Genie
A TEREX BRAND

Service and Repair Manual

Serial Number Range

Z®-34/22 IC

from Z34F-14000
from Z34D-1900

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. 1312294GT
Rev A1
December 2022

Introduction

Important

Read, understand and obey the safety rules and operating instructions in the appropriate Operator's Manual on your machine before attempting any 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 as 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:

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Find a Manual for this Model

Go to http://www.genielift.com

Use the links to locate Service Manuals, Maintenance Manuals, Service and Repair Manuals, Parts Manuals and Operator's Manuals.

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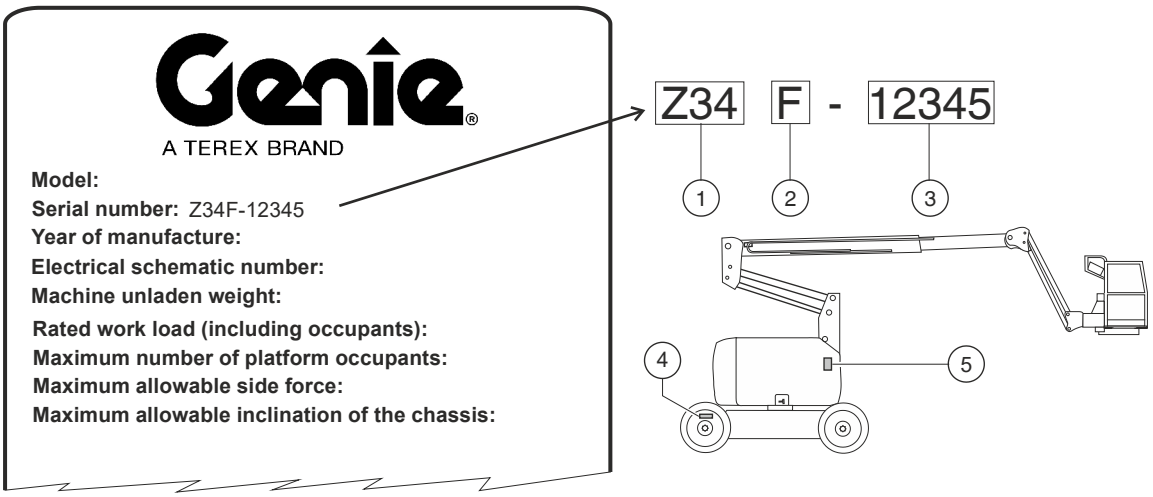
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Revision History

Revision	Date	Section	Procedure / Page / Description
A	7/2021		Initial Release
A1	12/2022	Front Cover	Add facility code and serial break
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			

Introduction

Serial Number Legend



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

Safety Rules



Danger

Failure to obey the instructions and safety rules in this manual and the appropriate Operator's Manual on your machine 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 modify or alter a MEWP without prior written permission from the manufacturer.

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 Indicates a imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.

NOTICE Indicates 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

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.



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

Tires and wheels	rough terrain	industrial
Tire size	10-16.5 NHS	9-14.5 LT
Tire ply rating	8 Ply	Tread 6 Sidewall 6
Tire and wheel weight, foam filled (minimum)	175 lbs 79 kg	175 lbs 79 kg
Overall tire diameter	30.5 in 77.5 cm	28 in 37 cm
Wheel diameter	16.5 in 42 cm	14.5 in 36.8 cm
Wheel width	10 in 25.4 cm	7 in 18 cm
Wheel lugs, 4WD	9 @ 5/8 -18	
Wheel lugs, 2WD Front Rear	 8 @ 5/8 -18 9 @ 5/8 -18	 8 @ 5/8 -18 9 @ 5/8 -18
Lug nut torque, dry	125 ft-lbs 170 Nm	125 ft-lbs 170 Nm
Lug nut torque, lubricated	95 ft-lbs 129 Nm	95 ft-lbs 129 Nm
Tire pressure rough terrain	45 psi 3.1 bar	100 psi 6.9 bar

Tires and wheels	Hi-flotation (option)
Tire size	31-15.5-15
Tire ply rating	8
Overall tire diameter	31 in 78.7 cm
Wheel diameter	15 in 38.1 cm
Wheel width	13 in 33 cm
Wheel lugs	9 @ 5/8 -18
Lug nut torque, dry	125 ft-lbs 170 Nm
Lug nut torque, lubricated	95 ft-lbs 129 Nm
Tire pressure	44 psi 3 bar

Fuel capacities	
LPG tank	33.5 pounds 15.2 kg
Fuel tank	9.3 gallons 35.2 liters
Hydraulic tank	18 gallons 68.1 liters
Hydraulic system (including tank)	22 gallons 83.3 liters
Drive hubs	17 fl oz 503 cc

Drive hub oil type: SAE 90 multipurpose hypoid gear oil API service classification GL5

Specifications

Machine Component Weights

Drive motor	27 lbs 12 kg
Torque hub	113 lbs 51 kg
Primary boom assembly (including extension boom)	647 lbs 293 kg
Primary boom cylinder	59 lbs 27 kg
Primary boom extend cylinder	75 lbs 34 kg
Secondary boom linkage	832 lbs 377 kg
Secondary boom cylinder	54 lbs 24 kg
Jib boom assembly	53lbs 24kg
Jib boom cylinder	34 lbs 15 kg
4 ft / 1.5 m platform	99 lbs 45 kg
5 ft / 2.4 m platform	105 lbs 48 kg
Battery 12 volt	41 lbs 19 kg

Performance Specifications

Drive speed, maximum	
Stowed position	3.0 mph 5.1 km/h 40 ft / 9.1 sec 12.2 m / 9.1 sec
Raised or extended	0.6 mph 0.98 km/h 40 ft / 45 sec 12.2 m / 45 sec
Gradeability	See Operator's Manual
Braking distance, maximum	
High range on paved surface	3 to 4 ft 0.9 to 1.2 m
Joystick function speeds, maximum from platform controls	
Primary boom up	15 to 21 seconds
Primary boom down	13 to 19 seconds
Primary boom extend	14 to 20 seconds
Primary boom retract	14 to 20 seconds
Secondary boom up	15 to 21 seconds
Secondary boom down	11 to 17 seconds
Jib boom up	24 - 30 seconds
Jib boom down	15 to 21 seconds
Turntable rotate, 355°	62 to 72 seconds
Platform rotate	6 - 12 seconds

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

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

Hydraulic Oil 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 Shell Tellus S4 VX 32 Shell Donax TG (Dexron III) 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 Genie Product Support before use.

NOTICE

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

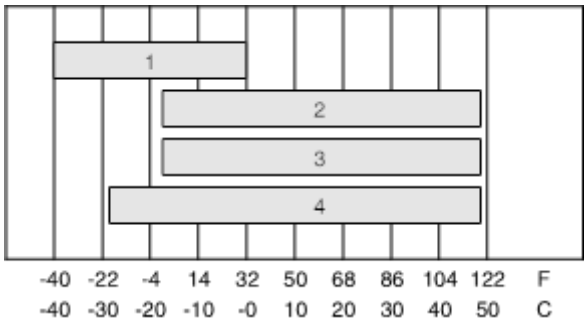
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond its maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

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

Chevron Rando HD Premium Oil MV Fluid Properties

ISO Grade	32
Viscosity index	200
Kinematic Viscosity cSt @ 200°F / 100°C cSt @ 104°F / 40°C	 7.5 33.5
Brookfield Viscosity cP @ -4°F / -20°C cP @ -22°F / -30°C	 1040 3310
Flash point	375°F / 190°C
Pour point	-58°F / -50°C
Maximum continuous operating temperature	171°F / 77°C

Note: A hydraulic oil heating system is recommended when the ambient temperature is consistently below 0°F / -18°C.

Note: Do not operate the machine when the ambient temperature is below -20°F / -29°C with Rando HD Premium MV.

Chevron 5606A Hydraulic Oil Fluid Properties

ISO Grade	15
Viscosity index	300
Kinematic Viscosity cSt @ 200°F / 100°C cSt @ 104°F / 40°C cSt @ -40°F / -40°C	 5.5 15.0 510
Flash point	180°F / 82°C
Pour point	-81°F / -63°C
Maximum continuous operating temperature	124°F / 51°C

Note: Use of Chevron 5606A hydraulic fluid, or equivalent, is required when ambient temperatures are consistently below 0°F / -17°C unless an oil heating system is used.

NOTICE

Continued use of Chevron 5606A hydraulic fluid, or equivalent, when ambient temperatures are consistently above 32°F / 0°C may result in component damage

Petro-Canada Environ MV 46 Fluid Properties

ISO Grade	46
Viscosity index	154
Kinematic Viscosity cSt @ 200°F / 100°C cSt @ 104°F / 40°C	 8.0 44.4
Flash point	482°F / 250°C
Pour point	-49°F / -45°C
Maximum continuous operating temperature	180°F / 82°C

Shell Tellus S4 VX Fluid Properties

ISO Grade	32
Viscosity index	300
Kinematic Viscosity cSt @ 200°F / 100°C cSt @ 104°F / 40°C	 9 33.8
Brookfield Viscosity cSt @ -4°F / -20°C cSt @ -13°F / -25°C cSt @ -40°F / -40°C	 481 702.4 2624
Flash point	>100
Pour point	-76°F / -60°C
Maximum continuous operating temperature	103°F / 75°C

UCON Hydrolube HP-5046 Fluid Properties

ISO Grade	46
Viscosity index	192
Kinematic Viscosity cSt @ 149°F / 65°C cSt @ 104°F / 40°C cSt @ 0°F / -18°C	 22 46 1300
Flash point	None
Pour point	-81°F / -63°C
Maximum continuous operating temperature	189°F / 87°C

Specifications

Hydraulic Component Specifications

Drive Pump	
Type: bi-directional variable displacement piston pump	
Displacement per revolution	1.71 cu in 28 cc
Flow rate @ 3000 rpm	22 gpm 84 L/min
Function Pump	(standard)
Type: fixed displacement gear pump	
Displacement per revolution	0.24 cu in 4 cc
Flow rate @ 3000 rpm	3 gpm 11.4 L/min
Function Pump	(230V generator option)
Type: fixed displacement gear pump	
Displacement per revolution	0.37 cu in 6 cc
Flow rate @ 3000 rpm	4.4 gpm 16.7 L/min

Auxiliary Pump	
Type: fixed displacement gear pump	
Displacement per revolution	0.5 gpm 1.9 L/min
Auxiliary pump relief pressure	3400 psi 234.5 bar
Function manifold	
System relief valve pressure, maximum	3200 psi 220.6 bar
Primary boom down relief valve pressure	1600 psi 110 bar
Secondary boom down relief valve pressure	1600 psi 110 bar
Steer flow regulator	1.0 gpm 3.8 L/min
platform rotate flow regulator	0.3 gpm 1.1 L/min
Traction Manifold	
Hot oil relief pressure	
2WD	170 psi 11.7 bar
4WD	150 psi 10.3 bar
Steer end drive motors (4WD models)	
Displacement per revolution	1.53 cu in 25 cc

Specifications

Non-steer end drive motors	
Displacement per revolution	1.53 cu in 25 cc
Hydraulic Filters	
Medium pressure filter	Beta 3 ˆ 200
Medium pressure filter bypass pressure	50 psi 3.4 bar
Hydraulic tank return filter	10 micron with 25 psi / 1.7 bar bypass

Machine Torque Specifications

Platform Rotator	
3/4-10 center bolt, GR 8, dry 3/4-10 center bolt, GR 8, lubricated	380 ft-lbs 515 Nm 280 ft-lbs 379 Nm
3/8-16 outer bolts, GR 8, dry 3/8-16 outer bolts, GR 8, lubricated	44 ft-lbs 60 Nm 33 ft-lbs 45 Nm
Turntable rotate assembly	
Rotate bearing mounting bolts, lubricated	180 ft-lbs 244 Nm
Rotate bearing motor mounting bolts, lubricated	93 ft-lbs 126 Nm
Drive motors and hubs	
Drive hub mounting bolts, lubricated	180 ft-lbs 244 Nm
Drive motor mounting bolts, lubricated 3/8-16, GR5 7/16-14, GR5	 23 ft-lbs 31 Nm 37 ft-lbs 50 Nm

Specifications

Kubota WG-972 Engine

Displacement	57.8 cu in 0.96 liters
Number of cylinders	3
Bore and Stroke	2.93 x 2.90 inches 74.5 x 73.6 mm
Horsepower	32.5 @ 3600 rpm 24.2 kW @ 3600 rpm
Firing order	1 - 2 - 3
Low idle	1600 rpm 229.7 Hz
High idle	3000 rpm 441.7 Hz
Compression ratio	9.2:1
Compression pressure	130 to 185 psi 8.96 to 12.76 bar
Governor	centrifugal mechanical
Valve clearance, cold	0.0057 to 0.0072 in 0.145 to 0.183 mm
Lubrication system	
Oil pressure	29 to 64 psi 2.0 to 4.4 bar
Oil capacity (including filter)	3.6 quarts 3.4 liters
Oil viscosity requirements	
Below 86°F / 30°C	5W-20
-4°F to 104°F / -20°C to 40°C	10W-30
Above 14°F / -10°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.	
Fuel Pump	
Fuel pressure, static	4.26 psi 0.29 bar
Fuel flow rate	0.11 gpm 0.40 L/min
Fuel requirement	
For fuel requirements, refer to the engine Operator Manual for your engine.	
Alternator output	40A @ 12V DC
Fan belt deflection	1/4 to 3/8 in 7 to 9 mm
Starter motor	
Brush length, new	0.551 in 14 mm
Brush length, minimum	0.437 in 11.1 mm
Battery	
Type	12V DC
Group	34/78
Quantity	1
Ampere hour	75AH
Cold cranking ampere	900A
Reserve capacity @ 25A rate	125 minutes
Engine coolant	
Capacity	1.3 quarts 1.22 liters
Ignition system	
Ignition spark advance	21° BTDC
Ignition coil primary resistance	1.87 to 2.53 Ω @ 68°F / 20°C
Ignition coil secondary resistance	10.4 to 15.6 kΩ @ 68°F / 20°C
#1 Spark plug wire resistance	2.81 to 4.79 kΩ
#2 Spark plug wire resistance	3.4 to 5.8 kΩ
#3 Spark plug wire resistance	3.57 to 6.09 kΩ
Spark plug type	NGK BKR4E-11
Spark plug gap	0.024 to 0.027 in 0.6 to 0.7 mm

Specifications

GM .998L Engine

Displacement	60.9 cu in 0.99 liters
Number of cylinders	4
Bore and Stroke	2.58 x 2.91 inches 65.5 x 74 mm
Horsepower	28.5 @ 3000 rpm 21.3 kW @ 3000 rpm
Firing order	1 - 3 - 4 - 2
Low idle	1100 rpm 36.6 Hz
High idle	3000 rpm 100 Hz
Compression ratio	9.5:1
Governor	ECM controlled
Valve clearance, cold	.005 - .007 in .13 - .18 mm
Lubrication system	
Oil pressure	29 to 64 psi 2.0 to 4.4 bar
Oil capacity (including filter)	3.2 quarts 3.0 liters
Oil viscosity requirements	
Below 86°F / 30°C	5W-20
-4°F to 104°F / -20°C to 40°C	10W-30
Above 14°F / -10°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.	
Fuel requirement	
For fuel requirements, refer to the engine Operator Manual for your engine.	

Alternator output	70A @ 14V DC
Fan belt deflection	.3125 in 8 mm
Battery	
Type	12V DC
Group	34/78
Quantity	1
Ampere hour	75AH
Cold cranking ampere	900A
Reserve capacity @ 25A rate	120 minutes
Engine coolant	
Capacity	5 quarts 4.7 liters
Ignition system	
Ignition timing	controlled by ECM
Spark plug type	TORCH K6RF-11
Spark plug gap	1 -1.2mm

Specifications

Kubota D1105 Engine

Displacement	68.53 cu in 1.123 liters
Number of cylinders	3
Bore and Stroke	3.07 x 3.09 inches 78 x 78.4 mm
Horsepower, gross intermittent	24.8 @ 3000 rpm 18.5 kW @ 3000 rpm
Firing order	1 - 2 - 3
Low idle	1250 rpm 260 Hz
High idle	3000 rpm 600 Hz
Compression ratio	24:1
Compression pressure	412 to 469 psi 28.4 to 32.3 bar
Governor	centrifugal mechanical
Valve clearance, cold	0.0057 to 0.0072 in 0.145 to 0.185 mm
Lubrication system	
Oil pressure	28 to 64 psi 1.9 to 4.4 bar
Oil capacity (including filter)	5.4 quarts 5.1 liters
Oil viscosity requirements	
-22° F to 86° F/ -30° C to 30° C	5W-30 (synthetic)
-4° F to 90° F / -20° C to 32° C	10W-40
Above 23° F / -5° C	20W-50
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.	
Engine coolant	
Capacity	3.3 quarts 3.1 liters
Type	Extended Life
Unit ships with Havoline Xtended life, an ethylene glycol engine coolant. Consult your local supplier for compatibility before mixing engine coolants.	
Fuel injection system	
Injection pump make	Bosch MD
Injection pump pressure, maximum	1991 psi 137 bar
Injection timing	18° BTDC
Fuel requirement	
For fuel requirements, refer to the engine Operator Manual for your engine.	
Starter motor	
Cranking speed	200 - 300 RPM
Current draw, normal load	155A
Battery	
Type	12V DC
Group	34/78
Quantity	1
Ampere hour	75AH
Cold cranking ampere	900A
Reserve capacity @ 25A rate	125 minutes
Alternator output	40A @ 12V DC
Fan belt deflection	1/4 to 3/8 inch 7 to 9 mm

Specifications

Perkins 403D-11 Engine

Displacement	69 cu in 1.13 liters
Number of cylinders	3
Bore and Stroke	3.03 x 3.19 inches 77 x 81 mm
Horsepower	26.1 @ 3000 rpm 19.5 kW @ 3000 rpm
Firing order	1 - 2 - 3
Low idle	1500 rpm 300 Hz
High idle, to serial number 9547	3000 rpm 600 Hz
High idle, from serial number 9548	2800 rpm 550 Hz
Compression ratio	23:1
Compression pressure	425 psi 29.3 bar
Pressure (psi) of lowest cylinder must be within 50 psi / 3.45 bar of highest cylinder	
Governor	mechanical, all speed
Valve clearance, cold	0.008 in 0.2 mm
Lubrication system	
Oil pressure	40 to 60 psi 2.76 to 4.1 bar
Oil capacity (including filter)	4.6 quarts 4.4 liters
Oil viscosity requirements	
Below 86°F / 30°C	5W-20
-4°F to 104°F / -20°C to 40°C	10W-30
Above 14°F / -10°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.	
Fuel injection system	
Injection pump make	Bosch
Injection timing	23° BTDC @ 3000 rpm
Injection pressure	2133 psi 147 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator Manual for your engine.	
Alternator output	40A @ 12V DC
Fan belt deflection	3/8 in 10 mm
Starter motor	
Current draw, normal load	100 - 150A
Battery	
Type	12V DC, Group 34/78
Quantity	1
Ampere hour	75AH
Cold cranking ampere	900A
Reserve capacity @ 25A rate	125 minutes
Engine coolant	
Capacity	3.28 quarts 3.1 liters

Specifications

Perkins 403F-11 Engine

Displacement	69 cu in 1.13 liters
Number of cylinders	3
Bore and Stroke	3.03 x 3.19 inches 77 x 81 mm
Horsepower	24.7 @ 2800 rpm 18.4 kW @ 2800 rpm
Firing order	1 - 2 - 3
Low idle	1500 rpm 300 Hz
High idle	2800 rpm 550 Hz
Compression ratio	23:1
Compression pressure	425 psi 29.3 bar
Pressure (psi) of lowest cylinder must be within 50 psi / 3.45 bar of highest cylinder	
Governor	mechanical, all speed
Valve clearance, cold	0.008 in 0.2 mm
Lubrication system	
Oil pressure	40 to 60 psi 2.76 to 4.1 bar
Oil capacity (including filter)	4.6 quarts 4.4 liters
Oil viscosity requirements	
Below 86°F / 30°C	5W-20
-4°F to 104°F / -20°C to 40°C	10W-30
Above 14°F / -10°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.	
Fuel injection system	
Injection pump make	Bosch
Injection timing	23° BTDC @ 2800 rpm
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Type	12V DC, Group 34/78
Quantity	1
Ampere hour	75AH
Cold cranking ampere	900A
Reserve capacity @ 25A rate	125 minutes
Engine coolant	
Capacity	3.28 quarts 3.1 liters

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	18 ft-lbs / 25 Nm
-6	30 ft-lbs / 41 Nm
-8	40 ft-lbs / 55 Nm
-10	60 ft-lbs / 81 Nm
-12	85 ft-lbs / 115 Nm
-16	110 ft-lbs / 150 Nm
-20	150 ft-lbs / 205 Nm
-24	230 ft-lbs / 315 Nm

JIC 37° Fittings

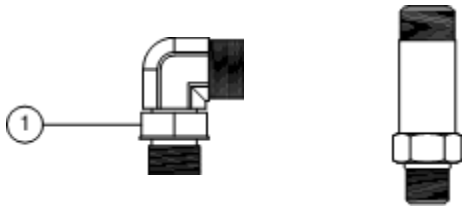
(swivel nut or hose connection)

SAE Dash Size	Thread Size	Flats
-4	7/16-20	2
-6	9/16-18	1 1/2
-8	3/4-16	1 1/2
-10	7/8-14	1 1/2
-12	1 1/16-12	1 1/4
-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)
(all types)

SAE Dash Size	Torque
-4	14 ft-lbs / 19 Nm
-6	23 ft-lbs / 31,2 Nm
-8	36 ft-lbs / 49 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

1 jam nut

Non-adjustable fitting

SAE O-ring Boss Port

(tube fitting - installed into Steel)

SAE Dash Size		Torque
-4	ORFS / 37° (Adj) ORFS (Non-adj) 37° (Non-adj)	15 ft-lbs / 20,3 Nm 26 ft-lbs / 35,3 Nm 22 ft-lbs / 30 Nm
-6	ORFS (Adj / Non-adj) 37° (Adj / Non-adj)	35 ft-lbs / 47,5 Nm 29 ft-lbs / 39,3 Nm
-8	ORFS (Adj / Non-adj) 37° (Adj / Non-adj)	60 ft-lbs / 81,3 Nm 52 ft-lbs / 70,5 Nm
-10	ORFS (Adj / Non-adj) 37° (Adj / Non-adj)	100 ft-lbs / 135,6 Nm 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-ring in Parker Seal Lok™ fittings and hose end are custom-size O-rings. They are not standard 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 the O-ring face seal 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. Refer to the appropriate torque chart in this section.

6 Operate all machine functions and inspect the hose, fittings and related components to confirm 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.

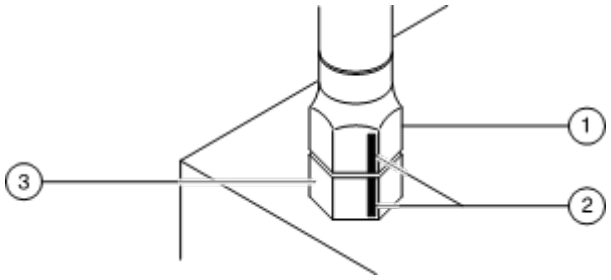


Illustration 1

1 hex nut
2 reference mark
3 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 the correct 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 fitting to properly tighten the joint after it has been loosened.

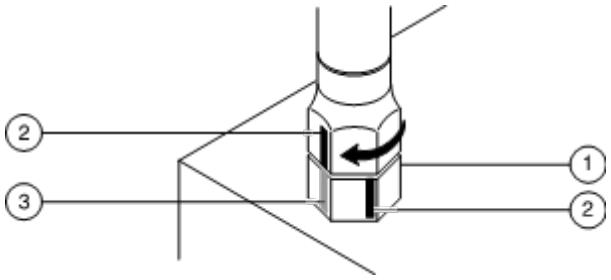


Illustration 2

1 body hex fitting
2 reference mark
3 second mark

4 Tighten the hex nut until the mark on the hex nut is aligned with the second 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.

Repair Procedures



Observe and Obey:

☑ Repair procedures shall be completed by a person trained and qualified on the repair of this machine.

☑ Immediately tag and remove from service a damaged or malfunctioning machine.

☑ Repair any machine damage or malfunction before operating the machine.

Before Repairs Start:

☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.

☑ Be sure that all necessary tools and parts are available and ready for use.

☑ Use only Genie approved replacement parts.

☑ Read each procedure completely and adhere to the instructions. Attempting shortcuts may produce hazardous conditions.

Machine Configuration:

☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:

- Machine parked on a firm, level surface
- Key switch in the off position with the key removed
- The red Emergency Stop button in the off position at both the ground and platform controls
- Wheels chocked
- All external AC power supply disconnected from the machine
- Boom in the stowed position
- Turntable secured with the turntable rotation lock

Repair Procedures

About This Section

Most of the procedures in this section should only be performed by 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 Indicates a imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.

NOTICE Indicates 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.

Platform Controls

1-1 Drive Joystick

The drive joystick is connected to the drive motor controller, located under the drive chassis cover at the non-steer end of the machine. Maintaining the boom function speed controller at the proper settings is essential to safe machine operation. The boom function speed controller should operate smoothly and provide proportional speed control through its entire range of motion. For further information or assistance, contact the Genie Product Support.

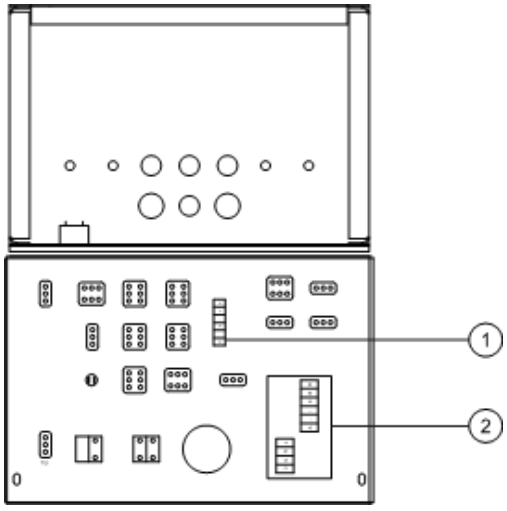
How to Adjust the Drive Joystick

Note: Perform this procedure with the engine off.

1 Remove the fasteners from the platform control box lid.

2 Open the control box lid and locate the drive joystick.

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



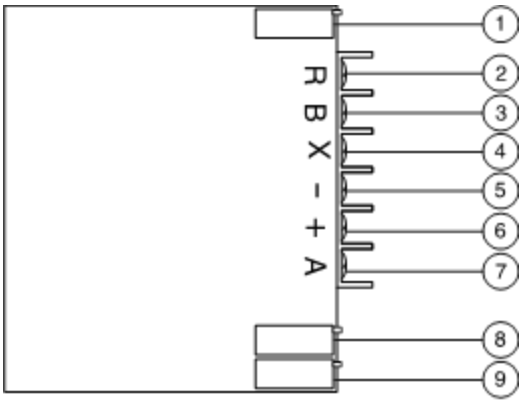
1 boom function speed controller
2 drive joystick

3 Locate and disconnect the wire connected to terminal "A" on the drive joystick circuit board.

4 Set a multimeter to read DC current.

Note: The multimeter, when set to read DC current, should be capable of reading up to 1200 mA.

5 Connect the black(-) lead from the multimeter to the wire that was just disconnected. Connect the red(+) lead of the multimeter to terminal "A" on the joystick.



1 low range potentiometer
2 terminal "R", activates low range
3 terminal "B", drive reverse
4 terminal "X", brake release
5 terminal "-", ground
6 terminal "+", positive
7 terminal "A", drive forward
8 threshold potentiometer
9 high range potentiometer

6 Turn the keyswitch to platform controls and pull out the red Emergency Stop button out to the on position at both the ground and platform controls. Do not start the engine.

Set the threshold:

Note: The drive joystick adjustments are not final adjustments. Final adjustments will need to be made to meet drive speed specifications. Refer to Section 2, Specifications.

7 Press down the foot switch. Move the drive joystick off center in either direction just until a current reading appears on the mulitmeter display.

8 Hold the drive joystick in position and adjust the threshold potentiometer until the multimeter displays approximately 600 mA.

Set the high range:

9 Press down the foot switch. Move and hold the drive joystick full stroke in either direction.

10 Hold the drive joystick in position and adjust the hi range potentiometer until the multimeter displays slightly higher than 1100 mA.

Set the low range:

11 Start the engine from the platform controls and raise the primary boom approximately 3 feet / 1 m. Turn the engine off.

12 Press down the foot switch. Move and hold the drive joystick full stroke in either direction.

13 Hold the drive joystick in position and adjust the lo range potentiometer until the multimeter displays approximately 700 mA.

14 Push in the red Emergency Stop button to the off position at the platform controls.

15 Disconnect the multimeter.

16 Connect the wire that was disconnected in step 3 to terminal "A" of the drive joystick.

Set the stowed drive speed:

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

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

18 Create start and finish lines by marking two lines on the ground 40 feet / 12.2 m apart.

19 Start the engine from the platform controls and move the engine idle select switch to foot switch activated high idle (rabbit and foot switch symbol).

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

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

22 Continue at full speed and note the time when the machine reference point passes over the finish line. Refer to Section 2, Specifications.

⊙ Result: The stowed drive speed does not meet specification. Adjust the hi range potentiometer on the drive joystick clockwise to increase the speed or counterclockwise to decrease the stowed drive speed. Continue to perform steps 20 through 22 until the stowed drive speed meets specification.

Platform Controls

Set the raised drive speed:

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

23 Press down the foot switch and raise the primary boom approximately 3 feet / 1 m.

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

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

26 Continue at full speed and note the time when the machine reference point passes over the finish line. Refer to Section 2, Specifications.

⊙ Result: The raised drive speed does not meet specification. Adjust the lo range potentiometer on the drive joystick clockwise to increase the speed or counterclockwise to decrease the raised drive speed. Continue to perform steps 24 through 26 until the raised drive speed meets specification.

27 Lower the primary boom to the stowed position. Turn the engine off.

28 Close the platform control box lid and install the fasteners.

1-2
Boom Function Speed Controller

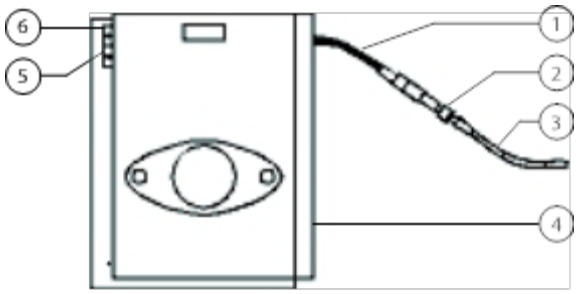
Boom Function Speed Controller Adjustments

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

Note: Do not adjust the boom function speed controller unless the static battery supply voltage is above 24V DC.

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

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



1 black wire
2 diode
3 white/red wire
4 boom function speed controller
5 threshold trimpot
6 max out trimpot

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

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

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

6 Set the threshold: Press down the foot switch. Move the primary boom toggle switch in the up direction until the amperage reading appears. Adjust the amperage to 0.820A. Turn the threshold trimpot adjustment screw clockwise to increase the amperage or counterclockwise to decrease the amperage.

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

8 Set the Hi Range: Press down the foot switch. Move the primary boom toggle switch in the up direction. Adjust the amperage to 1.650A. Turn the Hi Range trimpot adjustment screw clockwise to increase the amperage or counterclockwise to decrease the amperage.

9 Set the Low Range: Press down the foot switch. Move the primary boom toggle switch in the up direction. Adjust the amperage to 1.450A. Turn the Low Range trimpot adjustment screw clockwise to increase the amperage or counterclockwise to decrease the amperage.

Boom function speed controller specifications	
Threshold	0.820A
HI Range	1.650A
Low Range	1.450A

Platform Components

2-1 Platform Leveling Slave Cylinder

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

How to Remove the Platform Leveling Slave Cylinder

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

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

2 Raise the boom slightly and place blocks under the platform for support. Lower the boom until the platform is resting on the blocks.

3 Remove the pin retainer fastener from the rod-end pivot pin.

4 Remove the external snap ring from the barrel-end pivot pin.

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

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

7 Carefully pull the cylinder out of the boom.

8 Tag and disconnect the hydraulic hoses from the slave cylinder and connect them togetherwith a connector. 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.

How to Bleed the Slave Cylinder

1 Raise the jib boom to a horizontal position.

2 Move the platform level toggle switch up and down through two platform leveling cycles to remove any air that might be in the system.

2-2 Platform Rotator

How to Remove the Platform Rotator

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

1 Remove the platform.

2 Tag, disconnect and plug the hydraulic hoses from the platform rotate manifold.

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

3 Support the platform mounting weldment with a suitable lifting device. Do not apply any lifting pressure.

4 Remove the six mounting bolts from the platform mounting weldment. Remove the center bolt and slide the platform mounting weldment off of the platform rotator.

5 Support the platform rotator with a suitable lifting device. Do not apply any lifting pressure.

6 Remove the pin retaining fasteners from the jib boom and leveling links to platform rotator pivot pins. Do not remove the pins.

7 Use a soft metal drift to remove the leveling link pivot pin. Lower the leveling links to the ground.

8 Support the jib boom and jib boom lift cylinder with an suitable lifting device.

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

⚠WARNING Crushing hazard. The jib boom and jib boom lift cylinder could fall when when the platform rotator is removed if not properly supported by the suitable lifting device.

Note: When installing the platform rotator, be sure to torque the fasteners to specification. Refer to Specifications, *Machine Torque Specifications.*

Platform Components

How to Bleed the Platform Rotator

Note: This procedure will require two people.

1 Move the function enable toggle switch to either side and activate the platform rotate toggle switch to the right and then to the left through two platform rotation cycles. Then hold the switch to the right position until the platform is fully rotated to the right.

2 Place a suitable container underneath the platform rotator.

3 Open the top bleed screw on the rotator, but do not remove it.

⚠ 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 Move the function enable toggle switch to either side and hold the platform rotate toggle switch to the left position until the platform is fully rotated to the left. Continue holding the toggle switch until air stops coming out of the bleed screw. Close the bleed screw.

⚠ WARNING Crushing hazard. Keep clear of the platform during rotation.

5 Open the bottom bleed screw on the rotator, but do not remove it.

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

6 Move the function enable toggle switch to either side and hold the platform rotate toggle switch to the right position until the platform is fully rotated to the right. Continue holding the toggle switch until air stops coming out of the bleed screw. Close the bleed screw.

⚠ WARNING Crushing hazard. Keep clear of the platform during rotation.

7 Clean up any hydraulic oil that may have spilled.

8 Rotate the platform fully in both directions and inspect the bleed screws for leaks.

2-3 Platform Overload System

How to Calibrate the Platform Overload System

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 Level the platform.

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

3 Using a suitable lifting device, place an appropriate test weight equal to that of the maximum platform capacity at the center of the platform floor.

Determine the limit switch trigger point:

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

⊙ Result: **The overload indicator light and the alarm is on**. Slowly tighten the load spring adjustment nut by turning it clockwise just until the overload indicator light and alarm turns off.

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

Note: There may be an approximate 2 second delay before the overload indicator light turns on and the alarm sounds.

⊙ Result: **The overload indicator light and alarm is off**. Slowly loosen the load spring adjustment nut by turning it counterclockwise just until the overload indicator light and alarm turn on.

Note: There may be an approximate 2 second delay before the overload indicator light turns on and the alarm sounds.

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

Confirm the setting:

5 Turn the key switch to platform control.

6 Lift the test weight off the platform floor using a suitable lifting device.

7 Place the test weight back onto the center of the platform floor using a suitable lifting device.

⊙ Result: The alarm should be off. The platform overload indicator light should be off at both the ground and platform controls.

Note: There may be an approximate 2 second delay before the overload indicator light and alarm turn off.

8 Add an additional 10 lb / 4.5 kg test weight to the original test weight to overload the platform.

⊙ Result: The alarm should sound. The platform overload indicator light should be flashing at both the ground and platform controls.

Note: There may be an approximate 2 second delay before the overload indicator light turns on and the alarm sounds.

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.

Note: If the platform overload system is not operating properly, repeat steps 1 through 4.

Jib Boom Components

3-1
Jib Boom

How to Remove the Jib Boom

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

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

1 Remove the platform.

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

3 Tag, disconnect and plug the jib boom lift cylinder hydraulic hoses. Cap the fittings on the jib boom lift 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 Remove the cable cover from the side of the jib boom.

5 Tag, disconnect and plug the hydraulic hoses from ports "T" and "P" of the jib boom 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.

6 Tag and disconnect the electrical wiring from the jib boom manifold.

7 Attach a lifting strap from an suitable lifting device to the jib boom.

8 Remove the pin retaining fasteners from the jib boom pivot pin at the jib boom bellcrank.

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

⚠WARNING Crushing hazard. The jib boom could fall when the pin is removed if not properly supported by the suitable lifting device.

10 Remove the pin retaining fasteners from the jib boom lift cylinder rod-end pivot pin. Do not remove the pin.

11 Remove both of the jib boom leveling links from the bellcrank.

12 Attach a lifting strap from an suitable lifting device to the rod-end of the jib boom lift cylinder.

13 Use a soft metal drift to remove the jib boom lift cylinder rod-end pivot pin. Remove the jib boom lift cylinder from the jib boom bellcrank.

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

3-2
Jib Boom Bell Crank

How to Remove the Jib Boom Bell Crank

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

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

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

2 Support and secure the jib boom bell crank to an appropriate lifting device.

3 Remove the pin retaining fasteners from the slave cylinder rod-end pivot pin. Do not remove the pin.

4 Place a block of wood under the platform leveling slave cylinder for support. Protect the cylinder rod from damage.

5 Remove the pin retaining fasteners from the jib boom bell crank at the extension boom. Use a soft metal drift to remove the pin.

6 Use a soft metal drift to remove the slave cylinder rod-end pivot pin.

7 Remove the jib boom bell crank from the extension boom.

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

3-3
Jib Boom Lift Cylinder

How to Remove the Jib Boom Lift Cylinder

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

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

1 Raise the jib boom slightly and place blocks under the platform mounting weldment. Then lower the jib 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.

2 Tag, disconnect and plug the jib 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.

3 Remove the pin retaining fasteners from the jib boom lift cylinder rod-end pivot pin. Do not remove the pin.

Jib Boom Components

4 Use a soft metal drift to tap the rod-end pivot pin half way out and lower one of the leveling links to the ground. Tap the pin the other direction and lower the opposite leveling link. Do not remove the pin.

5 Attach a lifting strap from an suitable lifting device to the rod end of the jib boom lift cylinder.

6 Remove the pin retaining fasteners from the jib boom lift cylinder barrel-end pivot pin. Use a soft metal drift to remove the barrel-end pivot pin.

7 Use a soft metal drift to remove the jib boom lift cylinder rod-end pivot pin. Remove the jib boom lift cylinder from the machine.

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

Primary Boom Components

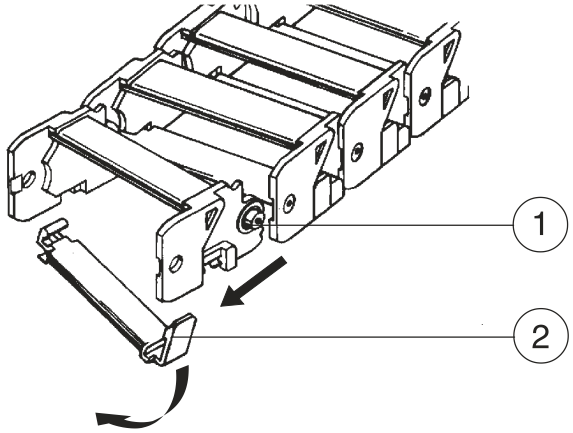
4-1
Cable Track

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

How to Repair the Primary Boom Cable Track

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

Note: A 7 link repair section of cable track is available through the Genie Service Parts Department.



1 link separation point
2 lower clip

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

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

3 Repeat steps 1 and 2 for each link.

4-2
Primary Boom

How to Shim the Primary Boom

1 Extend the boom until the wear pads are accessible.

2 Loosen the wear pad mounting fasteners.

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

4 Tighten the mounting fasteners.

5 Extend and retract the boom through an entire cycle. Check for tight spots that could cause scraping or binding.

Note: Always maintain squareness between the outer and inner boom tubes.

Primary Boom Components

How to Remove the Primary 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 (if equipped) on the fitting and/or hose end must be replaced. All connections must be torqued to specification during installation. Refer to Specifications, *Hydraulic Hose and Fitting Torque Specifications.*

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

1 Remove the platform.

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

3 Remove the jib boom. Refer to Repair Procedure, *How to Remove the Jib Boom*.

4 Remove the jib boom bell crank.Refer to Repair Procedure, *How to Remove the Jib Boom Bell Crank*.

5 Support the slave cylinder.

6 Tag and disconnect the hydraulic hoses to the slave cylinder and connect them together using a connector. Plug the slave cylinder hoses from the cable track.

⚠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 external snap ring from the slave cylinder barrel-end pivot pin.

8 Use a soft metal drift to remove the slave cylinder barrel-end pin.

9 Remove the slave cylinder from the primary boom.

10 Support the cable track with an suitable lifting device.

11 Remove the cable track mounting fasteners, then remove the cable track from the boom and lay it off to the side.

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

12 Remove the turntable end cover.

13 Remove the pin retaining fasteners from the master cylinder rod-end pivot pin. Use a soft metal drift to remove the pin. Pull the cylinder back and secure it from moving.

14 Remove the drive speed limit switch mounted on the side of the boom at the pivot end. Do not disconnect the wiring.

Primary Boom Components

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

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

16 Attach a suitable 5 ton / 5,000 kg lifting device to the center point of the boom.

17 Attach a suitable lifting device to the primary boom lift cylinder.

18 Using a suitable lifting device, raise the primary boom to a horizontal position.

19 Place support blocks across the secondary boom to support the boom lift cylinder.

20 Remove the pin retaining fasteners from the primary boom lift cylinder rod-end pin. Use a soft metal drift to remove the pin.

⚠WARNING Crushing hazard. The boom lift cylinder will fall unless it is properly supported.

21 Lower the rod-end of the primary boom lift cylinder onto support blocks. Protect the cylinder rod from damage.

22 Remove the hose clamp brackets from the underside of the primary boom.

23 Remove the hose clamp from the side of the primary boom.

24 Remove the limit switch cam mounting fastener (if equipped).

Note: Note the position of the cam before removing it.

25 Remove the pin retaining fasteners from the primary boom pivot pin.

26 Use a soft metal drift to remove the primary boom pivot pin. Carefully remove the boom from the machine and place it on a structure capable of supporting it.

⚠WARNING Crushing hazard. If the suitable lifting device is not properly attached, the boom could become unbalanced and fall when it is removed from the machine.

Note: During removal, the suitable lifting device strap will need to be carefully adjusted for proper balancing.

Primary Boom Components

How to Disassemble the Primary Boom

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

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

2 Place blocks under the extension cylinder for support.

3 Remove the retaining fasteners from the extension cylinder barrel-end pivot pin. Use a soft metal drift to remove the pin.

4 Label the location of all wear pads from the outer boom tube at the platform end. Remove all wear pads, including shims, from the platform end of the boom.

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

5 Carefully rotate the barrel end of the extension cylinder until the pin mounting bore is in a vertical position.

6 Attach a lifting strap from an suitable lifting device to the extension tube at the platform end.

7 Support and slide the extension tube out of the outer primary boom tube. Place the extension boom tube on blocks for support.

⚠WARNING Crushing hazard. The boom tubes could become unbalanced and fall if not properly supported by the suitable lifting device.

Note: During removal, the suitable lifting device strap will need to be carefully adjusted for proper balancing.

8 Remove the external snap rings from the extension cylinder rod-end pivot pins at the platform end of the extension tube. Use a soft metal drift to remove the pins.

9 Support and slide the extension cylinder out of the base end of the extension tube. Place the extension cylinder on blocks for support.

Note: During removal, the suitable lifting device strap will need to be carefully adjusted for proper balancing.

10 Remove and label the wear pads from the extension cylinder.

Note: Pay careful attention to the location of each wear pad.

4-3
Primary Boom Lift Cylinder

The primary boom lift cylinder raises and lowers the primary boom. The primary boom lift cylinder is equipped with a counterbalance valve to prevent movement in the event of a hydraulic line failure.

How to Remove the Primary 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 (if equipped) on the fitting and/or hose end must be replaced. All connections must be torqued to specification during installation. Refer to Specifications, *Hydraulic Hose and Fitting Torque Specifications.*

1 Raise the primary boom enough to access the primary boom lift cylinder rod-end pivot pin.

2 Raise the secondary boom enough to access the primary boom lift cylinder barrel-end pivot pin.

3 Attach a lifting strap from an suitable lifting device to the primary boom for support. Do not apply any lifting pressure.

4 Place a block of wood across the upper secondary boom to support the cylinder when the rod-end pivot pin is removed.

5 Attach a lifting strap from an suitable lifting device to the primary boom lift cylinder.

6 Remove the rear turntable cover.

7 Place a 4x4 inch / 10 x 10 cm block between the lower compression arms and the cross member of the upper secondary boom. Carefully lower the secondary boom onto the block.

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

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

⚠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.

9 Lower the rod end of the cylinder onto the blocks that were placed on the upper secondary boom.

10 Remove the pin retaining fasteners from the upper compression arm pivot pin (same side of machine as the primary boom lift cylinder barrel-end pivot pin retaining fasteners).

11 Place a rod through the compression arm pivot pin and twist to remove the pin.

12 Swing the compression arm up out of the way and secure it from moving.

Primary Boom Components

13 Tag, disconnect and plug the primary 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.

14 Support the primary boom lift cylinder with straps or ropes to restrict it from swinging freely when the barrel-end pivot pin is removed.

15 Remove the pin retaining fasteners from the lift cylinder barrel-end pivot pin. Do not remove the pivot pin.

16 Use the suitable lifting device to raise the primary boom 1 inch / 2.5 cm. This will relieve pressure on the barrel-end pivot pin.

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

⚠ WARNING Crushing hazard. The primary boom could become unbalanced and fall when removed from the machine if not properly attached to the suitable lifting device.

18 Attach a lifting strap from an suitable lifting device to the rod end of the primary boom lift cylinder. Carefully loosen the straps and allow the barrel end of the primary boom lift cylinder to slowly swing down.

19 Carefully remove the cylinder from the machine.

4-4 Primary Boom Extension Cylinder

The primary boom extension cylinder extends and retracts the primary boom extension tube. The primary boom extension cylinder is 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 (if equipped) on the fitting and/or hose end must be replaced. All connections must be torqued to specification during installation. Refer to Specifications, *Hydraulic Hose and Fitting Torque Specifications.*

1 Raise the primary boom to a horizontal position. Then extend the boom approximately 3 to 4 feet / 1 m until the extension cylinder rod-end pivot pins are accessible.

2 Remove the external snap rings from the extension cylinder rod-end pivot pins. Use a soft metal drift to remove the pins.

3 Remove the rear turntable cover.

Primary Boom Components

4 Raise the secondary boom until the master cylinder rod-end pivot pin is accessible.

5 Remove the drive speed limit switch from the pivot end of the primary boom. Do not disconnect the wiring.

6 Remove the pin retaining fasteners from the master cylinder rod end pivot pin. Use a soft metal drift to remove the pin.

7 Manually retract the master cylinder and push it toward the platform end of the boom to obtain enough clearance for the extension cylinder removal.

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

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

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

10 Carefully pull out and properly support the extension cylinder from the primary boom using a lifting strap from an suitable lifting device.

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

NOTICE Component damage hazard. Be careful not to damage the counterbalance valves on the primary boom extension cylinder when removing the cylinder from the primary boom.

NOTICE Component damage hazard. Hoses and cables can be damaged if the primary boom extension cylinder is dragged across them.

Note: During removal, the suitable lifting device strap will need to be carefully adjusted for proper balancing.

Note: Note the length of the cylinder after removal. The cylinder must be at the same length for installation.

Primary Boom Components

4-5 Platform Leveling Master Cylinder

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

How to Remove the Platform Leveling Master 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 (if equipped) on the fitting and/or hose end must be replaced. All connections must be torqued to specification during installation. Refer to Specifications, *Hydraulic Hose and Fitting Torque Specifications.*

1 Remove the rear turntable cover.

2 Raise the secondary boom until the master cylinder barrel-end pivot pin is above the turntable counterweights.

3 Raise the primary boom until the master cylinder rod-end pivot pin is accessible.

4 Attach a lifting strap from an suitable lifting device to the upper pivot for support. Do not apply any lifting pressure.

5 Secure the upper secondary boom to the pivot end of the primary boom with a strap.

Note: Securing the upper secondary boom to the pivot will prevent the upper secondary boom from falling when the master cylinder barrel-end pivot pin is removed from the cylinder.

6 Tag, disconnect and plug the master 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.

7 Tie a strap around the lug on the rod end of the master cylinder and secure the strap to the primary boom.

Note: The strap will be used to lower the cylinder out of the upper pivot.

8 Remove the pin retaining fasteners from the master cylinder rod-end pivot pin. Use a soft metal drift to remove the pin.

9 Remove the pin retaining fasteners from the master cylinder barrel-end pivot pin.

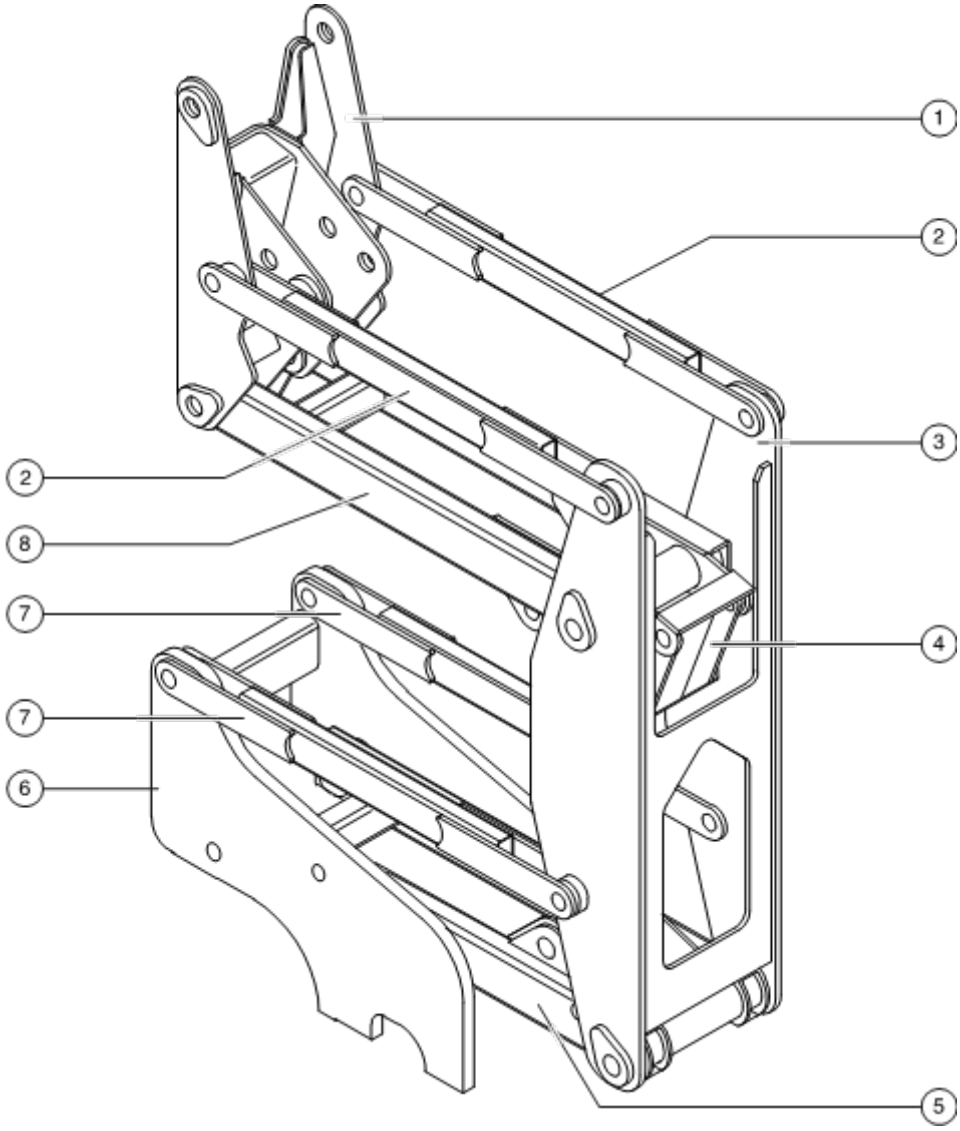
10 Use a soft metal drift to remove the pin from the cylinder. Do not remove the pin from the upper mid-pivot. Push the pin to one side, only far enough to remove the cylinder.

⚠WARNING Crushing hazard. The upper secondary boom and the upper pivot may fall if the pivot pin is completely removed.

Note: The pin should remain in one side of the upper secondary boom and upper mid-pivot.

11 Use the strap around the rod-end lug to lower the cylinder out of the machine.

Secondary Boom Components



Secondary Boom components

1 upper pivot
2 upper compression arm
3 mid-pivot
4 compression link
5 lower secondary boom
6 turntable pivot
7 lower compression arm
8 upper secondary boom

Secondary Boom Components

5-1
Secondary Boom

How to Disassemble the Secondary 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.

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

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

1 Remove the rear turntable cover.

2 Place a suitable lifting device under the platform for support.

3 Disconnect the battery.

4 Remove the cable cover from the side of the jib boom.

5 Remove the wire loom from the cables at the platform control box.

6 Locate the cables from the primary boom cable track to the platform control box. Number each cable and its entry location at the platform control box.

7 Open the platform control box.

8 Tag and disconnect each wire from the cables in 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.

9 Pull the cables out of the platform control box.

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

11 Remove the hose clamps from the bottom side of the primary boom.

12 Tag, disconnect and plug the hydraulic hoses at the union located on the bottom side of the primary boom. Cap the fittings on the union.

⚠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.

13 Remove the hose clamp from the side of the primary boom at the pivot end.

14 Remove the primary boom extend drive speed limit switch mounted on the side of the primary boom at the pivot end. Do not disconnect the wiring.

15 Attach a lifting strap from an suitable lifting device to the pivot end of the primary boom.

16 Using the suitable lifting device, carefully lift the secondary and primary boom assembly until the master cylinder and primary boom lift cylinder hydraulic hoses are accessible.

17 Remove the cable covers from the top of the upper secondary boom.

Secondary Boom Components

18 Tag, disconnect and plug the primary boom lift cylinder and master cylinder hydraulic hoses. Cap the fittings on the cylinders.

⚠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.

19 Using the suitable lifting device, lower the boom assembly to the fully stowed position.

20 Pull all the cables and hoses through the upper pivot.

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

21 Position a lifting strap from the suitable lifting device approximately 2 feet / 60 cm from the platform end of the primary boom. Measure from the platform end of the primary boom tube.

22 Remove the pin retaining fasteners from the upper pivot to upper secondary compression arm pivot pins. Place a rod through the compression arm pivot pin and twist to remove the pins.

23 Swing the compression arms down and out of the way. Secure them from moving.

24 Remove the pin retaining fasteners from the upper pivot to the upper secondary boom pivot pin. Use a soft metal drift to remove the pin.

25 Carefully remove the entire primary boom assembly from the machine (primary boom assembly, jib boom assembly, platform, master cylinder, primary lift cylinder and upper pivot).

⚠WARNING Crushing hazard. The primary boom assembly could become unbalanced and fall when removed from the machine if not properly supported by the suitable lifting device. Do not remove the assembly from the machine until it is properly balanced.

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

26 Place the entire assembly onto a structure capable of supporting it.

27 Remove the pin retaining fasteners from the upper secondary compression arm pivot pins. Do not remove the pins.

28 Position a lifting strap from an suitable lifting device at the center of the control box side upper compression arm.

29 Place a rod through the compression arm pivot pin and twist to remove the pin. Remove the compression arm from the machine.

⚠WARNING Crushing hazard. The upper secondary compression arm could become unbalanced and fall when removed from the machine if not properly supported by the suitable lifting device.

30 Repeat step 29 for the engine side upper compression arm.

31 Remove the plastic plug in the bulkhead to access the secondary boom lift cylinder rod-end pivot pin.

Secondary Boom Components

32 Remove the pin retaining fasteners from the rod end of the secondary boom lift cylinder. Use a soft metal drift to remove the pin. Secure the cylinder from moving.

33 Remove the pin retaining fasteners from the lower pivot pin of the compression link. Use a soft metal drift to remove the pin.

34 Attach a lifting strap from an suitable lifting device to the upper secondary boom.

35 Remove the pin retaining fasteners from the mid-pivot to upper secondary boom pivot pin. Use a soft metal drift to remove the pin.

36 Remove the upper secondary boom with compression link from the machine.

⚠ CAUTION Crushing hazard. The upper secondary boom with compression link could become unbalanced and fall when removed from the machine if not properly supported by the suitable lifting device.

37 Remove the drive speed limit switch mounted on the inside of the lower mid-pivot. Do not disconnect the wiring.

38 Remove the cable covers from the top of the lower secondary boom. Pull all the cables and hoses towards the counterweight end of the turntable.

39 **Gasoline/LPG models**: Remove the LPG hose from the tank and then remove the LPG tank.

40 Remove the battery hold down and battery.

41 Remove the pin retaining fasteners from the secondary boom lift cylinder barrel-end pivot pins.

42 Attach a lifting strap from an suitable lifting device to the lug on the rod-end of the secondary boom lift cylinder.

43 Tag, disconnect and plug the hydraulic hoses from the secondary boom lift 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.

44 Use a slide hammer to remove the secondary boom lift cylinder barrel-end pivot pins. Remove the secondary boom lift cylinder from the machine.

⚠ WARNING Crushing hazard. The secondary boom lift cylinder could become unbalanced and fall when removed from the machine if not properly attached to the suitable lifting device.

Note: Access the pins using the access holes located in the bulkheads, one on each side.

45 Attach a lifting strap from an suitable lifting device to the mid-pivot for support. Do not lift it.

46 Remove the pin retaining fasteners from the mid-pivot to lower compression arm pivot pins. Place a rod through the compression arm pivot pins and twist to remove the pins.

47 Remove the pin retaining fasteners from the mid-pivot to lower secondary boom pivot pins. Use a soft metal drift to remove the pin.

48 Remove the mid-pivot from the machine.

⚠ WARNING Crushing hazard. The mid-pivot could become unbalanced and fall when removed from the machine if not properly supported by the suitable lifting device.

49 Attach a lifting strap from an suitable lifting device to the control box side lower compression arm.

50 Remove the pin retaining fasteners from the lower compression arm to turntable pivot pins. Place a rod through the compression arm pivot pin and twist to remove the pin. Remove the compression arm from the machine.

⚠WARNING Crushing hazard. The lower secondary compression arm could become unbalanced and fall when removed from the machine if not properly supported by the suitable lifting device.

51 Repeat step 50 for the engine side lower compression arm.

52 Attach a lifting strap from an suitable lifting device to the lower secondary boom.

53 Remove the pin retaining fasteners from the lower secondary boom to turntable pivot pin. Use a soft metal drift to remove the pin.

54 Remove the lower secondary boom from the machine.

⚠WARNING Crushing hazard. The lower secondary boom could become unbalanced and fall when removed from the machine if not properly supported by the suitable lifting device.

5-2 Secondary Boom Lift Cylinder

The secondary boom lift cylinder raises and lowers the secondary boom. The secondary boom lift cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

How to Remove the Secondary 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 (if equipped) on the fitting and/or hose end must be replaced. All connections must be torqued to specification during installation. Refer to Specifications, *Hydraulic Hose and Fitting Torque Specifications.*

1 Rotate the turntable to the side until the boom is centered between the steer and non-steer tires.

2 Raise the primary boom to full height. Do not extend it. Turn the machine off.

3 Attach a lifting strap from an suitable lifting device to the lug on the rod-end of the secondary boom lift cylinder.

4 Open the engine side turntable cover. Pull up on the engine tray lock pin and swing the engine tray out and away from the machine. Secure the engine tray from moving.

Secondary Boom Components

5 Remove the pin retaining fasteners from the secondary boom lift cylinder barrel-end pivot pins.

6 Use a slide hammer to remove the barrel-end pivot pins.

Note: Access the pins using the access holes located in the bulkheads, one on each side.

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

8 Carefully lower the cylinder down through the secondary boom, just enough to access the hydraulic hoses.

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

9 Tag, disconnect and plug the hydraulic hoses from the secondary boom lift 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.

10 Carefully remove the cylinder by raising it through the top of the secondary boom using the suitable lifting device.

⚠WARNING Crushing hazard. The secondary boom lift cylinder could become unbalanced and fall when removed from the machine if not properly supported by the suitable lifting device.

6-1
Kubota Diesel Models

Timing Adjustment

Complete information to perform this procedure is available in the Kubota D-1105 Workshop Manual.

Kubota D1105 Workshop Manual	
Genie part number	229761GT

Glow Plugs

How to Check the Glow Plugs

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

⊙ Result: The resistance should be approximately 1Ω.

2 If the ohm reading is different than 1Ω, remove the wire and connector plate from the three individual glow plugs. Then, one glow plug at a time, measure the resistance between the glow plug and ground.

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

3 Install the connector plate and wires to all three glow plugs.

4 Turn the key switch to ground control and pull out the red Emergency Stop button to the on position.

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

6 Hold the glow plug switch in the on position.

⊙ Result: The volt meter should read 12V DC or more.

RPM Adjustment

Refer to Maintenance Procedure in the appropriate Service or Maintenance Manual for your machine, *Check and Adjust the Engine RPM*.

Engines

Flex Plate

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

How to Remove the Flex Plate

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

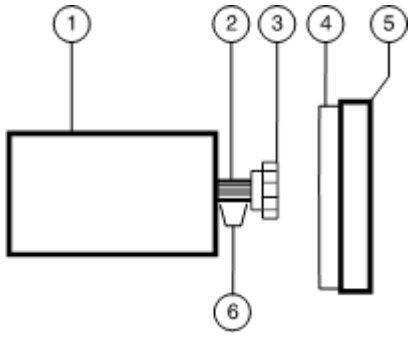
2 Carefully pull the pump away from the engine and secure it from moving.

3 Remove the flex plate mounting fasteners.

4 Remove the flex plate from the engine.

How to Install the Flex Plate

1 Install the flex plate onto the flywheel with the raised spline away from the flywheel.



1 pump
2 pump shaft
3 pump coupler
4 flex plate
5 flywheel
6 1/32 inch / 0.8 mm gap

2 Apply removable Loctite® thread sealant to the flex plate mounting fasteners. Torque the flex plate mounting fasteners to 36 ft-lbs / 49 Nm.

3 Install the coupler onto the pump shaft with the set screw towards the pump. Leave a 1/32 inch / 0.8 mm gap between the coupler and pump end plate.

4 Apply removable Loctite® thread sealant to the coupler set screw. Torque the set screw to 65-70 ft-lbs / 88-95 Nm.

NOTICE

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

Coolant Temperature and Oil Pressure Switches

The engine coolant temperature switch is a normally open switch. The switch contacts close at approximately 225°F / 107°C. If the coolant temperature rises above the switch point, the switch contacts close and the engine will shut off to prevent damage. The engine will not start until the temperature drops below the switch point. An over- temperature indicator light at the ground controls should turn on when the switch closes.

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

The engine oil switch is a normally closed switch. The switch contacts open at approximately 7 psi / 0.48 bar. If the oil pressure drops below the switch point, the contacts open and the engine will shut off to prevent damage. A low oil pressure indicator light at the ground controls should turn on when the switch opens.

NOTICE Component damage hazard.Do not crank the engine with the low oil pressure light on.

6-2 Kubota Gasoline / LPG Models

Choke Adjustment

The choke is solenoid-operated and functions only in the gasoline mode. This choke will not operate in LPG mode.

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

Timing Adjustment

Note: The ignition timing cannot be adjusted. The timing adjustment screw is factory sealed with a tamper resistant cap installed by the manufacturer. If service or repair is needed, contact your local Kubota dealer.

Carburetor Adjustment

Note: The carburetor cannot be adjusted. The carburetor mixture screws are factory sealed with tamper resistant caps installed by the manufacturer. If service or repair is needed, contact your local Kubota dealer.

RPM Adjustment

Refer to Maintenance Procedure in the appropriate Service or Maintenance Manual for your machine, *Check and Adjust the Engine RPM*.

Engines

Flex Plate

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

How to Remove the Flex Plate

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

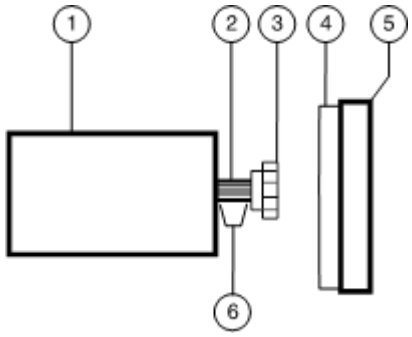
2 Carefully pull the pump away from the engine and secure it from moving.

3 Remove the flex plate mounting fasteners.

4 Remove the flex plate from the engine.

How to Install the Flex Plate

1 Install the flex plate onto the flywheel with the raised spline away from the flywheel.



1 pump
2 pump shaft
3 pump coupler
4 flex plate
5 flywheel
6 1/32 inch / 0.8 mm gap

2 Apply removable Loctite® thread sealant to the flex plate mounting fasteners. Torque the flex plate mounting fasteners to 36 ft-lbs / 49 Nm.

3 Install the coupler onto the pump shaft with the set screw towards the pump. Leave a 1/32 inch / 0.8 mm gap between the coupler and pump end plate.

4 Apply removable Loctite® thread sealant to the coupler set screw. Torque the set screw to 65-70 ft-lbs / 88-95 Nm.

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

Coolant Temperature and Oil Pressure Switches

The engine coolant temperature switch is a normally open switch. The switch contacts close at approximately 225°F / 107°C. If the coolant temperature rises above the switch point, the switch contacts close and the engine will shut off to prevent damage. The engine will not start until the temperature drops below the switch point. An over- temperature indicator light at the ground controls should turn on when the switch closes.

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

The engine oil switch is a normally closed switch. The switch contacts open at approximately 7 psi / 0.48 bar. If the oil pressure drops below the switch point, the contacts open and the engine will shut off to prevent damage. A low oil pressure indicator light at the ground controls should turn on when the switch opens.

NOTICE Component damage hazard.Do not crank the engine with the low oil pressure light on.

6-3 Perkins Diesel Models

Timing Adjustment

Complete information to perform this procedure is available in the Perkins 403D-11 Workshop Manual.

Perkins 403D-11 Workshop Manual	
Genie part number	131662GT
Perkins 403F-11 Workshop Manual	
Genie part number	1254821GT

RPM Adjustment

Refer to Maintenance Procedure in the appropriate Service or Maintenance Manual for your machine, *Check and Adjust the Engine RPM*.

Engines

Flex Plate

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

How to Remove the Flex Plate

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

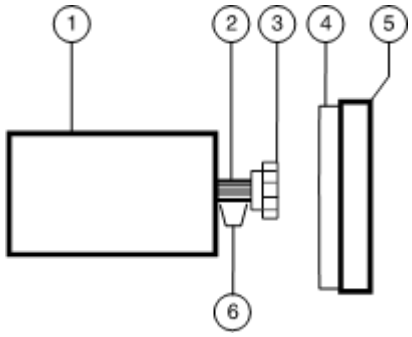
2 Carefully pull the pump away from the engine and secure it from moving.

3 Remove the flex plate mounting fasteners.

4 Remove the flex plate from the engine.

How to Install the Flex Plate

1 Install the flex plate onto the flywheel with the raised spline away from the flywheel.



1 pump
2 pump shaft
3 pump coupler
4 flex plate
5 flywheel
6 1/32 inch / 0.8 mm gap

2 Apply removable Loctite® thread sealant to the flex plate mounting fasteners. Torque the flex plate mounting fasteners to 36 ft-lbs / 49 Nm.

3 Install the coupler onto the pump shaft with the set screw towards the pump. Leave a 1/32 inch / 0.8 mm gap between the coupler and pump end plate.

4 Apply removable Loctite® thread sealant to the coupler set screw. Torque the set screw to 65-70 ft-lbs / 88-95 Nm.

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

Coolant Temperature and Oil Pressure Switches

The engine coolant temperature switch is a normally open switch. The switch contacts close at approximately 225°F / 107°C. If the coolant temperature rises above the switch point, the switch contacts close and the engine will shut off to prevent damage. The engine will not start until the temperature drops below the switch point. An over- temperature indicator light at the ground controls should turn on when the switch closes.

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

The engine oil switch is a normally closed switch. The switch contacts open at approximately 7 psi / 0.48 bar. If the oil pressure drops below the switch point, the contacts open and the engine will shut off to prevent damage. A low oil pressure indicator light at the ground controls should turn on when the switch opens.

NOTICE Component damage hazard.Do not crank the engine with the low oil pressure light on.

6-4 GM .998L Models

Timing Adjustment

Complete information to perform this procedure is available in the GM .998L Service Manual.

GM .998L Service Manual	
Genie part number	1311928GT

Engines

Flex Plate

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

How to Remove the Flex Plate

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

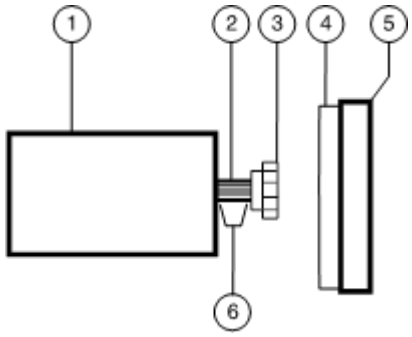
2 Carefully pull the pump away from the engine and secure it from moving.

3 Remove the flex plate mounting fasteners.

4 Remove the flex plate from the engine.

How to Install the Flex Plate

1 Install the flex plate onto the flywheel with the raised spline away from the flywheel.



1 pump
2 pump shaft
3 pump coupler
4 flex plate
5 flywheel
6 1/32 inch / 0.8 mm gap

2 Apply removable Loctite® thread sealant to the flex plate mounting fasteners. Torque the flex plate mounting fasteners to 36 ft-lbs / 49 Nm.

3 Install the coupler onto the pump shaft with the set screw towards the pump. Leave a 1/32 inch / 0.8 mm gap between the coupler and pump end plate.

4 Apply removable Loctite® thread sealant to the coupler set screw. Torque the set screw to 65-70 ft-lbs / 88-95 Nm.

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

7-1 Auxiliary Pump

How to Test the Auxiliary Pump

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

1 Tag, disconnect and plug the high pressure hydraulic hose from the auxiliary pump.

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

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

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

4 Activate any function using auxiliary power.

⊙ Result: The pressure gauge reads 2800 psi /193 bar, immediately stop. The pump is good.

⊠ Result: The pressure fails to reach 2800 psi /193 bar, the pump is faulty and will need to be serviced or replaced.

5 Remove the pressure gauge and install the hydraulic hose.

How to Remove the Auxiliary Pump

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

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

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

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

Hydraulic Pumps

7-2
Function Pump

How to Remove the Function Pump

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

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

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

Remove the pump mounting fasteners. Carefully remove the pump.

7-3 Drive Pump

The drive pump is a bi-directional variable displacement piston pump. The pump output is controlled by a non-feedback, proportional electrical displacement controller (NFPE), 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 Sauer Danfoss 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 (if equipped) on the fitting and/or hose end must be replaced. All connections must be torqued to specification during installation. Refer to Specifications, *Hydraulic Hose and Fitting Torque Specifications.*

1 Remove the drain plug from the hydraulic tank and completely drain the tank into a container of suitable capacity. Refer to Specifications., Hydraulic Specifications.

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

2 Disconnect the electrical connectors from the coils of the NFPE controller (NFPE) located on the drive pump.

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

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

4 Support the pump with a suitable lifting device.

5 Remove the drive pump mounting bolts. Carefully remove the pump.

NOTICE Component damage hazard. The pump(s) may become unbalanced and fall if not properly supported.

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.

How to Prime the Drive Pump

1 Connect a 0 to 6000 psi / 0 to 414 bar pressure gauge to the test port on the drive pump.

2 **Gasoline/LPG models**: Disconnect the ignition coil wire from the center of the ignition coil.

Diesel models: Hold the manual fuel shutoff lever clockwise to the closed position.

3 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 320 psi / 22 bar.

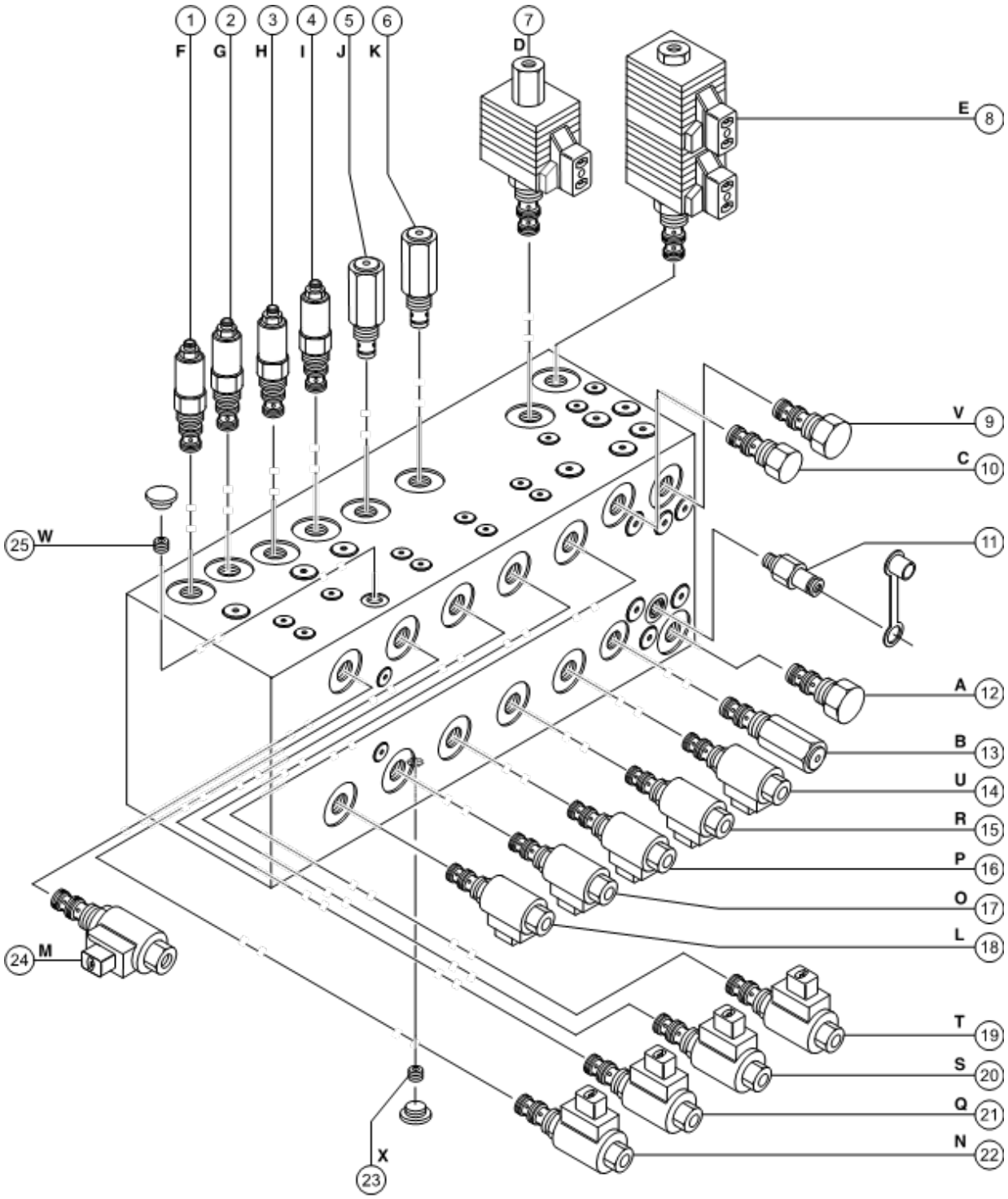
Manifolds

8-1 Function Manifold Components

The function manifold is mounted to the turntable under the ground control box.

Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve, 3000 psi / 207 bar	F	Platform level up	25-30 ft-lbs / 34-41 Nm
2	Counterbalance valve, 3000 psi / 207 bar	G	Platform level down	25-30 ft-lbs / 34-41 Nm
3	Counterbalance valve, 1500 psi / 103 bar	H	Turntable rotate left	25-30 ft-lbs / 34-41 Nm
4	Counterbalance valve, 1500 psi / 103 bar	I	Turntable rotate right	25-30 ft-lbs / 34-41 Nm
5	Relief valve, 1600 psi / 110 bar	J	Secondary boom down	25-30 ft-lbs / 34-41 Nm
6	Relief valve, 1600 psi / 110 bar	K	Primary boom down	25-30 ft-lbs / 34-41 Nm
7	Proportional solenoid valve	D	System flow regulating circuit	35-40 ft-lbs / 47-54 Nm
8	Solenoid valve, 3 position 4 way	E	Steer left/right	10-12 ft-lbs / 14-16 Nm
9	Flow regulator valve, 0.1 gpm / 0.38 L/min	V	Differential sensing circuit	35-40 ft-lbs / 47-54 Nm
10	Differential sensing valve	C	All functions	35-40 ft-lbs / 47-54 Nm
11	Diagnostic fitting		Testing	
12	Priority flow regulator valve, 1 gpm / 3.8 L/min	A	Steering	34-40 ft-lbs / 47-54 Nm
13	Relief valve, 3200 psi / 221 bar	B	System relief	25-30 ft-lbs / 34-41 Nm
14	Solenoid valve, 2 position 3 way	U	Primary boom retract	8-10 ft-lbs / 11-14 Nm
15	Solenoid valve, 2 position 3 way	R	Primary boom up	8-10 ft-lbs / 11-14 Nm

Manifolds

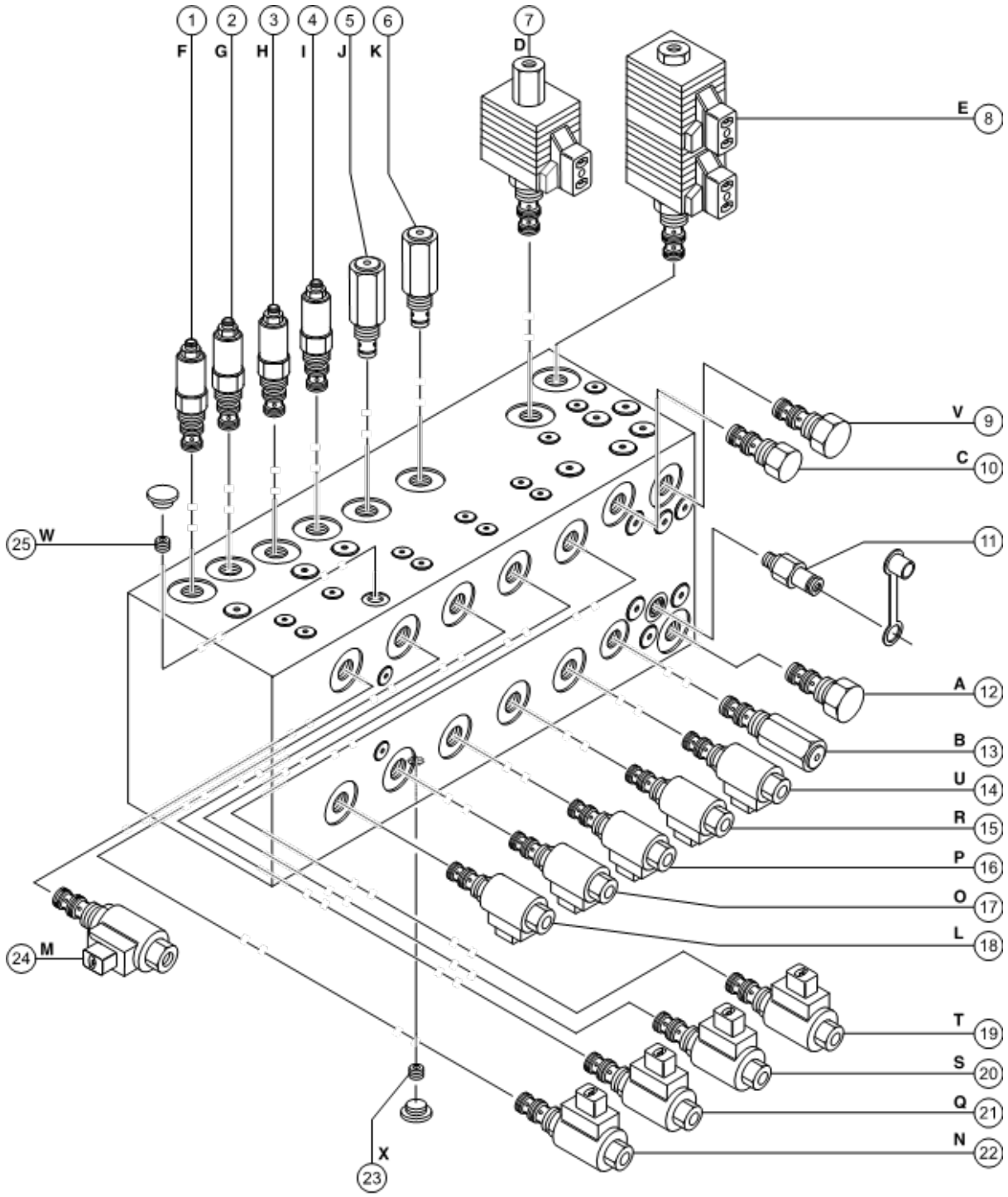

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Manifolds

Function Manifold Components, continued

Index No.	Description	Schematic Item	Function	Torque
16	Solenoid valve, 2 position 3 way	P	Secondary boom up	8-10 ft-lbs / 11-14 Nm
17	Solenoid valve, 2 position 3 way	O	Turntable rotate left	8-10 ft-lbs / 11-14 Nm
18	Solenoid valve, 2 position 3 way	L	Platform level up	8-10 ft-lbs / 11-14 Nm
19	Solenoid valve, 2 position 3 way	T	Primary boom extend	8-10 ft-lbs / 11-14 Nm
20	Solenoid valve, 2 position 3 way	S	Primary boom down	8-10 ft-lbs / 11-14 Nm
21	Solenoid valve, 2 position 3 way	Q	Secondary boom down	8-10 ft-lbs / 11-14 Nm
22	Solenoid valve, 2 position 3 way	N	Turntable rotate right	8-10 ft-lbs / 11-14 Nm
23	Orifice, 0.052 inch / 1.32 mm	X	Turntable rotate circuit	
24	Solenoid valve, 2 position 3 way	M	Platform level down	8-10 ft-lbs / 11-14 Nm
25	Orifice, 0.052 inch / 1.32 mm	W	Turntable rotate circuit	

Manifolds


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Manifolds

8-2 Valve Adjustments - Function Manifold

How to Adjust the System Relief Valve

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

Note: Refer to Function Manifold Component list to locate the system relief valve.

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test port on the function manifold.

2 Move and hold the function enable toggle switch to either side and hold the primary boom extend/retract toggle switch in the retract direction with the primary boom fully retracted.

3 Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Component Specifications*.

4 Turn the machine off. Hold the system relief valve with a wrench and remove the cap.

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 and 3 to verify the relief valve pressure.

7 Remove the pressure gauge.

How to Adjust the Primary Boom Down Relief Valve

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

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

2 Start the engine from the ground controls.

3 Hold the function enable/rpm select toggle switch to the high rpm position and activate and hold the primary boom toggle switch in the down direction with the primary boom fully lowered.

4 Observe the pressure reading on the pressure gauge. Refer to Specifications, *Manifold Component Specifications.*

5 Turn the machine off. Hold the relief valve and remove the cap (item K).

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 setting.

8 Remove the pressure gauge.

Manifolds

How to Adjust the Secondary Boom Down Relief Valve

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

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

2 Start the engine from the ground controls.

3 Hold the function enable/rpm select toggle switch to the high rpm position and activate and hold the secondary boom toggle switch in the down direction with the secondary boom fully lowered.

4 Observe the pressure reading on the pressure gauge. Refer to Specifications, *Manifold Component Specifications.*

5 Turn the machine off. Hold the relief valve and remove the cap (item J).

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.

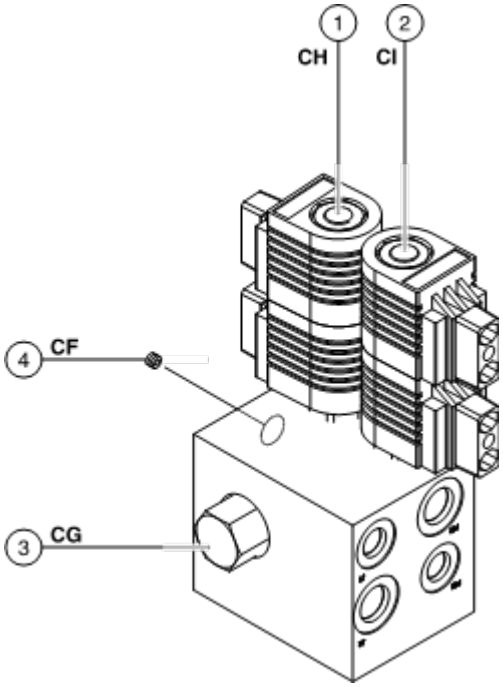
7 Repeat steps 2 through 6 to confirm the relief valve pressure setting.

8 Remove the pressure gauge.

8-3
Jib Boom and Platform / Jib Boom Rotate Manifold Components

The jib boom/platform rotate manifold is mounted to the jib boom.

Index No.	Description	Schematic Item	Function	Torque
1	Solenoid valve, 3 position 4 way	CH	Jib boom up/down	8-10 ft-lbs / 11-14 Nm
2	Solenoid valve, 3 position 4 way	CI	Platform rotate left/right	8-10 ft-lbs / 11-14 Nm
3	Flow regulator valve, 0.3 gpm / 1.14 L/min	CG	Platform rotate circuit	8-10 ft-lbs / 11-14 Nm
4	Orifice plug, 0.028 inch / 0.71 mm(located in "P" port)	CF	Platform rotate and jib boom circuit	

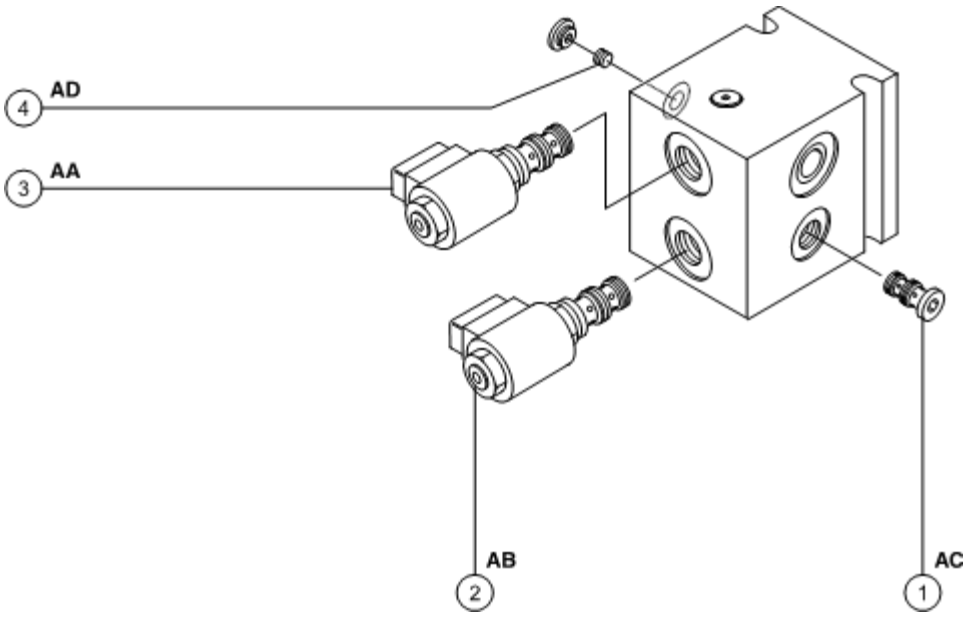


Manifolds

8-4
Brake/Two-Speed Manifold Components

The brake / 2-speed manifold is located under the drive chassis cover at the non-steer end.

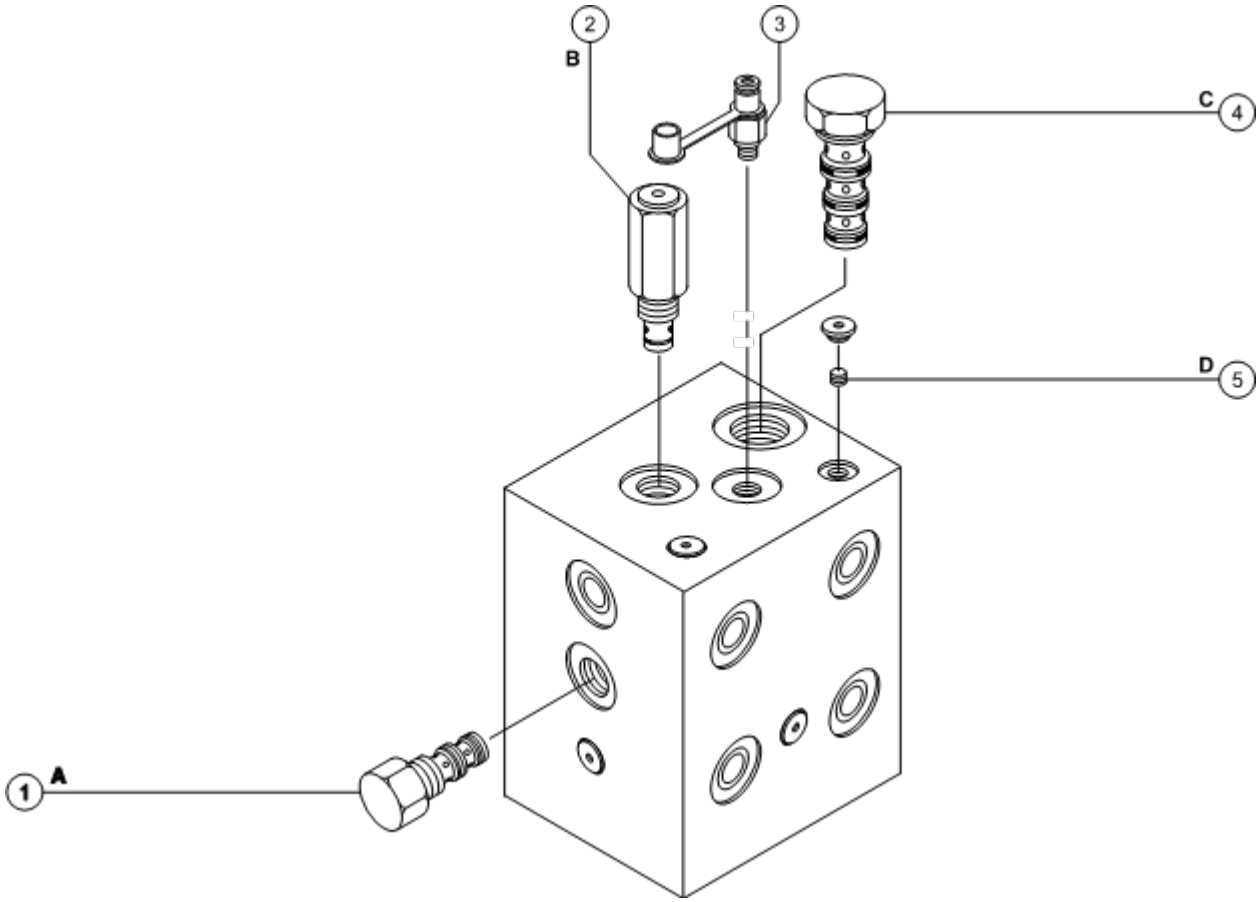
Index No.	Description	Schematic Item	Function	Torque
1	Check Valve	AC	Pressure circuit	8-10 ft-lbs / 10-15 Nm
2	Solenoid valve, 2 position 3 way	AB	2-speed motor shift	25-30 ft-lbs / 34-41 Nm
3	Solenoid valve, 2 position 3 way	AA	Brake	25-30 ft-lbs / 34-41 Nm
4	Orifice Plug, 0.025 inch / 0.64 mm	AD	Tank return circuit	



8-5
Traction Manifold Components, 2WD

The 2WD traction is mounted inside the drive chassis at the non-steer end.

Index No.	Description	Schematic Item	Function	Torque
1	Shuttle valve, 3 position 3 way	A	Charge pressure circuitthat gets hot oil out of low pressureside of drive pump and allows lowpressure flow path for brakerelease and 2-speed motor shift	10-12 ft-lbs / 14-16 Nm
2	Relief valve, 210 psi / 14.5 bar	B	Charge pressure circuit	35-40 ft-lbs / 47-54 Nm
3	Diagnostic fitting		Testing	
4	Flow divider/combiner valve	C	Controls flow to drive motorsin forward and reverse	130-140 ft-lbs / 176-190 Nm
5	Orifice 0.070 inch / 1.78 mm	D	Equalizes pressure on both sidesdivider/combiner valve C.	



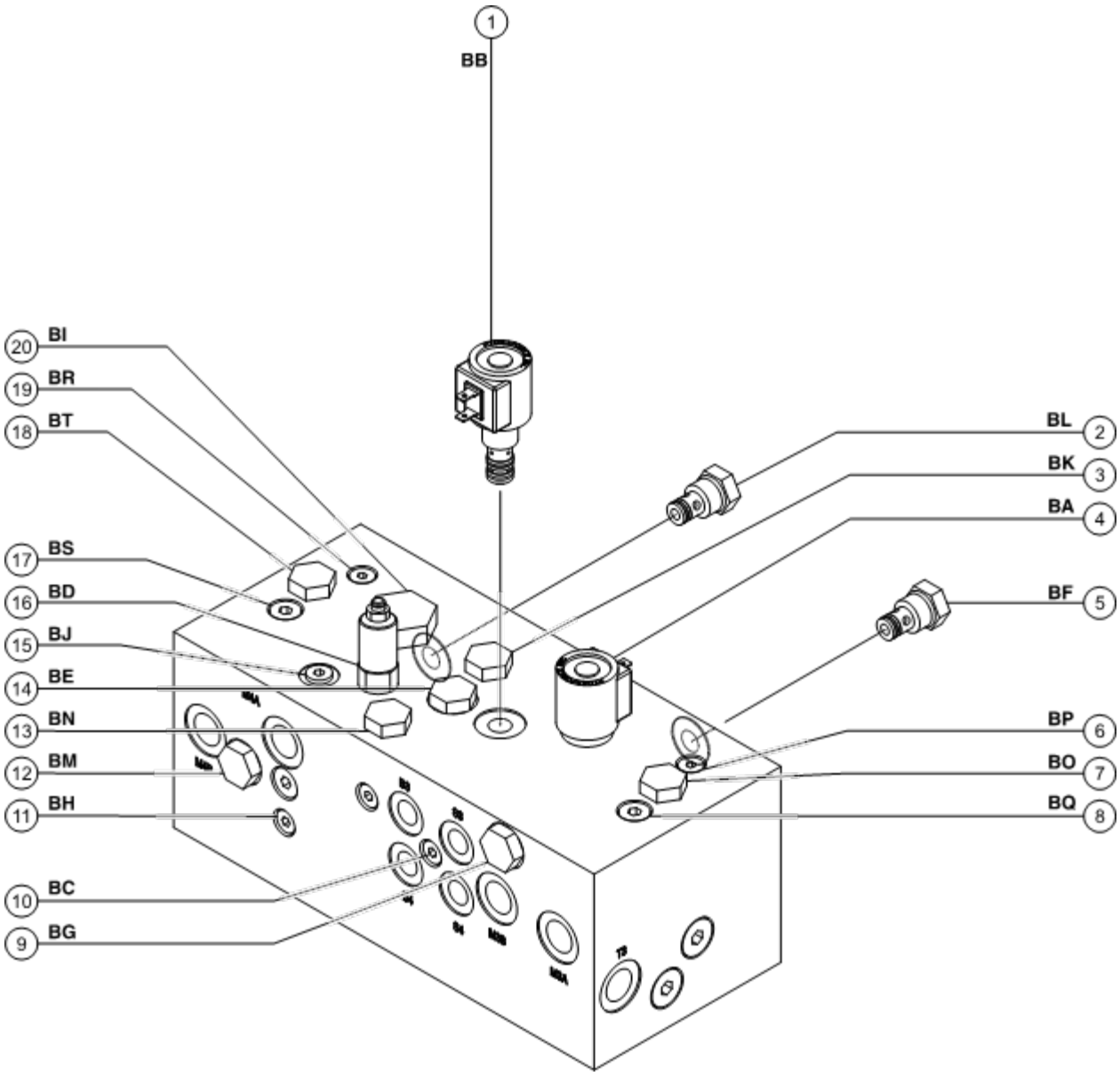
Manifolds

8-6
Traction Manifold Components, 4WD

The 4WD traction manifold is mounted inside the drive chassis at the non-steer end.

Index No.	Description	Schematic Item	Function	Torque
1	Solenoid valve, 2 position 3 way	BB	Brake	20 ft-lbs / 27.1 Nm
2	Check valve	BL	Drive motor anti-cavitation	20 ft-lbs / 27.1 Nm
3	Shuttle valve, 3 position 3 way	BK	Charge pressure circuitthat gets hot oil out of low pressureside of drive pump and allows lowpressure flow path for brakerelease and 2-speed motor shift	15-18 ft-lbs / 20-24 Nm
4	Solenoid valve, 2 position 3 way	BA	2-speed motor shift	20 ft-lbs / 27.1 Nm
5	Check valve	BF	Drive motor anti-cavitation	20 ft-lbs / 27.1 Nm
6	Orifice plug, 0.039 inch / 1 mm	BP	Equalizes pressure on both sides offlow divider/combiner valve BO	
7	Flow divider/combiner valve	BO	Controls flow to right side drivemotors in forward and reverse	25 ft-lbs / 33.9 Nm
8	Orifice plug, 0.039 inch / 1 mm	BQ	Equalizes pressure on both sides offlow divider/combiner valve BO	
9	Check valve	BG	Drive motor anti-cavitation	20 ft-lbs / 27.1 Nm
10	Orifice plug, 0.032 inch / 0.8 mm	BC	Brake circuit	
11	Orifice plug, 0.079 inch / 2 mm	BH	Equalizes pressure on both sides offlow divider/combiner valve BI	
12	Check valve	BM	Drive motor anti-cavitation	20 ft-lbs / 27.1 Nm
13	Check valve	BN	Drive motor anti-cavitation	20 ft-lbs / 27.1 Nm
14	Check valve	BE	Drive motor anti-cavitation	20 ft-lbs / 27.1 Nm
15	Orifice plug, 0.079 inch / 2 mm	BJ	Equalizes pressure on both sides offlow divider/combiner valve BI	
16	Relief valve, 150 psi / 10.3 bar	BD	Charge pressure circuit	20 ft-lbs / 27.1 Nm
17	Orifice plug, 0.039 inch / 1 mm	BS	Equalizes pressure on both sides offlow divider/combiner valve BT	
18	Flow divider/combiner valve	BT	Controls flow to left side drivemotors in forward and reverse	25 ft-lbs / 33.9 Nm
19	Orifice plug, 0.039 inch / 1 mm	BR	Equalizes pressure on both sides offlow divider/combiner valve BT	
20	Flow divider/combiner valve	BI	Controls flow to flow divider/combiner valves BO and BT	30 ft-lbs / 40.6 Nm

Manifolds


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Manifolds

8-7
Valve Adjustments, 4WD Traction Manifold

How to Adjust the Charge Pressure Relief Valve

1 Chock both sides of all four wheels of the machine.

Note: Be sure the machine cannot move in either direction.

2 Start the engine from the platform controls. Slowly move the drive joystick to full stroke in either direction.

⊙ Result: The engine rpm lowers considerably, as if the engine is under a heavy load, but does not stall. The charge pressure relief valve is set correctly. Proceed to step 8.

⊠ Result: The engine rpm does not lower considerably. The charge pressure relief valve is set too low. Proceed to step 3 to adjust the charge pressure relief valve.

⊠ Result: The engine stalls. The charge pressure relief valve is set too high. Proceed to step 3 to adjust the charge pressure relief valve.

3 Turn the engine off. Connect a 0 to 600 psi / 0 to 40 bar pressure gauge to the test port located on the traction manifold.

4 Start the engine from the platform controls. Slowly move the drive joystick to full stroke in either direction and observe the pressure reading on the pressure gauge.

⊙ Result: When the charge pressure relief valve is set correctly, the pressure reading on the gauge should be between 135 to 180 psi / 9 to 12 bar.

5 Turn the engine off. Hold the relief valve and remove the cap (item B or BD).

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

7 Repeat this procedure beginning with step 2.

8 Remove the wheel chocks.

9 Turn the engine off and remove the pressure gauge.

8-8 Valve Coils

How to Test a Coil

A properly functioning coil provides an electromotive force which operates the solenoid valve. Critical to normal operation is continuity within the coil. Zero 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.

1 Tag and disconnect the wiring from the coil to be tested.

2 Test the coil resistance.

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

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

⊙ Result: The resistance should be within specification, plus or minus 30%.

⊙ Result: If the resistance is not within specification, plus or minus 30%, replace the coil.

Valve Coil Resistance Specifications

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 / -7.7°C that your air temperature increases or decreases from 68°F / 20°C.

Valve Coil Resistance Specification	
2 position 3 way solenoid valve, 10V DC (schematic items L, M, N, O, P, Q, R, S, T, U,AA, AB, BA and BB)	6Ω
3 position 4 way solenoid valve, 10V DC (schematic item E, CH, CI)	6Ω
Proportional solenoid valve, 12V DC (schematic item D)	5Ω

Manifolds

How to Test a Coil Diode

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.

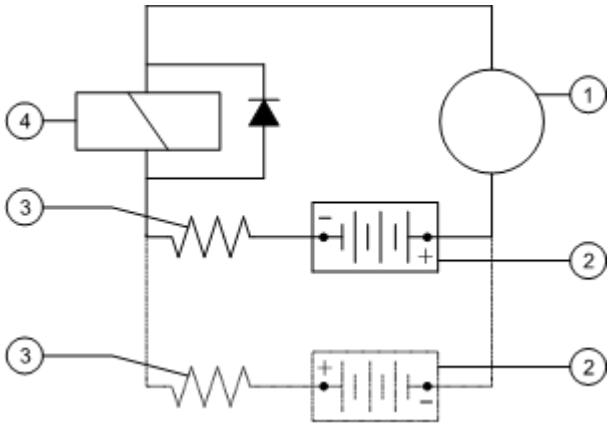
⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

1 Test the coil for resistance. Refer to Repair Procedure, *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.

Resistor, 10Ω	
Genie part number	27287

Note: The battery should read 9V DC or more when measured across the terminals.



1 multimeter
2 9V DC battery
3 10Ω resistor
4 coil

Note: Dotted lines in illustration indicate a reversed connection as specified in step 6.

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.

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.

9-1 Fuel Tank

How to Remove the Fuel Tank

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

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

⚠ DANGER Explosion and fire hazard. Never drain or store fuel in an open container due to the possibility of fire.

1 Raise the secondary boom so the upper pivot is approximately 12 feet / 4 m off the ground.

2 **Gasoline/LPG models**: Turn the LPG shutoff valve to the closed position on the LPG tank.

3 **Gasoline/LPG models**: Remove the LPG hose from the tank and then remove the tank from the machine.

4 **Gasoline/LPG models**: Remove the mounting fasteners from the LPG bottle bracket then remove the bracket from the machine.

5 Turn the manual fuel shutoff valve (if equipped) to the closed position on the fuel tank.

6 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 gasoline and/or diesel fuel.

7 Tag, disconnect and plug the fuel hoses from the fuel tank. Cap the fittings on the fuel tank. Clean up any fuel that may have spilled.

8 Remove the fuel tank retaining plate fasteners at the bulkhead.

9 Remove the fuel tank from the machine using an appropriate lifting device.

Note: Clean the fuel tank and inspect for cracks and other damage before installing.

Fuel and Hydraulic Tanks

9-2 Hydraulic Tank

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

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 and cause severe component damage. Dealer service is recommended.

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

1 Place a suitable container under the hydraulic tank. Refer to Specifications, *Machine Specifications*.

2 Remove the drain plug from the hydraulic tank and completely drain the tank into a container of suitable capacity. Refer to Specifications, *Machine Specifications*.

⚠ 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 Tag, disconnect and plug the hoses from the return filter. Cap the fittings on the return filter.

4 Tag, disconnect and plug the suction hoses from the bottom of the tank. Cap the fittings.

5 Remove the fasteners from the hydraulic tank hold down straps. Remove the straps.

6 Remove the turntable cover using a suitable lifting device.

7 Support and secure the hydraulic tank to a suitable lifting device. Remove the hydraulic tank from the machine.

⚠ WARNING Crushing hazard. The hydraulic tank could become unbalanced and fall if not properly supported when removed from the machine.

10-1 Turntable Rotation Hydraulic Motor

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

How to Remove the Turntable Rotation Motor

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

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

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

2 Remove the turntable rotation motor mounting bolts. Remove the motor from the machine.

Axle Components

11-1 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 and place a lifting jack of ample capacity under the steer axle.

3 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.

4 Remove the lug nuts. Remove the tire and wheel assembly.

5 Remove the dust cap, cotter pin and castle nut.

Note: Always use a new cotter pin when installing a castle nut.

6 Pull the hub off the spindle. The washer and outer bearing should fall loose from the hub.

7 Place the hub on a flat surface and gently pry the bearing seal out of the hub.

8 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 Install a new bearing grease seal into the hub by pressing it evenly into the hub until it is flush.

Note: Always replace the bearing grease seal when removing the hub.

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 Fill the hub cavity with clean, fresh grease.

6 Place the outer bearing into the hub.

7 Install the washer and castle nut.

8 Tighten the castle nut to 158 ft-lbs / 214 Nm to seat the bearings.

Note: Rotate the hub by hand while torquing the castle nut to make sure the bearings seat properly.

9 Loosen the castle nut one full turn and then torque to 35 ft-lbs / 47 Nm.

10 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.

11 Install the dust cap, then the tire and wheel assembly. Torque the wheel lug nuts to specification. Refer to Specifications, *Machine Torque Specifications*.

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 procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Key switch in the off position with the key removed
  - The red Emergency Stop button in the off position at both the ground and platform controls
  - Wheels chocked
  - All external AC power supply disconnected from the machine
  - Boom in the stowed position
  - Turntable secured with the turntable rotation lock
  - Welder disconnected from the machine (if equipped with the weld cable to platform option)

Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.
- ☑ Read each appropriate fault code thoroughly. Attempting short cuts may produce hazardous conditions.
- ☑ Be aware of the following hazards and follow generally accepted safe workshop practices.

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

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

Fault Codes

How to Retrieve Engine Fault Codes - Perkins 403F-11 Models

The electronic engines can perform a self-diagnostics test. When the system detects an active problem, a diagnostic LED is activated. The multifunction LED is located on the ground box next to the hour meter. The LED will flash a two digit code that will give an indication of the fault. By counting the number of flashes in a given sequence you can determine the flash code.

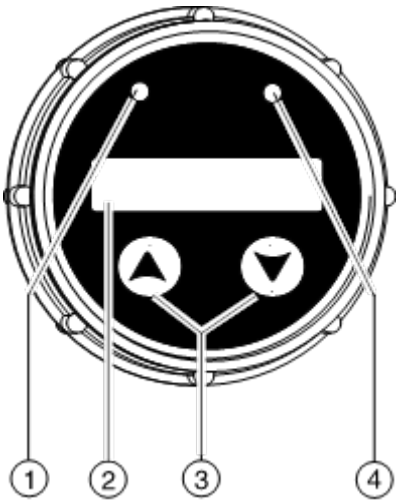
After the flash code is finished, the flash code will continue to be repeated. If a second flash code has been activated, the system will repeat both codes in a given sequence.

Example: Four short flashes will indicated a flash code 04. Three long flashes of one second each followed by one short flash will indicate a flash code of 31. If there is more than one code to be indicated, the system will flash the first code then after a delay interval the next code is flashed.

Flash code	Description	Status	Action
Flash Codes with Key ON (Engine not in Operation)			
13	Oil pressure switch malfunction Oil pressure switch disconnected	Engine will start, but will shut down after 180 seconds	Check harness connection
22	Pressure sensor malfunction Pressure sensor disconnected	Engine will start but the engine will go into limp home mode	Check harness connection
33	Actuator position sensor malfunction	Engine will start but the engine will go into limp home mode	Check harness connection
04	Actuator drive malfunction Speed sensor disconnected	Engine will not start	Check harness connection
Flash Codes During Engine Cranking			
13	Speed sensor malfunction Speed sensor disconnected	Engine will not start	Check harness connection
Flash Codes with Engine in Operation			
31	Oil pressure decline.Weak signal from oil pressure switch	Engine will go into limp mode but engine may shut down	Check engine oil. Check harness connection
22	Pressure sensor malfunction	The engine will go into limp home mode	Check harness connection
33	Actuator position sensor malfunction	The engine will go into limp home mode	Check harness connection
04	Actuator drive malfunction Speed sensor disconnected	The engine will shut down	Check harness connection
15	Speed sensor malfunction Speed sensor disconnected	The engine will go into limp home mode	Check harness connection

How to Retrieve Engine Fault Codes - GM .998L Models

The emissions control system utilizes a diagnostic display located on the ground control box. A fault condition will be displayed for one of the following: The fault caused the engine to shut down or the fault is related to the exhaust gas oxygen (EGO) sensors. In the event the diagnostic trouble code (DTC) is related to either an engine shutdown fault or an oxygen sensor fault, the following statement applies: If the machine is not serviced by a technician and the condition causing the DTC no longer exists, the DTC will no longer display after the fourth start cycle. In the event the DTC is not related to an engine shutdown or oxygen sensor fault, the DTC will no longer be shown. Use the Up and Down arrows to scroll through the list if there is more than one stored fault. To return to the main menu, press the Up and Down arrows simultaneously and release.



1 alarm amber light
2 display
3 up / down navigation arrows
4 shutdown red light

Fault Codes

Description	DTC Set 2 SPN-2/FMI-2	Description	DTC Set 2 SPN-2/FMI-2
DTC 11: Intake cam / distributor position error	520800 / 7	DTC 221: TPS1-2 higher than expected	653/6
DTC 16: Crank and/or cam no sync during start	636 / 8	DTC 222: TPS2 voltage low	520251 / 4
DTC 24: Exhaust cam position error	520801 / 7	DTC 223: TPS2 voltage high	520251 / 3
DTC 87 Fuel pressure lower than expected	94 / 1	DTC 234: Boost control overboost failure	1692 / 0
DTC 88 Fuel pressure higher than expected	94 / 0	DTC 236: TIP active	1692 / 2
DTC 91: FP low voltage	94 / 4	DTC 237: TIP low voltage	1127 / 4
DTC 92: FP high voltage	94 / 3	DTC 238: TIP high voltage	1127 / 3
DTC 107: MAP voltage low	106 / 4	DTC 261: Injector 1 open or short to ground	651 / 5
DTC 108: MAP pressure high	106 / 16	DTC 262: Injector 1 coil shorted	651 / 6
DTC 111: IAT higher than expected stage 1	105 / 15	DTC 264: Injector 2 open or short to ground	652 / 5
DTC 112: IAT voltage low	105 / 4	DTC 265: Injector 2 coil shorted	652 / 6
DTC 113: IAT voltage high	105 / 3	DTC 267: Injector 3 open or short to ground	653 / 5
DTC 116: ECT higher than expected stage 1	110 / 15	DTC 268: Injector 3 coil shorted	653/6
DTC 117: ECT voltage low	110 / 4	DTC 270: Injector 4 open or short to ground	654 / 5
DTC 118: ECT voltage high	110 / 3	DTC 271: Injector 4 coil shorted	654 / 6
DTC 121: TPS1-2 lower than expected	51 / 1	DTC 273: Injector 5 open or short to ground	655 / 5
DTC 122: TPS1 voltage low	51 / 4	DTC 274: Injector 5 coil shorted	655 / 6
DTC 123: TPS1 voltage high	51 / 3	DTC 276: Injector 6 open or short to ground	656 / 5
DTC 127: IAT higher than expected stage 2	105 / 0	DTC 277: Injector 6 coil shorted	656 / 6
DTC 129: BP pressure low	108 / 1	DTC 279: Injector 7 open or short to ground	657 / 5
DTC 134: EGO1 open / lazy	724 / 10	DTC 280: Injector 7 coil shorted	657 / 6
DTC 140: EGO3 open / lazy	520209 / 10	DTC 282: Injector 8 open or short to ground	658 / 5
DTC 154: EGO2 open / lazy	520208 / 10	DTC 283: Injector 8 coil shorted	658 / 6
DTC 160: EGO4 open / lazy	520210 / 10	DTC 285: Injector 9 open or short to ground	659 / 5
DTC 171: Adaptive-learn gasoline bank1 high	520200 / 0	DTC 308: Cylinder 8 emissions/catalyst damaging misfire	1330 / 31
DTC 172: Adaptive-learn gasoline bank1 low	520200 / 1	DTC 326: Knock1 excessive or erratic signal	731 / 2
DTC 174: Adaptive-learn gasoline bank2 high	520201 / 0	DTC 327: Knock1 sensor open or not present	731 / 4
DTC 175: Adaptive-learn gasoline bank2 low	520201 / 1	DTC 331: Knock2 excessive or erratic signal	520241 / 2
DTC 182: FT low voltage	174 / 4	DTC 332: Knock2 sensor open or not present	520241 / 4
DTC 183: FT high voltage	174 / 3	DTC 336: CRANK input signal noise	636 / 2
DTC 187: Gaseous fuel temp sender low voltage	520240 / 4	DTC 337: Crank signal loss	636 / 4
DTC 188: Gaseous fuel temp sendr high voltage	520240 / 3	DTC 341: CAM input signal noise	723 / 2
DTC 217: ECT higher than expected stage 2	110 / 0	DTC 342: Loss of CAM input signal	723 / 4
DTC 219: RPM higher than max allowed govern speed	515 / 15	DTC 359: Fuel run-out longer than expected	1239 / 7

Fault Codes

Description	DTC Set 2 SPN-2 / FMI-2	Description	DTC Set 2 SPN-2 / FMI-2
DTC 420: Catalyst inactive on gasoline (Bank 1)	520211 / 10	DTC 1111: RPM above fuel rev limit level	515 / 16
DTC 430: Catalyst inactive on gasoline (Bank 2)	520212 / 10	DTC 1112: RPM above spark rev limit level	515 / 0
DTC 502: Roadspeed input loss of signal	84 / 1	DTC 1121: FPP1/2 simultaneous voltages out-of-range	91 / 31
DTC 508: IAC ground short	520252 / 6	DTC 1122: FPP1/2 do not match each other or IVS	520250 / 31
DTC 509: IAC coil open/short	520252 / 5	DTC 1131: WGP voltage high	1192 / 3
DTC 520: Oil pressure sndr low prssure stage 1	100 / 18	DTC 1132: WGP voltage low	1192 / 4
DTC 521: Oil pressure sender high pressure	100/ 0	DTC 1151: Closed-loop LPG high	520206 / 0
DTC 522: Oil pressure sender low voltage	651 / 5	DTC 1152: Closed-loop LPG low	520206 / 1
DTC 523: Oil pressure sender high voltage	100 / 3	DTC 1153: Closed-loop NG high	520207 / 0
DTC 524: Oil pressure low	100 / 1	DTC 1154: Closed-loop NG low	520207 / 1
DTC 562: Vbat voltage low	168 / 17	DTC 1155: Closed-loop gasoline bank1 high	520204 / 0
DTC 563: Vbat voltage high	168 / 15	DTC 1156: Closed-loop gasoline bank1 low	520204 /
DTC 601: Microprocessor failure - FLASH	628 / 13	DTC 1157: Closed-loop gasoline bank2 high	520205 / 0
DTC 604: Microprocessor failure - RAM	630 / 12	DTC 1158: Closed-loop gasoline bank2 low	520205 / 1
DTC 606: Microprocessor failure - COP	629 / 31	DTC 1161: Adaptive-learn LPG high	520202 / 0
DTC 615: Start relay coil open	1321 / 5	DTC 1162: Adaptive-learn LPG low	520202 / 1
DTC 616: Start relay ground short	1321 / 4	DTC 1163: Adaptive-learn NG high	520203 / 0
DTC 617: Start relay coil short to power	1321 / 3	DTC 1164: Adaptive-learn NG low	520203 / 1
DTC 627: Fuel pump relay coil open	1348 / 5	DTC 1165: Catalyst inactive on LPG	520213 / 10
DTC 628: Fuel-pump high-side open or short to ground	1347 / 5	DTC 1166: Catalyst inactive on NG	520214 / 0
DTC 628: Fuel pump relay control ground short	1348 / 4	DTC 1171: MegaJector delivery pressure higher than expected	520260 / 0
DTC 629: Fuel-pump high-side short to power	1347 / 6	DTC 1172: MegaJector delivery pressure lower than expected	520260 / 1
DTC 629: Fuel pump relay coil short to power	1348 / 3	DTC 1173: MegaJector comm lost	520260 / 31
DTC 642: Sensor supply voltage 1 low	1079 / 4	DTC 1174: MegaJector voltage supply high	520260 / 3
DTC 643: Sensor supply voltage 1 high	1079 / 3	DTC 1175: MegaJector voltage supply low	520260 / 4
DTC 650: MIL open	1213 / 5	DTC 1176: MegaJector internal actuator fault detection	520260 / 12
DTC 652: Sensor supply voltage 2 low	1080 / 4	DTC 1177: MegaJector internal circuitry fault detection	520260 / 12
DTC 653: Sensor supply voltage 2 high	1080 / 3	DTC 1178: MegaJector internal comm fault detection	520260 / 12
DTC 685: Power relay coil open	1485 / 5	DTC 1182: Fuel impurity level high	520401 / 0
DTC 686: Power relay ground short	1485 / 4	DTC 1183: MegaJector autozero / lockoff failure	520803 / 31
DTC 687: Power relay coil short to power	1485 / 3	DTC 1311: Cylinder 1 misfire detected	1323 / 11
DTC 916: Shift actuator feedback out-of-range	520226 / 3	DTC 1312: Cylinder 2 misfire detected	1324 / 11
DTC 919: Shift unable to reach desired gear	520226 / 7	DTC 1313: Cylinder 3 misfire detected	1325 / 11
DTC 920: Shift actuator or drive circuit failed	520226 / 31	DTC 1314: Cylinder 4 misfire detected	1326 / 11

Fault Codes

Description	DTC Set 2 SPN-2 / FMI-2	Description	DTC Set 2 SPN-2 / FMI-2
DTC 1315: Cylinder 5 misfire detected	1327 / 11	DTC 1543: AUX analog Pull-Up/Down 2 high voltage	520220 / 3
DTC 1316: Cylinder 6 misfire detected	1328 / 11	DTC 1544: AUX analog Pull-Up/Down 2 low voltage	520220 / 4
DTC 1317: Cylinder 7 misfire detected	1329 / 11	DTC 1545: AUX analog Pull-Up/Down 3 high voltage	520221 / 3
DTC 1318: Cylinder 8 misfire detected	1330 / 11	DTC 1546: AUX analog Pull-Up/Down 3 low voltage	520221 / 4
DTC 1411: EMWT1 voltage high	441 / 3	DTC 1547: AUX analog Pull-Up/Down 4 high voltage	713 / 3
DTC 1412: EMWT2 voltage high	442 / 3	DTC 1548: AUX analog Pull-Up/Down 4 low voltage	713 / 4
DTC 1413: EMWT1 voltage low	441 / 4	DTC 1551: AUX digital 1 high voltage	520222 / 3
DTC 1414: EMWT2 voltage low	442 / 4	DTC 1552: AUX digital 1 low voltage	520222 / 4
DTC 1415: EMWT1 higher than expected stage 1	441 / 15	DTC 1553: AUX digital 2 high voltage	520223 / 3
DTC 1416: EMWT2 higher than expected stage 1	442 / 15	DTC 1554: AUX digital 2 low voltage	520223 / 4
DTC 1417: EMWT1 higher than expected stage 2	441 / 0	DTC 1555: AUX digital 3 high voltage	520224 / 3
DTC 1418: EMWT2 higher than expected stage 2	442 / 0	DTC 1555: Water Intrusion Detection	520224 / 3
DTC 1419: ERWT1 voltage high	443 / 3	DTC 1556: AUX digital 3 low voltage	520224 / 4
DTC 1420: ERWT2 voltage high	444 / 3	DTC 1561: AUX analog Pull-Down 2 high voltage	0 / 3
DTC 1421: ERWT1 voltage low	443 / 4	DTC 1561: AUX analog Pull-Down 3 high voltage	0 / 4
DTC 1422: ERWT2 voltage low	444 / 4	DTC 1561: AUX analog Pull-Down 2 low voltage	0 / 4
DTC 1423: ERWT1 higher than expected stage 1	443 / 15	DTC 1611: Sensor supply voltage 1 and 2 out-of-range	1079 / 31
DTC 1424: ERWT2 higher than expected stage 1	444 / 15	DTC 1612: Microprocessor failure - RTI 1	629 / 31
DTC 1425: ERWT1 higher than expected stage 2	443 / 0	DTC 1613: Microprocessor failure - RTI 2	629 / 31
DTC 1426: ERWT2 higher than expected stage 2	444 / 0	DTC 1614: Microprocessor failure - RTI 3	629 / 31
DTC 1511: AUX analog Pull-Up 1 high voltage	520216 / 3	DTC 1615: Microprocessor failure - A/D	629 / 31
DTC 1511: AUX analog Pull-Up 1 high voltage	520216 / 3	DTC 1616: Microprocessor failure - Interrupt	629 / 31
DTC 1512: AUX analog Pull-Up 1 low voltage	520216 / 4	DTC 1621: RS-485 Rx inactive	0 / 31
DTC 1513: AUX analog Pull-Up 2 high voltage	520217 / 3	DTC 1622: RS-485 Rx noise	0 / 31
DTC 1514: AUX analog Pull-Up 2 low voltage	520217 / 4	DTC 1623: RS-485 Rx bad packet format	0 / 31
DTC 1515: AUX analog Pull-Down 1 high voltage	520215 / 3	DTC 1624: RS-485 remote shutdown request	0 / 31
DTC 1516: AUX analog Pull-Down 1 low voltagee	520215 / 4	DTC 1625: J1939 shutdown request	1384 / 31

Fault Codes

Description	DTC Set 2 SPN-2 / FMI-2	Description	DTC Set 2 SPN-2 / FMI-2
DTC 1517: AUX analog Pull-Up 3 high voltage	520218 / 3	DTC 1626: CAN-J1939 Tx fault	639 / 12
DTC 1518: AUX analog Pull-Up 3 low voltage	520218 / 4	DTC 1627: CAN-J1939 Rx fault	639 / 12
DTC 1521: CHT higher than expected stage 1	110 / 16	DTC 1628: J1939 CAN address / engine-number conflict	639 /13
DTC 1522: CHT higher than expected stage 2	110 / 0	DTC 1629: J1939 TSC1 message receipt loss	639 / 9
DTC 1531: Gov1/2/3 interlock failure	520270 / 31	DTC 1630: J1939 ETC message receipt loss	91 / 2
DTC 1541: AUX analog Pull-Up/Down 1 high voltage	520219 / 3	DTC 1632: PWM1-Gauge1 short to power	697 / 6
DTC 1542: AUX analog Pull-Up/Down 1 low voltage	520219 / 4	DTC 1633: PWM2-Gauge2 open / ground short	698 / 5
DTC 1634: PWM2-Gauge2 short to power	698 / 6	DTC 2126: FPP1-2 higher than expected	91 / 16
DTC 1635: PWM3-Gauge3 open / ground short	699 / 6	DTC 2127: FPP2 voltage low	29 / 4
DTC 1636: PWM3-Gauge3 short to power	700 / 5	DTC 2128: FPP2 voltage high	29 / 3
DTC 1637: PWM4 open / ground short	700 / 6	DTC 2130: IVS stuck at-idle, FPP1/2 match	558 / 5
DTC 1638: PWM4 short to power	520230 / 5	DTC 2131: IVS stuck off-idle, FPP1/2 match	558 / 6
DTC 1639: PWM5 open / ground short	520230 / 5	DTC 2135: TPS1/2 simultaneous voltages out-of-range	51 / 31
DTC 1640: PWM5 short to power	520230 / 6	DTC 2139: FPP1 lower than IVS	91 / 1
DTC 1641: Buzzer control ground short	920 / 4	DTC 2140: FPP2 lower than IVS	29 / 1
DTC 1642: Buzzer open	920 / 5	DTC 2229: BP pressure high	108 / 0
DTC 1643: Buzzer control short to power	920 / 3	DTC 2300: Spark coil 1 primary open or short to ground	1268 / 5
DTC 1644: MIL control ground short	1213 / 4	DTC 2301: Spark coil 1 primary shorted	1268 / 6
DTC 1645: MIL control short to power	1213 / 3	DTC 2303: Spark coil 2 primary open or short to ground	1269 / 5
DTC 1651: J1939 ETC message receipt loss while in-gear	91 / 9	DTC 2304: Spark coil 2 primary shorted	1269 / 6
DTC 1661: PWM6 open / ground short	925 / 5	DTC 2306: Spark coil 3 primary open or short to ground	1270 / 5
DTC 1662: PWM6 short to power	925 / 3	DTC 2307: Spark coil 3 primary shorted	1270 / 6
DTC 1663: PWM7 open / ground short	926 / 5	DTC 2309: Spark coil 4 primary open or short to ground	1271 / 5
DTC 1664: PWM7 short to power	926 / 3	DTC 2310: Spark coil 4 primary shorted	1271 / 6
DTC 1665: PWM8 open / ground short	2646 / 5	DTC 2312: Spark coil 5 primary open or short to ground	1272 / 5
DTC 1666: PWM8 short to power	2646 / 3	DTC 2313: Spark coil 5 primary shorted	1272 / 6
DTC 1669: PWM9 open / ground short	2647 / 5	DTC 2315: Spark coil 6 primary open or short to ground	1273 / 5
DTC 1670: PWM9 short to power	2647 / 3	DTC 2316: Spark coil 6 primary shorted	1273 / 6
DTC 2111: Unable to reach lower TPS	51 / 7	DTC 2318: Spark coil 7 primary open or short to ground	1274 / 5
DTC 2112: Unable to reach higher TPS	51 / 7	DTC 2319: Spark coil 7 primary shorted	1274 / 6
DTC 2115: FPP1 higher than IVS	91 / 0	DTC 2321: Spark coil 8 primary open or short to ground	1275 / 5
DTC 2116: FPP2 higher than IVS	29 / 0	DTC 2322: Spark coil 8 primary shorted	1275 / 6
DTC 2120: FPP1 invalid voltage and FPP2 disagrees with IVS	520250 / 31	DTC 2324: Spark coil 9 primary open or short to ground	1276 / 5
DTC 2121: FPP1-2 lower than expected	91 / 18	DTC 2325: Spark coil 9 primary shorted	1276 / 6
DTC 2122: FPP1 voltage high	91 / 3	DTC 2327: Spark coil 10 primary open or short to ground	1277 / 5

Fault Codes

Description	DTC Set 2 SPN-2 / FMI-2	Description	DTC Set 2 SPN-2 / FMI-2
DTC 2123: FPP1 voltage low	91 / 4	DTC 2328: Spark coil 10 primary shorted	1277 / 6
DTC 2125: FPP2 invalid voltage and FPP1 disagrees with IVS	520250 / 31	DTC 2428: EGT temperature high	173 / 0
DTC 2618: Tach output ground short	645 / 4	DTC 8909: UEGO pump voltage shorted low	3218 / 3
DTC 2619: Tach output short to power	645 / 3	DTC 8910: UEGO sense cell voltage high	3218 / 3
DTC 8901: UEGO microprocessor internal fault	3221 / 1	DTC 8911: UEGO sense cell voltage low	3218 / 4
DTC 8902: UEGO heater supply high voltage	3222 / 3	DTC 8912: UEGO pump voltage at high drive limi	3217 / 3
DTC 8903: UEGO heater supply low voltage	3222 / 4	DTC 8913: UEGO pump voltage at low drive limit	3217 / 3
DTC 8904: UEGO cal resistor voltage high	3221 / 3	DTC 8914: UEGO sense cell slow to warm up	3225 / 4
DTC 8905: UEGO cal resistor voltage low	3221 / 4	DTC 8915: UEGO pump cell slow to warm up	3222 / 4
DTC 8906: UEGO return voltage shorted high	3056 / 3	DTC 8916: UEGO sense cell impedance high	3225 / 10
DTC 8907: UEGO return voltage shorted low	3056 / 4	DTC 8917: UEGO pump cell impedance high	3225 / 0
DTC 8908: UEGO pump voltage shorted high	3218 / 3	DTC 8918: UEGO pump cell impedance low	3225 / 1

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 in the appropriate 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.

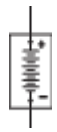
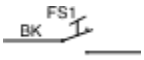
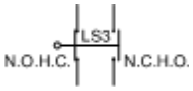
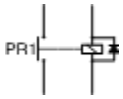
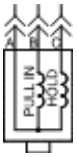
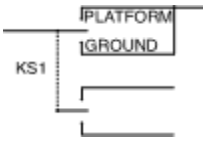
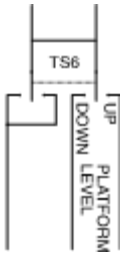
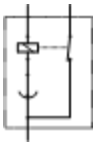
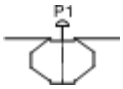
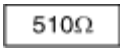
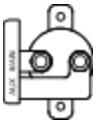
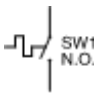
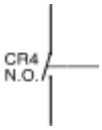
Electrical Schematics

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

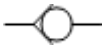
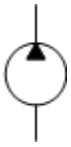
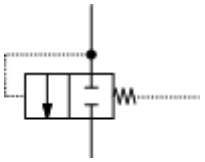
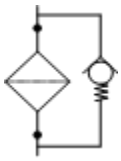
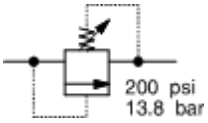
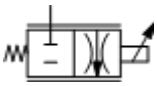
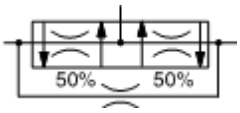
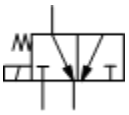
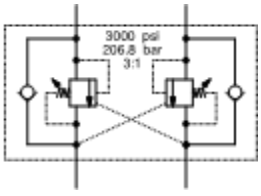
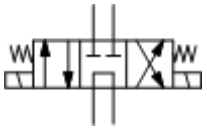
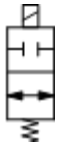
Hydraulic Schematics

⚠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.

Electrical Symbol Legend

 Battery	 Coil, solenoid or relay	 Horn or alarm	 Flashing beacon	 Gauge
 Diode	 Hour meter	 LED	 Fuse with amperage	 Foot switch
 T-circuits connect	 Limit switch	 Power relay	 Coil with suppression	 Fuel or RPM solenoid
 Connection - no terminal	 T-circuits connect at terminal	 Circuits crossing no connection	 Quick disconnect terminal	 Circuit breaker with amperage
 Key switch	 Toggle Switch DPDT	 Toggle Switch SPDT	 Pump or Motor	 Tilt sensor
 Horn button - normally open	 Emergency Stop button - normally closed	 Resistor with ohm value	 Battery separator	 Gauge sending unit
 Oil temperature switch normally open	 Coolant temperature switch - normally open	 Oil pressure switch normally closed	 Control relay contact normally open	 Diode starting aid, glow plug or flame ignitor

Hydraulic Symbols Legend

 Orifice with size	 Check valve	 Shut off valve	 Brake
 Pump, fixed displacement	 Pump, bi-directional variable displacement	 Motor, bi-directional	 Motor, 2 speed bi-directional
 Cylinder, double acting	 Pump, prime mover (engine or motor)	 Shuttle valve. 2 position, 3 way	 Differential sensing valve
 Filter with bypass relief valve	 Relief valve with pressure setting	 Priority flow regulator valve	 Solenoid operated proportional valve
 Directional valve (mechanically activated)	 Flow divider/combiner valve	 Pilot operated 3 position, 3 way shuttle valve	 Solenoid operated 2 position, 3 way directional valve
 Counterbalance valve with pressure and pilot ratio	 Solenoid operated 3 position 4 way directional valve	 Solenoid operated 3 position, 4 way proportional directional valve	 Solenoid valve, 2 position 2 way

Electrical Component and Wire Color Legends

Item	Description
B	**Battery**
B1	Engine Start - 12V DC
C	**Connector**
C5	2 speed/brake manifold/drive pump connector
C7	Power to platform, 12v cable connector
C9	Footswitch input connector
C49	Engine
C53	Fuel level sensor
C54	Options connector
C56	Engine
CB	**Circuit Breaker**
CB1	Circuit breaker, engine, 15A
CB2	Circuit breaker, controls, 10A
CB7	Circuit breaker, 10A
CR	**Control Relay**
CR1	Start relay
CR2	Ignition power relay
CR3	Auxiliary Pump
CR4	High idle relay
CR5	Service horn relay
CR6	Drive enable relay
CR8	Glow plug relay
CR9	Platform level interlock relay
CR10	Platform level interlock relay
CR18	Drive speed
CR23	Drive light enable
CR42	Stowed and tilted lift pump enable
CR51	Aircraft package (option)
CR75	Tilt sensor monitor
CR76	Load sense aux recovery
CR78	Lift pump disable
CR80	Telematics relay
CR81	Alternator
CR85	Tilt drive cutoff

F	Fuse
F1	Fuse, VSW 5A
F2	Fuse, ECM 10A
F3	Fuse, fuel pump 15A
F4	Fuse, ignition 20A
F5	Fuse, 5A
F6	Fuse, starter 25A
F18	Fuse 10A
F19	Fuse 10A
G	**Gauge**
G6	Hour meter
G9	Gauge display

Electrical Component and Wire Color Legends

Item	Description
H	**Horn or Alarm**
H1	Tilt/load sense alarm
H2	Service horn
H3	Travel alarm
H4	Descent (ground)
H6	Load sense (ground)
JC	**Joystick**
JC1	Boom proportional joystick: secondary boom up/down
JC2	Boom proportional joystick: primary up/down, turntable rotate
JC3	Drive proportional joystick
KS	**Keyswitch**
KS1	Key switch
L	**LED or Light**
L1	Drive enable led
L2	Check engine led
L4	Platform overload led (ce only)
L29	Drive lights (option)
L30	Work lights (option)
L48	Tilt alarm led (ansi/csa only)
LS	**Limit Switch**
LS1	Primary boom extend/retract
LS2	Primary boom up/down
LS3	Drive enable
LS4	Secondary boom up/down
LS18	Load sense limit switch

Item	Description
M	**Motor**
M2	Auxiliary pump
M3	Engine starter
M4	Fuel pump
P	**Button**
P1	Red emergency stop button
P2	Emergency stop button
P3	Horn Button
P4	Function enable button
PR	**Power Relay**
PR1	Auxiliary pump (m2)
PR2	Engine starter (m3)
PR3	Starting aid / glow plugs
PR4	Function pump (m5)
R	**Resistor**
R4	Speed limiting variable resistor 20 ohms
R14	Up/down speed resister 7.5 ohms
R20	4.7k ohms
R21	GBOX 120 ohms
R22	CAN communication120 ohms

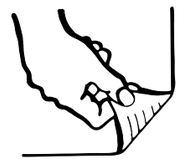
Electrical Component and Wire Color Legends

Item	Description
TS	**Toggle Switch**
TS1	Auxiliary pump switch
TS2	Start engine switch
TS3	Fuel select switch (ford efi only)
TS4	Engine speed
TS6	Glow plug switch
TS7	Platform rotate switch
TS8	Jib up/down toggle switch
TS9	Platform level up/down toggle switch
TS10	Secondary boom up/down toggle switch
TS11	Primary boom up/down toggle switch
TS12	Turntable rotate toggle switch
TS13	Primary boom extend/retract switch
TS14	Drive speed switch
TS15	Drive enable switch
TS43	Heater switch (option)
TS46	Proximity kill switch (option)
TS47	Generator switch (option)
TS51	Auxiliary pump toggle switch
TS52	Engine start toggle switch
TS53	Fuel select toggle switch
TS54	Rpm select toggle switch
TS56	Glow plug toggle switch
TS57	Platform rotate toggle switch
TS58	Jib boom up/down toggle switch
TS59	Platform level up/down toggle switch
TS60	Secondary boom up/down toggle switch
TS61	Primary boom up/down toggle switch
TS62	Turntable rotate toggle switch
TS63	Primary boom extend/retract switch

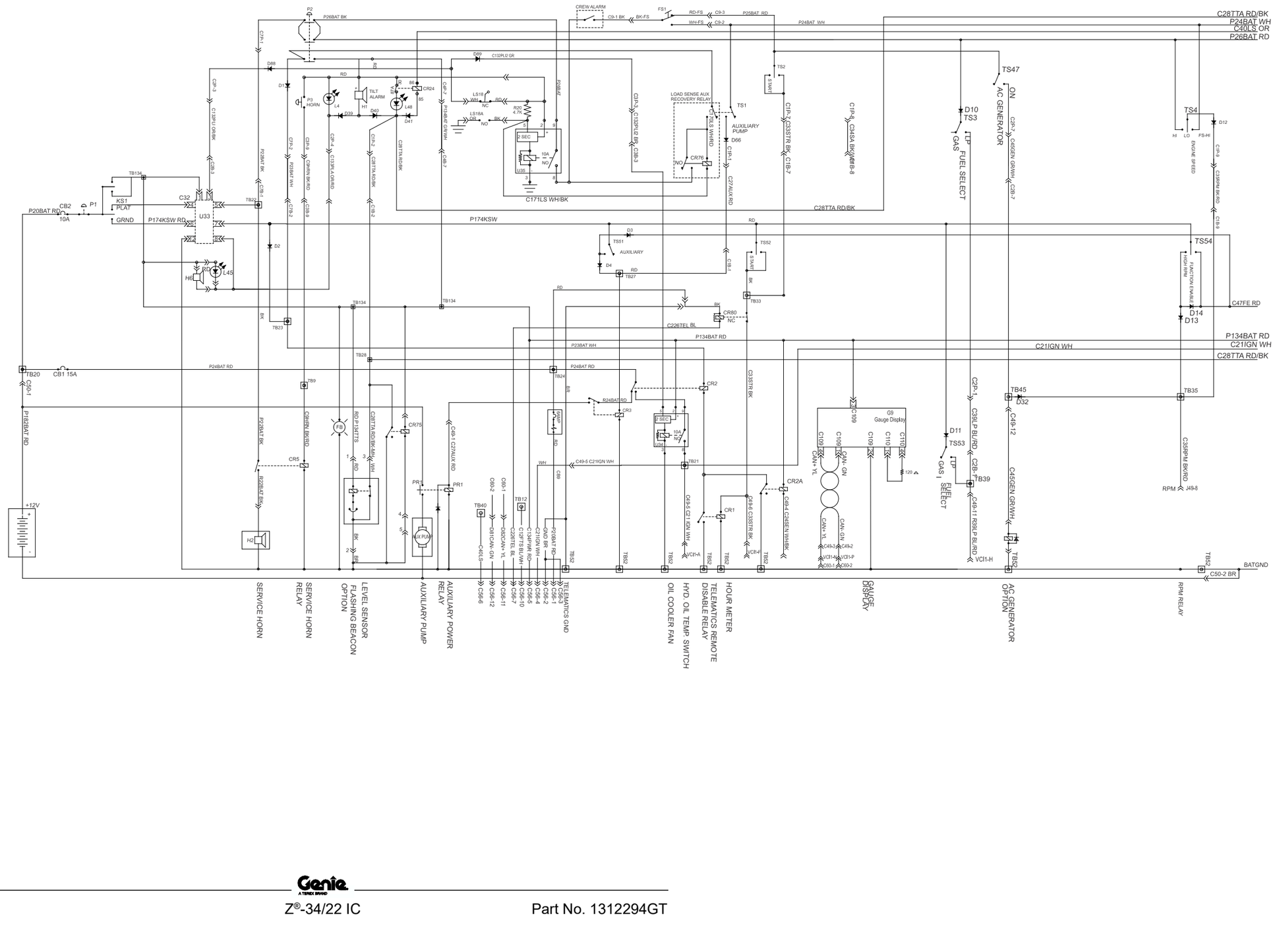
Item	Description
U	**Module**
U33	Load sense module
U34	Time delay relay - 2 seconds, 10A
U35	Time delay relay

Wire Color Legend	
Item	**Description**
BL	Blue
BK	Black
BR	Brown
GN	Green
OR	Orange
PP	Purple
RD	Red
WH	White
YL	Yellow
BL/RD	Blue/Red
BL/WH	Blue/White
BK/RD	Black/Red
OR/WH	Orange/White
RD/BK	Red/Black
RD/WH	Red/White
WH/BL	White/Blue
WH/BK	White/Black
WH/RD	White/Red
WH/YL	White/Yellow
YL/BK	Yellow/Black

Electrical Schematic - Gasoline/LPG Models

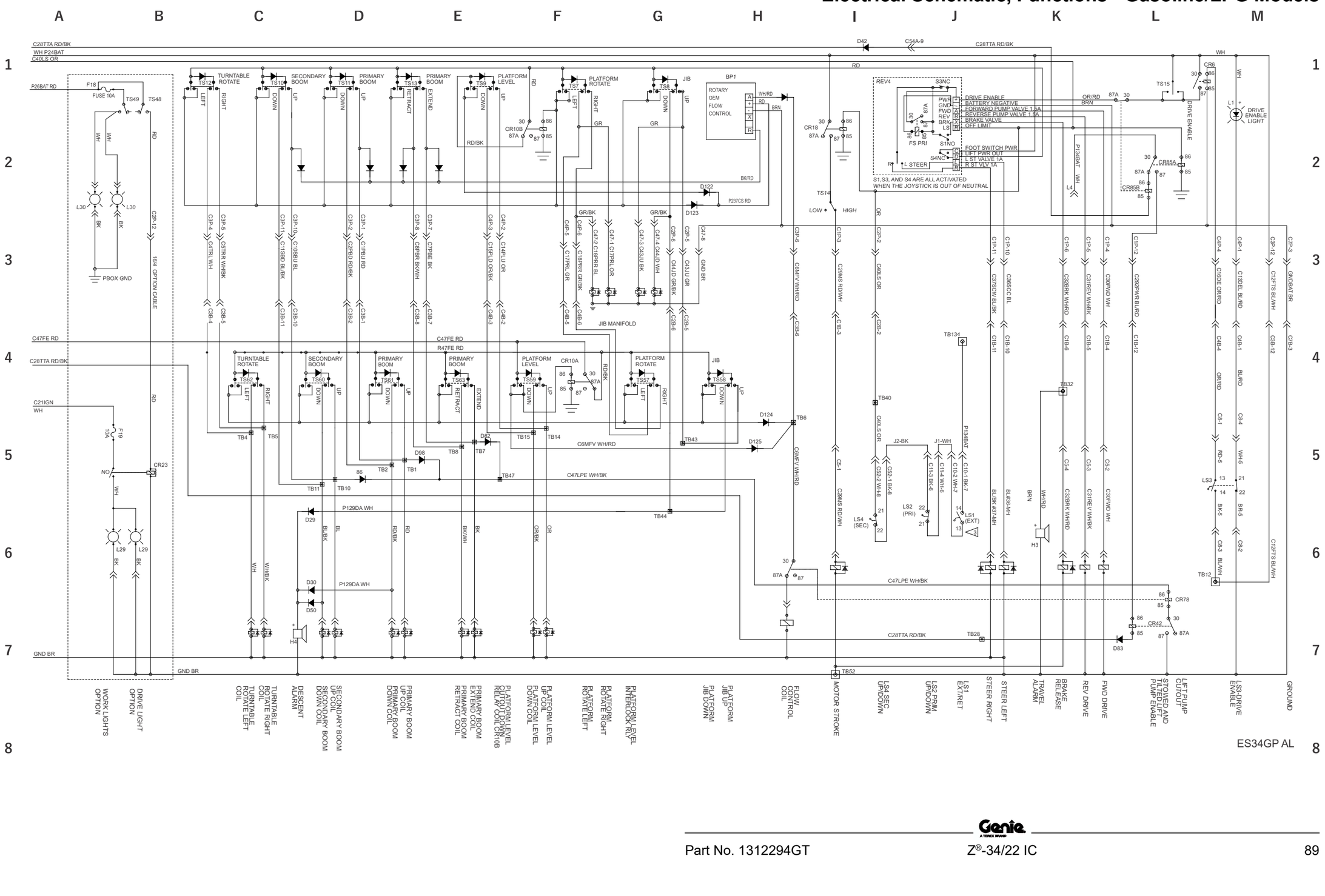


Electrical Schematic - Gasoline/LPG Models



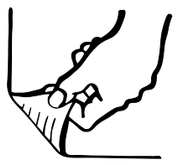
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Electrical Schematic, Functions - Gasoline/LPG Models

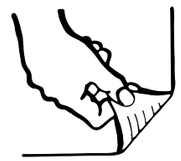


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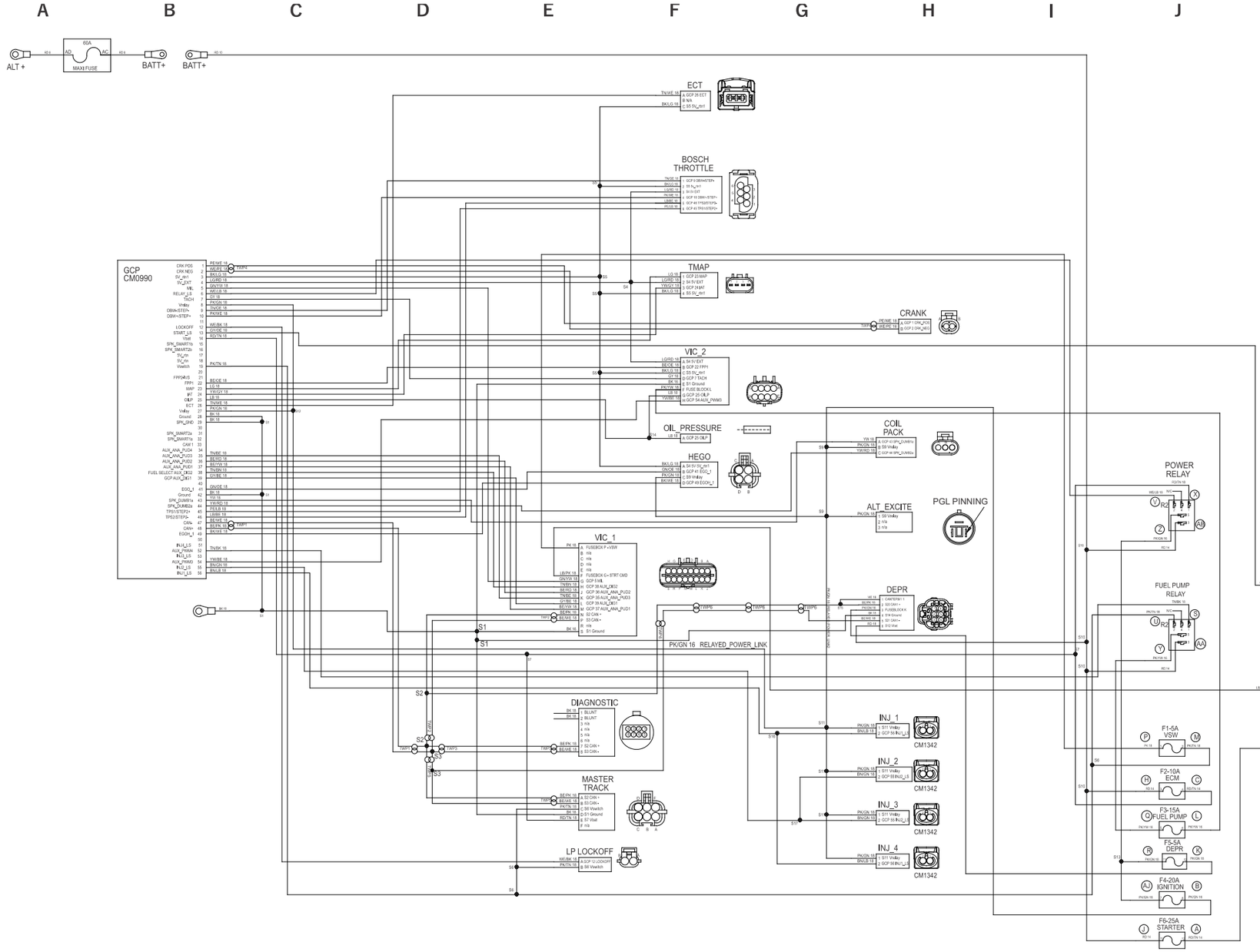
Electrical Schematic, Functions - Gasoline/LPG Models

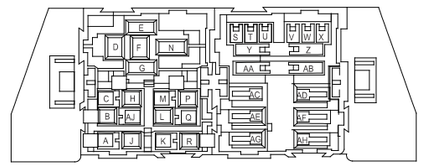


Electrical Schematic, PSI DF Engine - Gasoline/LPG Models



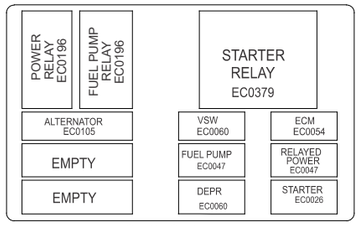
Electrical Schematic, PSI DF Engine - Gasoline/LPG Models





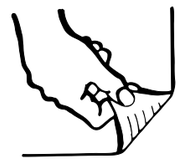
INSERTION VIEW

FUSE BLOCK

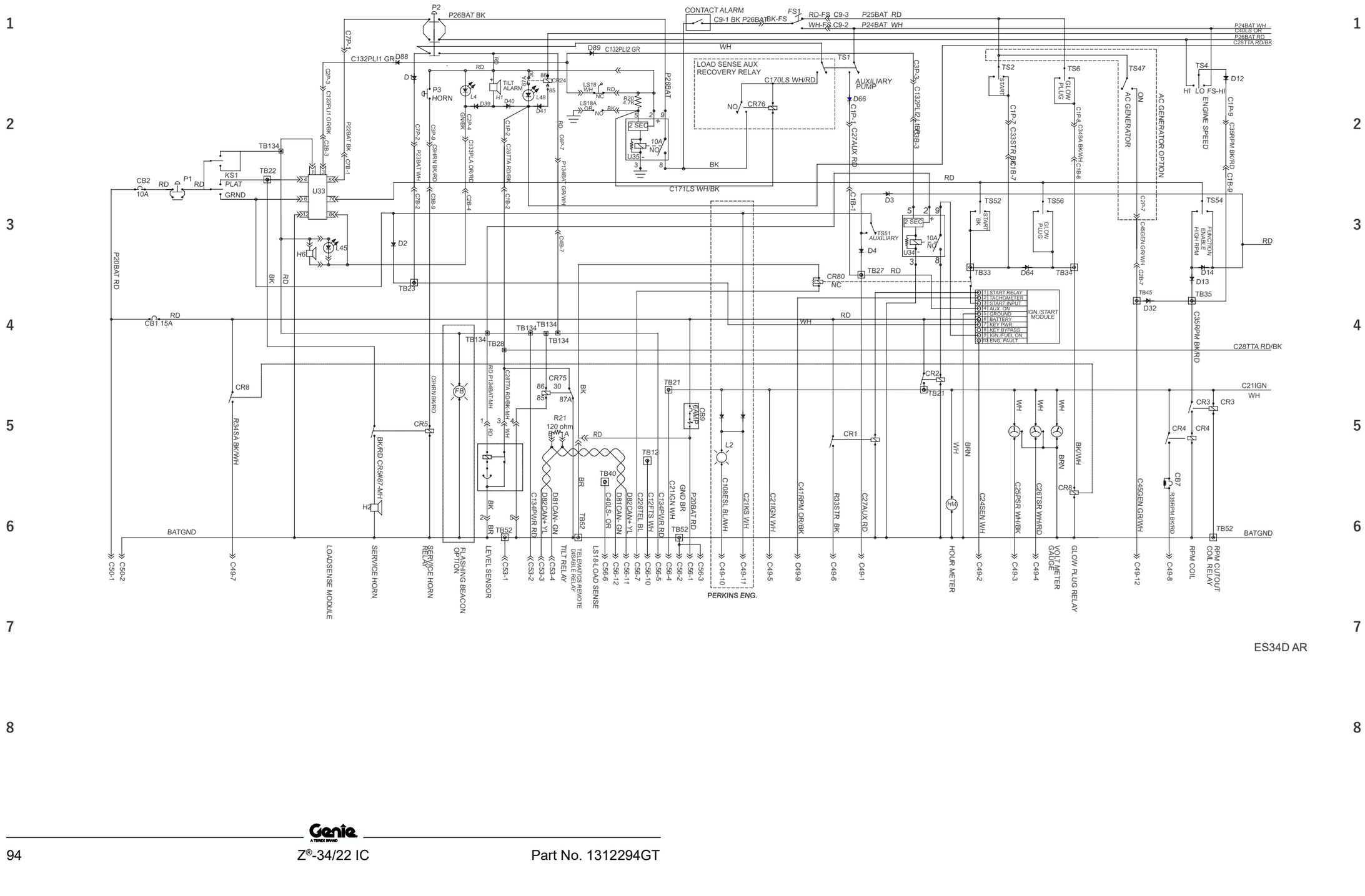


LOADING VIEW

Electrical Schematic - Diesel Models (ANSI / CSA)



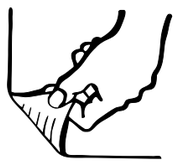
Electrical Schematic - Diesel Models (ANSI / CSA)



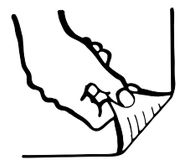
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Electrical Schematic, Functions - Diesel Models (ANSI / CSA)

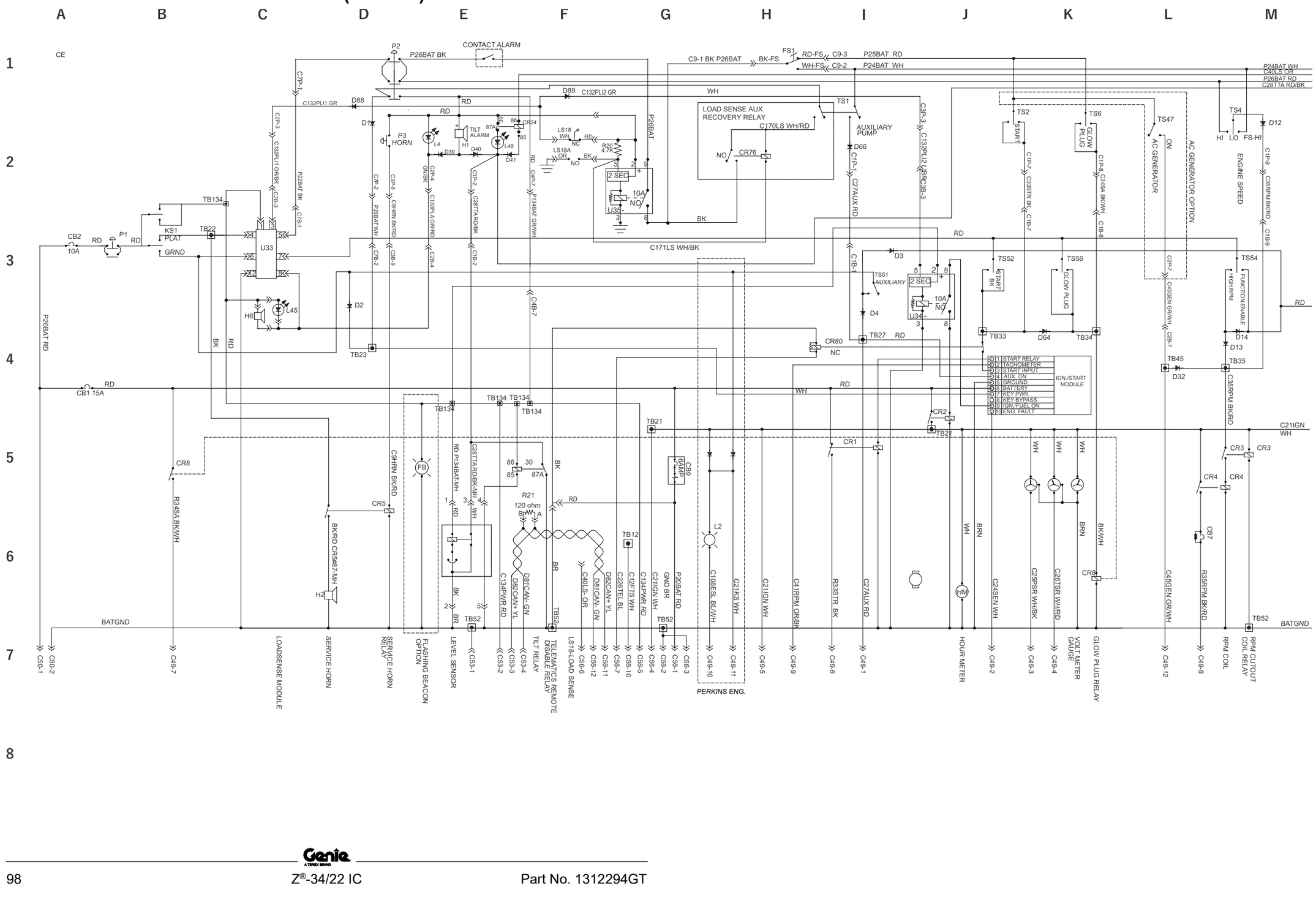
Electrical Schematic, Functions - Diesel Models (ANSI / CSA)



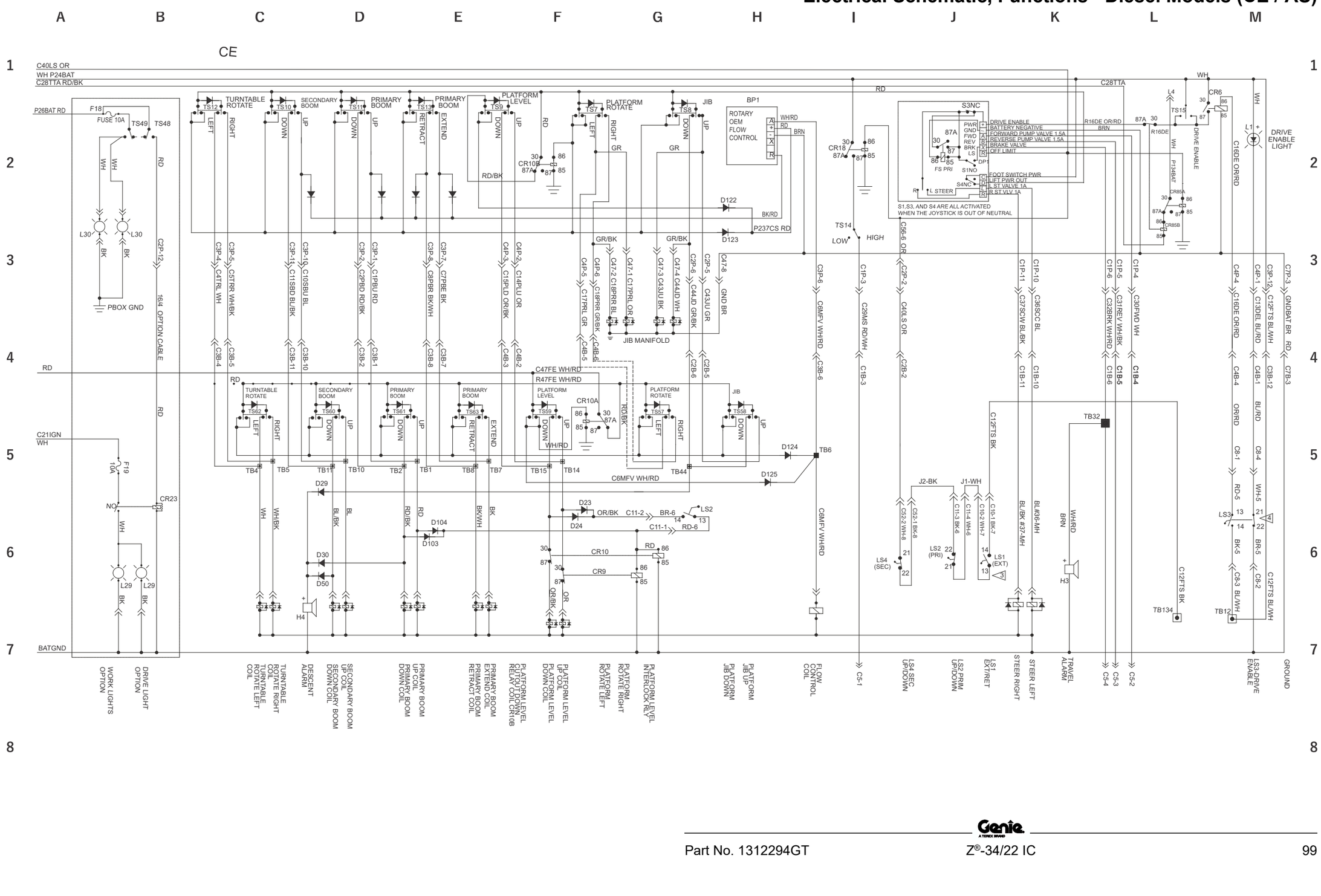
Electrical Schematic - Diesel Models (CE / AS)



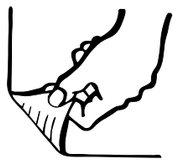
Electrical Schematic - Diesel Models (CE / AS)



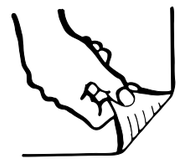
Electrical Schematic, Functions - Diesel Models (CE / AS)



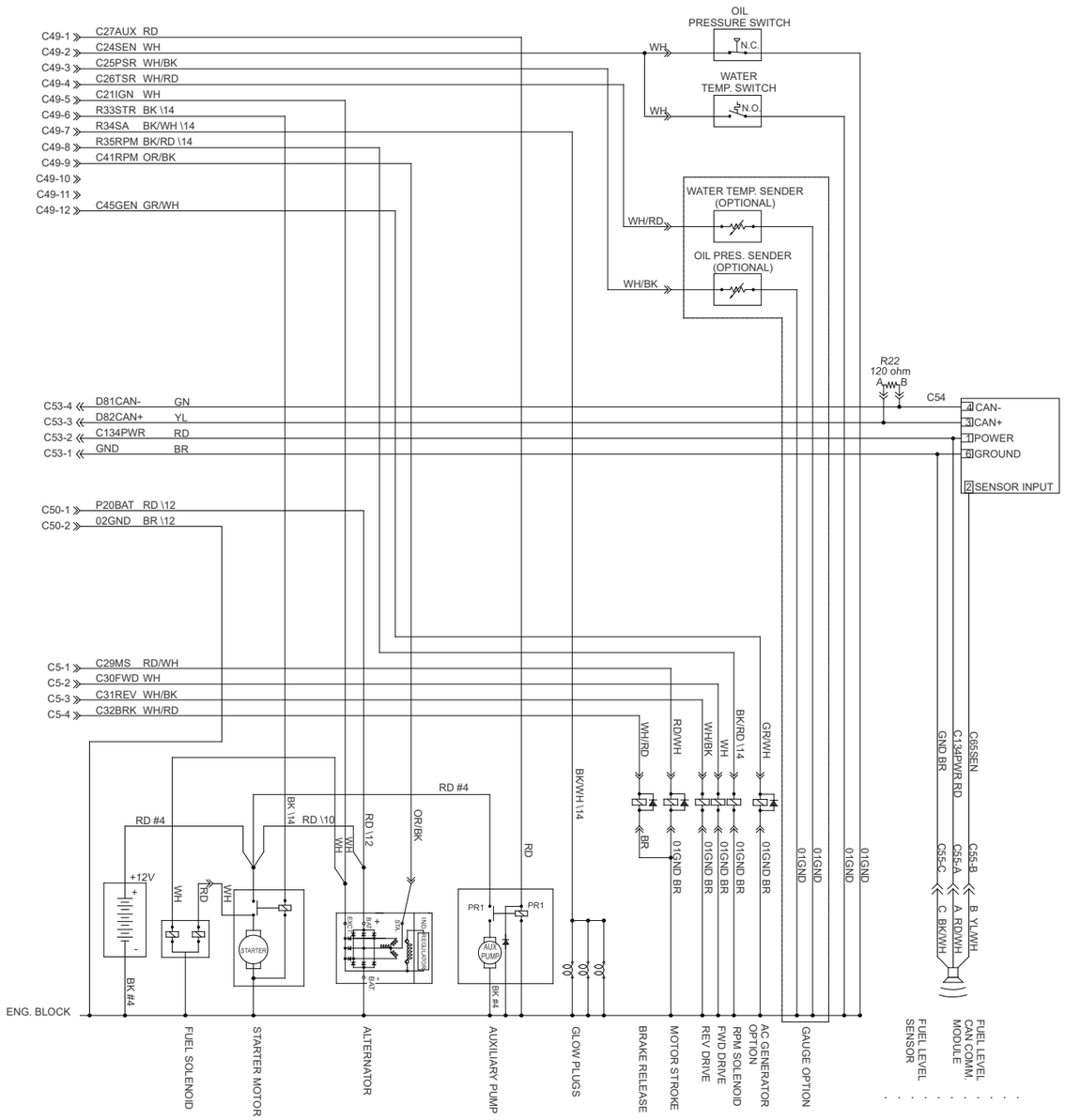
Electrical Schematic, Functions - Diesel Models (CE / AS)



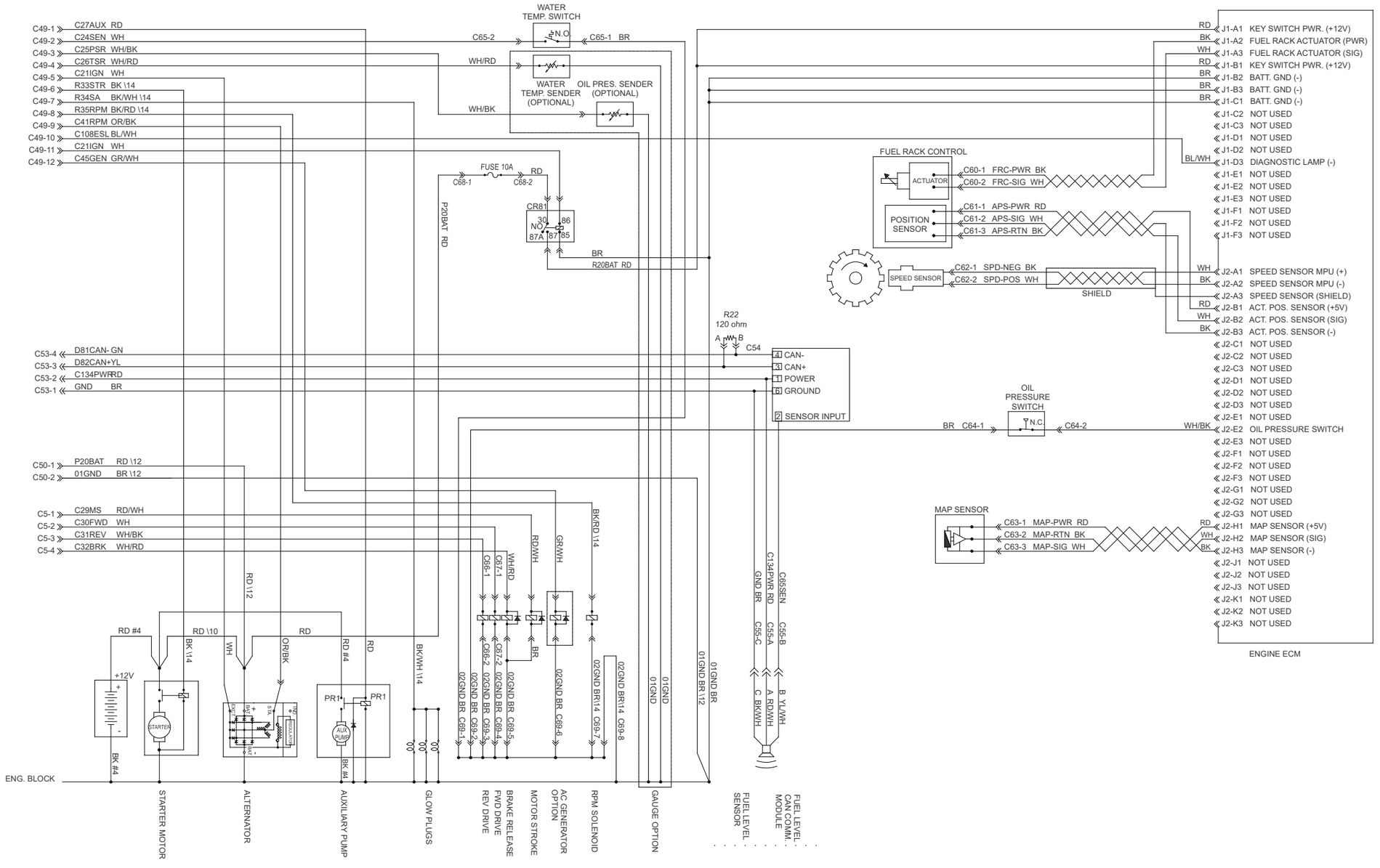
Kubota D1105 Engine Schematic



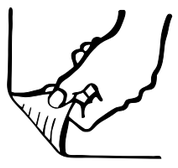
Kubota D1105 Engine Schematic, Options



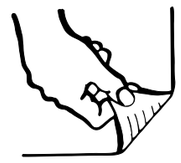
Perkins 403F-11 Engine Schematic, Options



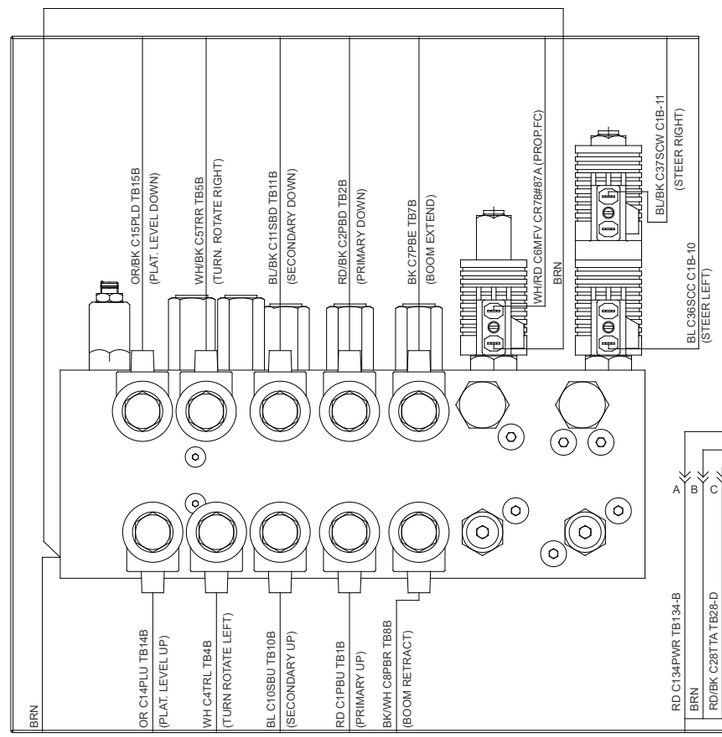
Perkins 403F-11 Engine Schematic, Options

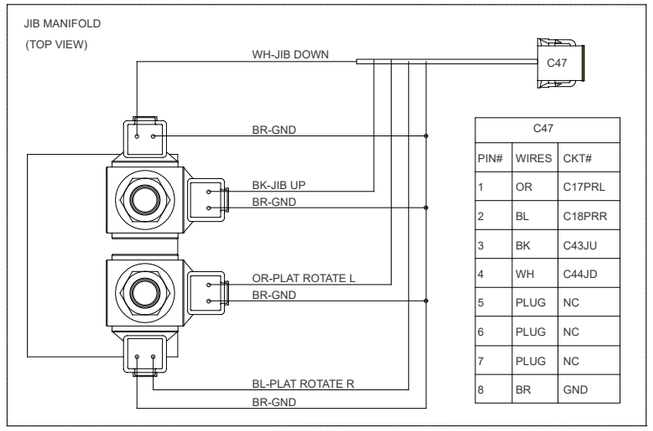


Manifold and Limit Switch Wiring Diagram - Diesel Models, Options

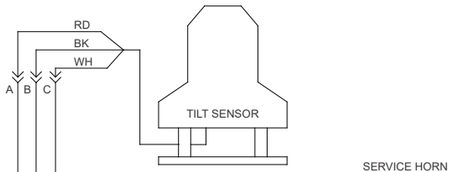


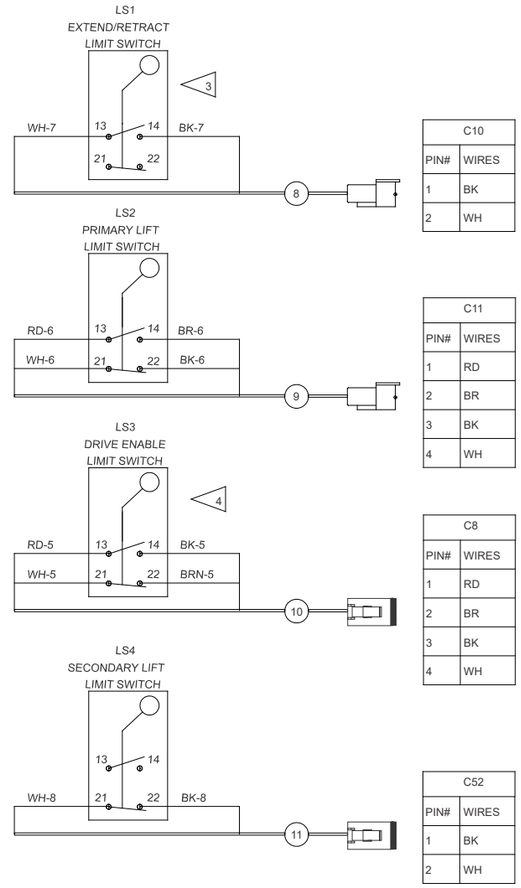
Manifold and Limit Switch Wiring Diagram - Diesel Models, Options





C47		
PIN#	WIRES	CKT#
1	OR	C17PRL
2	BL	C18PRR
3	BK	C43JU
4	WH	C44JD
5	PLUG	NC
6	PLUG	NC
7	PLUG	NC
8	BR	GND



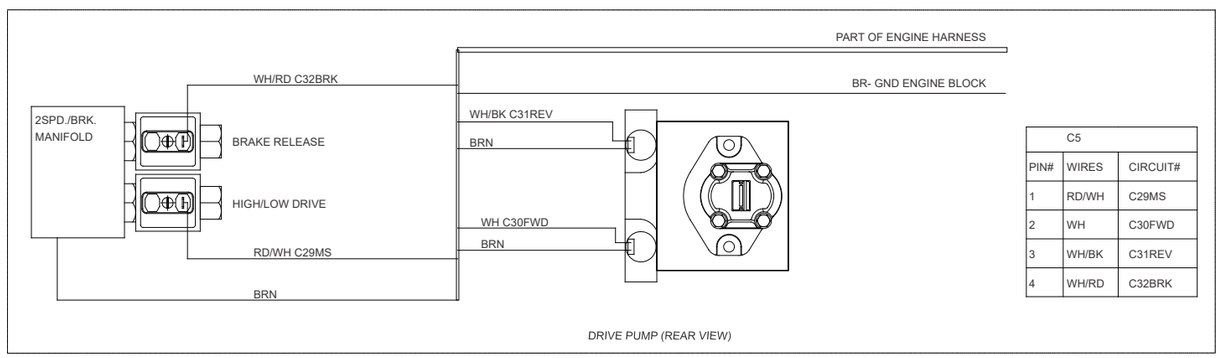


C10	
PIN#	WIRES
1	BK
2	WH

C11	
PIN#	WIRES
1	RD
2	BR
3	BK
4	WH

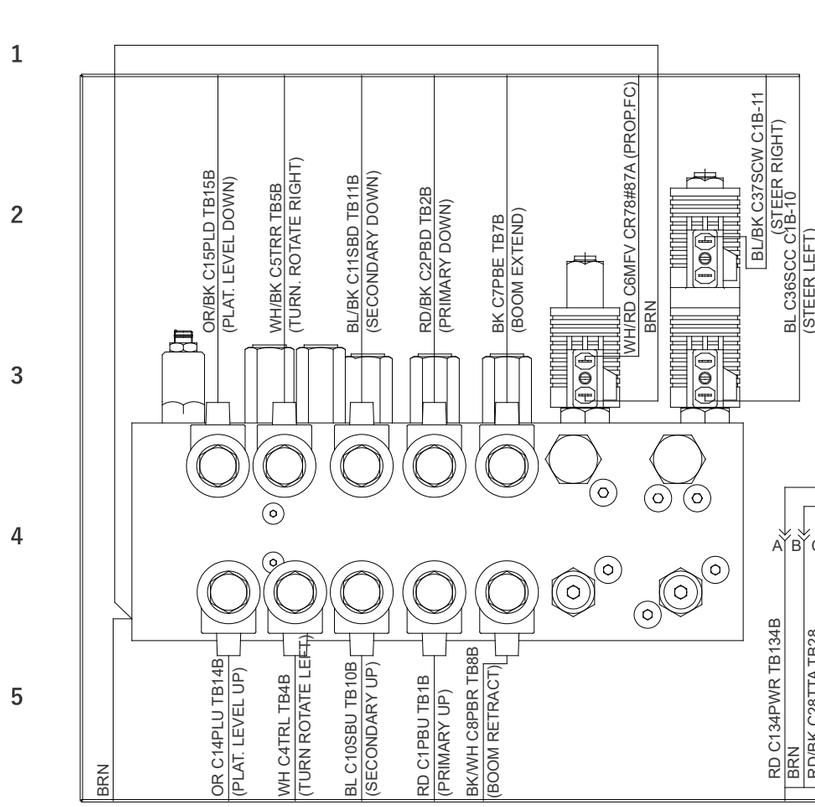
C8	
PIN#	WIRES
1	RD
2	BR
3	BK
4	WH

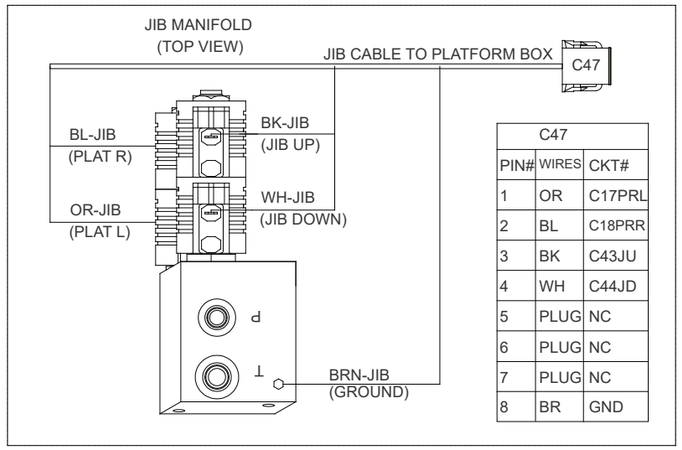
C52	
PIN#	WIRES
1	BK
2	WH



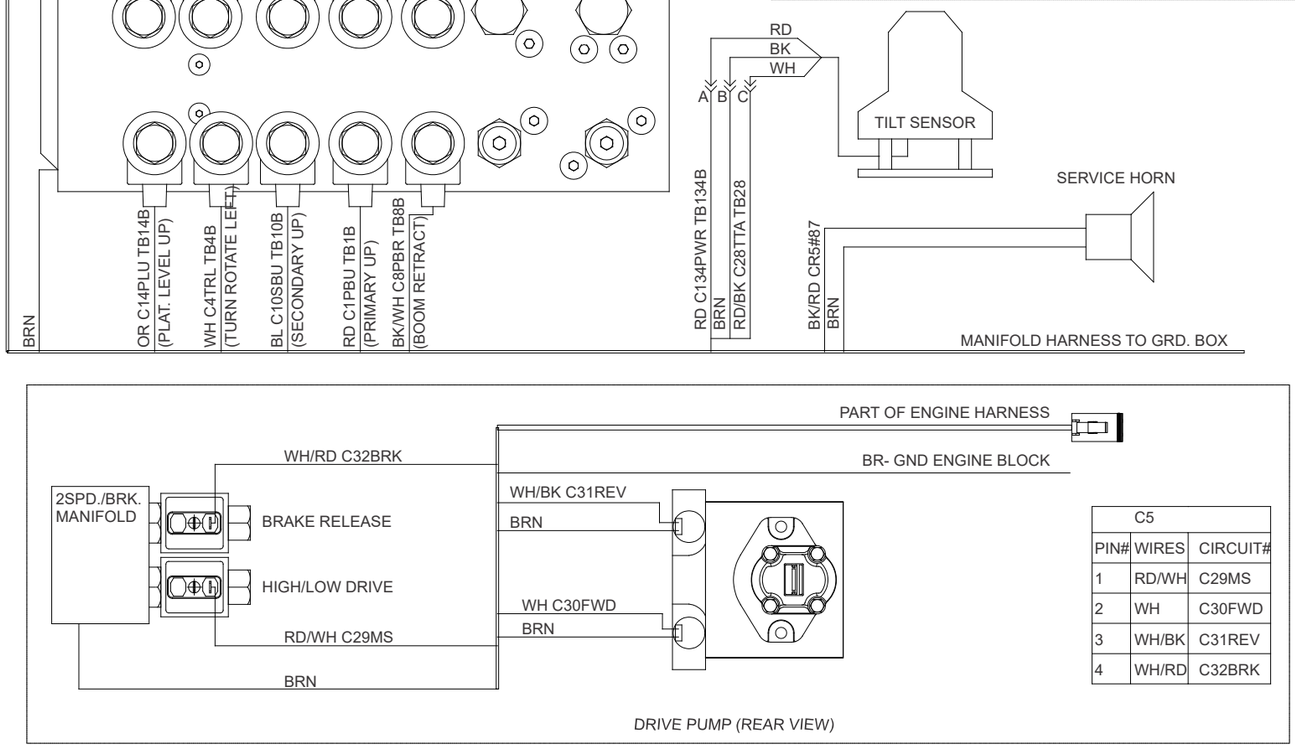
C5		
PIN#	WIRES	CIRCUIT#
1	RD/WH	C29MS
2	WH	C30FWD
3	WH/BK	C31REV
4	WH/RD	C32BRK

Manifold and Limit Switch Wiring Diagram - Gasoline/LPG Models, Options

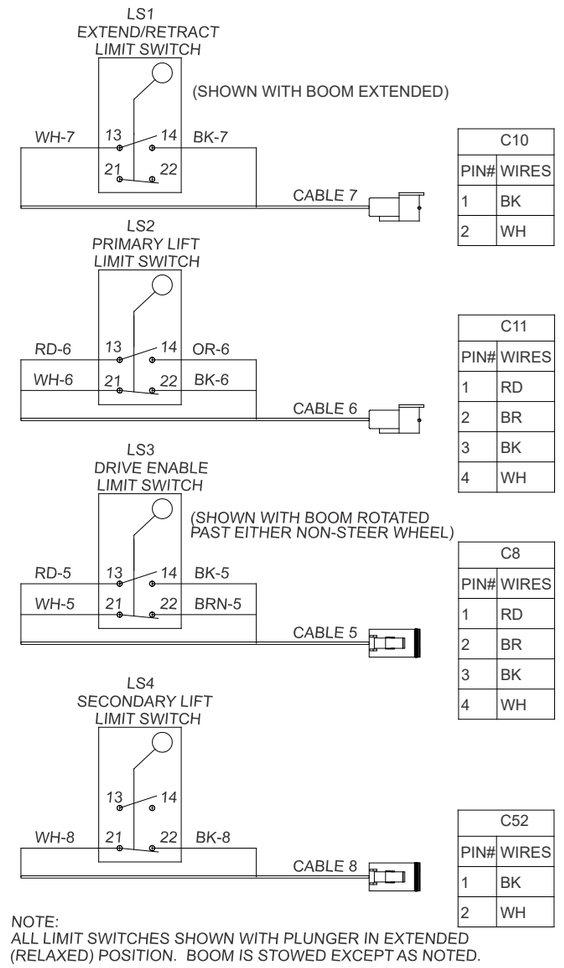




C47		
PIN#	WIRES	CKT#
1	OR	C17PRL
2	BL	C18PRR
3	BK	C43JU
4	WH	C44JD
5	PLUG	NC
6	PLUG	NC
7	PLUG	NC
8	BR	GND



C5		
PIN#	WIRES	CIRCUIT#
1	RD/WH	C29MS
2	WH	C30FWD
3	WH/BK	C31REV
4	WH/RD	C32BRK



C10	
PIN#	WIRES
1	BK
2	WH

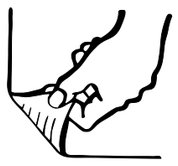
C11	
PIN#	WIRES
1	RD
2	BR
3	BK
4	WH

C8	
PIN#	WIRES
1	RD
2	BR
3	BK
4	WH

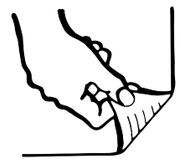
C52	
PIN#	WIRES
1	BK
2	WH

NOTE:
ALL LIMIT SWITCHES SHOWN WITH PLUNGER IN EXTENDED (RELAXED) POSITION. BOOM IS STOWED EXCEPT AS NOTED.

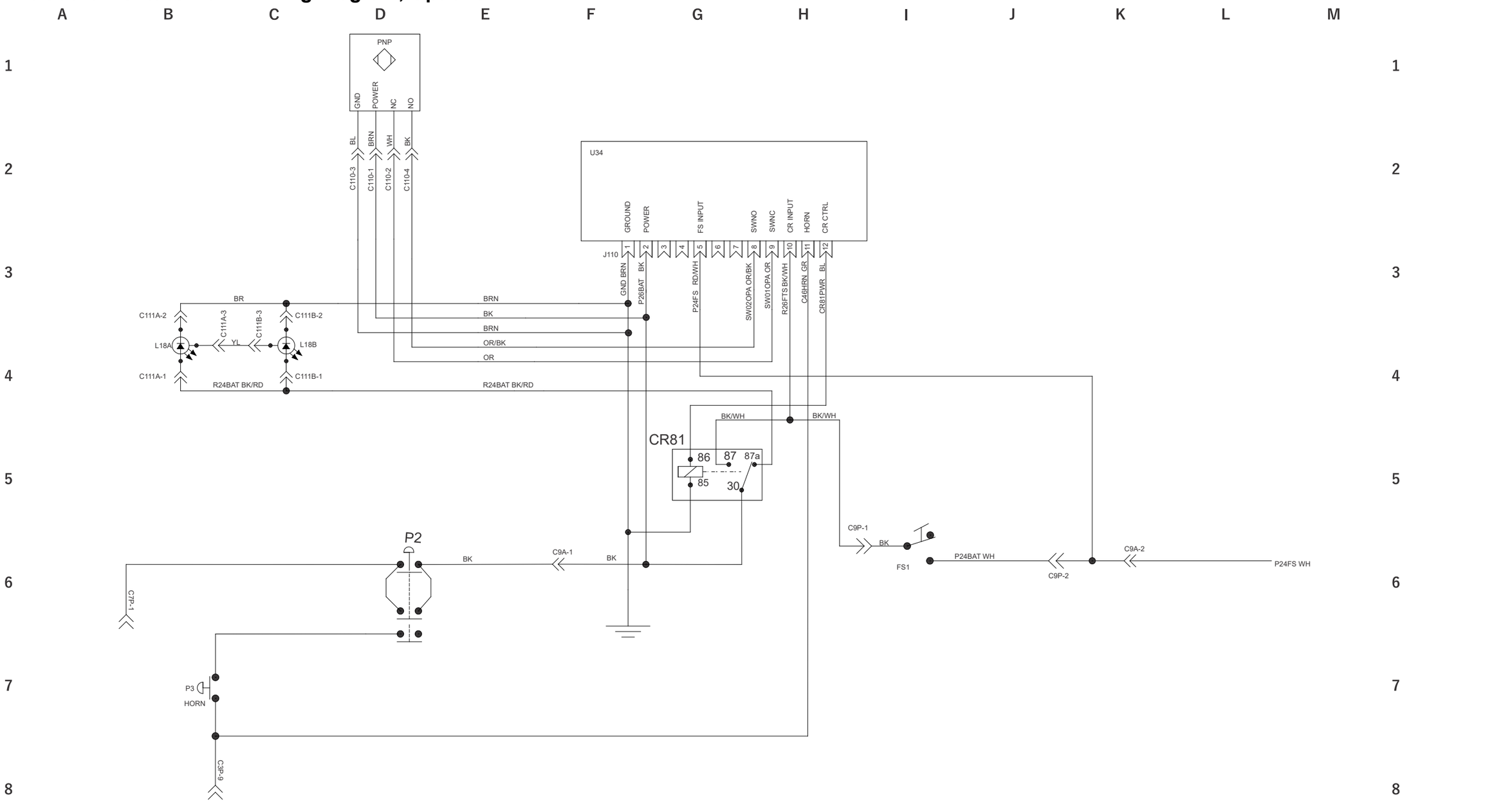
Manifold and Limit Switch Wiring Diagram - Gasoline/LPG Models, Options



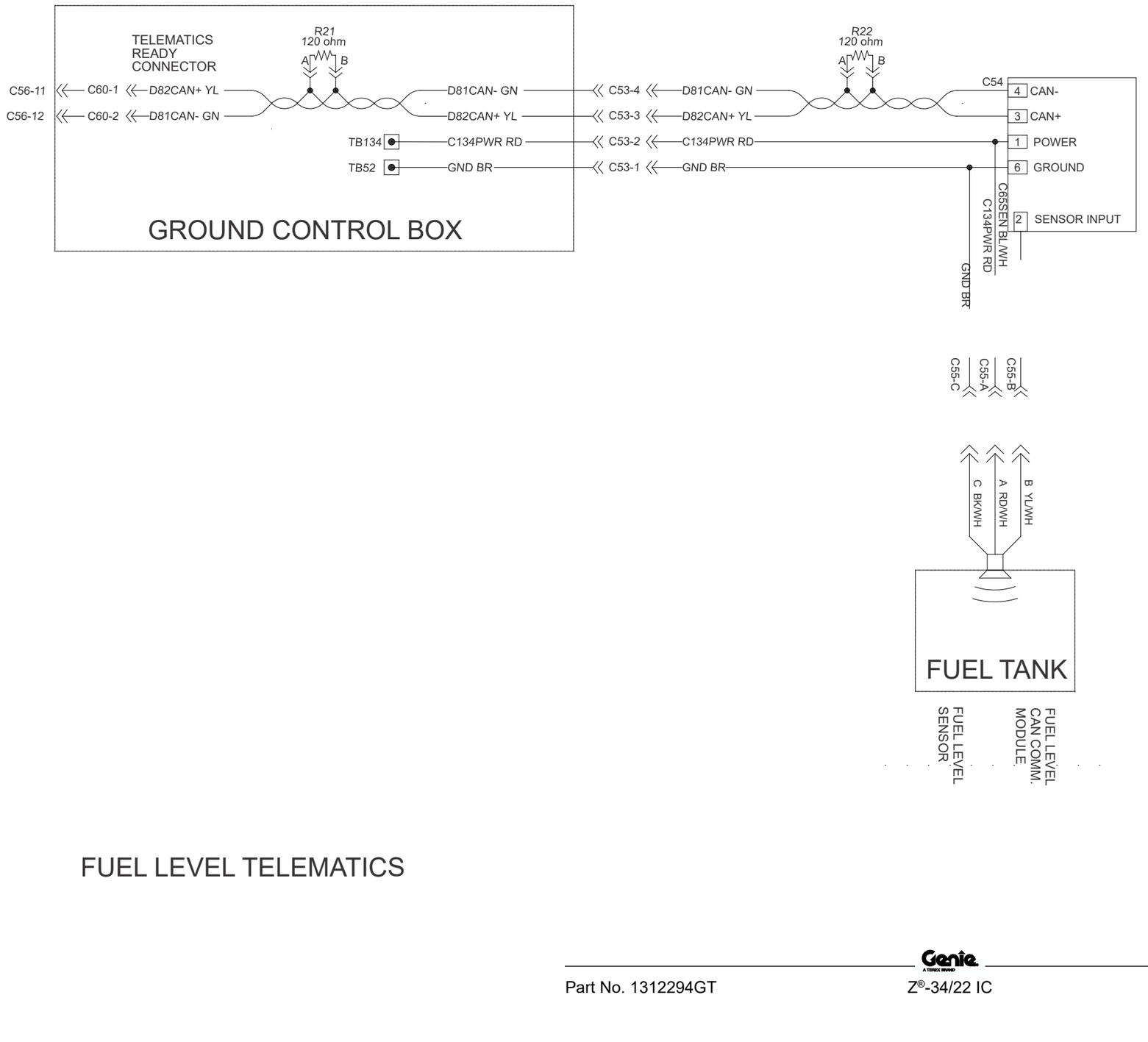
Lift Guard Contact Alarm Wiring Diagram, Options



Lift Guard Contact Alarm Wiring Diagram, Options

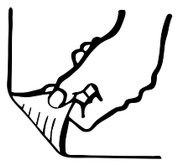


Fuel Level Telematics Wiring Diagram, Options

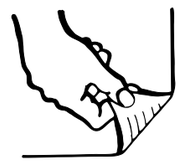


FUEL LEVEL TELEMATICS

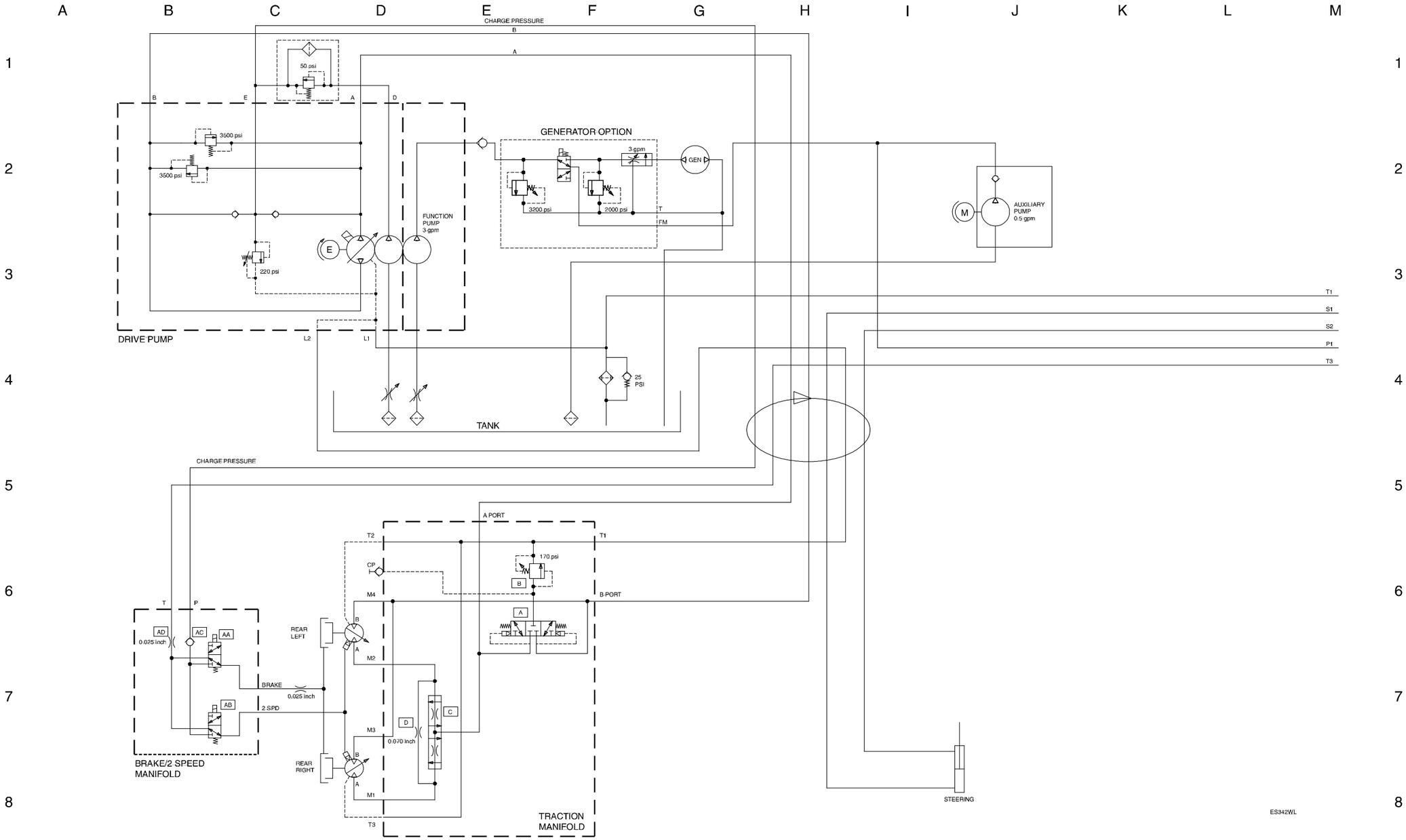
Fuel Level Telematics Wiring Diagram, Options



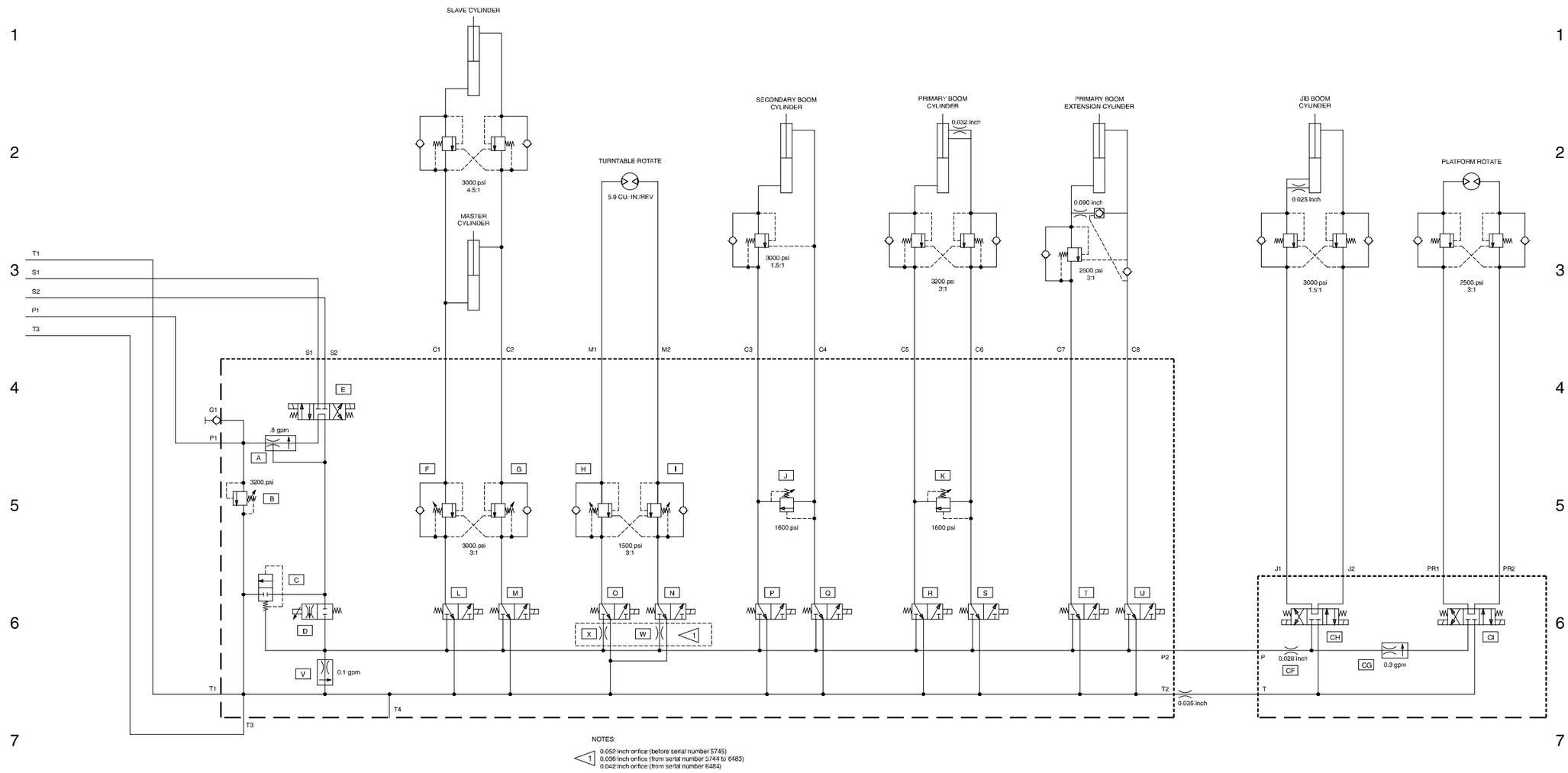
Hydraulic Schematic, 2WD Models



Hydraulic Schematic, 2WD Models

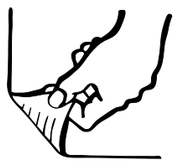


Hydraulic Schematic, 2WD Models

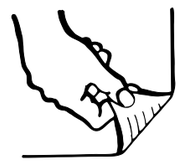


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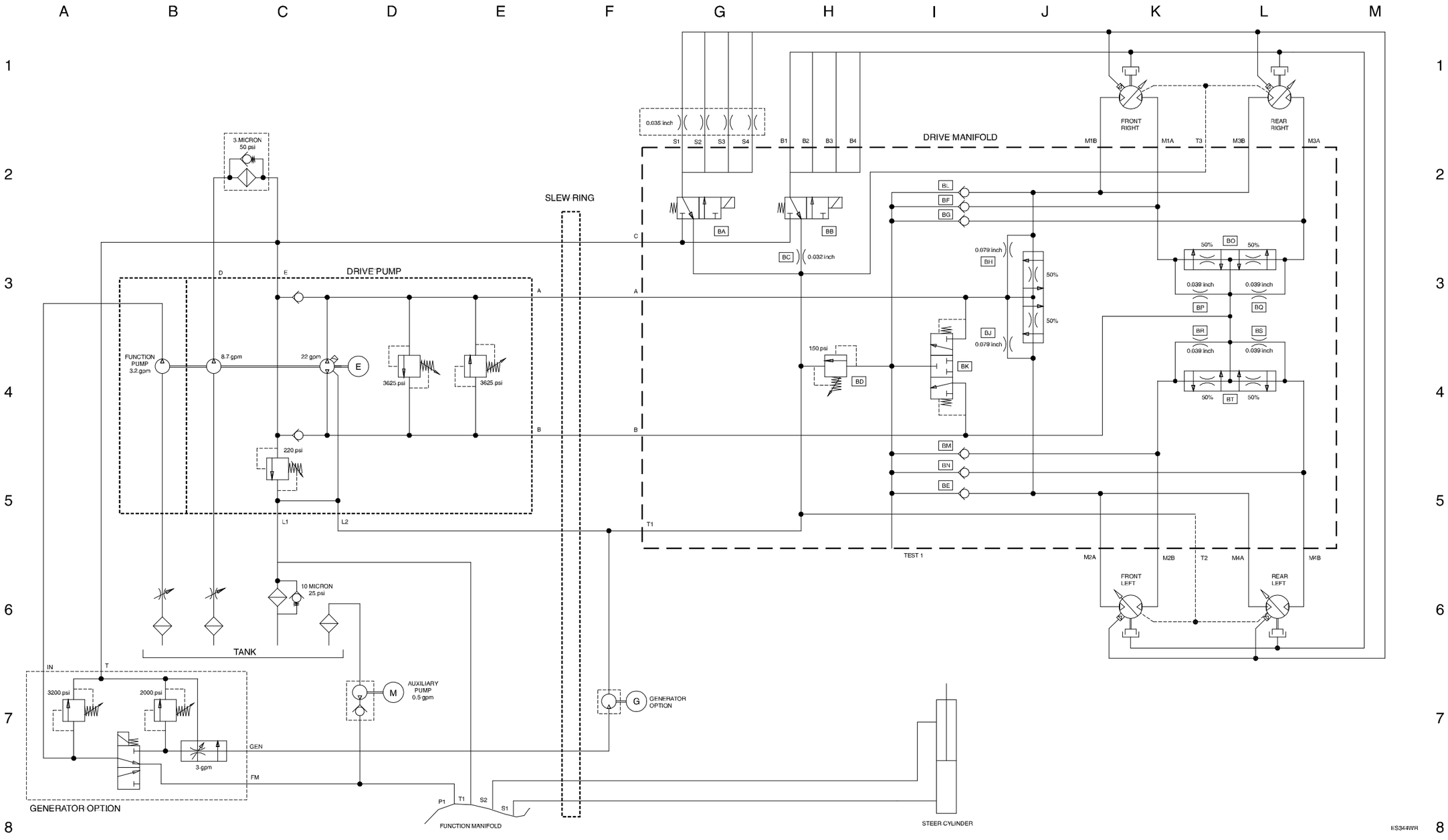
Hydraulic Schematic, 2WD Models



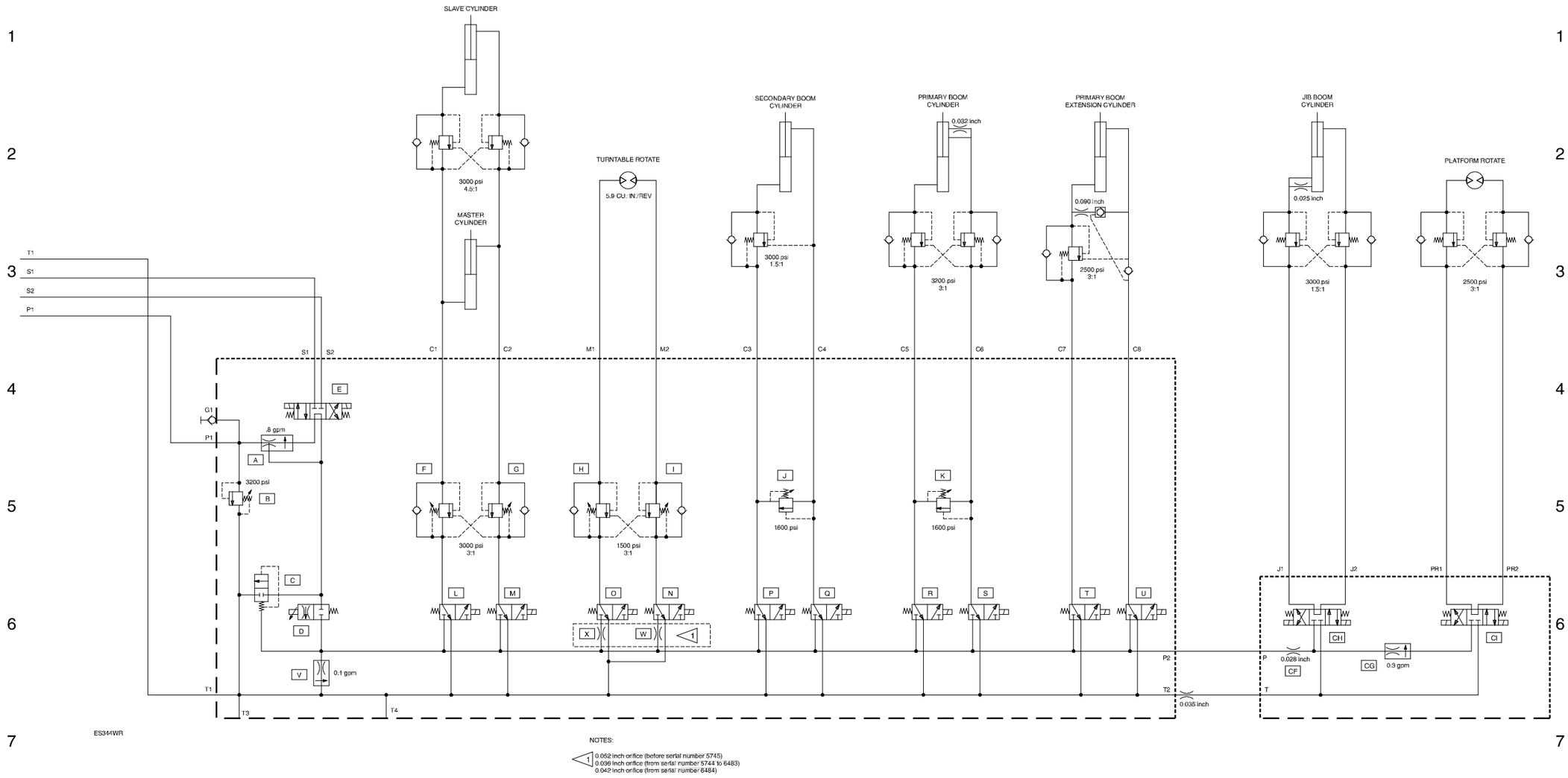
Hydraulic Schematic, 4WD Models



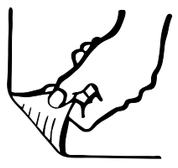
Hydraulic Schematic, 4WD Models



Hydraulic Schematic, 4WD Models



Hydraulic Schematic, 4WD Models



California Proposition 65

WARNING

Operating, servicing and maintaining this equipment can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. These chemicals can be emitted from or contained in other various parts and systems, fluids and some component wear by-products. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your equipment and vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your equipment or vehicle and after operation. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.

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