Genie
A TEREX BRAND

Service and Repair Manual

Serial Number Range

GTH™-636

from GTH06E-11750
from GTH06T-13818

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. 1287209GT
Rev B
September 2021

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 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:

Internet: www.genielift.com
E-mail: awp.techpub@terex.com

Find a Manual for this Model

Go to http://www.genielift.com

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

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First Edition, Second Printing

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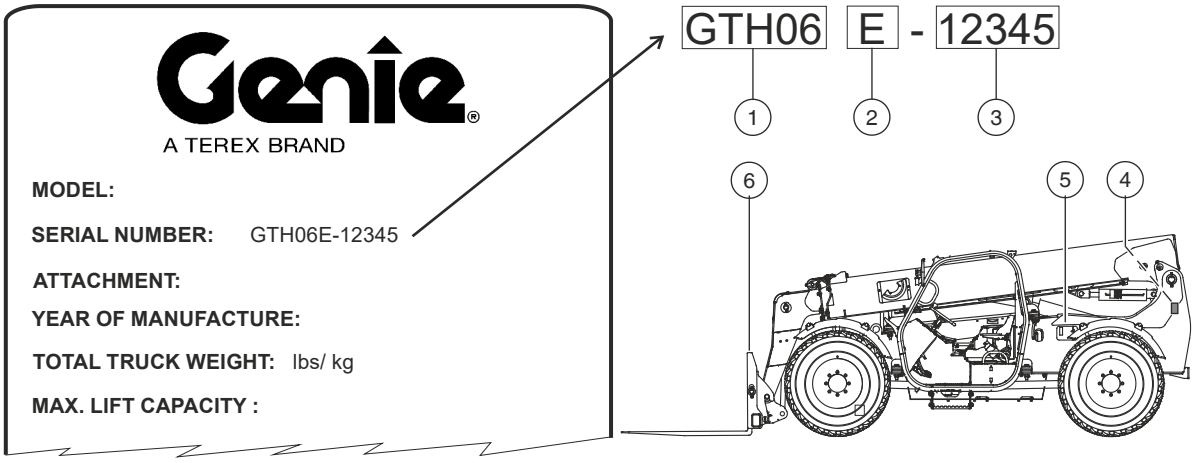
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Revision History

Revision	Date	Section	Procedure / Page / Description
A	4/2018		Initial Release
B	9/2021	Specification	Hydraulic Component Specifications Machine Component Weights Deutz TCD 2.9 L4 Engine Specifications
		Repair	2-1, 7-2, 7-3, 7-4
		Schematics	Harness Maps, Electrical, Hydraulic
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 label (located inside riser, cab side)
5 Serial number (stamped on chassis)
6 Serial label (located inside fork frame)

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 Telehandler 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	
Tire size	13.00 x 28
Tire ply rating	12
Weight, rough terrain tire (air filled)	335 lbs 151.9 kg
Weight, rough terrain tire (foam filled)	780 +50/-20 lbs 353 +23/-9 kg
Tire pressure (models with air-filled tires)	58 psi 4.3 bar
Lug nut torque	465 ft-lbs 630 Nm
Lug Pattern	8 x 10.826
Wheel diameter	28 in 71.12 cm
Wheel width	10 in 25.4 cm

Fluid capacities	
Fuel tank	27 gallons 102.2 liters
Hydraulic tank	19 gallons 71.9 liters
Hydraulic system (including tank)	31.5 gallons 119.2 liters

Specifications

Performance Specifications

Drive speed, maximum	
Deutz TD2.9 Engines	18 mph 29.0 km/h
Draw bar pull	15,100 lbs 6849 kg
Lift capacity, maximum	6000 lbs 2722 kg

Boom function speeds, maximum	
Boom up	10 to 12 seconds
Boom down	8 to 10 seconds
Boom extend	11 to 13 seconds
Boom retract	9 to 11 seconds
Fork rotate	3 to 6 seconds
Fork tilt up	6 to 8 seconds
Fork tilt down	5 to 7 seconds

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.

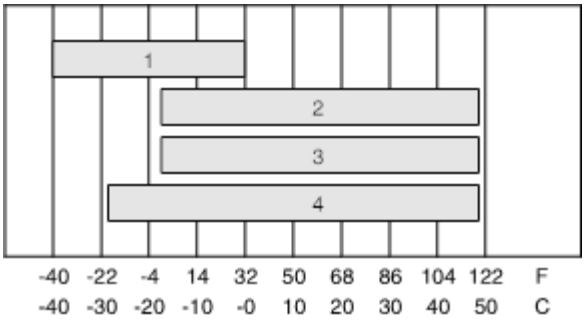
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond its maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

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	7.5
cSt @ 104°F / 40°C	33.5
Brookfield Viscosity	
cP @ -4°F / -20°C	1040
cP @ -22°F / -30°C	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	5.5
cSt @ 104°F / 40°C	15.0
cSt @ -40°F / -40°C	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	8.0
cSt @ 104°F / 40°C	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	9
cSt @ 104°F / 40°C	33.8
Brookfield Viscosity	
cSt @ -4°F / -20°C	481
cSt @ -13°F / -25°C	702.4
cSt @ -40°F / -40°C	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	22
cSt @ 104°F / 40°C	46
cSt @ 0°F / -18°C	1300
Flash point	None
Pour point	-81°F / -63°C
Maximum continuous operating temperature	189°F / 87°C

Specifications

Hydraulic Component Specifications

Function pump	
Type: variable displacement piston pump	
Displacement	2.3 cu in 0 to 38 cc
Flow rate @ 2600 rpm	26 gpm 99 L/min
Pump pressure, maximum	3190 psi 220 bar
Pressure compensator	3190 psi 220 bar
Standby pressure	650 psi 44.8 bar
Primary Function Manifold	
System relief valve pressure, maximum (measured at test port TP)	3200 psi 221 bar
Fork tilt relief valve pressure, maximum	3500 psi 241 bar
Flow regulator, Sway circuit	2 gpm 7.5 L/min
Secondary Function Manifold	
Steer relief valve pressure, maximum (measured at test port TS)	2650 psi 182.7 bar
Parking brake relief valve pressure, maximum (measured at test port TPB)	350 psi 24.1 bar
Differential lock relief valve pressure, maximum	250 psi 17.2 bar

Manifold Component Specifications

Plug torque	
SAE No. 2	50 in-lbs / 6 Nm
SAE No. 4	13 ft-lbs / 18 Nm
SAE No. 5	15 ft lbs / 20 Nm
SAE No. 6	18 ft-lbs / 24 Nm
SAE No. 8	50 ft-lbs / 68 Nm
SAE No. 10	55 ft-lbs / 75 Nm
SAE No. 12	75 ft-lbs / 102 Nm

Machine Component Weights

Primary boom	4600 lbs 2087 kg
Primary boom lift cylinder	284 lbs 129 kg
Primary boom extend cylinder	282 lbs 128 kg
Drive chassis assembly	4004 lbs 1816 kg
Transmission	370 lbs 168 kg
Axle	1103 lbs 500 kg

Air Conditioner Refrigerant Specifications

System Full Charge
R134a

Specifications

Deutz TCD 2.9 L4 Engine

Displacement	177 cu. in 2.9 liters
Number of cylinders	4
Bore and Stroke	3.6 x 4.3 inches 92 x 110 mm
Horsepower net intermittent @ 2600 rpm	74.2 hp 55 kW
Firing order	1 - 3 - 4 - 2
Standby idle	1000 rpm
Low idle	950 rpm
High idle	2600 rpm
Compression ratio	17.4:1
Compression pressure (psi or bar) of the lowest cylinder must be at least 75% of the highest cylinder	
Governor	electronic
Lubrication system	
Oil pressure, hot (@ 2000 rpm)	40 to 60 psi 2.8 to 4.1 bar
Oil capacity (including filter)	9.4 quarts 8.9 liters
Oil viscosity requirements	**Low ash oil required**
-22°F to 86°F / -30°C to 30°C	5W-30 (synthetic)
-4°F to 104°F / -20°C to 40°C	10W-40
Above 5°F / -15°C	15W-40
Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine.	

Oil temperature switch	
Installation torque	8 - 18 ft-lbs 11 - 24 Nm
Temperature switch point	275°F 135°C
Oil Pressure switch	
Installation torque	8 - 18 ft-lbs 11 - 24 Nm
Pressure switch point	20 psi 1.4 bar
Fuel injection system	Bosch
Injection pump pressure, maximum	23200 psi 1600 bar
Injector opening pressure	3046 psi 210 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator Manual for your engine.	
Engine coolant	
Capacity	3.3 gallons 12.5 liters
Type	Extended Life
Starter motor	
Current draw, normal load	400A
Battery – Engine starting and control system	
Type	12V DC
Quantity	1
Battery capacity, maximum	1000A
Reserve capacity @ 25A rate	200 Minutes
Alternator output	95A @ 12V DC
Fan belt deflection	3/8 to 1/2 inch 9 to 12 mm

Specifications

Dana VDT12000 Transmission Specifications

Transmission Type	3 speed powershift converter
Speeds, Forward	3
Speeds, Reverse	3
Torque Converter	
Maximum input	3100 rpm
Size	12 inches
Lubrication	
Oil capacity, transmission	14.3 quarts 13.5 liters
Oil capacity, drop box	1.1 quart 1 liter
Oil viscosity requirements	
Units ship with Chevron Ursa Hydraulic 10W. Extreme operating temperatures may require the use of alternative transmission oils. For oil requirements, refer to the Dana VDT12000 Service Manual.	
Dana VDT12000 Service Manual	
Genie part number	218706

Dana 212 Drive Axle Specifications

Steering	Integrated steer cylinder
Joints	Heavy duty double U-joints
Steering angle, maximum	45°
Front Axle Lubrication	
Front differential	7.4 quarts 7 liters
Axle planetary end (each)	0.8 quarts 0.8 liters
Rear Axle Lubrication	
Rear differential	8.0 quarts 7.6 liters
Axle planetary end (each)	0.8 quarts 0.8 liters
Oil viscosity requirements	
Differential	Chevron Supreme 85W90 (API GL5)
Planetary ends	Chevron Supreme 85W90 (API GL5)
For additional axle information, refer to the Dana 212 Axle Service Manual.	
Dana 212 Axle Service Manual	
Genie part number	1259569

Hydraulic Hose and Fitting Torque Specifications

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

Seal-Lok™ Fittings

(hose end - ORFS)

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

JIC 37° Fittings

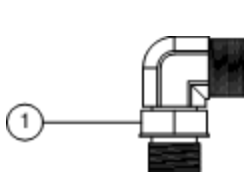
(swivel nut or hose connection)

SAE Dash Size	Thread Size	Flats
-4	7/16-20	2
-6	9/16-18	1 ¼
-8	3/4-16	1
-10	7/8-14	1
-12	1 1/16-12	1
-16	1 5/16-12	1
-20	1 5/8-12	1
-24	1 7/8-12	1

SAE O-ring Boss Port

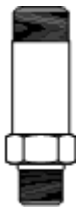
(tube fitting - installed into Aluminum)
(all types)

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



Adjustable Fitting

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
-5	ORFS (Adj / Non adj)	32 ft lbs / 43.4 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.

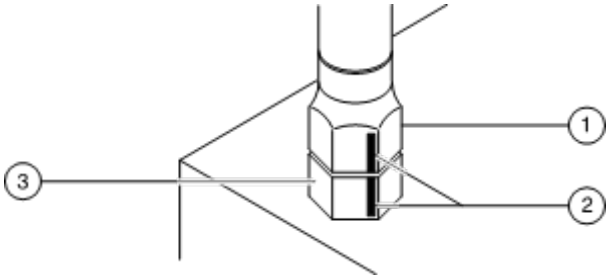


Illustration 1

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.

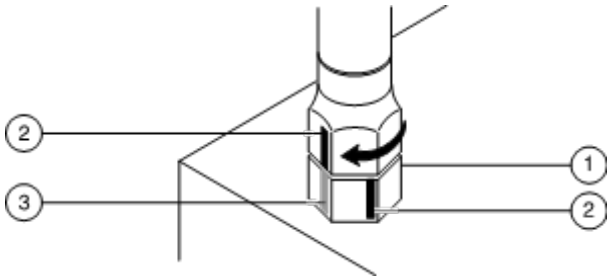


Illustration 2

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
- Boom in the stowed position
- Key switch in the off position with the key removed
- Wheels chocked

About This Section

Most of the procedures in this section should only be performed by 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.

Boom Components

1-1 Boom

How to Replace the Boom Wear Pads

1 **Lower wear pads**: Using a lifting strap from an overhead crane or a fork lift of sufficient capacity, lift the boom tube just enough to remove the weight from the pads.

2 Remove the wear pad retainer plates and remove the wear pads from the boom.

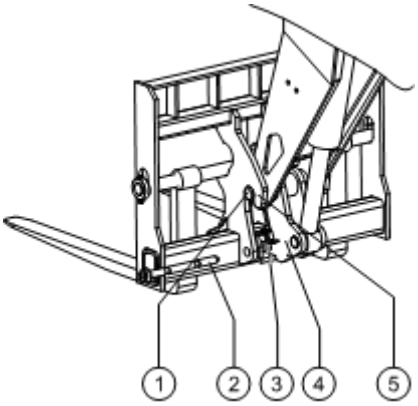
3 Lubricate the wear surface of the new pads. Refer to Maintenance Procedure, *Lubricate the Boom*.

Note: Do not lubricate the side wear pads.

4 Install the wear pads. Install and securely tighten the retainer plates. Do not over tighten.

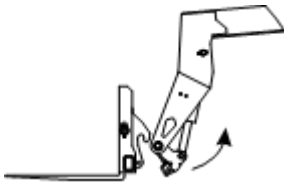
How to Use the Quick Attachment

1 Remove the quick attach lock pin. Tilt the forks forward to pivot the quick attach connector back.

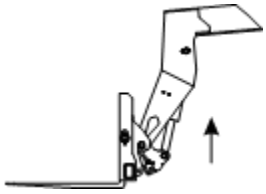


1 Quick attach pin
2 Quick attach lock pin
3 Quick attach lock lever
4 Quick attach connector
5 Attachment hooks

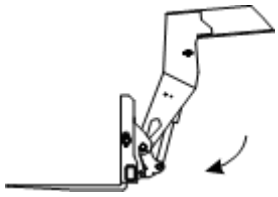
2 Position the boom so that the quick attach pin on the boom is below and centered between the hooks on the attachment. Raise the boom until the pin is secured n the hooks on the attachment.



3 Tilt the forks back to pivot the quick attach into the attachment.



4 Insert the quick attach lock pin all the way through the attachment and be sure the quick attach lock lever is secured in the notch on the pin.



How to Replace the Retraction Chain

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

1 Start the engine and allow the engine to idle.

2 Raise the boom to a horizontal position.

3 Fully retract the boom.

4 Extend the boom approximately 1 inch / 2.5 cm to insure retract chain is slack. It may be necessary to loosen the extend chain adjuster.

5 Turn the machine off and remove the key from the key switch.

6 Working under the boom, remove the fasteners securing the single-chain tensioner to the bottom of boom tube number 1.

Note: When installing the new chain, the chain tensioner should be mounted in the two most rearward holes.

7 Remove the inspection cover from the pivot end of the boom. Remove the extension cylinder. Refer to How to Remove the Extension Cylinder in the Repair section.

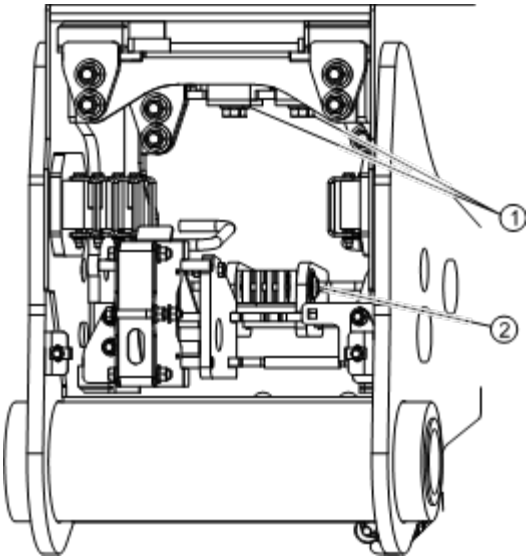
8 Remove the retaining clip from the retaining pin and then drive the pin securing the chain anchor to the boom.

9 Working at the pivot end of the boom, pull the chain out of the boom.

Boom Components

10 Remove the chain anchors from each end of the chain and install them on the new chain.

Note: Always use new cotter pins when installing a chain.



1 Extension chain anchors
2 Retract chain anchor

11 Feed an electrical 'fish tape' through the boom from the front and attach it to the new chain. Also attach a short rope to the pivot end of the chain.

12 Working at the fork end of the boom, use the tape to carefully pull the chain through the boom just until the end of the chain is accessible. Remove the tape from the chain.

13 Now pull the chain carefully toward the pivot end until the mounting holes of the chain anchor line up with the holes on the boom tube. Install the fasteners securing the chain to the bottom of the boom tube.

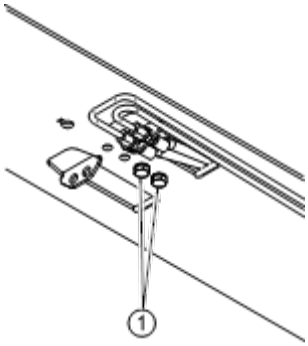
14 Working at the pivot end of the boom, route the chain over the roller and install the chain onto the boom assembly using the pivot pin and retaining clip removed in step 8.

15 Install the extension cylinder removed in step 7.

16 Check the tension on the extension chains. Refer to Maintenance Procedure, *Adjust the Boom Sequencing Chains.*

NOTICE

Component damage hazard. Chains can be damaged if the boom is used while the chains are out of adjustment. Do not return the machine to use until the chains have been correctly adjusted.



1 Retract chain anchor bolts

How to Replace the Extension Chains

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

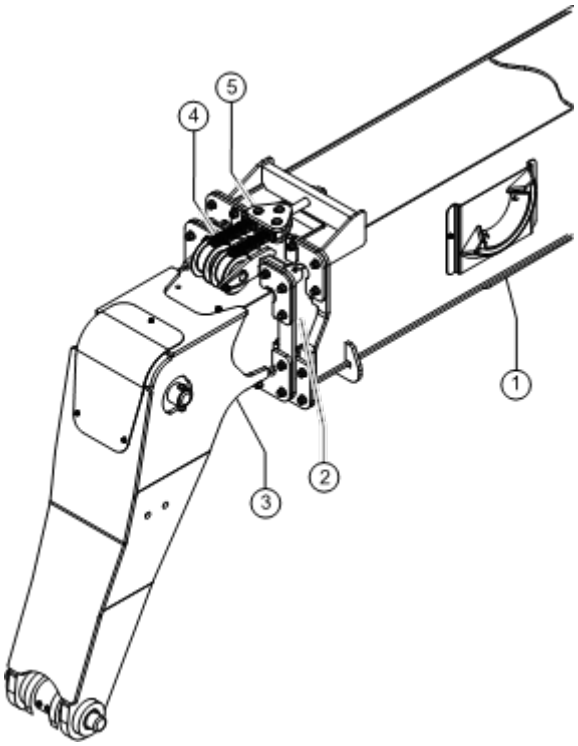
1 Start the engine and allow the engine to idle.

2 Raise the boom to a horizontal position.

3 Fully retract the boom.

4 Turn the machine off and remove the key from the key switch.

5 Working at the fork end of the boom, loosen the fasteners securing the single-chain tensioners to the top of boom tube number 1. After noting the orientation and assembly order of the components, remove the fasteners and pull the tensioners free of the boom.



1 boom tube number 1
2 boom tube number 2
3 boom tube number 3
4 extension chains
5 single-chain tensioner

6 Select a chain tensioner. Remove the bow tie clip securing the chain anchor pin to the chain assembly. Remove the chain anchor pin from the assembly and remove the chain anchor from the tensioner assembly.

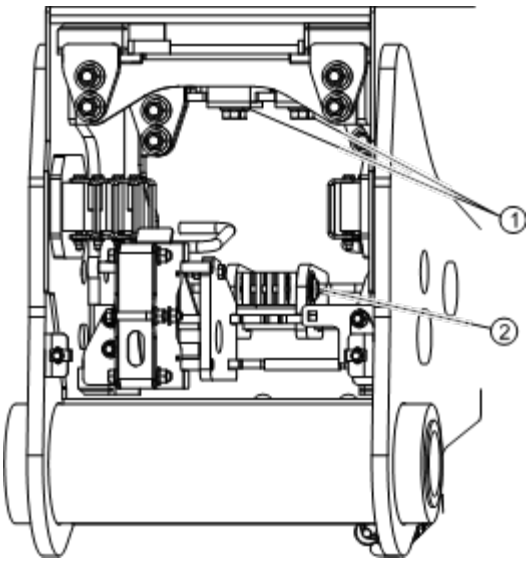
Boom Components

7 Repeat this procedure, beginning with step 6, for the other chain.

8 Working at the fork end of the boom, select a chain. Securely connect a 30 foot / 10 m length of rope to the end of the chain. Securely tie off the other end of the rope to the boom structure.

9 Remove the inspection cover from the pivot end of the boom. Remove the extension cylinder. Refer to How to Remove the Extension Cylinder in the Repair section.

10 Locate the chain anchors of the extension chains at the top of boom tube 3.



1 Extension chain anchors
2 Retract chain anchor

11 Remove the fasteners securing the extension chain anchors to the boom tubes.

12 Working at the pivot end of the boom, pull the chain out of the boom.

Note: Rope coming loose from the chain during removal may result in a difficult reassembly. Be sure the rope is securely attached to the chain and boom structure before pulling the chain out of the boom.

13 On a workbench, remove the bow tie clip securing the chain anchor pin to the chain assembly. Remove the pin and chain anchor pin from the assembly.

14 Install the chain anchors, pins and clips onto the new chain using new cotter pins.

15 Remove the rope from the end of the old chain and securely attach the rope to the new chain.

16 Working at the fork end of the boom, use the rope to carefully pull the chain through the boom just until the end of the chain is accessible.

17 Working at the pivot end of the boom and using the fasteners removed in step 5, install the chain anchor onto the boom tube. Securely tighten the fasteners. Do not over tighten.

18 Remove the rope from the chain and install the chain into the chain anchor of the tensioner assembly. Secure the chain to the chain anchor using the pin and clip removed in step 6.

19 Repeat this procedure, beginning with step 5, for the other chains.

Boom Components

20 Install the inspection cover, removed in step 9, onto the boom. Install and securely tighten the fasteners. Do not over tighten.

21 Install the chain tensioners into the tensioner mount at the fork end of boom tube number 1. Install the mounting components, removed in step 6. Evenly tighten the chain tensioners to the top of the boom tube until they are securely tightened.

22 Adjust the chains. Refer to Maintenance Procedure, *Adjust the Boom Sequencing Chains.*

NOTICE Component damage hazard. Chains can be damaged if the boom is used while the chains are out of adjustment. Do not return the machine to use until the chains have been correctly adjusted.

How to Remove the Boom

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

Note: When removing a hose assembly or fitting, the O-ring (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 lifting fork and frame. See the Repair procedure, *How to Remove the Lifting Fork Frame*.

2 Attach a lifting strap from an overhead 10 ton / 10,000 kg crane to the fork end of the boom. Support the boom. Do not apply any lifting pressure.

3 Select a fork level cylinder. Remove the fasteners securing the fork level cylinder rod-end pivot pin to the boom.

4 Using a lifting strap from another overhead crane, support the rod-end of the fork level cylinder. Do not apply any lifting pressure.

Boom Components

5 Use a soft metal drift to remove the fork level cylinder pivot pin.

6 Lower the fork level cylinder onto the chassis.

⚠ WARNING Crushing hazard. Keep hands clear of the cylinder manifold when lowering the cylinder.

7 Identify the hydraulic hoses from the lift cylinder. Tag, disconnect and plug the hoses at the lift cylinder manifold. Cap the fittings on the cylinder manifold.

8 Remove the fasteners securing the lift cylinder barrel-end pivot pin to the chassis.

9 Support and secure the barrel end of the lift cylinder to the boom.

10 Use a soft metal drift to remove the lift cylinder pivot pin.

11 Tag, disconnect and plug the hydraulic hoses at the hydraulic hard line connections at the pivot end of the boom. Cap the fittings.

12 Using the overhead crane, raise the boom to a horizontal position.

⚠ WARNING Crushing hazard. The lift cylinder will fall if not properly supported when the boom is raised.

13 Remove the fasteners securing the boom pivot pin to the chassis.

14 Using a suitable tool, remove the boom pivot pin.

⚠ DANGER Crushing hazard. The boom will fall if not properly supported when the pivot pin is removed from the machine.

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

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

NOTICE Component damage hazard. The weight of the boom assembly may crush the hydraulic hard lines under the boom. Use caution when placing the boom assembly onto a structure capable of supporting it.

Boom Components

How to Disassemble the Boom

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

Note: When removing a hose assembly or fitting, the O-ring (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 extension cylinder. See the Repair procedure, How to Remove the Extension Cylinder.

2 Remove the boom. See the Repair procedure, How to Remove the Boom.

3 Remove the hose sheave covers from the hose roller assembly.

Note: The hose covers ensure that the hoses do not jump off the hose rollers.

4 Working at the pivot end of the boom, remove the clamps securing the hoses to the inside of boom tube number 3.

5 Working at the fork end of the boom, remove the clamps securing the hoses to the inside of boom tube number 3.

6 Working at the pivot end of the boom, pull the fork level hydraulic hoses from the boom and lay them to the side.

7 Working at the pivot end of the boom, remove the fasteners securing the hose roller assembly to boom tube number 2. Remove the hose roller assembly from the boom.

8 Working at the fork end of the boom, loosen evenly, then remove, the fastener securing the chain tensioners to the top of boom tube number 1.

9 Working at the fork end of the boom, remove the fasteners securing the extension chain rollers to the top of boom tube number 2. Remove the chain rollers from the boom.

10 Working at the pivot end of the boom, remove the fasteners securing the retraction chain block pivot pin to boom tube number 3. Remove the pins and pivot pin. Remove the chain from the roller.

11 Working at the pivot end of the boom, remove the clips securing the retraction chain roller to boom tube number 2. Remove the chain roller from the boom.

12 Working at the fork end of the boom, remove the wear pads from boom tube number 2.

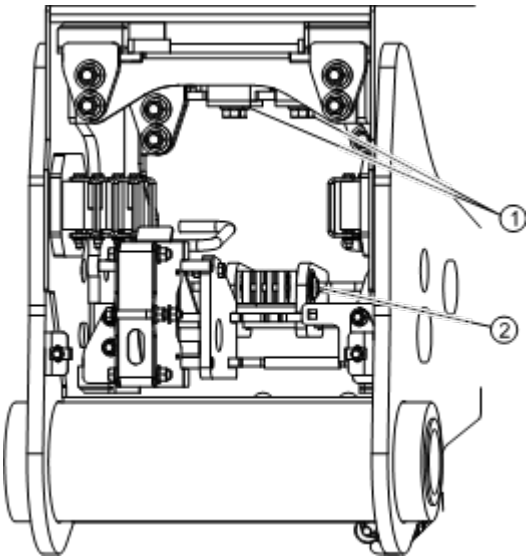
13 Working at the pivot end, removed the retainers securing the wearpads, but leave the wearpads in place. This will insure the boom will slide out smoothly.

14 Support and slide boom tube number 3 out of boom tube number 2. Place boom tube number 3 on a structure capable of supporting it.

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

Boom Components

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



1 Extension chain anchors
2 Retract chain anchor

15 Working at the fork end of the boom, remove the wear pads from boom tube number 1.

16 Support and slide boom tube number 2 out of boom tube number 1. Place boom tube number 2 on a structure capable of supporting it.

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

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

1-2 Boom Lift Cylinder

How to Remove the Lift 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 Attach a lifting strap from an overhead 10 ton / 10,000 kg crane to the fork end of the boom. Support the boom. Do not apply any lifting pressure.

2 Tag, disconnect and plug the hydraulic hoses at the lift cylinder manifold. Cap the fittings.

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

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

Attach a lifting strap from an overhead crane to the rod end of the lift cylinder. Support the cylinder. Do not apply any lifting pressure.

3 Remove the fasteners securing the lift cylinder barrel-end pivot pin to the chassis.

4 Use a soft metal drift to remove the pivot pin.

5 Remove the fasteners securing the lift cylinder rod-end pivot pin to the boom.

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

⚠DANGER Crushing hazard. The boom will fall if not properly supported when the pivot pin is removed from the machine.

7 Using the overhead crane, raise the boom to a horizontal position. Remove the cylinder from the machine.

⚠DANGER Crushing hazard. The cylinder will fall if not properly supported when removed from the machine.

1-3 Boom Extension Cylinder

How to Remove the Extension 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 Raise the boom to a horizontal position.

2 Remove the access covers on the number 1 boom.

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

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

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

4 Remove the hose sheave covers.

5 Remove the extend cylinder retaining clips from the #1 and #2 booms.

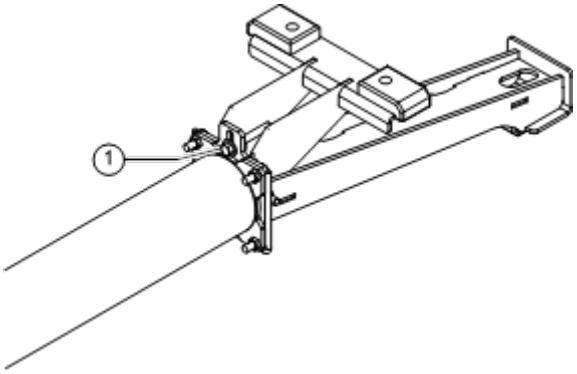
Boom Components

6 Support the extension cylinder with a suitable lifting device and begin removing from the boom assembly.

7 Before the cylinder can be removed from the boom assembly, loosen the upper wearpad mount retaining fastener. This will allow the mount to lower onto the lower wear pad mount.

8 Remove the cylinder from the boom assembly.

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



1 Upper mount retaining fastener

1-4
Fork Level Cylinder

How to Remove the Fork Level 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 Remove the lifting fork frame. See 1-2, How to Remove the Lifting Fork Frame.

2 Remove the fastener securing the fork level cylinder rod-end pivot pin to the fork frame mount.

3 Use a soft metal drift to remove the pivot pin.

4 Attach a lifting strap from an overhead crane to the barrel end of the fork level cylinder. Support the cylinder. Do not apply any lifting pressure.

5 Tag, disconnect and plug the fork level cylinder hoses from the cylinder manifolds. Cap the fittings.

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

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

6 Remove the fasteners securing the fork level cylinder barrel-end pivot pin to the boom.

7 Use a soft metal drift to remove the pivot pin. Remove the cylinder from the machine.

⚠WARNING Crushing hazard. The cylinder could fall if not properly supported when the pivot pin is removed from the machine.

1-5 Hydraulic Hoses

How to Adjust the Fork Level Cylinder and/or Auxiliary Hose

1 Fully retract the boom.

2 Fully lower the tips of the lifting forks.

3 Remove the cover from the fork end of the boom.

4 Loosen the hose clamp securing the fork level cylinder or auxiliary hoses.

5 Pull each hose until it is equally tensioned and not touching the boom tube.

6 Tighten the clamp bolt to secure the hoses in place.

Boom Components

How to Replace the Fork Level Cylinder and/or Auxiliary Hoses

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 Fully retract the boom.

2 Fully lower the tips of the lifting forks.

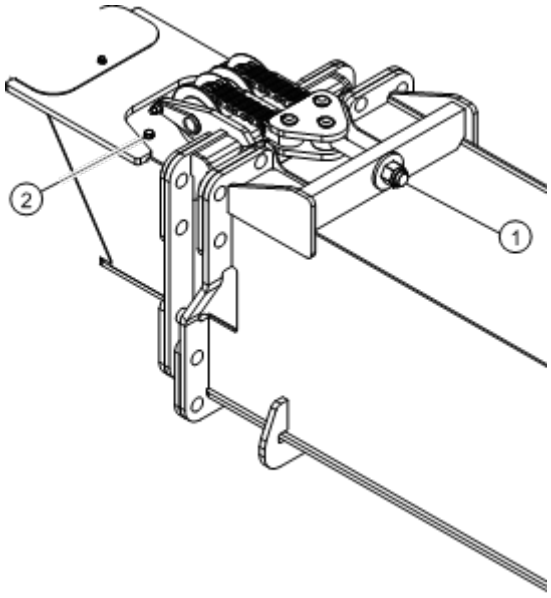
3 Remove the cover from the fork end of the boom.

4 Attach a lifting strap from an overhead crane to the top of the lifting fork frame. Support the frame. Do not apply any lifting pressure.

5 Disconnect and plug the fork level cylinder supply hoses at the cylinder manifold or the auxiliary supply hoses at the quick connect fittings. Cap the fittings.

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

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



1 chain adjustment bolt
2 hose clamp bolt

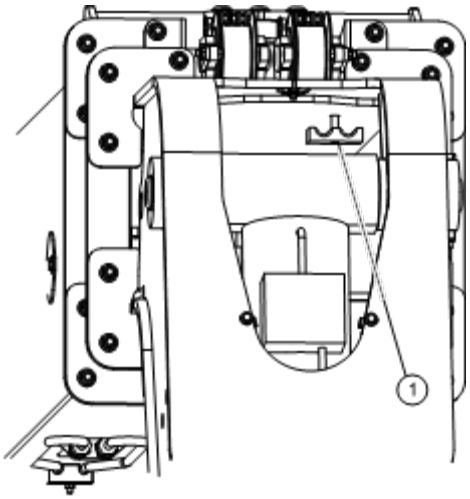
6 Working near the center of the boom assembly, tag, disconnect and plug the hydraulic hoses from the hydraulic hard lines under boom tube number number 1. Cap the hard lines.

7 Securely connect a 30 feet / 10 m length of rope to each end of the hoses disconnected in steps 5 and 6. Securely tie off the other end of each section of rope to the boom structure.

8 Remove the hose clamp at the fork end of the boom by loosening the hose clamp bolt located on the top of the boom.

Boom Components

9 Remove the cover from the pivot end of the boom and remove the hose sheave cover.



1 hose tension clamp

10 Pull the hose out of the boom.

Note: Rope coming loose from either end of the hose or the boom during hose removal may result in a difficult reassembly. Be sure each section of rope is securely attached to both the hose and the boom structure before pulling the hose out of the boom.

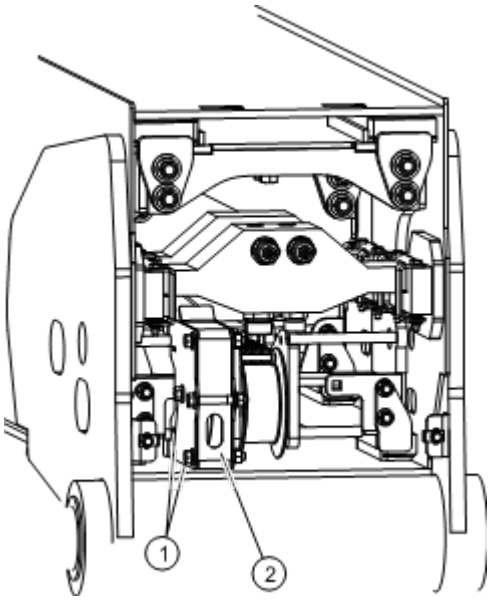
11 Remove the rope from each end of the hose. Discard the hose.

12 Securely install a section of rope onto each end of the new hose assembly.

Note: Tag each hose before assembly.

13 Install the new hose assembly into the boom in the same manner the hose was removed. Using the rope, carefully pull the hose through the boom until each end is accessible.

14 Install both ends of the hose assembly onto the correct connection points. Torque to specification. Refer to Section 2, Specifications.



1 Cover retaining bolts
2 hose sheave cover

15 Repeat this procedure for the remaining hose to be replaced, beginning with step 8.

16 Tension the hoses using the Repair procedure, "How to Adjust the Fork Level and Auxiliary Hydraulic Hoses".

17 Repeat this procedure for the auxiliary hydraulic hoses beginning with step 5.

18 Remove the lifting strap from the fork frame.

19 Install hose sheave covers removed in step 9.

20 Install the covers onto both ends of the boom. Install and securely tighten the retaining fasteners.

Operator's Compartment

2-1
Operator's Compartment

How to Remove the Operator's Compartment

The operator's compartment is used to activate machine functions while sitting in the operator's drivers seat.

Within the operator's compartment there is a transmission column shifter, steering selector, 4-way controller, accelerator pedal, brake pedal and a differential lock switch. All of these components are replaceable.

For further information or assistance, consult the Genie Product Support.

⚠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.

1 Disconnect the battery from the machine.

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

2 Locate the secondary function manifold under the manifold inspection cover. Tag, disconnect and plug the hydraulic hoses at ports BP and BT of the secondary function manifold. Cap the fittings.

3 Locate the brake manifold under the manifold inspection cover. Tag, disconnect and plug the hydraulic hose at the underside of the brake manifold. Cap the fitting.

4 Working under the dashboard, locate the hydraulic hose at port L of the steering orbitral.

5 Working at the front axle, locate the hydraulic hose connected to the front axle steer cylinder at the operator's compartment side of the machine. Tag, disconnect and plug the hydraulic hose. Cap the fitting.

6 Tag, disconnect and plug the hydraulic hoses at ports SUP, SUR and SUT of the secondary function manifold. Cap the fitting.

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

7 Remove the fasteners securing the joystick mount to the operator's compartment. Disconnect the joystick harness and the remove the joystick assembly.

8 Working inside the chassis, tag and disconnect the wire harnesses at the connectors next to the operator's compartment.

9 Support and secure the operator's compartment to an adjustable table capable of supporting the weight and that will allow the operator's compartment to remain in an upright and stable position.

NOTICE Component damage hazard. Wrapping a strap around the cab and lifting using an suitable lifting device can put excessive pressure on the glass windows of the cab, causing the windows to break. Do not lift the cab using a strap from an suitable lifting device if the strap contacts the windows.

Note: Placing a wedge between the operator's compartment and the adjustable table may be required to keep the operator's compartment stable.

10 Remove the lower fasteners securing the operator's compartment to the chassis.

11 Remove the upper fasteners securing the operator's compartment to the chassis.

⚠WARNING Crushing hazard. The operator's compartment will fall if not properly supported when the fasteners are removed from the machine.

12 Slowly move the operator's compartment away from the chassis while feeding all loose hoses, cables and wires through the opening of the chassis.

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

Bolt torque specification	
Operator's cab mounting bolts	550 ft-lbs 746 Nm

2-2 Machine Controls

How to Remove the Steering Column

1 Disconnect the battery from the machine.

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

2 Remove the fasteners securing the transmission control lever and turn signal shifter, if equipped, to the column. Carefully separate the lever from the column.

3 Remove the nut securing the key switch to the dash panel. Gently push the key switch through the opening.

4 Remove the fasteners securing the dash panel to the dashboard.

5 Carefully pull the dash panel towards the seat of the operator's compartment.

6 Tag and disconnect the wire harness from the componments of the dash panel. Remove the dash panel from the machine.

7 Loosen the two lower fasteners securing the dash frame to the operator's compartment.

8 Remove the two upper fasteners securing the dash frame to the operator's compartment.

9 Rotate the dash frame towards the seat of the operator's compartment.Remove the dashboard from the machine.

10 Tag and disconnect the ground wire of the steer column.

11 Support and secure the steer orbitral to the dash frame.

12 Remove the fasteners securing the steer column and steer orbitral to the dash frame.

13 Lower the steer orbitral and remove the steer column from the machine.

Operator's Compartment

How to Remove the Steering Wheel

1 Open the access door above the hydraulic tank.

2 Disconnect the battery from the machine.

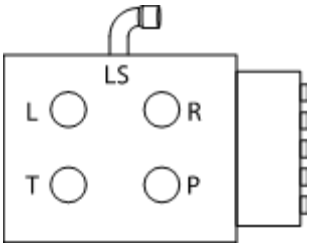
⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

3 Remove the horn button from the steering wheel. Remove the nut securing the steering wheel to the column and remove the steering wheel.

How to Remove the Steer Orbitral

1 Remove the steering column. Refer to Repair Procedure, *How to Remove the Steering Column*.

2 Working under the dashboard, locate the hydraulic hose at port L of the steering orbitral.



3 Follow the hydraulic hose from port L of the steer orbitral to its connection at the front axle of the machine. Tag, disconnect and plug the hydraulic hose at the front axle. Cap the fitting.

4 Tag, disconnect and plug the hydraulic hoses at ports SUP, SUR and SUT of the secondary function manifold. Cap the fitting.

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

5 Tag, disconnect and plug the hydraulic hose at port SULS of the primary function manifold. Cap the fitting.

6 Slowly move the steer orbitral away from the dash frame while feeding all loose hoses through the opening of the chassis.

How to Remove the Joystick - Models with Electronic Joystick

1 Disconnect the battery from the machine.

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

2 Remove the side access panel.

3 Tag and disconnect the joystick wire harness from the machine.

4 Remove the fasteners securing the joystick mount panel to the side console.

5 Remove the fasteners securing the joystick to the mount panel. Remove the joystick.

Operator's Compartment

How to Remove the Brake Pedal Assembly

1 Disconnect the battery from the machine.

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

2 Fully press and release the brake pedal a minimum of 10 times to release the hydraulic pressure in the brake system.

3 Tag, disconnect and plug the hydraulic hoses at ports BP and BT of the secondary hydraulic manifold. Cap the fittings.

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

4 Follow the hydraulic hose from port A of the brake pedal manifold to the brake manifold. Tag, disconnect and plug this hydraulic hose at the brake manifold. Cap the fitting.

5 Remove the fasteners securing the brake pedal assembly to the dash frame.

6 Gently rotate the brake pedal in an upwards direction and slowly move the brake pedal assembly away from the dash frame while feeding all loose hoses through the opening of the chassis.

How to Remove the Gauge Cluster Assembly

1 Disconnect the battery from the machine.

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

2 Remove the fasteners securing the transmission control lever to the column. Carefully separate the lever from the column.

3 Grasp the edge of the dash cluster and pull the cluster through the opening in the dashboard.

4 Tag and disconnect the wire harness from the dash cluster. Remove the dash cluster from the machine.

Fuel and Hydraulic Tanks

3-1
Fuel and Hydraulic Tanks

How to Remove the Fuel and Hydraulic Tank Assembly

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

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

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

1 Disconnect the battery from the machine.

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

FUEL TANK

2 Remove the access cover above the fuel tank and the access door above the filler cap.

3 Tag and disconnect the wire harness from the fuel level terminals.

4 Remove the filler cap from the fuel tank.

5 Using an approved hand-operated pump, drain the fuel tank into a container of suitable capacity. 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.

6 Tag, disconnect and plug the fuel supply and return hoses. Cap the fittings.

7 Remove the clamps holding the vent hose so the vent and hose can be removed with the tank.

8 Remove the fastener securing the fuel tank straps, unhook and remove. and remove the tank from the chassis.

HYDRAULIC TANK

Note: The fuel tank must be removed before removing the hydraulic tank.

9 Remove the access cover to the hydraulic tank.

10 Remove the filler cap from the hydraulic tank.

11 Place a drain pan or other suitable container under the hydraulic tank. Refer Specifications, *Machine Specifications*.

12 Remove the drain plug from the hydraulic tank and completely drain the tank.

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

13 Tag, disconnect and plug the supply and return hoses from the hydraulic tank. Cap the fittings.

14 Support and secure the tank assembly to an appropriate lifting device.

15 Remove the fasteners securing the tank assembly to the chassis. Remove the tank from the machine.

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

Engines

4-1 Engines

How to Repair the Deutz TD 2.9 L4 Engine

Maintenance procedures and additional engine information is available in the Deutz TD 2.9 Workshop Manual.

Deutz TD2.9 Workshop Manual	
Genie part number	218704

4-2 Engine Fault Codes

How to Retrieve Engine Fault Codes

When the engine Electronic Control Module (ECM) detects an abnormal operating condition, a fault code is immediately stored in the ECM memory. At the same time, a colored warning lamp is illuminated.

To view the fault code, push and hold the diagnostic button for 5 seconds. The fault code will be displayed on the screen, if present. If more than one code is present, quickly push the diagnostic button to cycle through the codes. Push and hold the diagnostic button for 5 seconds to return to the operation screen.

To learn the specifics of and how to use the fault codes, refer to, Fault Codes Section.

5-1
Transmission

How to Repair the Transmission

Repair procedures and additional transmission information is available in the Dana VDT12000 Service Manual.

Dana VDT12000 Service Manual	
Genie part number	218706

Hydraulic Pump

6-1
Hydraulic Pump

How to Test 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.*

⚠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.

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

2 Start the engine and fully retract the boom. Continue to hold the joystick in the boom retract position and observe the pressure gauge.

⊙ Result: If the pressure gauge reads 3200 psi / 220 bar, immediately stop. The pump is good.

☒ Result: If the pressure fails to reach 3200 psi / 220 bar, the pump needs to be adjusted OR or the pump or pump coupling is faulty and will need to be serviced or replaced.

NOTICE Component damage hazard. There is no relief valve in the hydraulic pump and the pump can be damaged if the pressure is allowed to exceed specification. When testing the pump, crank the engine in one second intervals until the correct pressure is confirmed. Do not over-pressurize the pump.

3 Remove the pressure gauge and install plug onto port TP. Torque to specification. Refer to Section Specifications, *Hydraulic 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.

How to Remove the Function Pump

⚠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 engine off and cool.

1 Open the engine cover.

2 Disconnect the battery from the machine.

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

3 Tag and disconnect the case drain hose at the top of the pump. Cap the fitting on the pump.

Note: Placing the open end of the case drain hose below the hydraulic oil level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not lower the open end of the case drain hose to below the fluid level of the hydraulic tank until the hose is plugged.

4 Tag, disconnect and plug the large hydraulic pump supply hose at the pump. Cap the fitting on the pump.

Note: Placing the open end of the pump supply hose below the fluid level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not lower the open end of the pump supply hose to below the fluid level of the hydraulic tank until the hose is plugged.

5 Tag, disconnect and plug the high pressure hose at the pump. Cap the fitting on 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.

6 Remove the fasteners securing the pump to the transmission. Remove the pump from the machine.

Hydraulic Pump

How to Install the Function Pump

1 Carefully install the hydraulic pump onto the transmission. Install the fasteners and tighten to finger tight.

2 Torque the fasteners evenly to 85 ft-lbs / 115 Nm.

3 Install the smaller high pressure hose onto the pump outlet. Torque the fasteners to 27-37 ft-lbs / 37-50 Nm.

4 Install the larger low pressure hose onto the pump outlet. Install the hose retaining rings and fasteners. Torque the fasteners to 55-66 ft-lbs / 74-90 Nm.

5 Working at the case drain at the top of the pump, fill the pump with hydraulic fluid until the fluid is at the top of the case drain fitting.

6 Install the case drain hose onto the pump and torque to specification. Refer to Specifications, *Hydraulic Specifications*.

7 Securely install the wire harness onto the pump.

8 Check the level of the hydraulic fluid in the hydraulic tank. Add fluid if needed.

9 Prime the pump. Refer to Repair Procedure, *How to Prime the Function Pump*.

10 Start the engine and inspect for leaks.

11 Turn the machine off.

12 Adjust the pump pressure. Refer to Repair Procedures, *How to Adjust the Function Pump Standby Pressure* and *How to Adjust the Function Pump Pressure Pressure Compensator*.

How to Prime 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 Install all hoses onto the hydraulic pump. Torque to specification. Refer to Specifications, *Hydraulic Hose and Fitting Torque Specifications*.

2 Locate the case drain filler plug at the side of the function pump.

3 Remove the plug and slowly fill the case drain port of the pump with hydraulic fluid until the oil level is even with the bottom of the hole. Install the plug and torque to 40 ft-lbs / 54 Nm.

4 Start the engine, allow the engine to run at low idle for 15 seconds then shut off the engine. Wait 15 seconds, then start the engine again. Allow the engine to run at low idle for 15 seconds and then shut off the engine.

5 Check for hydraulic leaks and clean up any oil that may have spilled.

How to Adjust the Function Pump Standby Pressure

1 Connect a 0 to 1000 psi / 0 to 100 bar pressure gauge to test port 'TP' on the primary function manifold. See 7-1 or 7-2, Primary Function Manifold Components.

2 Start the engine and allow the engine to run at low idle.

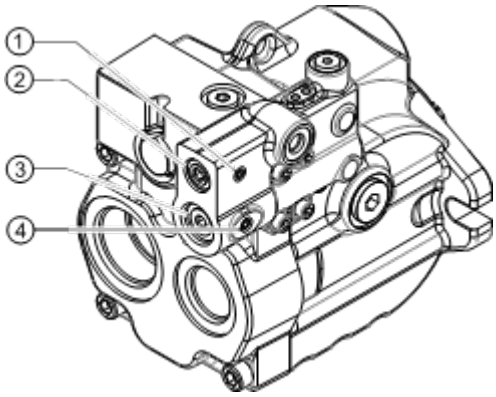
3 Observe the pressure reading on the pressure gauge.

⊙ Result: The pressure gauge reads 650 ±20 psi / 44.8 ±1.4 bar. The pump is functioning correctly. Proceed to step 6.

⊠ Result: The pressure gauge fails to read 650 ±20 psi / 44.8 ±1.4 bar. The pressure setting needs to be adjusted. Proceed to step 4.

4 Loosen the set screw for the standby pressure adjustment screw.

5 Adjust the function pump standby pressure. Turn the adjustment screw clockwise to increase the pressure or counterclockwise to decrease the pressure. Tighten the set screw.



1 Standby Pressure Adjustment set screw
2 Standby pressure adjustment
3 Pressure compensator adjustment
4 Pressure compensator adjustment set screw

6 Turn the engine off and remove the pressure gauge.

⚠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.

Hydraulic Pump

How to Adjust the Function Pump Standby Pressure

Note: Two people will be required to perform this procedure.

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to port 'M1' on the function pump.

2 Start the engine and allow the engine to run at low idle.

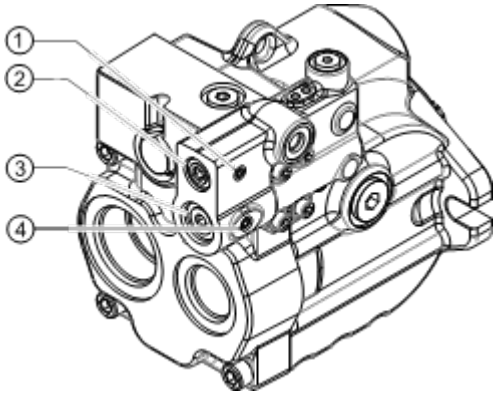
3 Fully retract the boom.

4 Continue to activate the boom retract function and observe the pressure reading on the pressure gauge.

⊙ Result: The pressure gauge reads 3200±150 psi / 220±10.3 bar. The pump is functioning correctly. Proceed to step 7.

⊠ Result: The pressure gauge fails to read 3200±150 psi / 220±10.3 bar. The pressure setting needs to be adjusted. Proceed to step 5.

5 Loosen the set screw for the pressure compensator adjustment screw.



1 Standby Pressure Adjustment set screw
2 Standby pressure adjustment
3 Pressure compensator adjustment
4 Pressure compensator adjustment set screw

6 Adjust the pressure compensator pressure. Turn the adjustment screw clockwise to increase the pressure or counterclockwise to decrease the pressure. Tighten the set screw.

NOTICE Component damage hazard. Do not adjust the pressure compensator higher than specified.

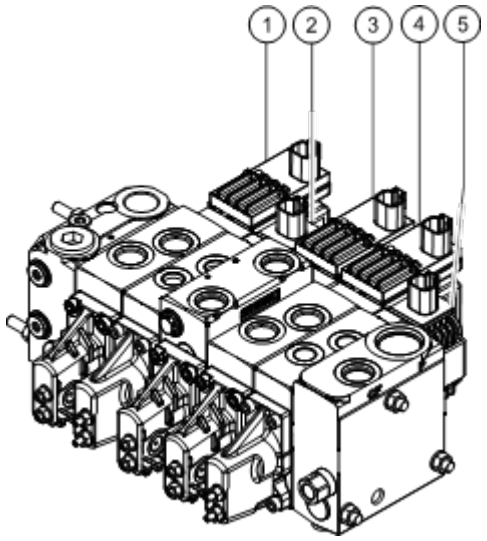
7 Turn the engine off and remove the pressure gauge.

⚠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.

7-1
PVG Manifold Components - Electronic Joystick

The PVG manifold is located under the manifold inspection cover.

Index No.	Description	Function
1	Assembly, lift	Controls boom up/down
2	Assembly, auxiliary	Controls auxiliary functions
3	Assembly, tilt	Fork tilt function
4	Assembly, extend/retract	Controls boom extend/retract
5	Assembly, sway	Controls sway function



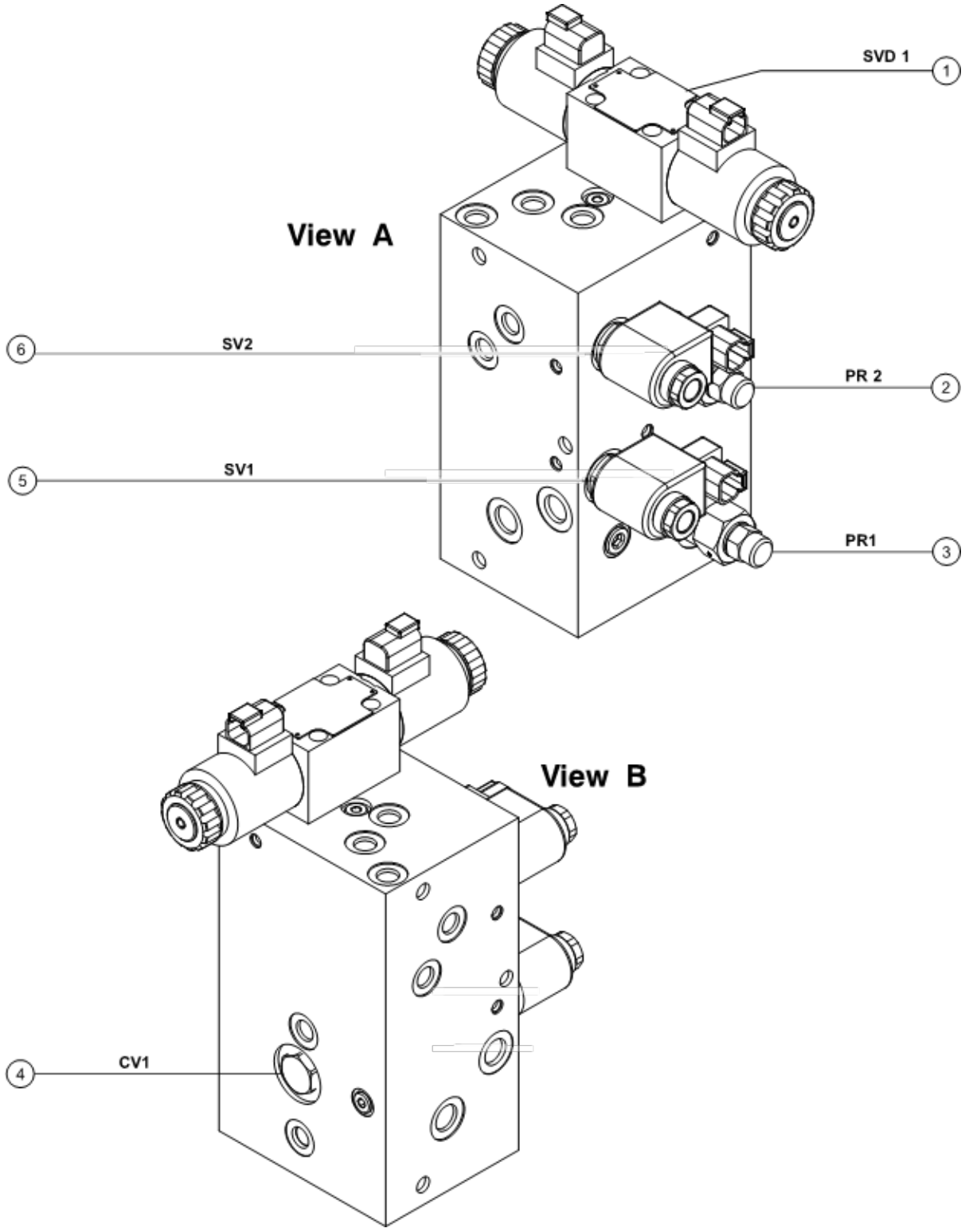
Manifolds

7-2
Secondary Function Manifold Components

The secondary function manifold is located under the manifold inspection cover.

Index No.	Description	Schematic Item	Function	Torque
1	DO3 valve, 3 position 4 way	SVD1	Steer left/right	60 in-lbs / 6.8 Nm
2	Pressure reducing/relief valve, 250 psi / 17 bar	PR2	Differential lock-up circuit	50 ft-lbs / 68 Nm
3	Pressure reducing/relief valve, 350 psi / 24.8 bar	PR1	Parking brake circuit	25-30 ft-lbs / 34-41 Nm
4	Check valve, 5 psi / 0.35 bar	CV1	Steering circuit	20 ft-lbs / 27.1 Nm
5	Solenoid valve, 2 position 3 way	SV1	Differential lock up select	19-21 ft-lbs / 25.8-28.6 Nm
6	Solenoid valve, 2 position 3 way	SV2	Rear lock up select	19-21 ft-lbs / 25.8-28.6 Nm

Manifolds

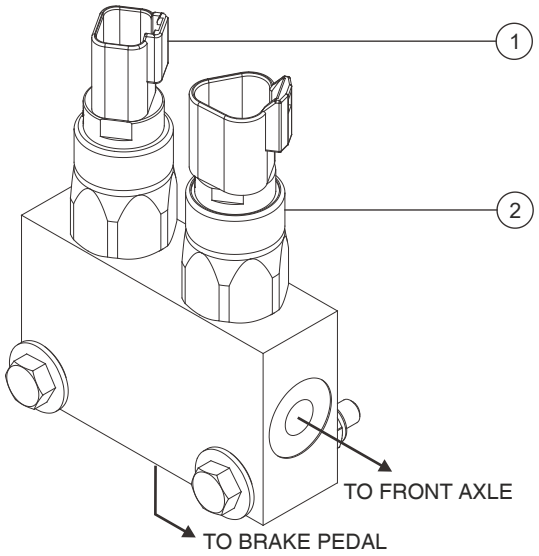


Manifolds

7-3
Brake Manifold Components

The auxiliary manifold is located under the transmission inspection cover.

Index No.	Description	Schematic Item	Function	Torque
1	Pressure switch, 450 psi / 31 bar	S6	Clutch cut-off pressure	11 ft-lbs / 14.9 Nm
2	Pressure switch, 50 psi / 3.4 bar	S16	Brake light pressure (option)	11 ft-lbs / 14.9 Nm



7-4
Valve Adjustments - Secondary Function Manifold

How to Set the Parking Brake System Pressure

Note: Be sure that the hydraulic oil level is visible in the inspection glass of the hydraulic tank.

1 Install a 0 to 1000 psi / 0 to 100 bar pressure gauge into test port 'TP' at the top of the primary function manifold, Refer to Primary Function Manifold Components.

2 Start the engine. Allow the engine to idle after warming the engine to operating temperature.

3 Without operating any machine controls, observe the reading on the pressure gauge.

⊙ Result: The pressure gauge reads 650 ±20 psi / 44.8 ±1.4 bar. The pump is functioning correctly.

⊠ Result: The pressure gauge fails to read 650 ±20 psi / 44.8 ±1.4 bar. The pressure setting needs to be adjusted. Refer to Repair Procedure, *How to Adjust the Function Pump Pressure*.

4 Turn the machine off. Remove the pressure gauge from the test port.

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

5 Install a 0 to 1000 psi / 0 to 100 bar pressure gauge into test port 'TPB' at the top of the secondary function manifold, Refer to Secondary Function Manifold Components.

6 Start the engine. Allow the engine to idle.

⊙ Result: The pressure gauge reads 350 psi / 24.1. The pressure setting is correct. Proceed to step 11.

⊠ Result: The pressure gauge fails to read 350 psi / 24.1. The pressure setting needs to be adjusted. Proceed to step 7.

7 Turn the machine off. Hold the brake pressure reducing/relief valve with a wrench and remove the cap (schematic item PR4).

8 Adjust the internal hex socket. Turn it clockwise to increase the pressure or counterclockwise to decrease the pressure.

NOTICE Component damage hazard. Do not adjust the relief valve pressures higher than specifications.

9 Install the relief valve cap.

10 Repeat this procedure beginning with step 6.

11 Turn the machine off. Remove the pressure gauge from the test port.

⚠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.

Manifolds

7-5 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 that provides this force field.

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.

⊙ 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 Specification

Note: The following coil resistance specifications are at an ambient temperature of 68°F / 20°C. As valve coil resistance is sensitive to changes in air temperature, the coil resistance will typically increase or decrease by 4% for each 18°F / 10°C that your air temperature increases or decreases from 68°F / 20°C.

Valve Coil Resistance Specification

Description	Specification
DO3 valve, 3 position 4 way 12V DC with diode (schematic items SVD1)	5.6Ω
Solenoid valve, 2 position 2 way 12V DC with diode (schematic items SV9)	8.8Ω
Solenoid valve, 2 position 3 way 12V DC with diode (schematic items SV5, SV7, SV6)	8.8Ω
Solenoid valve, 2 position 4 way 12V DC with diode (schematic items SV1, SV2, SV3, SV4)	8.8Ω

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.

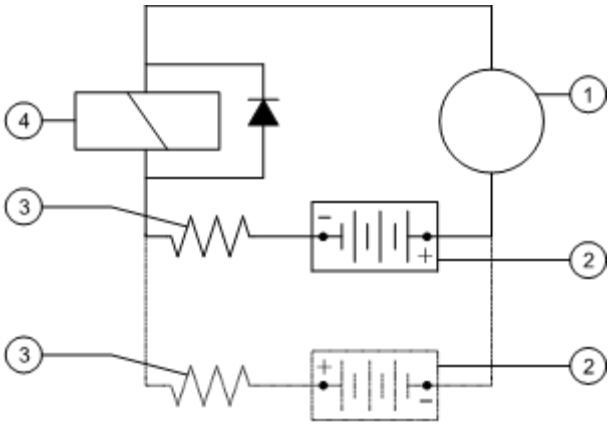
1 Test the coil for resistance. Refer to Repair Procedure, *How to Test a Coil*.

2 Connect a 10W 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.

Axle

8-1 Axles

How to Remove the Axle

⚠ 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.

1 Chock the wheels.

2 Remove the fasteners securing the driveshaft to the transmission. Lower the end of the driveshaft to the ground.

3 Remove the fasteners securing the driveshaft to the axle. remove the driveshaft from the machine.

4 Tag and remove the hydraulic hoses from the axle.

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

5 Loosen the lug nuts of both wheels on the axle to be removed. Do not remove the lug nuts.

6 Raise the end of the machine until the tires are off the ground. Place blocks under the chassis for support.

⚠ DANGER Crushing hazard. The chassis will fall if not properly supported.

7 Remove the lug nuts. Remove the tire and wheel assembly from both ends of the axle.

8 Support and secure the axle to an appropriate lifting device.

9 Remove the fasteners securing the sway cylinder rod-end pivot pin to the chassis.

10 Use a soft metal drift to remove the pivot pin.

11 Remove the fasteners securing the axle to the chassis. Remove the axle from the machine.

⚠ DANGER Crushing hazard. The axle will fall if not properly supported when the fasteners are removed from the machine.

Bolt torque specification	
Axle mounting bolts	380 ft-lbs 515 Nm

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
  - Boom in the stowed position
  - Key switch in the off position with the key removed
  - Wheels chocked

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.

Diagnostic Display

When the engine Electronic Control Module (ECM) detects an abnormal operating condition, a fault code is immediately stored in the ECM memory.

The fault code is displayed on the LCD display which is located on the gauge cluster in the operator's compartment.

The gauge cluster also includes two warning lights.

They are an amber colored light which signals an abnormal engine condition which should be corrected as soon as possible and a red colored light which signals an engine condition which requires the operator to shut down the engine as soon as possible.

The ECM will, in some cases, automatically shut down the engine when the red light is displayed.

Active Fault Codes

Active Fault Codes will be displayed on the gauge cluster when the diagnostic button is pressed for 5 seconds, if present. If multiple fault codes are detected, scroll through them using the diagnostic button.

Active Codes vs Stored Codes

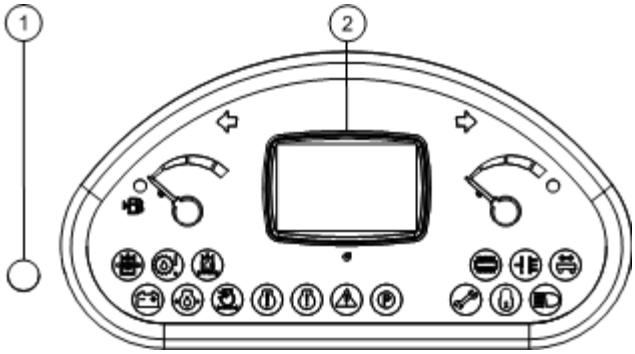
Active fault codes, indicating an engine condition or conditions which have not been corrected, are displayed at the moment the fault is detected.

Stored fault codes are the cumulative history of fault codes which the ECM has detected. These fault codes may be recalled by service personnel at a later time even if the condition which caused the engine fault has ceased to exist.

Note: Additional hardware will be necessary to access stored codes.

Decoding Fault Codes

The Suspect Parameter Number (SPN) and the Failure Mode Identifier (FMI), when combined, are the basis for an engine fault code. The SPN number indicates the affected component; the FMI number reveals the type of failure that has occurred. Comparing the combination of numbers to the fault code chart on the following pages will help to determine the exact engine fault and a corrective course of action. For additional information, refer to the engine operator's manual which came with your machine.



1 Diagnostic button
2 LCD screen

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
51	3	EGR-Valve, short circuit to battery
51	3	Position sensor error of actuator EGR-Valve; signal range check high
51	3	EGR-Valve; short circuit to battery (A02)
51	3	EGR-Valve; short circuit to battery (A67)
51	4	EGR-Valve; short circuit to ground
51	4	Position sensor error actuator EGR-Valve; signal range check low
51	4	EGR-Valve; short circuit to ground (A02)
51	4	EGR-Valve; short circuit to ground (A67)
1	4	Actuator error EGR-Valve; Voltage below threshold
51	5	Actuator error EGR-Valve; signal range check low
51	5	Actuator EGR-Valve; open load
51	5	Actuator error EGR-Valve; signal range check low
51	5	Actuator EGR-Valve; open load
51	6	Actuator error EGR-Valve; signal range check high
51	6	Actuator error EGR-Valve; signal range check high
51	6	Actuator EGR-Valve; over current
51	6	Actuator error EGR-Valve; Overload by short-circuit
51	7	Actuator position for EGR-Valve not plausible
51	11	Actuator error EGR-Valve; Power stage over temp due to high current
51	12	Actuator EGR-Valve; powerstage over temperature
51	12	Mechanical actuator defect EGR-Valve
51	12	Actuator EGR-Valve; over temperature
94	1	Low fuel pressure; warning threshold exceeded
94	1	Low fuel pressure; shut off threshold exceeded
94	3	Sensor error low fuel pressure; signal range check high
94	4	Sensor error low fuel pressure; signal range check low
97	3	Sensor error water in fuel; signal range check high
97	4	Sensor error water in fuel; signal range check low
97	12	Water in fuel level prefilter; maximum value exceeded

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
100	0	High oil pressure; warning threshold exceeded
100	0	High oil pressure; shut off threshold exceeded
100	1	Low oil pressure; warning threshold exceeded
100	1	Low oil pressure; shut off threshold exceeded
100	3	Sensor error oil pressure; signal range check high
100	4	Sensor error oil pressure sensor; signal range check low
102	2	Charged air pressure above warning threshold
102	2	Charged air pressure above shut off threshold
102	4	Sensor error charged air press.; signal range check low
105	0	High charged air cooler temperature; warning threshold exceeded
105	0	High charged air cooler temperature; shut off threshold exceeded
105	3	Sensor error charged air temperature; signal range check high
105	4	Sensor error charged air temperature; signal range check low
108	3	Sensor error ambient air press.; signal range check high
108	4	Sensor error ambient air press.; signal range check low
110	0	High coolant temperature; warning threshold exceeded
110	0	High coolant temperature; shut off threshold exceeded
110	3	Sensor error coolant temp.; signal range check high
110	4	Sensor error coolant temp.; signal range check low
111	1	Coolant level too low
132	11	Air flow sensor load correction factor exceeding the maximum drift limit; plausibility error
132	11	Air flow sensor load correction factor exceeding drift limit; plausibility error
132	11	Air flow sensor low idle correction factor exceeding the maximum drift limit
132	11	Air flow sensor load correction factor exceeding the maximum drift limit
157	3	Sesnor error rail pressure; signal range check high
157	4	Sensor error rail pressure; signal range check low

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
168	0	Physical range check high for battery voltage
168	1	Physical range check low for battery voltage
168	2	High battery voltage; warning threshold exceeded
168	2	Low battery voltage; warning threshold exceeded
168	3	Sensor error battery voltage; signal range check high
168	4	Sensor error battery voltage; signal range check low
171	3	Sensor error environment temperature; signal range check high
171	4	Sensor error environment temperature; signal range check low
172	0	Physical range check high for intake air temperature
172	1	Physical range check low for intake air temperature
172	2	Sensor ambient air temperature; plausibility error
172	2	Intake air sensor; plausibility error
172	3	Sensor error intake air; signal range check high
172	4	Sensor error intake air sensor; signal range check low
174	0	High low fuel temperature; warning threshold exceeded
174	0	High Low fuel temperature; shut off threshold exceeded
175	0	Physical range check high for oil temperature
175	0	High oil temperature; warning threshold exceeded
175	0	High oil temperature; shut off threshold exceeded
175	1	Physical range check low for oil temperature
175	2	Sensor oil temperature; plausibility error
175	2	Sensor oil temperature; plausibility error oil temperature too high
175	3	Sensor error oil temperature; signal range check high
175	4	Sensor error oil temperature; signal range check low
190	0	Engine speed above warning threshold (FOC-Level 1)
190	2	Offset angle between crank- and camshaft sensor is too large
190	8	Sensor camshaft speed; disturbed signal

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
190	8	Sensor crankshaft speed; disturbed signal
190	11	Engine speed above warning threshold (FOC-Level 2)
190	12	Sensor camshaft speed; no signal
190	12	Sensor crankshaft speed; no signal
190	14	Engine speed above warning threshold (Overrun Mode)
190	14	Camshaft- and Crankshaft speed sensor signal not available on CAN
411	0	Physical range check high for differential pressure Venturiunit (EGR)
411	1	Physical range check low for differential pressure Venturiunit (EGR)
411	3	Sensor error differential pressure Venturiunit (EGR); signal range check high
411	4	Physical range check low for EGR differential pressure
411	4	Sensor error differential pressure Venturiunit (EGR); signal range check low
412	3	Sensor error EGR cooler downstream temperature; signal range check high
412	4	Sensor error EGR cooler downstream temperature; signal range check low
520	9	Timeout Error of CAN-Receive-Frame TSC1TR; Setpoint
597	2	Break lever mainswitch and break lever redundancy switch status not plausible
624	3	SVS lamp; short circuit to batt.
624	4	SVS lamp; short circuit to grd.
624	5	SVS lamp; open load
624	12	SVS lamp; powerstage over temperature
630	12	Access error EEPROM memory (delete)
630	12	Access error EEPROM memory (read)
630	12	Access error EEPROM memory (write)
639	14	CAN-Bus 0 "BusOff-Status"
651	3	Injector 1 (in firing order); short circuit
651	4	High side to low side short circuit in the injector 1 (in firing order)

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
651	5	Injector 1 (in firing order); interruption of electric connection
652	3	Injector 2 (in firing order); short circuit
652	4	High side to low side short circuit in the injector 2 (in firing order)
652	5	Injector 2 (in firing order); interruption of electric connection
653	3	Injector 3 (in firing order); short circuit
653	4	High side to low side short circuit in the injector 3 (in firing order)
653	5	Injector 3 (in firing order); interruption of electric connection
654	3	Injector 4 (in firing order); short circuit
654	4	High side to low side short circuit in the injector 4 (in firing order)
654	5	Injector 4 (in firing order); interruption of electric connection
676	11	Cold start aid relay error.
676	11	Cold start aid relay open load
677	3	Starter relay high side; short circuit to battery
677	3	Starter relay low side; short circuit to battery
677	4	Starter relay high side; short circuit to ground
677	4	Starter relay low side; short circuit to ground
677	5	Starter relay; no load error
677	12	Starter relay; powerstage over temperature
703	3	Engine running lamp; short circuit to battery
703	4	Engine running lamp; short circuit to ground
703	5	Engine running lamp; open load
703	12	Engine running lamp; powerstage over temperature
729	5	Cold start aid relay open load
729	12	Cold start aid relay; over temperature error
898	9	Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
1079	13	Sensor supply voltage monitor 1 error (ECU)
1080	13	Sensor supply voltage monitor 2 error (ECU)

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
1109	2	Engine shut off demand ignored
1136	0	Physikal range check high for ECU temperature
1136	1	Physikal range check low for ECU temperature
1136	3	Sensor error ECU temperature; signal range check high
1136	4	Sensor error ECU temperature; signal range check low
1176	3	Sensor error pressure sensor upstream turbine; signal range check high
1176	4	Sensor error pressure sensor downstream turbine; signal range check high
1180	0	Physical range check high for exhaust gas temperature upstream turbine
1180	0	Turbocharger Wastegate CAN feedback; warning threshold exceeded
1180	0	Exhaust gas temperature upstream turbine; warning threshold exceeded
1180	1	Physical range check low for exhaust gas temperature upstream turbine
1180	1	Turbocharger Wastegate CAN feedback; shut off threshold exceeded
1180	1	Exhaust gas temperature upstream turbine; shut off threshold exceeded
1180	3	Sensor error exhaust gas temperature upstream turbine; signal range check high
1180	11	Sensor exhaust gas temperature upstream turbine; plausibility error
1188	2	Wastegate; status message from ECU missing
1188	7	Wastegate actuator; blocked
1188	11	Wastegate actuator; internal error
1188	11	Wastegate actuator; EOL calibration not performed correctly
1188	11	Wastegate actuator; over temperature (> 145øC)
1188	11	Wastegate actuator; over temperature (> 135øC)
1188	11	Wastegate actuator; operating voltage error
1188	13	Wastegate actuator calibration deviation too large, recalibration required
1231	14	CAN-Bus 1 "BusOff-Status"
1235	14	CAN-Bus 2 "BusOff-Status"

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
1237	2	Override switch; plausibility error
1322	12	Too many recognized misfires in more than one cylinder
1323	12	Too many recognized misfires in cylinder 1 (in firing order)
1324	12	Too many recognized misfires in cylinder 2 (in firing order)
1325	12	Too many recognized misfires in cylinder 3 (in firing order)
1326	12	Too many recognized misfires in cylinder 4 (in firing order)
2659	0	Physical range check high for EGR exhaust gas mass flow
2659	1	Physical range check low for EGR exhaust gas mass flow
2659	2	Exhaust gas recirculation AGS sensor; plausibility error
2659	2	AGS sensor temperature exhaust gas mass flow; plausibility error
2659	12	Exhaust gas recirculation; AGS sensor has "burn off" not performed
2797	4	Injector diagnostics; timeout error of short circuit to ground measurement cyl. Bank 0
2798	4	Injector diagnostics; timeout error of short circuit to ground measurement cyl. Bank 1
2798	4	Injector diagnostics; short circuit to ground monitoring Test in Cyl. Bank 0
2798	4	Injector diagnostics; short circuit to ground monitoring Test in Cyl. Bank 1
3224	2	DLC Error of CAN-Receive-Frame AT1IG1 NOX Sensor (SCR-system upstream cat; DPF-system downstream cat); length of frame incorrect
3224	9	Timeout Error of CAN-Receive-Frame AT1IG1; NOX sensor upstream
3248	4	Sensor error particle filter downstream temperature; signal range check low
3699	2	DPF differential pressure sensor and a further sensor or actuator CRT system defective
3699	2	Temperature sensor us. and ds. DOC simultaneously defect
3699	14	Maximum stand-still-duration reached; oil exchange required
4765	0	Physical range check high for exhaust gas temperature upstream (DOC)
4765	1	Physical range check low for exhaust gas temperature upstream (DOC)

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
4766	0	Physical range check high for exhaust gas temperature downstream (DOC)
4766	1	Physical range check low for exhaust gas temperature downstream (DOC)
4768	2	Sensor exhaust gas temperature upstream (DOC); plausibility error
4768	3	Sensor error exhaust gas temperature upstream (DOC); signal range check high
4768	4	Sensor error exhaust gas temperature upstream (DOC) signal range check low
4769	2	Sensor exhaust gas temperature downstream (DOC); plausibility error
4769	3	Sensor error exhaust gas temperature downstream (DOC); signal range check high
4769	4	Sensor error exhaust gas temperature downstream (DOC); signal range check low
23006	3	Controller mode switch; short circuit to battery
23006	4	Controller mode switch; short circuit to ground
23008	1	Manipulation control was triggered
23008	2	Timeout error in Manipulation control
23009	9	Pressure Relief Valve (PRV) reached maximun allowed opening count
23009	10	Pressure relief valve (PRV) reached maximun allowed open time
23212	9	Timeout Error of CAN-Receive-Frame ComEngPrt; Engine Protection
23216	9	Timeout Error of CAN-Receive-Frame PrHtEnCmd; pre-heat command, engine command
23240	9	Timeout CAN-message FunModCtl; Function Mode Control
23350	4	Injector cylinder-bank 1; short circuit
23352	4	Injector cylinder-bank 2; short circuit
23354	12	Injector powerstage output defect
23470	2	Pressure Relief Valve (PRV) forced to open; performed by pressure increase
23470	2	Pressure Relief Valve (PRV) forced to open; performed by pressure shock

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
23470	7	Maximum rail pressure in limp home mode exceeded (PRV)
23470	11	The PRV can not be opened at this operating point with a pressure shock
23470	11	Rail pressure out of tolerance range
23470	12	Open Pressure Relief Valve (PRV); shut off condition
23470	12	Open Pressure Relief Valve (PRV); warning condition
23470	14	Pressure Relief Valve (PRV) is open
23550	12	T50 start switch active for too long
23601	13	Sensor supply voltage monitor 3 error (ECU)
23603	9	Timeout Error of CAN-Receive-Frame AMB; Ambient Temperature Sensor
23605	9	Timeout Error of CAN-Receive-Frame TSC1AE; Traction Control
23606	9	Timeout Error of CAN-Receive-Frame TSC1AR; Retarder
23612	12	Internal software error ECU; injection cut off
23612	12	Internal ECU monitoring detection reported error
23612	12	Internal ECU monitoring detection reported error
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Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
23612	12	Internal ECU monitoring detection reported error
23612	12	Internal software error ECU
23612	14	Softwarereset CPU SWReset_0
23612	14	Softwarereset CPU SWReset_1
23612	14	Softwarereset CPU SWReset_2
23613	0	Maximum positive deviation of rail pressure exceeded (RailMeUn0)
23613	0	Maximum positive deviation of rail pressure in metering unit exceeded (RailMeUn1)
23613	0	Railsystem leakage detected (RailMeUn10)
23613	0	Maximum negative deviation of rail pressure in metering unit exceeded (RailMeUn2)
23613	0	Negative deviation of rail pressure second stage (RailMeUn22)
23613	0	Maximum rail pressure exceeded (RailMeUn4)
23613	1	Minimum rail pressure exceeded (RailMeUn3)
23613	2	Setpoint of metering unit in overrun mode not plausible
23615	3	Metering unit (Fuel-System); short circuit to battery highside
23615	3	Metering unit (Fuel-System); short circuit to battery low side
23615	4	Metering unit (Fuel-System); short circuit to ground high side
23615	4	Metering Unit (Fuel-System); short circuit to ground low side
23615	5	Metering unit (Fuel-System); open load
23615	12	Metering unit (Fuel-System); powerstage over temperature
23619	2	Physical range check high for exhaust gas temperature upstrem (SCR-CAT)
23698	11	Shut off request from supervisory monitoring function
23717	12	Timeout Error of CAN-Transmit-Frame AmbCon; Weather environments
23718	3	SCR mainrelay; short circuit to battery (only CV56B)
23718	4	SCR mainrelay; short circuit to ground (only CV56B)
23718	5	SCR mainrelay; open load (only CV56B)
23718	12	SCR mainrelay; powerstage over temperature (only CV56B)
23766	9	Timeout Error of CAN-Receive-Frame Active TSC1AE
23767	9	Timeout Error of CAN-Receive-Frame Passive TSC1AE

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
23768	9	Timeout Error of CAN-Receive-Frame Active TSC1AR
23769	9	Timeout Error of CAN-Receive-Frame Passive TSC1AR
23770	9	Timeout Error of CAN-Receive-Frame Passive TSC1DE
23776	9	Timeout Error of CAN-Receive-Frame TSC1TE - active
23777	9	Passive Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
23778	9	Active Timeout Errorof CAN-Receive-Frame TSC1TR
23779	9	Passive Timeout Error of CAN-Receive-Frame TSC1TR
23788	12	Timeout Error of CAN-Transmit-Frame TrbCH; Status Wastegate
23793	9	Timeout Error of CAN-Receive-Frame UAA10; AGS sensor service message
23794	9	Timeout Error of CAN-Receive-Frame UAA11; AGS sensor data
23895	13	Check of missing injector adjustment value programming (IMA) injector 1 (in firing order)
23896	13	check of missing injector adjustment value programming (IMA) injector 2 (in firing order)
23897	13	check of missing injector adjustment value programming (IMA) injector 3 (in firing order)
23898	13	check of missing injector adjustment value programming (IMA) injector 4 (in firing order)
23910	6	Air Pump; over current
23913	3	Sensor error glow plug control diagnostic line voltage; signal range check high
23913	4	Sensor error glow plug control diagnostic line voltage; signal range check low
23914	3	Glow plug control; short circuit to battery
23914	4	Glow plug control; short circuit to ground
23914	5	Glow plug control; open load
23914	5	Glow plug control release line; short circuit error
23914	11	Glow plug control; internal error
23914	12	Glow plug control; powerstage over temperature
23919	2	Sensor air pump airpressure; plausibility error
23920	2	Sensor exhaust gas back pressure burner; plausibility error

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
23922	7	Burner Shut Off Valve; blocked closed
23922	7	Burner Shut Off Valve; blocked closed
23929	0	Fuel Balance Control integrator injector 1 (in firing order); maximum value exceeded
23929	1	Fuel Balance Control integrator injector 1 (in firing order); minimum value exceeded
23930	0	Fuel Balance Control integrator injector 2 (in firing order); maximum value exceeded
23930	1	Fuel Balance Control integrator injector 2 (in firing order); minimum value exceeded
23931	0	Fuel Balance Control integrator injector 3 (in firing order); maximum value exceeded
23931	1	Fuel Balance Control integrator injector 3 (in firing order); minimum value exceeded
23932	0	Fuel Balance Control integrator injector 4 (in firing order); maximum value exceeded
23932	1	Fuel Balance Control integrator injector 4 (in firing order); minimum value exceeded
23935	12	Timeout Error of CAN-Transmit-Frame EEC3VOL1; Engine send messages
23936	12	Timeout Error of CAN-Transmit-Frame EEC3VOL2; Engine send messages
23946	0	Zerofuel calibration injector 1 (in firing order); maximum value exceeded
23946	1	Zerofuel calibration injector 1 (in firing order); minimum value exceeded
23947	0	Zerofuel calibration injector 2 (in firing order); maximum value exceeded
23947	1	Zerofuel calibration injector 2 (in firing order); minimum value exceeded
23948	0	Zerofuel calibration injector 3 (in firing order); maximum value exceeded
23948	1	Zerofuel calibration injector 3 (in firing order); minimum value exceeded
23949	0	Zerofuel calibration injector 4 (in firing order); maximum value exceeded
23949	1	Zerofuel calibration injector 4 (in firing order); minimum value exceeded
23960	0	Physical range check high for EGR cooler downstream temp.

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
23960	0	High exhaust gas temperature EGR cooler downstream; warning threshold exceeded
23960	1	Physical range check low for EGR cooler downstream temp.
23960	1	High exhaust gas temperature EGR cooler downstream; shut off threshold exceeded
23980	14	Bad quality of reduction agent detected
23981	11	Urea-tank without heating function (heating phase)
23982	0	Powerstage diagnosis disabled; high battery voltage
23982	1	Powerstage diagnosis disabled; low battery voltage
23988	3	Charging lamp; short circuit to battery
23988	4	Charging lamp; short circuit to ground
23988	5	Charging lamp; open load
23988	12	Charging lamp; over temp.
23998	4	Injector cylinder bank 2 slave; short circuit
23999	12	Injector powerstage output Slave defect
24014	1	Air pressure glow plug flush line; below limit
24016	2	Amount of air is not plausible to pump speed
24016	2	Calculated amount of air is not plausible to HFM reading
24016	11	HFM sensor; electrical fault
24021	11	Burner fuel line pipe leak behind Shut Off Valve
24024	11	Deviation of the exhaust gas temp. setpoint to actual value downstream (DOC) too high
24028	2	CAN message PROEGRActr; plausibility error
24029	2	Timeout Error of CAN-Receive-Frame ComEGRActr - exhaust gas recirculation positioner
24030	7	EGR actuator; internal error
24031	13	EGR actuator; calibration error
24032	2	EGR actuator; status message EGRCust is missing
24033	7	EGR actuator; due to overload in Save Mode
24034	3	Disc separator; short circuit to battery
24034	4	Disc separator; short circuit to ground
24034	5	Disc Separator; open load
24034	12	Disc Separator; powerstage over temperature

Diagnostic Display

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
24035	12	Injector diagnostics; time out error in the SPI communication
24057	2	Electric fuel pump; fuel pressure build up error
24097	9	Timeout error of CAN-Transmit-Frame DPFBrnAirPmpCtl
24098	9	Timeout error of CAN-Transmit-Frame ComDPFBrnPT
24099	9	Timeout error of CAN-Transmit-Frame ComDPFC1
24100	9	Timeout error of CAN-Transmit-Frame ComDPFHisDat
24101	9	Timeout error of CAN-Transmit-Frame ComDPFTstMon
24102	9	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmpCtl
24103	9	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmp
24104	9	Timeout error of CAN-Receive-Frame ComRxDPFCtl
24105	9	Timeout error of CAN-Transmit-Frame ComEGRMsFlw
24106	9	Timeout error of CAN-Receive-Frame ComRxEGRMsFlw1
24107	9	Timeout error of CAN-Receive-Frame ComRxEGRMsFlw2
24108	9	Timeout error of CAN-Transmit-Frame ComEGRTVActr
24109	9	Timeout error of CAN-Receive-Frame ComRxEGRTVActr
24110	9	Timeout error of CAN-Transmit-Frame ComETVActr
24111	9	Timeout error of CAN-Receive-Frame ComRxETVActr
24112	9	Timeout ComITVActr
24113	9	Timeout error of CAN-Receive-Frame ComRxITVActr
24114	9	Timeout error of CAN-Transmit-Frame A1DOC
24115	9	Timeout error of CAN-Transmit-Frame AT1S
24116	9	Timeout error of CAN-Transmit-Frame SCR2
24117	9	Timeout error of CAN-Transmit-Frame SCR3
24118	9	Timeout error of CAN-Receive-Frame ComRxCM1
24119	9	Timeout error of CAN-Receive-Frame ComRxCustSCR3
24120	9	Timeout error of CAN-Receive-Frame ComRxSCRHtDiag
24121	9	Timeout error of CAN-Receive-Frame ComRxTrbChActr
24122	9	Timeout error of CAN-Receive-Frame ComRxUQSens
24123	9	Timeout error of CAN-Receive-Frame ComSCRHtCtl
24124	9	Timeout error of CAN-Receive-Frame ComTxAT1IMG
24125	9	Timeout error of CAN-Receive-Frame ComTxTrbChActr

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.

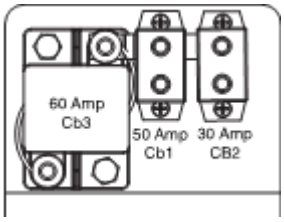
Electrical Schematics

⚠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.

Fuse Panel Layout

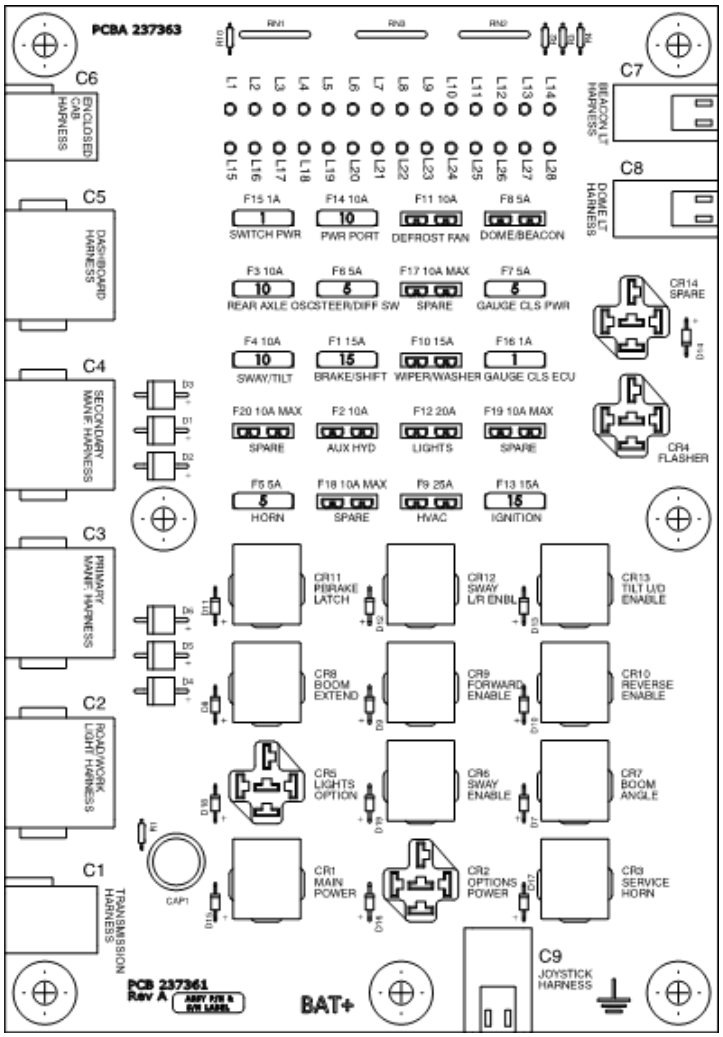


Circuit Breakers located on the Battery Tray

CB1- Telehandler Control System Power

CB2- Engine Power / ECM

CB3- Glow Plugs



Fuse Board located in the Cab

Electrical Component & Wire Color Abbreviation Legend

Item	Description
ALT	**Alternator**
B	**Battery**
B1	Main Battery, 12V
CB	**Circuit Breaker**
CB1	ECS Power, 50 Amp
CB2	Engine ECU Power, 30 Amp
CB3	Engine Glow Plugs, 60 Amp
C	**Capacitor**
C1	4700 uf
CR	**Control Relay**
CR1	Main Power
CR2	Options Power
CR3	Service Horn
CR4	Flasher
CR5	Lights Option
CR6	Sway Enable
CR7	Boom Angle
CR9	Forward Enable
CR10	Reverse Enable
CR11	Parking Brake Latch
CR12	Sway Left/Right Enable
CR13	Tilt Up/Down Enable
CR16	Condenser Fans
CR18	Telematics

Item	Description
D	**Diode**
EMS	**Engine Management System**
F	**Fuse**
F1	15 Amp - Parking Brake Switch
F2	10 Amp - Stabilizer Power
F3	10 Amp – Sway/Drive Enable
F4	10 Amp – Joystick Power
F5	5 Amp - Service Horn
F6	5 Amp - Steer/Differential Switch
F7	5 Amp - Gauge Cluster Power
F8	5 Amp - Dome/Beacon Light
F9	25 Amp – HVAC
F10	15 Amp – Windshield Wiper/Washer
F11	10 Amp – Defrost Fan
F12	20 Amp – Lights
F13	15 Amp – Ignition
F14	10 Amp – Power Port
F15	1 Amp - Sensor / Switch Power
F16	1 Amp – Gauge Cluster ECU
F17	Not Used
F18	Not Used
F19	5 Amp - Telematics
F21	15 Amp - Condenser Fan 1
F23	15 Amp - Condenser Fan 2

Electrical Component & Wire Color Abbreviation Legend

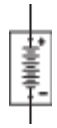
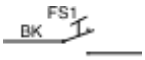
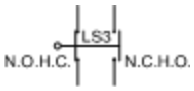
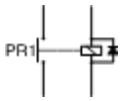
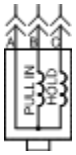
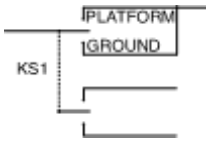
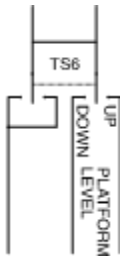
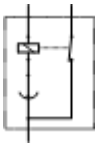
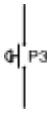
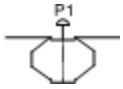
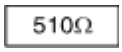
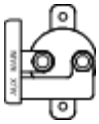
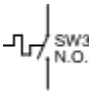
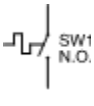
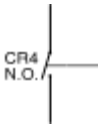
Item	Description
L	**LED Light**
L1	Ignition Power ON
L2	Options Power Relay ON
L3	Horn Relay ON
L4	Blinkers / Pilot Light ON
L5	Road Lights, Work Lights ON
L6	Sway Enable Coil Power ON
L7	Boom angle
L9	Brake Pressure ON
L10	Reverse ON
L11	Parking Brake Latch ON
L12	Sway Enable ON
L13	Tilt Circuit Power ON
L14	Horn Power ON
L15	Cab, Tail Light Power ON
L16	Rear Axle Float Coil Power ON
L18	Parking Brake Power ON
L19	Forward Coil Power ON
L20	Reverse Coil Power ON
L21	PB Release Coil Power ON
L22	Sway L/R Enable Coil Power ON
L23	Tilt U/D Enable Coil Power ON
L24	Forward Shift ON
L25	Parking Brake Release OFF
L26	Brake Light Power ON
L27	Hazard Power ON
L28	Not Used
M	**Motor**
R	**Resistor**

Item	Description
S	**Switch**
S1	Key Start Switch
S2	Parking Brake Switch
S5	Parking Brake Pressure Switch
S6	Service Brake Pressure Switch
S10	Steer Select Switch
S15	Horn Switch
S16	Brake Light Pressure Switch
S17	Windshield Wiper Motor Switch
S17	Windshield Washer Switch
S18	Skylight Wiper Motor Switch
S18	Skylight Washer Switch
S19	Dome Light Switch
S21	Defroster Fan Switch
S22	Road / Work Light Switch
S23	Brake Pressure Warning Switch
S24	Transmission Oil Pressure Switch
S25	Transmission Oil Temp. Switch
S26	Boom Light Switch
TP	**Throttle Pedal**
TSS	**Turn Signal Shifter**

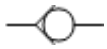
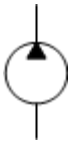
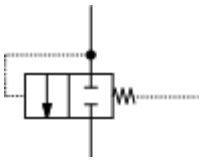
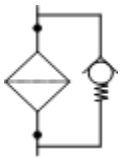
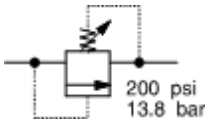
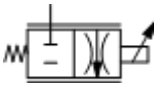
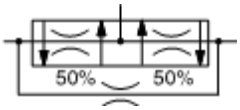
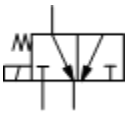
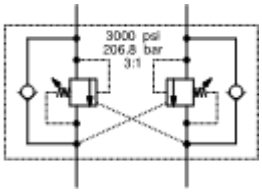
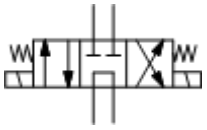
Electrical Component & Wire Color Abbreviation Legend

Wire Color Legend	
BL	Blue
BL/BK	Blue/Black
BL/RD	Blue/Red
BL/WH	Blue/White
BK	Black
BK/RD	Black/Red
BK/WH	Black/White
BK/YL	Black/Yellow
BR	Brown
GR	Green
GR/BK	Green/Black
GR/WH	Green/White
RD	Red
RD/BK	Red/Black
RD/WH	Red/White
OR	Orange
OR/BK	Orange/Black
OR/RD	Orange/Red
WH	White
WH/BK	White/Black
WH/RD	White/Red
YL	Yellow
OR/WH	Orange/White

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

Harness Map Legend

Base Harnesses (included In all models)

Item	Description
1	Harness, Dashboard
2	Harness, Secondary Manifold
4	Harness, Transmission
5	Harness, Boom Angle Switch
6	Harness, Throttle Pedal
8	Harness, Backup Alarm
9	Assembly, Power Buss
11	Harness, PCB Ground
12	Harness, CAN Interface Jumper
13	Harness, Primary PVG

Engine Options Harnesses

Item	Description
14	Harness, Engine ECU, TCD3.6 T4F
15	Harness, Engine Base, TCD3.6 T4F
16	Cable, Battery, Red 2/0
17	Harness, Engine TCU, TDC3.6
18	Harness, Engine, TCD3.6
19	Cable, Battery, Red 2/0
20	Harness, Engine, 854E
21	Cable, Battery, Black 2/0
23	Cable, Battery, Red 2/0
24	Harness, Engine, 1104D
25	Harness, Diagnostic Plug Ext.
26	Harness, T4F User Interface
28	Harness, Connector Ext.
29	Harness, Connector Ext. T3

Beacon Light Option Harnesses

Item	Description
47	Harness, Beacon Light
48	Harness, Power, Beacon Light

3rd Gear Lockout Option Harness

Item	Description
49	Harness, 3rd Gear Bypass

Work Light Option Harnesses

Item	Description
30	Harness, Light, Led, Clear, 5" Round
31	Harness Cab Light Power
33	Harness, Backup Light
34	Harness, Boom Light Power
39	Harness, Work Lights

Road Light Option Harnesses

Item	Description
30	Harness, Light, Led, Clear, 5" Round
31	Harness, Cab Light Power
32	Harness, Taillight LED
33	Harness, Backup Light
34	Harness, Boom Light Power
35	Harness, Road Lights
36	Harness, Front Lights Power
37	Harness,light,drive,clear,3led
38	Harness, Light, Turn Signal, Amber

Enclosed Cab With HVAC Option Harnesses

Item	Description
40	Harness, Enclosed Cab
41	Harness, Cab Fan
42	Harness, Power, Dome Light
43	Dome Light With Connector
45	Harness, Cab A/C
46	Harness, A/C

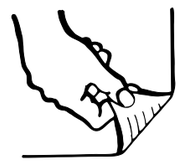
Enclosed Cab With Heat Option Harnesses

Item	Description
40	Harness, Enclosed Cab
41	Harness, Cab Fan
42	Harness, Power, Dome Light
43	Dome Light With Connector
44	Harness, Cab Heater

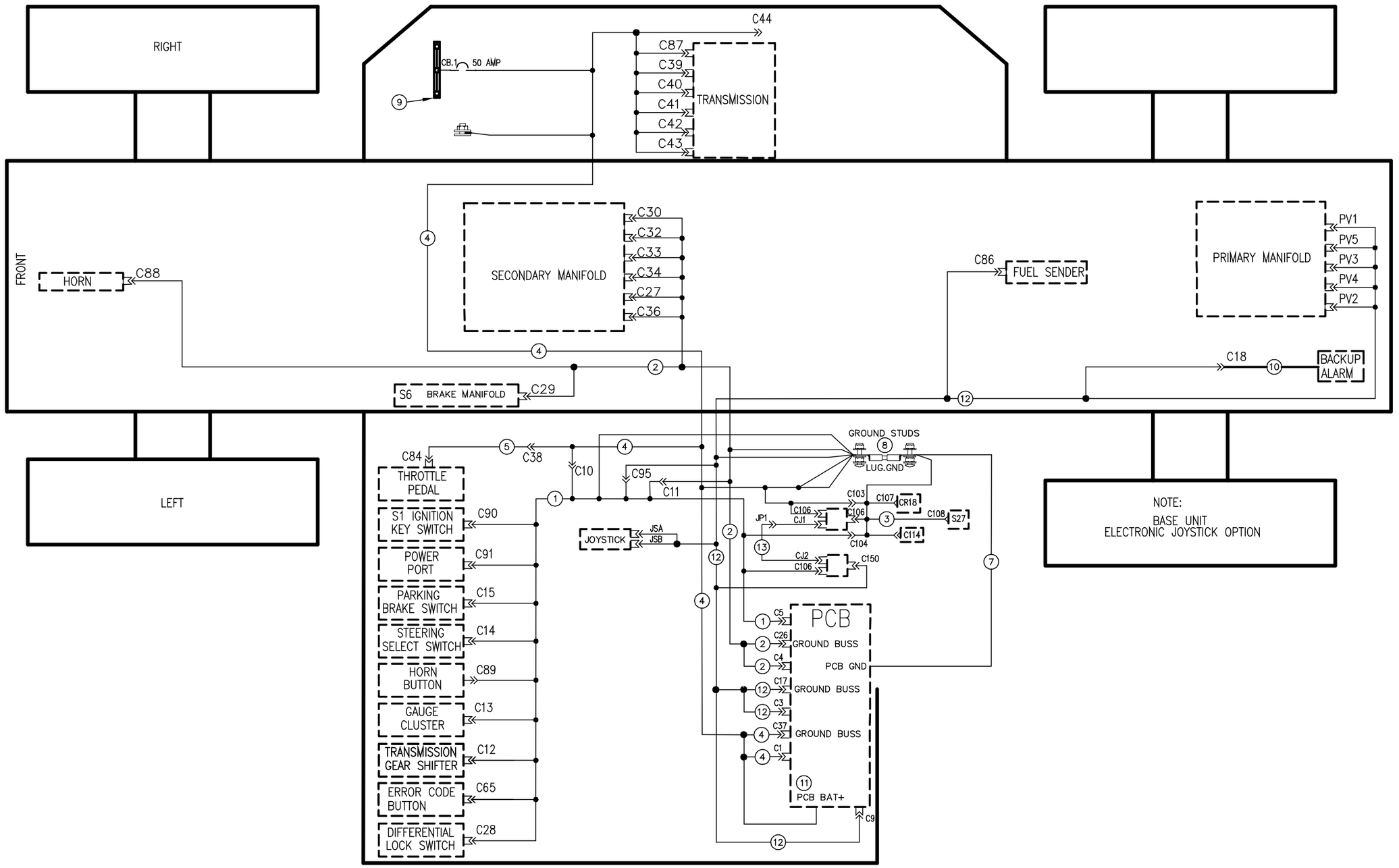
Rear Proximity Alarm Option

Item	Description
50	Harness, Rear Prox Alarm, GTH

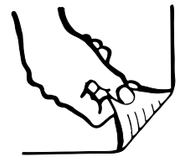
Harness Map - Control System Power
Single Joystick



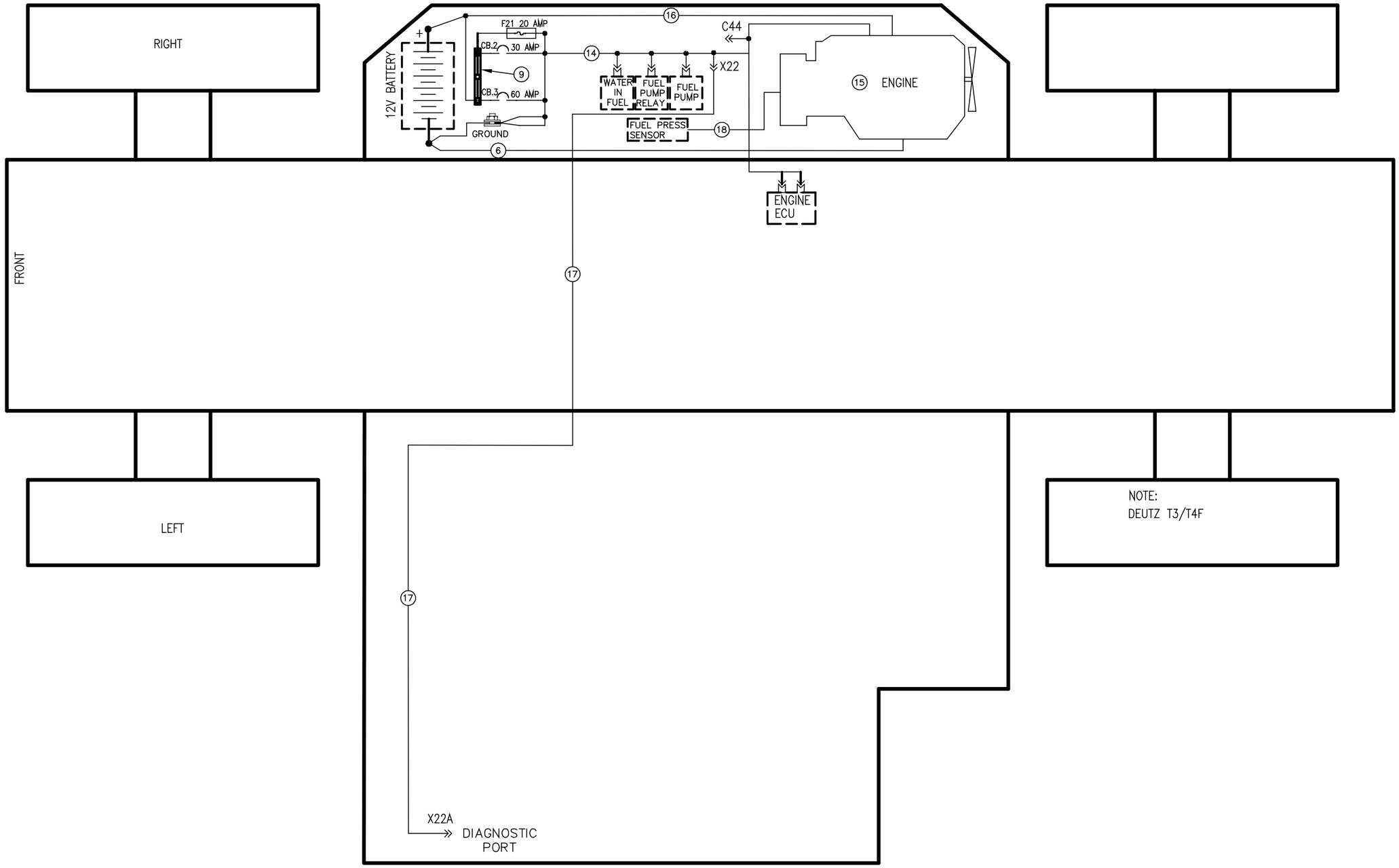
Harness Map - Control System Power Electronic Joystick



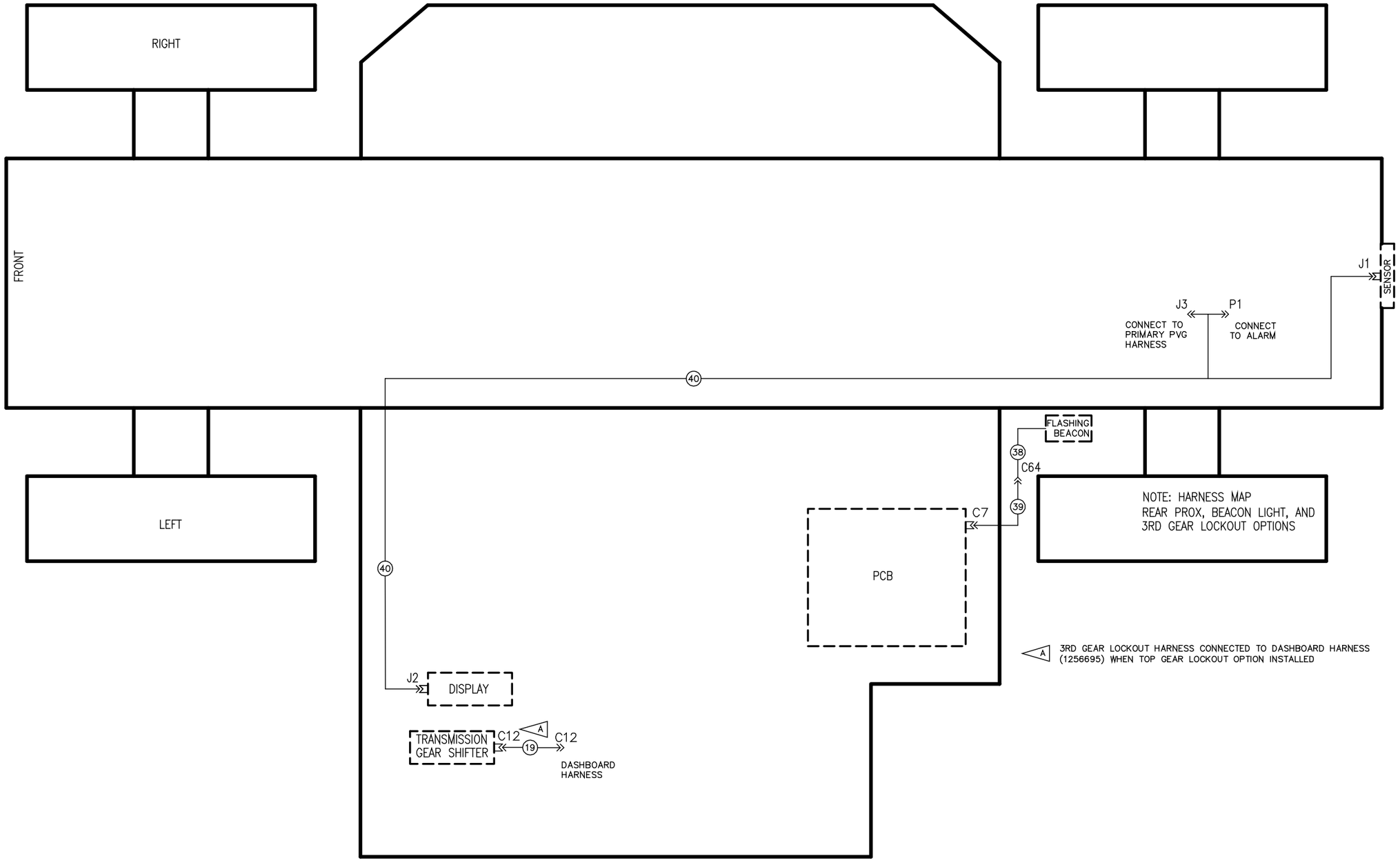
Harness Map - Deutz TD2.9 Engine
Battery Power and Ground



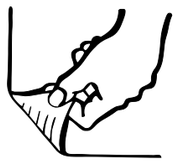
Harness Map - Deutz TD2.9 Engine Battery Power and Ground



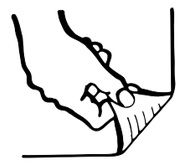
Harness Map - Options Auxiliary Hydraulics, Beacon and 3rd Gear Lockout



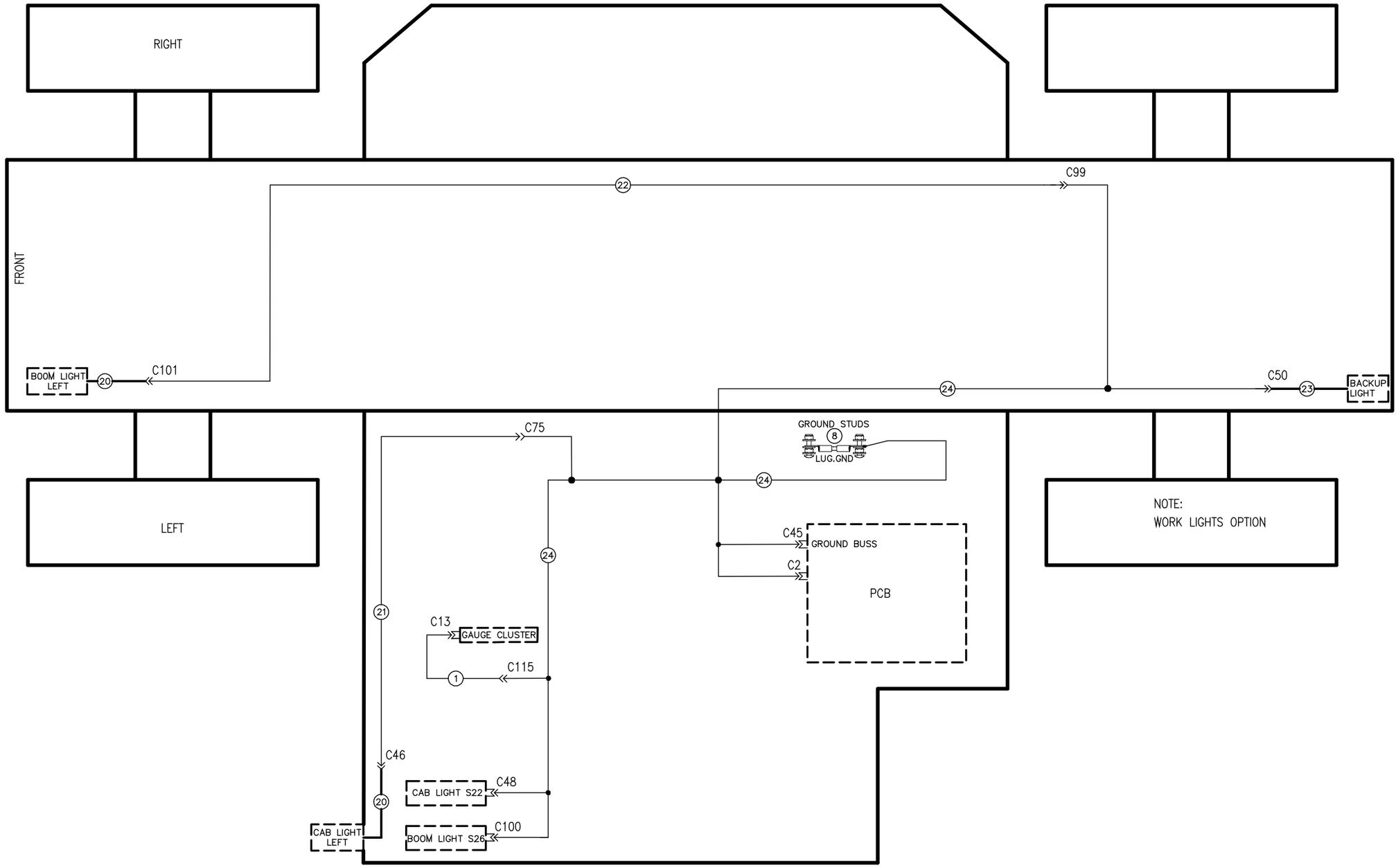
Harness Map - Options Auxiliary Hydraulics, Beacon and 3rd Gear Lockout



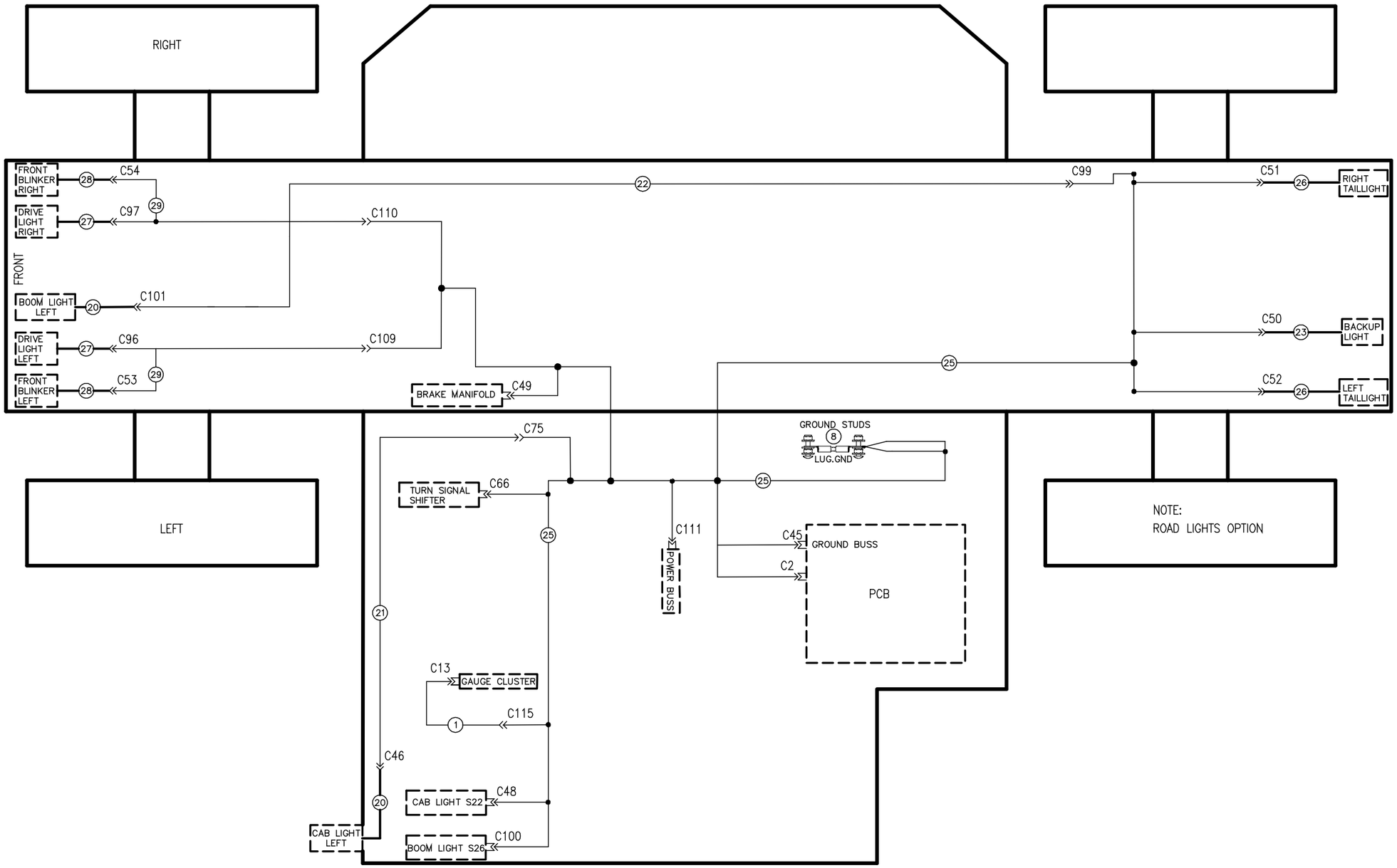
Harness Map - Options
Work Lights



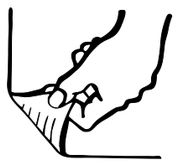
Harness Map - Options
Work Lights



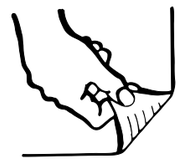
Harness Map - Options
Road Lights



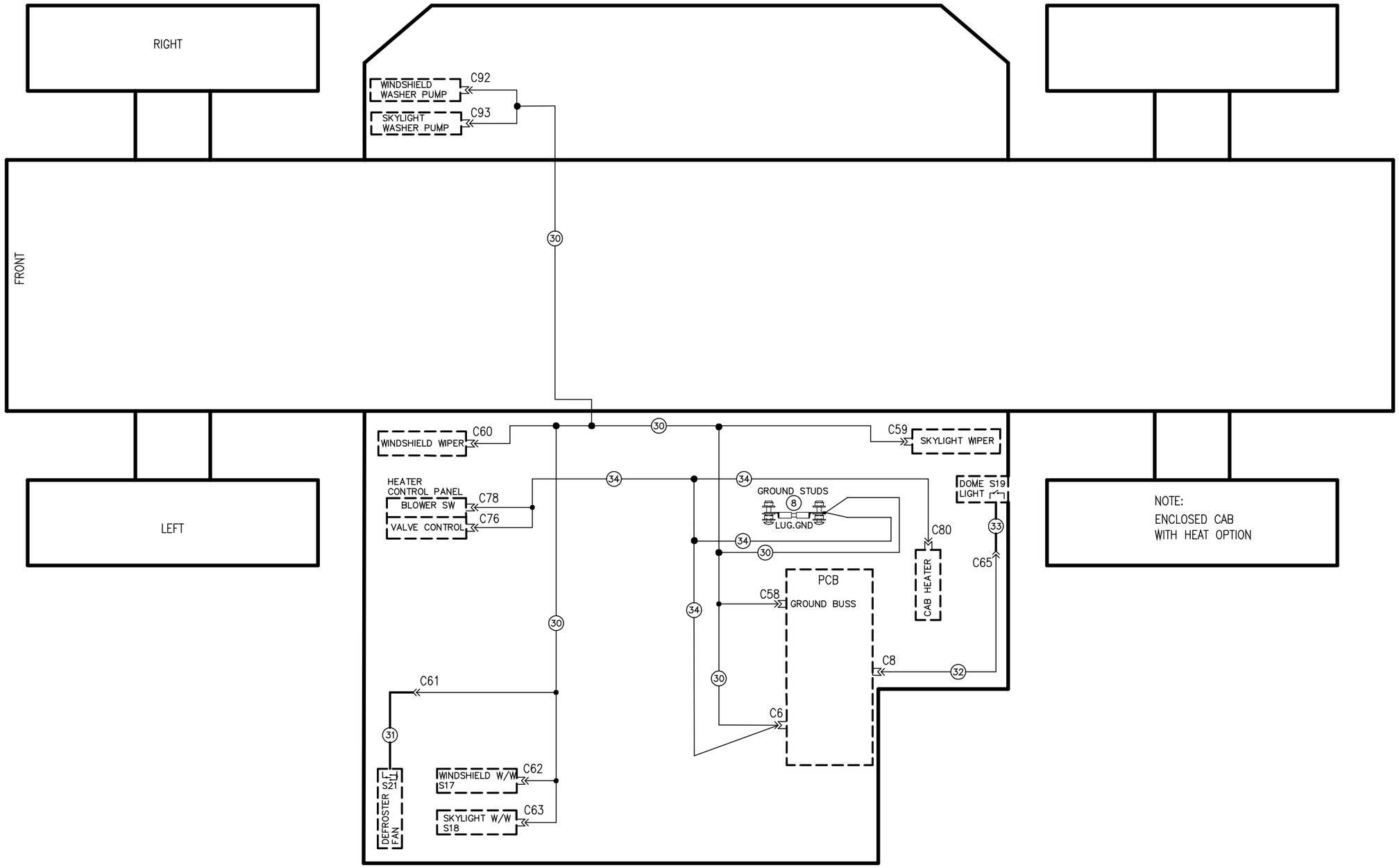
Harness Map - Options Road Lights



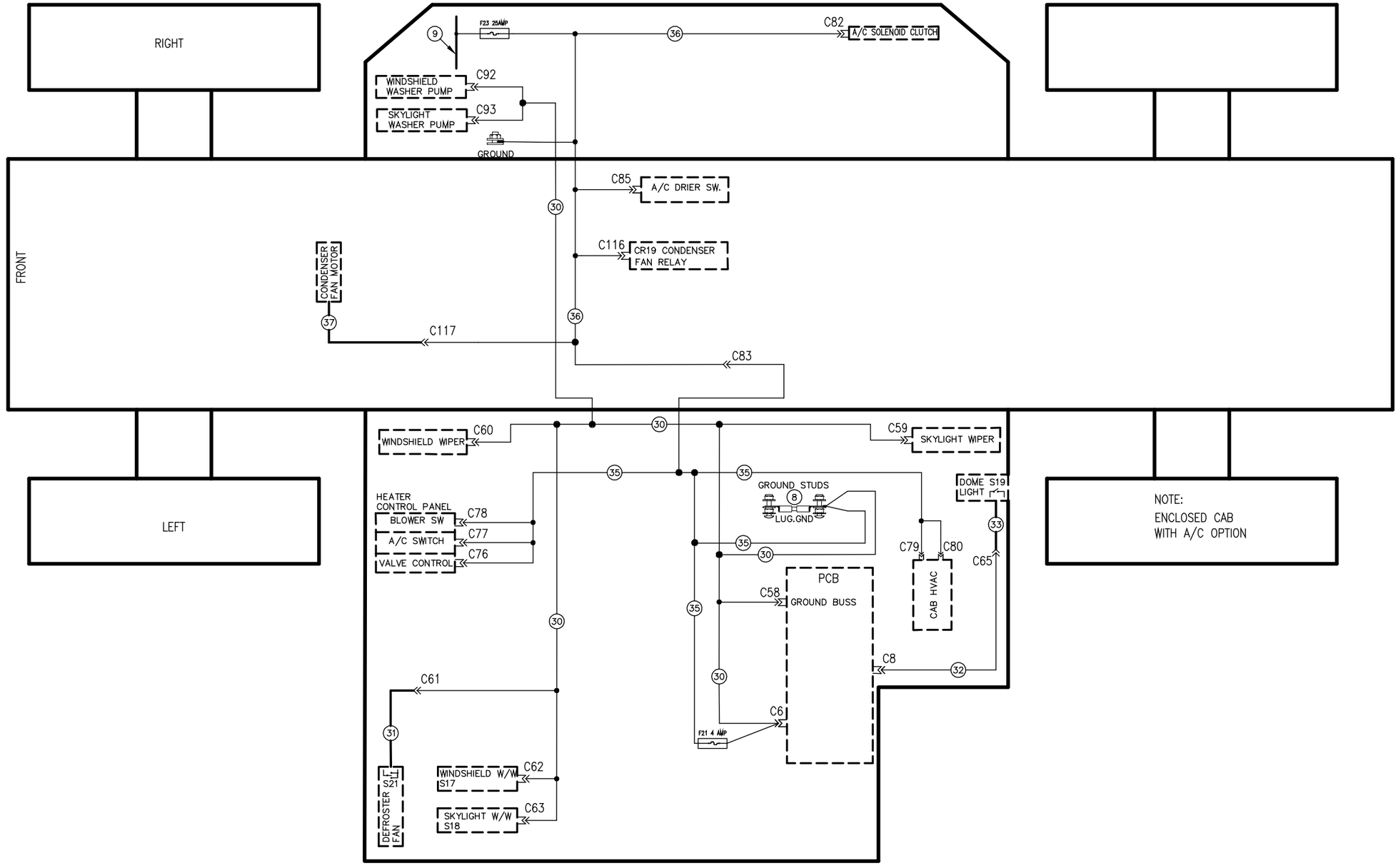
Harness Map - Options
Enclosed Cab with Heater



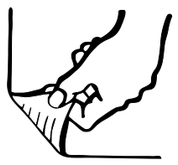
Harness Map - Options
Enclosed Cab with Heater



Harness Map - Options
Enclosed Cab with HVAC

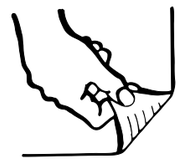


Harness Map - Options
Enclosed Cab with HVAC



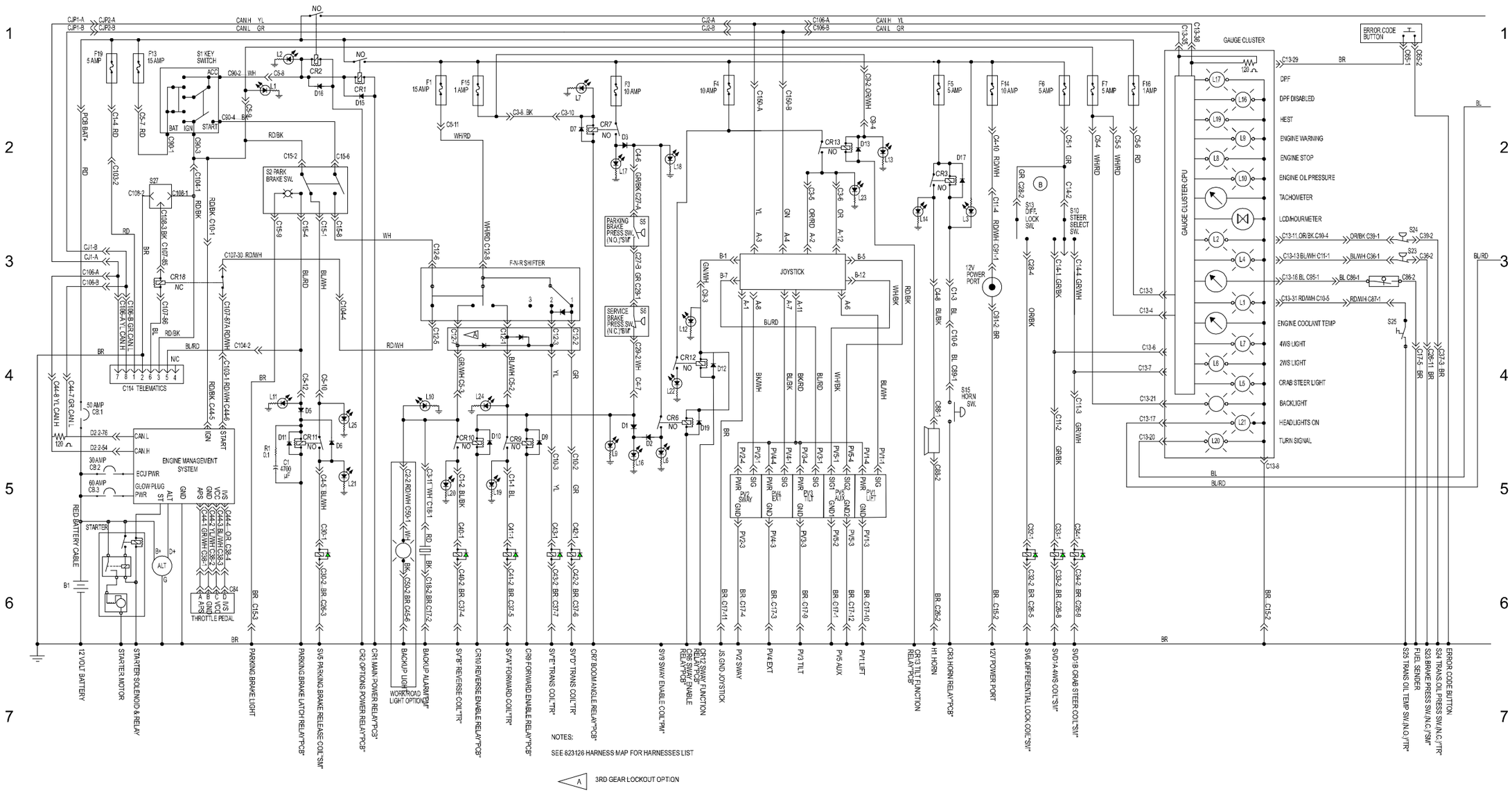
Electrical Schematic

(from GTH06E-11750 to 13097)



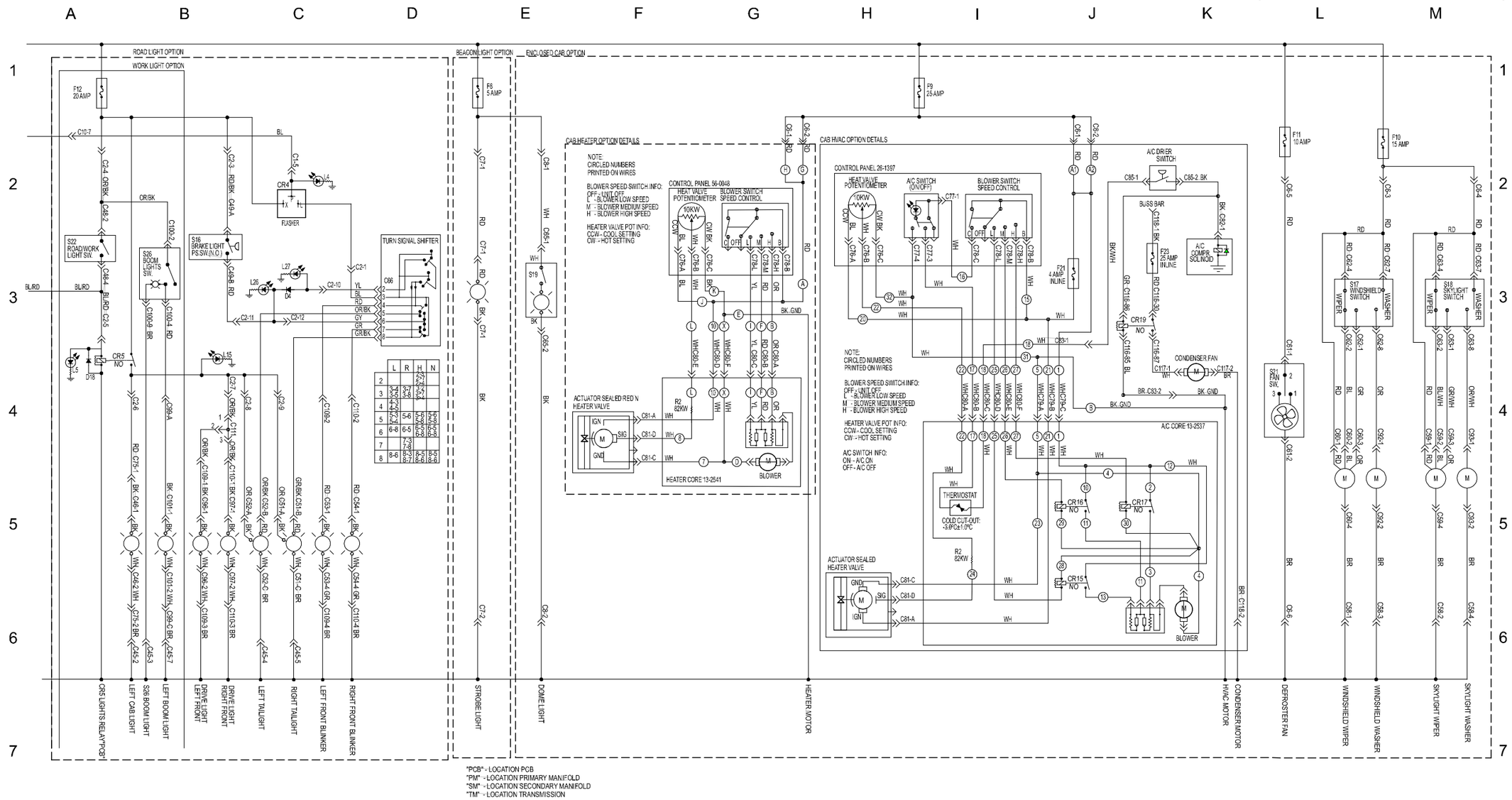
Electrical Schematic

(from GTH06E-11750 to 13097)



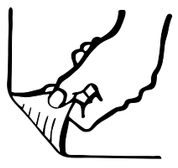
Electrical Schematic

(from GTH06E-11750 to 13097)



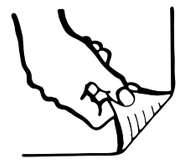
Electrical Schematic

(from GTH06E-11750 to 13097)



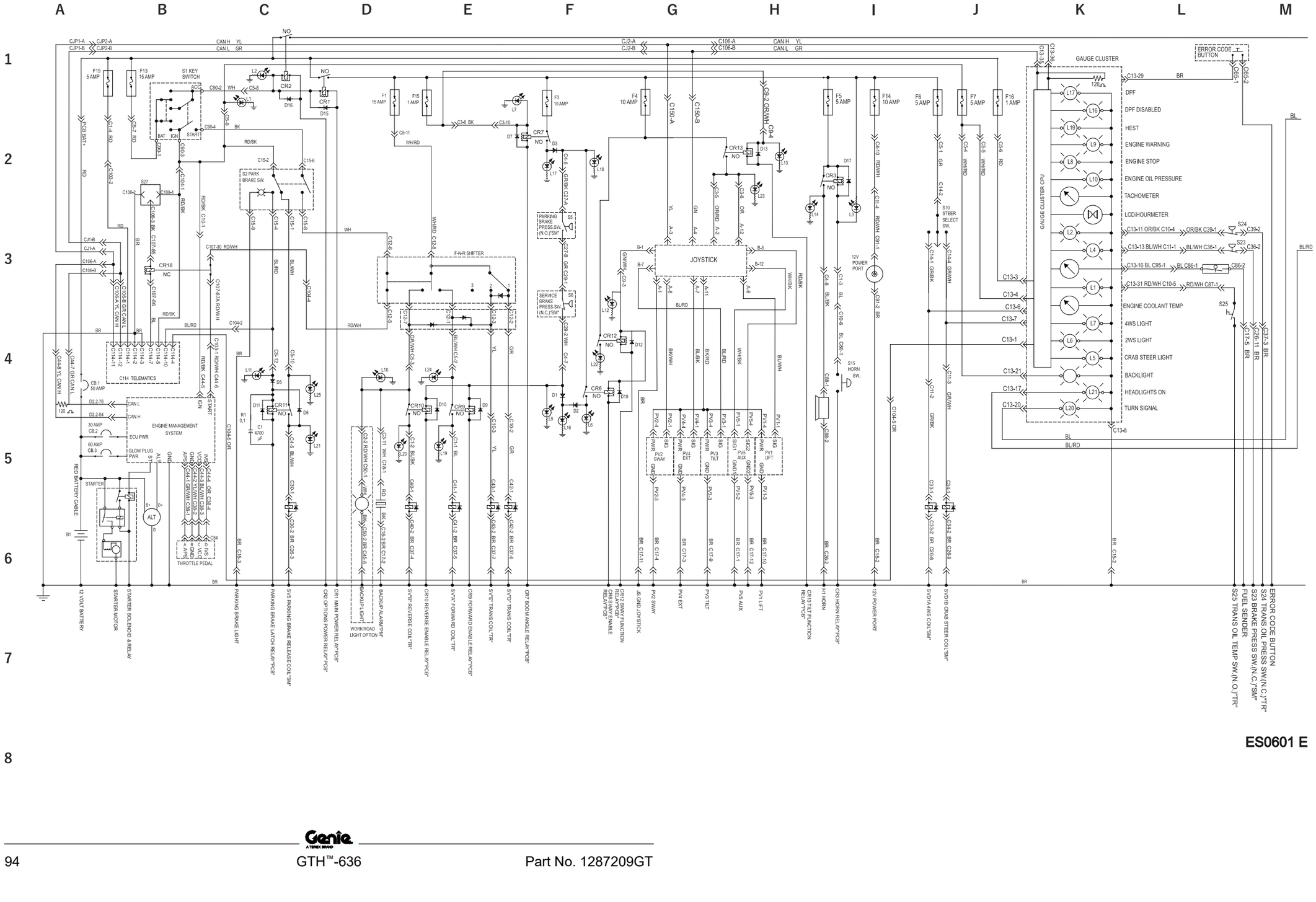
Electrical Schematic

(from GTH06E-13098)

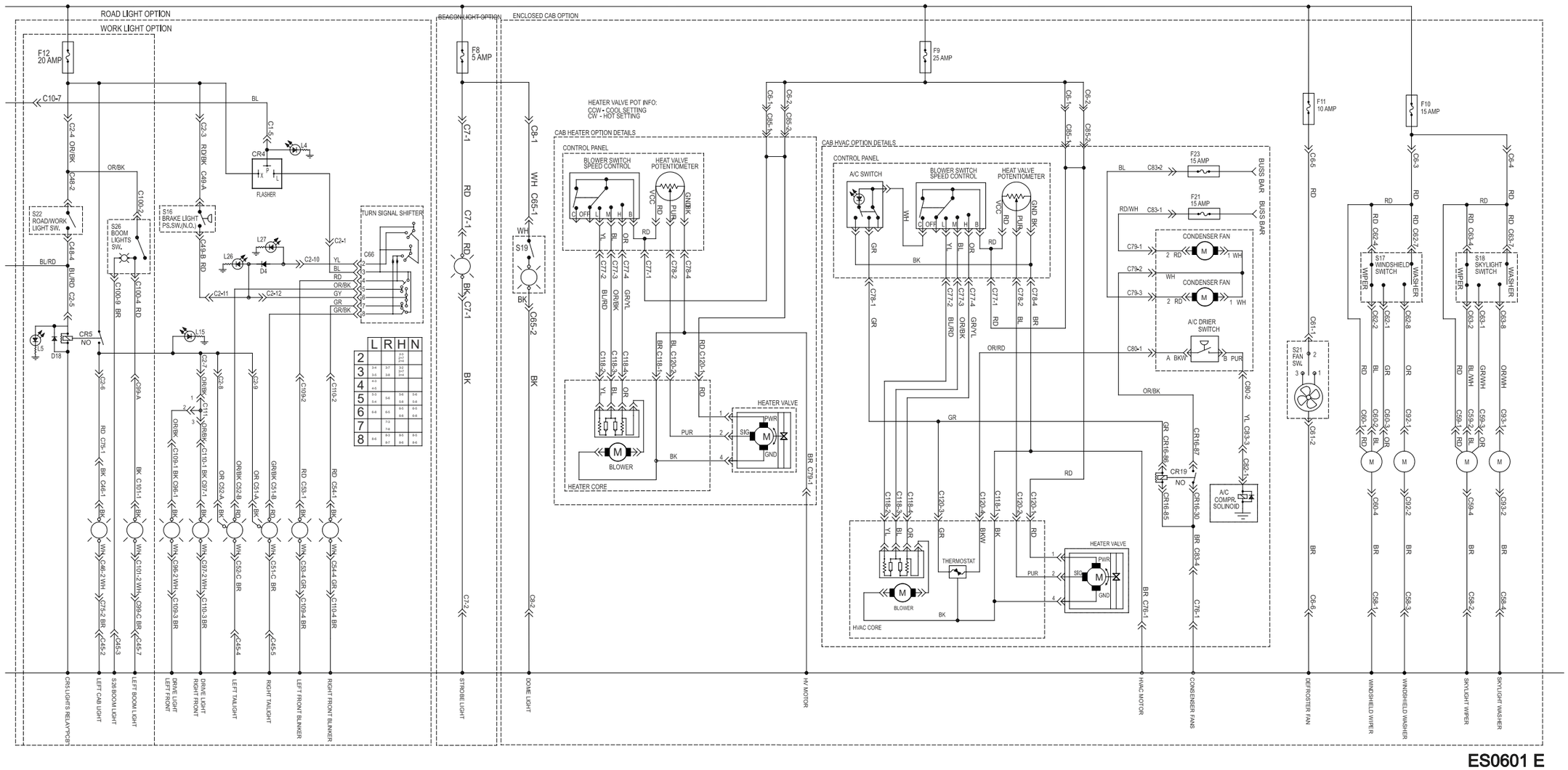


Electrical Schematic

(from GTH06E-13098)



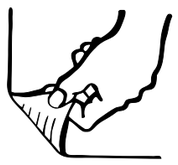
Electrical Schematic
(from GTH06E-13098)



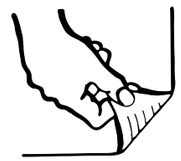
ES0601 E

Electrical Schematic

(from GTH06E-13098)



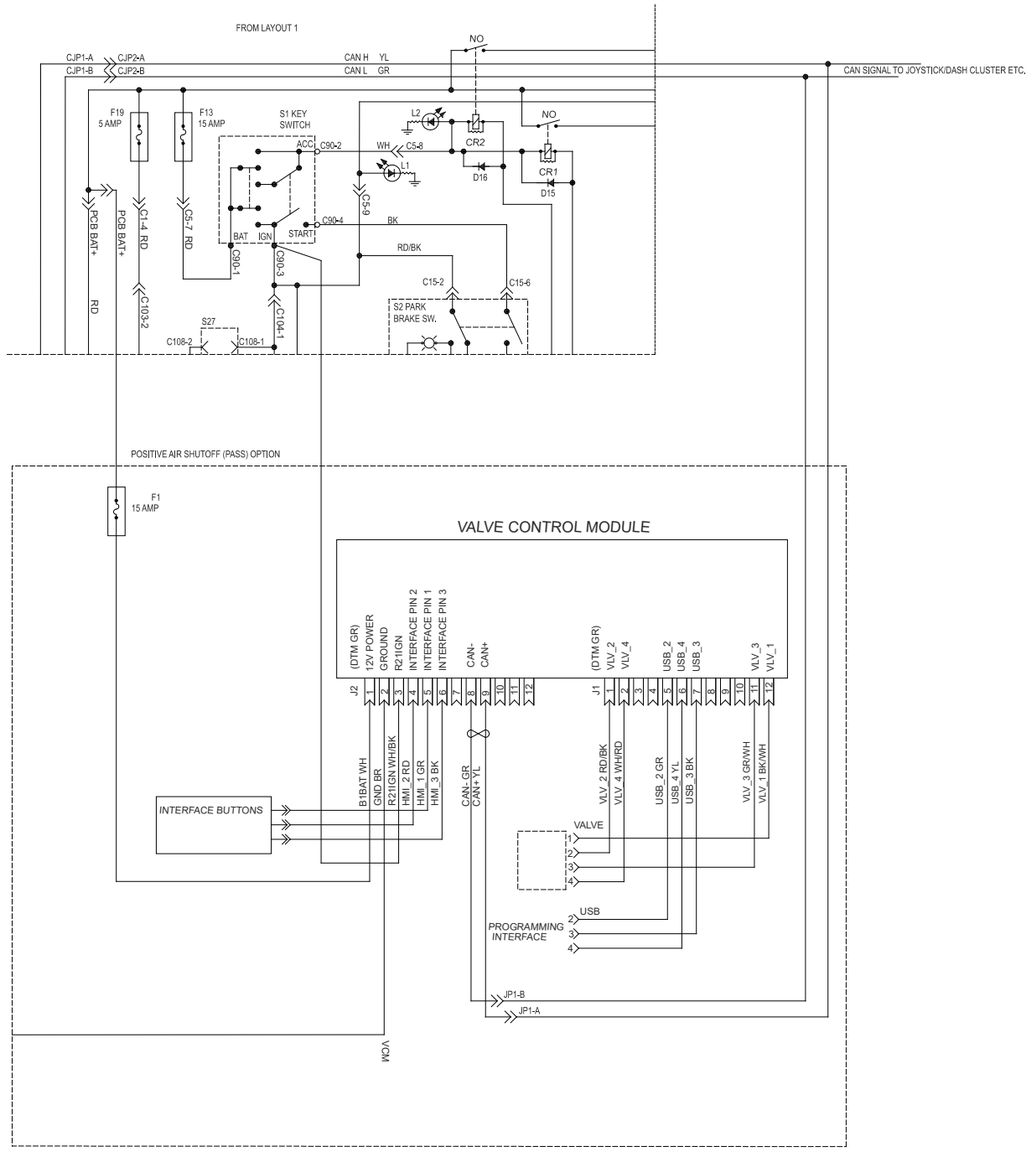
Electrical Schematic, Option
(from GTH06E-13098)



Electrical Schematic, Option

(from GTH06E-13098)

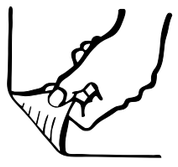
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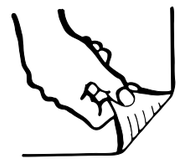
ES0601 E

Electrical Schematic - Deutz T4F Eng Harness

Electrical Schematic - Deutz T4F Eng Harness

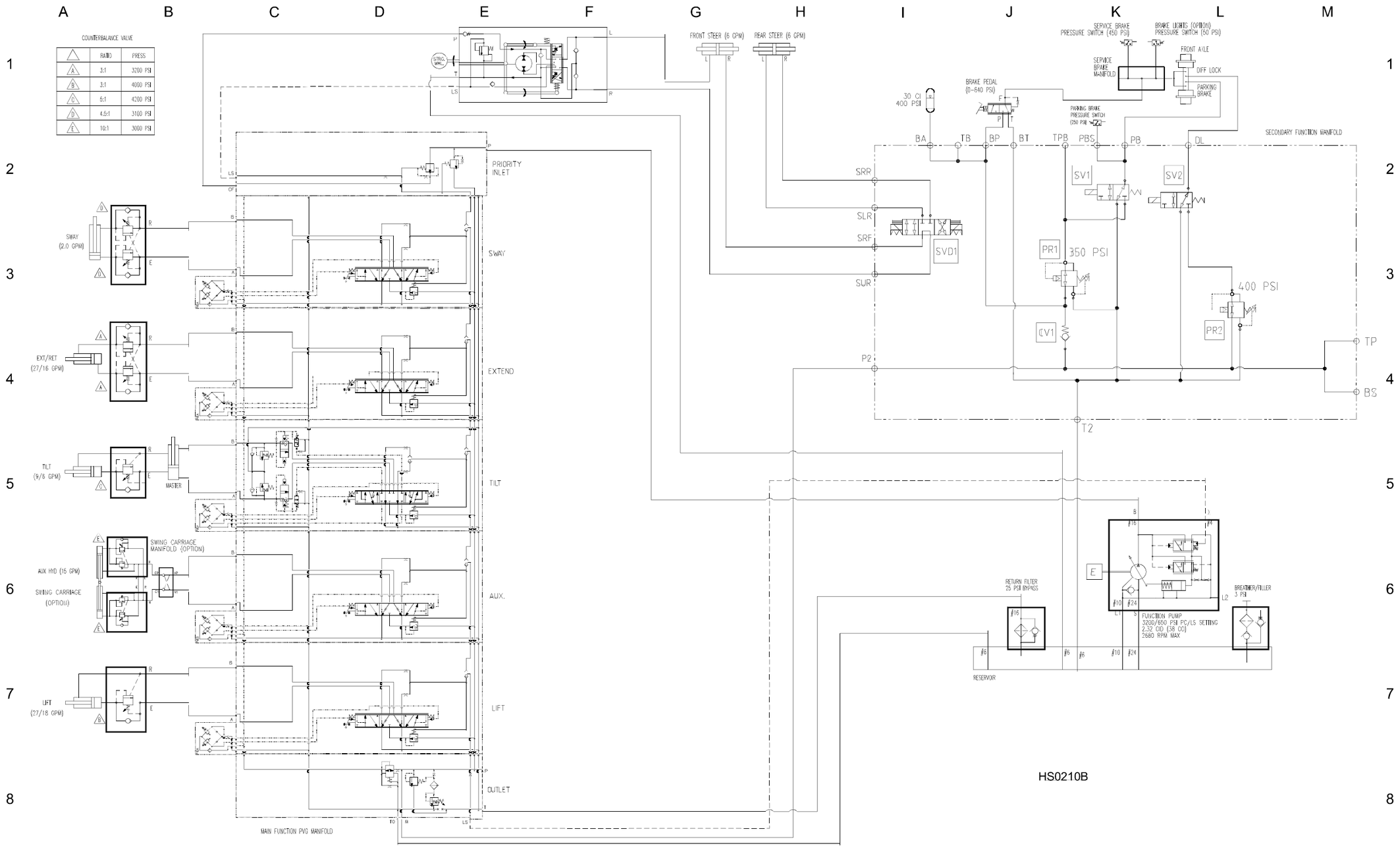


Hydraulic Schematic
(from GTH06E-11750 to 13097)



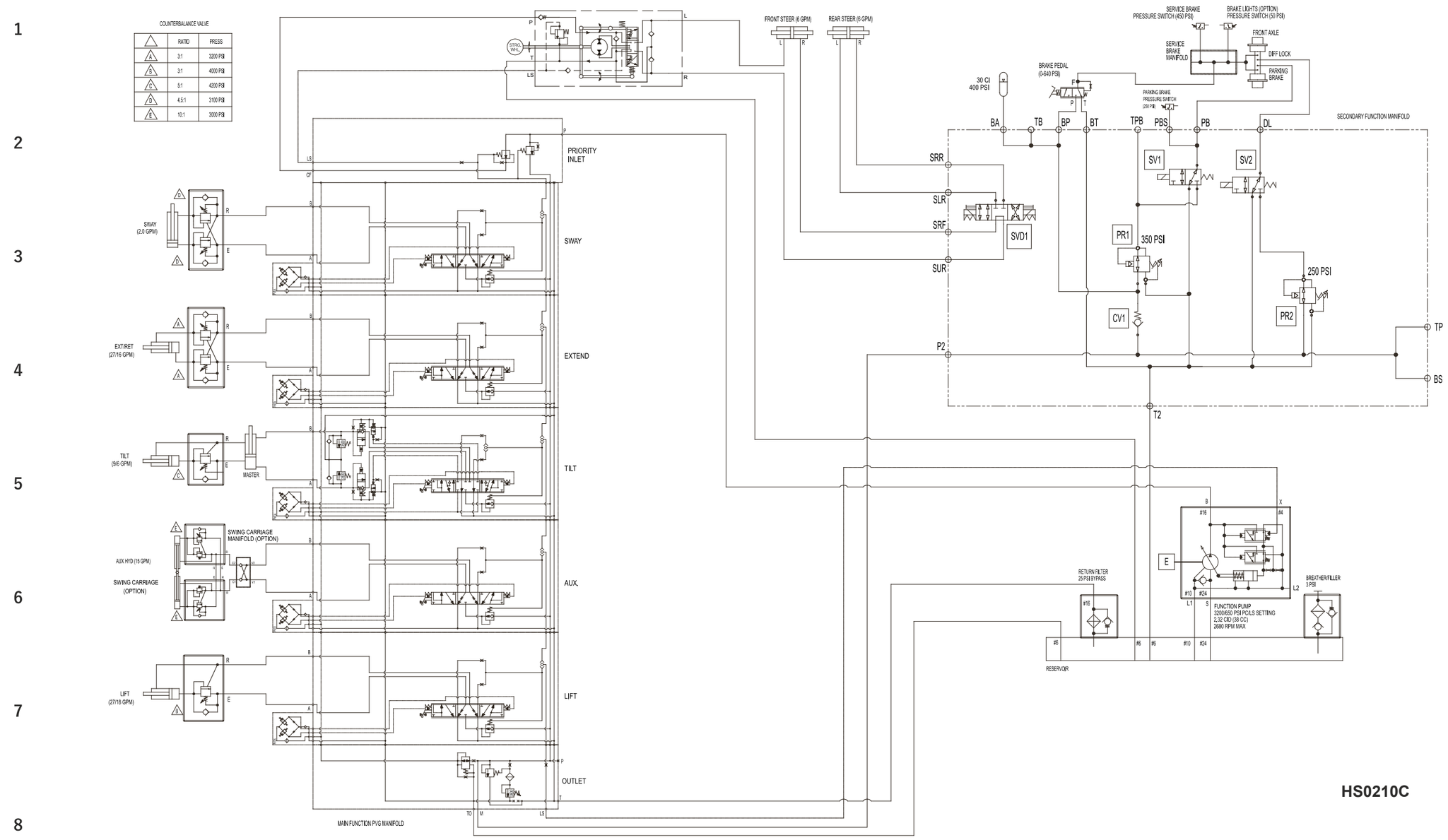
Hydraulic Schematic

(from GTH06E-11750 to 13097)



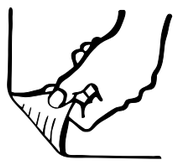
HS0210B

Hydraulic Schematic
(from GTH06E-13098)



HS0210C

Hydraulic Schematic
(from GTH06E-13098)



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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