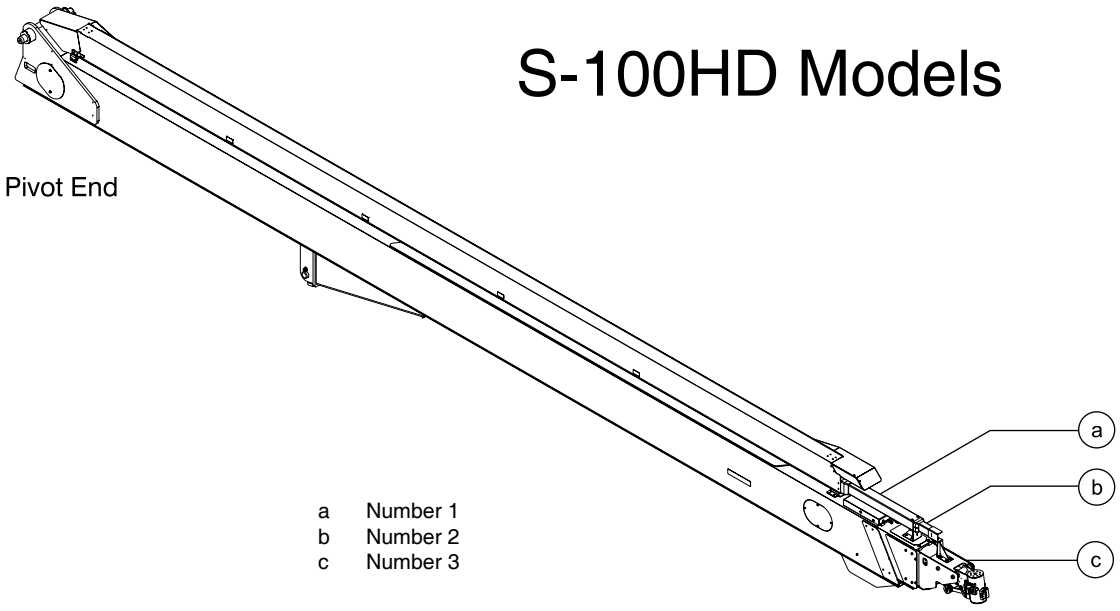
6 Press the **enter** or **previous** button on the LCD screen until EXIT is displayed.

7 Press the **plus** button or **minus** button to select YES and then press the **enter** button.

8 Turn the key switch to the off position.

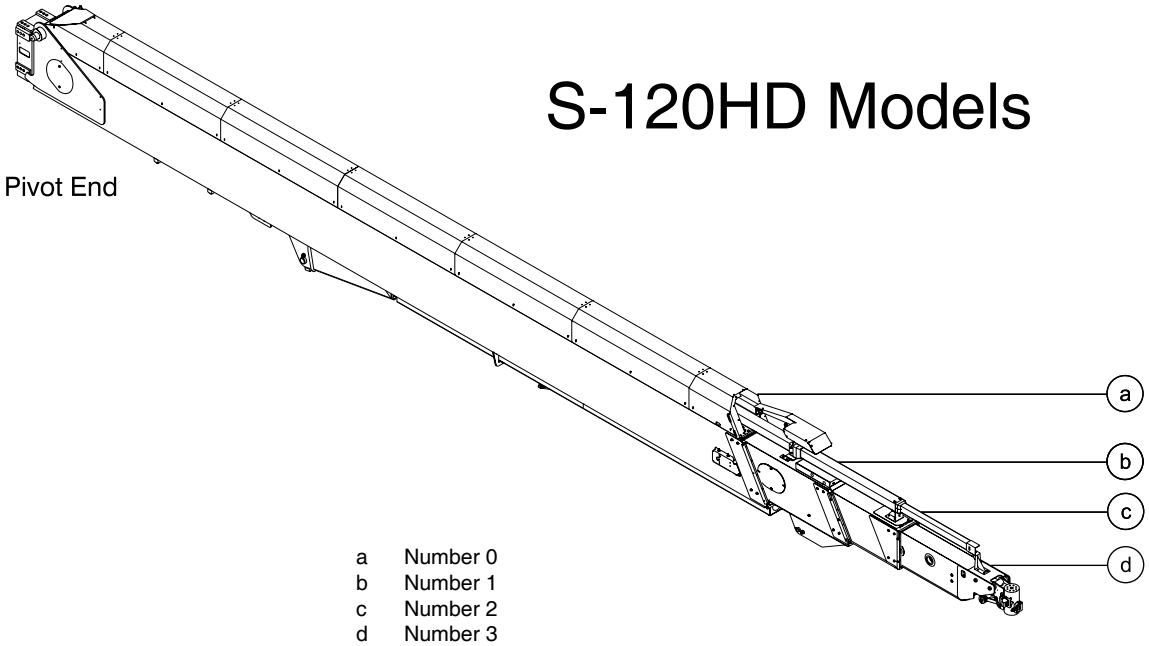
Boom Components

S-100HD Models



a Number 1
b Number 2
c Number 3

S-120HD Models



a Number 0
b Number 1
c Number 2
d Number 3

BOOM COMPONENTS

4-1
Cable Track

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

How to Remove the Boom Cable Track Assembly

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

Note: Perform this procedure with the boom horizontal.

1 Remove the protective cover from the platform manifold.

2 Remove the cable track assembly end covers from both the pivot and platform end of the machine.

For S-100HD machines proceed to step 4.

3 Using an appropriate overhead lifting device and beginning at the pivot end, remove the cable track covers from the number 0 boom tube.

4 Tag, disconnect and plug the two hydraulic hoses from the boom pull tube to the platform manifold. Secure them to the cable track assembly.

⚠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.

5 Tag and disconnect the electrical connectors from the bottom of the control box.

6 Remove the fasteners holding the pull tube to the number 3 boom tube.

7 Remove the fasteners holding the pull tube to the number 2 boom tube.

8 Tag and disconnect the electrical cables located at the platform end of the main cable track tube on the engine side of the machine. These cables include platform controls, limit and proximity switches and work light (if installed).

9 Tag, disconnect and plug the platform manifold hydraulic hoses from the bulkhead at the platform end of the main cable track tube on the engine side of the machine. Cap the fittings.

⚠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.

10 Remove the fasteners securing the side tube and horizontal cable track to the main cable track tube located on the engine side of the tube.

11 Lift the side tube (including the cables and hoses disconnected in steps 8 and 9) from the brackets and secure it to the number 0 boom tube (S-120HD machines) or the number 1 boom tube (S-100HD machines).

12 Attach a lifting strap from an overhead crane to the cable track housing assembly connected to the number 1 boom tube.

13 Remove the fasteners holding the assembly to the platform end of the number 1 boom tube.

For S-120HD machines proceed to step 15.

14 Remove the fasteners holding the assembly to the pivot end of the number 1 boom tube.

15 Carefully lift the assembly from the boom and set it on a structure capable of supporting it.

Note: During removal, the overhead crane strap may need to be adjusted for proper balancing.

NOTICE Component damage hazard. Cables, hoses, boom cable tube and cable track can be damaged if they are kinked or pinched.

NOTICE Component damage hazard. The boom cable tube and cable tracks can be damaged if they are twisted.

How to Repair the Boom Cable Track

NOTICE Component damage hazard. The boom cable track can be damaged if it is twisted.

Note: A cable track repair kit is available through the Genie Product Support for each of the cable tracks.
Use part number 62322 which includes a 3-link section for the 60 link cable track; part number 226064 which includes a 4-link section for the 37 link cable track; or 226094 which includes a 4-link section for the 139 link cable track.

1 Visually inspect the cable track and determine which section needs to be replaced.

2 Remove the snap-on cable track spacers.

3 On the metal cable track, remove the external snap rings from the pivot pins at each end of the 3-link or 4-link section to be removed.

4 On the poly cable track, using a hex key, twist and remove the orange fasteners at each end of the 4-link section to be removed.

5 Lift up the hoses and cables and carefully remove the damaged 3-link section of cable track.

NOTICE Component damage hazard. Hoses and cables can be damaged if they are kinked or pinched.

BOOM COMPONENTS

6 Remove the snap-on spacers from the replacement section of cable track.

7 Lift up the hoses and cables and carefully insert the new 3-link or 4-link section of cable track.

NOTICE Component damage hazard. Hoses and cables can be damaged if they are kinked or pinched.

8 Connect the ends of the replacement cable track section to the existing cable track using the pivot pins and external snap rings or orange twist fasteners.

Note: Be sure that the pivot pins are installed from the inside out so the external snap rings or poly buttons are on the outside of the cable track.

9 Install the cable track snap-on spacers.

4-2
Boom

How to Shim the Boom

1 Measure each upper, side and lower wear pad.

Boom wear pad specifications	$^1/_2$ inch
Minimum thickness	12.7 mm

Note: If a wear pad is not less than specification, perform the following procedure.

2 Remove the retaining fasteners from the appropriate black plastic boom tube cover at the platform end of the boom. Remove the cover.

3 Extend the boom until the wear pads are accessible.

4 Loosen the wear pad mounting fasteners.

5 Fit as many shims as can be installed by hand.

6 Tighten the mounting fasteners.

7 Remove the boom end cover retaining fasteners at the pivot end of the boom. Remove the boom end cover from the machine.

8 Remove the boom side inspection cover retaining fasteners from the boom at the pivot end of the boom. Remove the boom inspection cover from the machine to access boom 3 wear pads.

9 Loosen the wear pad mounting fasteners.

10 Fit as many shims as can be installed by hand.

11 Tighten the mounting fasteners.

12 Replace the covers.

13 Extend and retract the boom through an entire cycle. Check for tight spots that may cause binding of the boom.

How to Remove the Boom

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

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

1 Remove the platform. Refer to Repair Procedure, *How to Remove the Platform*.

2 Remove the platform rotator. Refer to Repair Procedure, *How to Remove the Platform Rotator*.

3 Remove the cable track. Refer to Repair Procedure, *How to Remove the Boom Cable Track Assembly.*

4 Raise the boom approximately 4 feet / 1.2 m.

5 Attach a lifting strap from an overhead crane to the rod end of the boom lift cylinder.

6 Attach an overhead 10 ton / 10,000 kg crane to the platform end of the boom for support. Do not lift the boom.

7 Remove the boom storage area cover retaining fasteners. Remove the cover from the machine.

BOOM COMPONENTS

8 Place support blocks under the boom lift cylinder.

9 Remove the pin retaining fastener from the boom lift cylinder rod-end pivot pin. Use a soft metal drift to remove the pin.

⚠WARNING Crushing hazard. The boom lift cylinder may fall when the rod-end pivot pin is removed if the boom lift cylinder is not properly supported by the overhead crane.

⚠WARNING Crushing hazard. The boom may fall when the rod-end pivot pin is removed if the boom is not properly supported by the overhead crane.

10 Carefully raise the boom with the overhead crane until the rod end of the boom lift cylinder can be removed.

11 Carefully lower the rod end of the boom lift cylinder down onto the support blocks.

12 Lower the boom with the overhead crane to a horizontal position.

13 Remove the boom end cover retaining fasteners from the pivot end of the boom. Remove the cover.

14 Locate the cable break limit switch above the primary boom extension cylinder at the pivot end of the boom.

15 Tag and disconnect the wiring connector from the cable break limit switch.

16 Tag, disconnect and plug the hydraulic hoses from the primary boom extension cylinder. Cap the fittings on the cylinder.

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

17 Attach a second overhead 10 ton / 10,000 kg crane to the pivot end of the boom for support. Do not apply any lifting pressure.

18 Remove the pin retaining fastener from the boom pivot pin. Do not remove the pin.

19 Use a soft metal drift to remove the boom pivot pin.

NOTICE Component damage hazard. Be careful not to damage the boom envelope limit switch(s) located on the inside of the engine side turntable riser when removing the boom assembly. The boom envelope switch(s) can be damaged even if the damage is not visible.

20 Carefully remove the boom assembly from the machine and place it on a structure capable of supporting it.

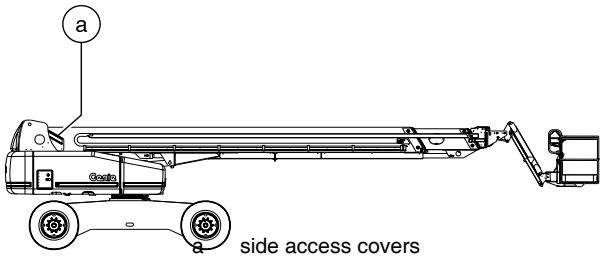
⚠WARNING Crushing hazard. The boom may become unbalanced and fall when it is removed from the machine if it is not properly supported by the overhead cranes.

How to Disassemble the Boom, S-120HD Models

Note: Complete disassembly of the boom is only necessary if the outer or inner boom tubes must be replaced. The primary boom extension cylinder can be removed without completely disassembling the boom. Refer to Repair Procedure, *How to Remove the Primary Extension Cylinder*.

1 Remove the boom. Refer to Repair Procedure, *How to Remove the Boom*.

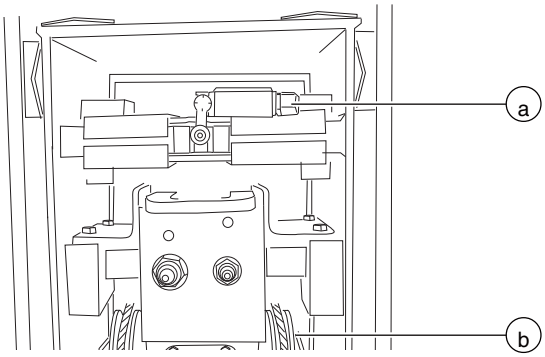
2 Remove the retaining fasteners from the access covers on both sides of the boom at the pivot end. Remove the access covers.



a side access covers

3 Secure the number 2 and number 3 boom tubes together with a strap or chain to prevent them from moving.

4 Remove the cable clamp from the cable break limit switch wiring.



a cable break limit switch
b cable pulley

5 Disconnect the wiring connector from the cable break limit switch.

6 Tag, disconnect and plug the hydraulic hoses from the primary boom extension cylinder. Cap the fittings on the cylinder.

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

7 Remove the fasteners from the inner cable track mounting bracket at the primary boom extension cylinder.

8 Lay the inner cable track and hoses down and out of the way.

BOOM COMPONENTS

9 Remove the pulley pivot pin retaining fasteners from the number 2 boom tube at the pivot end of the boom.

10 Remove the pulley pivot pins, cable guards and pulleys.

Note: When installing the pulleys, be sure that the side of the pulley with the taller flange is facing the center of the boom tube.

11 Locate the number 3 boom tube extension cable clevis pins on both sides of the number 2 boom tube at the pivot end of the boom.

12 Remove the cotter pin and clevis pin from both cables.

Note: When installing a clevis pin, always replace the cotter pin with a new one.

13 Remove the lower external snap ring and washer from the cable break limit switch actuator pivot pin.

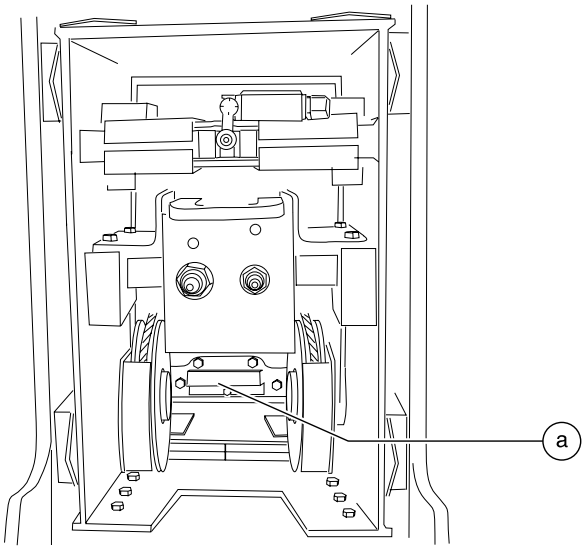
14 Remove the cable break actuator mounting plate retaining fasteners. Remove the lower plate from the machine.

15 Remove the upper plate and actuator pivot pin. Do not remove the cable break limit switch from the mounting plate.

16 Push the cable break actuator and cables towards the platform end of the boom approximately 18 inches / 46 cm.

17 Remove the red cable adjustment locking bracket retaining fasteners. Remove the red locking bracket from the machine.

⚠WARNING Bodily injury hazard. Failure to install the red cable adjustment locking bracket will allow the cable mounting bolts to loosen and fall out which could result in death or serious injury.



a red cable adjustment locking bracket

18 Remove the two cable adjustment bolts.

19 Remove the cable-end block mounting plate fasteners. Remove the cable-end block mounting plate from the machine.

20 Remove the trunnion pin retaining fasteners.

21 Use a slide hammer to remove the trunnion pins from the primary boom extension cylinder.

22 Remove the primary boom extension cylinder hold down brackets at the pivot end of the boom.

23 Attach a lifting strap from an overhead crane to the lifting eye on the primary boom extension cylinder.

24 Support and slide the primary boom extension cylinder out of the boom assembly while guiding the cables out of the boom and place it on a structure capable of supporting it.

⚠WARNING Crushing hazard. The primary boom extension cylinder may become unbalanced and fall when it is removed from the boom if it is not properly supported and attached to the overhead crane.

NOTICE Component damage hazard. Cables can be damaged if they are kinked or pinched.

Note: During removal, the overhead crane strap will need to be adjusted for proper balancing.

25 Remove the retaining fasteners from the limit switch cover on top of the number 2 boom tube at the platform end of the machine.

26 Carefully remove the cover with proximity and limit switches from the top of the number 2 boom tube at the platform end of the boom.

⚠DANGER Tip-over hazard. Failure to install the correct proximity and/or limit switches in the correct location will result in the machine tipping over, resulting in death or serious injury.

27 Tag and disconnect the wiring connectors from the proximity and limit switches at the top of the number 2 boom tube at the platform end of the boom. Do not remove the proximity or limit switches.

28 Remove the retaining fasteners from the limit switch cover on the side of the number 0 boom tube at the platform end of the boom.

29 Carefully remove the cover with proximity and limit switches from the number 0 boom tube at the platform end of the boom.

⚠DANGER Tip-over hazard. Failure to install the correct proximity and/or limit switches in the correct location will result in the machine tipping over, resulting in death or serious injury.

30 Tag and disconnect the wiring connectors from the proximity and limit switches at the ground controls side of the number 0 boom tube at the platform end of the boom. Do not remove the proximity or limit switches.

31 Remove the retaining fasteners from each black plastic boom tube cover at the platform end of the machine. Remove the covers.

32 Remove and label the top and side wear pads of the number 3 boom tube at the pivot end of the boom. Do not remove the bottom wear pads.

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

33 Remove and label the top and side wear pads from the number 2 boom tube at the platform end of the boom. Do not remove the bottom wear pads.

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

BOOM COMPONENTS

34 Attach a lifting strap from an overhead crane to the number 3 boom tube at the platform end of the boom.

35 Support and slide the number 3 boom tube out of the number 2 boom tube. When the number 3 boom tube is approximately halfway removed, remove the bottom wear pads from the number 2 boom tube at the platform end of the boom.

⚠WARNING Crushing hazard. The number 3 boom tube may become unbalanced and fall when it is removed from the number 2 boom tube if it is not properly supported and attached to the overhead crane.

Note: During removal, the overhead crane strap will need to be adjusted for proper balancing.

36 Remove and label the top and side wear pads from the number 2 boom tube at the pivot end of the boom. Do not remove the bottom wear pads.

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

37 Remove and label the top and side wear pads from the number 1 boom tube at the platform end of the boom. Do not remove the bottom wear pads.

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

38 Attach a lifting strap from an overhead crane to the number 2 boom tube at the platform end of the boom.

39 Support and slide the number 2 boom tube out of the number 1 boom tube. When the number 2 boom tube is approximately halfway removed, remove the bottom wear pads from the number 1 boom tube at the platform end of the boom.

⚠WARNING Crushing hazard. The number 2 boom tube may become unbalanced and fall when it is removed from the number 1 boom tube if it is not properly supported and attached to the overhead crane.

Note: During removal, the overhead crane strap will need to be adjusted for proper balancing.

40 Remove the secondary boom extend cylinder cover retaining fasteners. Remove the covers.

⚠WARNING Bodily injury hazard. Do not operate the machine unless the secondary extend cylinder covers are properly installed. Operating the machine with the covers removed could result in death or serious injury.

41 Tag, disconnect and plug the secondary boom extension cylinder hydraulic hoses. Cap the fittings on the cylinder.

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

42 Support the secondary boom extension cylinder with an overhead crane or other suitable lifting device.

43 Remove the pin retaining fasteners from both the rod-end and barrel-end pivot pins. Do not remove the pins.

44 Use a soft metal drift to remove both pivot pins and remove the secondary boom extension cylinder from the machine while guiding the barrel end of the cylinder out of the boom.

⚠WARNING Crushing hazard. The secondary boom extension cylinder may become unbalanced and fall if it is not properly supported when it is removed from the machine.

NOTICE Component damage hazard. The boom lift cylinder rod can become damaged if the barrel end of the secondary boom extension cylinder is allowed to come in contact with it.

45 Remove and label the top and side wear pads from the number 1 boom tube at the pivot end of the boom. Do not remove the bottom wear pads.

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

46 Remove and label the top and side wear pads from the number 0 boom tube at the platform end of the boom. Do not remove the bottom wear pads.

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

47 Attach a lifting strap from an overhead crane to the number 1 boom tube at the platform end of the boom.

48 Support and slide the number 1 boom tube out of the number 0 boom tube. When the number 1 boom tube is approximately halfway removed, remove the bottom wear pads from the number 0 boom tube at the platform end of the boom.

⚠WARNING Crushing hazard. The number 1 boom tube may become unbalanced and fall when it is removed from the number 0 boom tube if it is not properly supported and attached to the overhead crane.

Note: During removal, the overhead crane strap will need to be adjusted for proper balancing.

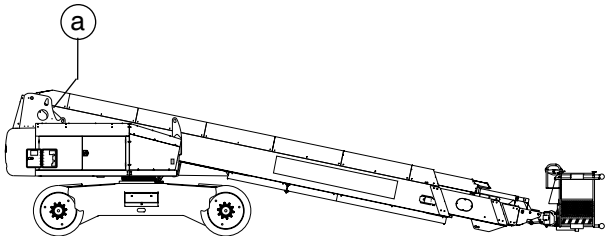
How to Disassemble the Boom, S-100HD Models

Note: Complete disassembly of the boom is only necessary
if the outer or inner boom tubes must be replaced. The primary boom extension cylinder can be removed without completely disassembling the boom. Refer to Repair Procedure, *How to Remove the Primary Extension Cylinder*.

1 Remove the boom. Refer to Repair Procedure, *How to Remove the Boom*.

2 Remove the retaining fasteners from the access covers on both sides of the boom at the pivot end. Remove the access covers.

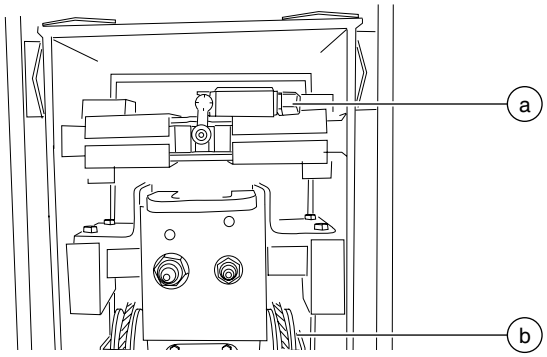
BOOM COMPONENTS



a side access covers

3 Secure the number 2 and number 3 boom tubes together with a strap or chain to prevent them from moving.

4 Remove the cable clamp from the cable break limit switch wiring.



a cable break limit switch
b cable pulley

5 Disconnect the wiring connector from the cable break limit switch.

6 Tag, disconnect and plug the hydraulic hoses from the primary boom extension cylinder. Cap the fittings on the cylinder.

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

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

8 Remove the pulley pivot pins, cable guards and pulleys.

Note: When installing the pulleys, be sure that the side of the pulley with the taller flange is facing the center of the boom tube.

9 Locate the number 3 boom tube extension cable clevis pins on both sides of the number 2 boom tube at the pivot end of the boom.

10 Remove the cotter pin and clevis pin from both cables.

Note: When installing a clevis pin, always replace the cotter pin with a new one.

11 Remove the lower external snap ring and washer from the cable break limit switch actuator pivot pin.

12 Remove the cable break actuator mounting plate retaining fasteners. Remove the lower plate from the machine.

13 Remove the upper plate and actuator pivot pin. Do not remove the cable break limit switch from the mounting plate.

14 Push the cable break actuator and cables towards the platform end of the boom approximately 18 inches / 46 cm.

15 Remove the red cable adjustment locking bracket retaining fasteners. Remove the red locking bracket from the machine.

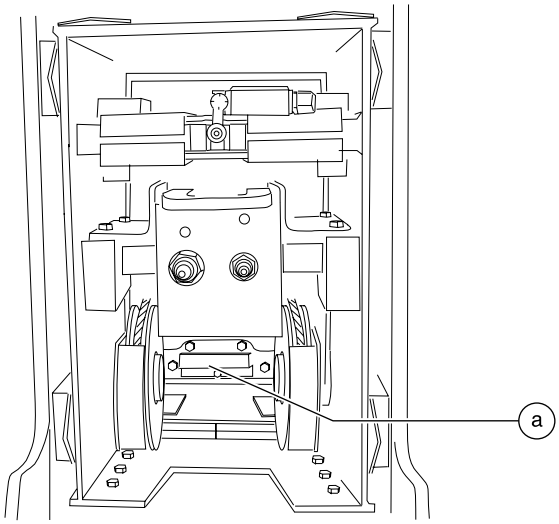
⚠WARNING Bodily injury hazard. Failure to install the red cable adjustment locking bracket will allow the cable mounting bolts to loosen and fall out which could result in death or serious injury.

16 Remove the two cable adjustment bolts.

17 Remove the cable-end block mounting plate fasteners. Remove the cable-end block mounting plate from the machine.

18 Remove the trunnion pin retaining fasteners.

19 Use a slide hammer to remove the trunnion pins from the primary boom extension cylinder.



a red cable adjustment locking bracket

20 Remove the primary boom extension cylinder hold down brackets at the pivot end of the boom.

21 Attach a lifting strap from an overhead crane to the lifting eye on the primary boom extension cylinder.

BOOM COMPONENTS

22 Support and slide the primary boom extension cylinder out of the boom assembly while guiding the cables out of the boom and place it on a structure capable of supporting it.

⚠WARNING Crushing hazard. The primary boom extension cylinder may become unbalanced and fall when it is removed from the boom if it is not properly supported and attached to the overhead crane.

NOTICE Component damage hazard. Cables can be damaged if they are kinked or pinched.

Note: During removal, the overhead crane strap will need to be adjusted for proper balancing.

23 Remove the retaining fasteners from the limit switch cover on top of the number 2 boom tube at the platform end of the machine.

24 Carefully remove the cover with proximity and limit switches from the top of the number 2 boom tube at the platform end of the boom.

⚠DANGER Tip-over hazard. Failure to install the correct proximity and/or limit switches in the correct location will result in the machine tipping over, resulting in death or serious injury.

25 Tag and disconnect the wiring connectors from the proximity and limit switches at the top of the number 2 boom tube at the platform end of the boom. Do not remove the proximity or limit switches.

26 Remove the retaining fasteners from the limit switch cover on the side of the number 1 boom tube at the platform end of the boom.

27 Carefully remove the cover with proximity and limit switches from the number 1 boom tube at the platform end of the boom.

⚠DANGER Tip-over hazard. Failure to install the correct proximity and/or limit switches in the correct location will result in the machine tipping over, resulting in death or serious injury.

28 Tag and disconnect the wiring connectors from the proximity and limit switches at the ground controls side of the number 1 boom tube at the platform end of the boom. Do not remove the proximity or limit switches.

29 Remove the retaining fasteners from each black plastic boom tube cover at the platform end of the machine. Remove the covers.

30 Remove and label the top and side wear pads of the number 3 boom tube at the pivot end of the boom. Do not remove the bottom wear pads.

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

31 Remove and label the top and side wear pads from the number 2 boom tube at the platform end of the boom. Do not remove the bottom wear pads.

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

32 Attach a lifting strap from an overhead crane to the number 3 boom tube at the platform end of the boom.

33 Support and slide the number 3 boom tube out of the number 2 boom tube. When the number 3 boom tube is approximately halfway removed, remove the bottom wear pads from the number 2 boom tube at the platform end of the boom.

⚠WARNING Crushing hazard. The number 3 boom tube may become unbalanced and fall when it is removed from the number 2 boom tube if it is not properly supported and attached to the overhead crane.

Note: During removal, the overhead crane strap will need to be adjusted for proper balancing.

34 Remove and label the top and side wear pads from the number 2 boom tube at the pivot end of the boom. Do not remove the bottom wear pads.

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

35 Remove and label the top and side wear pads from the number 1 boom tube at the platform end of the boom. Do not remove the bottom wear pads.

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

36 Attach a lifting strap from an overhead crane to the number 2 boom tube at the platform end of the boom.

37 Support and slide the number 2 boom tube out of the number 1 boom tube. When the number 2 boom tube is approximately halfway removed, remove the bottom wear pads from the number 1 boom tube at the platform end of the boom.

⚠WARNING Crushing hazard. The number 2 boom tube may become unbalanced and fall when it is removed from the number 1 boom tube if it is not properly supported and attached to the overhead crane.

Note: During removal, the overhead crane strap will need to be adjusted for proper balancing.

BOOM COMPONENTS

4-3
Boom Lift Cylinder

How to Remove the Boom Lift Cylinder

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

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

1 Raise the boom until there is approximately 4 feet / 1.2 m between the turntable and boom rest pad.

2 Attach a lifting strap from an overhead crane or other suitable lifting device to the rod end of the the boom lift cylinder.

3 Attach an overhead 10 ton / 9071 kg crane to the platform end of the boom for support. Do not lift the boom.

4 Remove the boom storage area cover retaining fasteners. Remove the cover from the machine.

5 Place support blocks under the boom lift cylinder.

6 Remove the pin retaining fastener from the boom lift cylinder rod-end pivot pin. Use a soft metal drift to remove the pin. Protect the cylinder rod from damage.

⚠WARNING Crushing hazard. The boom lift cylinder may fall when the rod-end pivot pin is removed if the boom lift cylinder is not properly supported by the overhead crane.

⚠WARNING Crushing hazard. The boom may fall when the rod-end pivot pin is removed if the boom is not properly supported by the overhead crane.

7 Carefully raise the boom with the overhead crane until the rod end of the boom lift cylinder can be removed.

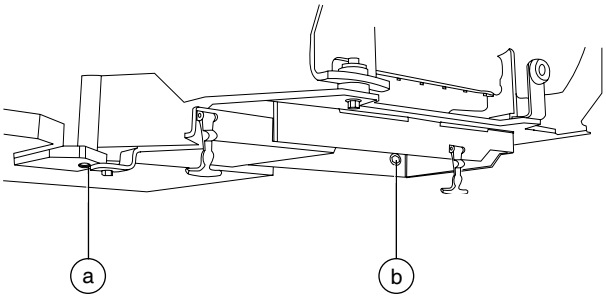
8 Carefully lower the rod end of the boom lift cylinder down onto the support blocks.

9 Carefully raise the boom with the overhead crane until the barrel end of the boom lift cylinder is accessible.

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

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

11 Remove the engine pivot plate retaining fastener. Swing the engine pivot plate out away from the machine.



a engine pivot plate anchor hole
b engine pivot plate retaining fastener

12 Locate the engine pivot plate anchor hole at the pivot end of the engine pivot plate.

13 Install the bolt that was just removed into the anchor hole to secure the engine pivot plate from moving.

⚠WARNING Crushing hazard. Failure to install the bolt into the engine pivot plate anchor hole to secure it from moving could result in death or serious injury.

14 Remove the pin retaining fastener from the barrel-end pivot pin. Do not remove the pin.

15 Support the boom lift cylinder with an overhead crane.

16 Use a slide hammer to remove the boom lift cylinder barrel-end pivot pin through the access hole in the engine side turntable riser.

17 With the boom lift cylinder being supported by the overhead crane, pull the boom lift cylinder toward the platform until it is out.

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

NOTICE Component damage hazard. Be careful not to damage the proximity and/or limit switches when removing the boom lift cylinder.

NOTICE Component damage hazard. The cables and hydraulic hoses can be damaged if the boom lift cylinder is pulled across them.

BOOM COMPONENTS

4-4
Extension Cylinders

The primary boom extension cylinder is located inside the boom assembly and incorporates cables and pulleys that are responsible for extending the number 2 and 3 boom tubes. The secondary boom extension cylinder (S-120HD models) is located underneath the number 0 boom tube and is responsible for extending the number 1 boom tube. The extension cylinders are equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

How to Remove the Primary Boom Extension Cylinder

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

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

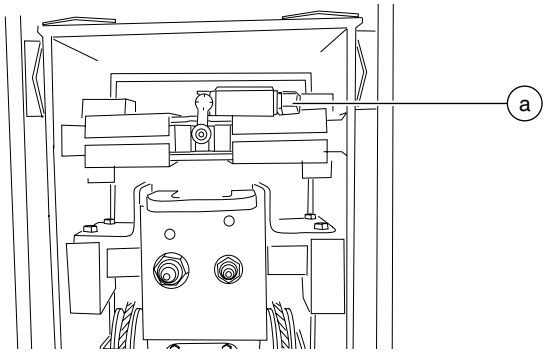
1 Raise the boom to a horizontal position.

2 Remove the retaining fasteners from the boom end cover at the pivot end of the boom. Remove the cover from the machine.

3 Remove the access cover retaining fasteners from both sides of the boom. Remove the access covers.

4 Secure the number 2 and number 3 boom tubes together with a strap or chain to prevent them from moving.

5 Remove the cable clamp from the cable break limit switch wiring.



a cable break limit switch

6 Disconnect the wiring connector from the cable break limit switch.

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

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

8 **S-120HD models:** Remove the fasteners from the inner cable track mounting bracket at the primary boom extension cylinder.

9 **S-120HD models:** Lay the inner cable track and hoses down and out of the way.

10 Remove the pulley pivot pin retaining fasteners from the number 2 boom tube at the pivot end of the boom.

11 Remove the pulley pivot pins, cable guards and pulleys.

Note: When installing the pulleys, be sure that the side of the pulley with the shorter flange is facing the inside of the boom tube.

12 Locate the number 3 boom tube extension cable clevis pins on both sides of the number 2 boom tube at the pivot end of the boom.

13 Remove the cotter pin and clevis pin from both cables.

Note: When installing a clevis pin, always replace the cotter pin with a new one.

14 Remove the lower external snap ring and washer from the cable break limit switch actuator pivot pin.

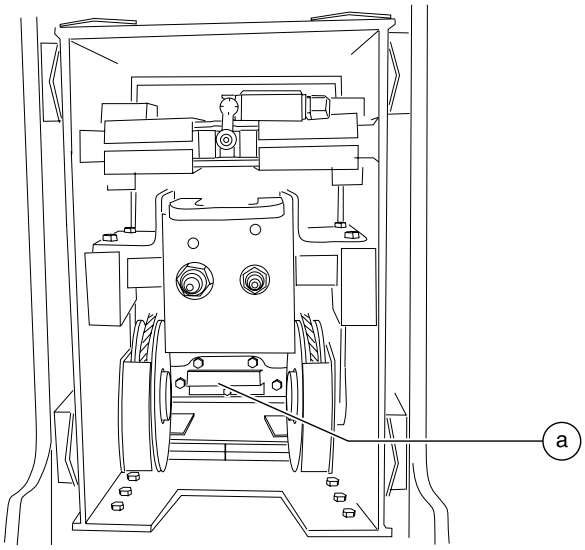
15 Remove the cable break actuator mounting plate retaining fasteners. Remove the lower plate.

16 Remove the upper plate and actuator pivot pin. Do not remove the cable break limit switch from the mounting plate.

17 Push the cable break actuator and cables towards the platform end of the boom approximately 18 inches / 46 cm.

18 Remove the retaining fasteners from the red cable adjustment locking bracket. Remove the red locking bracket.

⚠WARNING Bodily injury hazard. Failure to install the red cable adjustment locking bracket would allow the cable mounting bolts to loosen and fall out which could result in death or serious injury.



a red cable adjustment locking bracket

BOOM COMPONENTS

19 Remove the two cable adjustment bolts.

20 Remove the cable-end block mounting plate fasteners. Remove the cable-end block mounting plate.

21 Remove the trunnion pin retaining fasteners.

22 Use a slide hammer to remove the trunnion pins from the primary boom extension cylinder.

Note: Use a $^{1}/_{2}$-13 bolt thread on each end of the slide hammer.

23 Attach a lifting strap from an overhead crane to the lifting eye on the primary boom extension cylinder.

24 Support and slide the primary boom extension cylinder out of the boom assembly while guiding the cables out of the boom and place it on a structure capable of supporting it.

⚠WARNING Crushing hazard. The primary boom extension cylinder may become unbalanced and fall when it is removed from the boom if it is not properly supported and attached to the overhead crane.

NOTICE Component damage hazard. Cables can be damaged if they are kinked, pinched or snagged during removal.

Note: During removal, the overhead crane strap will need to be adjusted for proper balancing.

How to Remove the Secondary Boom Extension Cylinder, S-120HD Models

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

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

1 Raise the boom until the secondary boom extension cylinder barrel-end pivot pin is above the turntable covers.

2 Remove the secondary boom extend cylinder cover retaining fasteners. Remove the covers.

⚠WARNING Bodily injury hazard. Do not operate the machine unless the secondary extend cylinder covers are properly installed. Operating the machine with the covers removed could result in death or serious injury.

3 Tag, disconnect and plug the secondary boom extension cylinder hydraulic hoses. Cap the fittings on the cylinder.

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

4 Support the secondary boom extension cylinder with an overhead crane or other suitable lifing device.

5 Remove the pin retaining fasteners from both the rod-end and barrel-end pivot pins. Do not remove the pins.

6 Protect the boom lift cylinder rod from damage.

7 Use a soft metal drift to remove both pivot pins.

8 Remove the secondary boom extension cylinder from the machine while guiding the barrel end of the cylinder out of the boom.

⚠WARNING Crushing hazard. The secondary boom extension cylinder may become unbalanced and fall if it is not properly supported when it is removed from the machine.

NOTICE Component damage hazard. The boom lift cylinder rod can become damaged if the barrel end of the secondary boom extension cylinder is allowed to come in contact with it.

BOOM COMPONENTS

4-5
Boom Extend/Retract Cables

How to Adjust the Boom Extend/ Retract Cables

Properly adjusted extend/retract cables are essential to safe machine operation. Failure to maintain proper adjustment of the cables could result in unsafe operating conditions and may cause component damage. The boom extend and retract functions should operate smoothly and be free of hesitation, jerking and unusual noise.

Note: A flashlight may be necessary to be able to see the extend/retract cables inside of the boom assembly.

Note: Perform this procedure with the boom fully retracted.

1 Start the engine from the ground controls.

2 Raise the boom to a horizontal position.

3 Stop the engine.

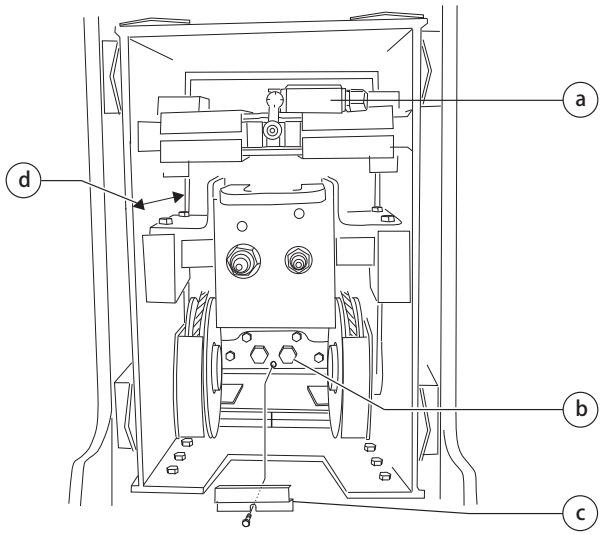
4 Remove the boom end cover from the pivot end of the machine.

5 Locate the red locking bracket (c) covering the cable adjustment bolts at the pivot end of the boom (illustration 1).

6 Remove the retaining fastener from the red locking bracket and remove the bracket from the machine.

7 Locate the retract cable equalizer bolt under the number 1 boom tube at the platform end of the boom assembly (illustration 3).

8 Loosen the nylock (g) and jam nut (h) on the cable tension equalizer bracket. Do not remove the nuts.



a limit switch
b extend cable adjustment bolts
c red cable adjustment locking bracket
d boom tube distance

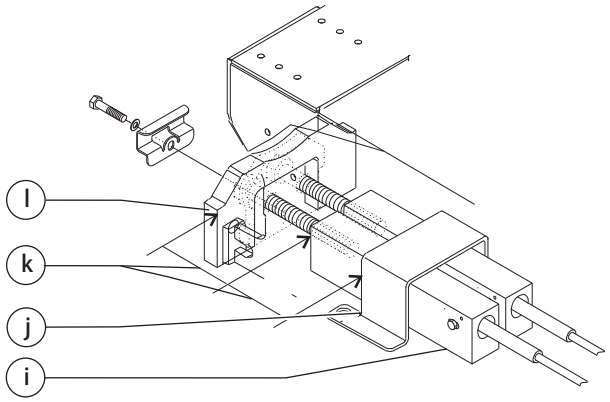
Illustration 1

9 At the pivot end of the boom (illustration 1), turn the cable adjustment bolts (b) clockwise to obtain $6^{3}/_{4}$ inches / 17 cm between the end of the number 3 boom tube and the end of the number 2 boom tube (d). As a guide (Illustration 2), the end of the extension cable coupling (i) should be approximately mid-point (k) between the guide plate (l) and the cable retainer bracket (j). Illustration 2 is visible by removing the boom side covers.

Note: Adjust the cable adjustment bolts evenly so the cable break limit switch (a) stays centered in the limit switch actuator (Illustration 1).

Note: If the distance is greater than $6^{3}/_{4}$ inches / 17 cm, loosen the extend cable adjustment bolts and tighten the hex jam nut on the cable tension equalizer bolt until the distance is less than $6^{3}/_{4}$ inches / 17 cm. Loosen the jam nut and repeat step 9.

BOOM COMPONENTS



i extension cable coupling
j cable retainer bracket
k equal distance
l guide plate

Illustration 2

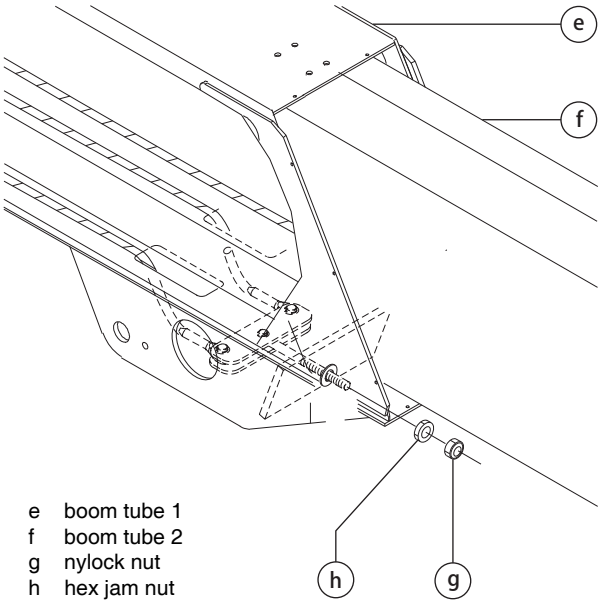
10 At the platform end of the boom, tighten the hex jam nut (h) on the cable tension equalizer bracket located underneath the number 1 boom tube (Illustration 3). Tighten the hex jam nut until it is snug. Do not overtighten.

11 Hold the hex jam nut with a wrench and tighten the nylock nut (g) against the hex jam nut.

12 Re-check that the cable break limit switch is centered in the limit switch actuator. Adjust the extension cable adjustment bolts to center it.

13 At the pivot end of the boom, measure the distance between the end of the number 3 boom tube and the end of the number 2 boom tube.

- Result: The measurement between the end of the number 3 boom tube and the end of the number 2 boom tube should be $6^{3}/_{4}$ to $6^{7}/_{8}$ inches / 17 to 17.5 cm (d).



e boom tube 1
f boom tube 2
g nylock nut
h hex jam nut

Illustration 3

14 Install the red locking bracket over the cable adjustment bolts. A flat edge of each bolt head (b) must be on top for the locking bracket to secure the bolts.

⚠WARNING Bodily injury hazard. Failure to re-install the red cable adjustment locking bracket would allow the cable mounting bolts to loosen and fall out which could result in death or serious injury.

15 Lower the boom to the stowed position.

16 Start the engine from the platform controls.

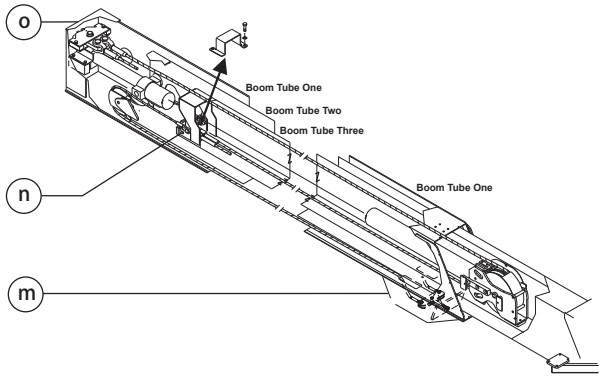
BOOM COMPONENTS

17 Extend the boom approximately 2 feet / 0.6 m.

18 Retract the boom. While retracting the boom, visually inspect the number 2 and number 3 boom tubes.

◊ Result: The number 2 should not move more than $^1/_2$ inch (13 mm) before the number 3 boom tube begins to retract.

Note: If the number 2 boom tube moves more than $^1/_2$ inch (13 mm) before the number 3 boom tube begins to retract, repeat the procedure until the number 2 boom moves less than $^1/_2$ inch before the number 3 boom begins to retract.



m figure 3 platform end
n figure 2, boom tube 3
o figure 1, pivot end

Illustration 4

How to Replace the Boom Extend/ Retract Cables

Note: The cable pulleys must also be replaced when replacing the cables.

1 Remove the boom extension cylinder. Refer to Repair Procedure, *How to Remove the Primary Boom Extension Cylinder.*

Boom extend cables:

2 Remove the retaining fasteners that secure the extension cable retainer to the pulley mount. Remove the retainer.

3 Remove the cables from the lower boom extend cable bracket that attaches to the number 3 boom tube.

4 Remove the front and rear fasteners from the anchor bracket that supports the cable anchors. Remove the bracket.

5 Remove the pulley and boom extend cables from the extension cylinder assembly. Discard the old cables and pulleys.

6 Route the new boom extend cables through the boom extend pulley bracket.

Note: Be sure before installing the extend cables through the boom adjustment coupling that the tall end of the cable anchors are facing down.

7 Install the new boom extend cable pulley, pivot pin and snap rings.

Note: Be sure the boom extend cables are routed through the grooves of the pulley and the upper wear pad on the extension cylinder.

8 Install the boom extend cables to the lower extend cable bracket that mounts to the number 3 boom tube.

Boom retract cables:

9 Remove the fasteners from the boom retract cables at the platform end of the boom.

10 Attach a rope to one of the boom retract cables at the pivot end of the boom.

11 At the platform end of the boom, pull on the boom retract cable that has the rope attached to it.

12 Pull the old cable completely out of the boom tube. Discard the old boom retract cable.

13 Remove the rope from the old cable and securely attach the rope to the same end of the new boom retract cable.

14 At the pivot end of the boom, carefully pull the rope with the new retract cable attached.

15 Pull the new cable towards the pivot end of the boom until the end of the cable is at the end of the boom tube. Remove the rope.

16 Repeat steps 11 through 16 for the other boom retract cable.

17 At the platform end of the boom, install the retract cables and fasteners to the adjustment plate.

18 Remove and discard the old boom retract pulleys from the pivot end of the boom extension cylinder.

19 Install the new boom retract pulleys to the pivot end of the boom extension cylinder.

20 Secure the number 2 and number 3 booms together at the platform end with a chain or strap to prevent them from moving.

21 Install the boom extension cylinder assembly into the boom.

Note: Before lowering the extension cylinder into the saddles of the number 1 boom tube, wrap the boom retract cables around the pulleys.

22 Remove the chain or strap from the platform end of the number 2 and number 3 boom tubes.

23 Adjust the boom extend/retract cables. Refer to Repair Procedure, *How to Adjust the Boom Extend/Retract Cables.*

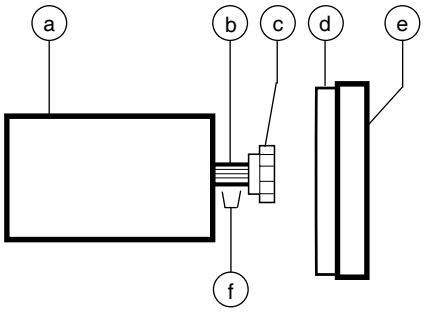
Engines

6-1 RPM Adjustment

Refer to Maintenance Procedure, *Check and Adjust the Engine RPM.*

6-2 Flex Plate

The flex plate couples the engine to the pump. The flex plate is bolted to the engine flywheel and has a cut-out in the center for the pump coupler.



a pump
b pump shaft
c coupler
d flex plate
e flywheel
f Deutz models- .245 inch / 6.2 mm gap
Cummins or Perkins models-
.255 inch / 6.5 mm gap

How to Remove the Flex Plate

1 Disconnect the wiring plug at the electronic proportional controller located on the drive pump.

2 Remove the hose clamp from the air cleaner hose at the air cleaner. Carefully disconnect the hose from the air cleaner.

3 Remove the air cleaner mounting fasteners. Remove the air cleaner from the machine.

4 Remove the fuel filter/water separator retaining fasteners from the pump mounting plate. Do not disconnect the fuel hoses.

5 Remove the fuel filter/water separator and lay it to the side.

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

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

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

8 Remove the flex plate mounting fasteners, then remove the flex plate from the flywheel.

How to Install the Flex Plate

1 Install the flex plate onto the engine flywheel with the raised spline towards the pump.

2 Apply Loctite® removable thread sealant to the mounting fasteners. Then torque the flex plate mounting bolts in sequence to:
Cummins engines: 23 ft-lbs / 31.2 Nm.
Deutz engines: 28 ft-lbs / 38 Nm.

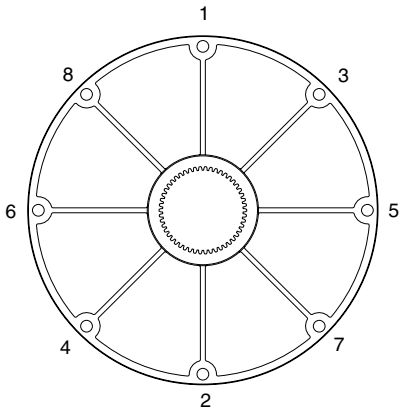
3 Install the pump coupler onto the pump shaft with the set screw toward the pump. Leave the appropriate gap between coupler and pump end plate for your engine.

4 Apply Loctite® removable thread sealant to the pump coupler set screw. Torque the set screw to 61 ft-lbs / 83 Nm.

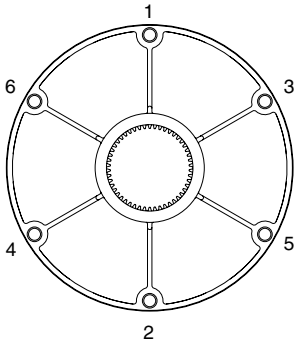
5 Install the bell housing/mounting plate assembly. Apply Loctite® removable thread sealant to the mounting fasteners. Then torque the pump retaining fasteners to:
Cummins engines: 28 ft-lbs / 38 Nm.
Deutz engines: 47 ft-lbs / 63 Nm.

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

NOTICE Component damage hazard. When installing the pump, do not force the pump coupler into the flexplate or damage to the pump shaft seal may occur.



Cummins Engines



Deutz 2011 Engines

ENGINES

6-3
Oil Pressure and Coolant Temperature Sending Units - Cummins Models

The coolant temperature sending unit is an electrical device. If the coolant temperature reaches 210° F / 99° C, the ECM will shut the engine off to prevent damage and will not start until the coolant temperature drops below 210° F / 99° C. The engine temperature will be shown on the display screen at the ground controls when the key is ON and the Emergency Stop Button is pulled out to the ON position. Use the scroll buttons and scroll to the ENGINE TEMPERATURE screen.

NOTICE Component damage hazard. Do not crank the engine with a water temperature fault shown on the display at the ground controls.

The oil pressure sending unit is an electrical device. If the oil pressure drops below 12 psi / 0.8 bar, the ECM will shut the engine off to prevent damage. The engine oil pressure will be indicated on the display screen at the ground controls while the engine is running. Use the scroll buttons and scroll to the ENGINE OIL PRESSURE screen.

NOTICE Component damage hazard. Do not crank the engine with a low oil pressure fault shown on the display at the ground controls.

6-4
Oil Pressure and Temperature Sending Units - Deutz Models

The engine oil temperature sending unit is an electrical device. If the engine oil temperature reaches 275° F / 135° C, the ECM will shut the engine off to prevent damage and will not start until the engine oil temperature drops below 275° F / 135° C. The engine temperature will be shown on the display screen at the ground controls when the key is ON and the Emergency Stop Button is pulled out to the ON position. Use the scroll buttons and scroll to the ENGINE TEMPERATURE screen.

NOTICE Component damage hazard. Do not crank the engine with a oil temperature fault shown on the display at the ground controls.

The oil pressure sending unit is an electrical device. If the oil pressure drops below 12 psi / 0.8 bar, the ECM will shut the engine off to prevent damage. The engine oil pressure will be indicated on the display screen at the ground controls while the engine is running. Use the scroll buttons and scroll to the ENGINE OIL PRESSURE screen.

NOTICE Component damage hazard. Do not crank the engine with a low oil pressure fault shown on the display at the ground controls.

Ground Controls

The ground control box (TCON) is the communication and operations center for the machine. The ground control box contains two key switches. The key switch towards the top of the control box is for selection of ground or platform controls. The key switch at the bottom of the control box is the Service Bypass key switch. It is used to allow the boom to be raised above 10° with the axles retracted and to correct an out-of-level platform. If the machine trips an envelope safety switch, the operator at the ground controls can turn and hold the Service Bypass key switch in the RECOVER position and the machine will automatically lower the boom to the stowed position in sequence.

The ground control box contains a replaceable membrane decal with touch sensitive buttons for various machine functions. The ground control box also contains two printed circuit boards:

The **LCD (Liquid Crystal Display) circuit board** is mounted to the inside of the control box lid which controls the LCD display screen.

The **ECM circuit board** is the main circuit board for the machine. There are relays on the ECM circuit board that can be replaced. All operating parameters and configuration of options for the machine are stored in the ECM memory.

Note: The ECM circuit board inside the ground control box (TCON) cannot be replaced by itself. If the ECM circuit board is faulty and needs to be replaced, contact the Genie Product Support.

Note: When an ECM circuit board is replaced, the proportional valves will need to be calibrated. Refer to Repair Procedure, *How to Calibrate a Joystick.*

7-1 Circuit Boards

How to Remove the LCD Display Screen Circuit Board

1 Push in the Emergency Stop button to the OFF position at both the ground and platform controls.

2 Remove the platform control box mounting fasteners. Remove the platform control box from the machine.

NOTICE Component damage hazard. Cables can be damaged if they are kinked or pinched.

3 Locate the cables that connect to the bottom of the control box. Number each cable and its location at the control box.

4 Disconnect the cables from the bottom of the platform control box.

5 Remove the control cable plug retaining fasteners from the bottom of the platform control box.

6 Remove the platform control box lid fasteners. Open the control box lid.

GROUND CONTROLS

7 Locate the ECM circuit board mounted to the inside of the platform control box.

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

NOTICE Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

8 Remove the ECM circuit board mounting fasteners.

9 Carefully remove the ECM circuit board from the platform control box.

7-2 Membrane Decal

The membrane decal is a special decal that consists of a decal with an electronic membrane on the backside. The membrane contains touch sensitive areas that, when pushed, activates the machine functions. The membrane buttons activate machine functions similar to toggle switches, but do not have any moving parts.

How to Replace the Membrane Decal

1 Turn the key switch at the ground controls to the OFF position.

2 Push in the Emergency Stop button to the OFF position at both the ground and platform controls.

3 Remove the ground control box lid fasteners. Open the control box lid.

4 Carefully disconnect the two ribbon cables from the membrane decal at the ECM circuit board.

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

NOTICE Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

5 Carefully remove the membrane decal from the control box lid while guiding the ribbon cables out of the control box lid.

6 Remove any decal adhesive from the control box lid with a mild solvent.

Note: Do not allow any solvent to come in contact with the LCD display screen.

7 Install the new membrane decal while guiding the ribbon cables through the control box lid.

8 Connect the ribbon cables to the ECM circuit board.

9 Close the control box lid and install the retaining fasteners.

7-3 Control Relays

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

How to Test a Single Pole Double Throw Relay

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

NOTICE Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

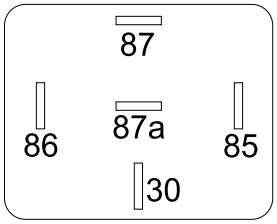
1 Turn the key switch to the OFF position.

2 Open the ground control box and remove the relay to be tested from the ECM circuit board.

GROUND CONTROLS

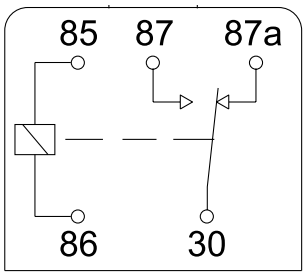
3 Connect the leads from an ohmmeter or continuity tester to each terminal combination and check for continuity. Terminals 85 and 86 represent the coil and should not be tested in any other combination.

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



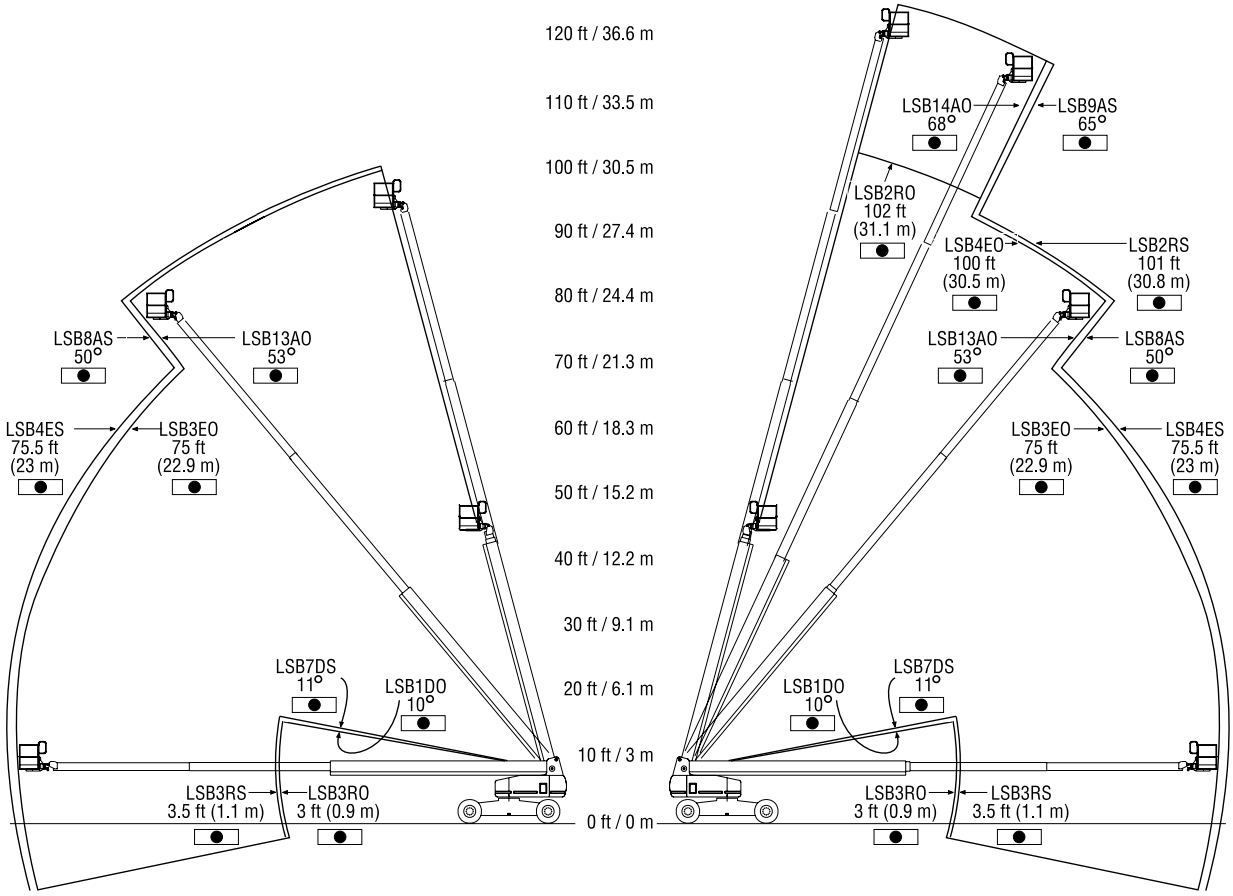
4 Connect 12V DC to terminal 85 and a ground wire to terminal 86, then test the following terminal combinations.

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

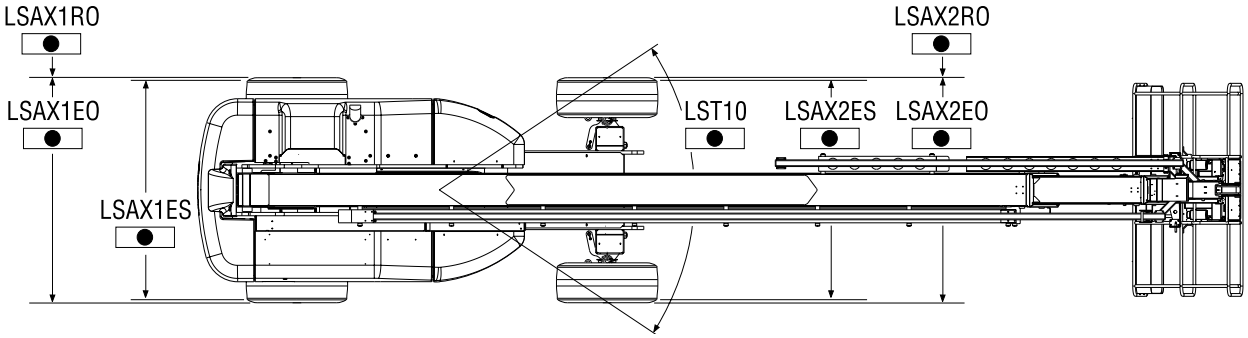


Control Relay Schematic

Limit Switches



S-100HD Models **S-120HD Models**



LIMIT SWITCHES

8-1
Limit Switches

How to Test the Limit Switches

There are 2 types of limit switches: Mechanical (roller arm) and proximity. Mechanical limit switches are activated by a part of the machine physically moving the roller arm of the switch. Proximity switches are a magnetic type of switch and are activated by the close presence of a ferrous metal.

Mechanical Operational Limit Switch:

1 Manually activate the limit switch.

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

2 Connect the leads from an ohmmeter or continuity tester to the Deutsch connector terminals in the combination listed below and check for continuity.

terminal 1 to 2	continuity (zero Ω)
terminal 3 to 4	no continuity (infinite Ω)
terminal 1 to 3 and 4	no continuity (infinite Ω)
terminal 2 to 3 and 4	no continuity (infinite Ω)

3 Activate the limit switch. Connect the leads from an ohmmeter or continuity tester to the Deutsch connector terminals in the combination listed below and check for continuity.

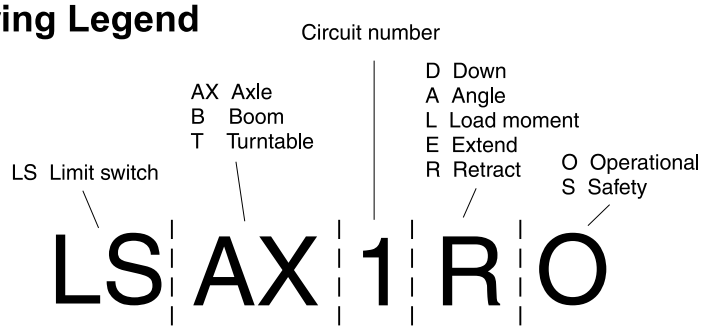
terminal 1 to 2	no continuity (infinite Ω)
terminal 3 to 4	continuity (zero Ω)
terminal 1 to 3 and 4	no continuity (infinite Ω)
terminal 2 to 3 and 4	no continuity (infinite Ω)

Mechanical Safety Limit Switch:

1 Connect the leads from an ohmmeter or continuity tester to the Deutsch connector terminals in the combination listed below and check for continuity.

terminal 1 to 2	continuity (zero Ω)
terminal 3 to 4	continuity (zero Ω)
terminal 1 to 3 and 4	no continuity (infinite Ω)
terminal 2 to 3 and 4	no continuity (infinite Ω)
terminal 5 to 6	no continuity (infinite Ω)

Numbering Legend



2 Activate the limit switch. Connect the leads from an ohmmeter or continuity tester to the Deutsch connector terminals in the combination listed below and check for continuity.

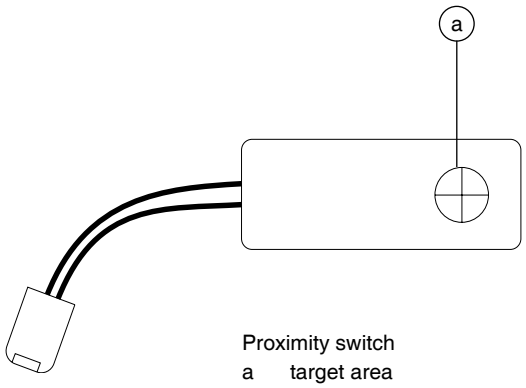
terminal 1 to 2	no continuity (infinite Ω)
terminal 3 to 4	no continuity (infinite Ω)
terminal 1 to 3 and 4	no continuity (infinite Ω)
terminal 2 to 3 and 4	no continuity (infinite Ω)
terminal 5 to 6	no continuity (infinite Ω)

Proximity Switch:

1 Connect the leads from an ohmmeter or continuity tester to the deutsch connector terminals in the combination listed below and check for continuity.

terminal 3 to 4	no continuity (infinite Ω)

2 Locate the target area of the proximity switch.



Proximity switch
a target area

3 Place a piece of ferrous metal (steel, iron, etc.) in front of the target area so it is no more than $^1/_2$ inch / 12.7 mm away from the target area of the proximity switch.

4 Connect the leads from an ohmmeter or continuity tester to the deutsch connector terminals in the combination listed below and check for continuity.

terminal 3 to 4	continuity (zero Ω)

5 Move the piece of ferrous metal (steel, iron, etc.) so it is more than $^1/_2$ inch / 12.7 mm away from the target area of the proximity switch.

6 Connect the leads from an ohmmeter or continuity tester to the deutsch connector terminals in the combination listed below and check for continuity.

terminal 3 to 4	no continuity (infinite Ω)

How to Adjust the Limit Switches

Note: Perform this procedure on a flat and level area and free from obstructions.

1 Fully retract the boom.

2 Place a digital protractor or digital level on top of the boom tube.

S-120HD models:

3 Raise boom until the protractor reads 67.5 degrees.

4 Loosen the mounting fasteners from the 68 degree proximity switch (LSB14AO).

LIMIT SWITCHES

5 Disconnect the Deutsch connector from the 68 degree proximity switch (LSB14AO) and connect an ohmmeter or continuity tester to terminals 3 and 4 of the deutsch connector.

6 Adjust LSB14AO until the switch contacts just open. While observing the digital protractor, raise the boom until the switch contacts close, then lower the boom until the switch contacts open. Repeat the process until the switch contacts open between 67.5 and 68 degrees.

7 Tighten the 68 degree proximity switch (LSB14AO) mounting fasteners.

8 Lower the boom to 65.3 degrees.

9 Loosen the mounting fasteners from the 65 degree safety switch (LSB9AS).

10 Disconnect the Deutsch connector from the 65 degree safety switch (LSB9AS) and connect an ohmmeter or continuity tester to terminals 1 and 2, and to terminals 3 and 4 of the deutsch connector.

11 Adjust LSB9AS until the switch contacts just open. While observing the digital protractor, raise the boom until the switch contacts close, then lower the boom until the switch contacts open. Repeat the process until the switch contacts open between 65 and 65.5 degrees.

12 Tighten the 65 degree safety switch mounting fasteners.

13 Lower the boom to 52.5 degrees.

14 **S-100HD models:** Raise the boom to 52.5 degrees.

15 Loosen the mounting fasteners from the 53 degree proximity switch (LSB13AO).

16 Disconnect the Deutsch connector from the 53 degree proximity switch (LSB13AO) and connect an ohmmeter or continuity tester to terminals 3 and 4 of the Deutsch connector.

17 Adjust LSB13AO until the switch contacts just open. While observing the digital protractor, raise the boom until the switch contacts close, then lower the boom until the switch contacts open. Repeat the process until the switch contacts open between 52.5 and 53 degrees.

18 Tighten the 53 degree limit switch mounting fasteners.

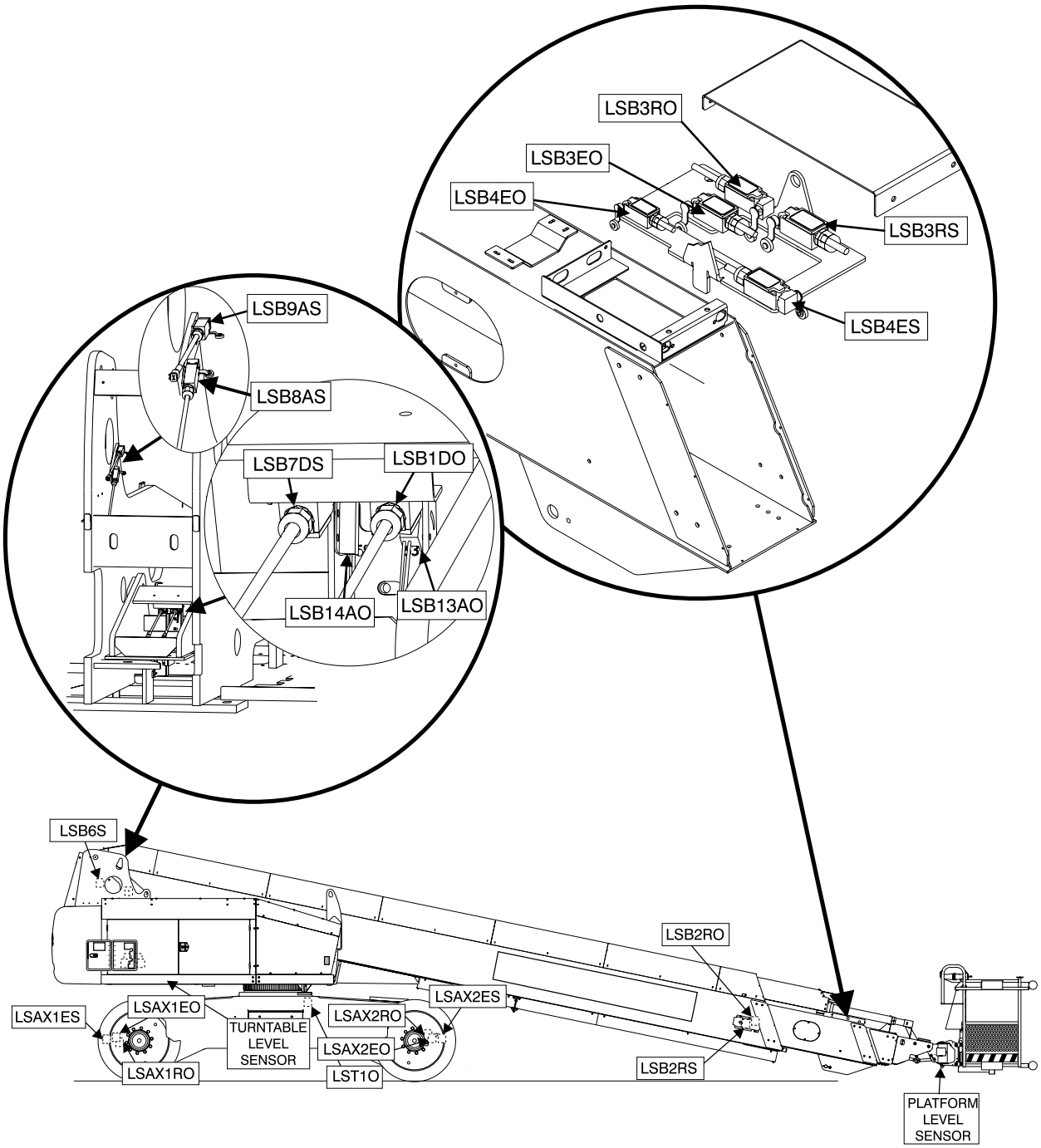
19 Lower the boom to 50.3 degrees.

20 Loosen the mounting fasteners from the 50 degree safety switch (LSB8AS).

21 Disconnect the Deutsch connector from the 50 degree safety switch (LSB8AS) and connect an ohmmeter or continuity tester to terminals 1 and 2, and to 3 and 4 of the Deutsch connector.

22 Adjust LSB8AS until the switch contacts just open. While observing the digital protractor, raise the boom until the switch contacts close, then lower the boom until the switch contacts open. Repeat the process until the switch contacts open between 50 and 50.5 degrees.

8-2
Limit Switch and Level Sensor Locations



LIMIT SWITCHES

Located under the drive chassis end cover at the center of the square end (blue): **LSAX1RO**, **LSAX1EO**, **LSAX1ES**

Located under the drive chassis end cover at the center of the round end (yellow): **LSAX2RO**, **LSAX2EO**, **LSAX2ES**

Located in the center of the swing chassis: **LS-T1O**

Located on the hydraulic tank tray: **Turntable Level Sensor**

Located on the inside of the swing chassis bulkhead at the counterweight end: **LSB9AS, LS-B8AS**

Located at the counterweight end of Boom tube 0: **LSB6S**

Located on the counterweight side of the lift cylinder support assembly: **LSB1DO**, **LSB7DS**, **LSB13AO**, **LSB14AO**

Located on the outside of the platform end of Boom tube 0: **LSB2RO**, **LSB2RS**

Located on the top of the platform end of Boom tube 1: **LSB3EO**, **LSB3RS**, **LSB3RO**, **LSB2RO**, **LSB4ES**

Located on the platform rotator: **Platform Level Sensor**

8-3 Limit Switch Functions

LSAX1RO: Operational Limit Switch, Front Axle, Retract. This switch activates when the axle is fully retracted, activating axle retracted LED and shutting off power to axle retract coils after two seconds.

LSAX2RO: Operational Limit Switch, Rear Axle, Retract. This switch activates when the axle is fully retracted, activating axle retracted LED and shutting off power to axle retract coils after two seconds.

LSAX1EO: Operational Limit Switch, Front Axle, Extend. This switch is activated when the axle is fully extended. If this switch is not activated, boom functions are restricted to the stowed range. If unit is out of stowed, all boom functions are disabled. Axle can be extended while driving to recover.

LSAX2EO: Operational Limit Switch, Rear Axle, Extend. This switch is activated when the axle is fully extended. If this switch is not activated, boom functions are restricted to the stowed range. If unit is out of stowed, all boom functions are disabled. Axle can be extended while driving to recover.

LSAX1ES: Safety Limit Switch, Front Axle, Extend. If this switch is tripped, then the axle is not fully extended. In this condition, if unit is out of stowed, power is cut to boom up, boom extend and axle retract.

LSAX2ES: Safety Limit Switch, Rear Axle, Extend. If this switch is tripped, then the axle is not fully extended. In this condition, if unit is out of stowed, power is cut to boom up, boom extend and axle retract.

LSB6S: Safety Limit Switch, Cable Tension. Cuts power to the extend directional valve if extend cables are out of adjustment or one breaks.

LSB1DO: Operational Limit Switch, 10^{O} Angle. This switch activates anytime the boom is raised above 10^{O}. If axles are not extended, boom up is disabled and the extend axle LED and icon will flash as long as boom up is operated. At this point, if axles are extended, the motors are shifted to low and drive speed is limited to 0.7 mph.

LSB7DS: Safety Limit Switch, 11^{O} Angle. If axles are not extended, this switch is activated when boom is raised to 11^{O}, cutting power to boom up and axle retract.

LSB13AO: Operational Limit Switch, 53^{O} Angle. This switch activates at 53^{O} boom angle, allowing the boom to be extended beyond 75 feet. If the boom is lowered past this switch when the boom is beyond 75 feet, boom extend and boom down are disabled. The retract boom LED and icon and alarm will flash as long as boom down is operated.

LSB8AS: Safety Limit Switch, 50^{O} Angle. This switch cuts power to boom extend, boom down and the engine fuel solenoid when it is mechanically activated at 50^{O} if the boom length is more than 75.5 feet.

LSB14AO: Operational Limit Switch, 68^{O} Angle. This switch is activated at 68^{O} boom angle and allows the boom to be extended beyond 100 feet. If the boom is lowered past this switch when extended beyond 100 feet, boom extend and boom down are disabled. The boom retract LED and icon and alarm will flash as long as boom down is operated.

LSB9AS: Safety Limit Switch, 65^{O} Angle. This switch cuts power to boom extend, boom down and the engine fuel solenoid when it is mechanically activated at 65^{O} if the boom length is more than 101 feet.

LSB3RO: Operational Limit Switch, 3’ Extend. This switch activates anytime the boom is extended beyond 3 feet. If axles are not extended, boom extend is disabled and the extend axle LED and icon will flash as long as boom extend is operated. If axles are extended at this point, the motors are shifted to low and drive speed is limited to 0.7 mph. The boom up/down speed and turntable rotate speed are limited to 60% of maximum.

LSB3RS: Safety Limit Switch, 3.5’ Extend. If axles are not extended, this switch is activated when the boom is extended beyond 3.5 feet, cutting power to boom extend and axle retract.

LSB3EO: Operational Limit Switch, 75’ Extend. This switch activates anytime the boom is extended to 75 feet or beyond. At this point drive speed is reduced to 0.4 mph, boom up/down is reduced to 29% of maximum and turntable rotate is reduced to 40% of maximum. If boom angle is less than 53^{O}, then boom extend is disabled and the raise boom LED and icon and alarm will flash as long as boom extend is operated.

LSB4ES: Safety Limit Switch, 75.5’ Extend. This switch cuts power to boom extend, boom down and engine fuel solenoid when it is mechanically activated at 75.5 feet, if boom angle is less than 50^{O}.

LSB4EO: Operational Limit Switch, 100’ Extend. This switch activates anytime the boom is extended to 100 feet or beyond. The boom up/down is reduced to 20% of maximum. If boom angle is less than 68^{O}, then boom extend is disabled and the raise boom LED and icon and alarm will flash as long as boom extend is operated. If boom angle is greater than 65^{O}, the BO lockout valve will activate allowing hydraulic flow to the external cylinder to continue to extend to 120 feet.

LIMIT SWITCHES

LSB2RS: Safety Limit Switch, 101’ Extend. This switch cuts power to boom extend, boom down and engine fuel solenoid when it is mechanically activated at 101 feet, if boom angle is less than 65^{O}.

LSB2RO: Operational Limit Switch, 100’ Retract. This switch is activated anytime boom length is 100’ or less. Anytime the boom is being retracted while this switch is activated, the BN lockout valve is activated allowing hydraulic flow out of the inner cylinder.

LST1O: Operational Limit Switch, Drive Enable. This switch is activated when the turntable is rotated in the standard drive zone.

Turntable Level Sensor: Measures the X axis and Y axis of the turntable. The alarm sounds at 4.5^{O}.

Platform Level Sensor: Measures the angle of the platform. The range of measurement is +/- 20^{O}. The safety cutout is set at +/- 10^{O} from gravity and will disable the primary and secondary boom up/down functions and the platform level up/down functions.

Hydraulic Pumps

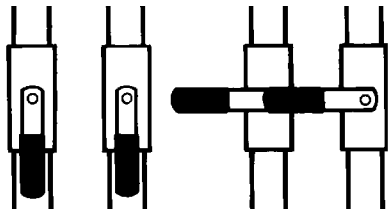
9-1 Function Pumps

There are three hydraulic pumps connected to the engine. There is one variable displacement pump that is used for drive functions and two fixed displacement pumps attached to the drive pump that are used for all other machine functions.

How to Remove the Function Pumps

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

1 Close the two hydraulic tank valves located at the hydraulic tank.



open closed

NOTICE Component damage hazard. The engine must not be started with the hydraulic tank shutoff valves in the CLOSED position or component damage will occur.
If the tank valves are closed, remove the key from the key switch and tag the machine to inform personnel of the condition.

2 Tag, disconnect and plug the hydraulic hoses from the function pumps. Cap the fittings on the pumps.

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

3 Support the function pumps with an overhead crane or other suitable lifing device.

4 Remove the pump mounting bolts. Carefully remove the pumps.

⚠WARNING Crushing hazard. The function pumps may become unbalanced and fall when the mounting bolts are removed if they are not properly supported.

NOTICE Component damage hazard. Be sure to open the two hydraulic tank valves and prime the pumps after installing the pumps. Refer to Repair Procedure, *How to Prime the Pumps.*

HYDRAULIC PUMPS

9-2 Drive Pump

The drive pump is a bi-directional variable displacement piston pump. The pump output is controlled by the electronic displacement controller (EDC), located on the pump. The only adjustment that can be made to the pump is the neutral or null adjustment. Any internal service to the pump should only be performed at an authorized Sundstrand-Sauer service center. Contact the Genie Product Support to locate your local authorized service center.

How to Remove the Drive Pump

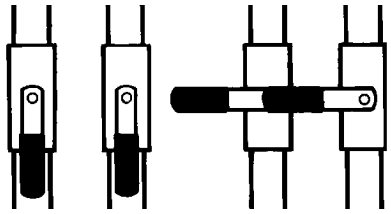
NOTICE Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system and cause severe component damage. Dealer service is recommended.

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

1 Remove the function pumps. Refer to Repair Procedure, *How to Remove the Function Pumps.*

2 Disconnect the electrical connection at the electronic displacement controller (EDC) located on the drive pump.

3 Close the two hydraulic tank valves located at the hydraulic tank.



NOTICE Component damage hazard. The engine must not be started with the hydraulic tank shutoff valves in the CLOSED position or component damage will occur. If the tank valves are closed, remove the key from the key switch and tag the machine to inform personnel of the condition.

4 Tag, disconnect and plug the hydraulic hoses from the drive pump. Cap the fittings on 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.

5 Support the drive pump with a suitable lifting device and remove the two drive pump mounting fasteners.

6 Carefully pull the drive pump out until the pump coupler separates from the flex plate.

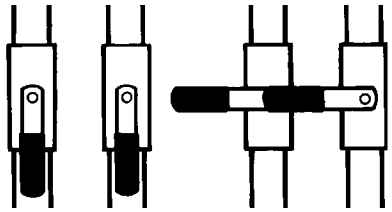
7 Remove the drive pump from the machine.

NOTICE Component damage hazard. Be sure to open the two hydraulic tank valves and prime the pump after installing the pump.

Note: Before installing the pump, verify proper pump coupler spacing. Refer to the appropriate flex plate installation instructions for your engine.

How to Prime the Pumps

NOTICE Component damage hazard. Be sure that the hydraulic tank shutoff valves are in the OPEN position before priming the pump. The engine must not be started with the hydraulic tank shutoff valves in the CLOSED position or component damage will occur.

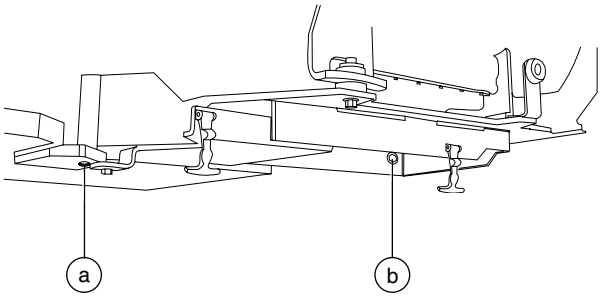


open closed

1 Connect a 0 to 600 psi (0 to 41 bar) pressure gauge to one of the test ports located under the drive pump.

Cummins models:

2 Remove the engine pivot plate retaining fastener. Swing the engine pivot plate out away from the machine to access the fuel injection pump.



a engine pivot plate anchor hole
b engine pivot plate retaining fastener

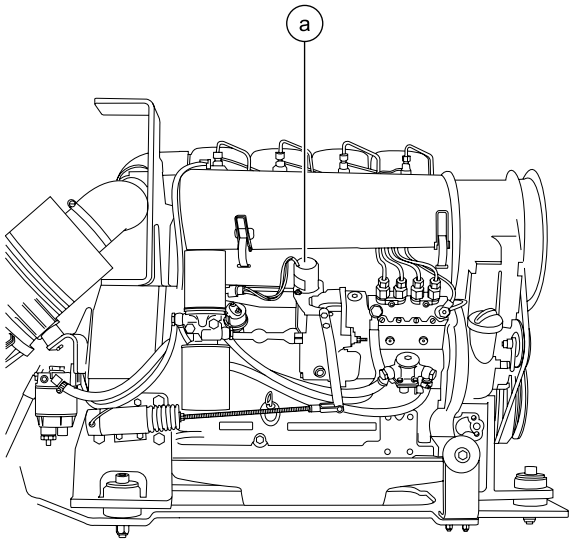
3 Locate the engine pivot plate anchor hole at the pivot end of the engine pivot plate.

4 Install the bolt that was just removed into the anchor hole to secure the engine pivot plate from moving.

⚠WARNING Crushing hazard. Failure to install the bolt into the engine pivot plate anchor hole to secure it from moving could result in death or serious injury.

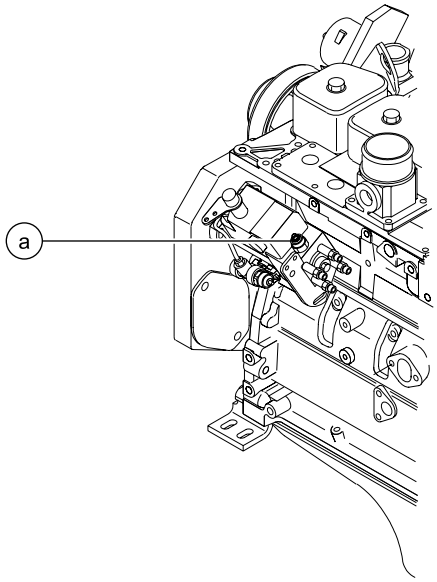
HYDRAULIC PUMPS

5 **Deutz models:** Disconnect the engine wiring harness from the fuel shutoff solenoid at the injector pump.



Deutz models
a fuel shutoff solenoid

Cummins and Perkins models: Disconnect the wire from the fuel shutoff solenoid at the injector pump.



Cummins models
a fuel shutoff solenoi

6 Have another person crank the engine with the starter motor for 15 seconds, wait 15 seconds, then crank the engine an additional 15 seconds or until the pressure reaches 250 psi / 17.2 bar.

⚠WARNING Bodily injury hazard. Keep hands, loose clothing and hair clear of all moving engine parts while the engine is cranking.

7 **Deutz models:** Connect the engine wiring harness to the fuel shutoff solenoid at the injector pump.

Cummins and Perkins models: Connect the wire to the fuel shutoff solenoid at the injector pump.

8 Start the engine and check for hydraulic leaks.

9-3 Auxiliary Pump

How to Test the Auxiliary Pump

The auxiliary pump is a 2-section, gear-type pump. Pump number 1 is the pump section closest to the pump motor and pump number 2 is the pump section that is farther from the pump motor. Each section of the pump has its own relief valve located within the pump body.

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

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

⚠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 345 bar pressure gauge to the high pressure port on pump number 1.

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

4 Activate any function using auxiliary power.

⊙ Result: If the pressure gauge reads 2500 psi / 172 bar, immediately stop. The pump is good.

⊠ Result: If pressure fails to reach 2500 psi / 172 bar, the internal relief valve setting is incorrect or the pump is bad and will need to be serviced or replaced.

5 Turn the key switch to the OFF position.

6 Remove the pressure gauge and reconnect the hydraulic hose.

7 Disconnect the hydraulic hose from the high pressure port from pump number 2.

8 Connect a 0 to 5000 psi / 0 to 345 bar pressure gauge to the high pressure port on pump number 2.

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

10 Activate any function using auxiliary power.

⊙ Result: If the pressure gauge reads 3000 psi / 207 bar, immediately stop. The pump is good.

⊠ Result: If pressure fails to reach 3000 psi / 207 bar, the internal relief valve setting is incorrect or the pump is bad and will need to be serviced or replaced.

11 Remove the pressure gauge and reconnect the hydraulic hose.

How to Remove the Auxiliary Pump

1 Open the ground controls side turntable cover.

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

3 Remove the pump mounting fasteners and remove the pump from the pump motor.

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Manifolds

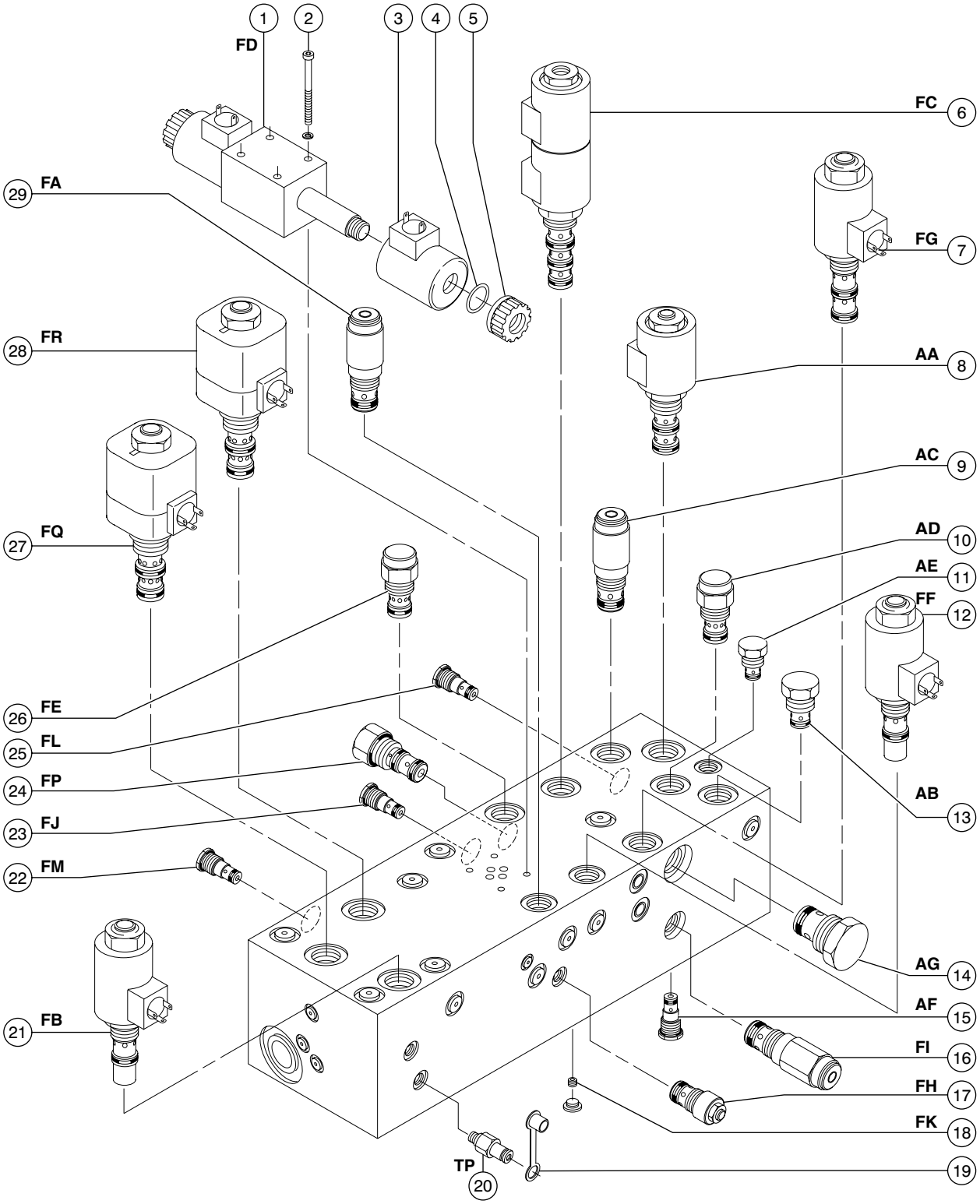
10-1
Function Manifold Components, S-100HD Models

The function manifold is mounted to the turntable next to the ground controls.

Index No.	Description	Schematic Item	Function	Torque
1	Solenoid Valve Assembly, 3 position 4 way, DO3, 12V DC	FD	Boom up/down	30-35 in-lbs / 3-4 Nm
6	Solenoid Valve, 3 position 4 way	FC	Turntable rotate control, left/right	25-27 ft-lbs / 34-37 Nm
7	Proportional Solenoid Valve	FG	Turntable rotate, proportional speed control	18-20 ft-lbs / 25-27 Nm
8	Solenoid Valve, 2 position 3 way	AA	Auxiliary drive/steer selector	25-27 ft-lbs / 34-37 Nm
9	Relief Valve, 3000 psi / 206.8 bar	AC	Platform manifold pressure limit	18-20 ft-lbs / 24-27 Nm
10	Flow Regulator Valve, 3 gpm / 11.36 L/min	AD	Priority flow to platform	25-27 ft-lbs / 34-37 Nm
11	Check Valve, 5 psi / 0.34 bar	AE	Blocks flow from pump 2 to auxiliary pump	12-14 ft-lbs / 16.3-19 Nm
12	Proportional Solenoid Valve, N.C.	FF	Primary lift, proportional valve speed control	33-37 ft-lbs / 45-50 Nm
13	Check Valve, 10 psi / 0.69 bar	AB	Blocks flow from pump 1 and 2 to auxiliary pump	18-20 ft-lbs / 24.5-27.2 Nm
14	Check Valve	AG	Blocks flow from auxiliary pump, port 2A to pump 1	33-37 ft-lbs / 45-50 Nm
15	Check Valve, 5 psi / 0.34 bar	AF	Blocks flow from auxiliary pump, ports 2A and 3A to pump 2	25-27 ft-lbs / 34-37 Nm

This list continues on the next page.

MANIFOLDS

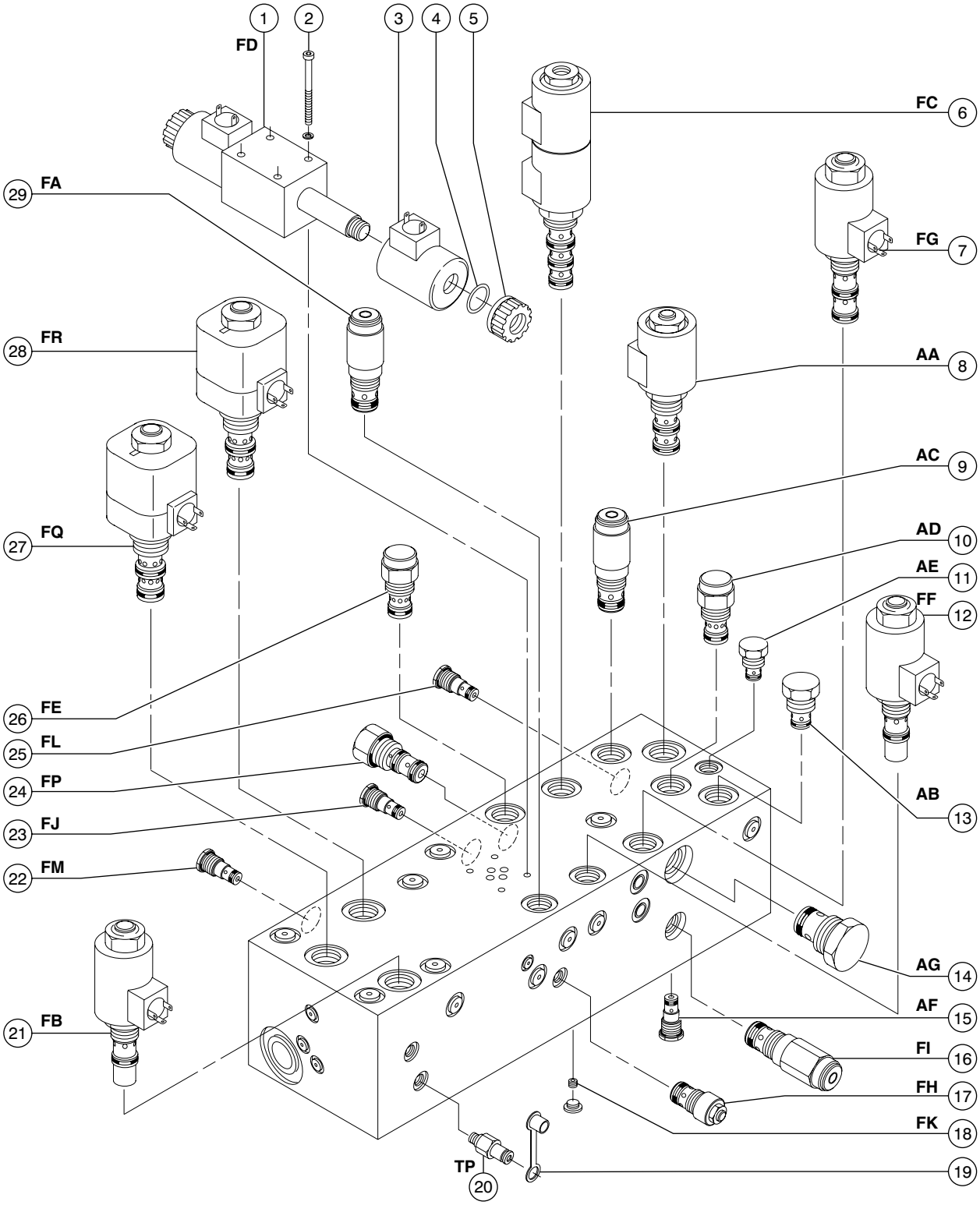

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Function Manifold Components, S-100HD Models, continued

The function manifold is mounted to the turntable next to the ground controls.

Index No.	Description	Schematic Item	Function	Torque
16	Relief Valve, 2600 psi / 179.3 bar	FI	Turntable, primary lift and boom retract pressure limit	25-27 ft-lbs / 34-37 Nm
17	Counterbalance Valve, 3200 psi / 220.6 bar	FH	Primary lift, load holding	30-35 ft-lbs / 38-41 Nm
18	Orifice Plug, 0.040 inch / 1.016 mm	FK	Differential sensing damping	
20	Diagnostic Nipple	TP	Testing	
21	Proportional Valve	FB	Boom extend/retract solenoid valve proportional speed control	33-37 ft-lbs / 45-50 Nm
22	Check Valve, 5 psi / 0.34 bar	FM	Extension cylinder load sense check	12-14 ft-lbs / 16.3-19 Nm
23	Check Valve, 5 psi / 0.34 bar	FJ	Primary lift load sense check	12-14 ft-lbs / 16.3-19 Nm
24	Differential Sensing Valve, 110 psi / 7.58 bar	FP	Directs flow to functions	25-27 ft-lbs / 34-37 Nm
25	Check Valve, 5 psi / 0.34 bar	FL	Extension cylinder load sense check	12-14 ft-lbs / 16.3-19 Nm
26	Flow Regulator Valve, 0.1 gpm / 0.38 L/min	FE	Bleeds off differential sensing valve to tank	18-20 ft-lbs / 24.5-27.2 Nm
27	Solenoid Valve, 2 position 3 way	FQ	Boom retract control	52-60 ft-lbs / 71-82 Nm
28	Solenoid Valve, 2 position 3 way	FR	Boom extend control	52-60 ft-lbs / 71-82 Nm
29	Relief Valve, 1800 psi / 124.1 bar	FA	Boom extend pressure limit	18-20 ft-lbs / 24.5-27.2 Nm

MANIFOLDS


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10-2
Valve Adjustments - Function Manifold, S-100HD Models

How to Adjust the Function Manifold Relief Valve

Note: 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 function manifold.

2 Start the engine from the ground controls.

3 Simultaneously push and hold the function enable/high speed button and the boom retract button with the boom fully retracted. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Oil Specifications.*

4 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item FI).

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

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

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

How to Adjust the Boom Extend Relief Valve

Note: Perform this procedure with the boom in the stowed position.

1 Connect a 0 to 3000 psi / 0 to 207 bar pressure gauge to the test port on the function manifold.

2 Start the engine from the ground controls.

3 Fully raise and extend the boom.

4 Simultaneously push and hold the function enable/high speed button and the boom extend button with the boom fully extended. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Specifications.*

5 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item FA).

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

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

7 Repeat steps 2 through 6 to confirm the relief valve pressure.

MANIFOLDS

10-3 Proportional Valves - Function Manifold

Note: When a proportional valve cartridge or coil is replaced or moved to a different valve cartridge or cavity, the proportional valve cartridge or coil will need to be calibrated. Refer to Repair Procedure, *How to Calibrate a Joystick*.

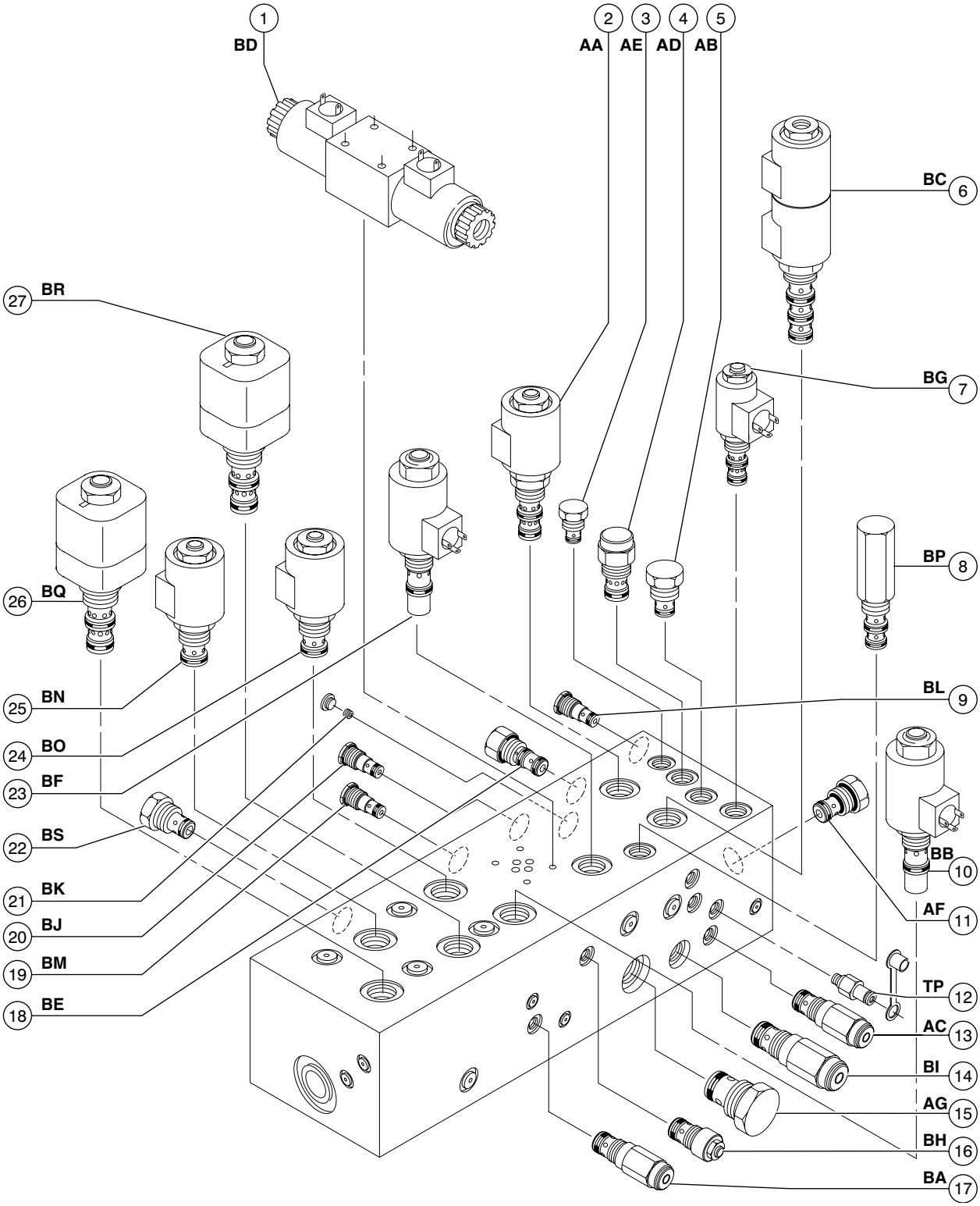
10-4
Function Manifold Components, S-120HD Models

The function manifold is mounted to the turntable next to the ground controls.

Index No.	Description	Schematic Item	Function	Torque
1	Solenoid Valve Assembly, 3 position 4 way, DO3, 12V DC	BD	Boom up/down	30-35 in-lbs / 3-4 Nm
2	Solenoid Valve, 2 position 3 way	AA	Auxiliary drive/steer selector	25-27 ft-lbs / 34-37 Nm
3	Check Valve, 5 psi / 0.34 bar	AE	Blocks flow from pump 2 to auxiliary pump	12-14 ft-lbs / 16.3-19 Nm
4	Flow Regulator Valve, 3 gpm / 11.36 L/min	AD	Priority flow to platform	23-25 ft-lbs / 31.2-33.9 Nm
5	Check Valve, 10 psi / 0.69 bar	AB	Blocks flow from pump 1 and 2 to auxiliary pump	18-20 ft-lbs / 25-27 Nm
6	Solenoid Valve, 3 position 4 way	BC	Turntable rotate control, left/right	25-27 ft-lbs / 34-37 Nm
7	Proportional Solenoid Valve	BG	Turntable rotate, proportional speed control	18-20 ft-lbs / 25-27 Nm
8	Differential Sensing Valve, 230 psi / 15.9 bar	BP	Directs flow to functions	33-37 ft-lbs / 45-50 Nm
9	Check Valve	BL	Turntable rotate load sense check	12-14 ft-lbs / 16.3-19 Nm
10	Proportional Solenoid Valve	BB	Boom extend/retract proportional speed control	33-37 ft-lbs / 45-50 Nm
11	Check Valve, 5 psi / 0.34 bar	AF	Blocks flow from auxiliary pump, ports 2A and 3A to pump 2	25-27 ft-lbs / 34-37 Nm
12	Diagnostic Nipple	TP	Testing	
13	Relief Valve, 3000 psi / 206.8 bar	AC	Platform manifold pressure limit	18-20 ft-lbs / 25-27 Nm

This list continues on the next page.

MANIFOLDS

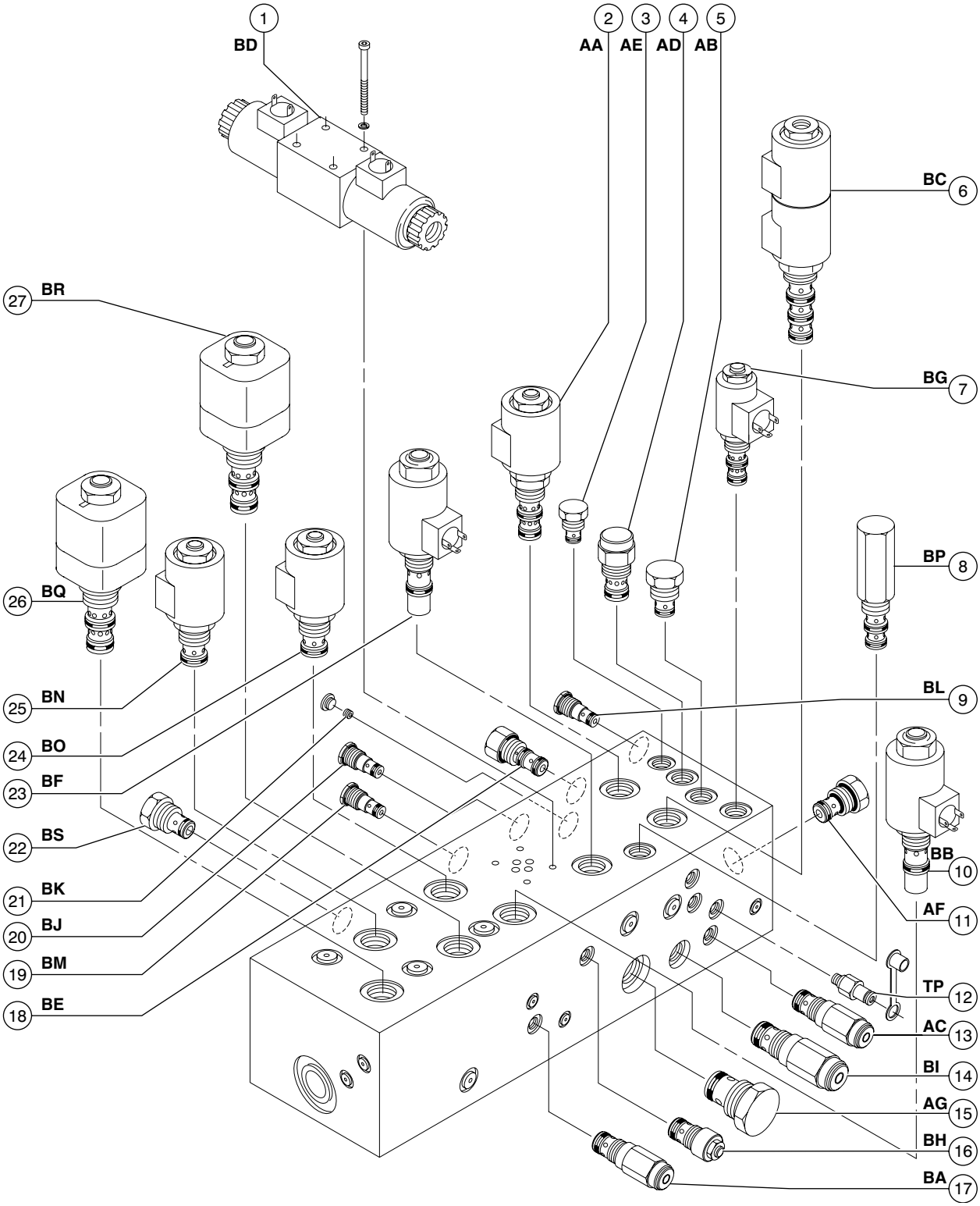

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Function Manifold Components, S-120HD Models, continued

The function manifold is mounted to the turntable next to the ground controls.

Index No.	Description	Schematic Item	Function	Torque
14	Relief Valve, 2600 psi / 179.3 bar	BI	Turntable, primary lift and boom retract pressure limit	12-14 ft-lbs / 16.3-19 Nm
15	Check Valve	AG	Blocks flow from auxiliary pump, port 2A to pump 1	33-37 ft-lbs / 45-50 Nm
16	Counterbalance Valve, 3200 psi / 220.6 bar	BH	Primary lift, load holding	30-35 ft-lbs / 41-47 Nm
17	Relief Valve, 1800 psi / 124.1 bar	BA	Boom extend pressure limit	18-20 ft-lbs / 25-27 Nm
18	Flow Regulator Valve, 0.1 gpm / 0.38 L/min	BE	Leads off differential sensing valve to tank	18-20 ft-lbs / 25-27 Nm
19	Check Valve, 5 psi / 0.34 bar	BM	Extension cylinder load sense check	12-14 ft-lbs / 16.3-19 Nm
20	Check Valve, 5 psi / 0.34 bar	BJ	Primary lift load sense check	12-14 ft-lbs / 16.3-19 Nm
21	Orifice Plug, 0.040 inch / 1.016 mm	BK	Differential sensing damping	
22	Check Valve, 30 psi / 2.06 bar	BS	Back pressure check, boom extend	33-37 ft-lbs / 45-50 Nm
23	Proportional Solenoid Valve	BF	Primary lift, proportional speed control	33-37 ft-lbs / 45-50 Nm
24	Solenoid Valve, 2 position 2 way, N.C.	BO	Boom extend sequence control	33-37 ft-lbs / 45-50 Nm
25	Solenoid Valve, 2 position 2 way, N.C.	BN	Boom retract sequence control	33-37 ft-lbs / 45-50 Nm
26	Solenoid Valve, 2 position 3 way	BQ	Boom retract control	52-60 ft-lbs / 71-82 Nm
27	Solenoid Valve, 2 position 3 way	BR	Boom extend control	52-60 ft-lbs / 71-82 Nm

MANIFOLDS


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10-5
Valve Adjustments - Function Manifold, S-120HD Models

How to Adjust the Function Manifold Relief Valve

Note: 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 function manifold.

2 Start the engine from the ground controls.

3 Simultaneously push and hold the function enable/high speed button and the boom retract button with the boom fully retracted. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Specifications.*

4 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item BI).

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

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

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

How to Adjust the Boom Extend Relief Valve

Perform this procedure with the boom in the stowed position.

1 Connect a 0 to 3000 psi / 0 to 207 bar pressure gauge to the test port on the function manifold.

2 Start the engine from the ground controls.

3 Fully raise and extend the boom.

4 Simultaneously push and hold the function enable/high speed button and the boom extend button with the boom fully extended. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Specifications.*

5 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item BA).

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

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

7 Repeat steps 2 through 6 to confirm the relief valve pressure.

MANIFOLDS

10-6
Proportional Valves - Function Manifold

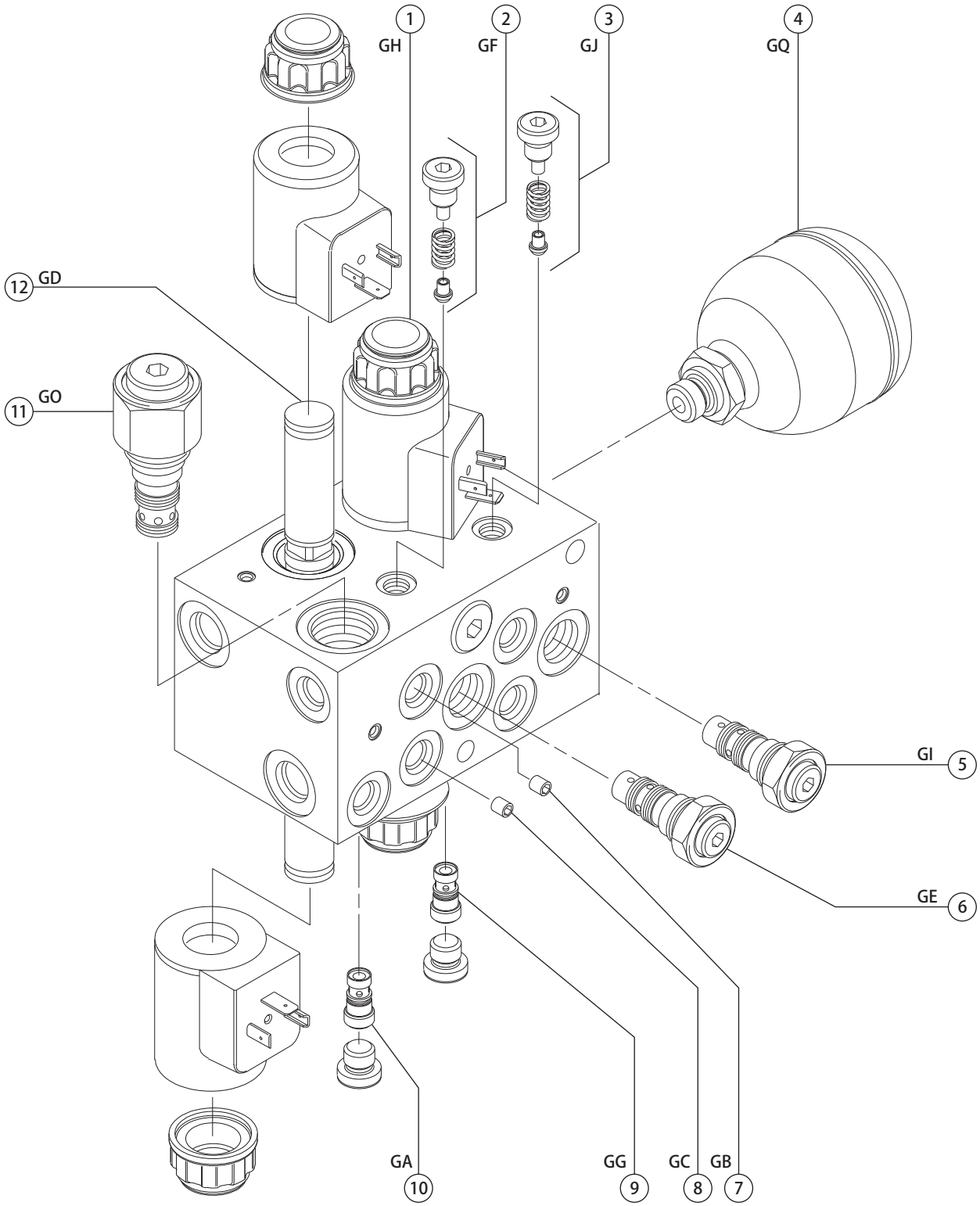
Note: When a proportional valve cartridge or coil is replaced or moved to a different valve cartridge or cavity, the proportional valve cartridge or coil will need to be calibrated. Refer to Repair Procedure, *How to Calibrate a Joystick Controller.*

10-07
Platform Manifold Components

The platform manifold is mounted to the platform mounting weldment.

Index No.	Description	Schematic Item	Function	Torque
1	Proportional solenoid valve, 3 position 4 way	GH	Platform level up/down	18-20 ft-lbs / 24-27 Nm
2	Check valve	GF	Platform rotate circuit	
3	Check valve	GJ	Platform level circuit	
4	Accumulator, 500 psi / 34.5 bar	GM	Hydraulic dampening	23 ft-lbs / 31 Nm
5	Differential sensing valve, N.O.	GI	Platform level differential sensing circuit	23-25 ft-lbs / 31-34 Nm
6	Differential sensing valve, N.O.	GE	Platform rotate differential sensing circuit	23-25 ft-lbs / 31-34 Nm
7	Orifice - plug, 0.030 inch / 0.762 mm	GB	Platform rotate left circuit	
8	Orifice - plug, 0.030 inch / 0.762 mm	GC	Platform rotate right circuit	
9	Shuttle valve	GG	Platform level load sense circuit	7.4-9 ft-lbs / 10-12 Nm
10	Shuttle valve	GA	Platform rotate load sense circuit	7.4-9 ft-lbs / 10-12 Nm
11	Differential sensing valve, N.C.	GC	Directs flow to functions	23-25 ft-lbs / 31-34 Nm
12	Proportional solenoid valve, 3 position 4 way	GD	Platform rotate left/right	18-20 ft-lbs / 24-27 Nm

MANIFOLDS

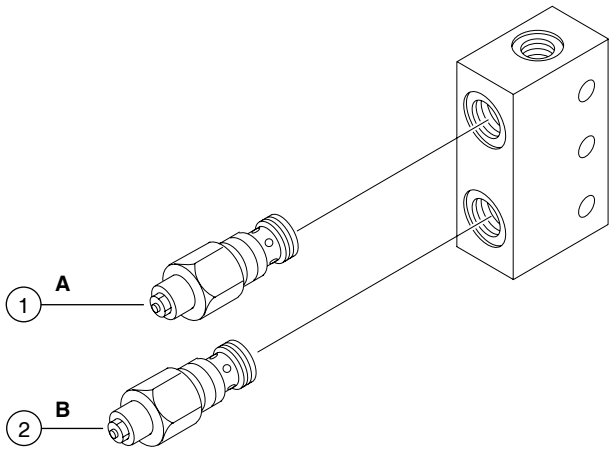


10-08
Proportional Valves - Platform Manifolds

Note: When a proportional valve cartridge or coil is replaced or moved to a different valve cartridge or cavity, the proportional valve cartridge or coil will need to be calibrated. Refer to Repair Procedure, *How to Calibrate a Joystick.*

10-09
Platform Rotate Counterbalance Valve Manifold Components

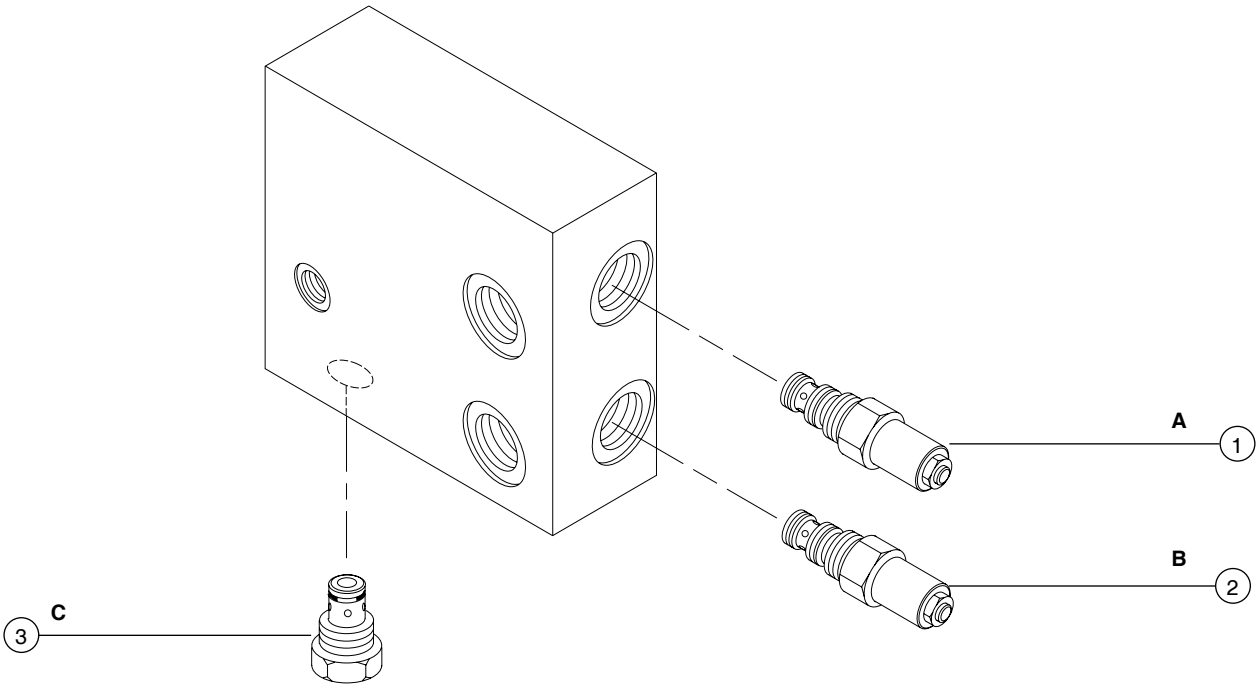
Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve	A	Platform rotate left	37-44 ft-lbs / 50-60 Nm
2	Counterbalance valve	B	Platform rotate right	37-44 ft-lbs / 50-60 Nm



10-10
Turntable Rotation Manifold Components

The turntable rotation manifold is mounted to the turntable rotation motor.

Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve	A	Turntable rotate left	37-44 ft-lbs / 50-60 Nm
2	Counterbalance valve	B	Turntable rotate right	37-44 ft-lbs / 50-60 Nm
3	Shuttle valve, 2 position 3 way	C	Turntable rotation brake release	10-12 ft-lbs / 14-16 Nm



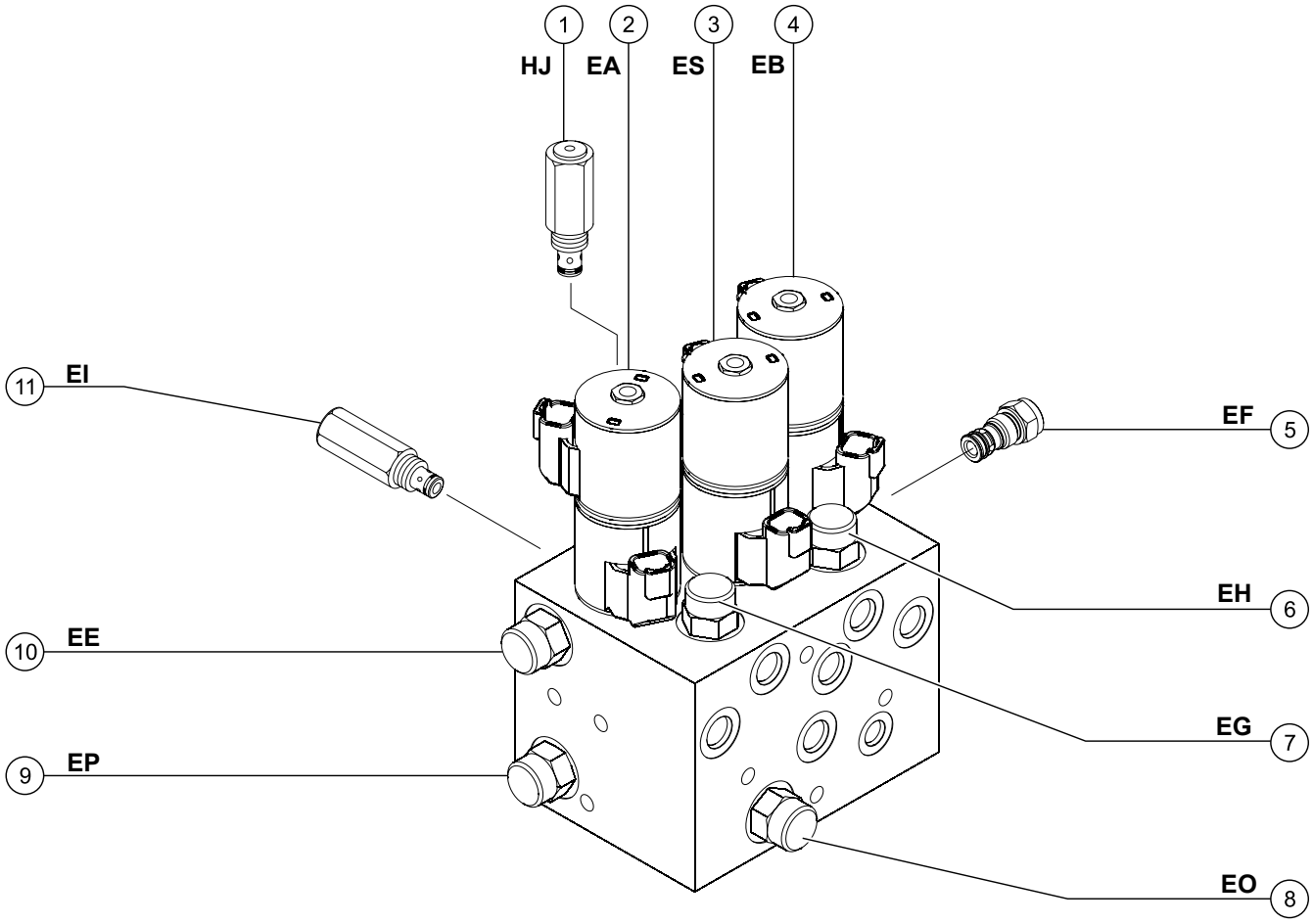
MANIFOLDS

10-11
Steer and Axle Extend/Retract Manifold Components

The steer and axle extend/retract manifold is mounted inside the drive chassis at the square end of the machine.

Index No.	Description	Schematic Item	Function	Torque
1	Relief Valve, 3000 psi / 207 bar	HJ	Steering pressure limit	19-21 ft-lbs / 25.8-28.6 Nm
2	Solenoid Valve, 3 position 5 way	EA	Right front steer cylinder	24-26 ft-lbs / 32.5-35.3 Nm
3	Solenoid Valve, 3 position 5 way	ES	Axle extend / retract	24-26 ft-lbs / 32.5-35.3 Nm
4	Solenoid Valve, 3 position 5 way	EB	Left front steer cylinder	24-26 ft-lbs / 32.5-35.3 Nm
5	Flow Regulator Valve, 2.0 gpm / 7.6 L/min	EF	Controls flow to left front steer cylinder	19-21 ft-lbs / 25.8-28.6 Nm
6	Flow Regulator Valve, 1.4 gpm / 5.3 L/min	EH	Controls flow to left front steer cylinder retract	19-21 ft-lbs / 25.8-28.6 Nm
7	Flow Regulator Valve, 1.4 gpm / 5.3 L/min	EG	Controls flow to right front steer cylinder retract	19-21 ft-lbs / 25.8-28.6 Nm
8	Flow Regulator Valve, 0.1 gpm / 0.38 L/min	EO	Bleeds off diff valve to tank	19-21 ft-lbs / 25.8-28.6 Nm
9	Differential Sensing Valve, 150 psi / 10.3 bar	EP	Differential sensing circuit, meters flow to functions	19-21 ft-lbs / 25.8-28.6 Nm
10	Flow Regulator Valve, 2.0 gpm / 7.6 L/min	EE	Controls flow to right front steer cylinder	19-21 ft-lbs / 25.8-28.6 Nm
11	Relief Valve, 1800 psi / 124 bar	EI	Axle extend	25-27 ft-lbs / 34-37 Nm

MANIFOLDS



MANIFOLDS

10-12
Valve Adjustments - Steer and Axle Extend/Retract Manifold

How to Adjust the Steer and Axle Retract Relief Valve

Note: Perform this procedure with the axles retracted and 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 steer and axle extend/retract manifold.

2 Start the engine from the platform controls.

3 Position the machine so that the left front wheel is against an immoveable object such as a curb.

4 Press down the foot switch and activate the steer function. Steer the wheel into the curb and hold. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Component Specifications.*

5 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item HJ).

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

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

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

How to Adjust the Axle Extend Relief Valve

Note: Perform this procedure with the axles retracted, the boom in the stowed position and the machine on a paved surface.

1 Connect a 0 to 5000 psi / 0 to 345 bar pressure gauge to the test port on the steer and axle extend/retract manifold.

2 Start the engine from the platform controls.

3 Press down the foot switch and push the axle extend button. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Specifications.*

4 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item EI).

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

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

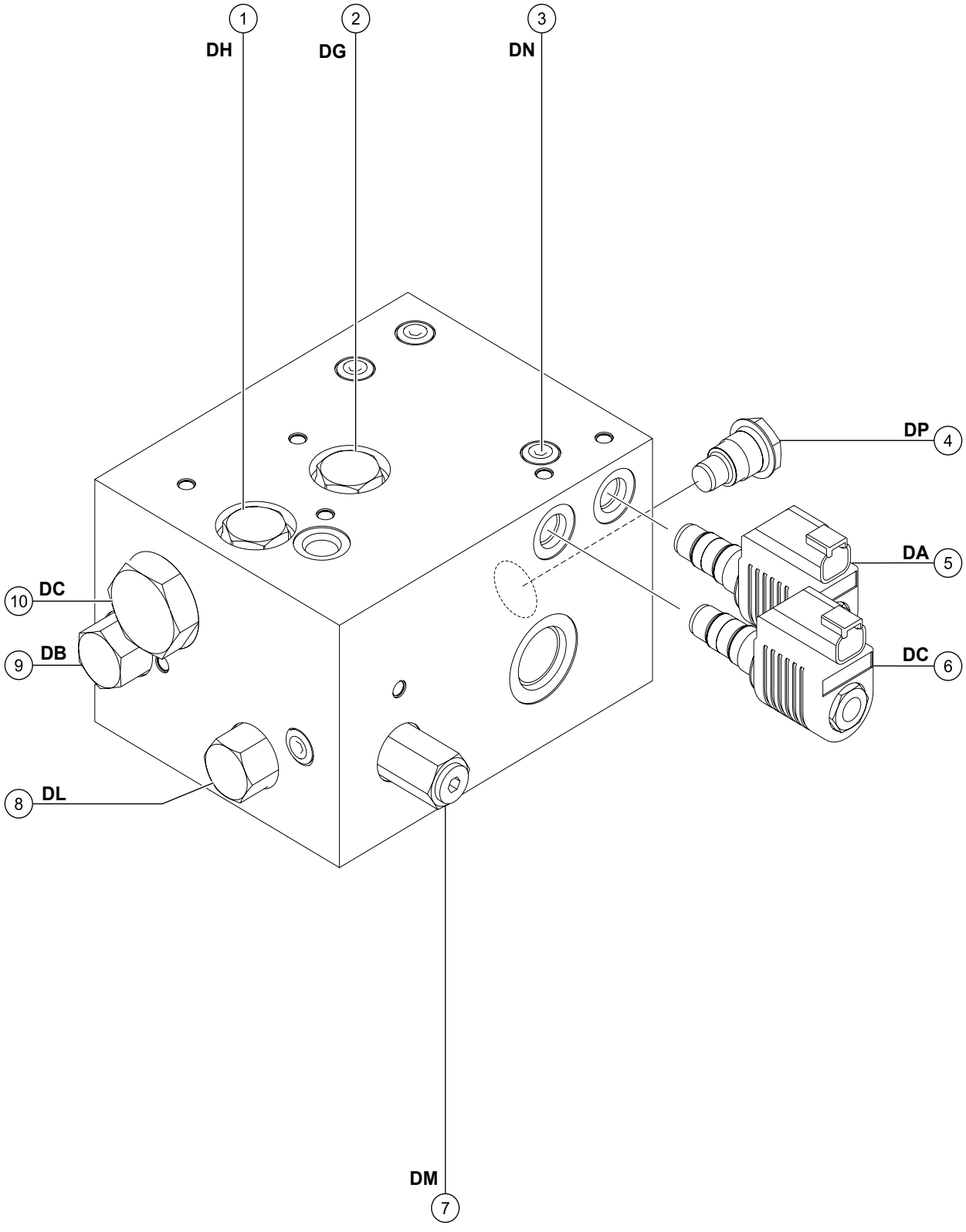
6 Repeat steps 2 through 5 to confirm relief valve pressure.

10-13
Traction Manifold, 2WD

The 2WD traction manifold is mounted inside the drive chassis at the circle-end of the machine.

Index No.	Description	Schematic Item	Function	Torque
1	Check valve, 5 psi / 0.34 bar	DH	Drive motor anti-cavitation	30-35 ft-lbs / 41-47 Nm
2	Check valve, 5 psi / 0.34 bar	DG	Drive motor anti-cavitation	30-35 ft-lbs / 41-47 Nm
3	Orifice, 0.031 in / 0.79 mm	DN	Brake and 2-speed circuit	
4	Check valve	DP	Keeps brakes released in case of temporary loss of charge pressure	20-25 ft-lbs / 27-34 Nm
5	Solenoid valve, 2 position 3 way	DA	Brake release	26-30 ft-lbs / 35-41 Nm
6	Solenoid valve, 2 position 3 way	DC	2-speed drive motor shift	26-30 ft-lbs / 35-41 Nm
7	Relief valve, 250 psi / 17.2 bar	DM	Charge pressure circuit	20-25 ft-lbs / 27-34 Nm
8	Shuttle valve, 3 position 3 way	DL	Charge pressure circuit that directs hot oil out of low pressure side of drive pump	30-35 ft-lbs / 41-47 Nm
9	Bi-directional flow control valve, 4.5 gpm / 17 L/min	DB	Equalizes pressure on both sides of divider/combiner valve EJ	30-35 ft-lbs / 41-47 Nm
10	Flow divider/combiner valve	DC	Controls flow to drive motors in forward and reverse	90-100 ft-lbs / 122-136 Nm

MANIFOLDS



MANIFOLDS

10-14
Traction Manifold, 4WD

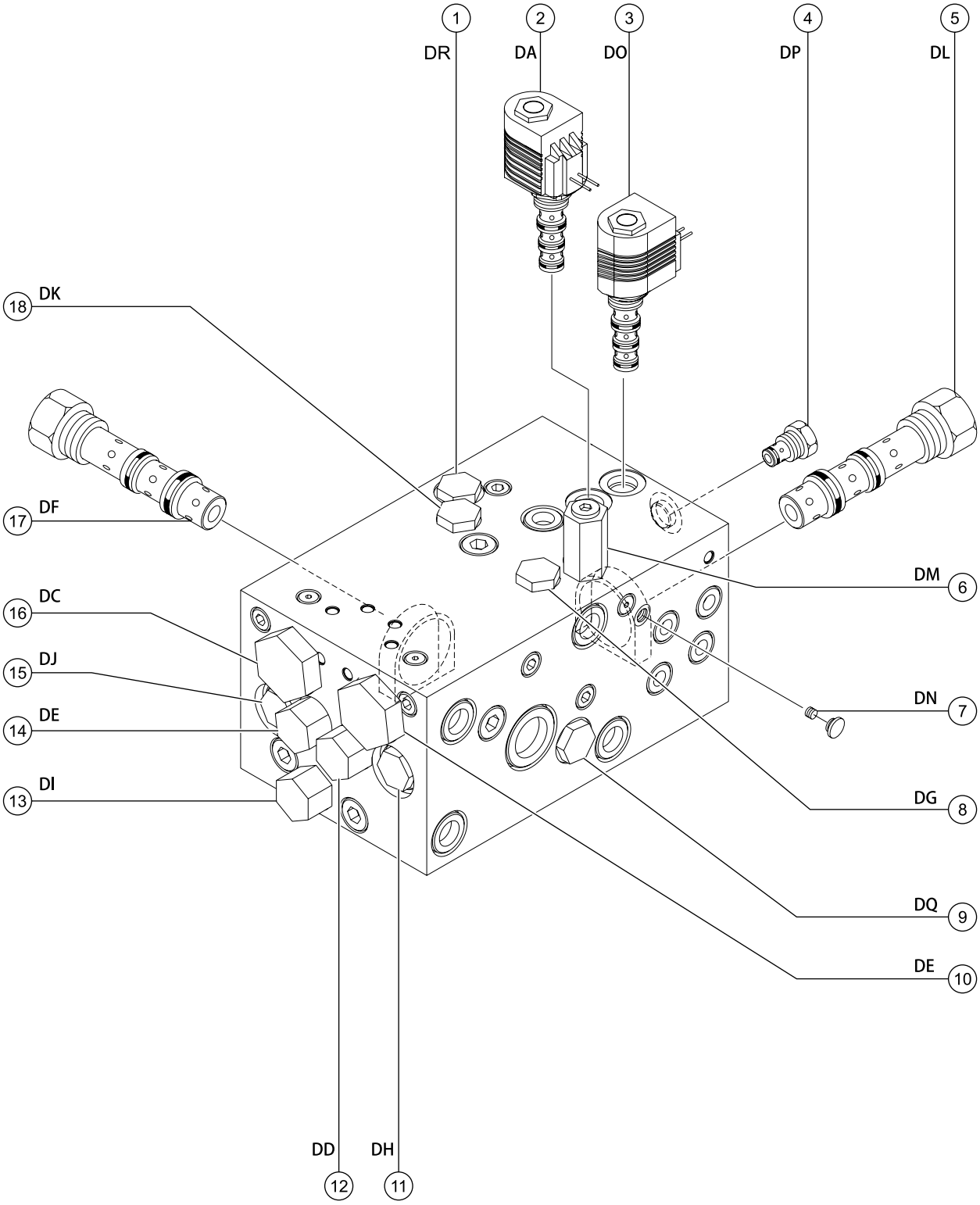
The drive manifold is mounted inside the drive chassis at the circle end of the machine.

The 4WD traction manifold is mounted inside the drive chassis at the circle-end of the machine.

Index No.	Description	Schematic Item	Function	Torque
1	Check Valve	DR	Anti-cavitation	30-35 ft-lbs / 40.7-47.5 Nm
2	Solenoid Valve, 2 position 3 way	DA	Two-speed drive motor shift	26-30 ft-lbs / 35.3-40.7 Nm
3	Solenoid Valve, 2 position 3 way	DO	Brake release	26-30 ft-lbs / 35.3-40.7 Nm
4	Check Valve	DP	Keeps brakes released if temporary loss of charge pressure	20-25 ft-lbs / 27.1-33.9 Nm
5	Shuttle Valve, 3 position 3 way	DL	Charge pressure circuit that directs hot oil out of low pressure side of drive pump	50-55 ft-lbs / 67.8-74.6 Nm
6	Relief Valve, 250 psi / 17.23 bar	DM	Charge pressure circuit	20-25 ft-lbs / 27.1-33.9 Nm
7	Orifice Plug, 0.030 inch / 0.762 mm	DN	Brake and two-speed circuit	20-25 ft-lbs / 27.1-33.9 Nm
8	Check Valve	DG	Anti-cavitation	20-25 ft-lbs / 27.1-33.9 Nm
9	Check Valve	DQ	Anti-cavitation	30-35 ft-lbs / 40.7-47.5 Nm
10	Flow Divider/Combiner Valve	DE	Controls flow to square end drive motors in forward and reverse	90-100 ft-lbs / 122-135.6 Nm
11	Check Valve	DH	Anti-cavitation	20-25 ft-lbs / 27.1-33.9 Nm
12	Bi-directional/Flow Control Valve, 2 gpm / 7.6 L/min	DD	Equalizes pressure on both sides of divider/combiner valve FJ	30-35 ft-lbs / 40.7-47.5 Nm

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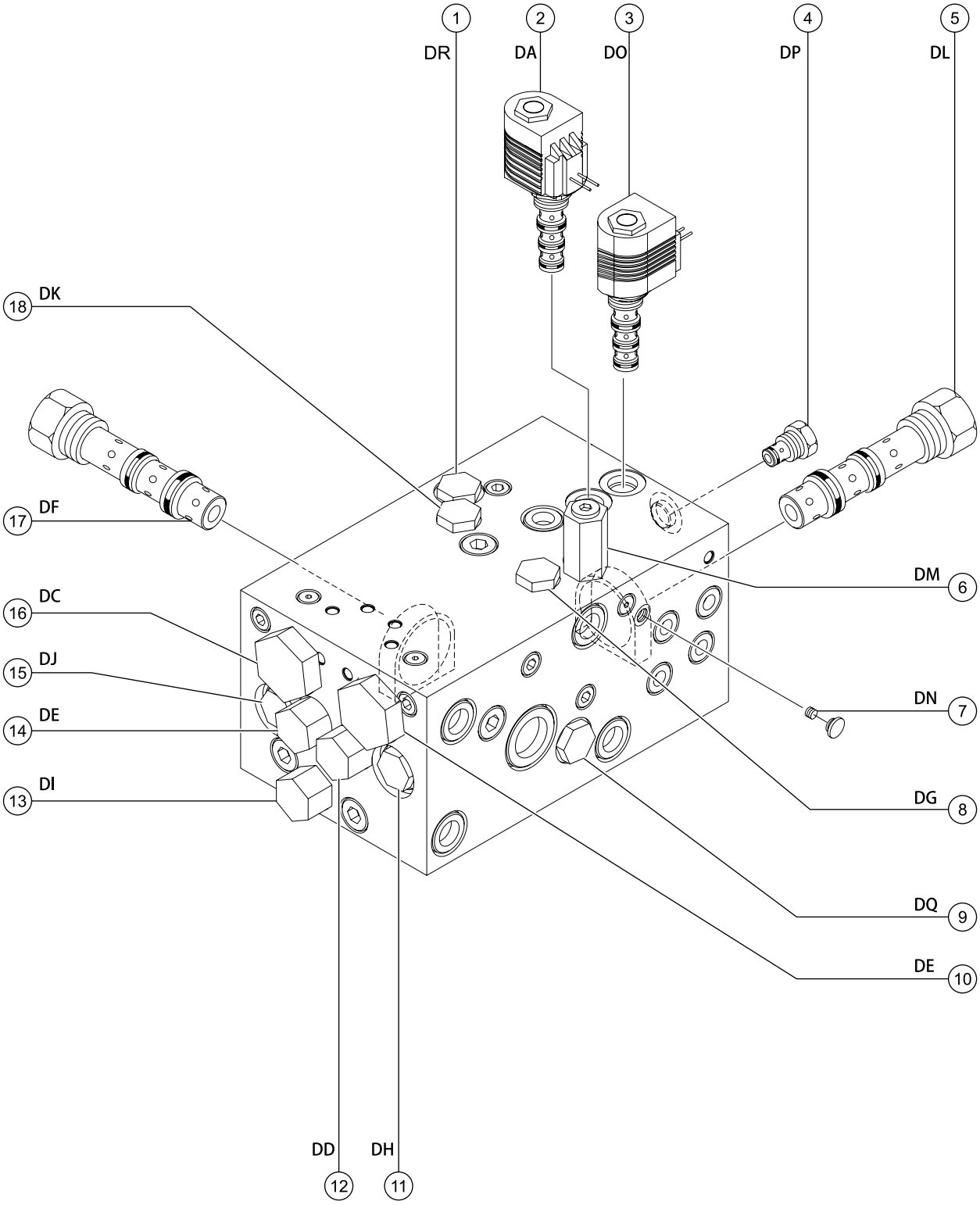
MANIFOLDS

Traction Manifold, 4WD, continued

The 4WD traction manifold is mounted inside the drive chassis at the circle-end of the machine.

Index No.	Description	Schematic Item	Function	Torque
13	Bi-directional/Flow Control Valve, 2 gpm / 7.6 L/min	DI	Equalizes pressure on both sides of divider/combiner valve FQ	30-35 ft-lbs / 40.7-47.5 Nm
14	Bi-directional/Flow Control Valve, 2 gpm / 7.6 L/min	DE	Equalizes pressure on both sides of divider/combiner valve FQ	30-35 ft-lbs / 40.7-47.5 Nm
15	Check Valve	DJ	Anti-cavitation	20-25 ft-lbs / 27.1-33.9 Nm
16	Flow Divider/Combiner Valve	DC	Controls flow to circle end drive motors in forward and reverse	90-100 ft-lbs / 122-135.6 Nm
17	Flow Divider/Combiner Valve	DF	Controls flow to divider/combiner valves FJ and FP	90-100 ft-lbs / 122-135.6 Nm
18	Check Valve	DK	Anti-cavitation	20-25 ft-lbs / 27.1-33.9 Nm

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MANIFOLDS

10-15 Valve Adjustments - Traction Manifold

How to Adjust the Charge Pressure Relief Valve

1 Connect a 0 to 600 psi / 0 to 41 bar pressure gauge to the test port located on the drive manifold.

2 Start the engine from the platform controls.

3 Drive the machine slowly in either direction and observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Specifications.*

4 Turn the engine off. Use a wrench to hold the charge pressure relief valve and remove the cap (item DM).

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

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

10-16 Valve Coils

How to Test a Coil

A properly functioning coil provides an electromagnetic force which operates the solenoid valve. Critical to normal operation is continuity within the coil. Zero resistance or infinite resistance indicates the coil has failed.

Since coil resistance is sensitive to temperature, resistance values outside specification can produce erratic operation. When coil resistance decreases below specification, amperage increases. As resistance rises above specification, voltage increases.

While valves may operate when coil resistance is outside specification, maintaining coils within specification will help ensure proper valve function over a wide range of operating temperatures.

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

Note: If the machine has been in operation, allow the coil to cool at least 3 hours before performing this test.

1 Tag and disconnect the wiring from the coil to be tested.

2 Test the coil resistance using a multimeter set to resistance (Ω). Refer to the Valve Coil Resistance Specification table.

☒ Result: If the resistance is not within the adjusted specification, plus or minus 10%, replace the coil.

Valve Coil Resistance Specification

Note: The following coil resistance specifications are at an ambient temperature of 68°F / 20°C. As valve coil resistance is sensitive to changes in air temperature, the coil resistance will typically increase or decrease by 4% for each 18°F / 20°C that your air temperature increases or decreases from 68°F / 20°C.

Description	Specification
Solenoid valve, 3 position 4 way, 12V DC (schematic item EA, EB, EC, ED)	8.8 Ω
Proportional solenoid valve, 12V DC (schematic item FG, BG, GD, GH)	5.4 Ω
Proportional solenoid valve, 12V DC (schematic item FB, FF, BB, BF)	5 Ω
Solenoid Valve, 2 position 3 way, 12V DC (schematic item FQ, FR, BQ, BR)	4.6 Ω
Solenoid Valve, 2 position 3 way, 12V DC (schematic item EE, EF)	7.2 Ω
Solenoid Valve, 2 position 2 way, 12V DC (schematic item BN, BO)	7.2 Ω
Solenoid valve, 3 position 4 way 12V (schematic items ES)	7.1 Ω
Solenoid valve, 2 position 3 way 12V (schematic items AA)	7.2 Ω
Solenoid valve, 2 position 3 way, 10V DC (schematic items FB, FC, FD)	5 Ω

How to Test a Coil Diode

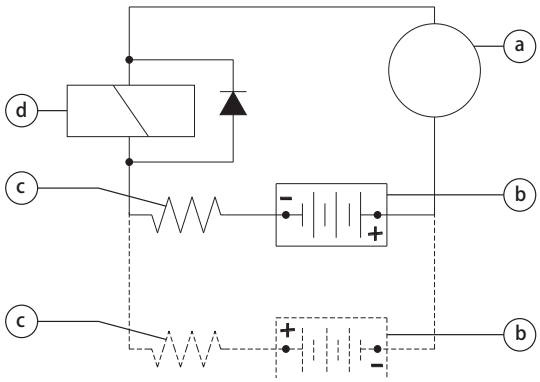
Genie incorporates spike suppressing diodes in all of its directional valve coils except proportional valves and those coils with a metal case. Properly functioning coil diodes protect the electrical circuit by suppressing voltage spikes. Voltage spikes naturally occur within a function circuit following the interruption of electrical current to a coil. Faulty diodes can fail to protect the electrical system, resulting in a tripped circuit breaker or component damage.

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

1 Test the coil for resistance. Refer to, *How to Test a Coil.*

2 Connect a 10Ω resistor to the negative terminal of a known good 9V DC battery. Connect the other end of the resistor to a terminal on the coil.

Note: The battery should read 9V DC or more when measured across the terminals.



a multimeter
b 9V DC battery
c 10Ω resistor
d coil

Note: Dotted lines in illustration indicate a reversed connection as specified in step 6

MANIFOLDS

3 Set a multimeter to read DC current.

Note: The multimeter, when set to read DC current, should be capable of reading up to 800 mA.

4 Connect the negative lead to the other terminal on the coil.

Note: If testing a single-terminal coil, connect the negative lead to the internal metallic ring at either end of the coil.

5 Momentarily connect the positive lead from the multimeter to the positive terminal on the 9V DC battery. Note and record the current reading.

6 At the battery or coil terminals, reverse the connections. Note and record the current reading.

⊙ Result: Both current readings are greater than 0 mA and are different by a minimum of 20%. The coil is good.

⊠ Result: If one or both of the current readings are 0 mA, or if the two current readings do not differ by a minimum of 20%, the coil and/or its internal diode are faulty and the coil should be replaced.

Fuel and Hydraulic Tanks

11-1
Fuel Tank

How to Remove the Fuel Tank

⚠DANGER Explosion and fire 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 and fire hazard. Never drain or store fuel in an open container due to the possibility of fire.

1 Remove the fixed engine side turntable cover. Refer to Repair Procedure, *How to Remove a Fixed Turntable Cover*.

2 Tag, disconnect and plug the fuel supply and return hoses. Cap the fittings on the fuel tank.

3 Remove the fuel filler cap from the tank.

4 Using an approved hand-operated pump, drain the fuel tank into a suitable container. Refer to specifications, *Machine Specifications.*

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

Note: Be sure to only use a hand operated pump suitable for use with diesel fuel.

5 Support and secure the fuel tank to an appropriate lifting device.

5 Remove the fuel tank retaining fasteners.

7 Remove the fuel tank from the machine.

⚠WARNING Crushing hazard. The fuel tank may become unbalanced and fall if it is not properly supported and secured to the lifting device.

Note: Clean the fuel tank and inspect for cracks and other damage before installing.

FUEL AND HYDRAULIC TANKS

11-2 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 lines and has an external return line filter with a filter condition indicator.

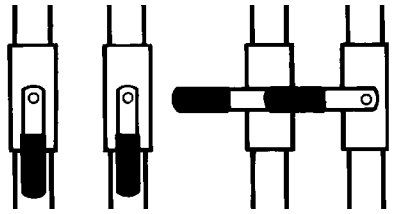
How to Remove the Hydraulic Tank

NOTICE 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.

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

1 Remove the ground controls side turntable cover. Refer to Repair Procedure, *How to Remove a Hinged Turntable Cover.*

2 Close the two hydraulic shutoff valves located at the hydraulic tank.



NOTICE Component damage hazard. Be sure that the hydraulic tank shutoff valves are in the OPEN position before priming the pump. The engine must not be started with the hydraulic tank shutoff valves in the CLOSED position or component damage will occur. If the hydraulic tank shutoff valves are closed, remove the key from the key switch and tag the machine to inform personnel of the condition.

3 Remove the drain plug from the hydraulic tank and allow all of the oil from the tank to drain into a suitable container. Refer to specifications, *Machine Specifications.*

4 Remove the ground controls support bracket retaining fasteners. Remove the ground controls assembly from the machine.

NOTICE Component damage hazard. Be sure to properly support the ground control box. Do not allow the ground controls to hang by the wiring.

NOTICE Component damage hazard. The ground control box wiring can be damaged if it is kinked or pinched.

5 Tag and disconnect the wiring from the horn.

6 Remove the horn retaining fasteners. Remove the horn from the machine.

7 Tag, disconnect and plug the two suction hoses that are attached to the hydraulic tank shutoff valves.

8 Tag, disconnect and plug the supply hose for the auxiliary power unit. Cap the fitting on the hydraulic tank.

9 Disconnect and plug the T-fitting located at the return filter with the 2 hoses connected to it. Cap the fitting on the return filter housing.

10 Remove the hydraulic tank retaining fasteners.

11 Support the hydraulic tank with 2 lifting straps. Place one lifting strap at each end of the tank and attach the lifting straps to an overhead crane.

12 Remove the hydraulic tank from the machine.

⚠WARNING Crushing hazard. The hydraulic tank could become unbalanced and fall if it is not properly supported and secured to the overhead crane.

NOTICE Component damage hazard. Be sure to open the two hydraulic tank valves and prime the pump after installing the hydraulic tank. Refer to Repair Procedure, *How to Prime the Pumps.*

Note: Always use pipe thread sealant when installing the drain plug and strainers.

Note: Refer to Specifications, *Machine Specifications*.

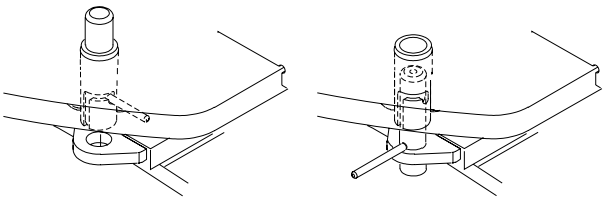
Turntable Rotation Components

12-1
Turntable Rotation Hydraulic Motor and Drive Hub

How to Remove the Turntable Rotation Hydraulic Motor

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

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

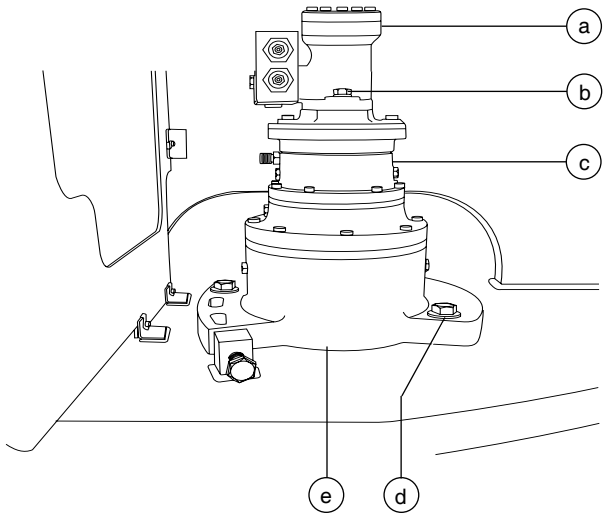


2 Remove the ground controls side fixed turntable cover. Refer to Repair Procedure, *How to Remove a Fixed Turntable Cover.*

3 Tag, disconnect and plug the hydraulic hoses from the manifold that is mounted to the motor.

⚠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.

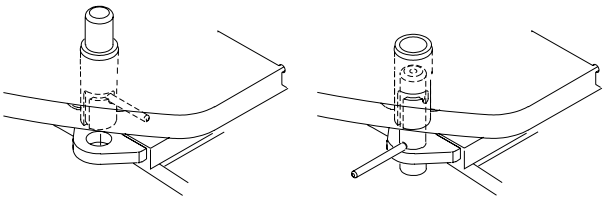
4 Remove the motor/brake mounting fasteners. Remove the motor from the brake.



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

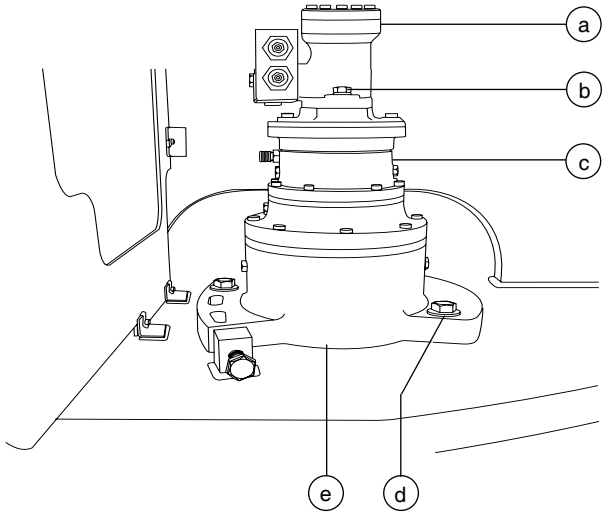
How to Remove the Turntable Rotation Drive Hub

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



2 Remove the turntable rotation motor. Refer to Repair Procedures, *How to Remove the Turntable Rotation Hydraulic Motor.*

3 Remove the brake from the drive hub and set it off to the side.



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

4 Attach a lifting strap from an overhead crane or other suitable lifting device to the drive hub.

5 Remove the drive hub mounting bolts and remove the drive hub from the machine.

⚠DANGER Tip-over hazard. If the turntable rotation lock pin is not properly installed, machine stability is compromised and the machine could tip over when the drive hub is removed from the machine, which could result in death or serious injury.

⚠WARNING Crushing hazard. The drive hub may become unbalanced and fall if it is not properly supported by the overhead crane or lifting device.

6 Remove the plug from the side of the drive hub. Drain the oil from the hub.

Installing the Drive Hub:

7 Install the drive hub. Use blue thread locking seal on all bolts. Torque the drive hub mounting bolts to 280 ft-lbs / 380 Nm.

8 Install the brake onto the drive hub and torque the mounting fasteners to 20 ft-lbs / 27 Nm.

9 Install the motor onto the brake and torque the mounting fasteners to 93 ft-lbs / 126 Nm.

10 Fill the drive hub with oil from the side hole until the oil level is even with the bottom of the hole. Apply pipe thread sealant to the plugs and install the plugs. Refer to Specifications, *Manifold Plug Torque Specifications.*

11 Adjust turntable rotation gear backlash.

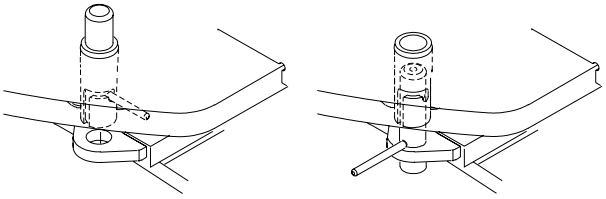
TURNTABLE ROTATION COMPONENTS

How to Adjust the Turntable Rotation Gear Backlash

The turntable rotation drive hub is adjustable to control the gap between the rotation motor gear and the turntable bearing.

Note: Be sure to check the backlash with the machine on a flat level surface.

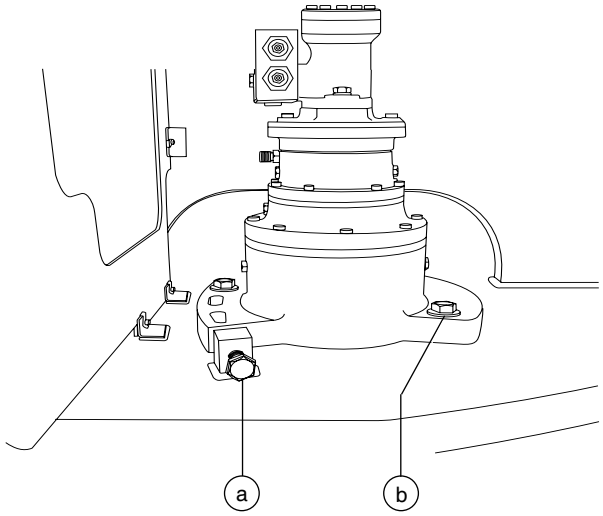
1 Secure the turntable from rotating with the turntable rotation lock pin.



2 Remove the ground controls side fixed turntable cover. Refer to Repair Procedure, *How to Remove a Fixed Turntable Cover.*

3 Loosen the turntable rotate drive hub mounting bolts. Do not remove them.

Note: It may be necessary to raise the boom slightly to access all the turntable rotate drive hub mounting bolts.



a adjustment bolt with lock nut
b pivot plate mounting bolts

4 Loosen the lock nut on the turntable drive hub adjustment bolt.

5 Tighten the turntable drive hub adjustment bolt until the turntable drive hub gear is fully engaged and tight into the turntable rotate gear.

6 Turn the adjustment bolt 3/4 turn counterclockwise. Tighten the lock nut on the adjustment bolt.

7 Rotate the drive hub away from the turntable rotate gear until it contacts the adjustment bolt. Torque the turntable rotate drive hub mounting bolts. Refer to Specifications, *Machine Specifications.*

8 Rotate the turntable through an entire rotation. Check for tight spots that could cause binding. Readjust if necessary.

Axle Components

13-1 Steer Sensors

The steer sensor measures steer angle and communicates that information to the ground controls ECM. The steer sensor on the ground controls side of the machine at the square end acts as the lead sensor. The other three sensors follow the position, or steer angle, of the lead sensor. There is a steer sensor mounted to the top of each upper yoke pivot pin.

Note: If the square-end steering function becomes inoperative, switch to circle-end steer mode and the ground controls side circle-end steer sensor will become the lead sensor.

Note: This procedure will require a minimum of two people.

Note: Perform this procedure with the axles extended.

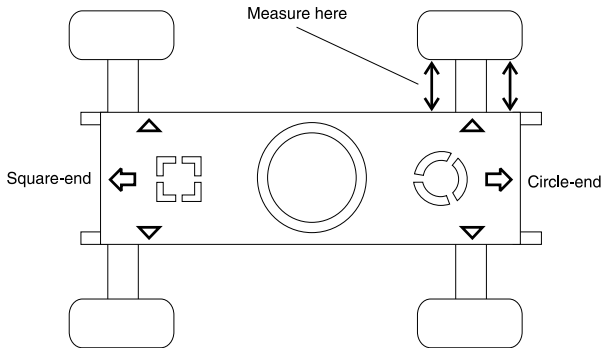
How to Measure the Tire Alignment

1 Start the engine from the platform controls.

2 Press down the foot switch and push the engine idle select button until the engine switches to high rpm.

Measure the steer end tires:

3 Measure the distance between the inside of one square-end tire and the chassis side plate on both sides of the axle.



Result: Both measurements should be the same to indicate that the tires are parallel with the chassis.

Note: If the measurements are different or if a tire is not parallel with the chassis, the steer sensor of that tire will need to be adjusted. Refer to Repair Procedures, *How to Adjust a Steer Sensor*.

4 Repeat step 3 for the other tire.

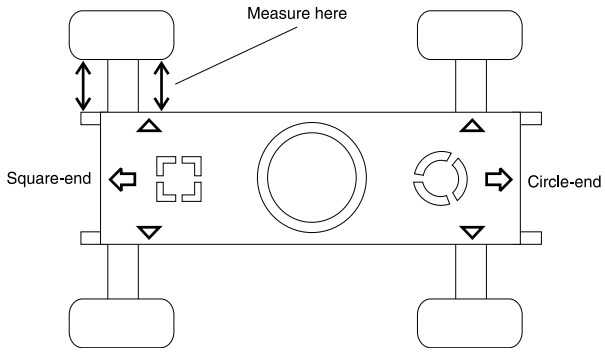
AXLE COMPONENTS

How to Adjust a Steer Sensor

1 Locate the steer sensor on top of the yoke pivot pin.

2 Loosen the steer sensor cover retaining fasteners. Do not remove them.

3 Rotate the steer sensor cover either clockwise or counterclockwise. Measure the distance between the inside of tire and the chassis side plate on both sides of the axle.



4 Repeat step 4 until the tire is parallel with the chassis.

5 Tighten the steer sensor cover fasteners.

6 Repeat steps 1 through 5 for the other steer sensor.

13-2
Yoke and Hub

How to Remove the Yoke and Hub

The yoke installation utilizes bushings and a thrust washer that may require periodic replacement. There is a steer sensor mounted to the upper yoke pivot pin.

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

1 Remove the hose hanger bracket retaining fasteners mounted to the top of the yoke. Remove the hose hanger bracket from the machine.

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

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

3 Mark the mounting position of the steer sensor cover on the yoke.

Note: It is very important that the steer sensor is installed in the exact position it was in prior to removal. If the steer sensor is not installed correctly, the steer function may operate improperly. If any steer functions operate improperly after removing and installing a steer sensor, refer to Repair Procedure, *How to Adjust a Steer Sensor.*

4 Remove the steer sensor cover retaining fasteners. Carefully remove the steer sensor cover and lay it out of the way.

NOTICE Component damage hazard. The steer sensor is a very sensitive instrument. It can be damaged internally if it is dropped or sustains any physical shock, even if the damage is not visible.

5 Lay the hoses and steer sensor cable out of the way.

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

6 Mark the mounting position of the steer sensor activator pin mounted to the top of the yoke pivot pin.

7 Remove the steer sensor activator pin retaining fasteners. Remove the steer sensor activator pin from the machine.

Note: It is very important that the steer sensor activator pin is installed in the exact position it was in prior to removal. If the steer sensor activator pin is not installed correctly, the steer function may operate improperly. If any steer functions operate improperly after removing and installing a steer sensor activator pin, refer to Repair Procedure, *How to Adjust a Steer Sensor.*

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

9 Center a lifting jack of ample capacity under the axle of the yoke and drive hub to be removed. Do not raise the machine.

10 Block the wheels at the opposite end of the machine.

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

12 Remove the lug nuts and remove the tire and wheel assembly.

13 Remove the drive motor mounting fasteners.

14 Slide the drive motor shaft out of the drive hub and remove the drive motor from the machine.

15 Remove the pin retaining fasteners from the steering cylinder rod-end pivot pins. Remove the pins.

AXLE COMPONENTS

16 Remove the pin retaining fasteners from the upper and lower yoke pivot pins.

17 Support the yoke/drive hub assembly with a lifting jack. Secure the yoke/drive hub assembly to the lifting jack.

18 Use a soft metal drift to remove both yoke pivot pins.

19 Remove the yoke/drive hub assembly from the machine.

⚠WARNING Crushing hazard. The yoke/hub assembly may become unbalanced and fall when the yoke pivot pins are removed if it is not properly supported and secured to the lifting jack.

20 Place the yoke/drive hub assembly on a flat surface with the drive hub facing down.

21 Remove the drive hub mounting fasteners that attach the yoke to the drive hub. Remove the yoke weldment from the drive hub.

Note: Replace the thrust washer with a new one when installing the yoke/drive hub assembly onto the axle. Refer to Specifications, *Machine Torque Specifications*.

13-3 Drive Motor

How to Remove a Drive Motor

NOTICE Component damage hazard. Repairs to the motor should only be performed by an authorized dealer.

NOTICE 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.

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

1 Tag, disconnect and plug the hydraulic hoses from the drive motor. Cap the fittings on the drive motor.

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

2 Remove the drive motor mounting fasteners.

3 Slide the drive motor shaft out of the brake and drive hub. Remove the drive motor from the machine.

13-4
Drive Hub

How to Remove a Drive Hub

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

1 Remove the drive motor. Refer to Repair Procedure, *How to Remove a Drive Motor*.

2 Tag, disconnect and plug the hydraulic hose from the brake. Cap the fittting on the brake.

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

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

4 Center a lifting jack of ample capacity under the axle of the drive hub to be removed. Do not raise the machine.

5 Block the wheels at the opposite end of the machine.

6 Raise the machine approximately 6 inches / 15 cm and place blocks under the chassis for support.

7 Remove the wheel lug nuts. Remove the tire and wheel assembly.

8 Place a second lifting jack under the drive hub for support and secure the drive hub to the lifting jack.

9 Remove the drive hub mounting bolts that attach the drive hub to the yoke. Remove the drive hub from the machine.

⚠WARNING Crushing hazard. The drive hub may become unbalanced and fall if it is not properly supported and secured to the lifting jack. Refer to Specifications, *Machine Torque Specifications*.

AXLE COMPONENTS

13-5
Steering Cylinders

How to Remove a Steering Cylinder

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

1 Locate the hose bracket mounted to the steer cylinder.

2 Remove the hose bracket cover retaining fasteners. Remove the hose bracket cover.

3 Remove the hose bracket retaining fasteners from the steering cylinder.

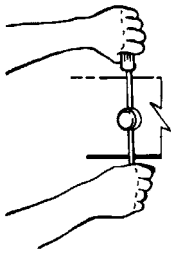
4 Tag, disconnect and plug the hydraulic hoses from the steering cylinder. Cap the fittings on the cylinder.

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

5 Remove the pin retaining fasteners from the steer cylinder pivot pins.

6 Support the steer cylinder with a suitable lifting device.

7 Place a rod through each steer cylinder pivot pin and twist to remove the pins.



8 Remove the steering cylinder from the machine.

⚠CAUTION Crushing hazard. The steer cylinder may become unbalanced and fall if it is not properly supported by the lifting device.

13-6
Hub and Bearings, 2WD Models

How to Remove the Hub and Bearings, 2WD Models

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

2 Block the non-steer wheels.

3 Center a lifting jack with a minimum capacity of 25,000 lbs / 12000 kg under the drive chassis between the steer wheels.

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

⚠CAUTION Crushing hazard. The machine may fall if not properly supported.

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

6 Remove the dust cap, cotter pin and castle nut.

Note: Always use a new cotter pin when installing a castle nut.

7 Pull the hub off the spindle. The washer and outer bearing should fall loose from the hub.

8 Place the hub on a flat surface and gently pry the bearing seal out of the hub.

9 Remove the rear bearing.

How to Install the Hub and Bearings, 2WD Models

Note: 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 clean, fresh 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.

NOTICE Component damage hazard. 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 castle nut.

7 Tighten the castle nut to 158 ft-lbs / 214 Nm to seat the bearing.

Note: Rotate the hub by hand while torquing the castle nut to make sure the bearings seat properly.

8 Loosen the castle nut one turn, and then torque to 35 ft-lbs / 47 Nm.

9 Install a new cotter pin. Bend the cotter pin to secure the castle nut.

Note: Always use a new cotter pin when installing a castle nut.

10 Install the dust cap, then the tire and wheel assembly. Torque the wheel lug nuts to specification. Refer to Specifications, *Machine Specifications.*

AXLE COMPONENTS

13-7 Extendable Axles

The extendable axles are used to widen the foot print of the drive chassis for stability.

How to Shim an Extendable Axle

Note: Measure each wear pad. Replace the wear pad if it is less than 7/16 inch / 11 mm thick. If the wear pad is 7/16 inch / 11 mm thick or more, perform the following procedure.

1 Fully extend the axle.

2 Remove the wear pad retaining fasteners.

Side wear pads:

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

4 Use a round punch through the wear pad mounting holes to align the shims with the wear pad. Install the wear pad retaining fasteners.

5 Extend and retract the axle through an entire cycle. Check for tight spots that could cause binding or scraping of the axle tubes.

Note: Always maintain squareness between the inner and outer axle tubes.

Top and bottom wear pads:

6 Center a lifting jack of ample capacity under the axle that needs to be shimmed. Do not raise the machine.

7 Block the wheels at the opposite end of the machine.

8 Raise the machine just until the weight of the machine is relieved off of the axle. Do not raise the wheels off of the ground.

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

10 Use a round punch through the wear pad mounting holes to align the shims with the wear pad. Install the wear pad retaining fasteners.

11 Extend and retract the axle through an entire cycle. Check for tight spots that could cause binding or scraping of the axle tubes.

Note: Always maintain squareness between the inner and outer axle tubes.

How to Remove an Inner Axle

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

Note: Perform this procedure with the tires parallel to the chassis and the axles fully extended.

1 Remove the top drive chassis cover.

2 Remove the yoke and hub assembly. Refer to Repair Procedure, *How to Remove the Yoke and Hub.*

3 Remove the steering cylinder. Refer to Repair Procedure, *How to Remove a Steering Cylinder.*

4 Remove the axle cover retaining fasteners located above the axle. Remove the chassis cover from the machine.

5 Remove the upper wear pad retainer plate retaining fasteners. Remove the plate from the machine.

6 Attach a lifting strap from an overhead crane of ample capacity to the inner axle for support. Do not lift it.

7 Remove the retaining fasteners from the upper and lower wear pads at the outer axle. Do not remove the side wear pads.

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

8 Remove the pin retaining fasteners from the axle stop pin. Use a slide hammer to remove the pin.

9 Remove the access cover fasteners from the end of the inner axle to access the axle extension cylinder clevis pin. Remove the cover.

10 Place support blocks under the end of the axle extension cylinder for support.

11 Remove the cotter pin from the axle extension cylinder clevis pin.

Note: Alwayse use a new cotter pin when installing a clevis pin.

12 Use a soft metal drift to remove the axle extension cylinder clevis pin.

13 Carefully support and slide the inner axle out of the chassis. Remove the axle from the machine.

⚠WARNING Crushing hazard. The inner axle may become unbalanced and fall when it is removed from the machine if it is not properly supported by the overhead crane.

NOTICE Component damage hazard. The aluminum limit switch track and the axle extension cylinder may become damaged if the axle is allowed to fall when it is removed from the machine.

Note: During removal, the overhead crane strap will need to be carefully adjusted for proper balancing.

Note: When installing an inner axle, there needs to be a minimum of $^1/_8$ inch / 3.1 mm gap between the proximity switches and the aluminum limit switch track. Measure the gap with the axles in both the retracted and extended positions. Adjust the proximity switches as necesary to obtain a $^1/_8$ inch / 3.1 mm gap.

AXLE COMPONENTS

How to Remove the Axle Extension Cylinder

1 Remove a yoke and hub assembly. Refer to Repair Procedure, *How to Remove the Yoke and Hub.*

2 Remove the axle. See *How to Remove an Inner Axle.*

3 Remove the access covers from the end of the remaining axle.

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

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

5 Tag and disconnect the wiring connectors from the proximity switches and limit switch. Do not remove the switches.

Note: The wiring connectors for the switches can be accessed through the access holes on either side of the chassis end plate.

6 Place blocks under the axle extension cylinder for support.

7 Attach a lifting strap from an overhead crane to the end of the axle extension cylinder.

Note: Attach the lifting strap to the end of the cylinder that has the inner axle removed.

8 Remove the cotter pin from the axle extension cylinder clevis pin on the remaining inner axle.

Note: Alwayse use a new cotter pin when installing a clevis pin.

9 Use a soft metal drift to remove the pin.

⚠CAUTION Crushing hazard. The axle extension cylinder may fall if it is not properly supported.

NOTICE Component damage hazard. The axle extension cylinder and limit switches can become damaged if the axle extension cylinder is allowed to fall.

10 Carefully support and slide the axle extension cylinder out of the axle.

Note: During removal, the overhead crane strap will need to be carefully adjusted for proper balancing.

Fault Codes



Observe and Obey:

- ☑ Troubleshooting and repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Boom in stowed position
  - Turntable rotated with the boom between the non-steer wheels
  - Turntable secured with the turntable rotation lock
  - Key switch in the off position with the key removed
  - Wheels chocked
  - All external AC power disconnected from the machine

Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions printed in the *Genie S-100HD and S-120HD Operator's Manual.*
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.
- ☑ Read each appropiate fault code thoroughly. Attempting shortcuts may produce hazardous conditions.
- ☑ Be aware of the following hazards and follow generally accepted safe workshop practices.

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

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could 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.

Note: Perform all troubleshooting on a firm, level surface.

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

CONTROL SYSTEM FAULT CODES

Fault Diagnostics - Control System

How to Read Control System Fault Codes

Note: Initial fault testing occurs at power-up.

Faults are abnormal conditions that exist due to component failure or System misuse. CPU, memory, LCD, LED, limited joystick and limited operator switch testing is done on power-up. If an operator switch is depressed on power-up, the display should show and error and not allow any machine functions.

Releasing the switch will clear the error and allow all machine functions. The joystick operates similarly.

All other fault testing is done continuously.

1 When a fualt is diagnosed, the PCON fault indicator will flash and a fault message will be displayed on the TCON LCD. The message will contain the fault source and type.

2 Additional information, including the occurrence counter and a time-stamp is available with a PC, connected to one of the RS232 ports. Up to 16 unique fault messages can be saved. Each fault is saved with the device identity, fault type, engine hour time-stamp and an 8-bit occurrence counter.

3 The fault code table on the following pages lists the functions or components monitored by the system.

DIAGNOSTIC CODES

Error Source	Error Type	Effects	Recovery Actions
Primary Boom Ext/Ret Flow Valve	Not calibrated	Normal function except threshold for one or the other direction is zero, Display message on LCD	Calibrate Thresholds
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
Primary Boom Up/Down Flow Valve	Not calibrated	Normal function except threshold for one or the other direction is zero, Display message on LCD	Calibrate Thresholds
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
Primary Boom Extend Valve	Fault Check	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
Primary Boom Retract Valve			
Primary Boom Up Valve			
Primary Boom Down Valve			
Engine Speed	Range Check (underspeed)	Display message on LCD	Power up controller with problem corrected
Oil Pressure	Range Check (low oil pressure)		
Water/Oil Temp	Range Check (high temperature)		
Water/Oil Temp Sensor	Fault Check	Display message on LCD	Power up controller with problem corrected
Oil Pressure Sensor			
Axle Extend/Retract Buttons	Fault Check (both buttons pressed)	Axle Extend/Retract disabled, display message on LCD	Power up controller with problem corrected
Axle Valves	Fault Check	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected

DIAGNOSTIC CODES

Error Source	Error Type	Effects	Recovery Actions
Primary Ext/Ret Joystick	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
	Not calibrated	Joystick Speed and Direction frozen at zero and neutral	Calibrate Joystick
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
Primary Up/Down Joystick	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
	Not calibrated	Joystick Speed and Direction frozen at zero and neutral	Calibrate Joystick
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
Steer Joystick	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
	Not calibrated	Joystick Speed and Direction frozen at zero and neutral	Calibrate Joystick
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
Primary Boom Up/Down switches on TCON	Fault Check (both buttons pressed)	Primary Boom Up/Down disabled, display message on LCD	Power up controller with problem corrected
Primary Boom Ext/Ret switches on TCON	Fault Check (both buttons pressed)	Primary Boom Ext/Retract disabled, display message on LCD	Power up controller with problem corrected
Primary Boom Length	Fault Check (unknown length)	Stop all boom functions, allow only boom retract, once fully retracted allow boom down. Display message on LCD	Power up controller with problem corrected
Primary Boom Angle	Fault Check (unknown angle)	Stop all boom functions, allow only boom retract. Display message on LCD	Power up controller with problem corrected

DIAGNOSTIC CODES

Error Source	Error Type	Effects	Recovery Actions
Primary Up/Down Speed	Not calibrated	Display message on LCD and allow operation at default speed	Perform auto calibrate precedure
Primary Extend/Retract Speed	Not calibrated	Display message on LCD and allow operation at default speed	Perform auto calibrate precedure
SAFETY SWITCH P3	Fault Check	Display message on LCD P3 SAFETY SWITCH FAULT	Power up controller with problem corrected
SAFETY SWITCH P6R1		Display message on LCD P6R1 SAFETY SWITCH FAULT	
SAFETY SWITCH P6R2		Display message on LCD P6R2 SAFETY SWITCH FAULT	
SAFETY SWITCH P7		Display message on LCD P7 SAFETY SWITCH FAULT	
SAFETY SWITCH P7R		Display message on LCD P7R SAFETY SWITCH FAULT	
SAFETY SWITCH P9A		Display message on LCD P9A SAFETY SWITCH FAULT	
SAFETY SWITCH P9B		Display message on LCD P9B SAFETY SWITCH FAULT	
SAFETY SWITCH P10		Display message on LCD P10 SAFETY SWITCH FAULT	
SAFETY SWITCH P11		Display message on LCD P11 SAFETY SWITCH FAULT	
SAFETY SWITCH P12		Display message on LCD P12 SAFETY SWITCH FAULT	
SAFETY SWITCH P14		Display message on LCD P14 SAFETY SWITCH FAULT	
SAFETY SWITCH P18		Display message on LCD P18 SAFETY SWITCH FAULT	
SAFETY SWITCH P22		Display message on LCD P22 SAFETY SWITCH FAULT	
SAFETY SWITCH P22R		Display message on LCD P22R SAFETY SWITCH FAULT	
CAN Bus	Fault Check	Display message on LCD	Power up controller with problem corrected

DIAGNOSTIC CODES

Error Source	Error Type	Effects	Recovery Actions
Primary Boom Lock-Out Valve #1	Fault Check	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
Primary Boom Lock-Out Valve #2			
Platform Overload	Fault Check (if active)	Display message on LCD	Power up controller with problem corrected
Shut Down Mode			
Turntable Rotate Joystick	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
	Not calibrated	Joystick Speed and Direction frozen at zero and neutral	Calibrate Joystick
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
Turntable Rotate Buttons	Fault Check (both buttons pressed)	TT rotate disabled, display message on LCD	Power up controller with problem corrected
Turntable Rotate Speed	Not calibrated	Display message on LCD and allow operation at default speed	Perform auto calibrate procedure
Turntable Rotate Flow Valve	Not calibrated	Normal function except threshold for one or the other directions is zero,display message on LCD	Calibrate Thresholds
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
Turntable Rotate CW Valves	Fault Check	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
Turntable Rotate CCW Valves			
Turntable Level Sensor X-Direction	Fault Check	Display message on LCD and sound audible alarm	Correct problem
Turntable Level Sensor Y-Direction			
Platform Level Sensor Y-Direction			

DIAGNOSTIC CODES

Error Source	Error Type	Effects	Recovery Actions
Propel Joystick	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
	Not calibrated	Joystick Speed and Direction frozen at zero and neutral	Calibrate Joystick
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
Propel Valves (High Current)	Not calibrated	Normal function except threshold for one or the other direction is zero, Display message on LCD	Calibrate Thresholds
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
	Value at 5.0 V	Shut down engine, Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
Motor Speed Valve	Fault Check	Shut down engine, Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
Brake Valve			
Platform Level Up Valve	Fault Check	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
Platform Level Down Valve			
Platform Rotate CW Valve			
Platform Rotate CCW Valve			
Jib Up Valve			
Jib Down Valve			
Jib Switches	Fault Check (both buttons pressed)	Affected functions disabled, display message on LCD	Power up controller with problem corrected
Platform Rotate Switches			
Platform Level Switches			
Footswitch Timeout		Display message on LCD	Recycle power
Hydraulic Generator/Welder - Bypass Valve	Fault Check	Disable Generator, Display message on LCD Display	Power up controller with problem corrected

DIAGNOSTIC CODES

Error Source	Error Type	Effects	Recovery Actions
SteeringJoystick	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
	Not calibrated	Joystick Speed and Direction frozen at zero and neutral	Calibrate Joystick
	Just calibrated	Initiate one second beep of audible warning device	Self-clearing (transient)
LF Steer Angle Sensor	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
RF Steer Angle Sensor	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
LR Steer Angle Sensor	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
RR Steer Angle Sensor	Value at 5.0 V	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
	Value Too High		
	Value Too Low		
	Value at 0 V		
LF Steer Valves	Fault Check	Limited Speed and Direction frozen at zero and neutral, Alarm sounds	Power up controller with problem corrected
RF Steer Valves			
LR Steer Valves			
RR Steer Valves			
Hydraulic Generator/Welder - Bypass Valve	Fault Check	Display message on LCD	Power up controller with problem corrected

CONTROL SYSTEM FAULT CODES

P_38-Propel (P13-17 TCON)	P_39-Turntable Rotate (P13-19 TCON)	P_10-Primary Boom Extend (P12-08 TCON)	P_11-Primary Up (P12-09 TCON)	P_9A-Primary Down (P12-06 TCON)	P_9B-Ignition/Fuel (P12-07 TCON)
P_22-Jib Jib Lvl Pwr	P_22R - Primary Up/Down FC	P_12 - Axle Retract (P121-08 SCON)			

	P_38	P_39	P_10	P_11	P_9A	P_9B	P_22	P_22R	P_12
Turntable tilt axis (+5°, secondary boom not stowed)	OFF	OFF		OFF					
Primary Boom Angle (crosscheck)	OFF	OFF	OFF	OFF	OFF*				
Primary Boom Length (crosscheck)	OFF	OFF	OFF	OFF	OFF*				
Primary 2 Cylinder (crosscheck)			OFF	OFF	OFF*				
Boom Envelope Safety Interlock			OFF		OFF	OFF			
Axle Safety Not Stowed		OFF		OFF					
Axles crosscheck Angle sensor vs. safety switch(es)		OFF	OFF	OFF	OFF				
Axle (not fully extended) and TT Rotate (stowed and in drive disable zone)	OFF	OFF							
Turntable Tilt Angle (crosscheck SCON internal sensor 3 in a delta configuration)	OFF	OFF	OFF	OFF	OFF				
Loss of CAN	OFF	OFF	OFF	OFF	OFF*	OFF			
Platform Overload (SCON pin #1)						OFF			
Platform Out of Level (>10°)							OFF		
Jib Bellcrank Out of Level (>10°)							OFF		
Boom Safety (max angle)	OFF	OFF		OFF		OFF			
Boom Safety (max length)	OFF	OFF	OFF	OFF	OFF	OFF			
Axle Retract Safety									OFF
Cable Tension (#1 or #2)			OFF						

* P-9A and P-10 energized if boom is fully retracted as indicated by LSB3RS

CONTROL SYSTEM FAULT CODES

Fault Source and Type will display as:

Source	Type
" ID XXX_xx FAULT "	

Where XXX is the one to three digit Fault Source and xx is the two digit Fault Type.

TCON - Turntable Controller

PCON - Platform Controller

SCON - Safety Controller

DCON - Drive Controller

Fault Type	
ID	Description
11	Value at 5V
12	Value too High
13	No Response
15	Value too Low
16	Value at 0V
17	Not Calibrated
21	Fault
26	Timeout
31	Invalid Setup
32	Min Cal Too Low
33	Min Cal Too High

Fault Source	
ID	Description
3	SCON Controller Area Network
4	Primary Boom Angle Zone
5	Primary Boom Length Switches Cross-Check
8	PCON Controller Area Network
9	Engine
18	DCON Controller Area Network
20	Boom Extend/Retract Joystick
21	Boom Up/Down Joystick
26	Boom Extend/Retract Buttons
27	Boom Up/Down Buttons
28	Boom Angle Sensors Cross-Check (SCON)
29	LSB2RS/LSB4ES Cross-Check (SCON)
30	Propel Joystick
35	Propel Valve
40	Turntable Rotate Joystick
43	Footswitch Timeout
44	Jib Up/Down Joystick
48	PBMAS Safety Envelope (SCON)
49	Jib Up/Down Buttons
50	Jib Up/Down Flow Valve
52	Steer Joystick
53	Left Front Steer Sensor
54	Right Front Steer Sensor
55	Left Rear Steer Sensor
56	Right Rear Steer Sensor
59	Rocker Steer Joystick
61	PBMLS Safety Envelope (SCON)
63	Front Axle Sensor
64	Rear Axle Sensor

CONTROL SYSTEM FAULT CODES

Fault Source	
ID	Description
65	Turntable Level Sensor X-Direction
66	Turntable Level Sensor Y-Direction
67	Boom Length Sensor Cross-Check (SCON)
68	Boom Safety Envelope (SCON)
70	Turntable Controller - Platform Controller Software Version
73	Engine Pressure Sensor
74	Engine Temperature Sensor
75	LSB2RO/LSB4EO Cross-Check
80	TCON/SCON Calibration Inconsistent
81	Boom Up/Down Flow Valve (Fine)
82	Boom Extend/Retract Flow Valve
83	Boom Extend/Retract Speed
85	Boom Up/Down Speed
86	Boom Angle Sensor
90	Jib Rotate Flow Valve
91	Turntable Rotate Buttons
92	Turntable Rotate Flow Valve
93	Turntable Rotate Speed
94	Boom Length Sensor
95	Jib Rotate Joystick
98	Platform Level Sensor
99	Platform Level Buttons
110	Platform Rotate Buttons
113	Jib Rotate Buttons
117	Propel Power P38
118	Turntable Rotate Power P39
121	Valve Power P6R1
122	Engine Power P6R2
123	Enable Input Power P7

Fault Source	
ID	Description
124	Enable Output Power P7R
125	Primary Down Power P9A
126	IGN/Fuel Power P9B
127	Primary Extend Power P10
128	Primary Up Power P11
129	Axle Retract Power P12
132	Platform Level Power P22
133	Primary Up/Down Valve Power P22R
134	DCON Valve Power P7R
142	Turntable Rotate CW Valve
143	Turntable Rotate CCW Valve
144	Axle Safety Not Stowed (SCON)
145	Boom Up Valve
146	Boom Down Valve
147	Platform Overload Switches Inconsistent (SCON)
148	Boom Extend Valve
149	Boom Retract Valve
152	Boom Up/Down Flow Valve (Gross)
153	Primary Lockout P1 Valve
154	Primary Lockout P2 Valve
157	Axles Fully Extended Cross-Check (SCON)
158	Drive Disable Zone and Axles Not Fully Extended (SCON)
160	Left Front Steer Valve
161	Right Front Steer Valve
162	Left Rear Steer Valve
163	Right Rear Steer Valve
164	Axle Valve
165	Boom Not Retracted and Chassis Tilted (SCON)

CONTROL SYSTEM FAULT CODES

Fault Source	
ID	Description
166	Brake Valve
167	Motor Shift Valve
168	Chassis Tilt Sensors Cross-Check (SCON)
170	Jib Bellcrank Level Sensor
171	Jib Bellcrank Level Flow Valve
172	AUX Relay
173	Platform Level Toggle Switch
174	Platform Rotate Toggle Switch
175	Platform Level Flow Valve
176	Platform Rotate Valve
180	Boom Length Sensor
195	Safety Platform Overload (SCON)
220	RSB1AO Active Cross-Check
221	LTB1LO Active Cross-Check
222	Axle Extend/Retract Toggle Switch
235	RSB1AO/LSB1DO Cross-Check
236	LTB1LO/LSB3RO Cross-Check
237	LTB1LO/LSB4EO Cross-Check
238	Pressure Comp Enable #1 Valve
239	Pressure Comp Enable #2/Generator Valve
245	Check Machine Software Type at TCON
246	Check Machine Software Type at SCON
247	TCON/SCON Software Inconsistent

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
51	3	1019	EGR-Valve, short circuit to battery
51	3	1024	Position sensor error of actuator EGR-Valve; signal range check high
51	3	1226	EGR-Valve; short circuit to battery (A02)
51	3	1227	EGR-Valve; short circuit to battery (A67)
51	4	1020	EGR-Valve; short circuit to ground
51	4	1025	Position sensor error of actuator EGR-Valve; signal range check low
51	4	1228	EGR-Valve; short circuit to ground (A02)
51	4	1229	EGR-Valve; short circuit to ground (A67)
51	4	1232	Actuator error EGR-Valve; Voltage below threshold
51	5	1015	Actuator error EGR-Valve; signal range check low
51	5	1017	Actuator EGR-Valve; open load
51	5	1023	Actuator error EGR-Valve; signal range check low
51	5	1223	Actuator EGR-Valve; open load
51	6	1014	Actuator error EGR-Valve; signal range check high
51	6	1022	Actuator error EGR-Valve; signal range check high
51	6	1224	Actuator EGR-Valve; over current
51	6	1230	Actuator error EGR-Valve; Overload by short-circuit
51	7	1016	Actuator position for EGR-Valve not plausible
51	11	1231	Actuator error EGR-Valve; Power stage over temp due to high current
51	12	1018	Actuator EGR-Valve; powerstage over temperature
51	12	1021	Mechanical actuator defect EGR-Valve
51	12	1225	Actuator EGR-Valve; over temperature
94	1	474	Low fuel pressure; warning threshold exceeded
94	1	475	Low fuel pressure; shut off threshold exceeded
94	3	472	Sensor error low fuel pressure; signal range check high
94	4	473	Sensor error low fuel pressure; signal range check low
97	3	464	Sensor error water fuel; signal range check high
97	4	465	Sensor error water fuel; signal range check low
97	12	1157	Water in fuel level prefilter; maximum value exceeded

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
100	0	734	High oil pressure; warning threshold exceeded
100	0	735	High oil pressure; shut off threshold exceeded
100	1	736	Low oil pressure; warning threshold exceeded
100	1	737	Low oil pressure; shut off threshold exceeded
100	3	732	Sensor error oil pressure; signal range check high
100	4	733	Sensor error oil pressure; signal range check low
102	2	88	Charged air pressure above warning threshold
102	2	89	Charged air pressure above shut off threshold
102	4	777	Sensor error charged air press; signal range check low
105	0	996	High charged air cooler temperature; warning threshold exceeded
105	0	997	High charged air cooler temperature; shut off threshold exceeded
105	3	994	Sensor error charged air temperature; signal range check high
105	4	995	Sensor error charged air temperature; signal range check low
108	3	412	Sensor error ambient air press; signal range check high
108	4	413	Sensor error ambient air press; signal range check low
110	0	98	High coolant temperature; warning threshold exceeded
110	0	99	High coolant temperature; shut off threshold exceeded
110	3	96	Sensor error coolant temp; signal range check high
110	4	97	Sensor error coolant temp; signal range check low
111	1	101	Coolant level too low
132	11	1	Air flow sensor load correction factor exceeding the maximum drift limit; plausibility error
132	11	2	Air flow sensor load correction factor exceeding drift limit; plausibility error
132	11	3	Air flow sensor low idle correction factor exceeding the maximum drift limit
132	11	4	Air flow sensor load correction factor exceeding the maximum drift limit
157	3	877	Sensor error rail pressure; signal range check high
157	4	878	Sensor error rail pressure; signal range check low

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
168	0	1180	Physical range check high for battery voltage
168	1	1181	Physical range check low for battery voltage
168	2	47	High battery voltage; warning threshold exceeded
168	2	48	Low battery voltage; warning threshold exceeded
168	3	45	Sensor error battery voltage; signal range check high
168	4	46	Sensor error battery voltage; signal range check low
171	3	417	Sensor error environment temperature; signal range check high
171	4	418	Sensor error environment temperature; signal range check low
172	0	1182	Physical range check high for intake air temperature
172	1	1183	Physical range check low for intake air temperature
172	2	9	Sensor ambient air temperature; plausibility error
172	2	983	Intake air sensor; plausibility error
172	3	981	Sensor error intake air; signal range check high
172	4	982	Sensor error intake air; signal range check low
174	0	481	High low fuel temperature; warning threshold exceeded
174	0	482	High low fuel temperature; shut off threshold exceeded
175	0	740	Physical range check high for oil temperature
175	0	745	High oil temperature; warning threshold exceeded
175	0	746	High oil temperature; shut off threshold exceeded
175	1	741	Physical range check low for oil temperature
175	2	738	Sensor oil temperature; plausibility error
175	2	739	Sensor oil temperature; plausibility error oil temperature too high
175	3	743	Sensor error oil temperature; signal range check high
175	4	744	Sensor error oil temperature; signal range check low
190	0	389	Engine speed above warning threshold (FOC-Lewel 1)
190	2	421	Offset angle between crank and camshaft sensor is too large
190	8	419	Sensor camshaft speed; disturbed signal

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
190	8	422	Sensor crankshaft speed; disturbed signal
190	11	390	Engine speed above warning threshold (FOC-Lewel 2)
190	12	420	Sensor camshaft speed; no signal
190	12	423	Sensor crankshaft speed; no signal
190	14	391	Engine speed above warning threshold (Overrun Mode)
190	14	1222	Camshaft and Crankshaft speed sensor signal not available on CAN
411	0	791	Physical range check high for differential pressure Venturiunit (EGR)
411	1	792	Physical range check low for differential pressure Venturiunit (EGR)
411	3	795	Sensor error differential pressure Venturiunit (EGR); signal range check high
411	4	381	Physical range check low for (EGR) differential pressure
411	4	796	Sensor error differential pressure Venturiunit (EGR); signal range check low
412	3	1007	Sensor error EGR cooler downstream temperature; signal range check high
412	4	1008	Sensor error EGR cooler downstream temperature; signal range check low
520	9	306	Timeout Error of CAN-Receive-Frame TSC1TR; Setpoint
597	2	49	Break lever mainswitch and break lever redundancy switch status not plausible
624	3	971	SVS lamp; short circuit to batt
624	4	972	SVS lamp; short circuit to grd
624	5	969	SVS lamp; open load
624	12	970	SVS lamp; powerstage over temperature
630	12	376	Access error EEPROM memory (delete)
630	12	377	Access error EEPROM memory (read)
630	12	378	Access error EEPROM memory (write)
639	14	84	CAN-Bus 0 "BusOff-Status"
651	3	580	Injector 1 (in firing order); short circuit
651	4	586	High side to low side short circuit in the injector 1 (in firing order)

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
651	5	568	Injector 1 (in firing order); interruption of electric connection
652	3	581	Injector 2 (in firing order); short circuit
652	4	587	High side to low side short circuit in the injector 2 (in firing order)
652	5	569	Injector 2 (in firing order); interruption of electric connection
653	3	582	Injector 3 (in firing order); short circuit
653	4	588	High side to low side short circuit in the injector 3 (in firing order)
653	5	570	Injector 3 (in firing order); interruption of electric connection
654	3	583	Injector 4 (in firing order); short circuit
654	4	589	High side to low side short circuit in the injector 4 (in firing order)
654	5	571	Injector 4 (in firing order); interruption of electric connection
676	11	543	Cold start aid relay error
676	11	544	Cold start aid relay open load
677	3	956	Starter relay high side; short circuit to battery
677	3	960	Starter relay low side; short circuit to battery
677	4	957	Starter relay high side; short circuit to ground
677	4	961	Starter relay low side; short circuit to ground
677	5	958	Starter relay; no load error
677	12	959	Starter relay; powerstage over temperature
703	3	426	Engine running lamp; short circuit to battery
703	4	427	Engine running lamp; short circuit to ground
703	5	424	Engine running lamp; open load
703	12	425	Engine running lamp; powerstage over temperature
729	5	545	Cold start aid relay open load
729	12	547	Cold start aid relay; over temperature error
898	9	305	Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
1079	13	946	Sensor supply voltage monitor 1 error (ECU)
1080	13	947	Sensor supply voltage monitor 2 error (ECU)

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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KWP = Keyword Protocol

SPN	FMI	KWP	Description
1109	2	121	Engine shut off demand ignored
1136	0	1398	Physikal range check high for ECU temperature
1136	1	1399	Physikal range check low for ECU temperature
1136	3	1400	Sensor error ECU temperature; signal range check high
1136	4	1401	Sensor error ECU temperature; signal range check low
1176	3	849	Sensor error pressure sensor upstream turbine; signal range check high
1176	4	850	Sensor error pressure sensor downstream turbine; signal range check high
1180	0	1193	Physical range check high for exhaust gas temperature upstream turbine
1180	0	1460	Turbocharger Wastegate CAN feedback; warning threshold exceeded
1180	0	1462	Exhaust gas temperature upstream turbine; warning threshold exceeded
1180	1	1194	Physical range check low for exhaust gas temperature upstream turbine
1180	1	1461	Turbocharger Wastegate CAN feedback; shut off threshold exceeded
1180	1	1463	Exhaust gas temperature upstream turbine; shut off threshold exceeded
1180	3	1067	Sensor error exhaust gas temperature upstream turbine; signal range check high
1180	11	1066	Sensor exhaust gas temperature upstream turbine; plausibility error
1188	2	1414	Wastegate; status message from ECU missing
1188	7	1415	Wastegate actuator; blocked
1188	11	1411	Wastegate actuator; internal error
1188	11	1412	Wastegate actuator; ELO calibration not performed correctly
1188	11	1416	Wastegate actuator; over temperature (> 145°C)
1188	11	1417	Wastegate actuator; over temperature (> 135°C)
1188	11	1418	Wastegate actuator; operating voltage error
1188	11	1413	Wastegate actuator calibration deviation too large, recalibration required
1231	14	85	CAN-Bus 1 "BusOff-Status"
1231	14	86	CAN-Bus 2 "BusOff-Status"

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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SPN	FMI	KWP	Description
1237	2	747	Override switch; plausibility error
1322	12	610	Too many recognized misfires in more than one cylinder
1323	12	604	Too many recognized misfires in cylinder 1 (in firing order)
1324	12	605	Too many recognized misfires in cylinder 2 (in firing order)
1325	12	606	Too many recognized misfires in cylinder 3 (in firing order)
1326	12	607	Too many recognized misfires in cylinder 4 (in firing order)
2659	0	1524	Physical range check high for EGR exhaust gas mass flow
2659	1	1525	Physical range check low for EGR exhaust gas mass flow
2659	2	1523	Exhaust gas recirculation AGS sensor; plausibility error
2659	2	1527	AGS sensor temperature exhaust gas mass flow; plausibility error
2659	12	1526	Exhaust gas recirculation; AGS sensor has "burn off" not performed
2797	4	1337	Injector diagnostics; timeout error of short circuit to ground measurement cyl. Bank 0
2798	4	1338	Injector diagnostics; timeout error of short circuit to ground measurement cyl. Bank 1
2798	4	1339	Injector diagnostics; short circuit to ground monitoring Test in Cyl. Bank 0
2798	4	1340	Injector diagnostics; short circuit to ground monitoring Test in Cyl. Bank 1
3224	2	127	DLC Error of CAN-Receive-Frame AT1IG1 NOX Sensor (SCR-system upstream cat; DPF-system downstream cat); length of frame incorrect
3224	9	128	Timeout Error of CAN-Receive-Frame AT1IG1; NOX Sensor upstream
3248	4	1047	Sensor error particle filter downstream temperature; signal range check low
3699	2	1616	DPF differential pressure sensor and a further sensor or actuator CRT system defective
3699	2	1617	Temperature sensor us. and ds. DOC simultaneously defect
3699	14	1615	Maximum stand-still-duration reached; oil exchange required
4765	0	1039	Physical range check high for exhaust gas temperature upstream (DOC)
4765	1	1042	Physical range check low for exhaust gas temperature upstream (DOC)

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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SPN	FMI	KWP	Description
4766	0	1029	Physical range check high for exhaust gas temperature downstream (DOC)
4766	1	1032	Physical range check low for exhaust gas temperature downstream (DOC)
4768	2	1036	Sensor exhaust gas temperature upstream (DOC); plausibility error
4768	3	1044	Sensor error exhaust gas temperature upstream (DOC); signal range check high
4768	4	1045	Sensor error exhaust gas temperature upstream (DOC); signal range check low
4769	2	1026	Sensor exhaust gas temperature downstream (DOC); plausibility error
4769	3	1034	Sensor error exhaust gas temperature downstream (DOC); signal range check high
4769	4	1035	Sensor error exhaust gas temperature downstream (DOC); signal range check low
523006	3	34	Controller mode switch; short circuit to battery
523006	4	35	Controller mode switch; short circuit to ground
523008	1	648	Manipulation control was triggered
523008	2	649	Timeout error in Manipulation control
523009	9	825	Pressure Relief Valve (PRV) reached maximum allowed opening count
523009	10	833	Pressure Relief Valve (PRV) reached maximum allowed open time
523212	9	171	Timeout Error of CAN-Receive-Frame ComEngPrt; Engine Protection
523216	9	198	Timeout Error of CAN-Receive-Frame PrHtEnCmd; pre-heat command, engine command
523240	9	179	Timeout CAN-message FunModCtl; Function Mode Control
523350	4	565	Injector cylinder-bank 1; short circuit
523352	4	566	Injector cylinder-bank 2; short circuit
523354	12	567	Injector powerstage output defect
523470	2	826	Pressure Relief Valve (PRV) forced to open; performed by pressure increase
523470	2	827	Pressure Relief Valve (PRV) forced to open; performed by pressure shock

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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SPN	FMI	KWP	Description
523470	7	876	Maximum rail pressure in limp home mode exceeded (PRV)
523470	11	831	The PRV can not be opened at this operating point with a pressure shock
523470	11	832	Rail pressure out of tolerance range
523470	12	828	Open Pressure Relief Valve (PRV); shut off condition
523470	12	829	Open Pressure Relief Valve (PRV); warning condition
523470	14	830	Pressure Relief Valve (PRV) is open
523550	12	980	T50 start switch active for too long
523601	13	948	Sensor supply voltage monitor 3 error (ECU)
523603	9	126	Timeout Error of CAN-Receive-Frame AMB; Ambient Temperature Sensor
523605	9	300	Timeout Error of CAN-Receive-Frame TSC1AR; Traction Control
523606	9	301	Timeout Error of CAN-Receive-Frame TSC1AR; Retarder
523612	12	387	Internal software error ECU; injection cut off
523612	12	612	Internal ECU monitoring detection reported error
523612	12	613	Internal ECU monitoring detection reported error
523612	12	614	Internal ECU monitoring detection reported error
523612	12	615	Internal ECU monitoring detection reported error
523612	12	616	Internal ECU monitoring detection reported error
523612	12	617	Internal ECU monitoring detection reported error
523612	12	618	Internal ECU monitoring detection reported error
523612	12	619	Internal ECU monitoring detection reported error
523612	12	620	Internal ECU monitoring detection reported error
523612	12	621	Internal ECU monitoring detection reported error
523612	12	623	Internal ECU monitoring detection reported error
523612	12	624	Internal ECU monitoring detection reported error
523612	12	625	Internal ECU monitoring detection reported error
523612	12	627	Internal ECU monitoring detection reported error
523612	12	628	Internal ECU monitoring detection reported error

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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KWP = Keyword Protocol

SPN	FMI	KWP	Description
523612	12	637	Internal ECU monitoring detection reported error
523612	12	1170	Internal software error ECU
523612	14	973	Softwarereset CPU SWReset_0
523612	14	974	Softwarereset CPU SWReset_1
523612	14	975	Softwarereset CPU SWReset_2
523613	0	856	Maximum positive deviation of rail pressure exceeded (RailMeUn0)
523613	0	857	Maximum positive deviation of rail pressure in meeting unit exceeded (RailMeUn1)
523613	0	858	Railsystem leakage detected (RailMeUn10)
523613	0	859	Maximum positive deviation of rail pressure in meeting unit exceeded (RailMeUn2)
523613	0	860	Negative deviation of rail pressure second stage (RailMeUn22)
523613	0	862	Maximum rail pressure exceeded (RailMeUn4)
523613	1	861	Maximum rail pressure exceeded (RailMeUn3)
523613	2	864	Setpoint of metering unit in overrun mode not plausible
523613	3	594	Metering unit (Fuel-System); short circuit to battery high side
523615	3	596	Metering unit (Fuel-System); short circuit to battery low side
523615	4	595	Metering unit (Fuel-System); short circuit to ground high side
523615	4	597	Metering unit (Fuel-System); short circuit to ground low side
523615	5	592	Metering unit (Fuel-System); open load
523615	12	593	Metering unit (Fuel-System); powerstage over temperature
523619	2	488	Physical range check high for exhaust gas temperature upstream (SCR-CAT)
523698	11	122	Shut off request from supervisory monitoring function
523717	12	125	Timeout Error of CAN-Transmit-Frame AmbCon; Weather environments
523718	3	1488	SCR mainrelay; short circuit to battery (only CV56B)
523718	4	1489	SCR mainrelay; short circuit to ground (only CV56B)
523718	5	1486	SCR mainrelay; open load (only CV56B)
523718	12	1487	SCR mainrelay; powerstage over temperature (only CV56B)
523766	9	281	Timeout Error of CAN-Receive-Frame Active TSC1AE
523767	9	282	Timeout Error of CAN-Receive-Frame Passive TSC1AE

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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SPN	FMI	KWP	Description
523768	9	283	Timeout Error of CAN-Receive-Frame Active TSC1AR
523769	9	284	Timeout Error of CAN-Receive-Frame Passive TSC1AR
523770	9	285	Timeout Error of CAN-Receive-Frame Passive TSC1DE
523776	9	291	Timeout Error of CAN-Receive-Frame TSC1TE active
523777	9	292	Passive Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
523778	9	293	Active Timeout Error of CAN-Receive-Frame TSC1TR
523779	9	294	Passive Timeout Error of CAN-Receive-Frame TSC1TR
523788	12	299	Timeout Error of CAN-Transmit-Frame TrbCH; Status Wastegate
523793	9	202	Timeout Error of CAN-Receive-Frame UAA10; AGS sensor service message
523794	9	203	Timeout Error of CAN-Receive-Frame UAA11; AGS sensor data
523895	13	559	Check of missing injector adjustment value programming (IMA) injector 1 (in firing order)
523896	13	560	Check of missing injector adjustment value programming (IMA) injector 2 (in firing order)
523897	13	561	Check of missing injector adjustment value programming (IMA) injector 3 (in firing order)
523898	13	562	Check of missing injector adjustment value programming (IMA) injector 4 (in firing order)
523910	6	1261	Air Pump; over current
523913	3	74	Sensor error glow plug control diagnostic line voltage; signal range check high
523913	4	75	Sensor error glow plug control diagnostic line voltage; signal range check low
523914	3	78	Glow plug control; short circuit to battery
523914	4	79	Glow plug control; short circuit to ground
523914	5	76	Glow plug control; open load
523914	5	1216	Glow plug control release line; short circuit error
523914	11	1217	Glow plug control; internal error
523914	12	77	Glow plug control; powerstage over temperature
523919	2	1378	Sensor air pump airpressure; plausibility error
523920	2	1379	Sensor exhaust gas back pressure burner; plausibility error

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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KWP = Keyword Protocol

SPN	FMI	KWP	Description
523922	7	1262	Burner Shut Off Valve; blocked closed
523922	7	1264	Burner Shut Off Valve; blocked closed
523929	0	109	Fuel Balance Control integrator injector 1 (in firing order); maximum value exceeded
523929	1	115	Fuel Balance Control integrator injector 1 (in firing order); minimum value exceeded
523930	0	110	Fuel Balance Control integrator injector 2 (in firing order); maximum value exceeded
523930	1	116	Fuel Balance Control integrator injector 2 (in firing order); minimum value exceeded
523931	0	111	Fuel Balance Control integrator injector 3 (in firing order); maximum value exceeded
523931	1	117	Fuel Balance Control integrator injector 3 (in firing order); minimum value exceeded
523932	0	112	Fuel Balance Control integrator injector 4 (in firing order); maximum value exceeded
523932	1	118	Fuel Balance Control integrator injector 4 (in firing order); minimum value exceeded
523935	12	168	Timeout Error of CAN-Transmit-Frame EEC3VOL1; Engine send messages
523936	12	169	Timeout Error of CAN-Transmit-Frame EEC3VOL2; Engine send messages
523946	0	1158	Zerofuel calibration injector 1 (in firing order); maximum value exceeded
523946	1	1164	Zerofuel calibration injector 1 (in firing order); minimum value exceeded
523947	0	1159	Zerofuel calibration injector 2 (in firing order); maximum value exceeded
523947	1	1165	Zerofuel calibration injector 2 (in firing order); minimum value exceeded
523948	0	1160	Zerofuel calibration injector 3 (in firing order); maximum value exceeded
523948	1	1166	Zerofuel calibration injector 3 (in firing order); minimum value exceeded
523949	0	1160	Zerofuel calibration injector 4 (in firing order); maximum value exceeded
523949	1	1166	Zerofuel calibration injector 4 (in firing order); minimum value exceeded
523960	0	1011	Physical range check high for EGR cooler downstream temp.

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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KWP = Keyword Protocol

SPN	FMI	KWP	Description
523960	0	1458	High exhaust gas temperature EGR cooler downstream; warning threshold exceeded
523960	1	1012	Physical range check low for EGR cooler downstream temp.
523960	1	1459	High exhaust gas temperature EGR cooler downstream; shut off threshold exceeded
523980	14	1187	Bad quality of reduction agent detected
523981	11	918	Urea-tank without heating function (heating phase)
523982	0	360	Powerstage diagnosis disabled; high battery voltage
523982	1	361	Powerstage diagnosis disabled; low battery voltage
523988	3	1245	Charging lamp; short circuit to battery
523988	4	1246	Charging lamp; short circuit to ground
523988	5	1243	Charging lamp; open load
523988	12	1244	Charging lamp; open temp.
523998	4	1327	Injector cylinder bank 2 slave; short circuit
523999	12	1328	Injector powerstage output Slave defect
524014	1	1254	Air pressure glow plug flush line; below limit
524016	2	1259	Amount of air is not plausible to pumb speed
524016	2	1260	Calculated amount of air is not plausible to HFM reading
524016	11	1258	HFM sensor; electrical fault
524021	11	1263	Burner fuel line pipe leak behind Shut Off Valve
524024	11	1302	Deviation of the exhaust gas temp. setpoint to actual value downstream (DOC) too high
524028	2	1431	CAN message PROEGRActr; plausible error
524029	2	1432	Timeout Error of CAN-Receive-Frame ComEGRActr - exhaust gas recirculation positioner
524030	7	1440	EGR actuator; internal error
524031	13	1441	EGR actuator; calibration error
524032	2	1442	EGR actuator; status message EGRCust is missing
524033	7	1443	EGR actuator; due to overload in Save Mode
524034	3	1438	Disc separator; short circuit to battery
524034	4	1439	Disc separator; short circuit to ground
524034	5	1436	Disc separator; open load
524034	12	1437	Disc separator; powerstage over temperature

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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SPN	FMI	KWP	Description
524035	12	1341	Injector diagnostics; time out error in the SPI communication
524057	2	1505	Electric fuel pump; fuel pressure build up error
524097	9	1663	Timeout Error of CAN-Transmit-Frame DPFBrnAirPmpCtl
524098	9	1664	Timeout Error of CAN-Transmit-Frame ComDPFBrnPT
524099	9	1665	Timeout Error of CAN-Transmit-Frame ComDPFC1
524100	9	1666	Timeout Error of CAN-Transmit-Frame ComDPFHisDat
524101	9	1667	Timeout Error of CAN-Transmit-Frame ComDPFTstMon
524102	9	1674	Timeout Error of CAN-Receive-Frame ComRxDPFBrnAirPmpCtl
524103	9	1675	Timeout Error of CAN-Receive-Frame ComRxDPFBrnAirPmp
524104	9	1676	Timeout Error of CAN-Receive-Frame ComRxDPFCtl
524105	9	1668	Timeout Error of CAN-Transmit-Frame ComEGRMsFlw
524106	9	1677	Timeout Error of CAN-Receive-Frame ComRxEGRMsFlw1
524107	9	1678	Timeout Error of CAN-Receive-Frame ComRxEGRMsFlw2
524108	9	1669	Timeout Error of CAN-Transmit-Frame ComEGRTVActr
524109	9	1679	Timeout Error of CAN-Receive-Frame ComRxEGRTVActr
524110	9	1670	Timeout Error of CAN-Transmit-Frame ComETVActr
524111	9	1680	Timeout Error of CAN-Receive-Frame ComRxETVActr
524112	9	1671	Timeout ComlTVActr
524113	9	1681	Timeout Error of CAN-Receive-Frame ComRxlTVActr
524114	9	1659	Timeout Error of CAN-Transmit-Frame A1DOC
524115	9	1660	Timeout Error of CAN-Transmit-Frame AT1S
524116	9	1661	Timeout Error of CAN-Transmit-Frame SCR2
524117	9	1662	Timeout Error of CAN-Transmit-Frame SCR3
524118	9	1672	Timeout Error of CAN-Receive-Frame ComRxCM1
524119	9	1673	Timeout Error of CAN-Receive-Frame ComRxCustSCR3

DEUTZ TD 2.9 L4 ENGINE FAULT CODES

SPN = Suspect Parameter Number
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KWP = Keyword Protocol

SPN	FMI	KWP	Description
524120	9	1682	Timeout Error of CAN-Receive-Frame ComRxSCRHtDiag
524121	9	1683	Timeout Error of CAN-Receive-Frame ComRxTrbChActr
524122	9	1684	Timeout Error of CAN-Receive-Frame ComRxUQSens
524123	9	1685	Timeout Error of CAN-Receive-Frame ComSCRHtCtl
524124	9	1686	Timeout Error of CAN-Receive-Frame ComTxAT1IMG
524125	9	1687	Timeout Error of CAN-Receive-Frame ComTxTrbChActr

PERKINS 854F-34T ENGINE FAULT CODE

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description	Refer to Engine Manual
27	3	Engine Exhaust Gas Recirculation Valve Position: Voltage Above Normal	Value Position Sensor- Test
27	4	Engine Exhaust Gas Recirculation Valve Position: Voltage Be- low Normal	Value Position Sensor- Test
29	3	Accelerator Pedal Position 2: Voltage Above Normal	Analog Throttle Position Sensor Circuit Test
29	4	Accelerator Pedal Position 2: Voltage Above Normal	Analog Throttle Position Sensor Circuit Test
51	3	Engine Throttle Valve 1 Position: Voltage Above Normal	Value Position Sensor- Test
51	4	Engine Throttle Valve 1 Position: Voltage Below Normal	Value Position Sensor- Test
91	3	Accelerator Pedal Position 1: Voltage Above Normal	Analog Throttle Position Sensor Circuit Test
91	4	Accelerator Pedal Position 1: Voltage Below Normal	Analog Throttle Position Sensor Circuit Test
97	4	Water In Fuel Indicator: High - least severe	Fuel Contains Water
100	2	Engine Oil Pressure: Erratic, Intermittent, or Incorrect	Switch Circuits - Test
100	17	Engine Oil Pressure: Low - least severe (1)	Oil Pressure Is Low
102	3	Engine Intake Manifold #1 Pressure: Voltage Above Normal	Engine Pressure Sensor Open or Short Circuit - Test
102	4	Engine Intake Manifold #1 Pressure: Voltage Below Normal	Engine Pressure Sensor Open or Short Circuit - Test
102	20	Engine Intake Manifold #1 Pressure: Data Drifted High	Engine Pressure Sensor Open or Short Circuit - Test
102	21	Engine Intake Manifold #1 Pressure: Data Drifted Low	Engine Pressure Sensor Open or Short Circuit - Test
105	3	Engine Intake Manifold #1 Temperature: Voltage Above Normal	Engine Temperature Sensor Open or Short Circuit - Test
105	4	Engine Intake Manifold #1 Temperature: Voltage Below Normal	Engine Temperature Sensor Open or Short Circuit - Test
107	2	Engine Air Filter 1 Differential Pressure: Erratic, Intermittent, or Incorrect	Switch Circuits - Test
107	15	Engine Air Filter 1 Differential Pressure: High - least severe (1)	Inlet Air Is Restricted
107	16	Engine Air Filter 1 Differential Pressure: High - moderate severity (2)	Inlet Air Is Restricted

PERKINS 854F-34T ENGINE FAULT CODE

SPN = Suspect Parameter Number
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SPN	FMI	Description	Refer to Engine Manual
108	3	Barometric Pressure: Voltage Above Normal	Engine Pressure Sensor Open or Short Circuit - Test
108	4	Barometric Pressure: Voltage Below Normal	Engine Pressure Sensor Open or Short Circuit - Test
110	3	Engine Coolant Temperature: Voltage Above Normal	Engine Temperature Sensor Open or Short Circuit - Test
110	4	Engine Coolant Temperature: Voltage Below Normal	Engine Temperature Sensor Open or Short Circuit - Test
110	15	Engine Coolant Temperature: High - least severe (1)	Coolant Temperature Is High
110	16	Engine Coolant Temperature: High - moderate severity (2)	Coolant Temperature Is High
152	2	Number Of ECU Resets: Erratic, Intermittent, or Incorrect	ECM Memory - Test
157	0	Engine Injector Metering Rail#1 Pressure: High - most severe (3)	Fuel Rail Pressure Problem
157	2	Engine Injector Metering Rail#1 Pressure: Erratic, Intermittent, or Incorrect	Fuel Rail Pressure Problem
157	3	Engine Injector Metering Rail#1 Pressure: Voltage Above Normal	Engine Temperature Sensor Open or Short Circuit - Test
157	4	Engine Injector Metering Rail#1 Pressure: Voltage Below Normal	Engine Temperature Sensor Open or Short Circuit - Test
157	10	Engine Injector Metering Rail#1 Pressure: Abnormal Rate of Change	Engine Temperature Sensor Open or Short Circuit - Test
157	16	Engine Injector Metering Rail#1 Pressure: High - moderate severity (2)	Fuel Rail Pressure Problem
157	17	Engine Injector Metering Rail#1 Pressure: Low - least severe (1)	Fuel Rail Pressure Problem
157	18	Engine Injector Metering Rail#1 Pressure: Low - moderate severity (2)	Fuel Rail Pressure Problem
168	3	Battery Potential/ Power Input 1: Voltage Above Normal	Ignition Keyswitch Circuit and Battery Supply Circuit - Test
166	2	Engine Rated Power: Erratic, Intermittent, or Incorrect	ECM Memory - Test
166	14	Engine Rated Power: Special Instruction	ECM Memory - Test
168	4	Battery Potential/ Power Input 1: Voltage Below Normal	Ignition Keyswitch Circuit and Battery Supply Circuit - Test

PERKINS 854F-34T ENGINE FAULT CODE

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description	Refer to Engine Manual
172	3	Engine Air Inlet Temperature Sensor: Voltage Above Normal	Engine Temperature Sensor Open or Short Circuit - Test
172	3	Engine Air Inlet Temperature Sensor: Voltage Below Normal	Engine Temperature Sensor Open or Short Circuit - Test
173	3	Engine Exhaust Gas Temperature: Voltage Above Normal	Engine Temperature Sensor Open or Short Circuit - Test
173	4	Engine Exhaust Gas Temperature: Voltage Below Normal	Engine Temperature Sensor Open or Short Circuit - Test
174	3	Engine Fuel Temperature 1: Voltage Above Normal	Engine Temperature Sensor Open or Short Circuit - Test
174	4	Engine Fuel Temperature 1: Voltage Below Normal	Engine Temperature Sensor Open or Short Circuit - Test
190	8	Engine Speed: Abnormal Frequency, Pulse Width, or Period	Engine Speed/Timing Sensor Circuit - Test
190	15	Engine Speed: High - least severe (1)	Engine Over speeds
558	2	Accelerator Pedal1Low Idle Switch: Erratic, Intermittent, or Incorrect	Idle Validation Switch Circuits - Test
593	31	Engine Idle Shutdown has Shutdown Engine	This code indicates that an engine idle shutdown is about to occur. This code does not represent a fault. If equipped, the warning lamp will come on.
594	31	Engine Idle Shutdown Driver Alert Mode	This code indicates that an engine idle shut down has occurred. This code does not represent a fault. If equipped, the warning lamp will flash and the shutdown lamp will come on.
623	6	Red Stop Lamp: Current Above Normal	Indicator Lamp Circuit- Test
624	6	Amber Warning Lamp: Current Above Normal	Indicator Lamp Circuit- Test
630	2	Calibration Memory: Erratic, Intermittent, or Incorrect	Injector Data Incorrect- Test
637	11	Engine Timing Sensor: Other Failure Mode	Engine Speed/Timing Sensor Circuit - Test
639	9	J1939 Network #1: Abnormal Update Rate	CAN Data Link Circuit - Test
639	14	J1939 Network #1: Special Instruction	CAN Data Link Circuit - Test
651	5	Engine Injector Cylinder #01: Current Below Normal	Injector Solenoid Circuit - Test
651	6	Engine Injector Cylinder #01: Current Above Normal	Injector Solenoid Circuit - Test
651	20	Engine Injector Cylinder #01: Data Drifted High	Injector Data Incorrect- Test
651	21	Engine Injector Cylinder #01: Data Drifted Low	Injector Data Incorrect- Test

PERKINS 854F-34T ENGINE FAULT CODE

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description	Refer to Engine Manual
652	5	Engine Injector Cylinder #02: Current Below Normal	Injector Solenoid Circuit - Test
652	6	Engine Injector Cylinder #02: Current Above Normal	Injector Solenoid Circuit - Test
652	20	Engine Injector Cylinder #02: Data Drifted High	Injector Data Incorrect- Test
652	21	Engine Injector Cylinder #02: Data Drifted Low	Injector Data Incorrect- Test
653	5	Engine Injector Cylinder #03: Current Below Normal	Injector Solenoid Circuit - Test
653	6	Engine Injector Cylinder #03: Current Above Normal	Injector Solenoid Circuit - Test
653	20	Engine Injector Cylinder #03: Data Drifted High	Injector Data Incorrect- Test
653	21	Engine Injector Cylinder #03: Data Drifted Low	Injector Data Incorrect- Test
654	5	Engine Injector Cylinder #04: Current Below Normal	Injector Solenoid Circuit - Test
654	6	Engine Injector Cylinder #04: Current Above Normal	Injector Solenoid Circuit - Test
654	20	Engine Injector Cylinder #04: Data Drifted High	Injector Data Incorrect- Test
654	21	Engine Injector Cylinder #04: Data Drifted Low	Injector Data Incorrect- Test
676	5	Engine Glow Plug Relay: Current Below Normal	Glow Plug Starting Aid - Test
676	6	Engine Glow Plug Relay: Current Above Normal	Glow Plug Starting Aid - Test
676	19	Engine Glow Plug Relay: Data Error	Glow Plug Starting Aid - Test
677	3	Engine Starter Motor Relay: Voltage Above Normal	Start Relay Circuit - Test
677	5	Engine Starter Motor Relay: Current Below Normal	Start Relay Circuit - Test
677	6	Engine Starter Motor Relay: Current Above Normal	Start Relay Circuit - Test
723	8	Engine Speed Sensor #2: Abnormal Frequency, Pulse Width, or Period	Engine Speed/Timing Sensor Circuit - Test
976	2	PTO Governor State: Erratic, Intermittent, or Incorrect	PTO Switch Circuit - Test
1041	2	Start Signal Indicator: Erratic, Intermittent, or Incorrect	Start Relay Circuit - Test

PERKINS 854F-34T ENGINE FAULT CODE

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description	Refer to Engine Manual
1076	2	Engine Fuel Injection Pump Fuel Control Value: Erratic, Intermittent, or Incorrect	Solenoid Value - Test
1076	5	Engine Fuel Injection Pump Fuel Control Value: Current Below Normal	Solenoid Value - Test
1076	6	Engine Fuel Injection Pump Fuel Control Value: Current Above Normal	Solenoid Value - Test
1081	5	Engine Wait to Start Lamp: Current Below Normal	Indicator Lamp Circuit - Test
1081	6	Engine Wait to Start Lamp: Current Above Normal	Indicator Lamp Circuit - Test
1127	16	Engine Turbocharger 1 Boost Pressure: High - moderate severity (2)	Intake Manifold Air Pressure Is High
1127	18	Engine Turbocharger 1 Boost Pressure: Low - moderate severity (2)	Intake Manifold Air Pressure Is Low
1188	5	Engine Turbocharger Wastegate Actuator 1 Position: Current Below Normal	Solenoid Value - Test
1188	6	Engine Turbocharger Wastegate Actuator 1 Position: Current Above Normal	Solenoid Value - Test
1209	3	Engine Exhaust Gas Pressure: Voltage Above Normal	Engine Pressure Sensor Open or Short Circuit - Test
1209	4	Engine Exhaust Gas Pressure: Voltage Below Normal	Engine Pressure Sensor Open or Short Circuit - Test
1221	2	Continuously Monitored Systems Support/Status: Erratic, Intermittent, or Incorrect	ECM Memory - Test
1221	14	Continuously Monitored Systems Support/Status: Special Instruction	Another diagnostic code has requested engine speed limitation. The warning lamp will flash. The engine speed is limited to 1200rpm. Troubleshoot all other diagnostic codes. No troubleshooting is required for this diagnostic code.
1239	0	Engine Fuel Leakage 1: High- most severe (3)	Fuel Rail Pressure Problem
1485	7	ECM Main Relay: Not Responding Properly	Electrical Power Supply - Test
1485	14	ECM Main Relay: Special Instruction	Electrical Power Supply - Test

PERKINS 854F-34T ENGINE FAULT CODE

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description	Refer to Engine Manual
2791	5	Engine Exhuast Gas Recirculation (EGR) Value Control: Current Below Normal	Motorized Value - Test
2791	6	Engine Exhuast Gas Recirculation (EGR) Value Control: Current Above Normal	Motorized Value - Test
2791	7	Engine Exhuast Gas Recirculation (EGR) Value Control: Not Responding Properly	Motorized Value - Test
2797	6	Engine Injector Group 1: Current Above Normal	Injector Solenoid Circuit - Test
2797	7	Engine Injector Group 1: Not Responding Property	Injector Solenoid Circuit - Test
2798	6	Engine Injector Group 2: Current Above Normal	Injector Solenoid Circuit - Test
2840	12	ECU Instance: Failure	ECM Memory - Test
2840	14	ECU Instance: Special Instruction	Electrical Power Supply - Test
2880	2	Engine Operator Primary Intermediate Speed Select: Erratic, Intermittent, or Incorrect	Throttle Switch Circuit - Test
2880	3	Engine Operator Primary Intermediate Speed Select: Voltage Above Normal	Throttle Switch Circuit - Test
2880	4	Engine Operator Primary Intermediate Speed Select: Voltage Below Normal	Throttle Switch Circuit - Test
2970	2	Accelerator Pedal 2 Low Idle Switch: Erratic, Intermittent, or Incorrect	Idle Validation Switch Circuit - Test
3217	3	After treatment #1 Intake 02: Voltage Above Normal	Oxygen Level - Test
3217	4	After treatment #1 Intake 02: Voltage Below Normal	Oxygen Level - Test
3217	5	After treatment #1 Intake 02: Current Below Normal	Oxygen Level - Test
3217	6	After treatment #1 Intake 02: Current Above Normal	Oxygen Level - Test
3217	12	After treatment #1 Intake 02: Failure	Oxygen Level - Test
3217	13	After treatment #1 Intake 02: Out of Calibration	Oxygen Level - Test
3217	15	After treatment #1 Intake 02: High - least severe (1)	Oxygen Level - Test

PERKINS 854F-34T ENGINE FAULT CODE

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description	Refer to Engine Manual
3219	15	After treatment #1 Intake Gas Sensor at Temperature: High - least severe (1)	Oxygen Level - Test
3219	17	After treatment #1 Intake Gas Sensor at Temperature: Low - least severe (1)	Oxygen Level - Test
3222	3	After treatment #1 Intake Gas Sensor Heater: Voltage Above Normal	Oxygen Level - Test
3222	4	After treatment #1 Intake Gas Sensor Heater: Voltage Below Normal	Oxygen Level - Test
3222	5	After treatment #1 Intake Gas Sensor Heater: Current Below Normal	Oxygen Level - Test
3242	3	Particulate Trap Intake Gas Temperature: Voltage Above Normal	Engine Temperature Sensor Open or Short Circuit - Test
3242	4	Particulate Trap Intake Gas Temperature: Voltage Below Normal	Engine Temperature Sensor Open or Short Circuit - Test
3251	0	Particulate Trap Differential Pressure: High- most severe (3)	Diesel Particulate Filter Collects Excessive Soot
3251	3	Particulate Trap Differential Pressure: Voltage Above Normal	Engine Pressure Sensor Open or Short Circuit - Test
3251	4	Particulate Trap Differential Pressure: Voltage Below Normal	Engine Pressure Sensor Open or Short Circuit - Test
3251	7	Particulate Trap Differential Pressure: Not Responding Properly	Diesel Particulate Filter Has Differential Pressure Problem
3251	10	Particulate Trap Differential Pressure: Abnormal Rate of Change	Diesel Particulate Filter Has Differential Pressure Problem
3251	16	Particulate Trap Differential Pressure: High-moderate severity (2)	Diesel Particulate Filter Collects Excessive Soot
3251	17	Particulate Trap Differential Pressure: Low - least severe (1)	Diesel Particulate Filter Has Differential Pressure Problem
3509	2	Sensor Supply Voltage 1: Erratic, Intermittent, or Incorrect	5 Volt Sensor Supply Circuit - Test
3510	2	Sensor Supply Voltage 2: Erratic, Intermittent, or Incorrect	5 Volt Sensor Supply Circuit - Test
3511	2	Sensor Supply Voltage 3: Erratic, Intermittent, or Incorrect	5 Volt Sensor Supply Circuit - Test
3697	6	Particulate Trap Lamp Command: Current Above Normal	Indicator Lamp Circuit - Test
3698	6	Exhaust System High Temperature Lamp Command: Current Below Normal	Indicator Lamp Circuit - Test

PERKINS 854F-34T ENGINE FAULT CODE

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description	Refer to Engine Manual
3702	6	Diesel Particulate Filter Active Regeneration Inhibited Status: Current Above Normal	Indicator Lamp Circuit - Test
4765	3	After treatment #1 Diesel Oxidation Catalyst Intake Gas Temperature: Voltage Above Normal	Engine Temperature Sensor Open or Short Circuit - Test
4765	4	After treatment #1 Diesel Oxidation Catalyst Intake Gas Temperature: Voltage Below Normal	Engine Temperature Sensor Open or Short Circuit - Test
5055	17	Engine Oil Viscosity: Low - least severe (1)	Oil Contains Fuel
5055	18	Engine Oil Viscosity: Low - moderate severity (2)	Oil Contains Fuel
5099	6	Engine Oil Pressure Low Lamp Data: Current Above Normal	Indicator Lamp Circuit - Test
5319	31	After treatment Diesel Particulate Filter Incomplete Regeneration	Diesel Particulate Filter Active Regeneration Was Interrupted
5324	7	Engine Glow Plug 1: Not Responding Properly	Glow Plug Starting Aid - Test
5325	7	Engine Glow Plug 2: Not Responding Properly	Glow Plug Starting Aid - Test
5326	7	Engine Glow Plug 3: Not Responding Properly	Glow Plug Starting Aid - Test
5327	7	Engine Glow Plug 4: Not Responding Properly	Glow Plug Starting Aid - Test
5419	5	Engine Throttle Actuator #1: Current Below Normal	Motorized Valve - Test
5419	6	Engine Throttle Actuator #1: Current Above Normal	Motorized Valve - Test
5419	7	Engine Throttle Actuator #1: Not Responding Properly	Motorized Valve - Test
5571	2	High Pressure Common Rail Fuel Pressure Relief Valve: Erratic, Intermittent, or Incorrect	Fuel Rail Pressure Problem
5571	7	High Pressure Common Rail Fuel Pressure Relief Valve: Not Responding Properly	Fuel Rail Pressure Problem
5571	10	High Pressure Common Rail Fuel Pressure Relief Valve: Abnormal Rate of Change	Fuel Rail Pressure Problem
5571	14	High Pressure Common Rail Fuel Pressure Relief Valve: Special Instruction	Fuel Rail Pressure Problem
5571	16	High Pressure Common Rail Fuel Pressure Relief Valve: High-moderate severity (2)	Fuel Rail Pressure Problem
5826	16	Emission Control System Operator Inducement Severity High-moderate severity (2)	Refer to "Operator Inducement Codes"

DIAGNOSTIC CODES

Control System Fault Codes

How to Clear Boom Safety Switch Faults

Note: Beginning with software release 3.0, the boom envelope switches will latch and faults must be reset in software or through the use of the TCON LCD. They will not clear by re-powering the machine.

Note: There are two methods to reset the faults, by using Web GPI or through the menu available on the TCON LCD.

Using Web GPI

1 Connect the device containing the WEB GPI software to the TCON with an RS-232 cable.

2 Select the Safety folder, then the Fault Status screen.

3 Change any safety switch drop down menus displaying FAULT to OK. Press SEND.

4 Exit Web GPI.W

Using the TCON LCD

Note: Take care when using this method to avoid resetting threshold defaults.

1 With the key switch off, press and hold the ↵ button and turn the key switch to the on position. Release the ↵ button after five seconds and press the − − ↓ ↓ buttons.

2 Press the ↓ button until CLEAR ALL SAFETY SWITCH FAULTS appears.

3 Select YES, then press the ↵ button.

4 Press the ↓ button until EXIT appears.

5 Select YES, then press the ↵ button.

Note: This clears all latching faults, not standard faults.

Software



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 in the *Genie S-100HD Operator's Manual and the Genie S-120HD Operator's Manual.*
- ☑ Be sure that all necessary tools and parts are available and ready for use.

About This Section

This section explains various parts of the machine software operating system and how to access some of the adjustable parameters of the control system.

Web GPI

The software system used on the machine is called Web GPI. It is a software application that is typically used with a laptop computer. The laptop can be connected to the ground controls via a tee harness connector (Genie part number 75094).

The Web GPI software can access all adjustable parameters for the machine. It can also be used to aid in troubleshooting and viewing fault code history.

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 Operator's Manual on your machine.
- ☑ 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.

Electrical Schematics

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

Hydraulic Schematics

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

Wire Circuit Legend

Circuit numbering

1 Circuit numbers consist of three parts: the circuit prefix, circuit number and circuit suffix. The circuit prefix indicates the type of circuit. The circuit number describes the function of the circuit. The circuit suffix provides an abbreviation for the number or may be used to further define the function of this portion of the circuit. It also may be used to indicate the final end of the circuit, i.e., LS or limit sw.

2 The circuit number may be used more than once in a circuit.

For Example:

C 74 PL – This is the circuit for the lockout valve #1. C stands for control, 74 is the number of the circuit for the primary #1 lock out valve. PL stands for Primary Lockout.

S 62 BST – This is the circuit that communicates to the onboard computers of the machine that the boom is fully stowed. S stands for safety, 62 is the number of the circuit for boom stowed and BST stands for Boom Stowed.

P 48 LP – P stands for power. 48 is the circuit number for work lamps and LP stands for Lamp.

R 48 LP – R stands for relay. In this case it is the wire that feeds the relay coil for the work lamp. All other numbers remain the same.

Circuit prefix

C.....Control

D.....Data

E.....Engine

G.....Gauges

N.....Neutral

P.....Power

R.....Relay Output

S.....Safety

V.....Valve

Circuit suffix

Definition	Suffix
AC Generator	GEN
Alternator Field	AF
Angle	ANG
Auxiliary Boom Valve	ABV
Auxiliary Forward Valve	AFV
Auxiliary Hydraulic Pump	AH
Auxiliary Platform Valve	APV
Auxiliary Reverse Valve	ARV
Auxiliary Steer/Drive Valve	ASV
Axle Extend Valve	AXE
Axle Oscillate	AXO
Axle Retract Valve	AXR
Axle Front Position	FAP
Axle Rear Position	RAP
Battery	BAT
Boom Extended	BEX
Boom Stowed	BST
Brake	BRK
Bypass Valves	BV
Calibrate	CAL
CAN Signal	CAN
CAN Shield	SHD
CATS Module	CAT
Chain Break	CNK
Data High	DTH
Data Low	DTL
Drive Chassis Controller	DCN
Drive Enable	DE
Drive Enable Left	DEL
Drive Enable Right	DER
Electrical Displacement Control	EDC
Envelope Light	ENV
Engine Speed Select	ESP
Engine Status Lamp	ESL
Envelope Lockout	ENL
Extend/retract Lockout	ERL
Filter Restricted	FLR
Filter Switch	FLT
Flashing Beacon	FB
Float Switch	FS
Footswitch Signal	FTS
Forward	FWD
Fuel Pump	FP
Fuel Select (gas/LP)	FL
Fuel Solenoid	FSL

WIRE CIRCUIT LEGEND

Definition	Suffix
Function Enable	FE
Ground Control	TCN
Ground	GND
Horn	HRN
High RPM	HS
Hydraulic Generator	HG
Ignition	IGN
Jib Bellcrank Down	JBD
Jib Bellcrank Up	JBU
Jib Sensor	JBS
Jib U/D Control	JUD
Jib Down	JD
Jib Up/Down Flow Control	JFC
Jib Select Valve	JSV
Jib Up	JU
Jib E/R Control	JER
Jib Ext	JBE
Jib Ret	JBR
Jib Rotate Left (CCW)	JRL
Jib Rotate Right (CW)	JRR
Joystick 5 VDC Power	JPW
Lamps	LPS
Left Front	LF
Left Front Steer Sensor	LFS
Left Rear	LR
Left Rear Steer Sensor	LRS
Limit Switch	LS
Lift Speed Reduction	LSR
Load Sensor	LDS
Lockout	LO
Low RPM	LS
Low fuel	LOF
Motor Shift (Speed)	MS
Multi Function Valve	MFV
Platform Control	PCN
Primary Ext/Ret Lockout	PEL
Platform Level Down	PLD
Platform Level Flow Control	PLF
Platform Level Up	PLU
Platform Rotate Flow Control	PRF
Platform Rotate Control	PRC
Platform Rotate Left (CCW)	PRL
Platform Rotate Right (CW)	PRR
Power	PWR
Power to Length Sensor	PSL
Platform Tilt Alarm	PTA
Platform Tilt Sensor	PTS
Pressure Comp Enable	PCE
Pressure Sender	PSR
Pressure Switches	PS
Primary Boom Angle Sensor	PBS
Primary Boom Down	PBD
Primary Boom Ext/Ret Lockout Valve	PBL
Primary Boom Extend	PBE
Primary Boom Extend/Retract Flow Control	PER
Primary Boom Retract	PBR
Primary Boom Angle Sensor	PBS
Primary Boom Down	PBD
Primary Boom Ext/Ret Lockout Valve	PBL
Primary Boom Extend	PBE
Primary Boom Extend/Retract Flow Control	PER
Primary Boom Retract	PBR
Primary Boom Up	PBU
Primary Boom Up/Dwn Flow Control	PUD
Primary Boom Extend/Retract Signal	PLS
Primary Boom Up/Down Signal	PES
Primary Lockout	PL
Primary Length Sensor	PSL
Propel Signal	JPL
Program Setup Enable	PSE
Propel Lockout	PLL
Proportional Valve	PRV
Proximity Sensor	PXS
Receptacle	REC
Recovery	RCV
Retract Lockout	RL
Return	RET
Reverse	REV
Right Front	RF
Right Front Steer Sensor	RFS
Right Rear	RR
Right Rear Steer Sensor	RRS
RPM	RPM
Secondary Boom Angle Sensor	SBS
Secondary Boom Elevated	SBL
Sec Boom Down	SBD
Sec Boom Extend	SBE
Sec Boom Extend/Retract Flow Control	SER
Sec Boom Retract	SBR
Sec Boom Up	SBU
Sec Boom Up/Dwn Flow Control	SUD
Secondary Boom	SB

This list continues on the next page.

WIRE CIRCUIT LEGEND

Definition	Suffix
Secondary Boom Lockout Valve (Extend)	SLE
Secondary Boom Lockout Valve (Riser Down)	SLD
Sensor	SEN
Spare	SP
Speed Sensor	SS
Start Aid (Glow Plug or choke)	SA
Starter	STR
Steer Control Signal	STC
Steering Valve Clockwise	SCW
Steering Valve Counter Clockwise	SCC
Temp Sender	TSR
Temp Switches	TS
Tether	TET
Tilt Alarm X axis	TAX
Tilt Alarm Y axis	TAY
Turntable or Ground Control Panel	TCN
Turntable Rotate Flow Control	TRF
Turntable Rotate Right (CW)	TRR
Turntable Rotate Signal	TRS
Turntable Tilt Alarm	TTA
Turntable Tilt Sensor	TTS
Test Switch	TSW

Wire Coloring

1 All cylinder extension colors are solid and all retract functions are striped black. When using black wire, the stripe shall be white.

2 All rotations that are LEFT or CW are solid, RIGHT or CCW are striped and black. When the wire is black, the stripe is white.

3 All proportional valve wiring is striped.

Wire Color Legend

BL	Blue
BL/BK	Blue/Black
BL/RD	Blue/Red
BL/WH	Blue/White
BK	Black
BK/RD	Black/Red
BK/WH	Black/White
BR	Brown
GR	Green
GR/BK	Green/Black
GR/WH	Green/White
RD	Red
RD/BK	Red/Black
RD/WH	Red/White
OR	Orange
OR/BL	Orange/Blue
OR/BK	Orange/Black
OR/RD	Orange/Red
WH	White
WH/BK	White/Black
WH/RD	White/Red
YL	Yellow

WIRE CIRCUIT LEGEND

Color	Circuit #	Primary function
RD	1	Primary boom up drive
RD/BK	2	Primary boom down drive
RD/WH	3	Primary boom up/dwn FC proportional valve drive
WH	4	Turntable rotate left valve drive
WH/BK	5	Turntable rotate right valve drive
WH/RD	6	Turntable rotate FC proportional valve drive
BK	7	Primary boom extend
BK/WH	8	Primary boom retract
BK/RD	9	Primary boom Extend/Retract proportional valve drive
BL	10	Secondary boom up valve drive
BL/BK	11	Secondary boom down valve drive
BL/WH	12	Secondary boom up/dwn FC proportional valve drive
BL/RD	13	Drive enable
OR	14	Platform level up valve
OR/BK	15	Platform level down valve
OR/RD	16	Platform up/dwn FC proportional valve drive
GR	17	Platform rotate left valve driver
GR/BK	18	Platform rotate right valve driver
GR/WH	19	Jib select valve driver circuit
RD	20	12V battery supply
WH	21	12V ignition supply
BK	22	Keyswitch power to platform ESTOP
WH	23	Power to platform
RD	24	Power to warning senders
WH/BK	25	Power to oil pressure sender
WH/RD	26	Power to temp sender
RD	27	Auxiliary power
RD/BK	28	Platform level alarm
RD/WH	29	Drive motor shift (speed)
WH	30	Forward/EDC-A
WH/BK	31	Reverse/EDC-B
WH/RD	32	Brake
BK	33	Start
BK/WH	34	Start aid (glow plug or choke)
BK/RD	35	High engine speed select
BL	36	Steer clockwise
BL/BK	37	Steer counterclockwise
BL/WH	38	Gas
BL/RD	39	LP
OR	40	Limit switch signal stowed
OR/BK	41	RPM signal
OR/RD	42	Boom retracted signal
GR	43	Jib up
GR/BK	44	Jib down
GR/WH	45	AC Generator
WH	46	Drive horn
WH/BK	47	Output power enable
WH/RD	48	Work lamp
WH/BK	49	Motion lamp
BL	50	Auxiliary boom
BL/WH	51	Auxiliary steer
BL/RD	52	Auxiliary platform
WH/BK	53	Boom envelope safety valve cutoff
BK/WH	54	Power to safety interlock switches (engine)
GR/BK	55	Axle oscillation
RD	56	Foot switch/TCON estop power
RD/WH	57	Boom down safety interlock
RD/BK	58	Safety interlock to engine
GR/WH	59	Chain break circuit
GR/WH	60	Axle extend
GR	61	Axle retract
OR	62	Boom stowed (safety)
OR/RD	63	Power to boom envelope safety switch

This list continues on the next page.

WIRE CIRCUIT LEGEND

Color, Circuit #, and Primary function		
OR/BK	64	Power for operational switches
BL/WH	65	Low fuel indication
BL	66	Drive enable
BL	67	Secondary boom not stowed
RD	68	Primary boom lowered (operational)
BL	69	Primary boom #1 extended
BL/WH	70	Primary boom #2 retracted
BL/BK	71	Primary boom #2 extended
GR	72	Secondary boom extend
GR/BK	73	Secondary boom retract
RD	74	Primary #1 Lockout
RD/WH	75	Primary #2 Lockout
BL	76	Pri boom #3 extended
WH	77	Lower angle #1 operational
WH/BK	78	Upper angle #2 operational
BK	79	power from TCON ESTOP
N/A	80	Can 2.0/J1939 Shield
GR	81	Can 2.0/J1939 Low
YL	82	Can 2.0/J1939 High
GR/WH	83	Tilt signal x axis
GR/BK	84	Tilt signal y axis
GR	85	Tilt sensor power
OR	86	Hydraulic filter restricted
RD	87	Platform level safety power
RD/BK	88	Platform level safety output
BR	89	Platform level safety ground
RD/BK	90	Proximity kill
RD/WH	91	Gate Interlock
WH/BK	92	Motor speed (LO/HI)
WH/RD	93	Motor bypass
WH	94	Load sensor
OR	95	Tether ESTOP return
RD	96	Tether power
BK	97	Tether ESTOP power
WH	98	J1708 + (high)

Color, Circuit #, and Primary function		
BK	99	J1708 - (low)
WH/RD	100	Outrigger lowered
WH/BK	101	Outrigger raised
OR	102	Pothole protector up
OR/RD	103	Pothole protector down
BK/WH	104	Proprietary data buss – (i.e. ITT or AP)
BK/RD	105	Proprietary data buss + (i.e. ITT or AP)
GR	106	Spare
RD	107	Alternator field
BL/WH	108	Engine status
GR/WH	109	Sensor pwr
BK	110	Sensor return
OR	111	Steer signal
RD	112	Steer signal to solenoid valve
OR/RD	113	Multi function valve
BK/RD	114	Load moment overweight
RD/BK	115	Load moment underweight
OR	116	Hydraulic oil cooler
RD	117	Flashing beacon
OR	118	Lift speed reduction
BL	119	Hydraulic pressure sensor output
OR	120	Oil cooler fan
GR	121	Axle oscillate LEFT
GR/BK	122	Axle oscillate RIGHT
RD/BK	123	Primary boom angle signal operational
RD/WH	124	Secondary boom angle signal operational
WH/RD	125	Secondary boomlockout (Ext Enable)
WH/BK	126	Secondary boom lockout (Riser Down Enable)
GR	127	ECU test switch
OR/RD	128	Low engine speed

WIRE CIRCUIT LEGEND

Color	Circuit #	Primary function
RD/BK	129	Descent alarm
WH/RD	130	Travel alarm
BL	131	Motion alarm
GR	132	Platform load input
GR/WH	133	Platform load alarm
GR/BK	134	Key switch power
BL/WH	135	Fuel pump
RD	136	Power to safety module
RD/WH	137	Propel power (P_38)
RD/BK	138	Pri boom up/sec boom dwn-Ext (P_11/30)
WH/RD	139	Turntable rot FC safety (P_39)
OR/RD	140	Boom envelope safety
RD	141	Primary boom angle signal safety
OR	142	Secondary boom angle signal safety
BL/RD	143	Drive enable left
BL/WH	144	Drive enable right
RD/WH	145	Calibrate
BL	146	Jib bellcrank up FC
BL/BK	147	Jib bellcrank down FC
BL/WH	148	Jib bellcrank sensor
GR/WH	149	Jib Up/Down FC
GR/BK	150	Hydraulic generator bypass
GR	151	Hydraulic EDCoutput
BK	152	Injector retard
BK	153	Jib extend
BK/WH	154	Jib retract
OR/RD	155	Pressure comp enable
GR/WH	156	Jib Up/Down
BK/RD	157	Jib Ext/Ret
BL/RD	158	Spare
BL/WH	159	Steer joystick signal
WH/RD	160	Propel joystick signal
WH/BK	161	Sec boom joystick signal
OR	162	Joystick 5 VDC power

Color	Circuit #	Primary function
BL/WH	163	Pri extend/retract signal
RD/WH	164	Pri up/down signal
WH/RD	165	TT Rotate signal
OR	166	Boom length signal safety
OR/BK	167	Boom length signal operational
BL/RD	168	Primary boom hydraulic valve lockout
GR	169	Envelope active LED
WH/RD	170	Load sense relay source
WH/BK	171	Load sense relay sink
BL	172	UP/DN flow control ground
BK	173	Ext/Ret flow control ground
WH	174	Key switch power, ground position
WH/BK	175	Load sensor signal operational
GR/WH	176	Secondary extend/retract FC
BL/RD	177	Extend/retract lockout
BK	178	Control module status light
GR	179	Drive power relay
BK	180	Lift power relay
OR	181	48 Volt alternator field (or battery)
RD	182	24 Volt battery
BL	183	Envelope or load sense recovery
WH	184	Program setup enable
WH	185	Encode A
BL	186	Encode B
BL	187	Bootstrap or program enable
GR	188	Safety cross check
BK	189	Data receive
BK/WH	190	Data transmit
WH/RD	191	Multi-Function pressure relief
WH/BK	192	Jib rotate left
WH/RD	193	Jib rotate right
WH/RD	194	Speed select input
OR/RD	195	Electric brake source
YL	196	2.5V Sensor power
BR	N/A	Ground or return

Limit Switches

Types of Limit Switches

There are two types of limit switches, which are found in various locations throughout the machine: mechanical-type **operational** or **safety** switches and magnetic **proximity** switches. As in aircraft, which features redundant safety systems, each mechanical safety switch is backed up with an independently functioning proximity switch.

The mechanical-type **operational** or **safety** switches are used to sense a positive displacement or movement of the limit switch actuator, or arm, as the machine moves through its range of operational functions. Included in this group are envelope limit switches, which sense the extended length and angle of the boom, position of the axles and rotational position of the turntable.
For example, when the 53° operational switch is activated by achieving a 53° boom angle, the boom may then be extended beyond 75 feet (22.9 m).
Another example is the drive enable limit switch, which disables the drive function anytime the boom is rotated past the rear axles, indicated by the 'square' end of the drive chassis.
In some cases, the engine will be stopped if safety parameters are exceeded.

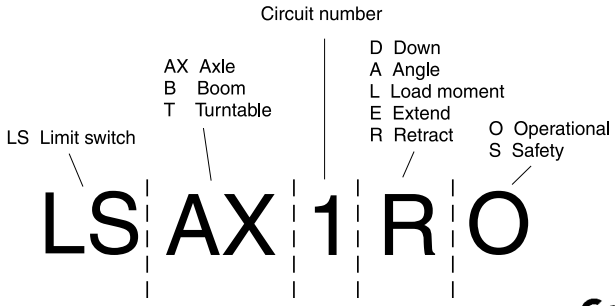
Magnetic **proximity** switches are used to sense very specific positions of a part of the machine in relation to the remainder of the machine. Proximity switches must be correctly aligned for the machine functions to operate. Proximity switches are found at the front and rear axle, the turntable and several locations on the boom.

Limit Switch Numbering

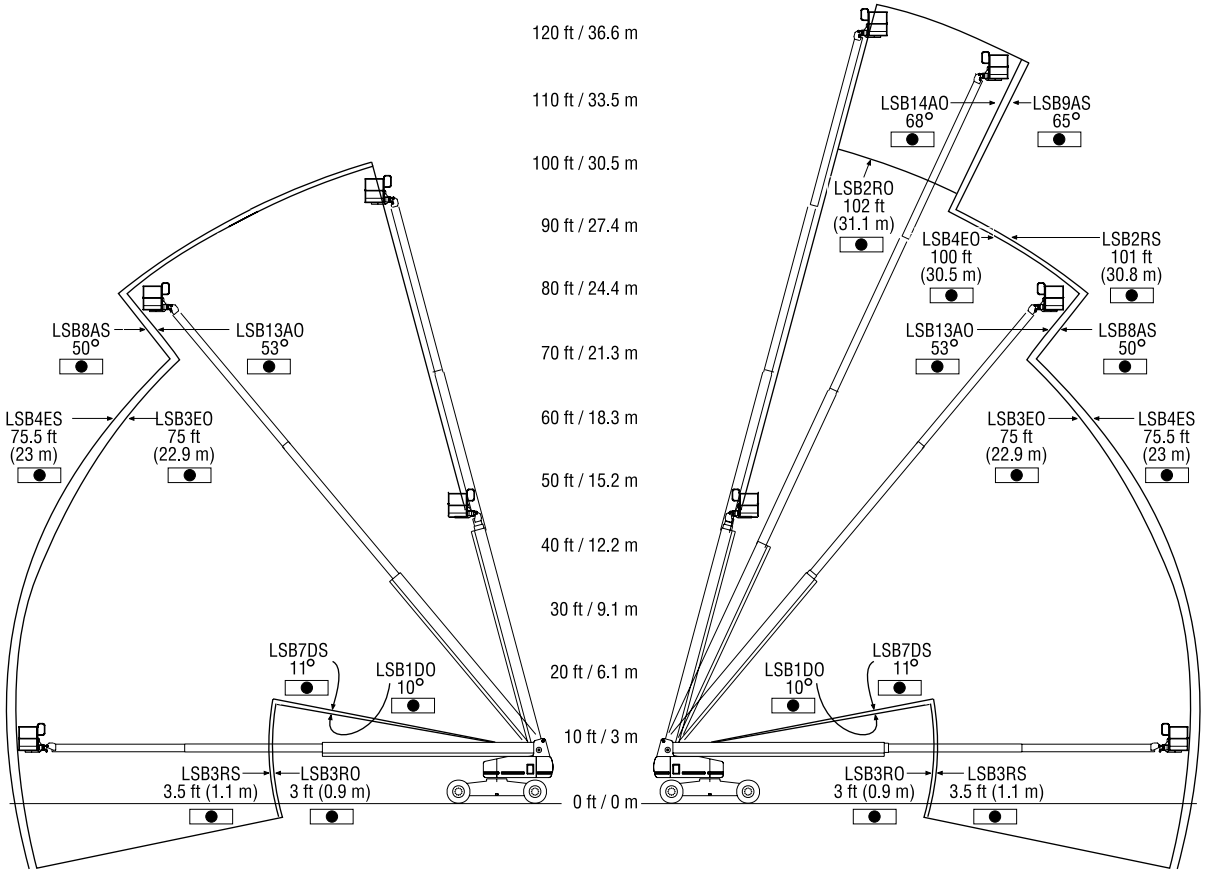
LSAX1RO	Front axle retract proximity
LSAX2RO	Rear axle retract proximity
LSAX1EO	Front axle extend proximity
LSAX2EO	Rear axle extend proximity
LSAX1ES	Front axle extend safety
LSAX2ES	Rear axle extend safety
LSB6S	Cable tension safety
LSB7DS	Boom 11° angle safety
LSB3RS	Boom 3 foot (0.9 m) extend safety
LSB2RS ••	Boom 101 feet (30.8 m) extend safety
LSB9AS ••	Boom 65° angle safety
LSB8AS	Boom 50° angle safety
LSB4ES	Boom 76 feet (23.2 m) extend safety
LST1O	Drive enable mechanical
LSB1DO	Boom 10° mechanical
LSB2RO ••	Boom >100 feet (30.5 m) retract proximity
LSB3RO	Boom >3 feet (0.9 m) stowed mechanical
LSB3EO	Boom 75 feet (22.9 m) extend proximity
LSB4EO ••	Boom 100 feet (30.5 m) extend proximity
LSB13AO	Boom 53° angle proximity
LSB14AO ••	Boom 68° angle proximity

(•• S-120HD models only)

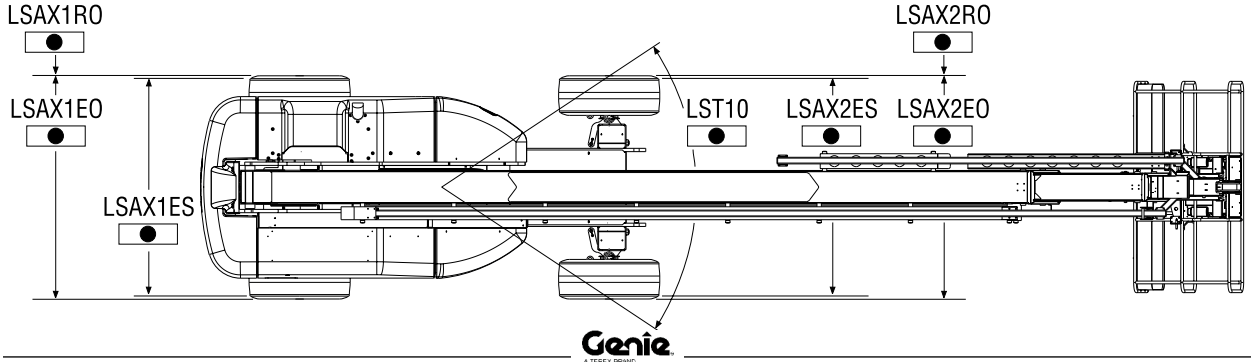
Numbering Legend



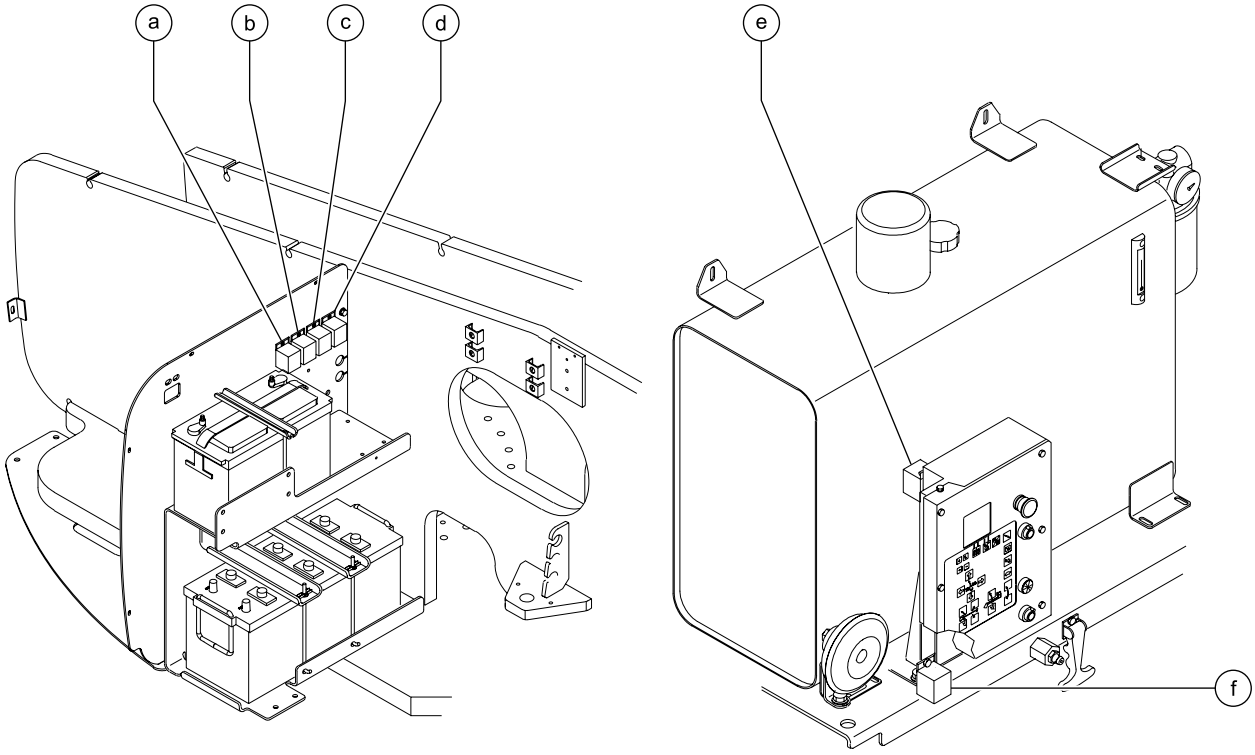
LIMIT SWITCHES



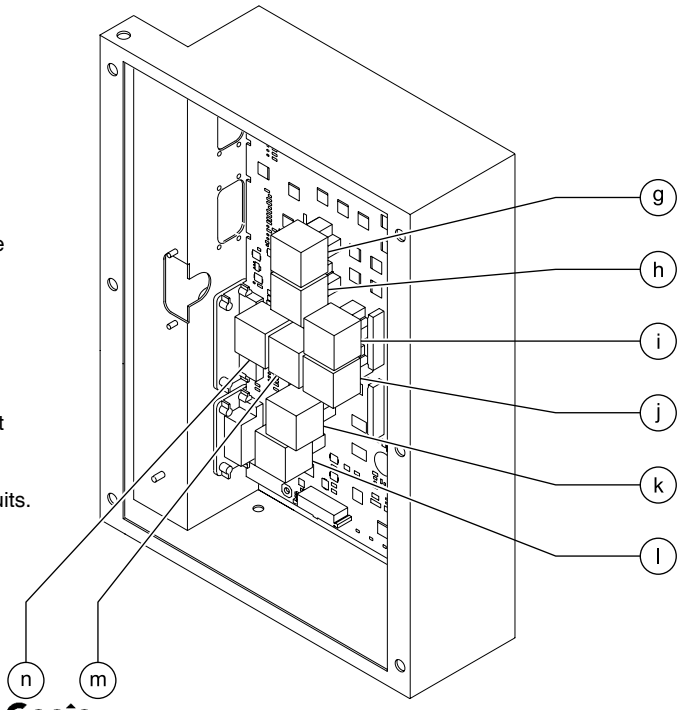
S-100HD Models **S-120HD Models**



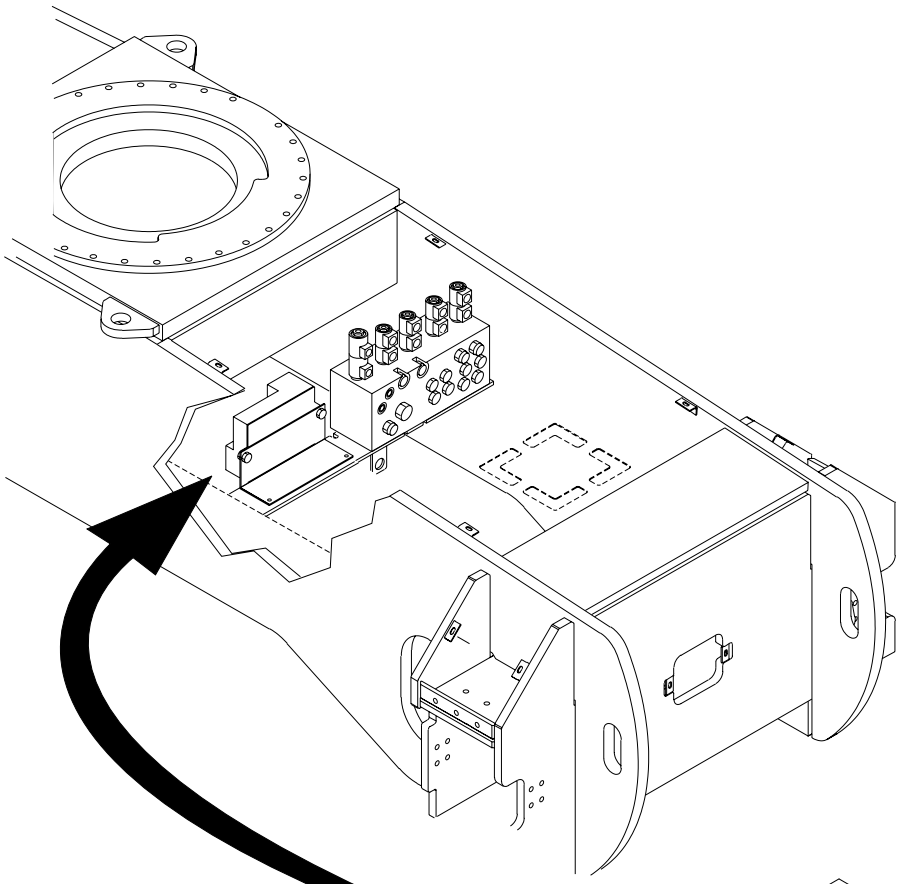
Relay Layout



a Fuel solenoid relay (Deutz models only).
b Oil cooler relay.
c Engine cold start relay.
d Starter relay.
e Horn relay.
f Flashing beacon relay.
g CR17 relay (K7) - powers C35RPM circuit (Hi/low solenoid).
h CR16 relay (K8) - powers C34SA circuit (Engine cold start).
i CR12 relay (K4) - powers primary valves 1 and 2, ignition, glow plug, starter relay, generator, and the boom retract, multifunction and platform rotate valve coils.
j CR14 relay (K2) - powers P7R or S56PRV circuit including the auxiliary valve, boom extend/retract and turntable rotate valve coils.
k CR10 relay (K6) - powers C21IGN and C107AF circuits (Fuel on/off solenoid and alternator field).
l CR15 relay (K1) - powers P22R or C03PBF circuit (Boom up/down valve coil).
m CR13 relay (K5) - powers P_7 and throttle relay.
n CR11 relay (K3) - powers P-6R2 or P54ENG circuits.



Drive Chassis Controller Pin Legend

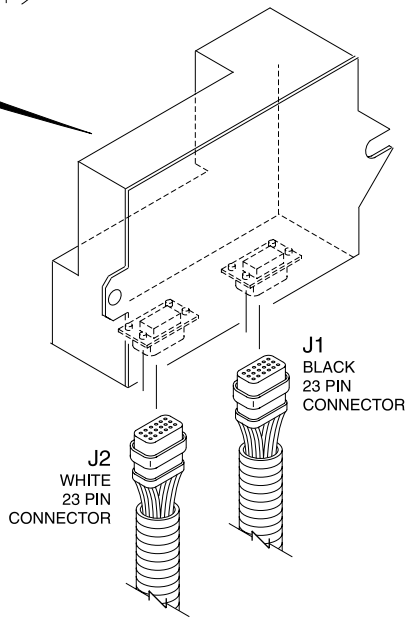


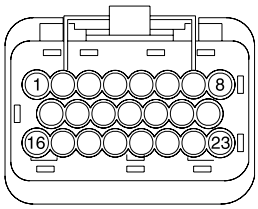
DCON
DRIVE CHASSIS CONTROLLER
J2

1 = VLVRET - BR
2 = V61AXRT - GR
3 = V60AXEX - GR/WH
4 = V29MS - RD/WH
5 = (UNUSED)
6 = (UNUSED)
7 = (UNUSED)
8 = (UNUSED)
9 = (UNUSED)
10 = (UNUSED)
11 = (UNUSED)
12 = C111RFS - OR
13 = C111LFS - OR
14 = VLVRET2 - BR
15 = V32BRK - WH/RD
16 = (UNUSED)
17 = (UNUSED)
18 = V36RFS - BL
19 = P110RT - BK
20 = P109ANG - GR/WH
21 = V37RFS - BL/BK
22 = V36LFS - BL
23 = V37LFS - BL/BK

DCON
DRIVE CHASSIS CONTROLLER
J1

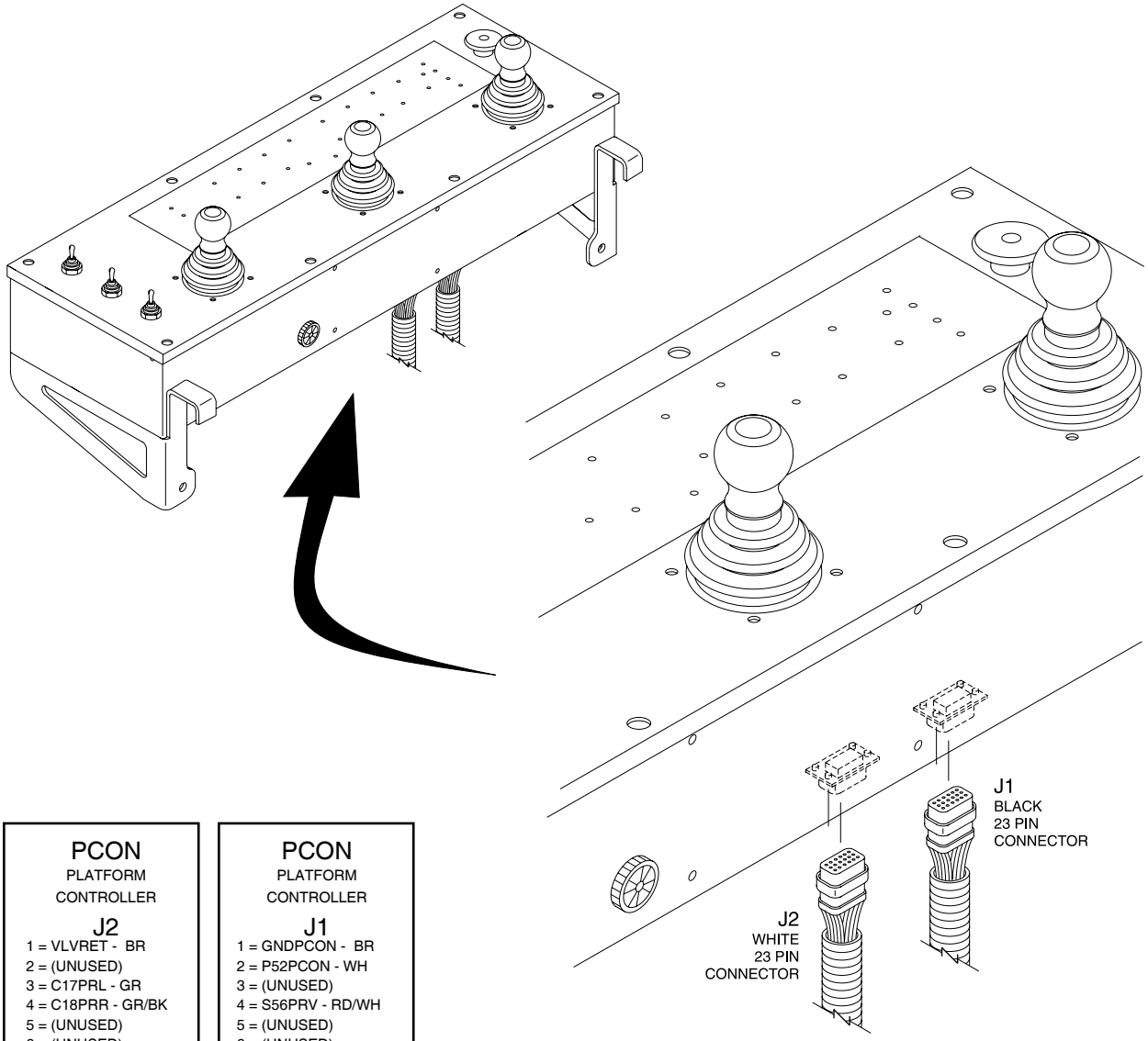
1 = GND-DCON - BR
2 = P21DCON - WH
3 = P53LS - GR
4 = (UNUSED)
5 = S56PRV - RD
6 = C61AXRT - GR
7 = (UNUSED)
8 = C61LS - GR
9 = P61LS - GR
10 = (UNUSED)
11 = (UNUSED)
12 = (UNUSED)
13 = (UNUSED)
14 = (UNUSED)
15 = C61LS(A) - GR
16 = (UNUSED)
17 = D81CAN(-) - GR
18 = D82CAN(+) - YL
19 = (UNUSED)
20 = (UNUSED)
21 = (UNUSED)
22 = (UNUSED)
23 = P61LS(A) - GR





PIN NUMBERING FOR
23 PIN
CONNECTORS

Platform Controller Pin Legend



PCON
PLATFORM
CONTROLLER

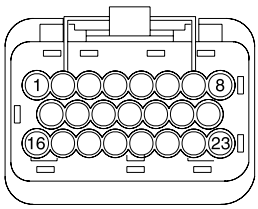
J2

1 = VLVRET - BR
2 = (UNUSED)
3 = C17PRL - GR
4 = C18PRR - GR/BK
5 = (UNUSED)
6 = (UNUSED)
7 = C14PLU - OR
8 = C15PLD - OR/BK
9 = (UNUSED)
10 = R90PXS - RD/BK
11 = C90PXS - RD/BK
12 = LDSGND - GR/YL
13 = LDSSIG - OR
14 = LDSPWR - BK
15 = C88PTS - RD/BK
16 = R56FTS - RD
17 = C56FTS - RD
18 = (UNUSED)
19 = PLATRET - BR
20 = C84TAY - GR/BK
21 = P85PTS - GR
22 = PTSRET - BR
23 = P87PTS - RD

PCON
PLATFORM
CONTROLLER

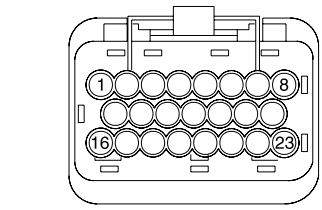
J1

1 = GNDPCON - BR
2 = P52PCON - WH
3 = (UNUSED)
4 = S56PRV - RD/WH
5 = (UNUSED)
6 = (UNUSED)
7 = P56PRV - RD
8 = (UNUSED)
9 = (UNUSED)
10 = (UNUSED)
11 = (UNUSED)
12 = (UNUSED)
13 = (UNUSED)
14 = (UNUSED)
15 = C47OUT - WH/BK
16 = C46HN - WH
17 = D81CAN(-) - GR
18 = D82CAN(+) - YL
19 = (UNUSED)
20 = (UNUSED)
21 = (UNUSED)
22 = (UNUSED)
23 = P23PCON - BK

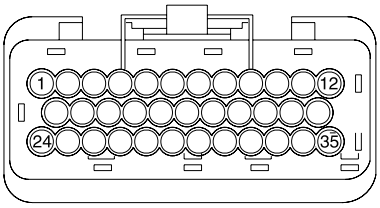


PIN NUMBERING FOR
23 PIN
CONNECTORS

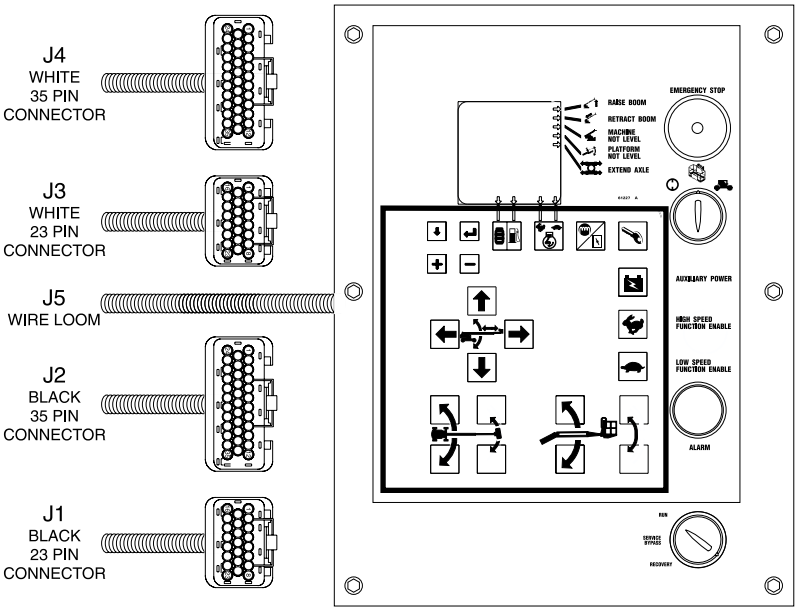
Turntable Controller Pin Legend



PIN NUMBERING FOR
23 PIN
CONNECTORS



PIN NUMBERING FOR
35 PIN
CONNECTORS



TCON
TURNTABLE
CONTROLLER

J1
1 = GNDPCON - BR
2 = P52PCON - WH
3 = C46HRN - WH
4 = C47OUT - WH/BK
5 = P23PCON - BK
6 = S56PRV - RD/WH
7 = P56PRV - RD
8 = R48LP - WH/RD
9 = R117FB - RD
10 = (UNUSED)
11 = (UNUSED)
12 = (UNUSED)
13 = (UNUSED)
14 = S132LDS - BL/WH
15 = P97TET - BK
16 = (UNUSED)
17 = D81CAN(-) - GR
18 = D82CAN(+) - YL
19 = (UNUSED)
20 = (UNUSED)
21 = (UNUSED)
22 = (UNUSED)
23 = P95TET - OR

TCON
TURNTABLE
CONTROLLER

J2
(S-120HD MODELS)
1 = GNDDCON - BR
2 = P21DCON - RD
3 = P53LS - WH/BK
4 = P54ENG - BK/WH
5 = P56PRV - RD
6 = P57PBD - RD/WH
7 = P58LS - RD/BK
8 = S59CNBK - GR/WH
9 = C60AXEX - GR/WH
10 = C61AXRT - GR
11 = S62BSTO - OR
12 = P63LS - OR/RD
13 = C64LS - OR/BK
14 = C65LOFL - BL/WH
15 = C66DREN - BL
16 = (UNUSED)
17 = C68PBD - RD
18 = C69PBE - BK
19 = C70PBE - BL/WH
20 = C71PBE - BL/BK
21 = (UNUSED)
22 = (UNUSED)
23 = V74PRLO - RD
24 = V75PRLO - RD/WH
25 = SNSR GND - BR
26 = (UNUSED)
27 = G119SR - BL
28 = C76PBE - BL
29 = C77AS - WH
30 = C78PS - WH/BK
31 = (UNUSED)
32 = (UNUSED)
33 = (UNUSED)
34 = (UNUSED)
35 = VLVRET1 - BR

TCON
TURNTABLE
CONTROLLER

J2
(S-100HD MODELS)
1 = GNDDCON - BR
2 = P21DCON - RD
3 = P53LS - WH/BK
4 = P54ENG - BK/WH
5 = P56PRV - RD
6 = P57PBD - RD/WH
7 = P58LS - RD/BK
8 = S59CNBK - GR/WH
9 = C60AXEX - GR/WH
10 = C61AXRT - GR
11 = S62BSTO - OR
12 = P63LS - OR/RD
13 = C64LS - OR/BK
14 = C65LOFL - BL/WH
15 = C66DREN - BL
16 = (UNUSED)
17 = C68PBD - RD
18 = C69PBE - BK
19 = C70PBE - BL/WH
20 = C71PBE - BL/BK
21 = (UNUSED)
22 = (UNUSED)
23 = (UNUSED)
24 = (UNUSED)
25 = SNSR GND - BR
26 = (UNUSED)
27 = G119SR - BL
28 = (UNUSED)
29 = C77AS - WH
30 = (UNUSED)
31 = (UNUSED)
32 = (UNUSED)
33 = (UNUSED)
34 = (UNUSED)
35 = (UNUSED)

TCON
TURNTABLE
CONTROLLER

J3
1 = (UNUSED)
2 = R35RPM - BK/RD
3 = C21IGN - WH
4 = C34SA - BK/WH
5 = (UNUSED)
6 = (UNUSED)
7 = C46HRN - WH
8 = (UNUSED)
9 = C33STR - BK
10 = C31EDC (-) WH/BK
11 = C30EDC (+) WH
12 = C25PSR - WH/BK
13 = C26TSR - WH/RD
14 = RET85TTSR - BR
15 = P85TTSR - GR
16 = VLVRET2 - BR
17 = (UNUSED)
18 = C41RPM - OR/BK
19 = C107AF - RD
20 = C83TAX - GR/WH
21 = C84TAY - GR/BK
22 = C45GEN - GR/WH
23 = (UNUSED)

TCON
TURNTABLE
CONTROLLER

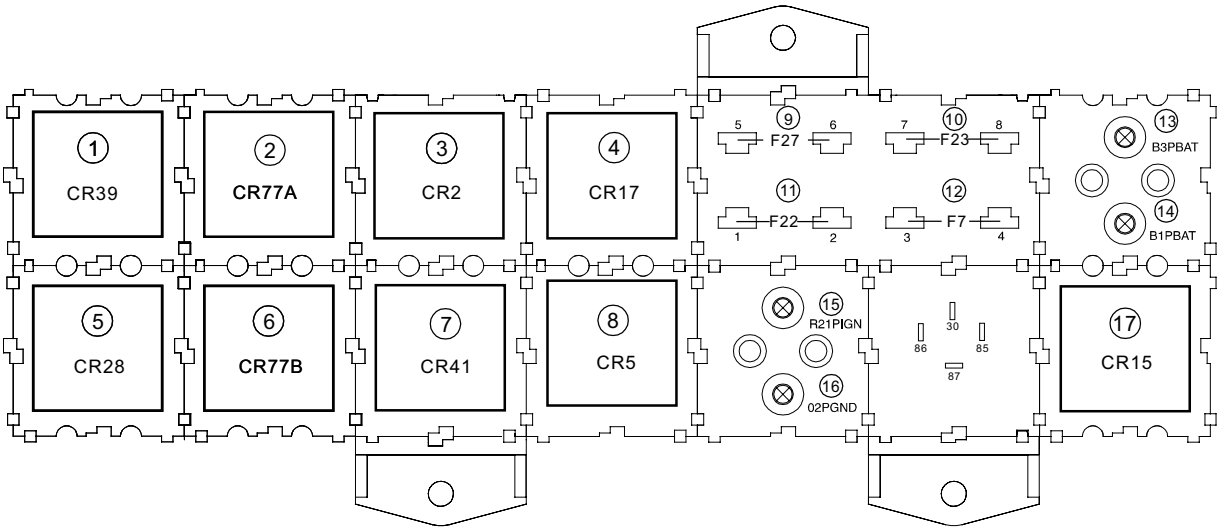
J5
1 = BATVLV - RD
2 = BATGND - BR
3 = BATGND - BR
4 = BATECU - RD

TCON
TURNTABLE
CONTROLLER

J4
1 = VLVRET4 - BR
2 = C03PBF - RD/WH
3 = C09PERF - BK/RD
4 = C06TRF - WH/RD
5 = (UNUSED)
6 = (UNUSED)
7 = C01PBU - RD
8 = C02PBD - RD/BK
9 = C07PBE - BK
10 = C08PBR - BK/WH
11 = (UNUSED)
12 = (UNUSED)
13 = (UNUSED)
14 = (UNUSED)
15 = S2PLD2 - GR/BK
16 = S7PLE2 - GR/WH
17 = S7PLE1 - BL/BK
18 = S2PLD1 - BL/RD
19 = (UNUSED)
20 = (UNUSED)
21 = (UNUSED)
22 = (UNUSED)
23 = C113MFV - OR/RD
24 = (UNUSED)
25 = C04TRL - WH
26 = C05TRR - WH/BK
27 = VLVRET7 - BR
28 = (UNUSED)
29 = (UNUSED)
30 = VLVRET6 - BR
31 = (UNUSED)
32 = C27AUX - RD
33 = (UNUSED)
34 = (UNUSED)
35 = (UNUSED)

Engine Relay and Fuse Panel Legend - Deutz TD2.9 Models

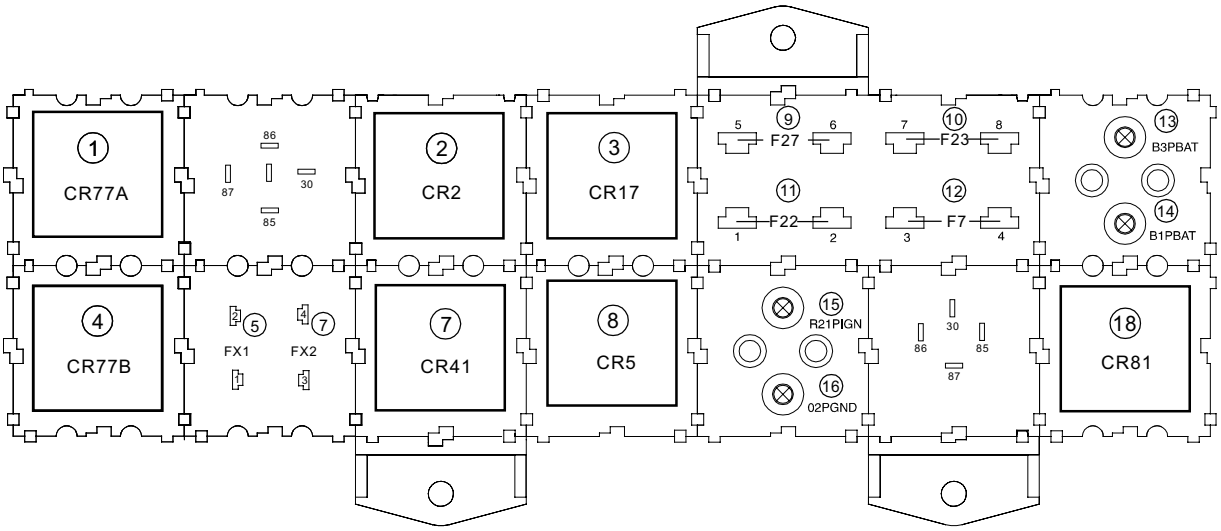
Deutz TD2.9 Models



Number	Component	Description
1	CR39	Engine Shutdown
2	CR77A	PCE # 1
3	CR2	Engine Alt. Relay
4	CR17	Hydraulic Oil Cooler / Fan Relay
5	CR28	Fuel Pump
6	CR77B	PCE#2
7	CR41	Flashing Beacon Relay
8	CR5	Horn Relay
9	F27	Fuse, 20A, RPM Solenoid
10	F23	Fuse, 30A, Eng / Start / Fuel
11	F22	Fuse, 60A, Glow Plug
12	F7	Fuse, 20A, Hydraulic Oil Cooler / Horn
13	B3BAT	Fused Power from B1
14	B1BAT	Power from Battery
15	R21PIGN	Ignition
16	02PGND	Ground
17	CR17	Glow Plug Relay

Engine Relay and Fuse Panel Legend - Perkins 854F Models

Perkins 854F-34T Models

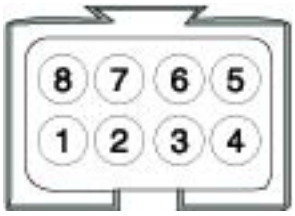


Number	Component	Description
1	CR77A	PCE # 1
2	CR2	Engine Alt
3	CR17	Hydraulic Oil Cooler Fan Relay
4	CR77B	PCE#2
5	FX1	Fuse, 30A, ECU Power
6	FX2	Fuse, 20A, Key Switch Power
7	CR41	Flashing Beacon Relay
8	CR5	Horn Relay
9	F27	Fuse, 20A, RPM Solenoid
10	F23	Fuse, 30A, Eng / Start / Fuel
11	F22	Fuse, 60A, Glow Plug
12	F7	Fuse, 20A, Hydraulic Oil Cooler / Horn
13	B3BAT	Fused Power from B1
14	B1BAT	Power from Battery
15	R21PIGN	Ignition
16	02PGND	Ground
17	CR1	Engine Starter
18	CR81	ECU Power

Telematics Connector Pin Legend

Genie installed Telematics connector is wried with an Active High digital input.

Connector Pin Numbering



Note: A Deutsch plug p/n DT06-08SA mates with the Genie Telematics connector.

Pin	Circuit Type	Circuit Properties	Genie Machine Function(s)	Telematics Use Case
1	System Power	12VDC 5 Amp Max. allowed draw	Battery Positive - constant power	Supply power to device
2	System Ground	0VDC	Battery Negative	Device Ground
3	Digital Output 1	12VDC	Engine Run Hour Meter 12V = engine run, 0V = engine off	Monitor Engine Hours
4	Digital Output 2	12VDC	Key Switch Activation 12V = key switch run, 0V = key switch off	Monitor mechine utilization
5	Digital Output 3	12VDC	Foot Switch 12V = active, 0V = inactive	Monitor mechine utilization
6	Digital Input 1	12VDC	Remote Disable Engine Start	Remotely Prevent Engine Start
7*	Databus H	CAN HIGH	Genie Databus	J1939 Engine Messages, Receive Proprietary Genie Telematics Message
8*	Databus L	CAN LOW	Genie Databus	J1939 Engine Messages, Receive Proprietary Genie Telematics Message

*Tier IV engine models only, J1939 engine message available.

*Genie proprietary databus support.

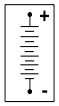
Wireless Certifications

Telematic device(s) should comply with specific wireless carrier certifications where applicable and comply with the following:

North America PTCRB, FCC/IC

Europe CE, R&TTE

Electrical Symbols Legend



Battery



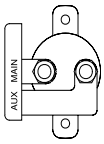
Chassis ground



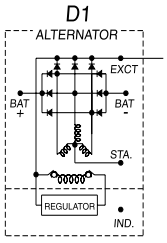
Fuse
with amperage



Circuit breaker
with amperage



Battery separator

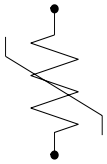


ALTERNATOR



Coil

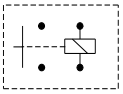
Diode



Current limiting
device



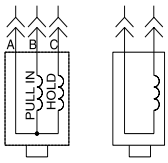
Relay



Power relay



Horn



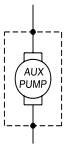
Fuel solenoid



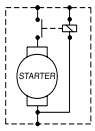
HIGH/LOW SPEED
SOLENOID



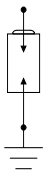
Auxiliary fan



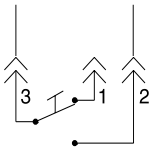
Auxiliary pump



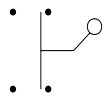
Starter motor



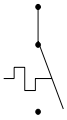
Engine cold
start ignitor



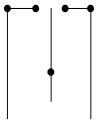
Foot switch



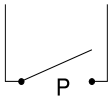
Fan belt
break switch



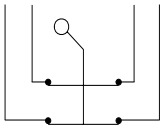
Temperature switch



Toggle switch



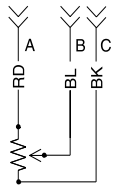
Proximity switch



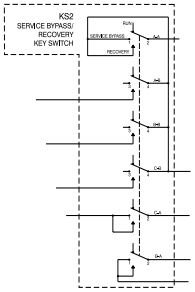
Proximity
kill switch



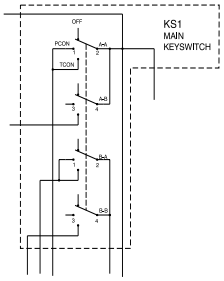
Sending unit



Steer sensor



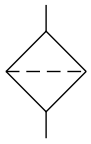
Service bypass/recovery
key switch

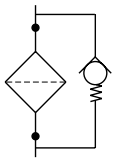


Main key switch

Hydraulic Symbols Legend


Oil cooler


Filter


Filter with bypass valve



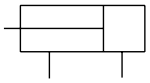
Pump prime mover engine or motor

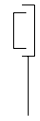


Fixed displacement pump with gpm and (L/min)


Bi-directional pump


Swash plate

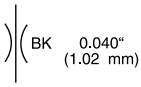

Double acting cylinder


Brake


Check valve

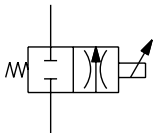

Test port

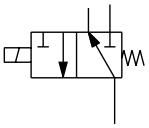

Shutoff valve

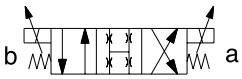


Orifice with size

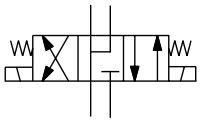

Bi-directional motor

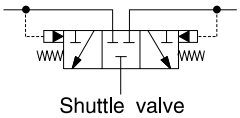

Solenoid operated proportional valve

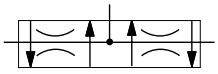

Solenoid operated 2 position, 3 way directional valve

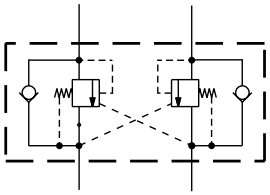


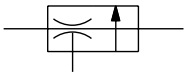
Electronic displacement controller (EDC)

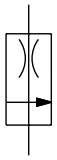

Solenoid operated 3 position, 4 way directional valve

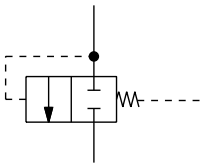

Shuttle valve

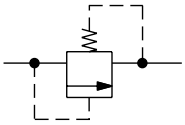

Flow divider/combiner valve

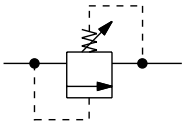

Counterbalance valve

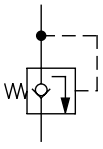

Priority flow regulator


Flow regulator


Differential sensing valve


Relief valve


Adjustable relief valve


Relief valve with an incorporated check valve

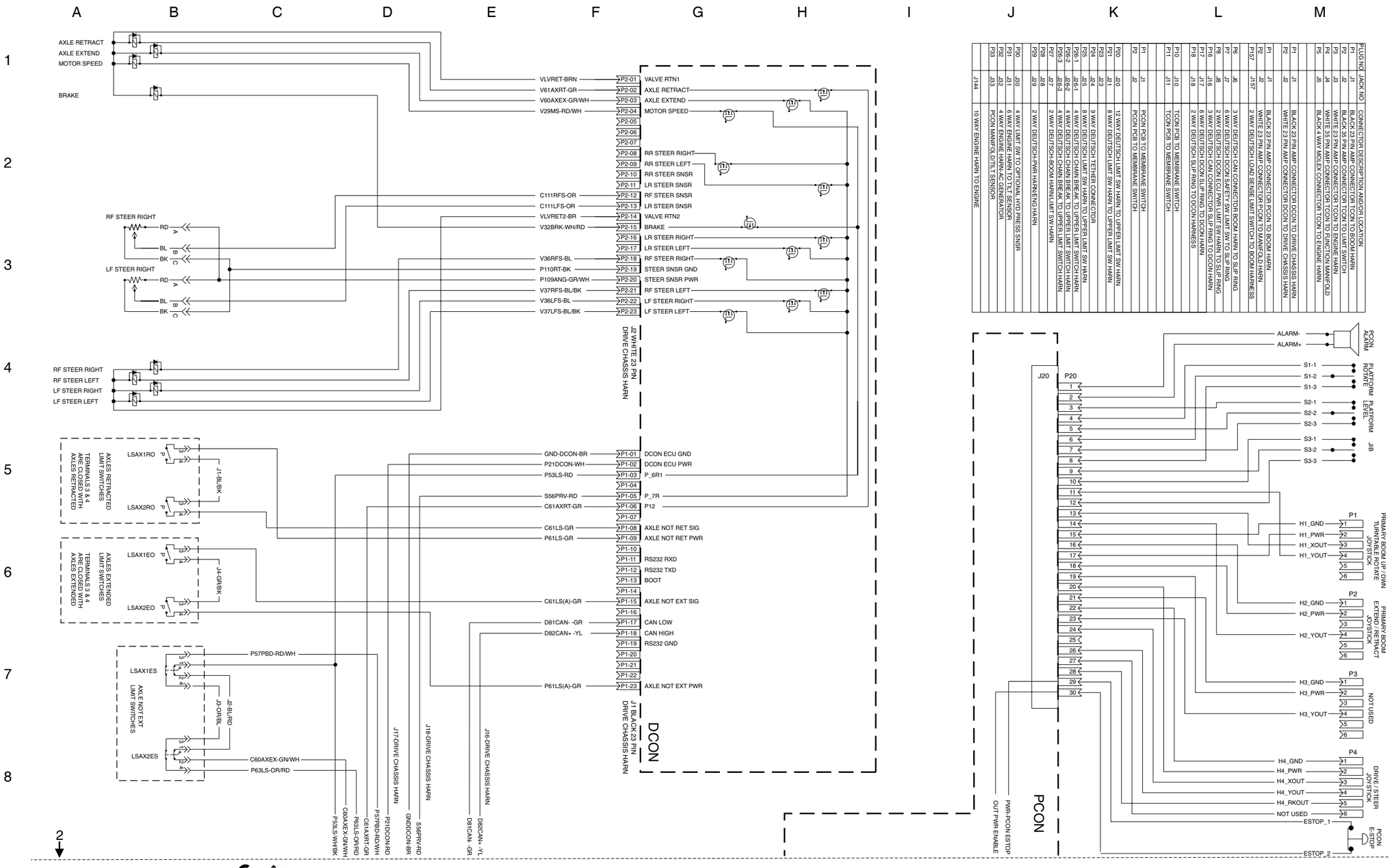
Electrical Schematic, View 1

S-100HD Models



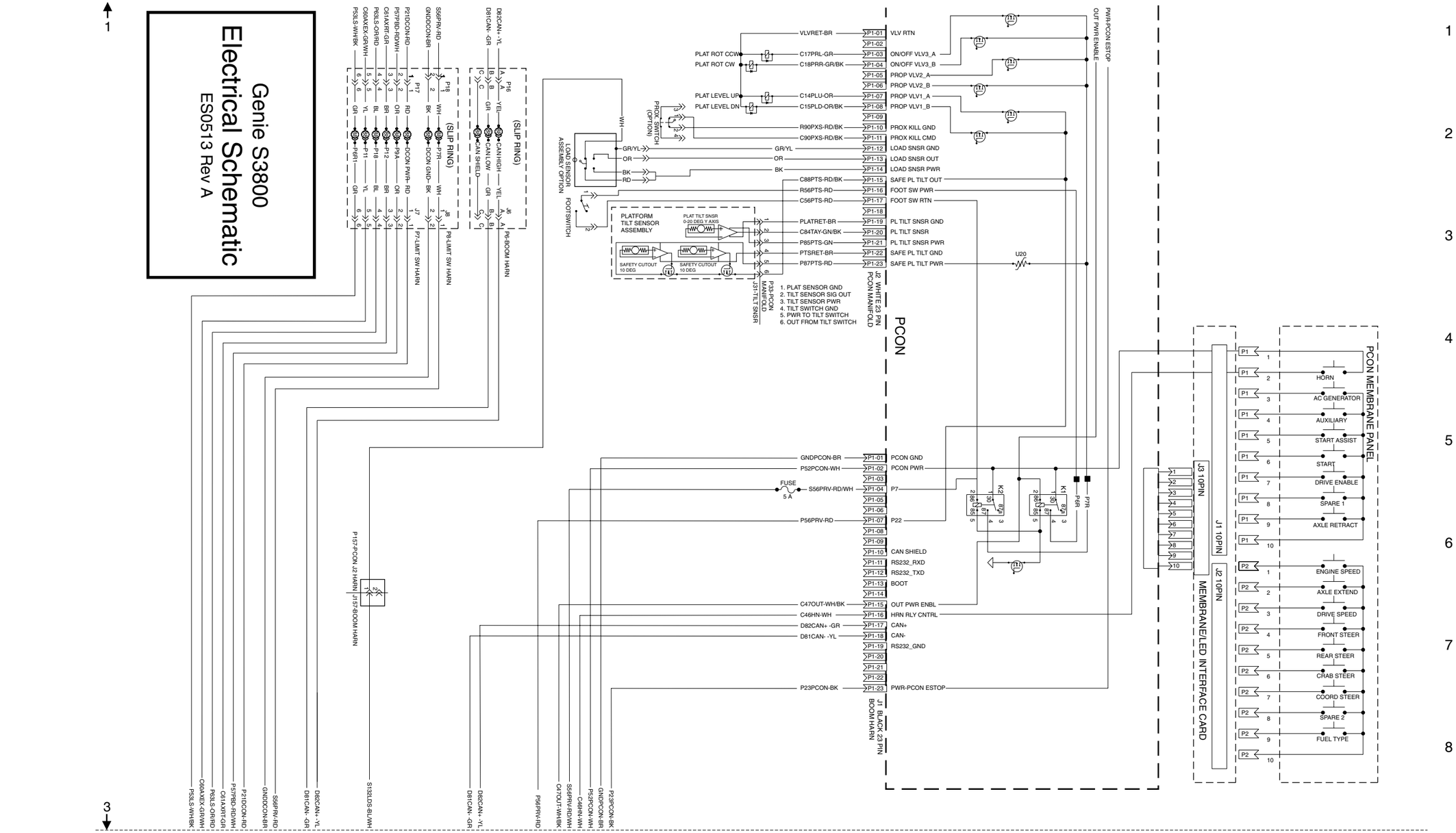
Electrical Schematic, View 1

S-100HD Models

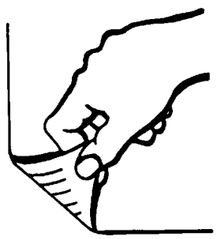


Electrical Schematic, View 2
S-100HD Models

Genie S3800
Electrical Schematic
ES0513 Rev A



Electrical Schematic, View 2
S-100HD Models



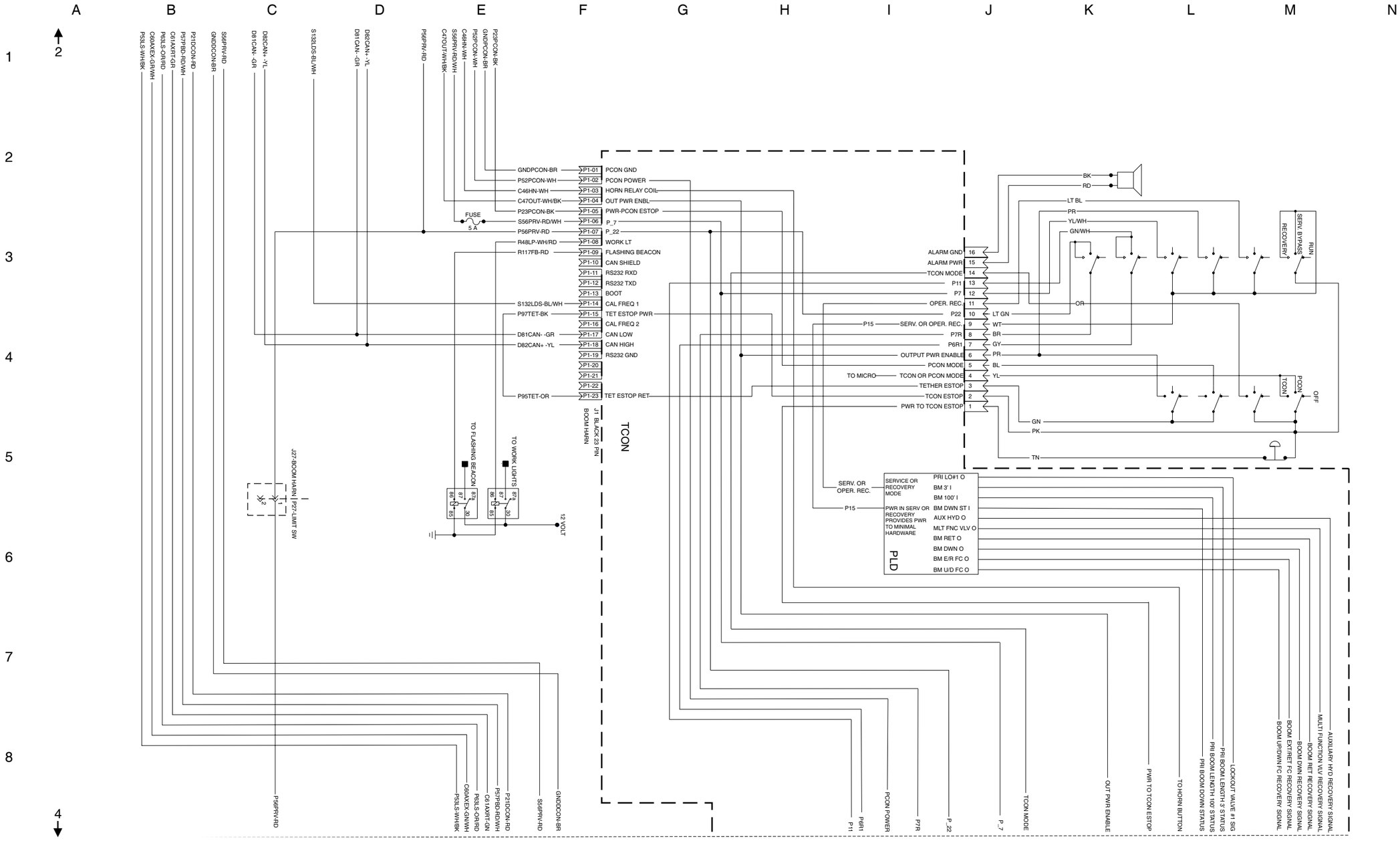
Electrical Schematic, View 3

S-100HD Models

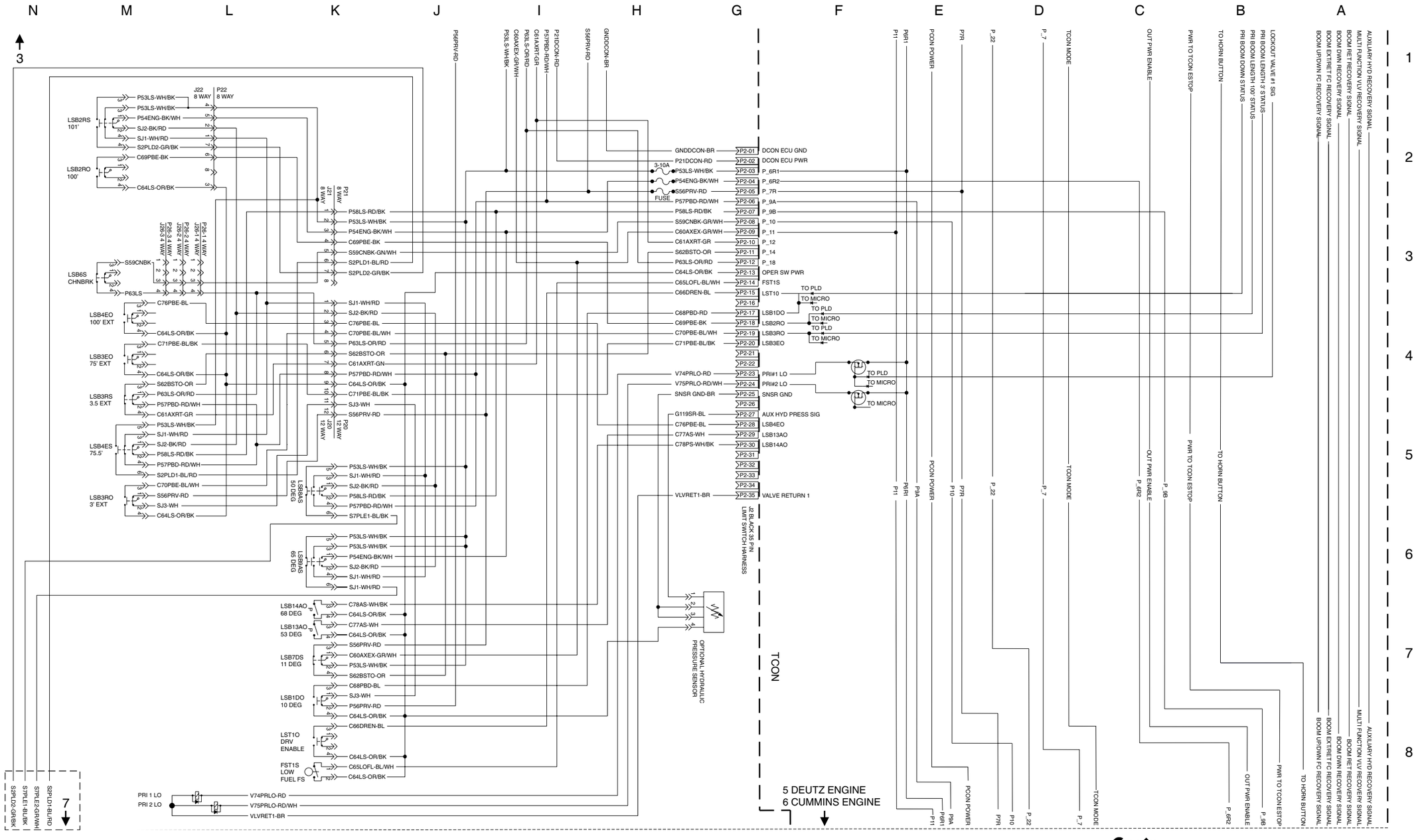


Electrical Schematic, View 3

S-100HD Models

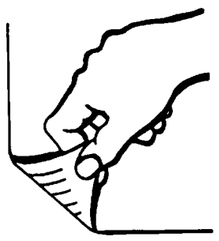


Electrical Schematic, View4
S-100HD Models



Electrical Schematic, View4

S-100HD Models



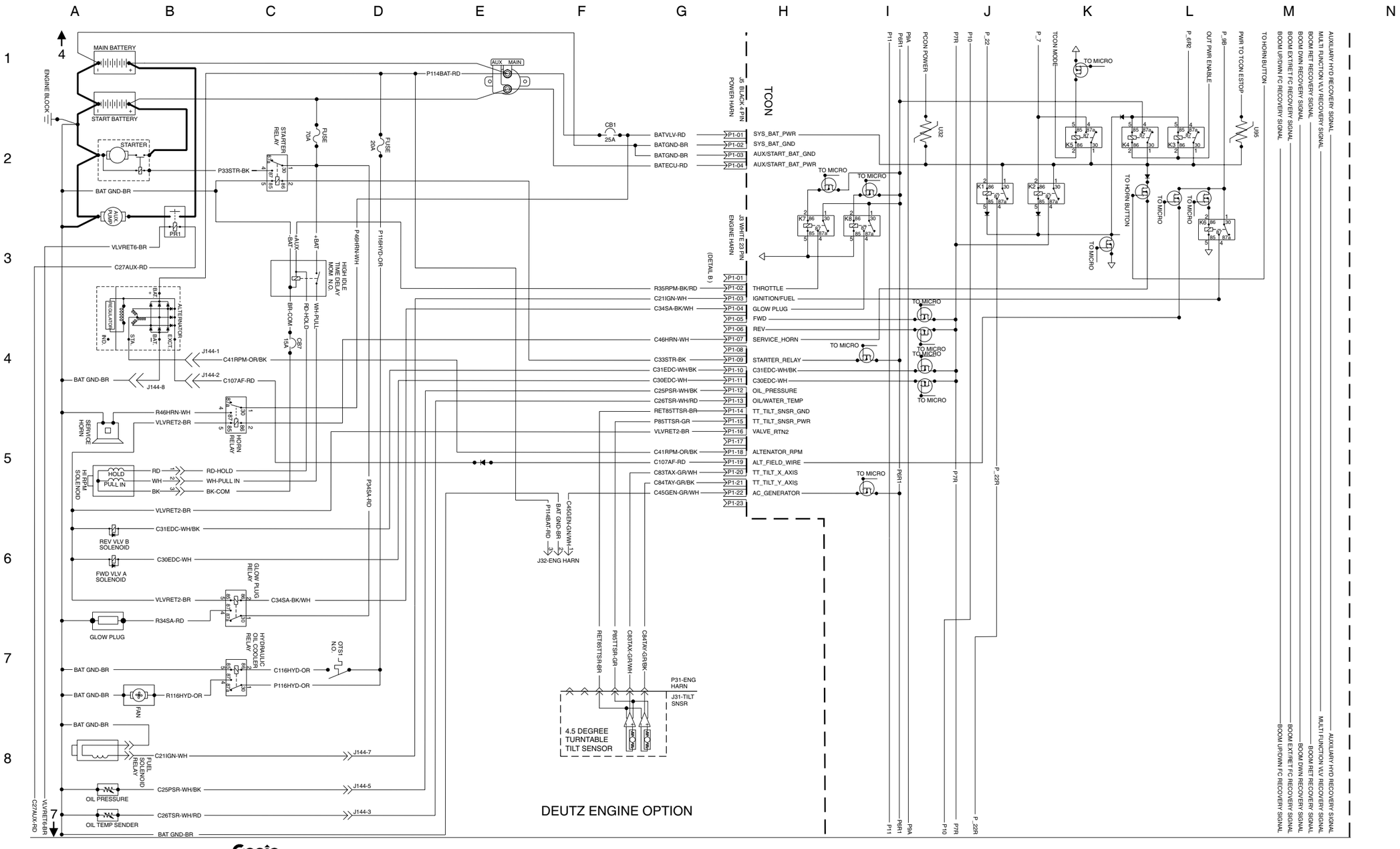
Electrical Schematic, View 5

S-100HD Models



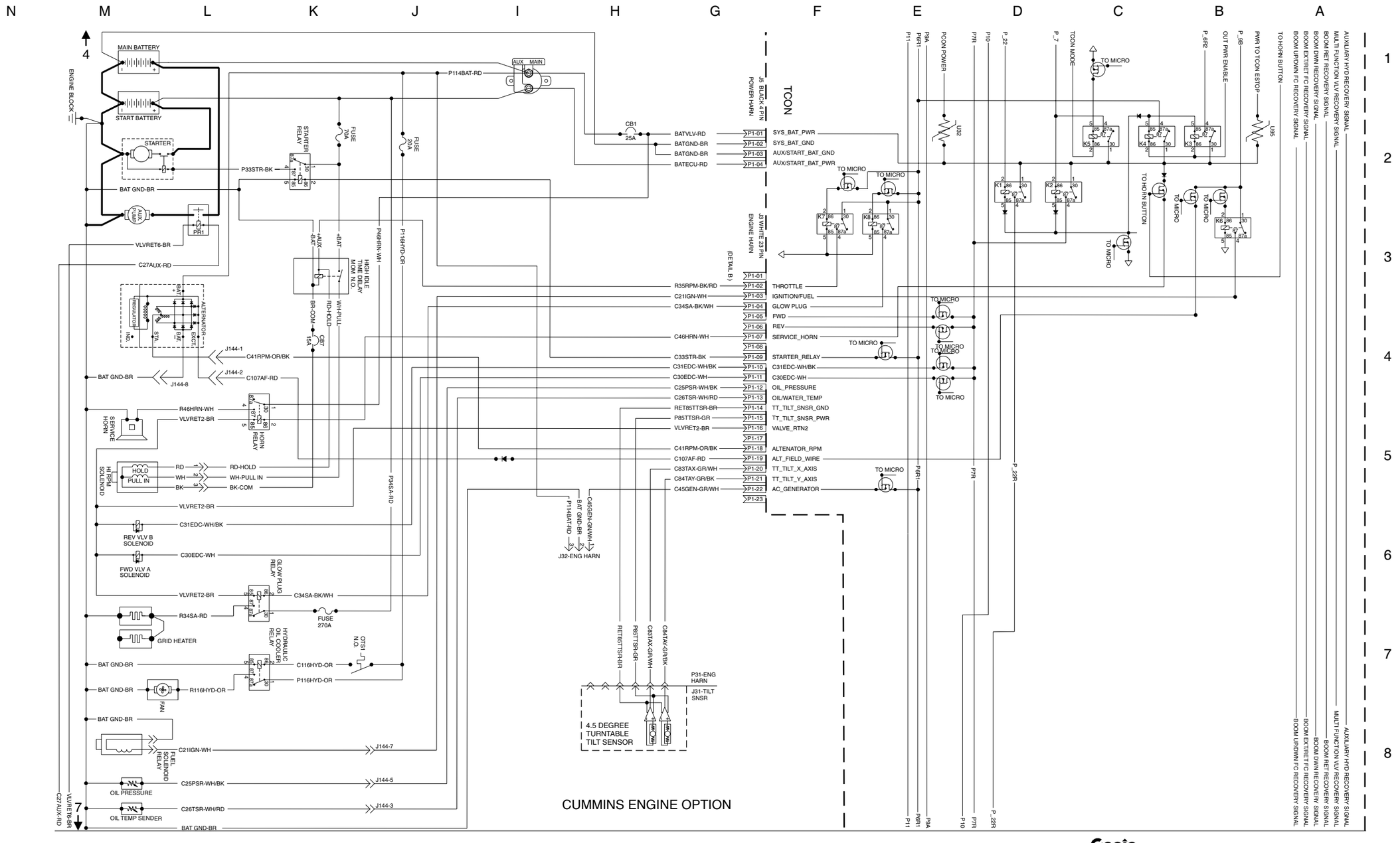
Electrical Schematic, View 5

S-100HD Deutz Engine Models



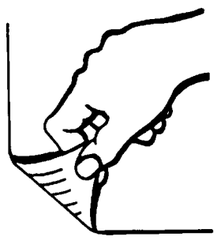
Electrical Schematic, View 6

S-100HD Cummins Engine Models



Electrical Schematic, View 6

S-100HD Models



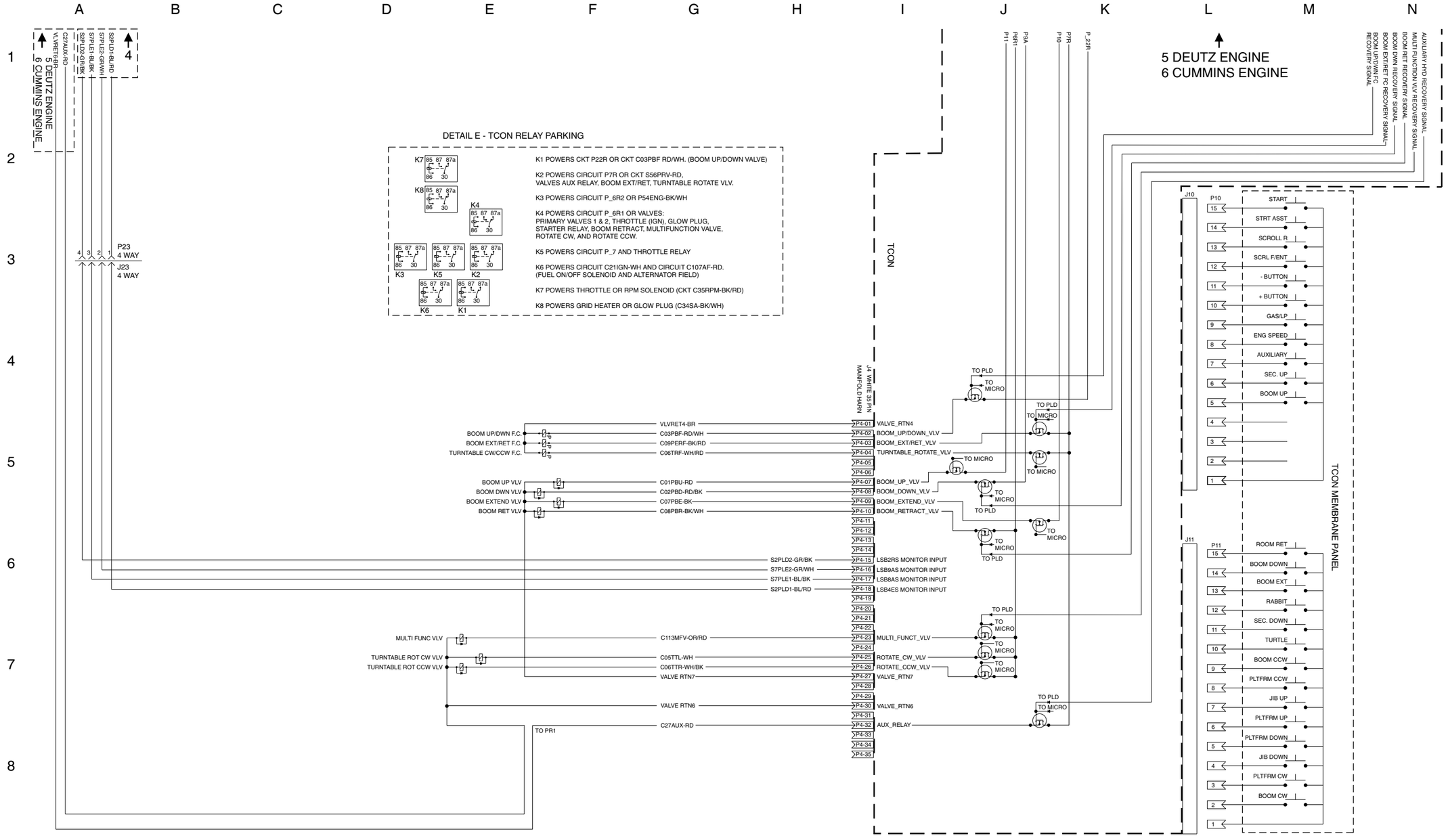
Electrical Schematic, View 7

S-100HD Models

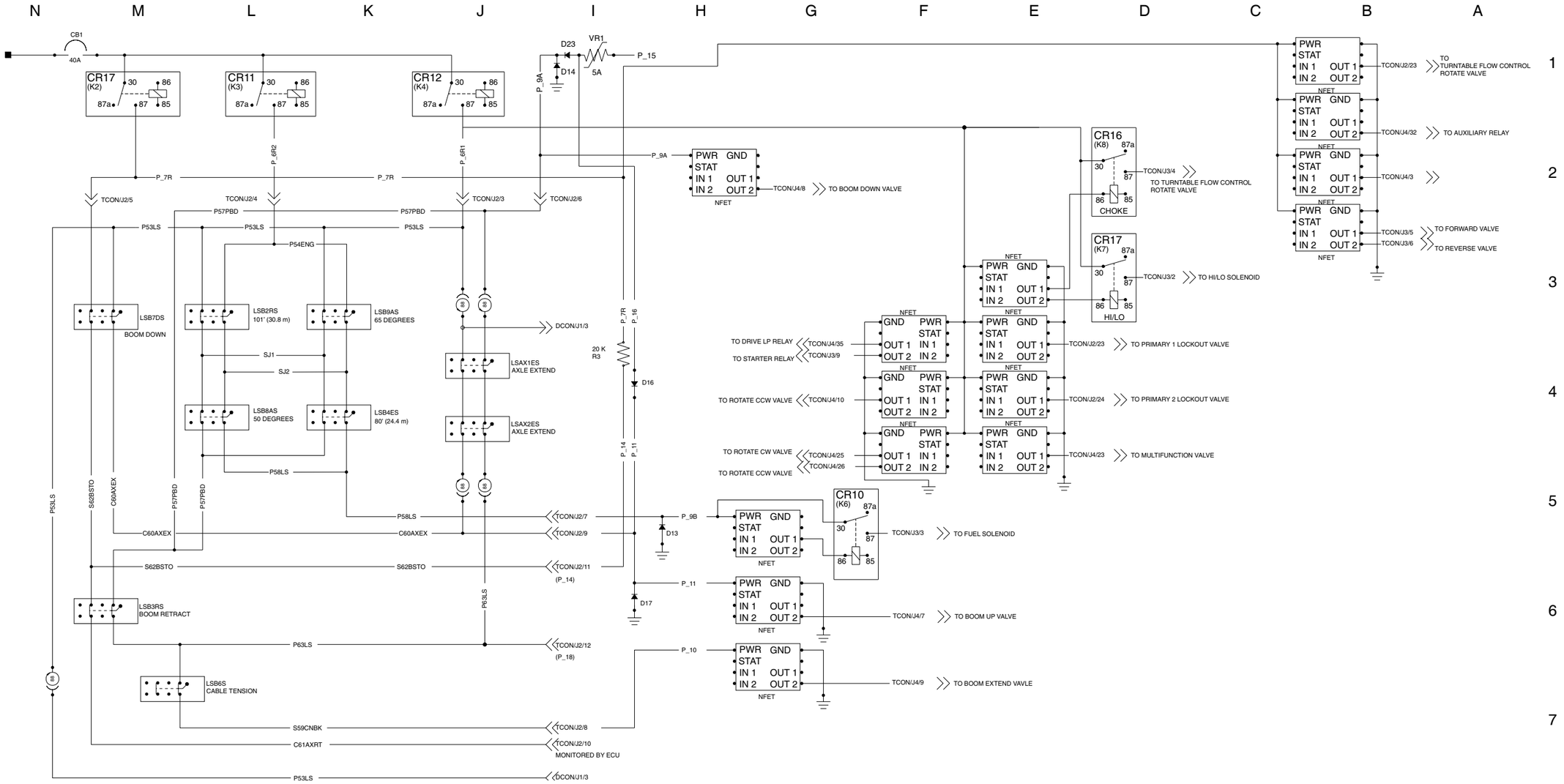


Electrical Schematic, View 7

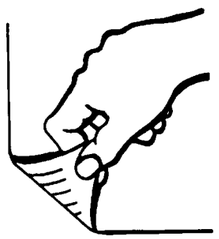
S-100HD Models



Safety Circuit Schematic, S-100HD Models



Safety Circuit Schematic,
S-100HD Models

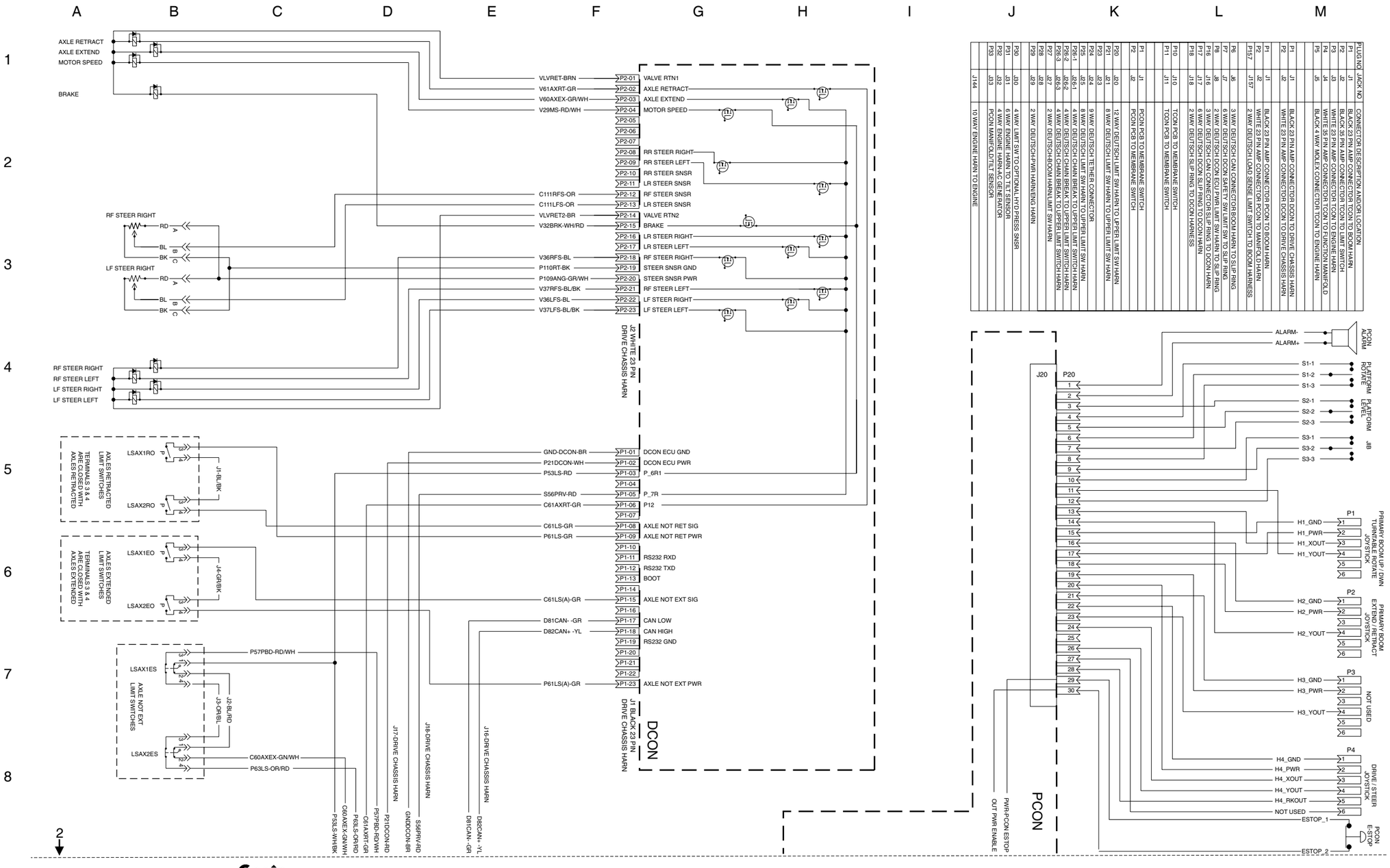


Electrical Schematic, View 1
S-120HD Models



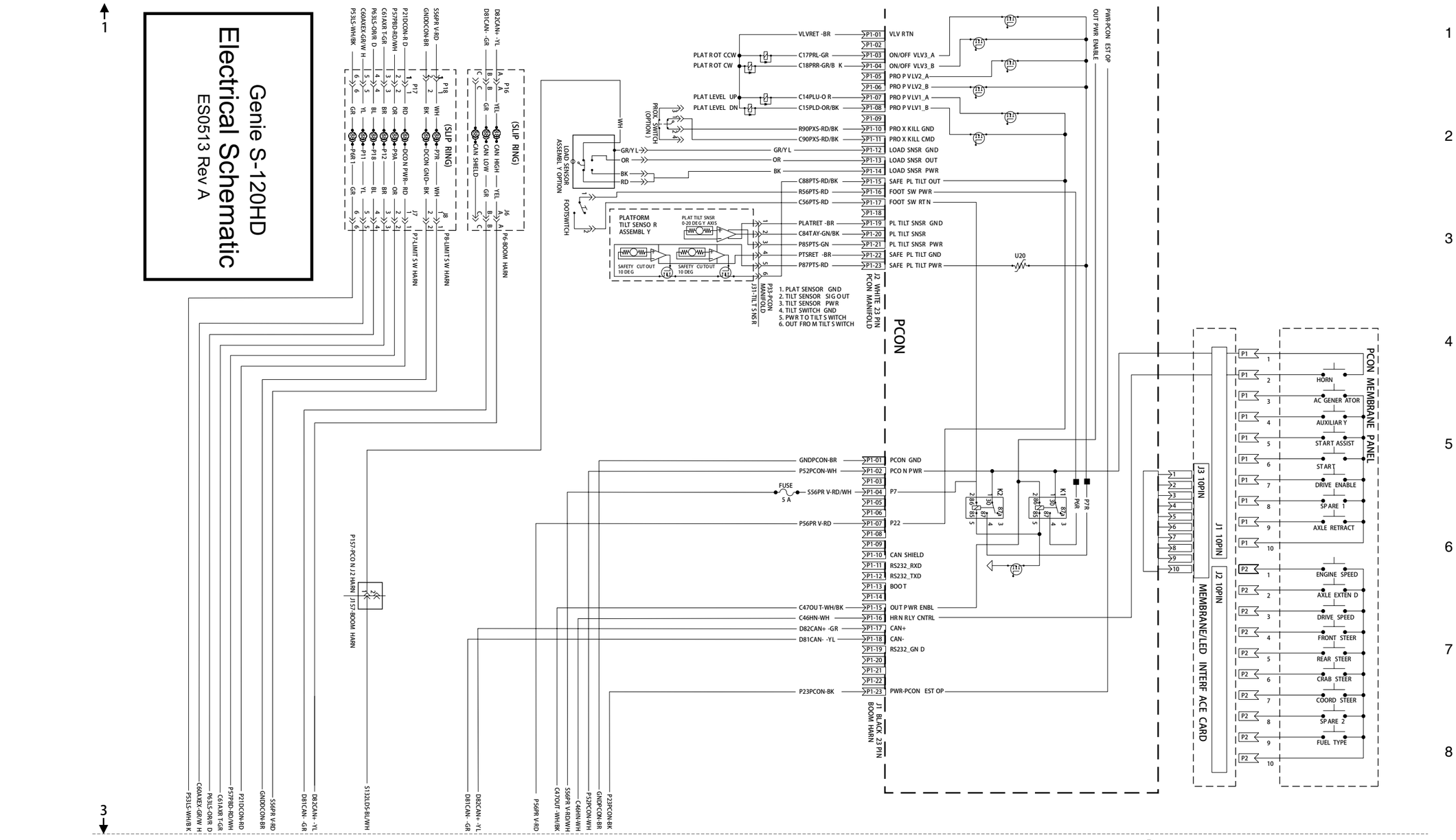
Electrical Schematic, View 1

S-120HD Models

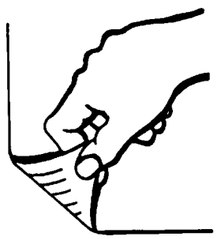


Electrical Schematic, View 2
S-120HD Models

Genie S-120HD
Electrical Schematic
ES0513 Rev A



Electrical Schematic, View 2
S-120HD Models



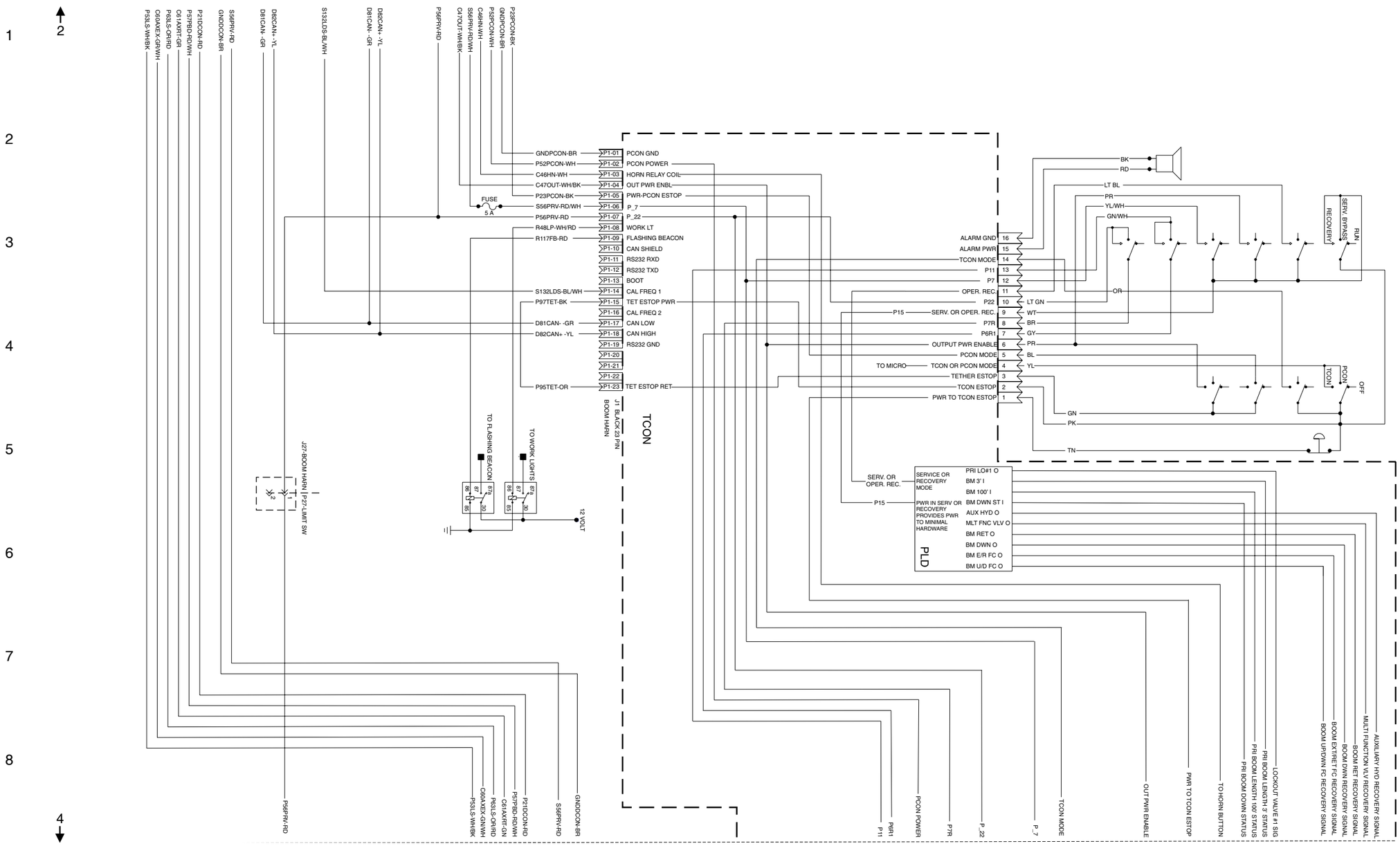
Electrical Schematic, View 3

S-120HD Models

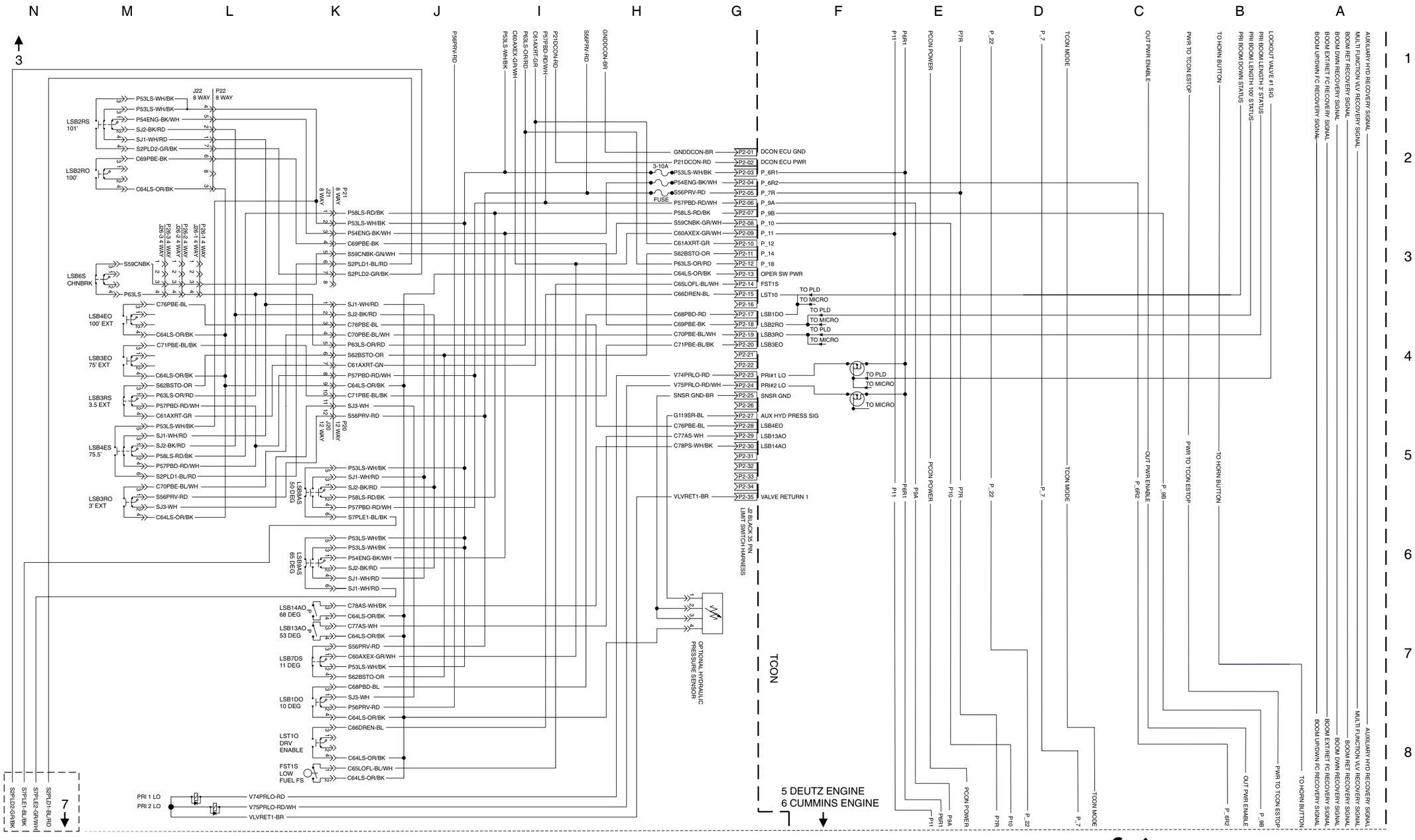


Electrical Schematic, View 3

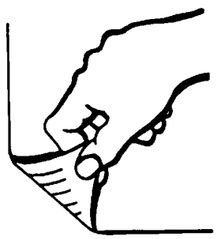
S-120HD Models



Electrical Schematic, View 4
S-120HD Models



Electrical Schematic, View 4
S-120HD Models



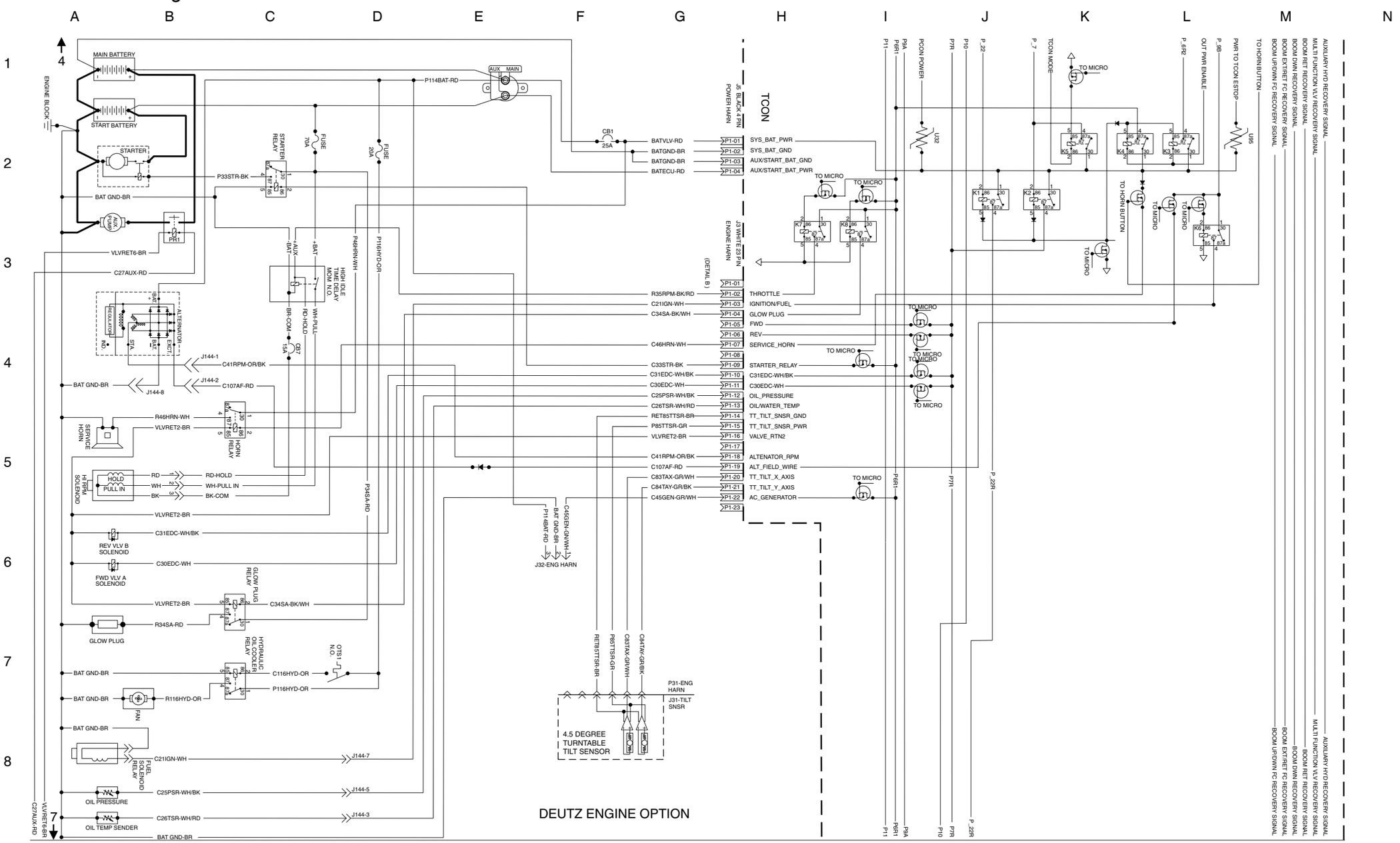
Electrical Schematic, View 5

S-120HD Models



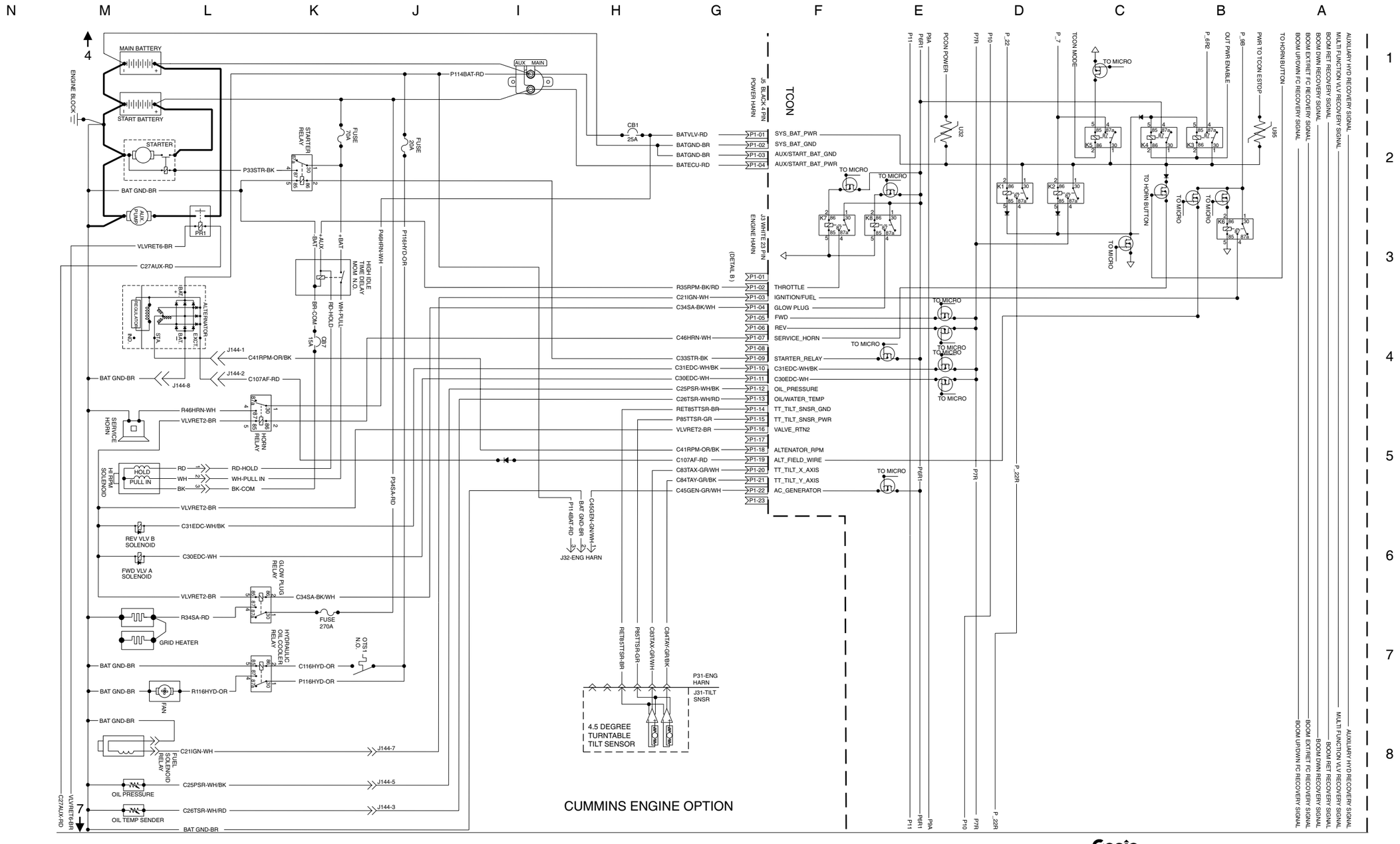
Electrical Schematic, View 5

S-120HD Deutz Engine Models

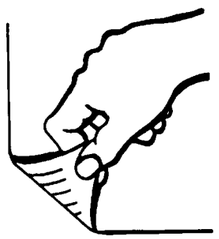


Electrical Schematic, View 6

S-120HD Cummins Engine Models



Electrical Schematic, View 6
S-120HD Models



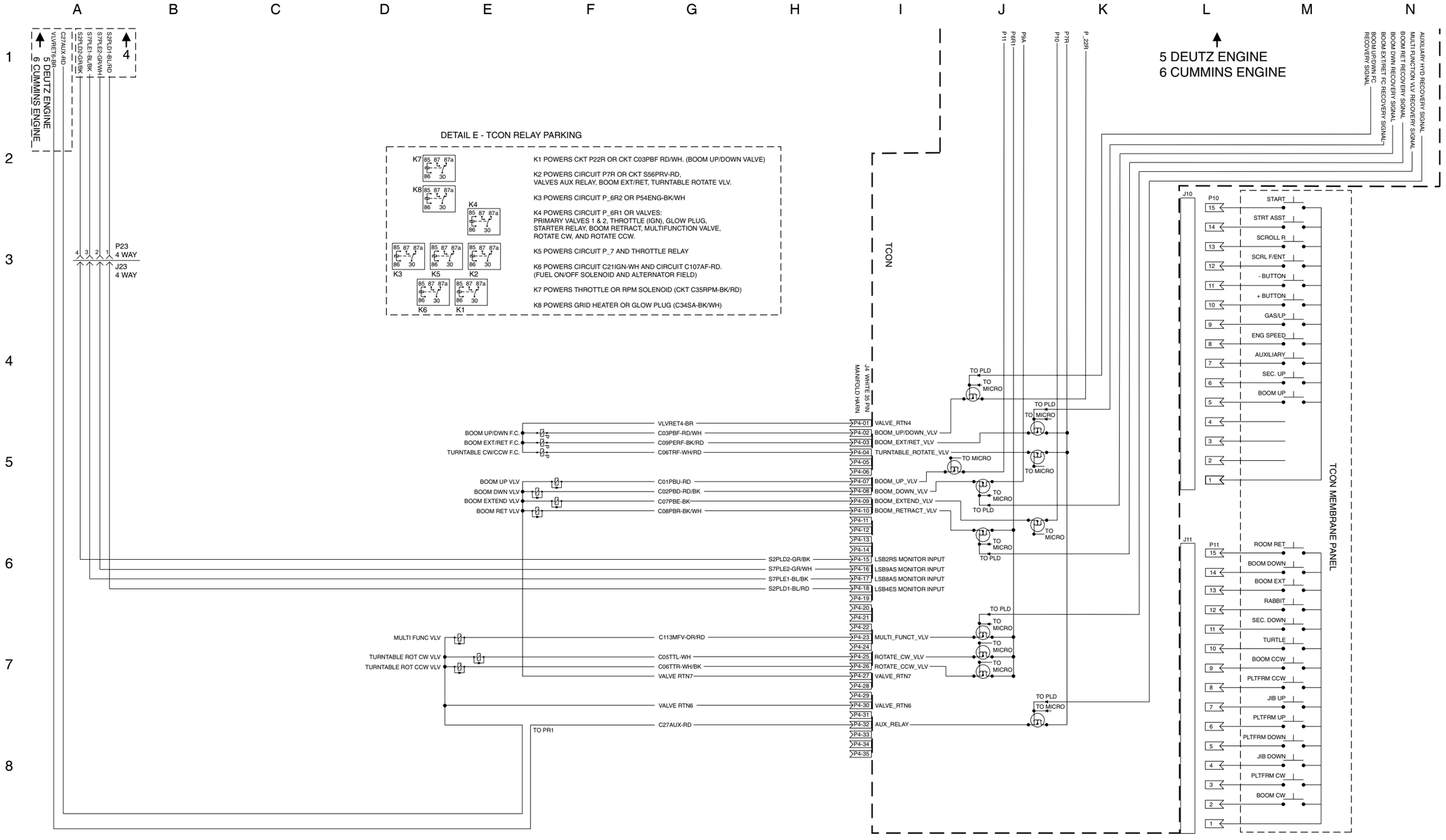
Electrical Schematic, View 7

S-120HD Models

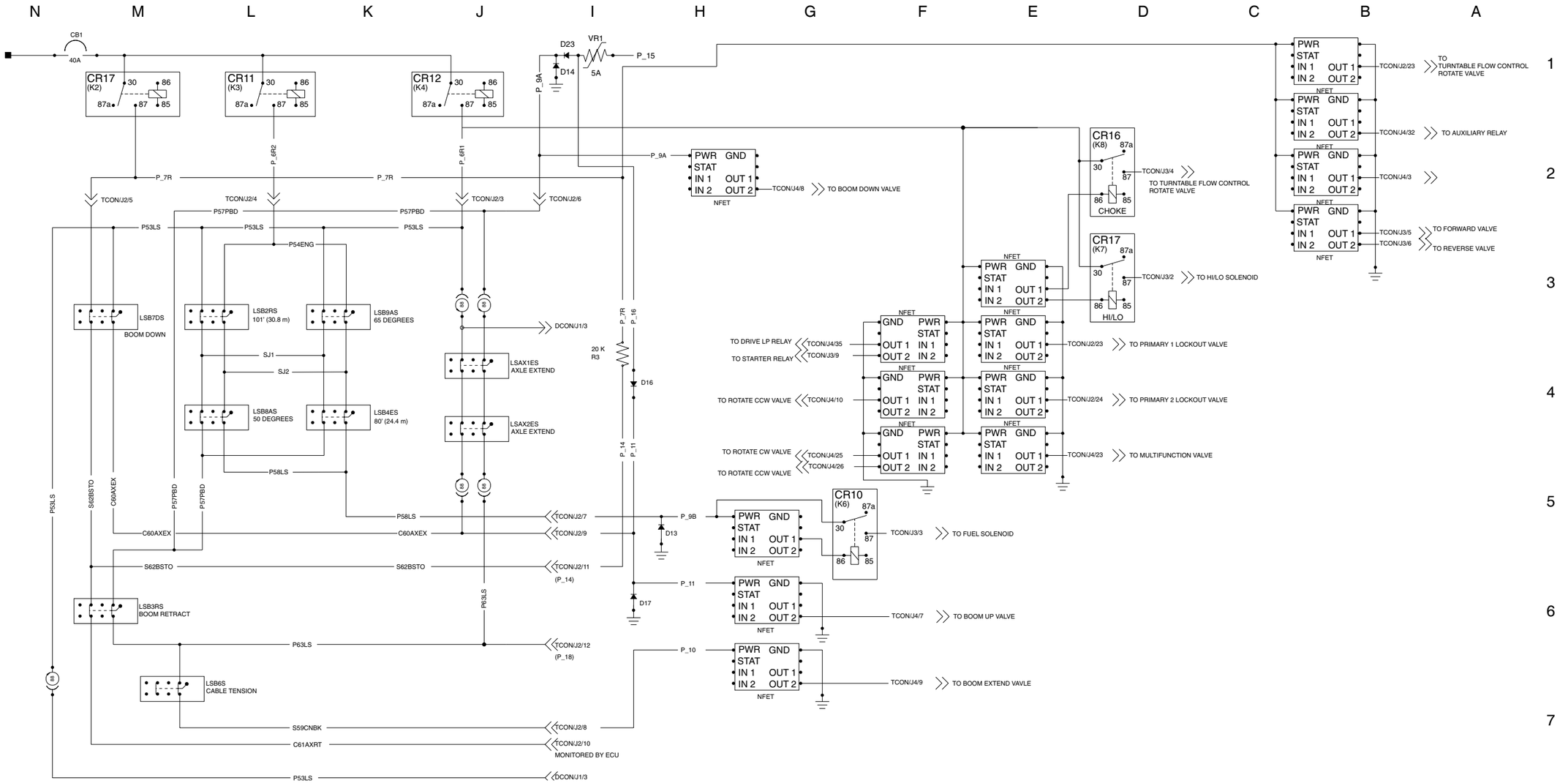


Electrical Schematic, View 7

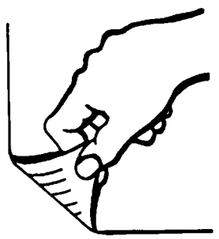
S-120HD Models



Safety Circuit Schematic, S-120HD Models



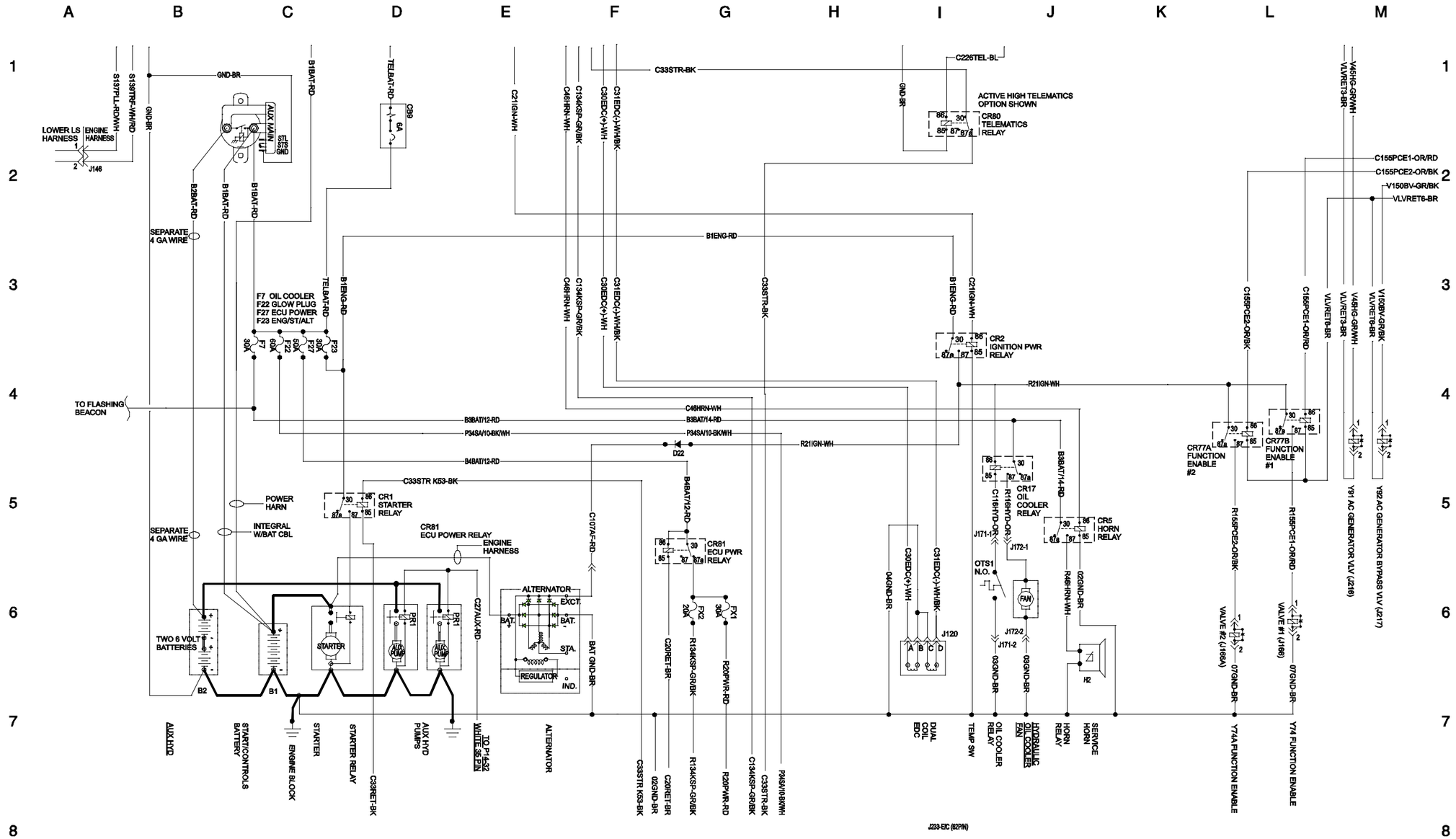
Safety Circuit Schematic,
S-120HD Models

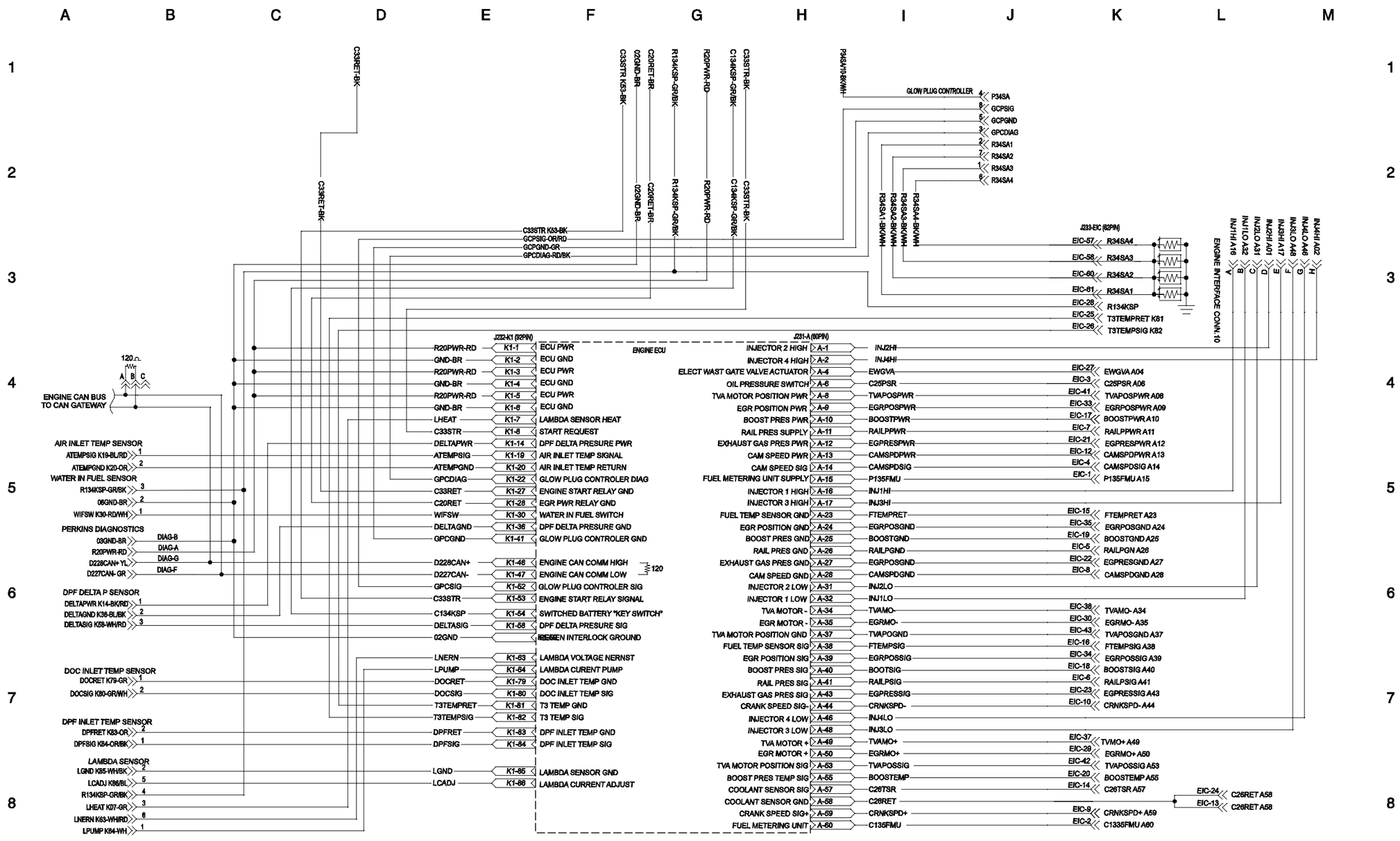


Perkins 854F-34T Engine Electrical Schematic

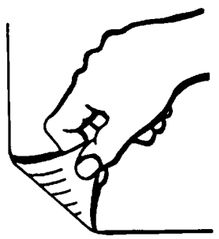


Perkins 854F-34T Engine Electrical Schematic




C33RET-BK
C33STR K53-BK
02GND-BR
C20RET-BR
R134KSP-GR/BK
R20PWR-RD
C134KSP-GR/BK
C33STR-BK
P34SA10-BK/WH
GLOW PLUG CONTROLLER
P34SA
GCPSIG
GCPGND
GPCDIAG
R34SA1
R34SA2
R34SA3
R34SA4
R34SA1-BK/WH
R34SA2-BK/WH
R34SA3-BK/WH
R34SA4-BK/WH
J233-E/C (62PIN)
E/C-57 R34SA4
E/C-58 R34SA3
E/C-60 R34SA2
E/C-61 R34SA1
E/C-28 R134KSP
E/C-25 T3TEMPRET K81
E/C-26 T3TEMPSIG K82
ENGINE INTERFACE CONN.10
INJ1HI A16
INJ1LO A32
INJ2LO A31
INJ2HI A01
INJ3HI A17
INJ3LO A48
INJ4LO A49
INJ4HI A02
C33STR K53-BK
GCPSIG-OR/RD
GCPGND-GR
GPCDIAG-RD/BK
J232-K1 (92PIN)
ENGINE ECU
J231-A (60PIN)
R20PWR-RD K1-1 ECU PWR
GND-BR K1-2 ECU GND
R20PWR-RD K1-3 ECU PWR
GND-BR K1-4 ECU GND
R20PWR-RD K1-5 ECU PWR
GND-BR K1-6 ECU GND
LHEAT K1-7 LAMBDA SENSOR HEAT
C33STR K1-8 START REQUEST
DELTAPWR K1-14 DPF DELTA PRESURE PWR
ATEMPSIG K1-19 AIR INLET TEMP SIGNAL
ATEMPGND K1-20 AIR INLET TEMP RETURN
GPCDIAG K1-22 GLOW PLUG CONTROLER DIAG
C33RET K1-27 ENGINE START RELAY GND
C20RET K1-28 EGR PWR RELAY GND
WIFSW K1-30 WATER IN FUEL SWITCH
DELTAGND K1-36 DPF DELTA PRESURE GND
GPCGND K1-41 GLOW PLUG CONTROLER GND
D228CAN+ K1-46 ENGINE CAN COMM HIGH
D227CAN- K1-47 ENGINE CAN COMM LOW
GPCSIG K1-52 GLOW PLUG CONTROLER SIG
C33STR K1-53 ENGINE START RELAY SIGNAL
C134KSP K1-54 SWITCHED BATTERY "KEY SWITCH"
DELTASIG K1-58 DPF DELTA PRESURE SIG
02GND KEYGEN INTERLOCK GROUND
LNERN K1-63 LAMBDA VOLTAGE NERNST
LPUMP K1-64 LAMBDA CURENT PUMP
DOCRET K1-79 DOC INLET TEMP GND
DOCSIG K1-80 DOC INLET TEMP SIG
T3TEMPRET K1-81 T3 TEMP GND
T3TEMPSIG K1-82 T3 TEMP SIG
DPFRET K1-83 DPF INLET TEMP GND
DPFSIG K1-84 DPF INLET TEMP SIG
LGND K1-85 LAMBDA SENSOR GND
LCADJ K1-86 LAMBDA CURRENT ADJUST
INJECTOR 2 HIGH A-1 INJ2HI
INJECTOR 4 HIGH A-2 INJ4HI
ELECT WAST GATE VALVE ACTUATOR A-4 EWGVA
OIL PRESSURE SWITCH A-6 C25PSR
TVA MOTOR POSITION PWR A-8 TVAPOSPWR
EGR POSITION PWR A-9 EGRPOSPWR
BOOST PRES PWR A-10 BOOSTPWR
RAIL PRES SUPPLY A-11 RAILPPWR
EXHAUST GAS PRES PWR A-12 EGPRESPWR
CAM SPEED PWR A-13 CAMSPDPWR
CAM SPEED SIG A-14 CAMSPDSIG
FUEL METERING UNIT SUPPLY A-15 P135FMU
INJECTOR 1 HIGH A-16 INJ1HI
INJECTOR 3 HIGH A-17 INJ3HI
FUEL TEMP SENSOR GND A-23 FTEMPRET
EGR POSITION GND A-24 EGRPOSGND
BOOST PRES GND A-25 BOOSTGND
RAIL PRES GND A-26 RAILPGND
EXHAUST GAS PRES GND A-27 EGPRESGND
CAM SPEED GND A-28 CAMSPDGND
INJECTOR 2 LOW A-31 INJ2LO
INJECTOR 1 LOW A-32 INJ1LO
TVA MOTOR - A-34 TVAMO-
EGR MOTOR - A-35 EGRMO-
TVA MOTOR POSITION GND A-37 TVAPOGND
FUEL TEMP SENSOR SIG A-38 FTEMPSIG
EGR POSITION SIG A-39 EGRPOSSIG
BOOST PRES SIG A-40 BOOTSIG
RAIL PRES SIG A-41 RAILPSIG
EXHAUST GAS PRES SIG A-43 EGPRESSIG
CRANK SPEED SIG- A-44 CRNKSPD-
INJECTOR 4 LOW A-46 INJ4LO
INJECTOR 3 LOW A-48 INJ3LO
TVA MOTOR + A-49 TVAMO+
EGR MOTOR + A-50 EGRMO+
TVA MOTOR POSITION SIG A-53 TVAPOSSIG
BOOST PRES TEMP SIG A-55 BOOSTEMP
COOLANT SENSOR SIG A-57 C26TSR
COOLANT SENSOR GND A-58 C26RET
CRANK SPEED SIG+ A-59 CRNKSPD+
FUEL METERING UNIT A-60 C135FMU
E/C-27 EWGVA A04
E/C-3 C25PSR A06
E/C-41 TVAPOSPWR A08
E/C-33 EGRPOSPWR A09
E/C-17 BOOSTPWR A10
E/C-7 RAILPPWR A11
E/C-21 EGPRESPWR A12
E/C-12 CAMSPDPWR A13
E/C-4 CAMSPDSIG A14
E/C-1 P135FMU A15
E/C-15 FTEMPRET A23
E/C-35 EGRPOSGND A24
E/C-19 BOOSTGND A25
E/C-5 RAILPGN A26
E/C-22 EGPRESGND A27
E/C-8 CAMSPDGND A28
E/C-38 TVAMO- A34
E/C-30 EGRMO- A35
E/C-43 TVAPOSGND A37
E/C-16 FTEMPSIG A38
E/C-34 EGRPOSSIG A39
E/C-18 BOOSTSIG A40
E/C-6 RAILPSIG A41
E/C-23 EGPRESSIG A43
E/C-10 CRNKSPD- A44
E/C-37 TVMO+ A49
E/C-29 EGRMO+ A50
E/C-42 TVAPOSSIG A53
E/C-20 BOOSTEMP A55
E/C-14 C26TSR A57
E/C-24 C26RET A58
E/C-13 C26RET A58
E/C-9 CRNKSPD+ A59
E/C-2 C1335FMU A60
120Ω
A B C
ENGINE CAN BUS
TO CAN GATEWAY
AIR INLET TEMP SENSOR
ATEMPSIG K19-BL/RD
ATEMPGND K20-OR
WATER IN FUEL SENSOR
R134KSP-GR/BK
06GND-BR
WIFSW K30-RD/WH
PERKINS DIAGNOSTICS
03GND-BR
R20PWR-RD
D228CAN+ YL
D227CAN- GR
DIAG-B
DIAG-A
DIAG-G
DIAG-F
DPF DELTA P SENSOR
DELTAPWR K14-BK/RD
DELTAGND K38-BL/BK
DELTASIG K58-WH/RD
DOC INLET TEMP SENSOR
DOCRET K79-GR
DOCSIG K80-GR/WH
DPF INLET TEMP SENSOR
DPFRET K83-OR
DPFSIG K84-OR/BK
LAMBDA SENSOR
LGND K85-WH/BK
LCADJ K86/BL
R134KSP-GR/BK
LHEAT K07-GR
LNERN K63-WH/RD
LPUMP K84-WH
120

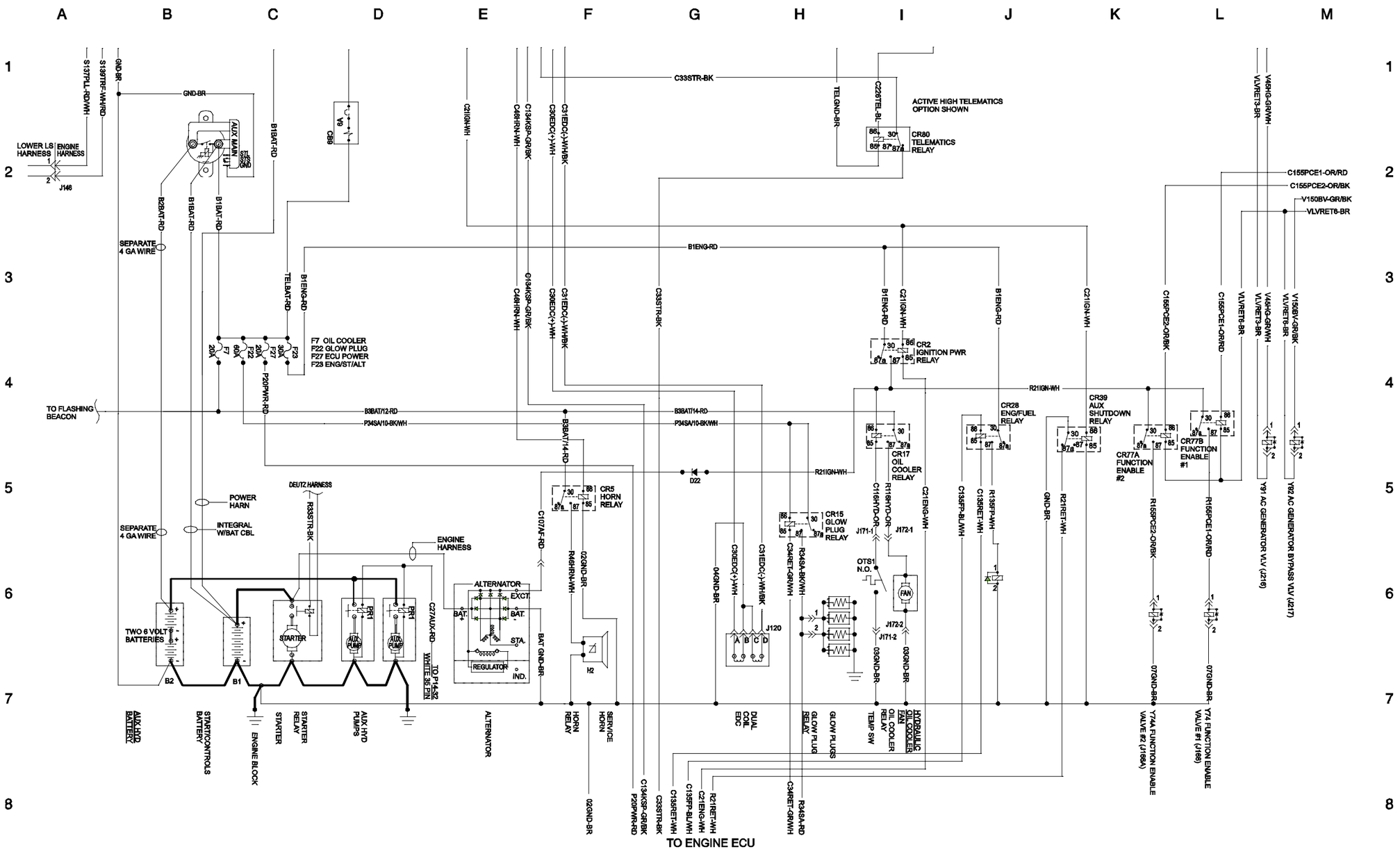
Perkins 854F-34T Engine Electrical Harness



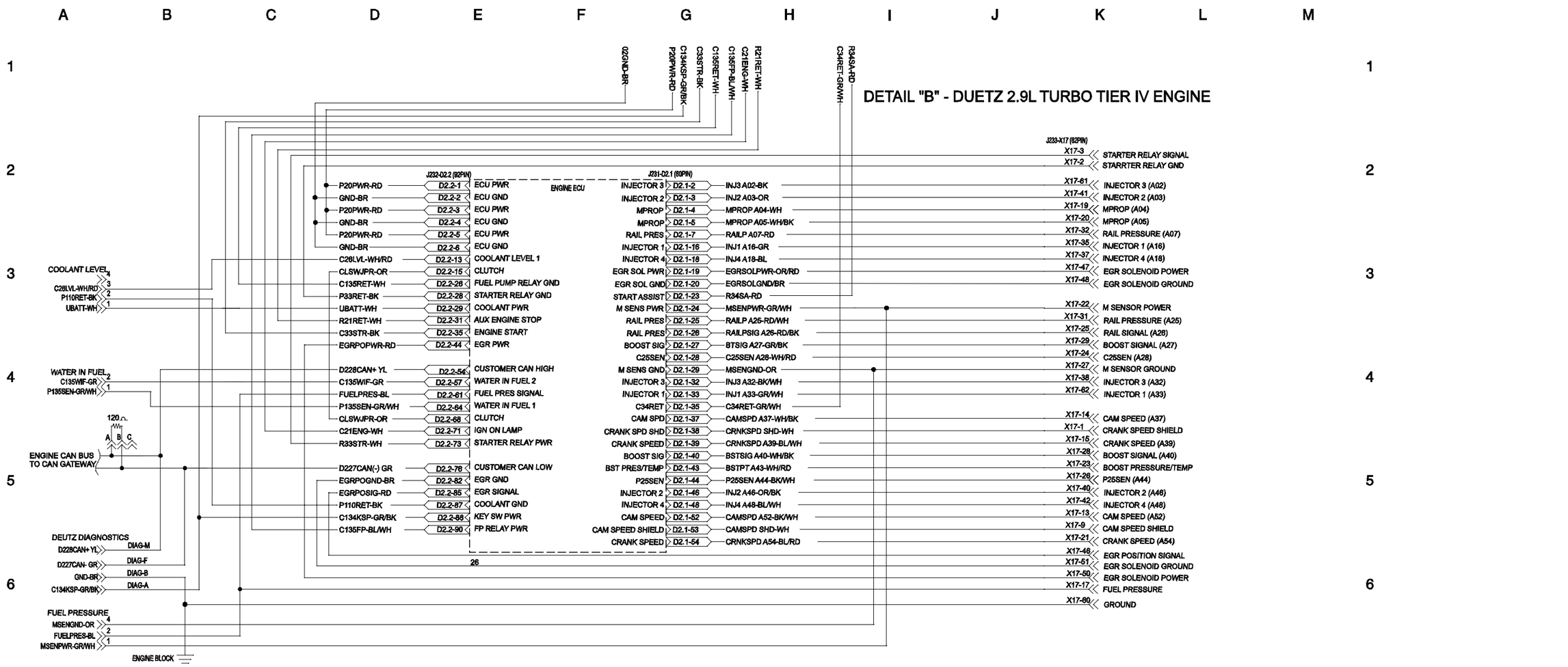
Deutz TD2.9 Engine Electrical Schematic



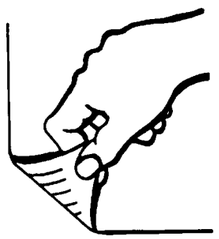
Deutz TD2.9 Engine Electrical Schematic



Deutz TD2.9 Engine Electrical Harness



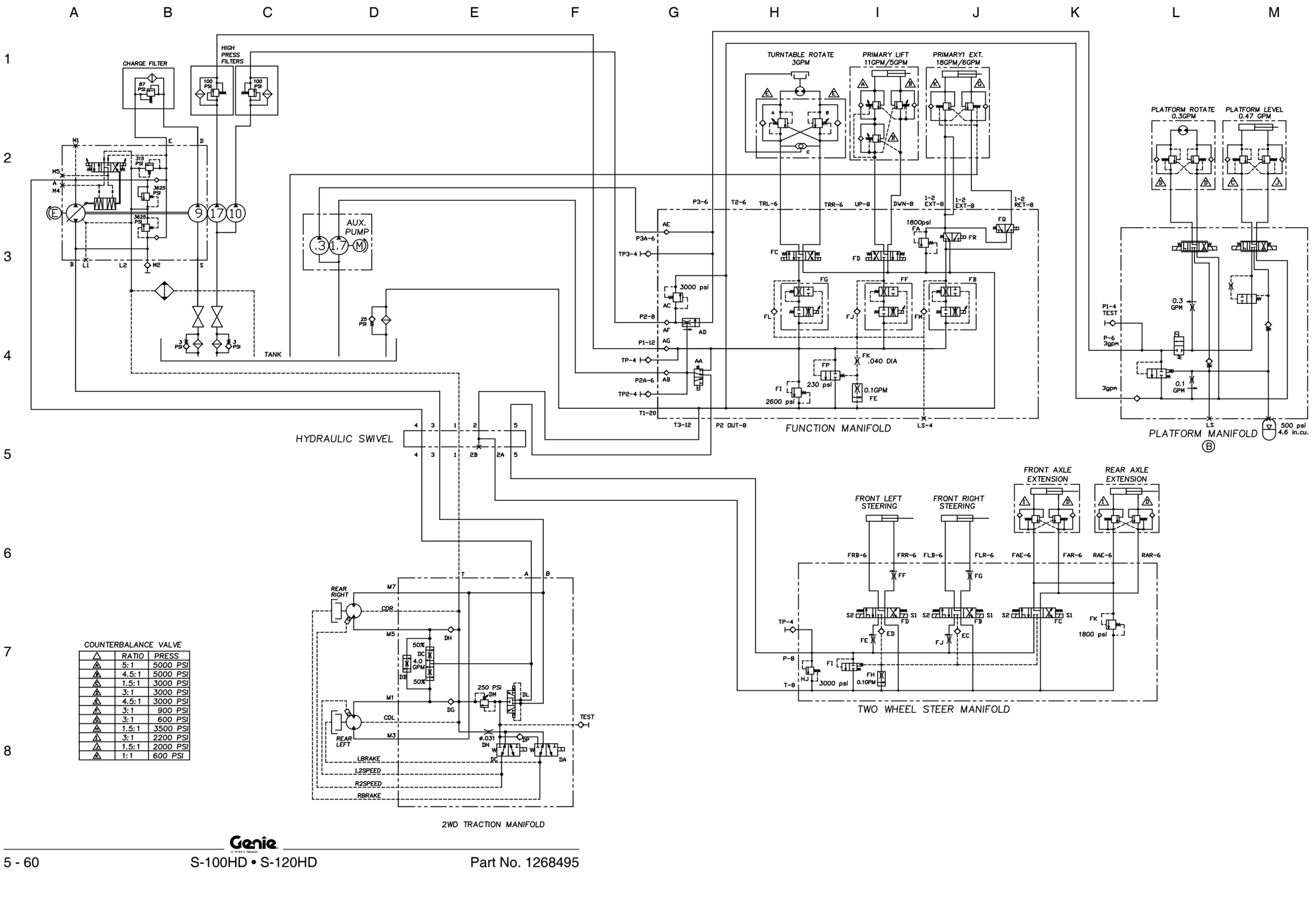
Deutz TD2.9 Engine Electrical Harness



Hydraulic Schematic,
S-100HD Models



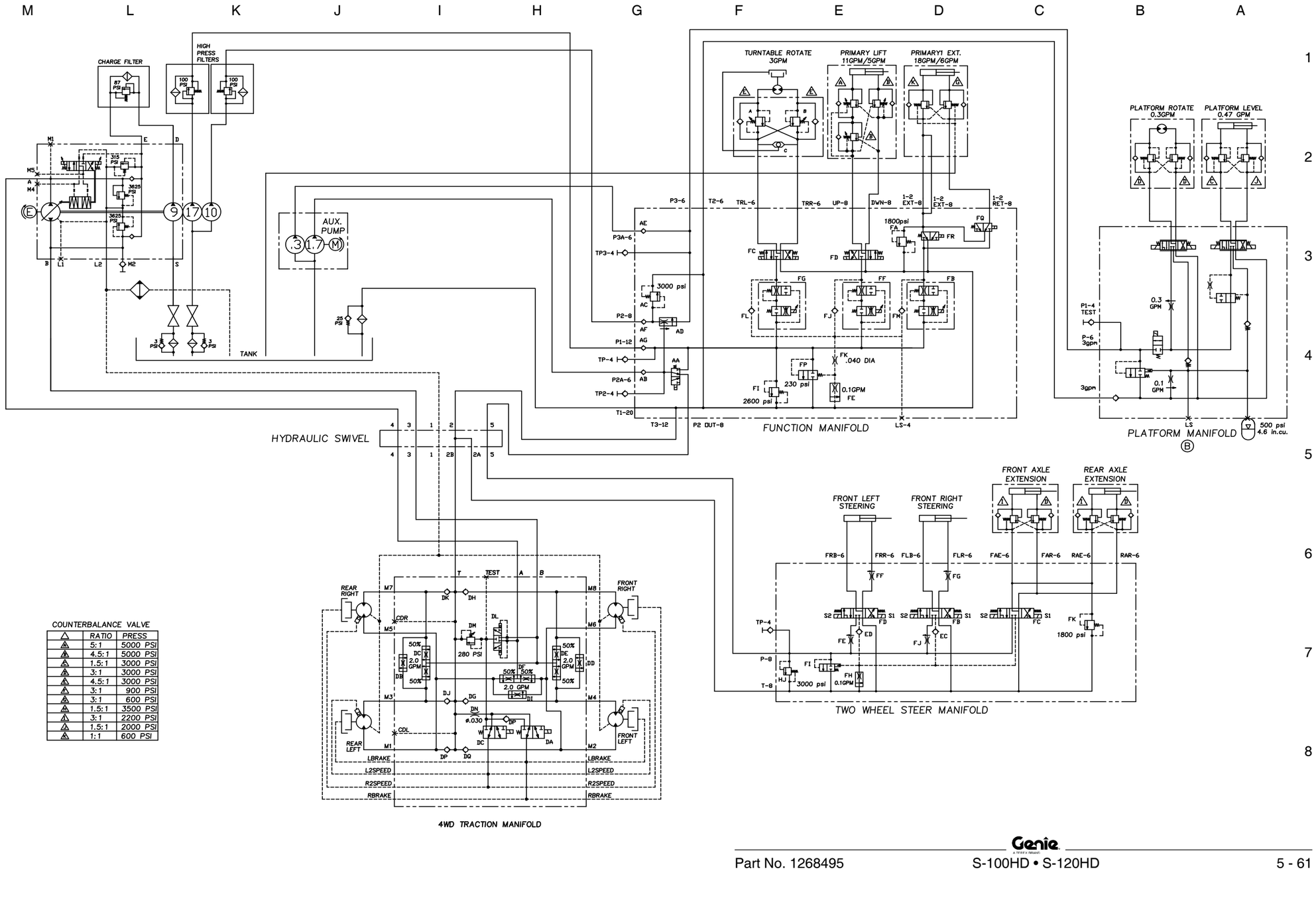
Hydraulic Schematic,
S-100HD Models, 2WD 2WS



COUNTERBALANCE VALVE

△	RATIO	PRESS
1	5:1	5000 PSI
2	4.5:1	5000 PSI
3	1.5:1	3000 PSI
4	3:1	3000 PSI
5	4.5:1	3000 PSI
6	3:1	900 PSI
7	3:1	600 PSI
8	1.5:1	3500 PSI
9	3:1	2200 PSI
10	1.5:1	2000 PSI
11	1:1	600 PSI

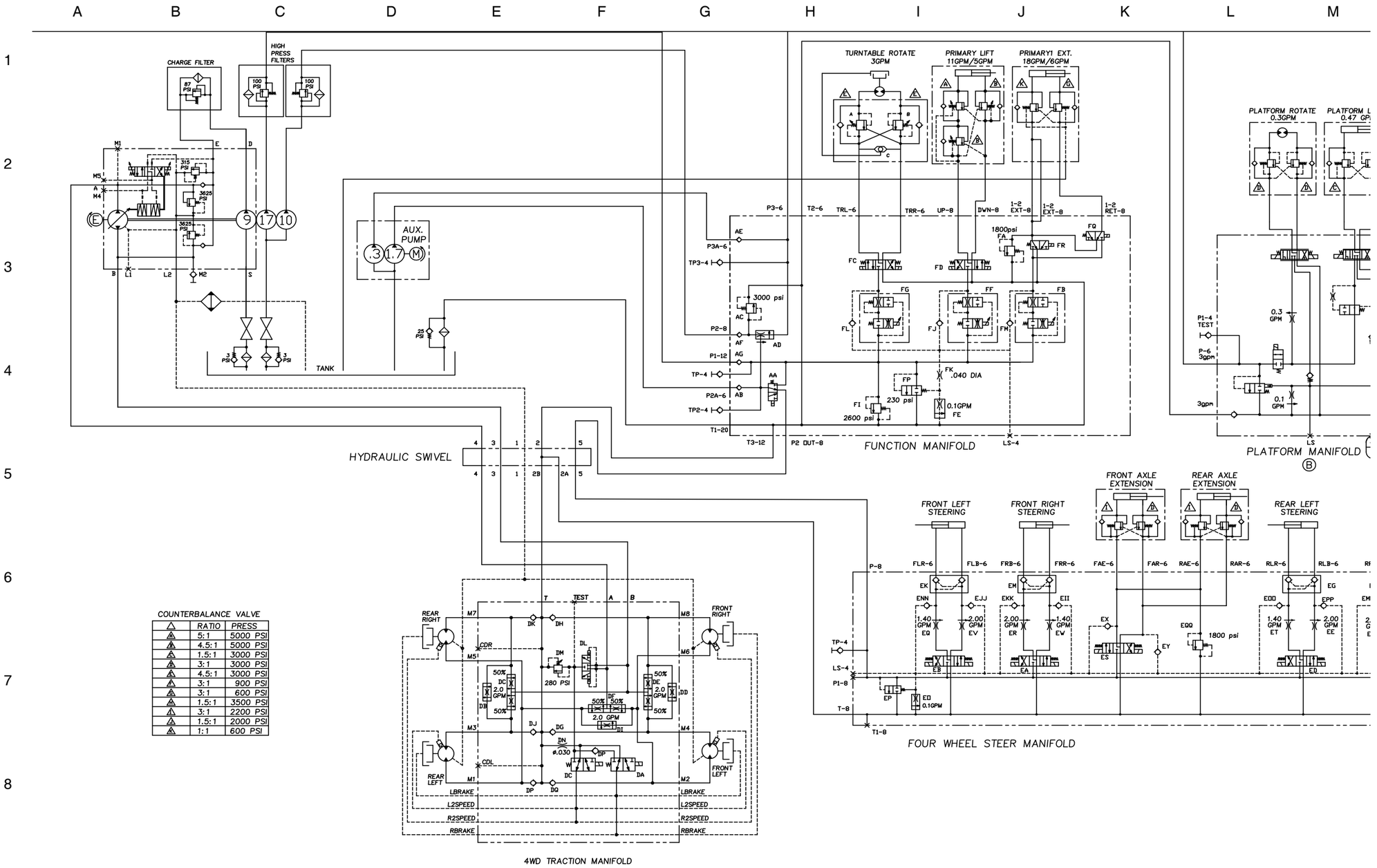
Hydraulic Schematic,
S-100HD Models, 4WD 2WS



COUNTERBALANCE VALVE

	RATIO	PRESS
1	5:1	5000 PSI
2	4.5:1	5000 PSI
3	1.5:1	3000 PSI
4	3:1	3000 PSI
5	4.5:1	3000 PSI
6	3:1	900 PSI
7	3:1	600 PSI
8	1.5:1	3500 PSI
9	3:1	2200 PSI
10	1.5:1	2000 PSI
11	1:1	600 PSI

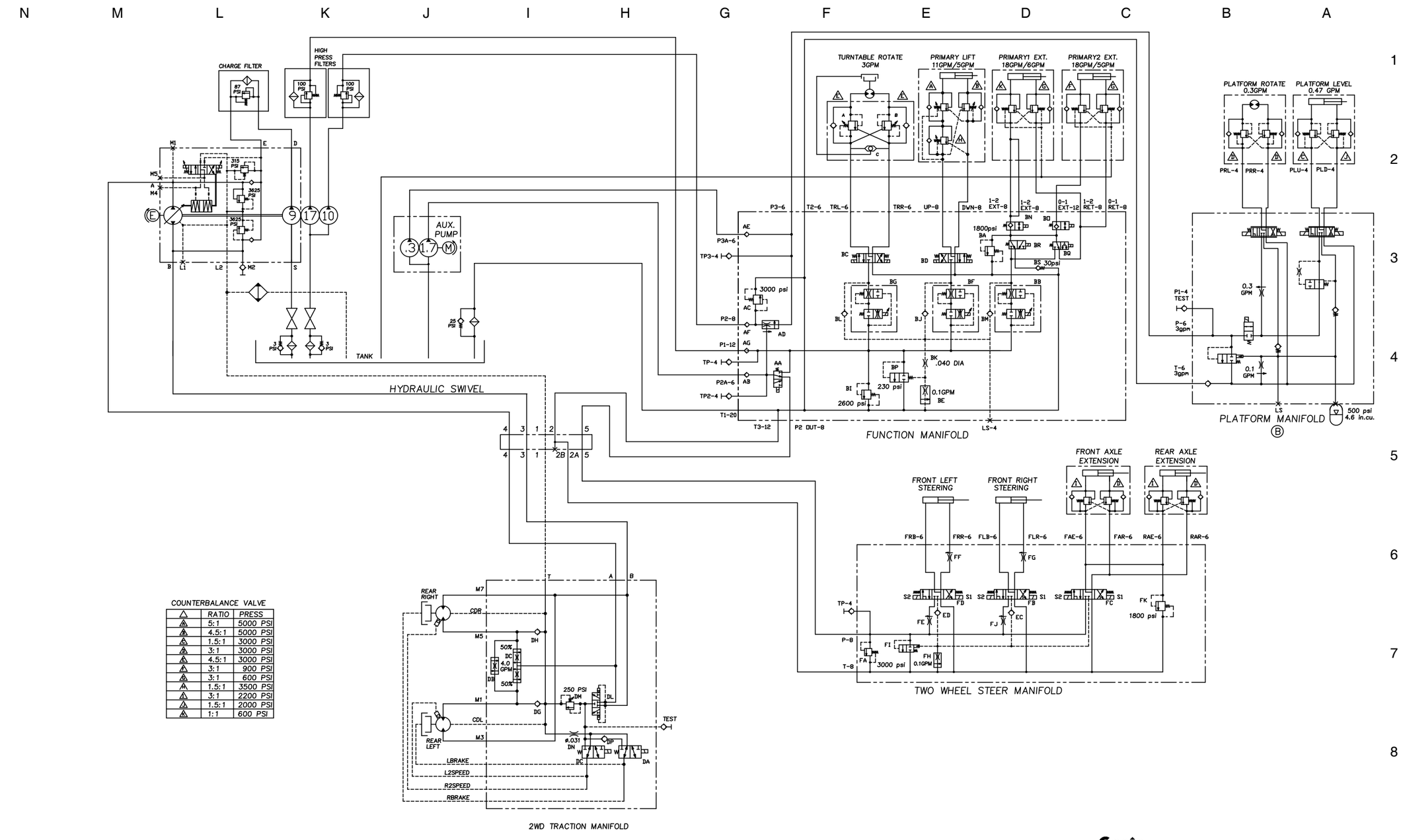
Hydraulic Schematic,
S-100HD Models, 4WD 4WS



COUNTERBALANCE VALVE

△	RATIO	PRESS
⚠	5:1	5000 PSI
⚠	4.5:1	5000 PSI
⚠	1.5:1	3000 PSI
⚠	3:1	3000 PSI
⚠	4.5:1	3000 PSI
⚠	3:1	900 PSI
⚠	3:1	600 PSI
⚠	1.5:1	3500 PSI
⚠	3:1	2200 PSI
⚠	1.5:1	2000 PSI
⚠	1:1	600 PSI

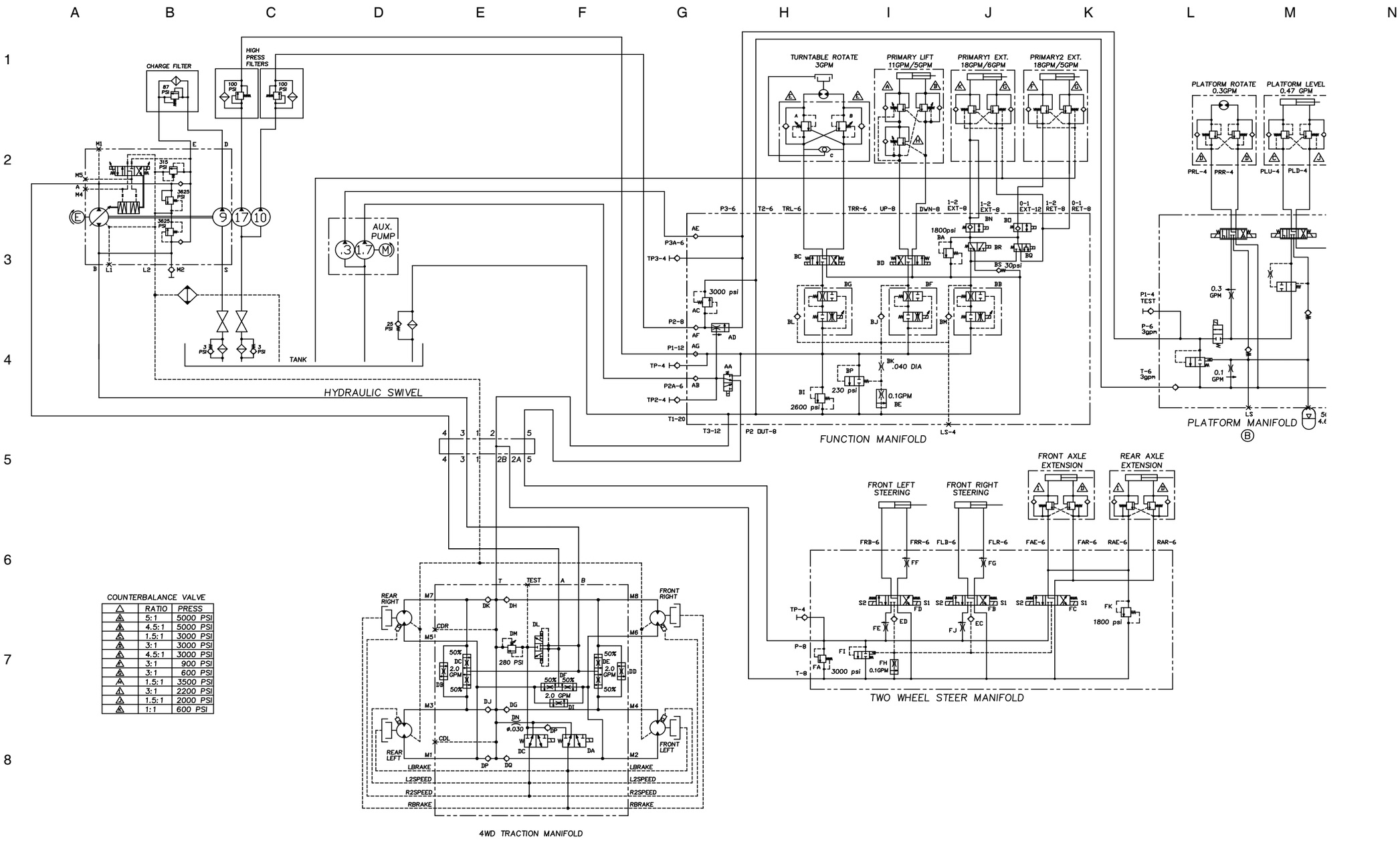
Hydraulic Schematic,
S-120HD Models, 2WD 2WS



COUNTERBALANCE VALVE

	RATIO	PRESS
1	5:1	5000 PSI
2	4.5:1	5000 PSI
3	1.5:1	3000 PSI
4	3:1	3000 PSI
5	4.5:1	3000 PSI
6	3:1	900 PSI
7	3:1	600 PSI
8	1.5:1	3500 PSI
9	3:1	2200 PSI
10	1.5:1	2000 PSI
11	1:1	600 PSI

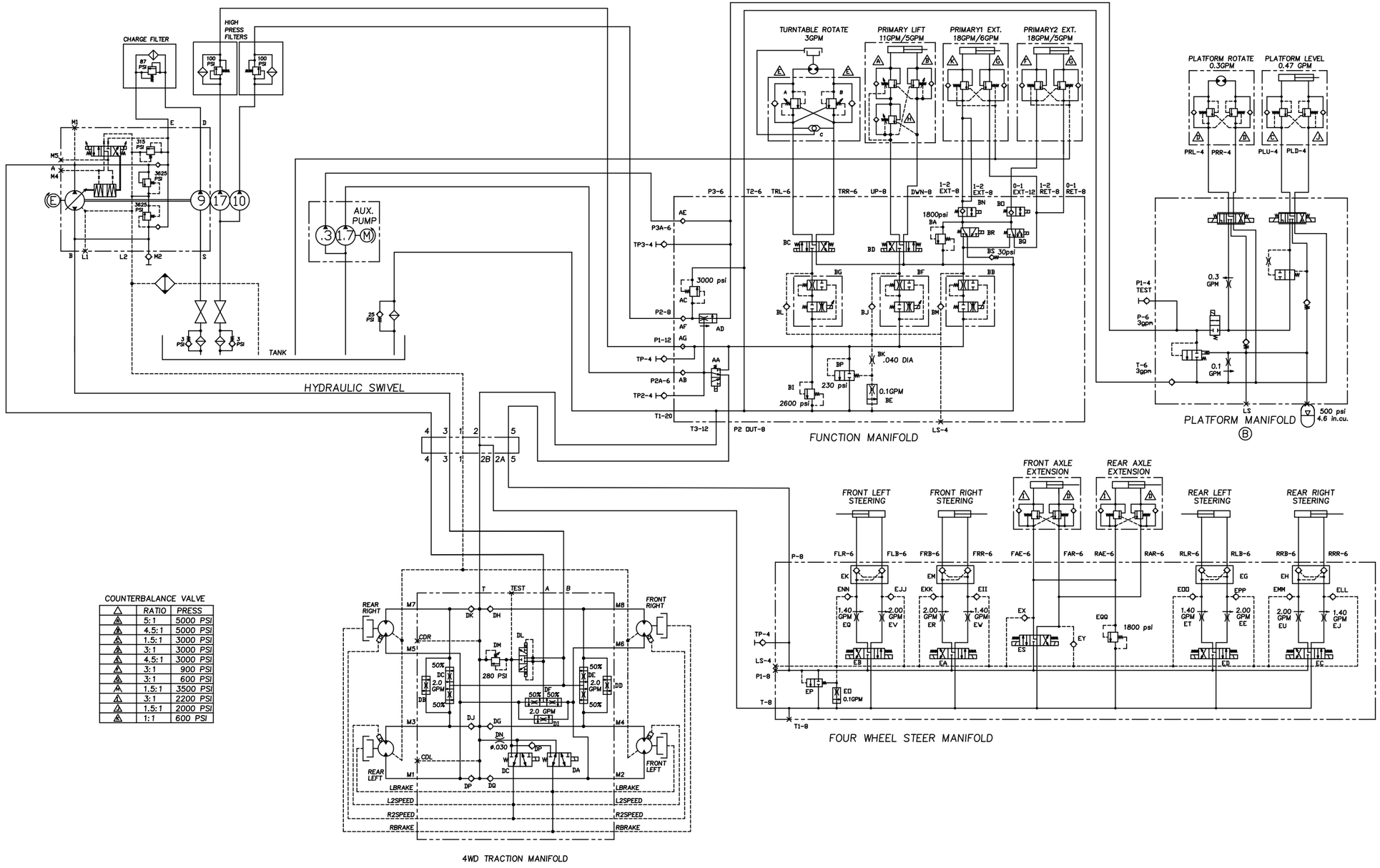
Hydraulic Schematic,
S-120HD Models, 4WD 2WS



COUNTERBALANCE VALVE

△	RATIO	PRESS
⚠	5:1	5000 PSI
⚠	4.5:1	5000 PSI
⚠	1.5:1	3000 PSI
⚠	3:1	3000 PSI
⚠	4.5:1	3000 PSI
⚠	3:1	900 PSI
⚠	3:1	600 PSI
⚠	1.5:1	3500 PSI
⚠	3:1	2200 PSI
⚠	1.5:1	2000 PSI
⚠	1:1	600 PSI

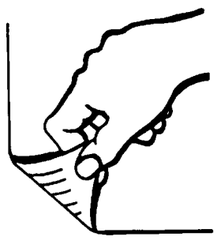
Hydraulic Schematic,
S-120HD Models, 4WD 4WS



COUNTERBALANCE VALVE

	RATIO	PRESS
1	5:1	5000 PSI
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3	1.5:1	3000 PSI
4	3:1	3000 PSI
5	4.5:1	3000 PSI
6	3:1	900 PSI
7	3:1	600 PSI
8	1.5:1	3500 PSI
9	3:1	2200 PSI
10	1.5:1	2000 PSI
11	1:1	600 PSI

Hydraulic Schematic,
S-120HD Models



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