A TEREX BRAND

Service and Repair Manual

Serial Number Range

Z-51/30J

From Z513014B-1201
to Z513016M-1999

From Z5130M-2000

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. 1268553GT
Rev A3
October 2020

Introduction

Important

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

This manual provides troubleshooting and repair procedures for qualified service professionals.

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

Compliance

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

Machine Design Life

Unrestricted with proper operation, inspection and scheduled maintenance.

Technical Publications

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

Readers are encouraged to notify Genie of errors and send in suggestions for improvement. All communications will be carefully considered for future printings of this and all other manuals.

Contact Us:

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1268553GT Rev A3 October 2020

First Edition, First Printing

Introduction

Revision History

Revision	Date	Section	Procedure / Page / Description
A	9/2015		Initial Release
A1	9/2016	Introduction	Serial Number Legend
A2	11/2017	Specifications	Machine Specifications
A3	10/2020	All Sections	Add Deutz TD 2.2 L3 engine

REFERENCE EXAMPLES:

Section – Repair Procedure, 4-2
Section – Fault Codes, All charts
Section – Schematics, Legends and schematics

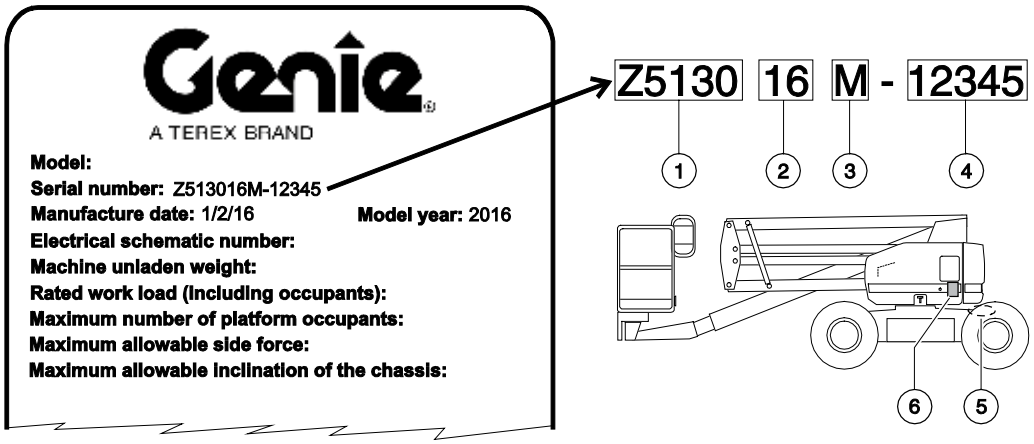
Electronic Version

Click on any content or procedure in the Table of Contents to view the update.

Introduction

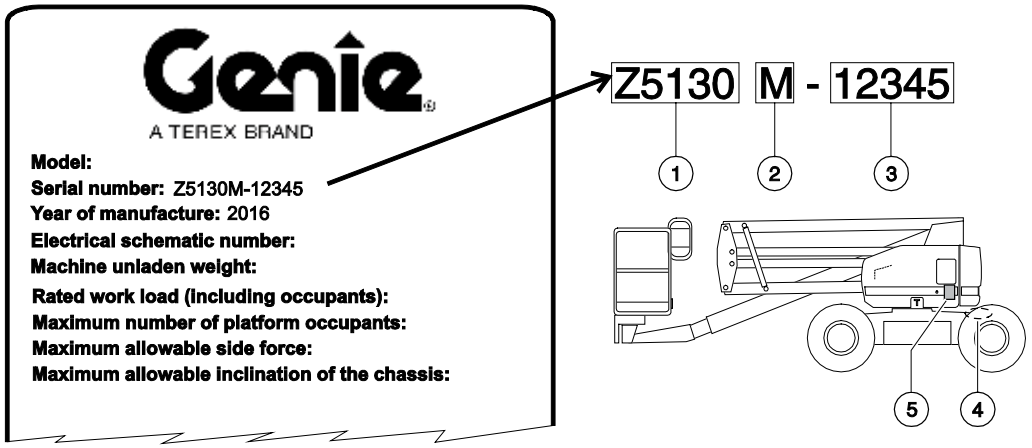
Serial Number Legend

To August 31, 2016



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

From September 1, 2016



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

Safety Rules

Danger

Failure to obey the instructions and safety rules in this manual and the appropriate Operator's Manual on your machine will result in death or serious injury.

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

Do Not 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 an 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

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	355/55 D625
Tire ply rating	14
Tire weight, new foam-filled (minimum) (Rough terrain)	390 lbs 177 kg
Overall tire diameter	36.9 in 93.7 cm
Wheel diameter	24.5 inches 62.2 cm
Wheel width	11.75 inches 29.8 cm
Wheel lugs	9 @ 5/8 -18
Lug nut torque, lubricated	94 ft-lbs 127.4 Nm
Lug nut torque, dry	125 ft-lbs 169.5 Nm

Fluid capacities	
Fuel tank	17 gallons 64.4 liters
Hydraulic tank	24 gallons 91 liters
Hydraulic system (including tank)	30 gallons 113.6 liters
Drive hubs - Steer end	17 fl oz 503 cc
Drive hubs with brake, 57:1, Non-steer end	24 fl oz 1242 cc
Turntable rotation drive hub	25.5 fl oz 750 cc

Performance Specifications

Drive speed, maximum	
Stowed position	5 mph 8 km/h 40 ft/5.5 sec 12.2 m/5.5 sec
Raised or extended position	0.6 mph 1 km/h 40 ft/45 sec 12.2 m/45 sec
Braking distance, maximum	
High range on paved surface	3 to 6 ft 0.9 to 1.8 m
Gradeability	See Operator's Manual

Boom function speeds, maximum from platform controls	
Jib boom up	48 to 52 seconds
Jib boom down	28 to 32 seconds
Primary boom up	36 to 40 seconds
Primary boom down	36 to 40 seconds
Secondary boom up	26 to 30 seconds
Secondary boom down	26 to 30 seconds
Primary boom extend	20 to 24 seconds
Primary boom retract	20 to 24 seconds
Turntable rotate, 355°	82 to 88 seconds

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

Specifications

Hydraulic Specifications

Hydraulic Oil Specification	
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 the Genie Product Support before use.

NOTICE

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

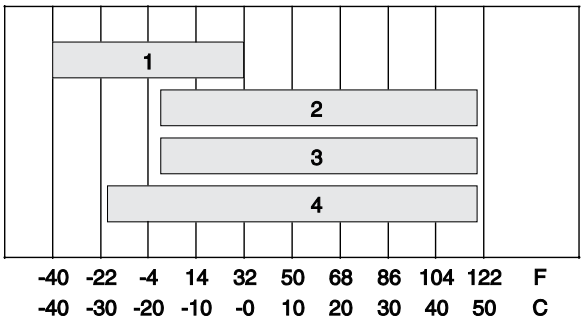
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond it's maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

NOTICE

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

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

Hydraulic Fluid Temperature Range



Ambient air temperature
1 Chevron hydraulic oil 5606A
2 Petro-Canada Environ MV 46
3 UCON Hydrolube HP-5046D
4 Chevron Rando HD premium oil MV

Specifications

Chevron Rando HD Premium Oil MV Fluid Properties

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

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

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

Chevron 5606A Hydraulic Oil Fluid Properties

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

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

NOTICE

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

Petro-Canada Environ MV 46 Fluid Properties

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

Shell Tellus S4 VX Fluid Properties

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

UNCON Hydrolube HP-5046 Fluid Properties

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

Specifications

Hydraulic Component Specifications

Drive pump	
Type:	bi-directional, variable displacement piston pump
Flow rate @ 2500 rpm	32 gpm 121 L/min
Drive pressure, maximum	3500 psi 241 bar
Charge pump	
Type	gear
Displacement	0.84 cu in 13.76 cc
Flow rate @ 2500 rpm	9.1 gpm 34.4 L/min
Charge pressure @ 2500 rpm	315 psi 21.7 bar
Function pump	
Type	gear
Displacement	0.67 cu in 11 cc
Flow rate @ 2500 rpm	7.25 gpm 27.4 L/min
Auxiliary pump	
Type:	gear, fixed displacement
Displacement per revolution	0.067 cu in 1.1 cc
Auxiliary pump relief pressure	3200 psi 220.6 bar

Function Manifold	
System relief valve pressure	3200 psi 220.6 bar
Secondary boom down relief valve pressure	2100 psi 145 bar
Platform level relief valve pressure	2500 psi 172 bar
Steer flow regulator	1.5 gpm 5.7 L/min
Boom extend flow regulator	2 gpm 7.6 L/min
Jib boom / platform rotate flow regulator	0.4 gpm 1.5 L/min
Drive manifold	
Hot oil relief pressure	250 psi 17.2 bar
Steer end drive motors	
Displacement per revolution	1.53 cu in 25 cc
Non-steer end drive motors	
Displacement per revolution, variable (2 speed motor)	0.01 to 1.83 cu in 1.61 to 30 cc
Hydraulic Filters	
High pressure filter	Beta 3 ³ 200
High pressure filter bypass pressure	100 psi 6.89 bar
Medium pressure filter	Beta 3 ³ 200
Medium pressure filter bypass pressure	50 psi 3.4 bar
Hydraulic return filter	10 micron with 25 psi / 1.7 bar bypass

Specifications

Manifold Component Specifications	
Plug Torque	
SAE No. 4	36 in-lbs / 4 Nm
SAE No. 4	10 ft-lbs / 13 Nm
SAE No. 6	14 ft-lbs / 19 Nm
SAE No. 8	38 ft-lbs / 51 Nm
SAE No. 10	41 ft-lbs / 55 Nm
SAE No. 12	56 ft-lbs / 76 Nm

Valve Coil Resistance Specification	
Proportional directional solenoid valve, 10V DC (schematic items BP, BU and BY)	6 to 8Ω
3 position 4 way directional valve, 10V DC (schematic items BF, BM and CG)	6 to 8Ω
2 position 3 way solenoid valve, 10V DC (schematic items CA, CC, G, AF and AG)	6 to 8Ω

Specifications

Deutz D2011 L03i Engine

Displacement	142 cu in 2.33 liters
Number of cylinders	3
Bore and Stroke	3.7 x 4.4 inches 94 x 112 mm
Horsepower	48 @ 2800 rpm 36 kW @ 2800 rpm
Firing order	1 - 2 - 3
Low idle	1500 rpm 313 Hz
High idle	2500 rpm 521.7 Hz
Compression ratio	19:01
Compression pressure	362 to 435 psi 25 to 30 ba
Governor	centrifugal mechanical
Valve Clearance, cold	
Intake	0.012 in 0.3 mm
Exhaust	0.020 in 0.5 mm
Lubrication system	
Oil pressure	20 to 44 psi 1.4 to 3 bar
Oil capacity (including filter)	9.5 quarts 9 liters
Oil viscosity requirements	
-22° F to 86° F/ -30° C to 30° C	5W-30 (synthetic)
-4° F to 90° F / -20° C to 32° C	10W-40
Above 23° F / -5° C	20W-50
Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine.	
Oil temperature switch	
Temperature switch point	300°F 149°C
Oil pressure switch	
Oil pressure switch point	22 psi 1.5 bar
Fuel injection system	
Injection pump make	Bosch
Injection pump pressure, maximum	15000 psi 1034 bar
Injector opening pressure	3046 psi 210 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator's Manual on your machine.	
Starter motor	
Current draw, no load	90A
Brush length, new	0.72 in 18.5 mm
Brush length, minimum	0.27 in 7 mm
Battery	
Type	12V DC, Group 34/78
Quantity	1
Cold cranking ampere	900A
Reserve capacity @ 25A rate	200 minutes
Alternator output	60A @ 14V DC
Fan belt deflection	3/8 to 1/2 inch 9 to 12 mm

Specifications

Deutz TD 2.2 L3 Engine

Displacement	134 cu. in 2,2 liters
Number of cylinders	3
Bore and Stroke	3.6 x 4.3 inches 92 x 110 mm
Horsepower net intermittent @ 2600 rpm	49 hp 36 kW
Induction system	turbocharged
Firing order	1 - 2 - 3
Low idle, standby	1000 rpm
Low idle, function enable	1500 rpm
High idle	2500 rpm
Governor	electronic
Lubrication system	**Low ash oil required**
Oil pressure, hot (@ 2000 rpm)	40 to 60 psi 2,8 to 4,1 bar
Oil capacity (including filter)	8 quarts 7,6 liters
Oil viscosity requirements	
-22° F to 86° F/ -30° C to 30° C	5W-30 (synthetic)
-4°F to 104°F / -20°C to 40°C	10W-40
Above 5°F / -15°C	15W-40
Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine.	
Oil temperature switch	
Installation torque	8 - 18 ft-lbs 11 - 24 Nm
Temperature switch point	257°F 125°C
Oil pressure switch	
Installation torque	8 - 18 ft-lbs 11 - 24 Nm
Pressure switch point	17.4 psi 1,2 bar

Fuel requirement	
For fuel requirements, refer to the engine Operator's Manual for your engine.	
Engine coolant capacity	2.5 gallons 9,5 liters
Unit ships with Ethylene Glycol engine coolant. Consult your local supplier for compatibility before mixing alternative engine coolants.	
Starter motor	
Current draw, normal load	140 - 200A
Cranking speed	250 - 350 rpm
Battery – Engine starting and control system	
Type	12V DC, Group 31
Quantity	1
Battery capacity, maximum	1000A
Reserve capacity @ 25A rate	200 Minutes
Alternator output	95A @ 14V DC

Specifications

Machine Torque Specifications

Platform Rotator	
3/4 -10 center bolt, GR 8	380 ft-lbs 515 Nm
3/8 -16 bolts, GR 8	44 ft-lbs 60 Nm
Turntable rotate assembly	
Rotate bearing mounting bolts, lubricated	180 ft-lbs 244 Nm
Drive motor/brake mounting bolts, dry	110 ft-lbs 149 Nm
Drive motor/brake mounting bolts, lubricated	80 ft-lbs 108 Nm
Drive motor and hubs	
Drive hub mounting bolts, lubricated	180 ft-lbs 244 Nm
Drive motor mounting bolts, lubricated	55 ft-lbs 75 Nm

Specifications

Hydraulic Hose and Fitting Torque Specifications

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

Seal-Lok™ Fittings
(hose end - ORFS)

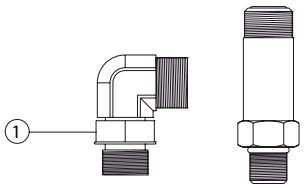
SAE Dash size	Torque
-4	18 ft-lbs / 24.4 Nm
-6	30 ft-lbs / 40.7 Nm
-8	40 ft-lbs / 54.2 Nm
-10	60 ft-lbs / 81.3 Nm
-12	85 ft-lbs / 115 Nm
-16	110 ft-lbs / 150 Nm
-20	150 ft-lbs / 203.4 Nm
-24	230 ft-lbs / 312 Nm

JIC 37° Fittings
(swivel nut or hose connection)

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

SAE O-ring Boss Port
(tube fitting - installed into Aluminum)
(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 Fitting1
Jam nut

Non-adjustable fitting

SAE O-ring Boss Port
(tube fitting - installed into Steel)

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

Specifications

Torque Procedure

Seal-Lok™ fittings

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

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

2 Lubricate the O-ring before installation.

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

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

5 Tighten the nut or fitting to the appropriate torque. Refer to the appropriate torque chart in this section.

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

JIC 37° fittings

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

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

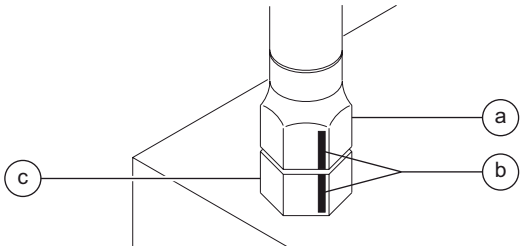


Figure 1

a hex nut
b reference mark
c body hex fitting

Specifications

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° Fittings table in this section to determine the correct number of flats, for the proper tightening position.

Note: The marks indicate that 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.

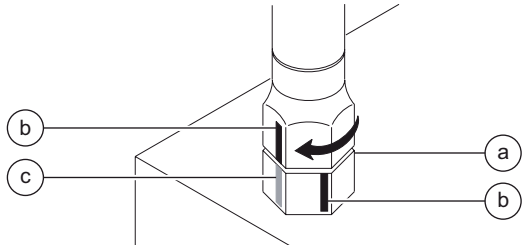


Figure 2

a body hex fitting
b reference mark
c second mark

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

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

Repair Procedures

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Repair Procedures

Observe and Obey:

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

Before Repairs Start:

- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.
- ☑ Be sure that all necessary tools and parts are available and ready for use.
- ☑ Use only Genie approved replacement parts.
- ☑ Read each procedure completely and adhere to the instructions. Attempting shortcuts may produce hazardous conditions.

Machine Configuration:

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

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

Repair Procedures

About This Section

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

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

Symbols Legend

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

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

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

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

NOTICE Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

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

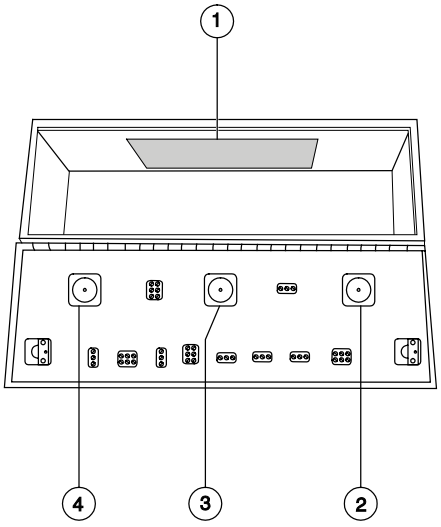
⊠ Indicates that an incorrect result has occurred after performing a series of steps.

Platform Controls

Platform Controls

The platform control box contains one printed circuit board. The ALC-500 circuit board inside the platform control box controls all proportional machine functions from the platform. The joystick controllers at the platform controls utilize Hall Effect technology and require no adjustment. The operating parameters of the joysticks are stored in memory at the ECM circuit board at the platform controls. If a joystick error occurs or if a joystick is replaced, it will need to be calibrated before that particular machine function will operate. Refer to Repair Procedure, *How to Calibrate a Joystick*.

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



1 ALC-500 circuit board
2 drive/steer joystick controller
3 secondary boom up/down joystick controller
4 primary boom up/down and turntable rotate left/right joystick controller

1-1 ALC-500 Circuit Board

Note: When the ALC-500 circuit board is replaced, the joystick controllers will need to be calibrated. Refer to Repair Procedure, How to Calibrate a Joystick.

How to Remove the ALC-500 Circuit Board

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

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

3 Locate the ALC-500 circuit board mounted to the inside of the platform control box.

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

4 Attach a grounded wrist strap to the ground screw inside the platform control box.

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

5 Carefully disconnect the wire connectors from the circuit board.

6 Remove the ALC-500 circuit board mounting fasteners.

7 Carefully remove the ALC-500 circuit board from the platform control box.

Platform Controls

1-2 Joysticks

How to Calibrate a Joystick

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

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

Note: Perform this procedure with the engine off.

1 Open the platform control box.

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

3 Turn the key switch to platform control. Do not start the engine.

4 Select a joystick to calibrate.

5 Disconnect the wire harness connector from the joystick for approximately 10 seconds or until the alarm sounds. Connect the wire harness connector to the joystick.

6 Move the joystick full stroke in either direction and hold for 5 seconds.

7 Return the joystick to the neutral position, pause for a moment, then move the joystick full stroke in the opposite direction. Hold for 5 seconds and return the joystick to the neutral position.

⊙ Result: The alarm should sound indicating successful joystick calibration.

8 Repeat this procedure for each joystick controlled machine function including the thumb rocker steer switch..

Note: No machine function should operate while performing the joystick calibration procedure.

Platform Controls

How to Adjust the Joystick Max-out Setting

The max-out setting of a joystick controls the maximum speed of a joystick-controlled machine function. Whenever a hydraulic cylinder, drive motor or hydraulic pump is replaced, the max-out setting should be adjusted to maintain optimum performance. The max-out settings on the joystick can be changed to compensate for hydraulic pump wear to maintain peak performance from the machine.

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

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

2 Turn the key switch to platform control. Do not start the engine.

3 Push in the platform controls red Emergency Stop button to the off position

4 Do not press down the foot switch.

5 Move and hold the drive enable toggle switch in the right position and pull out the red Emergency Stop button to the on position.

6 When the alarm sounds, release the drive enable toggle switch.

7 Momentarily activate the drive enable toggle switch in the right direction 4 times.

⊙ Result: There should be a pause and the alarm should sound 4 times indicating that the machine is in max-out calibration mode.

⊠ Result: The alarm does not sound. Repeat steps 3 through 7.

8 Start the engine from the platform controls and press down the foot switch.

9 Start a timer and activate the machine function that needs to be adjusted. Record the time it takes for that function to complete a full cycle (ie; boom up).

10 Compare the machine function time with the function times listed in Refer to Specifications, Performance Specifications. Determine whether the function time needs to increase or decrease.

11 While the joystick is activated, adjust the max-out setting to achieve the proper function cycle time. Momentarily move the drive enable toggle switch in the right direction to increase the function speed or momentarily move the drive enable toggle switch in the left direction to decrease the function speed.

Note: Each time the drive enable toggle switch is momentarily moved, the function speed will change in 2% increments from a default of 100%, with a minimum of 60% and a maximum of 120%.

12 Repeat steps 9 through 11 for each joystick controlled machine function.

13 Return the joystick to the neutral position and wait for approximately 10 seconds to allow the settings to be saved.

⊙ Result: The alarm should sound indicating that the settings have been saved in memory.

Note: Do not operate any machine function during the 10 second waiting time.

Platform Controls

How to Adjust the Joystick Ramp Rate Setting

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

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

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

2 Turn the key switch to platform control. Do not start the engine.

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

4 Do not press down the foot switch.

5 Move and hold the drive enable toggle switch in the right position and pull out the red Emergency Stop button to the on position.

6 When the alarm sounds, release the drive enable toggle switch.

7 Momentarily activate the drive enable toggle switch in the right direction 6 times.

⊙ Result: There should be a pause and the alarm should sound 6 times indicating that the machine is in ramp rate calibration mode.

8 Start the engine from the platform controls and press down the foot switch.

9 Start a timer and simultaneously move the joystick in either direction full stroke. Note how long it takes the function to reach maximum speed. This is the ramp rate.

10 Compare the function ramp rate time with the table below and determine whether the ramp rate time needs to increase or decrease.

11 While the joystick is activated, set the ramp rate. Momentarily move the drive enable toggle switch in the right direction to increase the time or momentarily move the drive enable toggle switch in the left direction to decrease the time.

Note: Each time the drive enable toggle switch is momentarily moved, the time will change in 10% increments.

12 Repeat steps 9 through 11 for each joystick controlled machine function.

13 Return the joystick to the neutral position and wait for approximately 10 seconds to allow the settings to be saved.

⊙ Result: The alarm should sound indicating that the settings have been saved in memory.

Platform Controls

Note: Do not operate any machine function during the 10 second waiting time.SENSOR SETTINGS is shown on the display.

Ramp rate (factory settings)	
Primary boom up/down	
accelerate	4 seconds
decelerate	0.5 second
Secondary boom up/down	
accelerate	2 seconds
decelerate	0.5 second
Turntable rotate	
accelerate	2 seconds
decelerate	0.5 second
Drive	
accelerate	3 seconds
decelerate to neutral	0.5 second
decelerate, change of direction	0.5 seconds
decelerate, coasting	0.75 second
decelerate, braking	1 second
decelerate, shift from low to high speed	1 second
decelerate, shift from high to low speed	2 seconds

How to Adjust the Joystick Threshold Setting

The threshold setting of a joystick is the minimum output at which a function proportional valve can open and allow the function to operate.

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

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

2 Turn the key switch to platform control. Do not start the engine.

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

4 Do not press down the foot switch.

5 Move and hold the drive enable toggle switch in the right position and pull out the red Emergency Stop button to the on position.

6 When the alarm sounds, release the drive enable toggle switch.

7 Momentarily activate the drive enable toggle switch in the right direction 8 times.

⊙ Result: There should be a pause and the alarm should sound 8 times indicating that the machine is in threshold calibration mode.

⊠ Result: The alarm does not sound. Repeat steps 3 through 7.

8 Start the engine from the platform controls and press down the foot switch.

Platform Controls

9 Select a boom function joystick to set the threshold.

10 Slowly move the joystick off center in either direction just until the function begins to move.

11 Slowly move the joystick back towards the neutral position. Just before the function stops moving, move the drive enable toggle switch to either side to set the threshold.

⊙ Result:The alarm should sound indicating a successful calibration.

Note: For each joystick axis, the threshold must be set for both directions.

12 Repeat steps 9 through 11 for each direction of boom joystick controlled machine function (boom up/down, boom extend/retract and turntable rotate left/right).

13 Return the joystick to the neutral position and wait for approximately 10 seconds to allow the settings to be saved.

⊙ Result: The alarm should sound indicating that the settings have been saved in memory.

Note: Do not operate any machine function during the 10 second waiting time.

14 Cycle the red Emergency Stop button off, then back on.

Platform Controls

2-1 Platform Leveling Slave Cylinder

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

How to Remove the Platform Leveling Slave Cylinder

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

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, H*ydraulic Hose and Fitting Torque Specifications*.

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

2 Raise the primary boom slightly and place blocks under the platform for support.

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

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

4 Tag, disconnect and plug the hydraulic hoses from the slave cylinder at the unions and connect them together using a connector. Connect the hoses from the cylinder together using a connector.

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

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

6 Remove the external snap rings from the slave cylinder barrel-end pivot pin. Do not remove the pin.

7 Place a block under the slave cylinder for support. Protect the cylinder rod from damage.

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

⚠WARNING Crushing hazard. The platform could fall when the slave cylinder rod-end pivot pin is removed if not properly supported.

NOTICE Component damage hazard. The slave cylinder rod may become damaged if it is allowed to fall if not properly supported by the lifting device.

9 Use a soft metal drift and drive the barrel-end pin out.

10 Carefully pull the cylinder out of the primary boom.

Platform Controls

How to Bleed the Slave Cylinder

1 Simultaneously activate the boom up function and the platform level up function until the boom is fully raised.

2 Simultaneously activate the boom down function and the platform level down function until the boom is fully lowered.

2-2 Platform Rotator

How to Bleed the Platform Rotator

Note: This procedure will require two people. Do not start the engine. Use auxiliary power for this procedure.

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

2 Place a suitable container underneath the platform rotator.

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

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

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

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

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

Platform Components

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

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

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

7 Clean up any hydraulic oil that may have spilled.

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

2-3 Platform Overload System

How to Calibrate the Platform Overload System

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

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

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

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

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

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

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

Platform Components

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

⊙ Result: The overload indicator lights are off and the alarm does not sound. Proceed to step 6.

⊠ Result: The overload indicator lights are flashing at the platform and ground controls, and the alarm is sounding. Slowly tighten the load spring adjustment nut in a clockwise direction in 10° increments until the overload indicator light turns off, and the alarm does not sound. Proceed to step 8.

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

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

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

⊙ Result: The overload indicator lights are off at the platform and ground controls, and the alarm does not sound. Slowly loosen the load spring adjustment nut in a counterclockwise direction in 10° increments until the overload indicator light flashes at both the platform and ground controls, and the alarm sounds. Proceed to step 7.

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

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

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

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

⊙ Result: The overload indicator lights are off and the alarm does not sound. Proceed to step 8.

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

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

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

⊙ Result:The overload indicator light is flashing at both the ground and platform controls, and the alarm is sounding. Proceed to step 9.

⊠ Result: The overload indicator light is off at both the ground and platform controls, and the alarm does not sound. Remove the additional 10 lb / 4.5 kg test weight. Repeat this procedure beginning with step 6.

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

Platform Components

9 Test all machine functions from the platform controls.

⊙ Result: All platform control functions should not operate.

10 Turn the key switch to ground control.

11 Test all machine functions from the ground controls.

⊙ Result: All ground control functions should not operate.

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

⊙ Result: The platform overload indicator light should be off at both the ground and platform controls and the alarm should not sound.

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

13 Test all machine functions from the ground controls.

⊙ Result: All ground control functions should operate normally.

14 Turn the key switch to platform control.

15 Test all machine functions from the platform controls.

⊙ Result: All platform control functions should operate normally.

Jib Boom Components

3-1
Jib Boom

How to Remove the Jib Boom

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

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

1 Remove the platform.

2 Disconnect the electrical connector from the jib boom/platform rotate select valve manifold mounted to the platform support.

3 Tag, disconnect and plug all of the hydraulic hoses from the jib boom/platform rotate select valve manifold. Cap the fittings on the manifold and pull the hoses out through the platform rotator.

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

4 Remove the platform mounting weldment.

5 Attach a lifting strap from an overhead crane to the platform rotator for support.

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

7 Remove the pin retaining fasteners from both platform rotator pivot pins. Do not remove the pins.

8 Use a soft metal drift to remove the leveling arm pivot pin and let the leveling arms hang down.

9 Use a soft metal drift to remove the platform rotator pivot pin and remove the platform rotator from the machine

10 Slide both of the jib boom leveling arms off of the jib boom cylinder rod-end pivot pin.

11 Remove the hose and cable cover from the side of the jib boom. Remove the hose and cable separators.

12 Attach a lifting strap from an overhead crane to the jib boom.

13 Support the barrel end of the jib boom lift cylinder with a suitable lifting device.

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

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

15 Remove the pin retaining fastener from the jib boom lift cylinder barrel-end pivot pin.

Jib Boom Components

16 Use a soft metal drift to remove the pin and let the cylinder hang down.

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

17 Remove the pin retaining fastener from the jib boom pivot pin. Use a soft metal drift to remove the pin, then remove the jib boom from the bellcrank.

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

18 Attach a lifting strap from an overhead crane to the lug on the rod end of the jib boom lift cylinder.

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

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

3-2
Jib Boom Lift Cylinder

How to Remove the Jib Boom Lift Cylinder

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

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

1 Raise the jib boom slightly and place blocks under the platform mounting weldment. Then lower the jib boom until the platform is resting on the blocks just enough to support the platform.

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

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

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

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

Jib Boom Components

4 Use a soft metal drift to tap the jib boom lift cylinder rod-end pivot pin half way out. Then lower one of the leveling arms to the ground. Tap the pin the other direction and lower the opposite leveling arm. Do not remove the pin.

5 Support the jib boom lift cylinder with a suitable lifting device.

6 Remove the pin retaining fastener from the jib boom lift cylinder barrel-end pivot pin. Use a soft metal drift to remove the barrel-end pin and let the cylinder hang down.

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

7 Attach a lifting strap from an overhead crane to the lug on the rod end of the jib boom lift cylinder.

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

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

Primary Boom Components

4-1
Cable Track

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

How to Remove the Cable Track

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

2 Disconnect the cables from the platform control box.

3 Remove the hose and cable cover from the side of the jib boom. Remove the hose and cable separators.

4 Remove the hose clamp on the primary boom bellcrank.

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

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

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

7 Tag and disconnect the hydraulic hoses from the platform leveling slave cylinder at the union and connect them together using a connector. Connect the hoses from the cylinder together using a connector.

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

8 Tag, disconnect and plug the hydraulic hoses from the jib boom/platform rotate manifold. Cap the fittings on the manifold.

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

Primary Boom Components

9 Tag, disconnect and plug the platform rotator hydraulic hoses at the union located above the primary boom lift cylinder. Cap the fittings on the unions.

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

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

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

11 Raise the boom to a horizontal position.

12 Place blocks between the upper and lower cable tracks and secure the upper and lower tracks together.

⚠WARNING Crushing hazard. If the upper and lower cable tracks are not properly secured together, the cable track could become unbalanced and fall when removed from the machine.

13 Attach a lifting strap from an overhead 5 ton / 5,000 kg capacity crane to the platform end of the primary boom for support. Do not lift it.

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

15 Support the rod end of the primary boom lift cylinder with a suitable lifting device.

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

17 Raise the primary boom slightly with the overhead crane to relieve the pressure on the primary boom lift cylinder rod-end pivot pin.

18 Use a soft metal drift to remove the primary boom lift cylinder rod-end pivot pin.

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

19 Lower the rod end of the primary boom lift cylinder approximately 12 inches / 30 cm.

20 Pull all of the hoses and cables out and away from the mounting ears for the rod end of the primary boom lift cylinder.

21 Raise the rod end of the primary boom lift cylinder back into position and install the rod-end pivot pin. Install the pin retaining fasteners.

Primary Boom Components

22 Attach a strap from an overhead crane to the cable track.

23 Remove the mounting fasteners from the upper cable track at the platform end of the extension boom.

24 Remove the cable track mounting fasteners that attach the lower cable track to the primary boom.

25 Remove the cable track from the machine and place it on a structure capable of supporting it.

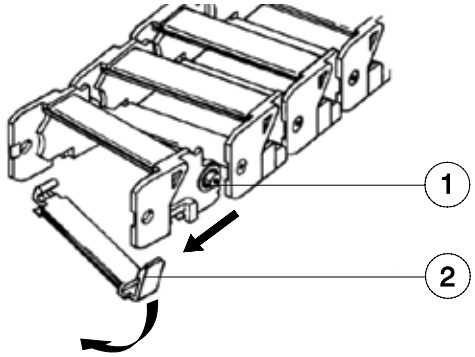
⚠WARNING Crushing hazard. The cable track could become unbalanced and fall if not properly attached to the overhead crane.

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

How to Repair the Primary Boom Cable Track

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

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



1 link separation point
2 lower clip

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

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

3 Repeat steps 1 and 2 for each link.

Primary Boom Components

4-2
Primary Boom

How to Remove the Primary Boom

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

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

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

1 Remove the platform.

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

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

4 Raise the primary boom to a horizontal position.

5 Remove the hose and cable cover from the upper pivot.

6 Remove the pin retaining fastener from the master cylinder barrel-end pivot pin. Use a soft metal drift to remove the pin. Then lower the cylinder and let it hang down.

NOTICE Component damage hazard. When lowering the master cylinder down, be sure not to damage the master cylinder hoses or fittings.

7 Locate the primary boom drive speed limit switch inside of the upper pivot.

8 Remove the primary boom drive speed limit switch mounting fasteners. Do not disconnect the wiring.

9 Locate the primary extension boom drive speed limit switch inside of the extension boom.

10 Remove the primary extension boom drive speed limit switch mounting fasteners. Do not disconnect the wiring.

11 Pull the limit switch and the wiring out of the extension tube and move it out of the way.

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

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

13 Remove the hose clamp at the pivot end of the boom.

Primary Boom Components

14 Attach a 5 ton / 5,000 kg overhead crane to the center point of the primary boom.

15 Attach a similar lifting device to the primary boom lift cylinder.

16 Place support blocks under the primary boom lift cylinder

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

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

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

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

20 Remove the primary boom pivot pin with a soft metal drift, then carefully remove the primary boom from the machine and place it on a structure capable of supporting it.

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

How to Disassemble the Primary Boom

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

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

2 Place blocks under the barrel end of the primary boom extension cylinder for support.

3 Remove the pin retaining fastener from the extension cylinder barrel-end pivot pin at the pivot end of the primary boom. Use a soft metal drift to remove the pin.

4 Remove and label the location of the wear pads from the platform end of the primary boom.

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

5 Support and slide the extension tube and extension cylinder assembly out of the boom tube.

⚠WARNING Crushing hazard. The primary boom extension tube could become unbalanced and fall when removed from the primary boom tube if not properly supported.

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

Primary Boom Components

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

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

⚠WARNING Crushing hazard. The extension cylinder could become unbalanced and fall when removed from primary boom extension tube if not properly supported.

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

4-3 Primary Boom Lift Cylinder

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

How to Remove the Primary Boom Lift Cylinder

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

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

1 Raise the primary boom to a horizontal position.

2 Raise the secondary boom until the primary boom lift cylinder barrel-end pivot pin is above the turntable covers.

3 Attach a 5 ton / 5000 kg overhead crane to the primary boom for support.

4 Raise the primary boom with the overhead crane slightly to take the pressure off the primary boom lift cylinder pivot pins.

5 Support the rod end and the barrel end of the primary boom lift cylinder with a second overhead crane or similar lifting device.

Primary Boom Components

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

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

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

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

8 Place a support block across both turntable covers under the primary boom lift cylinder.

9 Lower the rod end of the lift cylinder onto the block. Protect the cylinder rod from damage.

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

10 Remove the primary boom lift cylinder barrel-end pivot pin retaining fasteners. Do not remove the pin.

11 Use a slide hammer to remove the barrel-end pivot pin. Carefully remove the primary boom lift cylinder from the machine.

⚠WARNING Crushing hazard. The lift cylinder could become unbalanced and fall if not properly supported and secured to the lifting device.

4-4
Primary Boom Extension Cylinder

The primary boom extension cylinder extends and retracts the primary boom extension tube. The primary boom extension cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

How to Remove the Primary Boom Extension Cylinder

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

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

1 Raise the primary boom to a horizontal position.

2 Extend the primary boom until the primary boom extension cylinder rod-end pivot pin is accessible in the primary boom extension tube.

3 Remove the hose and cable guard from the upper pivot.

Primary Boom Components

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

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

5 At the platform end of the boom, remove the external snap rings from the extension cylinder rod-end pivot pin. Use a soft metal drift to remove the pin.

6 Remove the barrel-end pivot pin retaining fasteners.

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

8 Support and slide the extension cylinder out of the upper pivot.

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

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

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

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

4-5 Platform Leveling Master Cylinder

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

How to Remove the Platform Leveling Master 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 secondary boom until both the rod-end and barrel-end pivot pins on the master cylinder are accessible.

2 Tag, disconnect and plug the master cylinder hydraulic hoses. Cap the fittings on the cylinder.

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

3 Attach overhead crane or similar lifting device to the master cylinder.

Primary Boom Components

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

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

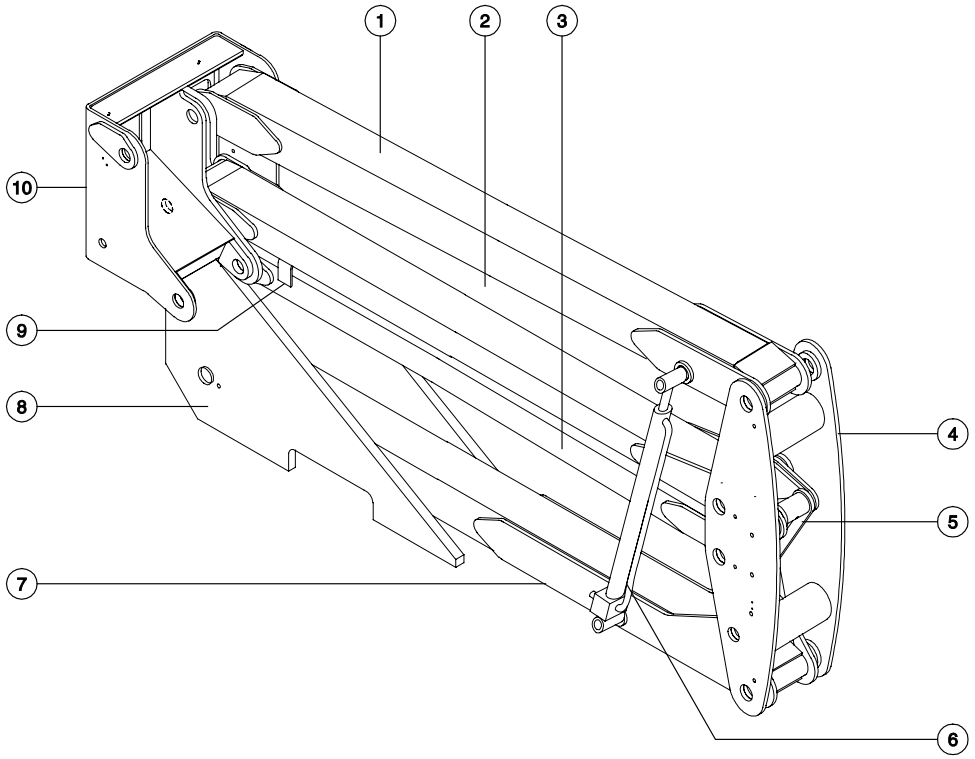
6 Remove the pin retaining fastener from the rod-end pivot pin.

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

8 Remove the master cylinder from the machine.

⚠WARNING Crushing hazard. The master cylinder could become unbalanced and fall if not properly attached to the overhead crane.

Secondary Boom Components



Secondary Boom Components

1 upper secondary boom (number 1 arm)
2 upper tension link (number 2 arm)
3 lower tension link (number 3 arm)
4 mid-pivot
5 compression link
6 secondary boom lift cylinder (2)
7 lower secondary boom (number 4 arm)
8 turntable pivot
9 boom rest
10 upper pivot

Secondary Boom Components

5-1
Secondary Boom

How to Disassemble the Secondary Boom

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

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

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

1 Remove the platform.

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

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

4 Remove the master cylinder. Refer to Repair Procedure, *How to Remove the Master Cylinder.*

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

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

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

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

8 Use a slide hammer to remove the pin. Remove the primary boom lift cylinder from the machine.

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

9 Tag, disconnect and plug the hydraulic hoses on both of the secondary boom lift cylinders. Cap the fittings on the cylinders.

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

Secondary Boom Components

10 Remove the pin retaining fasteners from both sides of the secondary boom lift cylinder rod-end pivot pin and barrel-end pivot pin. Do not remove the pins.

11 Attach a strap from an overhead crane to the lug on the rod end of one of the secondary boom lift cylinders for support. Do not apply any lifting pressure.

12 Use a soft metal drift to drive the barrel-end pivot pin half way out. Lower the barrel end of the secondary boom lift cylinder and let it hang down.

13 Use a soft metal drift to drive the rod-end pivot pin half way out.

14 Remove the secondary boom lift cylinder from the machine.

15 Repeat steps 11 through 14 for the other secondary boom lift cylinder.

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

NOTICE Component damage hazard. When removing a secondary boom lift cylinder from the machine, be careful not to damage the counterbalance valve at the barrel end of the cylinder.

16 Attach a lifting strap from an overhead crane to the upper pivot for support. Do not lift it.

17 Attach a lifting strap from a second overhead crane to the number 1 arm at the mid-point between the upper pivot and mid-pivot.

18 Remove the pin retaining fasteners from the number 1 arm pivot pins at the mid-pivot and the upper pivot. Do not remove the pins.

19 Use a soft metal drift to drive both pins out.

20 Remove the number 1 arm from the machine.

⚠WARNING Crushing hazard. The number 1 arm could become unbalanced and fall when removed from the machine if not properly attached to the overhead crane.

⚠WARNING Crushing hazard. The upper pivot could fall when the number 1 arm is removed from the machine if not properly supported by the overhead crane.

21 Using the overhead crane attached to the upper pivot, raise the secondary boom assembly approximately 30 inches / 76 cm.

22 Insert a 4 x 4 x 11 inch / 10 x 10 x 28 cm block between the number 2 arm and the boom rest. Then lower the secondary boom assembly onto the block.

⚠WARNING Crushing hazard. The secondary boom assembly could fall if not properly supported by the 4 x 4 x 11 inch / 10 x 10 x 28 cm block.

23 Pull all of the cables and hoses out through the upper pivot.

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

Secondary Boom Components

24 Remove the hose and cable covers from the top of the number 2 arm.

25 Pull all of the hoses and cables out of the upper pivot and out through the mid-pivot. Lay the hoses and cables on the ground.

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

26 Remove the pin retaining fastener from the number 2 arm pivot pin at the upper pivot. Use a soft metal drift to remove the pin.

27 Remove the upper pivot from the machine.

⚠WARNING Crushing hazard. The upper pivot could become unbalanced and fall when removed from the machine if not properly attached to the overhead crane.

28 Attach the lifting strap from an overhead crane to the number 2 arm at the upper pivot end.

29 Raise the number 2 arm slightly and remove the 4 x 4 x 11 inch / 10 x 10 x 28 cm block.

30 Lower the number 2 arm onto the boom rest pad.

31 Insert a 4 x 4 x 81/2 inch / 10 x 10 x 22 cm block between the number 3 arm and the number 4 arm at the mid-pivot end.

32 Attach a lifting strap from the overhead crane to the mid-pivot for support. Do not lift it.

33 Remove the pin retaining fasteners from the number 2, 3 and 4 arm pivot pins at the mid-pivot. Do not remove the pins.

34 Use a soft metal drift to drive each pin out. Then remove the mid-pivot from the secondary boom assembly.

⚠WARNING Crushing hazard. The mid-pivot could become unbalanced and fall when removed from the secondary boom assembly if not properly supported by the overhead crane.

35 Attach the lifting strap from an overhead crane to the center point of the number 2 arm for support. Do not lift it.

36 Remove the pin retaining fasteners from both compression link pivot pins. Do not remove the pins.

37 Use a soft metal drift to remove the lower compression link pivot pin at the number 3 arm.

38 Support the compression link with an appropriate lifting device.

39 Use a soft metal drift to remove the upper compression link pivot pin from the number 2 arm. Remove the compression link from the machine.

⚠WARNING Crushing hazard. The number 2 arm could fall when the compression link is disconnected from the number 2 arm if not properly supported by the overhead crane.

⚠WARNING Crushing hazard. The compression link may fall if not properly supported when removed from the secondary boom assembly.

Secondary Boom Components

40 Remove the number 2 arm from the machine.

⚠WARNING Crushing hazard. The number 2 arm could become unbalanced and fall when removed from the secondary boom assembly if not properly supported by the overhead crane.

41 Remove the upper and lower hose and cable covers from the number 3 arm.

42 Pull all of the cables and hoses from the number 3 arm and lay them over the turntable counterweight.

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

43 Open the ground controls side turntable cover.

44 Remove the fuel tank filler cap.

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

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

Note: Be sure to only use a hand-operated pump suitable for use with gasoline and diesel fuel.

46 Tag, disconnect and plug the fuel hoses from the fuel tank. Clean up any fuel that may have spilled.

47 Remove the fuel tank mounting fasteners. Carefully remove the fuel tank from the machine.

NOTICE Component damage hazard. The fuel tank is plastic and may become damaged if allowed to fall.

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

48 Remove the retaining fastener from the ground control box and function manifold pivot plate.

49 Lower the ground control box and function manifold pivot plate to access the number 3 arm pivot pin.

50 Attach the lifting strap from the overhead crane to the center point of the number 3 arm for support. Do not lift it.

51 Remove the mounting fasteners from the cover located in the boom storage area to access the number 3 and number 4 arm pivot pin retaining fasteners at the turntable riser.

52 Remove the pin retaining fasteners from the number 3 arm at the turntable riser. Do not remove the pin.

53 Use a slide hammer to remove the number 3 arm pivot pin from the turntable pivot through the access hole behind the ground control box.

Secondary Boom Components

54 Remove the number 3 arm from the machine.

⚠WARNING Crushing hazard. The number 3 arm could become unbalanced and fall when removed from the machine if not properly supported by the overhead crane.

55 Remove the upper and lower hose and cable covers from the number 3 arm.

56 Remove the secondary boom drive speed limit switch mounting fasteners from the number 4 arm at the mid-pivot end. Do not disconnect the wiring.

57 Remove the pin retaining fasteners from the number 4 arm at the turntable riser. Do not remove the pin.

58 Attach a lifting strap from the overhead crane to the center point of the number 4 arm. Do not lift it.

59 Use a slide hammer to remove the number 4 arm from the turntable riser through the ground controls side bulkhead.

60 Remove the number 4 arm from the machine.

⚠WARNING Crushing hazard. The number 4 arm could become unbalanced and fall when removed from the machine if not properly supported by the overhead crane.

5-2 Secondary Boom Lift Cylinder

There are two secondary boom lift cylinders incorporated in the structure of the secondary boom assembly. These cylinders operate in parallel and require hydraulic pressure to extend and retract. Each secondary boom lift cylinder is equipped with a counterbalance valve to prevent movement in the event of a hydraulic line failure.

How to Remove the Secondary Boom Lift Cylinder

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

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

1 Lower the secondary boom to the stowed position.

2 Raise the primary boom so that it is above the secondary boom lift cylinder rod-end pivot pin.

Secondary Boom Components

3 Tag, disconnect and plug the hydraulic hoses on the secondary boom lift cylinder.

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

4 Remove the pin retaining fasteners from the secondary boom lift cylinder rod-end pivot pin and barrel-end pivot pin. Do not remove the pins.

5 Attach a strap from an overhead crane to the lug on the rod end of the secondary boom lift cylinder for support. Do not apply any lifting pressure.

6 Use a soft metal drift to drive the barrel-end pivot pin half way out. Lower the barrel end of the secondary boom lift cylinder and let it hang down.

7 Use a soft metal drift to drive the rod-end pivot pin half way out.

8 Remove the secondary boom lift cylinder from the machine.

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

NOTICE Component damage hazard. When removing a secondary boom lift cylinder from the machine, be careful not to damage the counterbalance valve at the barrel end of the cylinder.

Engines

6-1 RPM Adjustment

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

6-2 Flex Plate

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

How to Remove the Flex Plate

1 Disconnect the battery cables from the battery

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

2 Disconnect the electrical connectors at the electrical proportional controller, located on the drive pump.

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

4 Carefully pull the pump and bell housing away from the engine and secure it from moving.

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

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

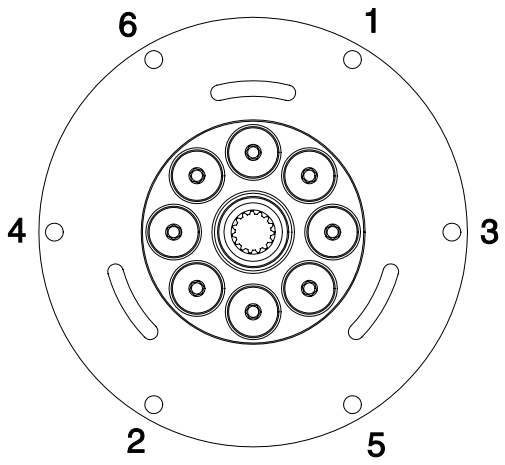
Engines

How to Install the Flex Plate

1 Install the flex plate onto the engine flywheel with the rubber vibration isolators towards the pump.

2 Apply Loctite® removable thread sealant to the flex plate fasteners and loosely install the fasteners.

3 Torque the flex plate mounting bolts in sequence to 28 ft-lbs / 38 Nm. Then torque the flex plate mounting bolts in sequence to 40 ft-lbs / 54 Nm.



Deutz Models

4 Apply a high viscosity coupling grease (Genie part number 128025) to the splines of the pump shaft and flex plate.

Grease Specification
Shell Alvania® Grease CG, NLGI 0/1 or equivalent.

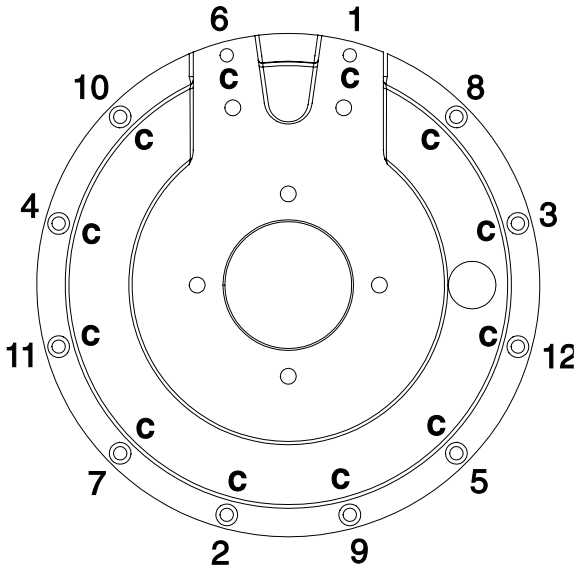
How to install the Pump and Bell Housing Assembly

1 Install the pump and bell housing assembly.

2 Torque the bell housing mounting bolts labeled "C" in sequence to 28 ft-lbs / 38 Nm. Then torque the bell housing mounting bolts labeled "C" in sequence to 40 ft-lbs / 54 Nm.

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

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



Deutz Models

Engines

6-3
Engine Fault Codes - Deutz TD 2.2 L3 Models

How to Retrieve Engine Fault Codes

The ECM constantly monitors the engine by the use of sensors on the engine. The ECM also uses signals from the sensors to initiate sequential fuel injection and make constant and instantaneous changes to ignition timing, fuel delivery and throttle position to maintain the engine's running condition at its highest efficiency while at the same time keeping exhaust emissions to a minimum. When a sensor fails or returns signals that are outside of set parameters, the ECM will store a fault code in memory that relates to the appropriate sensor. One or more faults will also be displayed on the LCD screen located at the ground controls.

If a fault occurs that does not result in an engine shutdown, the engine rpm will go into limp home mode resulting in the loss of high rpm.

Refer to Fault Code Section, How to Retrieve Active Engine Fault Codes for your specific engine model. Use the Fault Code Chart to aid in identifying the fault.

6-4
Diesel Particle Filter Regeneration - Deutz TD 2.2 L3 Engine

The combustion of diesel fuel results in soot, which is separated in the diesel particle filter (DPF). This must be regenerated as the contamination with soot increases. There are 3 types of regeneration.

Passive regeneration:

Under normal operating conditions when the exhaust temperature is >482°F / 250°C the particle filter contamination with soot remains in a permissible range. This process is automatically activated by the engine control unit, the operator does not need to perform any actions.

Standstill regeneration:

If passive regeneration does not attain an adequate reduction of the soot contamination, the particle filter will continue to become contaminated with soot and a standstill regeneration will be required by the operator.

To perform standstill regeneration, refer to the Operator's Manual on your machine.

Service regeneration:

If a fault occurs, the system reacts by reducing the engine performance. This can include limited machine functions, torque reduction, reduced engine rpm and replacement of the DPF.

If standstill regeneration is prohibited by the operator. Service regeneration must be performed by a trained technician with the use of the DEUTZ SerDia software tool and DeCom interface cable. Available from Deutz.

If service regeneration is not performed, replacement of the DPF will be required.

Hydraulic Pumps

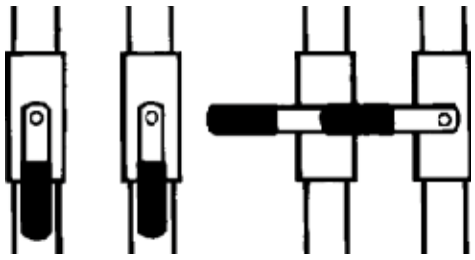
7-1 Lift/Steer Pump

How to Remove the Lift/Steer 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 Locate the two hydraulic tank valves at the hydraulic tank through the access hole underneath the turntable. Close the valves.

NOTICE Component damage hazard. The engine must not be started with the hydraulic tank shut-off valves in the closed position or component damage will occur. If the tank valves are closed, remove the key from the key switch and tag the machine to inform personnel of the condition..



open closed

2 Tag, disconnect and plug the lift/steer pump hydraulic hoses. Cap the fittings 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.

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

NOTICE Component damage hazard. Be sure to open the two hydraulic tank valves and prime the pump after installing the pump.

Hydraulic Pumps

7-2 Drive Pump

The drive pump is a bi-directional variable displacement piston pump. The pump output is controlled by the electro-proportional controller, located on the pump. The only adjustment that can be made to the pump is the neutral or null adjustment. Any internal service to the pump should only be performed at an authorized Eaton Hydraulics center. Call Genie Service Department to locate your local authorized service center.

How to Remove the Drive Pump

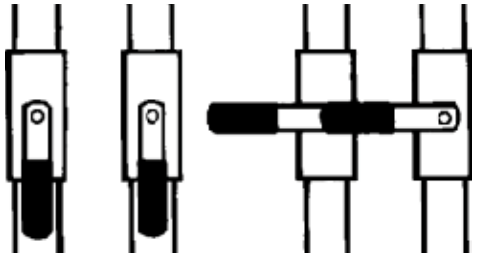
NOTICE Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system and cause severe component damage. Dealer service is recommended.

Note: When removing a hose assembly or fitting, the O-ring (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 Disconnect the electrical connectors at the electrical proportional controller located on the drive pump.

2 Locate the two hydraulic tank valves at the hydraulic tank through the access hole underneath the turntable. Close the valves.

NOTICE Component damage hazard. The engine must not be started with the hydraulic tank shut-off valves in the closed position or component damage will occur. If the tank valves are closed, remove the key from the key switch and tag the machine to inform personnel of the condition.



open closed

3 Tag and disconnect and plug the hydraulic hoses from the drive and lift/steer pumps. Cap the fittings on the pumps.

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

4 Support the pump with a lifting device and remove the two drive pump mounting fasteners.

Hydraulic Pumps

5 Carefully pull the drive pump out until the pump coupler separates from the flex plate.

6 Remove the drive pump from the machine.

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

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

NOTICE Component damage hazard. Be sure to open the two hydraulic tank valves and prime the pump after installing the pump.

How to Prime the Pump

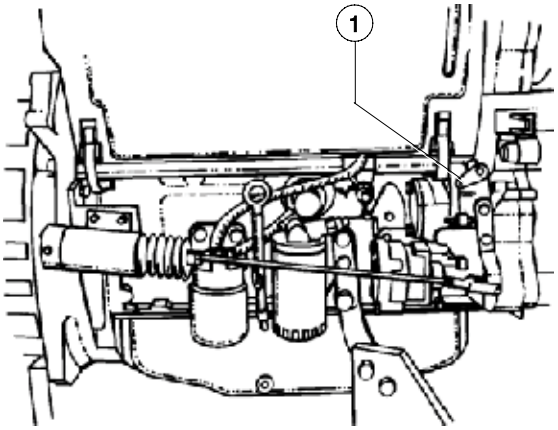
1 Connect a 0 to 600 psi / 0 to 41 bar pressure gauge to the test port on the drive pump.

2 Remove the safety pin from the engine pivot plate latch.

Note: The engine pivot plate latch is located under the engine turntable pivot plate at the counterweight end of the machine.

3 Open the engine pivot plate latch and swing the engine pivot plate out and away from the machine.

4 Hold the manual fuel shutoff valve clockwise to the closed position.



1 manual fuel shutoff valve

5 Have another person crank the engine with the starter motor for 15 seconds, wait 15 seconds, then crank the engine an additional 15 seconds or until the pressure reaches 320 psi / 22 bar.

6 Release the manual fuel shutoff valve.

7 Start the engine from the ground controls and check for hydraulic leaks.

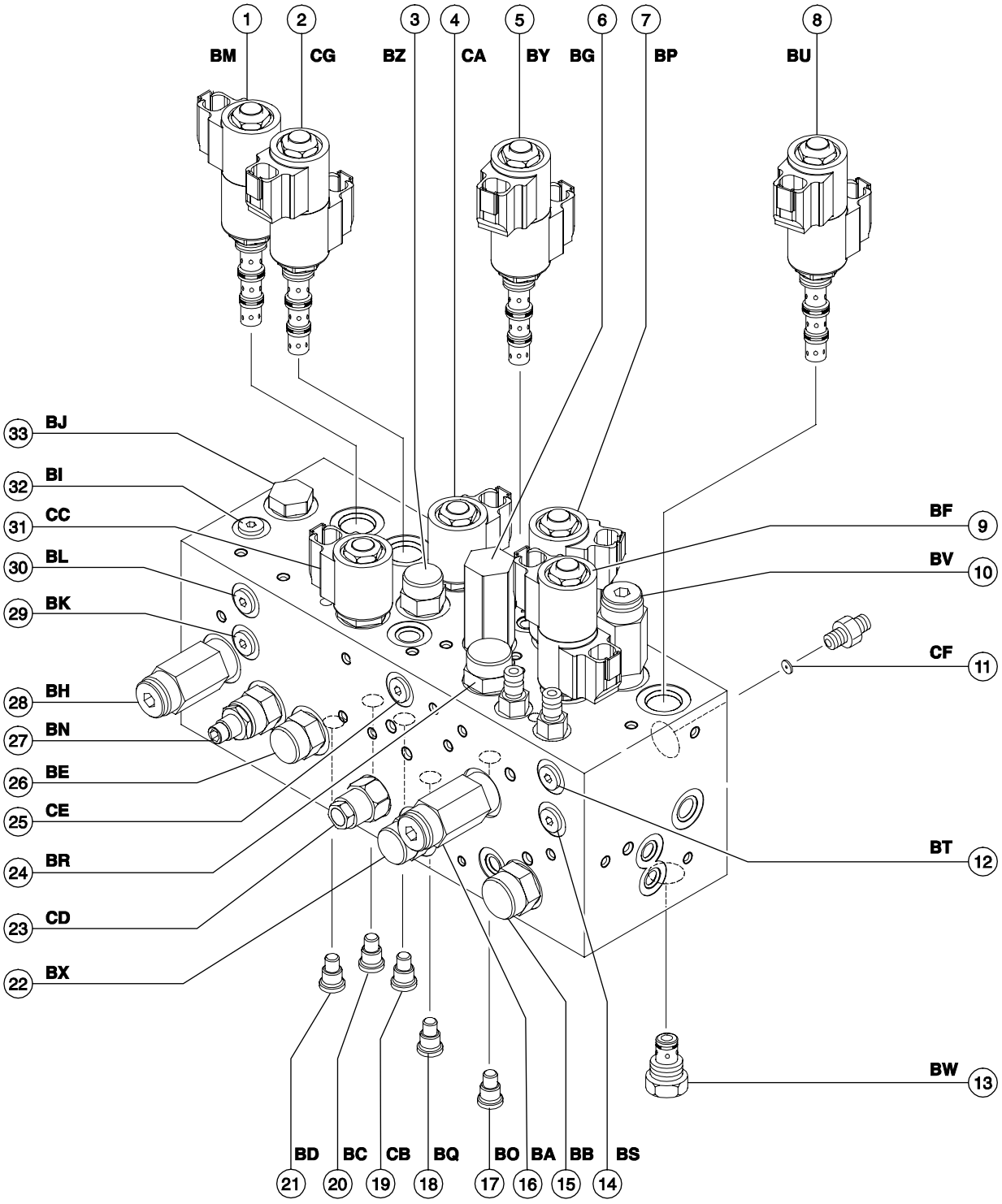
Manifolds

8-1
Function Manifold Components

The function manifold is located next to the hydraulic tank underneath the ground controls side cover

Index No.	Description	Schematic Item	Function	Torque
1	Solenoid valve, 3 position 4 way	BM	Platform level up/down	25 ft-lbs / 34 Nm
2	Solenoid valve, 3 position 4 way	CG	Platform rotate left/right and jib boom up/down	25 ft-lbs / 34 Nm
3	Flow regulator valve, 2 gpm / 7.6 L/min	BZ	Boom extend/retract circuit	20 ft-lbs / 27 Nm
4	Solenoid valve, 2 position 3 way	CA	Primary boom extend	20 ft-lbs / 27 Nm
5	Proportional directional solenoid valve, 3 position 4 way	BY	Primary boom up/down	16-20 ft-lbs / 22-27 Nm
6	Differential sensing valve 160 psi / 11 bar	BG	Meters flow to functions	25 ft-lbs / 34 Nm
7	Proportional directional solenoid valve, 3 position 4 way	BP	Turntable rotate left/right	16-20 ft-lbs / 22-27 Nm
8	Proportional directional solenoid valve, 3 position 4 way	BU	Secondary boom up/down	116-20 ft-lbs / 22-27 Nm
9	Solenoid valve, 3 position 4 way	BF	Steer left/right	25 ft-lbs / 34 Nm
10	Relief valve, 2100 psi / 145 bar	BV	Secondary boom down	20 ft-lbs / 27 Nm
11	Orifice, 0.046 inch / 1.17 mm	CF	Secondary boom down circuit	
12	Check valve, 5 psi / 0.3 bar	BT	Differential sensing circuit, secondary boom down	12-14 ft-lbs / 16-19 Nm
13	Check valve, 5 psi / 0.3 bar	BW	Secondary boom circuit	25 ft-lbs / 34 Nm
14	Check valve, 5 psi / 0.3 bar	BS	Differential sensing circuit, secondary boom up	12-14 ft-lbs / 16-19 Nm
15	Priority flow regulator valve, 2.0 gpm / 7.6 L/min	BB	Steer circuit	25 ft-lbs / 34 Nm
16	Relief valve, 3200 psi / 221 bar	BA	System relief	20 ft-lbs / 27 Nm
17	Shuttle valve	BO	Turntable rotate circuit	12-14 ft-lbs / 16-19 Nm

Manifolds

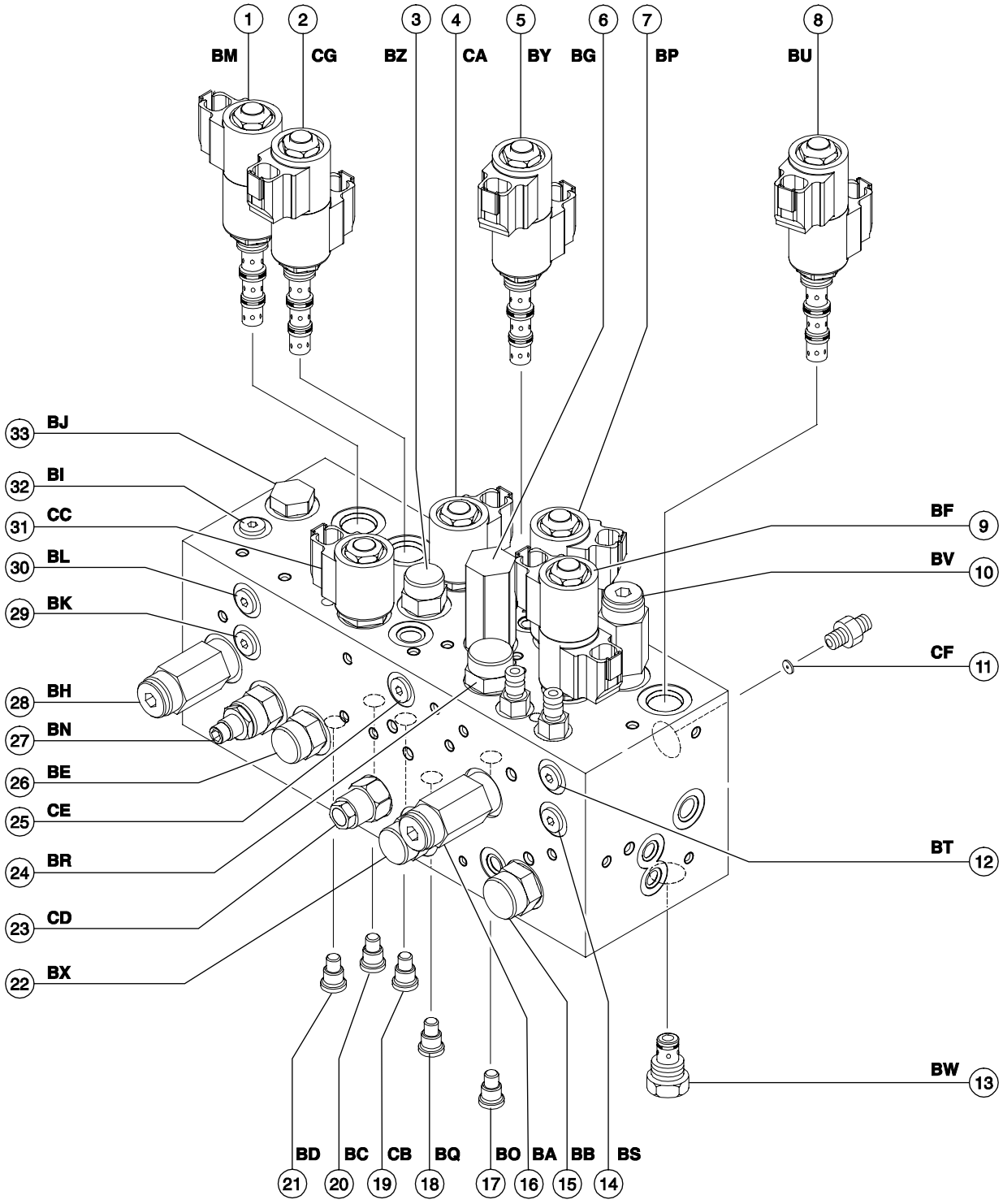

1 BM
2 CG
3 BZ
4 CA
5 BY
6 BG
7 BP
8 BU
33 BJ
32 BI
31 CC
30 BL
29 BK
28 BH
27 BN
26 BE
25 CE
24 BR
23 CD
22 BX
BF 9
BV 10
CF 11
BT 12
BW 13
21 BD
20 BC
19 CB
18 BQ
17 BO
16 BA
15 BB
14 BS

Manifolds

Function Manifold Components, continued

Index No.	Description	Schematic Item	Function	Torque
18	Check valve, 5 psi / 0.3 bar	BQ	Differential sensing circuit, turntable rotate	12-14 ft-lbs / 16-19 Nm
19	Check valve, 5 psi / 0.3 bar	CB	Differential sensing circuit, primary boom retract	12-14 ft-lbs / 16-19 Nm
20	Check valve, 5 psi / 0.3 bar	BC	Differential sensing circuit, platform rotate left and jib boom up	25 ft-lbs / 34 Nm
21	Check valve, 5 psi / 0.3 bar	BD	Differential sensing circuit, platform rotate right and jib boom down	25 ft-lbs / 34 Nm
22	Flow regulator valve, 0.1 gpm / 0.38 L/ min	BX	Primary boom load sense circuit	20 ft-lbs / 27 Nm
23	Counterbalance valve, 3000 psi / 207 bar	CD	Primary boom down circuit	30-35 ft-lbs / 45-50 Nm
24	Pressure compensator valve, 80 psi / 5.5 bar	BR	Turntable rotate circuit	25 ft-lbs / 34 Nm
25	Shuttle valve	CE	Differential sensing circuit, primary boom up/down	12-14 ft-lbs / 16-19 Nm
26	Flow regulator valve, 0.4 gpm / 1.5 L/min	BE	Jib boom and platform rotate circuit	20 ft-lbs / 27 Nm
27	Needle valve	BN	Platform level flow control	20 ft-lbs / 27 Nm
28	Relief valve, 2500 psi / 172 bar	BH	Platform level circuit	20 ft-lbs / 27 Nm
29	Check valve, 5 psi / 0.3 bar	BK	Differential sensing circuit, platform level up	12-14 ft-lbs / 16-19 Nm
30	Check valve, 5 psi / 0.3 bar	BL	Differential sensing circuit, platform level down	12-14 ft-lbs / 16-19 Nm
31	Solenoid valve, 2 position 3 way	CC	Primary boom retract	20 ft-lbs / 27 Nm
32	Shuttle valve	BI	Platform level circuit	12-14 ft-lbs / 16-19 Nm
33	Check valve, dual pilot operated, 135 psi / 9.3 bar	BJ	Platform level circuit	20 ft-lbs / 27 Nm

Manifolds


1 BM
2 CG
3 BZ
4 CA
5 BY
6 BG
7 BP
8 BU
33 BJ
32 BI
31 CC
30 BL
29 BK
28 BH
27 BN
26 BE
25 CE
24 BR
23 CD
22 BX
BF 9
BV 10
CF 11
BT 12
BW 13
21 BD
20 BC
19 CB
18 BQ
17 BO
16 BA
15 BB
14 BS

Manifolds

8-2 Valve Adjustments - Function Manifold

How to Adjust the System Relief Valve

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

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

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test1 port on the function manifold.

2 Start the engine from the ground controls.

3 Hold the function enable switch to the high rpm position and activate and hold the primary boom retract switch with the boom fully retracted.

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

5 Turn the engine off. Use a wrench to hold the relief valve and remove the cap.

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

⚠WARNING Tip-over hazard. Do not adjust the relief valve higher than specified.

7 Repeat steps 2 through 5 and recheck relief valve pressure.

8 Remove the pressure gauge.

How to Adjust the Secondary Boom Down Relief Valve

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

Note: Refer to Function Manifold Component list to locate the secondary boom down relief valve.

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test1 port on the function manifold.

2 Start the engine from the ground controls.

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

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

5 Turn the engine off. Use a wrench to hold the relief valve and remove the cap.

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

⚠WARNING Tip-over hazard. Do not adjust the relief valve higher than specified.

7 Repeat steps 2 through 5 and recheck relief valve pressure.

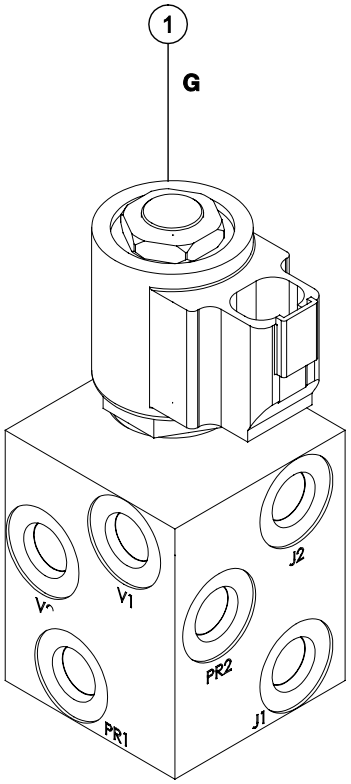
8 Remove the pressure gauge.

Manifolds

8-3
Jib Boom / Platform Rotate Manifold Components

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

Index No.	Description	Schematic Item	Function	Torque
1	Solenoid valve, 2 position 3 way	G	Platform rotate/jib boom select	8-10 ft-lbs / 11-14 Nm

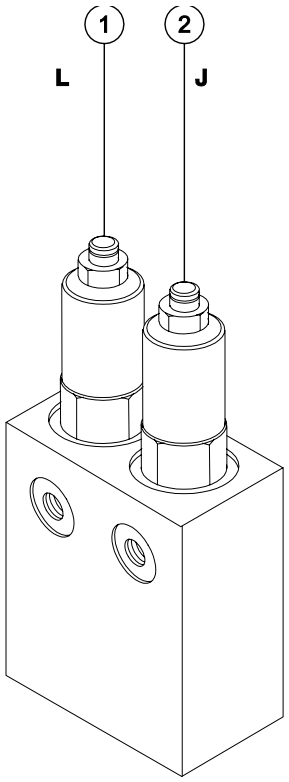


Manifolds

8-4
Turntable Rotation Manifold Components

The turntable rotation manifold is mounted to the turntable rotation motor located in the boom storage compartment.

Index No.	Description	Schematic Item	Function
1	Counterbalance valve	L	Turntable rotate right
2	Counterbalance valve	J	Turntable rotate left

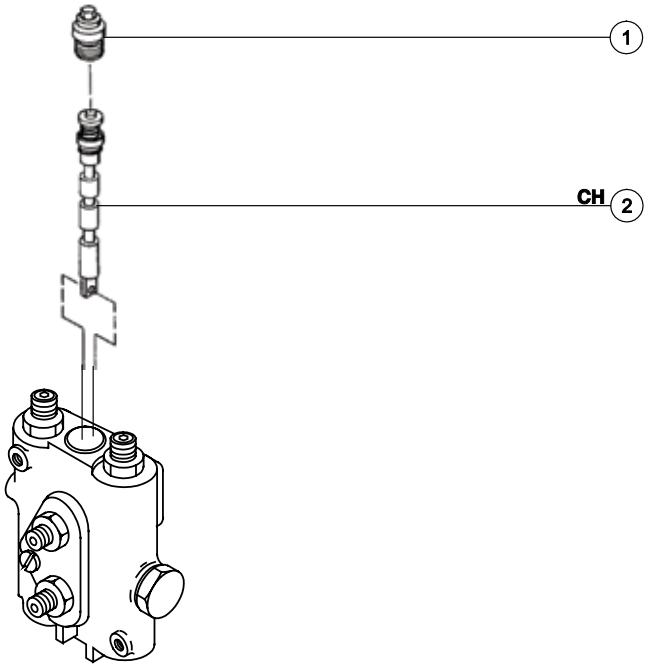


Manifolds

8-5
Directional Valve Manifold Components

The directional valve manifold is mounted inside the drive chassis at the non-steer end.

Index No.	Description	Schematic Item	Function	Torque
1	Cap		Breather	20-25 ft-lbs / 27-33 Nm
2	Spool valve	CH	Directional control	



Manifolds

How to Set Up the Directional Valve Linkage

Note: Adjustment of the oscillate directional valve linkage is only necessary when the linkage or valve has been replaced.

1 Lower the boom to the stowed position.

2 Use a "bubble type" level to be sure the floor is completely level.

⚠WARNING Tip-over hazard. Failure to perform this procedure on a level floor could compromise the stability of the machine resulting in the machine tipping over.

3 Check the tire pressure in all four tires and add air if needed to meet specification.

Note: The tires on some machines are foam-filled and do not need air added to them.

4 Remove the drive chassis cover and the non-steer axle covers.

5 Place a "bubble type" level across the drive chassis non-steer end. Check to be sure the drive chassis is completely leve.

6 Remove the ball joint retaining fastener from the bracket.

7 To level the drive chassis, start the engine and push up or pull down on the threaded rod until the machine is completely level.

8 Verify that the ground and drive chassis are completely level.

9 Adjust the ball joint until the hole lines up with the retaining fastener hole in the bracket.

10 Install the ball joint to the axle and tighten the jam nut.

11 Check to be sure the drive chassis is completely level.

12 Measure the distance between the drive chassis and the non-steer axle on both sides (from the inside of the drive chassis).

Note: If the distance is not equal and the adjustment to the linkage was completed with the ground and drive chassis level, repeat steps 6 through 11 OR consult Genie Product Support.

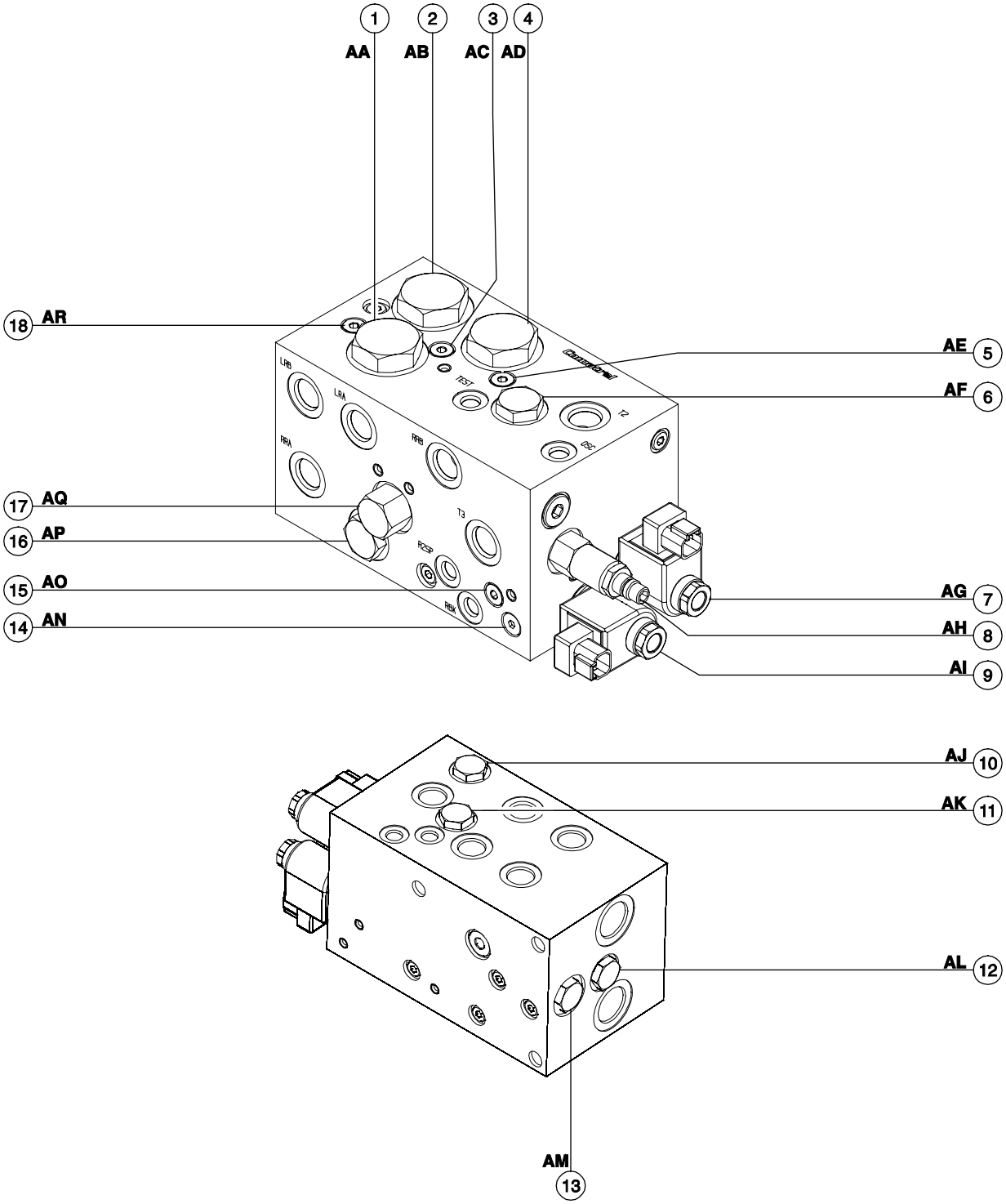
Manifolds

8-6
Traction Manifold Components

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

Index No.	Description	Schematic Item	Function	Torque
1	Flow divider/combiner valve	AA	Controls flow to flow divider/ combiner valves 2 and 4	25-30 ft-lbs / 34-41 Nm
2	Flow divider/combiner valve	AB	Controls flow to non-steer end drive motors in forward and reverse	25-30 ft-lbs / 34-41 Nm
3	Orifice, 0.047 in / 1.2 mm	AC	Drive circuit	
4	Flow divider/combiner valve	AD	Controls flow to steer end drive motors in forward and reverse	25-30 ft-lbs / 34-41 Nm
5	Orifice, 0.040 in / 1.02 mm	AE	Drive circuit	
6	Check valve	AF	Non-steer end drive motor circuit	10-12 ft-lbs / 14-16 Nm
7	Solenoid valve, 2 position 3 way	AG	Braking	10-12 ft-lbs / 14-16 Nm
8	Relief valve, 250 psi / 17.2 bar	AH	Charge pressure circuit	10-12 ft-lbs / 14-16 Nm
9	Solenoid valve, 2 position 3 way	AI	2-speed motor shift	10-12 ft-lbs / 14-16 Nm
10	Check valve	AJ	Steer end drive motor circuit	10-12 ft-lbs / 14-16 Nm
11	Check valve	AK	Steer end drive motor circuit	10-12 ft-lbs / 14-16 Nm
12	Check valve	AL	Non-steer end drive motor circuit	10-12 ft-lbs / 14-16 Nm
13	Check valve	AM	Non-steer end drive motor circuit	10-12 ft-lbs / 14-16 Nm
14	Check valve	AN	2 speed motor shift circuit	10-12 ft-lbs / 14-16 Nm
15	Orifice, 0.030 inch / 0.76 mm	AO	Brake circuit	
16	Check valve	AP	Steer end drive motor circuit	10-12 ft-lbs / 14-16 Nm
17	Shuttle valve, 3 position 3 way	AQ	Charge pressure circuit that directs hot oil out of low pressure side of drive pump and allows low pressure flow path for brake release and 2-speed motor shift	15-18 ft-lbs / 20-24 Nm
18	Orifice, 0.040 in / 1.01 mm	AR	Drive circuit	

Manifolds


1
2
3
4
AA
AB
AC
AD
18 AR
AE 5
AF 6
17 AQ
16 AP
15 AO
14 AN
AG 7
AH 8
AI 9
AJ 10
AK 11
AL 12
AM
13

Manifolds

8-7
Valve Adjustments,Traction Manifold

How to Adjust the Charge Pressure Relief Valve

1 Connect a 0 to 600 psi / 0 to 50 bar pressure gauge to the test port on the drive pump.

2 Hold the charge pressure relief valve and remove the cap (item AH).

3 Turn the internal hex socket clockwise fully until it stops. Install the cap.

4 Start the engine and move and hold the function enable/rpm select toggle switch to the high rpm (rabbit symbol) position. Note the reading on the pressure gauge.

5 Turn the engine off.

6 Remove the pressure gauge from the drive pump. Connect the gauge to the test port located on the traction manifold..

7 Hold the charge pressure relief valve and remove the cap (item AH).

8 Start the engine and move and hold the function enable/rpm select toggle switch to the high rpm (rabbit symbol) position.

9 Adjust the internal hex socket until the pressure reading on the gauge is 40 psi / 2.8 bar less than the pressure reading on the pump. Turn it clockwise to increase the pressure or counterclockwise to decrease the pressure. Install the valve cap

10 Turn the engine off and remove the pressure gauge.

Manifolds

8-8 Valve Coils

How to Test a Coil

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

⚠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	
Proportional directional solenoid valve, 10V DC (schematic items BP, BU and BY)	6 to 8Ω
3 position 4 way directional valve, 10V DC (schematic items BF, BM and CG)	6 to 8Ω
2 position 3 way solenoid valve, 10V DC (schematic items CA, CC, AF, AG and AI)	6 to 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.

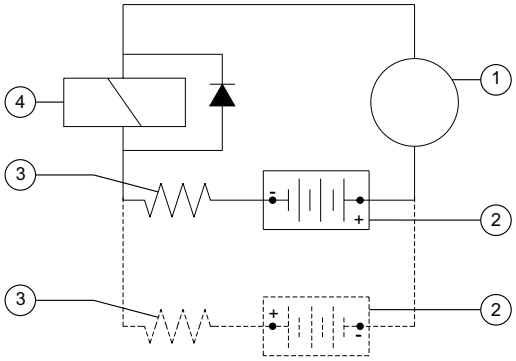
1 Test the coil for resistance. Refer to Repair Procedure, *How to Test a Coil.*

2 Connect a 10Ω resistor to the negative terminal of a known good 9V DC battery. Connect the other end of the resistor to a terminal on the coil.

Resistor. 10Ω	
Genie part number	27287

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

Manifolds



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.

Turntable Rotation Components

9-1 Turntable Rotation Assembly

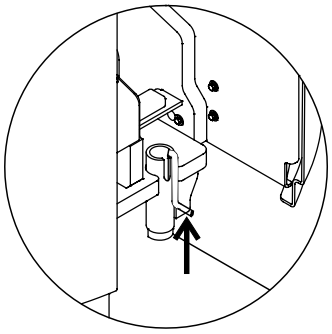
How to Remove the Turntable Rotation Assembly

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*

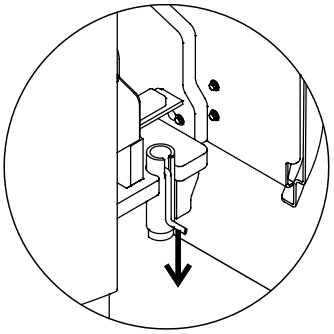
1 Raise the secondary boom until the upper pivot is above the turntable covers. Turn the machine off.

2 Secure the turntable from rotating with the turntable rotation lock.

⚠ DANGER Tip-over hazard. The machine could tip over when the turntable rotation assembly is removed if the turntable rotation lock is not in the locked position.



Unlocked position



Locked position

Turntable Rotation Components

3 Remove the safety pin from the engine pivot plate latch.

Note: The engine pivot plate latch is located under the engine turntable pivot plate at the counterweight end of the machine.

4 Remove the center turntable cover retaining fasteners. Remove the center turntable cover from the machine.

5 Open the engine pivot plate latch and swing the engine pivot plate out and away from the machine.

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

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

7 Attach a lifting strap from and overhead crane or other suitable lifting device to the turntable rotator assembly.

8 Remove the turntable rotation assembly mounting fasteners.

9 Carefully remove the turntable rotation assembly from the machine.

⚠DANGER Tip-over hazard. The machine could tip over when the turntable rotation assembly is removed if the turntable rotation lock is not in the locked position.

⚠WARNING Crushing hazard. The turntable rotation assembly could become unbalanced and fall when removed from the machine if not properly supported by the overhead crane.

Axle Components

10-1 Oscillating Axle Cylinders

The oscillating axle cylinders extend and retract between the drive chassis and the oscillating axle. The cylinders are equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure. The valves are not adjustable.

How to Remove an Oscillating Axle Cylinder

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

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

1 Tag, disconnect and plug the oscillating axle cylinder hydraulic hoses. Cap the fittings on the oscillate cylinder.

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

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

3 Attach a lifting strap from an overhead crane to the barrel end of the oscillating cylinder.

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

⚠CAUTION Crushing hazard. The oscillate cylinder may become unbalanced and fall when removed from the machine if not properly attached to the overhead crane

5 Remove the oscillate cylinder from the machine..

Fault Codes

Observe and Obey:

- ☑ Troubleshooting and repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.
- ☑ Unless otherwise specified, perform each procedure with the machine in the following configuration:
- Machine parked on a firm, level surface
- Key switch in the off position with the key removed
- The red Emergency Stop button in the off position at both the ground and platform controls
- Wheels chocked
- All external AC power supply disconnected from the machine
- Boom in the stowed position
- Turntable secured with the turntable rotation lock
- Welder disconnected from the machine (if equipped with the weld cable to platform option)

Before Troubleshooting:

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

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

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

Control System Fault Codes

Control System

How to Retrieve Control System Fault Codes

At least one fault code is present when the alarm at the platform controls produces two short beeps every 30 seconds for 10 minutes.

Perform this procedure with the engine off, the key switch turned to platform controls and the red Emergency Stop button pulled out to the on position at both the ground and platform controls.

1 Open the platform control box lid.

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

2 Locate the red and yellow fault LEDs on the ALC-500 circuit board inside the platform control box. Do not touch the circuit board.

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

3 Determine the error source: The red LED indicates the error source and will flash two separate codes. The first code will indicate the first digit of the two digit code, flashing once per second. It will then pause for 1.5 seconds and flash the second digit once per 0.5 second.

Note: When the red LED is flashing the code, the yellow LED will be on solid.

4 Determine the error type: The yellow LED indicates the error type and will flash two separate codes. The first code will indicate the first digit of the two digit code, flashing once per second. It will then pause for 1.5 seconds and flash the second digit once per 0.5 second.

Note: When the yellow LED is flashing the code, the red LED will be on solid.

5 Use the fault code table on the following pages to aid in troubleshooting the machine by pinpointing the area or component affected.

Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
21	Primary Up / Down Joystick.	11	Value at 5V	Function is inoperative.Alarm sounds indicating a fault	Cycle power off, then on after problem has been corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated		Calibrate joystick.
22	Primary Up / Down Directional Valves	21	Fault	Valve is operating outside of limits. Alarm sounds indicating a fault.	Cycle power off, then on after problem has been corrected.
23	Primary Up / Down Flow Valve	12	Value too high	Valve is operating outside of limits.	Cycle power off, then on after problem has been corrected
		15	Value too low	Alarm sounds indicating a fault.	
		17	Not calibrated	Normal function except threshold for one or both directions is zero.	Calibrate valve threshold.
24	Angle sensor	11	Value at 5V	Reduced speed function	Cycle power off, then on after problem has been corrected.
		12	Value too high	Alarm sounds indicating a fault.	
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated		Calibrate angle sensor.
		31	Invalid setup	Initiate 1 -second beep of Alarm Buzzer and required retract into safe envelope	Calibrate angle sensor.
26	Angle sensor cross check	19	Out of range	Reduced speed, required retract into safe envelope	Power up controller with problem corrected
31	Secondary Up / Down. Joystick	11	Value at 5V	Function is inoperative.Alarm sounds indicating a fault	Cycle power off, then on after problem has been corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated		Calibrate joystick.

Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
32	Secondary Up / Down. Directional Valves	21	Fault	Valve is operating outside of limits. Alarm sounds indicating a fault.	Cycle power off, then on after problem has been corrected.
33	Secondary Up / Down Flow Valve	12	Value too high	Valve is operating outside of limits.	Cycle power off, then on after problem has been corrected.
		15	Value too low	Alarm sounds indicating a fault.	
		17	Not calibrated	Normal function except threshold for one or both directions is zero.	Calibrate valve threshold.
34	Ext. Ret. Limit Switch	31	Invalid setup	Initiate 1-second beep of Alarm Buzzer. 1000lb. Mode: Required retract into FULLY RETRACTED state before lowering 500lb. Mode: Operates normally	Fully retract, then lower boom Check and service ext/ret and fully stowed switches
41	Turntable Rotate Joystick	11	Value at 5V	Limited speed and direction frozen at zero and neutral.	Cycle power off, then on after problem has been corrected.
		12	Value too high	Alarm sounds indicating a fault.	
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated		Calibrate joystick..
42	Turntable Rotate Directional Valves	21	Fault	Limited direction. Frozen at zero and neutral. Alarm sounds indicating a fault.	Cycle power off, then on after problem has been corrected.
43	Turntable Rotate Flow Valve	12	Value too high	Limited speed and direction.	Cycle power off, then on after problem has been corrected..
		15	Value too low	Frozen at zero and neutral. Alarm sounds indicating a fault.	
		17	Not calibrated	Normal function except threshold for one or both directions is zero.	Calibrate valve threshold.
44	Drive Enable Override Switch	21	Fault	Drive enable override direction is frozen at neutral.	Cycle power off, then on after problem has been corrected.
45	Platform Level Switch	21	Fault	Platform level frozen at neutral	Power up controller with problem corrected

Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
46	Primary Extend/ Retract Switch	21	Fault	Platform Ext/Ret frozen at neutral	Power up controller with problem corrected
51	Drive Joystick	11	Value at 5V	Limited speed and direction. Frozen at zero and neutral. Alarm sounds indicating a fault	Cycle power off, then on after problem has been corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated		
53	Drive Flow Valve (EDC)	12	Value too high	Limited speed and direction. Frozen at zero and neutral. ALarm sounds indicating a fault.	Cycle power off, then on after problem has been corrected.
		15	Value too low		
		17	Not calibrated	Normal function except threshold for one or both directions is zero.	Calibrate valve threshold.
54	Drive Brake Valve	21	Fault	Drive frozen at zero and neutral. Alarm sounds indicating a fault.	Cycle power off, then on after problem has been corrected.

Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
55	High Drive Motor Speed Valve	21	Fault	Motor speed in the low state. Alarm sounds indicating a fault	Cycle power off, then on after problem has been corrected.
56	Platform Level Value	21	Fault	Direction frozen at zero and neutral, AB	Power up controller with problem corrected
57	Foot switch/ ECU Power Crosscheck	12	Value too high	Direction frozen at zero and neutral, AB	Power up controller with problem corrected
		15	Value too low		
61	Steer Joystick	11	Value at 5V	Limited speed and direction. Frozen at zero and neutral. Alarm sounds indicating a fault.	Cycle power off, then on after problem has been corrected.
		12	Value too high		
		15	Value too high		
		16	Value at 0V		
		17	Not calibrated		
62	Steer Directional Valve	21	Fault	Limited speed and direction. Frozen at zero and neutral. Alarm sounds indicating a fault.	Cycle power off, then on after problem has been corrected.

Fault Codes Display

How to Retrieve Active Engine Fault Codes - Deutz TD 2.2 L3 Models

The ECM constantly monitors the engine by the use of sensors on the engine. The ECM also uses signals from the sensors to initiate sequential fuel injection and make constant and instantaneous changes to ignition timing, fuel delivery and throttle position to maintain the engine's running condition at its highest efficiency while at the same time keeping exhaust emissions to a minimum. When a sensor fails or returns signals that are outside of set parameters, the ECM will store a fault code in memory that relates to the appropriate sensor. One or more fault LED's will illuminate on the display located at the ground control box. The active fault code will also be displayed on the LCD screen.

If an engine fault occurs that does not result in an engine shutdown, the engine rpm will go into limp home mode resulting in the loss of high rpm.

When operating from the platform, if the red Emergency Stop button is pushed in, the active fault code(s) will be erased from the display.

Start the engine from the ground control box and operate various boom functions to verify that an active engine fault occurs and is shown on the display.

Note: All faults are stored in the Previous Fault history menu. These faults will not be erased when corrective action has been completed.

With an active fault and the engine running: (preferred method)

1 At the ground controls, activate the auxiliary pump toggle switch to shut the engine off.

Note: Do not push in the red Emergency Stop button or turn the key switch to the off position.

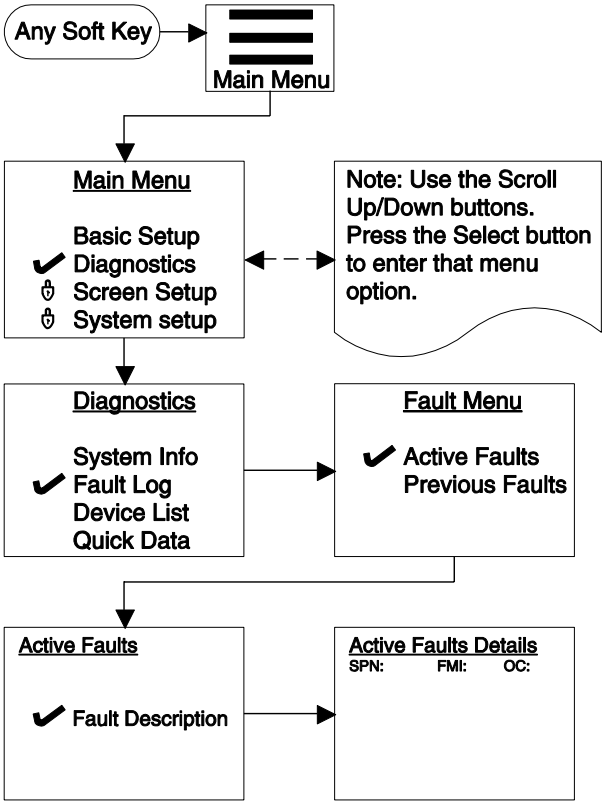
2 Press any soft key below the display.

3 Use the scroll up / down keys to check for multiple engine fault codes

With the engine not running:

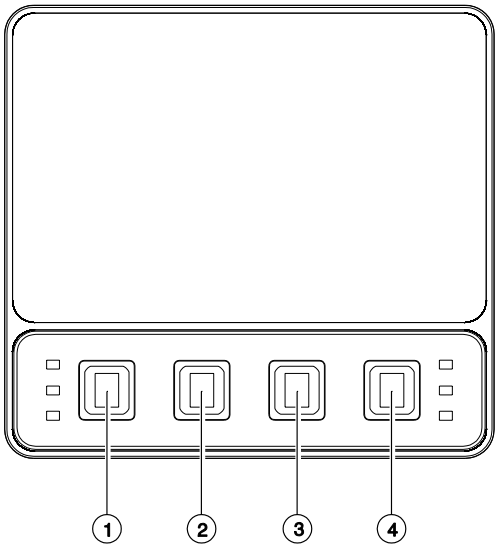
1 At the ground controls, turn the key switch to ground controls and pull out the red Emergency Stop button.

2 Navigate to the Active Fault Menu and use the scroll up / down keys to check for multiple engine fault codes



Fault Codes Display

Soft Key Functions and Icons - Deutz TD 2.2 L3 Models

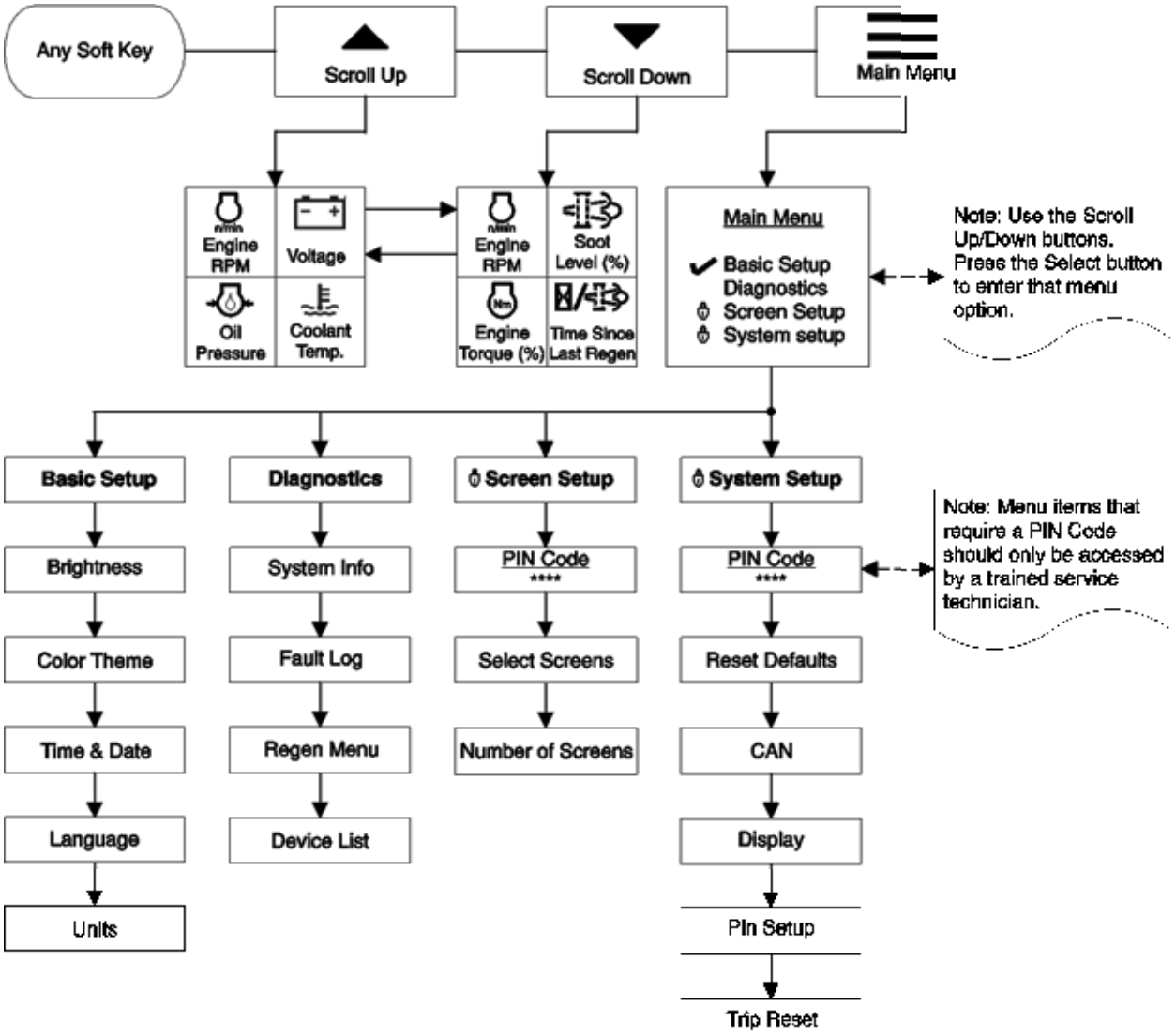


1 Exit / Back one screen
2 Scroll up • Increase Time / Date • Decrease brightness
3 Scroll down • Decrease Time / Date • Increase brightness
4 Main menu • Select

Engine RPM	Voltage	Oil Pressure	Coolant Temperature	Regen required	DPF Service required	Replace DPF	Change Oil
Soot load (%)	Engine torque	Hour meter	Time since last regen	Low coolant	Fuel/Water separator	Engine stop	Engine start
Exit / Back one screen	Scroll up	Scroll down	Select	Standstill regen active	Engine failure		
Main menu	Pin code required						

Fault Codes Display

Main Menu Structure - Deutz TD 2.2 L3 Models



Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
SPN = Suspect Parameter Number

DTC	SPN	FMI	Description
1000	98	2	Engine oil level sensor internal error. Sensor reports error. Open/ short transducer.
1001	98	31	Engine oil level out of range. Level low, high, foaming.
1002	98	31	Oil sensor voltage out of range. <8,5V ±0,5V; >16,5V ±0,5V.
1003	98	2	Oil sensor invalid sensor status.
1004	98	31	Oil sensor temperature out of range.
1005	98	14	Oil sensor is broken or disconnected.
1021	100	3	Oil pressure voltage above normal or shorted to high.
1022	100	4	Oil pressure voltage below normal or shorted to low.
1025	100	1	Low oil pressure. Warning threshold exceeded.
1026	100	1	Low oil pressure. Shut off threshold exceeded.
1043	107	0	Air filter differential pressure. Air filter clogged.
1071	411	2	Engine exhaust gas recirculation. Pressure does not change between engine operating points.
1072	411	0	Engine exhaust gas recirculation. Pressure above normal operational range.
1073	411	1	Engine exhaust gas recirculation. Pressure below normal operational range.
1074	411	2	Engine exhaust gas recirculation. Negative measured differential pressure.
1075	411	2	Engine exhaust gas recirculation. Positive measured differential pressure.
DTC	**SPN**	**FMI**	**Description**
1077	411	3	Engine exhaust gas recirculation. Signal value above maximum limit.
1078	411	4	Engine exhaust gas recirculation. Signal value below maximum limit.
1079	108	0	Ambient air pressure sensor above normal operational range.
1080	108	1	Ambient air pressure sensor below normal operational range.
1081	108	15	Fault check max signal range violated for ambient air pressure sensor.
1082	108	17	Fault check min signal range violated for ambient air pressure sensor.
1083	108	2	Ambient air pressure sensor error by component self diagnosis.
1084	3720	0	DPF ash load above normal operational range.
1086	3734	0	DPF soot load exceeded. Remove filter level.
1087	4781	14	DPF soot load exceeded shut off level.
1088	4781	0	DPF soot load exceeded warning level.
1089	4781	16	DPF. Too much standstill time in short time interval.
1090	10156	0	DPF. The standstill-regeneration mode time exceeds the short-limit.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
SPN = Suspect Parameter Number

1091	3735	16	DPF. Standstill required and no successful standstill longer than escalation threshold. Moderately severe.
1092	3735	0	DPF. Standstill required and no successful standstill longer than escalation threshold. Most severe.
1093	4766	1	DOC. Regeneration temperature in standstill main phase not reached.
1102	171	2	Ambient air temperature shows a deviation from expected value at cold start conditions.
DTC	**SPN**	**FMI**	**Description**
111	102	0	Engine intake manifold pressure above normal operational range.
1114	102	1	Engine intake manifold pressure below normal operational range.
1115	102	3	Intake manifold pressure sensor voltage above normal or shorted to high.
1116	102	4	Intake manifold pressure sensor voltage below normal or shorted to low.
1118	102	1	Intake manifold pressure below normal operational range.
1121	102	2	DFC for signal variation check for pressure sensor of the intake manifold.
1122	102	0	Intake air pressure valve sensor, warning condition exceeded.
1123	102	1	Intake air pressure valve sensor, shutoff condition exceeded.
1124	1209	2	Engine exhaust pressure turbine upstream differs from ambient pressure while engine not running.
1125	1209	15	Engine exhaust pressure turbine upstream above upper limit.
1126	1176	1	Engine turbocharger compressor intake pressure below normal operational range.
1127	1209	2	Engine exhaust pressure turbine upstream tuck check failed. Pressure does not change between engine operating points.
1130	1209	3	Engine exhaust pressure sensor voltage above normal or shorted to high.
1131	1209	4	Engine exhaust pressure sensor voltage below normal or shorted to low.
DTC	**SPN**	**FMI**	**Description**
1134	3251	3	DPF voltage above normal or shorted to high.
1135	3251	4	DPF voltage below normal or shorted to low.
1136	3251	14	DPF reporting communication error.
1137	3251	14	DPF reporting data error.
1138	3251	14	DPF reporting fast channel 1 error.
1139	3251	14	DPF reporting fast channel 2 signal range error.
1149	3251	2	DPF difference pressure value not plausible.
1150	3251	0	DPF difference pressure above shut off threshold.
1151	3251	16	DPF difference pressure above warning threshold.
1152	3251	1	DPF difference pressure below shut off threshold.
1153	3251	18	DPF difference pressure below warning threshold.
1161	5571	16	Rail fuel pressure relief valve above normal operational range.
1162	5571	2	Rail fuel pressure relief valve is forced to open, perform pressure increase.
1163	5571	2	Rail fuel pressure relief valve is forced to open. Performed by pressure increase.
1164	5571	16	Rail fuel pressure relief valve is forced to open. Shutoff conditions.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
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1165	5571	15	Rail fuel pressure relief valve is forced to open. Warning conditions.
1166	5571	0	Open rail fuel pressure relief valve was detected.
1167	5571	2	Unexpected opening of the rail fuel pressure relief valve.
1168	5571	2	Successful rail fuel pressure relief valve opening cannot be ensured.
1169	5571	13	Averaged rail fuel pressure after valve opening is outside the expected tolerance range.

DTC	SPN	FMI	Description
1170	5571	16	Open time of rail fuel pressure relief valve for wear out monitoring had exceeded.
1171	94	1	Fuel pressure build up during engine start not successful.
1172	1347	5	Electrical fuel pump current below normal or open circuit.
1174	1347	3	Electrical fuel pump voltage above normal or shorted to high.
1175	1347	4	Electrical fuel pump voltage below normal or shorted to low.
119	1231	14	CAN Bus 2 off Error for Application CAN.
1190	7103	13	Rail fuel pressure below set point, speed-dependent threshold exceeded.
1191	7103	13	Rail fuel pressure metering unit. Fuel quantity balance is disrupted.
1194	7103	13	Negative rail fuel pressure governor deviation at zero delivery by metering unit.
1195	7103	1	Rail fuel pressure value is below minimum rail pressure threshold.
1197	7103	0	Maximum rail fuel pressure exceeded.
1198	7103	2	Set point of fuel metering unit in overrun mode not plausible.
120	639	14	CAN Bus 1 off Error for Power train CAN.
1200	5357	14	Shut-off due to undershoot of minimum rail pressure.
1202	157	0	Maximum rail pressure exceeded in limp home mode.
1208	157	3	Engine fuel injector metering rail pressure voltage above normal or shorted to high.
DTC	**SPN**	**FMI**	**Description**
1209	157	4	Engine fuel injector metering rail pressure voltage below normal or shorted to low.
121	520252	2	Wrong checksum in the CAN message EAT Control.
1212	629	12	ECU. Keep alive error during runtime at an external device.
1213	629	12	ECU. Keep alive error during initialization phase at an external device.
1215	629	12	ECU. Read diagnosis error for non volatile memory.
1216	629	12	ECU. Write diagnosis error for non volatile memory.
1218	629	12	ECU. Stack memory threshold overrun.
1219	629	12	ECU. Observation counter irregular switch off counter triggered by engine running.
122	4207	2	TSC1 message checksum fault.
123	4207	2	TSC1 message checksum fault.
1233	5826	15	Emission control system operator inducement level 1 severity above normal operational range.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
SPN = Suspect Parameter Number

1235	5826	0	Emission control system operator inducement level 2 severity above normal operational range.
1236	5826	14	Emission control system operator pre-trigger inducement level 2 severity.
124	4207	2	TSC1 message checksum fault.
125	4207	2	TSC1 message checksum fault.
1274	91	3	Accelerator pedal sensor position 1 voltage above normal or shorted to high.
1275	2623	3	Accelerator pedal 1, channel 2 voltage above normal or shorted to high.
1276	29	3	Accelerator pedal 2 voltage above normal or shorted to high.
DTC	**SPN**	**FMI**	**Description**
1277	2625	3	Accelerator pedal 2, channel 2 voltage above normal or shorted to high.
1280	91	4	Accelerator pedal sensor position 1 voltage below normal or shorted to low.
1281	2623	4	Accelerator pedal 1, channel 2 voltage below normal or shorted to low.
1282	29	4	Accelerator pedal 2 voltage below normal or shorted to low.
1286	2625	4	Accelerator pedal 2, channel 2 voltage below normal or shorted to low.
1289	3509	14	Failure of sensor supply voltage 1 from ECU.
1290	3509	0	Sensor supply voltage 1 from ECU above normal operational range.
1291	3509	6	Sensor supply voltage 1 from ECU current above normal or grounded circuit.
1292	3509	1	Sensor supply voltage 1 from ECU below normal operational range.
1293	3510	14	Failure of sensor supply voltage 2 from ECU.
1294	3510	0	Sensor supply voltage 2 from ECU above normal operational range.
1295	3510	6	Sensor supply voltage 2 from ECU current above normal or grounded circuit.
1296	3510	1	Sensor supply voltage 2 from ECU below normal operational range.
1306	677	3	Engine starter motor relay voltage above normal or shorted to high.
1307	677	4	Engine starter motor relay voltage below normal or shorted to low.
DTC	**SPN**	**FMI**	**Description**
1308	677	5	Engine starter motor relay current below normal or shorted to low.
1310	677	3	Engine starter motor relay voltage above normal or shorted to high.
1311	677	4	Engine starter motor relay voltage below normal or shorted to low.
1323	91	11	Accelerator pedal position 1. Possible error between APP1 and APP2 or APP1 and idle switch.
1326	29	11	Accelerator Pedal 2 Position. Possible error between APP1 and idle switch.
1346	1041	14	Start signal indicator. Terminal 50 was operated too long.
1354	105	0	Engine intake manifold 1 temperature data above normal operational range. Warning threshold exceeded.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
SPN = Suspect Parameter Number

DTC	SPN	FMI	Description
1355	105	0	Engine intake manifold 1 temperature above normal operational range. Shutoff threshold exceeded.
1357	1136	0	Engine ECU temperature above normal operational range. Most severe.
1358	1136	1	Engine ECU temperature below normal operational range. Most severe.
1359	1136	15	Engine ECU temperature above normal operational range. Least severe.
1360	1136	17	Engine ECU temperature below normal operational range. Least severe.
1361	1136	2	Engine ECU temperature fault check.
1362	412	15	Engine exhaust gas recirculation temperature above normal operational range.
DTC	**SPN**	**FMI**	**Description**
1363	412	17	Engine exhaust gas recirculation temperature below normal operational range.
1364	412	3	Engine exhaust gas recirculation temperature voltage above normal or shorted to high.
1365	412	4	Engine exhaust gas recirculation temperature voltage below normal or shorted to low.
1372	51	5	Engine throttle valve 1, position 1 current below normal or open circuit.
1375	51	3	Engine throttle valve 1, position 1 voltage above normal or shorted to high. Short circuit to battery 1.
1376	51	3	Engine throttle valve 1, position 1 voltage above normal or shorted to high. Short circuit to battery 2.
1377	51	4	Engine throttle valve 1, position 1 voltage below normal or shorted to low. Short circuit to ground 1.
1378	51	4	Engine throttle valve 1, position 1 voltage below normal or shorted to low. Short circuit to ground 2.
1379	51	6	Engine throttle valve 1, position 1 current above normal or grounded circuit.
1382	51	7	Engine throttle valve 1 position 1 mechanical system not responding or out of adjustment. Valve stuck closed.
1383	51	7	Engine throttle valve 1 position 1 mechanical system not responding or out of adjustment. Valve stuck open.
1391	51	3	Engine throttle valve 1, position 1 voltage above normal or shorted to high.
DTC	**SPN**	**FMI**	**Description**
1392	51	4	Engine throttle valve 1, position 1 voltage below normal or shorted to low.
1397	105	0	Engine intake manifold 1 temperature above normal operational range.
1398	105	1	Engine intake manifold 1 temperature below normal operational range.
1399	4766	2	DOC temperature too high.
1400	4766	2	DOC temperature too low.
1401	4766	15	DOC outlet temperature above normal operational range.
1402	4766	3	DOC outlet temperature voltage above normal or shorted to high.
1403	4766	4	DOC outlet temperature voltage below normal or shorted to low.
1404	4766	2	DOC intake temperature error.
1405	4766	15	DOC Intake temperature above normal operational range.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
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1406	4766	3	DOC intake temperature voltage above normal or shorted to high.
1407	4766	4	DOC intake temperature voltage below normal or shorted to low.
1408	4766	2	DOC intake temperature does not change.
142	520256	9	Timeout of EAT control receive message. CAN message is not received.
144	523211	9	Timeout error of CAN receive frame EBC1.
154	523212	9	Timeout error of CAN receive frame engine protection.
1540	520254	8	The stand still regeneration mode time exceeds the long limit threshold.
1541	520255	2	Hoses connected to the dp DPF SENT sensor inverted. Swap hoses.
155	523741	14	Engine shutdown request via CAN.
DTC	**SPN**	**FMI**	**Description**
1587	97	0	Water in fuel level prefilter; maximum value exceeded
188	523240	9	Timeout CAN message function mode control.
219	520253	2	Rolling counter fault CAN message EAT Control.
220	4206	2	Fault check for Rolling Counter of TSC1AE.
221	4206	2	Fault check for Rolling Counter of TSC1AR.
222	4206	2	Fault check for Rolling Counter of TSC1TE.
223	4206	2	Fault check for Rolling Counter of TSC1TR.
349	3349	0	Timeout error of CAN receive frame active TSC1AE.
350	3349	0	Timeout error of CAN receive frame passive TSC1AE.
351	3349	0	Timeout error of CAN receive frame active TSC1AR.
352	3349	0	Timeout error of CAN receive frame passive TSC1AR.
353	3349	0	Timeout error of CAN receive frame TSC1TE active.
354	3349	0	TSC1 receive timeout error. Short circuit to ground error.
355	3349	0	Timeout error of CAN receive frame TSC1TR.
356	3349	0	Passive timeout error of CAN receive frame TSC1TR.
361	3349	0	Timeout error of CAN receive frame TSC1AE. Traction Control.
363	3349	0	Timeout error of CAN receive frame TSC1AR. Retarder.
365	3349	0	Timeout error of CAN receive frame TSC1TE. Setpoint.
DTC	**SPN**	**FMI**	**Description**
367	3349	0	Timeout Error of CAN receive frame TSC1TR; control signal.
38	1485	3	ECM main relay voltage above normal or shorted to high.
39	1485	3	ECM main relay voltage above normal or shorted to high of actuator relay 2.
40	1485	3	ECM main relay voltage above normal or shorted to high of actuator relay 3.
41	1485	4	ECM main relay voltage below normal or shorted to low.
42	1485	4	ECM main relay voltage below normal or shorted to low of actuator relay 2.
43	1485	4	ECM main relay voltage below normal or shorted to low of actuator relay 3.
48	168	0	Battery voltage above normal operational range.
49	168	1	Battery voltage low normal operational range.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
SPN = Suspect Parameter Number

50	168	3	Battery voltage above normal or shorted to high.
51	168	4	Battery voltage above normal or shorted to low.
516	523982	0	Power stage diagnosis disabled. High battery voltage.
517	523982	1	Power stage diagnosis disabled. High battery voltage.
52	168	0	High battery voltage. Warning threshold is exceeded.
567	27	5	Engine exhaust gas recirculation 1 valve position current below normal or open circuit.
570	27	3	Engine exhaust gas recirculation 1 valve position voltage above normal or shorted to battery 1.
571	27	3	Engine exhaust gas recirculation 1 valve position voltage above normal or shorted to battery 2.
DTC	**SPN**	**FMI**	**Description**
572	27	4	Engine exhaust gas recirculation 1 valve position voltage below normal or shorted to ground 1.
573	27	4	Engine exhaust gas recirculation 1 valve position voltage below normal or shorted to ground 2.
574	27	6	Engine exhaust gas recirculation 1 valve position current above normal or grounded circuit.
577	27	7	Engine exhaust gas recirculation 1 valve position. Mechanical system not responding or out of adjustment. Valve stuck closed.
578	27	7	Engine exhaust gas recirculation 1 valve position. Mechanical system not responding or out of adjustment. Valve stuck open.
582	5763	3	Engine exhaust gas recirculation 1, actuator 1 voltage above normal or shorted to high.
583	5763	4	Engine exhaust gas recirculation 1, actuator 1 voltage below normal or shorted to low.
586	3055	14	Internal software error ECU. Injection cut off.
587	190	0	Engine speed above warning threshold. Over speed detection in component engine protection.
588	190	0	Engine speed above warning threshold. FOC-Level 1.
589	190	0	Engine speed above warning threshold. FOC-Level 2.
590	190	0	Engine speed above warning threshold. Overrun Mode.
610	171	15	Environment temperature sensor, temperature above upper physical threshold.
DTC	**SPN**	**FMI**	**Description**
613	171	3	Ambient air temperature sensor voltage above normal or shorted to high.
614	171	4	Ambient air temperature sensor voltage below normal or shorted to low.
615	723	8	Camshaft speed sensor abnormal frequency or pulse width or period.
616	723	14	Camshaft sensor detection. Out of range, signal disrupted, no signal.
617	723	13	Offset angle between crank and camshaft sensor is too large.
618	4201	8	Crankshaft sensor detection. Out of range, signal disrupted, no signal.
619	4201	14	Crankshaft speed sensor. Speed detection, out of range, signal disrupted or no signal.
68	1669	14	CAN Bus ID-5. CAN Hardware registers are not updated within the expected time.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
SPN = Suspect Parameter Number

DTC	SPN	FMI	Description
70	110	2	Engine Coolant Temperature. Data erratic, intermittent or incorrect.
709	97	3	Water in fuel indicator 1. Voltage above normal or shorted to high.
710	97	4	Water in fuel indicator 1. Voltage below normal or shorted to low.
721	94	15	Low fuel pressure system, max. physical range exceeded.
723	94	3	Engine fuel pressure sensor voltage above normal or shorted to high.
724	94	4	Engine fuel pressure sensor voltage below normal or shorted to low.
725	94	1	Low fuel pressure system, warning threshold exceeded.
726	94	1	Low fuel pressure, shut off threshold exceeded.
75	110	3	Engine coolant temperature voltage above normal or shorted to high.
76	110	4	Engine coolant temperature voltage below normal or shorted to low.
DTC	**SPN**	**FMI**	**Description**
77	110	0	High coolant temperature. Warning threshold exceeded.
78	110	0	Coolant temperature. System reaction initiated.
797	676	12	Engine cold start aid relay error.
798	676	5	Engine cold start aid relay current below normal or open circuit.
799	676	5	Engine cold start aid relay current below normal or open circuit.
80	411	2	Intake air massflow not in expected range.
803	676	3	Engine cold start aid relay voltage above normal or shorted to high.
805	676	4	Engine cold start aid relay voltage below normal or shorted to low.
807	2797	14	Engine fuel 1 injector, Group 1. Number of possible injections limited by the injection valve
815	2797	4	Engine fuel 1 injector, Group 1 voltage below normal or shorted to low.
816	5358	5	Engine cylinder 1 fuel injection quantity current below normal or open circuit.
817	5359	5	Engine cylinder 2 fuel injection quantity current below normal or open circuit.
818	5360	5	Engine cylinder 3 fuel injection quantity current below normal or open circuit.
819	5361	5	Engine cylinder 4 fuel injection quantity current below normal or open circuit.
820	5362	5	Engine cylinder 5 fuel injection quantity current below normal or open circuit.
DTC	**SPN**	**FMI**	**Description**
821	5363	5	Engine cylinder 6 fuel injection quantity current below normal or open circuit.
822	2797	6	Engine fuel 1 injector, Group 1 current above normal or grounded circuit.
823	2798	6	Engine fuel 1 injector, Group 2 current above normal or grounded circuit.
824	5358	6	Engine cylinder 1 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side.
825	5359	6	Engine cylinder 2 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
FMI = Failure Mode Identifier
SPN = Suspect Parameter Number

826	5360	6	Engine cylinder 3 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side.
827	5361	6	Engine cylinder 4 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side.
828	5362	6	Engine cylinder 5 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side.
829	5363	6	Engine cylinder 6 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side.
83	111	1	Coolant level too low.
830	5358	6	Engine cylinder 1 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage.
DTC	**SPN**	**FMI**	**Description**
831	5359	6	Engine cylinder 2 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage.
832	5360	6	Engine cylinder 3 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage.
833	5361	6	Engine cylinder 4 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage.
834	5362	6	Engine cylinder 5 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage.
835	5363	6	Engine cylinder 6 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage.
836	105	3	Engine intake manifold temperature voltage above normal or shorted to high.
837	105	4	Engine intake manifold temperature voltage below normal or shorted to low.
838	2797	14	Engine fuel 1 injector, group 1 missing injector adjustment value programming injector 1.
839	2798	14	Engine fuel 1 injector, group 2 missing injector adjustment value programming injector 2.
DTC	**SPN**	**FMI**	**Description**
840	4257	14	Engine fuel 1 injector, group 3 missing injector adjustment value programming injector 3.
854	7103	5	Engine fuel metering rail pump current below normal or open circuit.
855	7103	3	Engine fuel metering rail pump voltage above normal or shorted to high. Short circuit to battery on the high side power stage.
856	7103	3	Engine fuel metering rail pump voltage above normal or shorted to high. Short circuit to battery on the low side power stage.
857	7103	4	Engine fuel metering rail pump voltage below normal or shorted to low. Short circuit to battery on the high side power stage.
858	7103	4	Engine fuel metering rail pump voltage below normal or shorted to low. Short circuit to battery on the low side power stage.

Deutz TD 2.2 L3 Engine Fault Codes

DTC = Diagnostic Trouble Code
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859	7103	6	Engine fuel metering rail pump current above normal or grounded circuit.
868	629	12	Function monitoring: fault of ECU ADC. Null load test pulse.
869	629	12	Function monitoring: fault of ECU ADC. Test voltage.
870	629	12	ECU. DFC to indicate ICO request from MoCSOP module.
871	91	14	Function monitoring: Monitoring of accelerator pedal position.
875	190	2	Function monitoring: Fault of engine speed check.
876	5357	2	Engine fuel injection error for multiple cylinders. Diagnostic fault check error between level 1 energizing time and level 2 information.
DTC	**SPN**	**FMI**	**Description**
877	5441	2	Engine fuel injection timing error for multiple cylinders.
878	5357	2	Engine fuel injection error for multiple cylinders. Diagnostic fault check to report the error due to non plausibility in ZFC.
879	523612	12	Internal recovery. Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI2 shut-off.
88	598	10	Clutch switch. Abnormal rate of change.
880	523612	12	Internal recovery. Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI3 efficiency factor.
881	523612	12	Internal recovery. Diagnosis fault check to report the error to demand for an ICO due to an error in change of EOM.
882	5357	2	Engine fuel injection error for multiple cylinders. Diagnosis fault check to report the error to demand for an ICO due to an error in total torque relevant quantity.
883	5357	2	Engine fuel injection error for multiple cylinders. Diagnostic fault check to report the error due to injection quantity correction.
884	5442	2	Engine fuel injection pressure error for multiple cylinders.
885	29	2	Accelerator pedal 2 position.
886	677	2	Engine starter motor relay. Function monitoring: Fault of ECU power train active.
DTC	**SPN**	**FMI**	**Description**
887	513	2	Actual engine percent torque. DFC to report the fault in energizing time comparison.
888	513	2	Actual engine percent torque. DFC to report in torque comparison error.
889	520250	2	Function monitoring: Error in the post-build selectable monitoring.
890	629	12	ECU. Status of the EMM alarm FCCU0 which is read out of the FCCU hardware module.
91	1109	2	Engine protection system approaching shutdown. Engine shut off demand ignored.
92	1109	14	Engine protection system approaching shutdown. Shut off request from supervisory monitoring function.
996	629	12	ECU. Diagnostic fault check to report ABE active state.
997	629	12	Function monitoring: Fault of ECU, WDA active by inquiry/response communication.
998	629	12	Function monitoring: Fault of ECU, Error Pin active suspision of HW fault.
999	629	12	Function monitoring: Fault of ECU, WDA active by overvoltage detection.

The following DTC fault code range shares the same description. Replace the ECU.

DTC	891 - 945	Description
SPN	629	Internal ECU error.
FMI	12	

Schematics

Observe and Obey:

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

Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.

About This Section

There are two groups of schematics in this section.

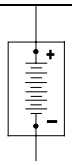
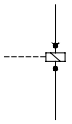
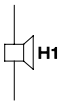
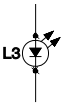
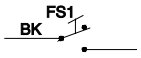
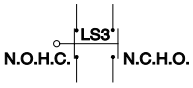
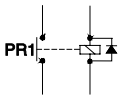
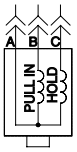
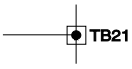
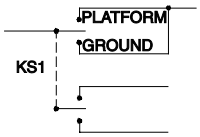
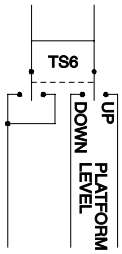
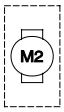
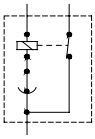
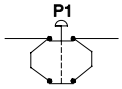
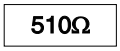
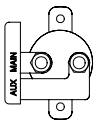
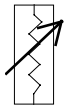
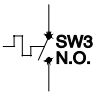
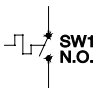
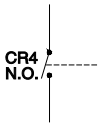
Electrical Schematics

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

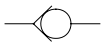
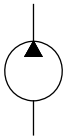
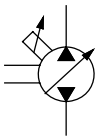
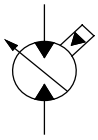
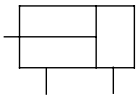
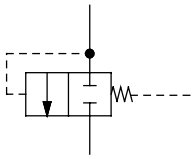
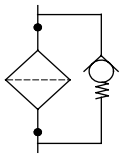
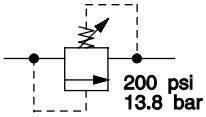
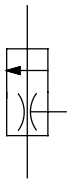
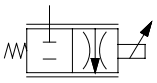
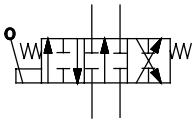
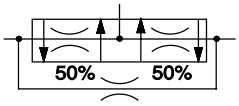
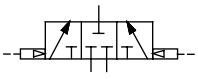
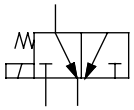
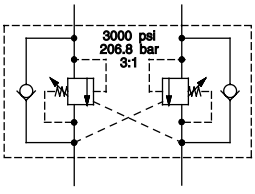
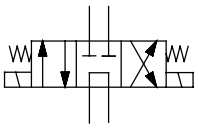
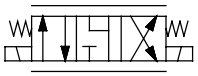
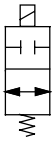
Hydraulic Schematics

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

Electrical Symbols Legends

 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 seperator	 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 Legends

 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
 Double acting cylinder	 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	 2 position, 2 way solenoid valve

Electrical Component and Wire Color Legends

Item	Description
B	**Battery**
B1	Engine Start - 12V DC
C	**Connector**
C7	Power to platform, 12v cable connector
C9	Footswitch input connector
C54	Options connector
CB	**Circuit Breaker**
CB1	Circuit breaker, engine, 15a
CB2	Circuit breaker, controls, 15a
CB7	Circuit breaker, controls, 10a Engine throttle solenoid
CR	**Control Relay**
CR1	Start relay
CR2	Ingition power relay
CR4	High idle relay
CR5	Horn relay
CR13	Jib relay (jib option)
CR14	Jib relay (jib option)
CR17	Hydraulic oil cooling fan (option)
CR23	Drive light enable
CR27	Brake circuit relay (lift/drive option)
CR30	Limit switch relay (lift/drive option)
CR76	Load sense aux recovery (AS models)
CR51	Aircraft package (option)
G	**Gauge**
G1	Battery Charge Indicator
G2	Engine oil pressure
G3	Engine coolant temp.
G4	Engine oil temp.
G6	Hour meter

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

Electrical Component and Wire Color Legends

Item	Description
M	**Motor**
M2	Auxiliary pump
M3	Engine starter
M4	Fuel pump
P	**Button**
P1	Red emergency stop button
P2	Emergency stop button
P3	Horn Button
P4	Function enable button
PR	**Power Relay**
PR1	Auxiliary pump (m2)
PR2	Engine starter (m3)
PR3	Starting aid / glow plugs
PR4	Function pump (m5)
R	**Resistor**
R4	Speed limiting variable resistor 20 ohms
R14	Up/down speed resister 7.5 ohms
SW	**Switch**
SW2	Engine oil pressure
SW3	Engine oil temperature

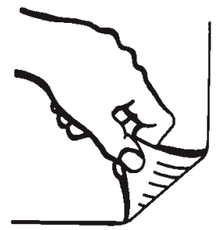
Item	Description
TS	**Toggle Switch**
TS1	Auxiliary pump switch
TS2	Start engine switch
TS3	Fuel select switch (ford efi only)
TS4	Hi/low rpm switch
TS6	Glow plug switch
TS7	Platform rotate switch
TS8	Jib rotate switch (jib option)
TS9	Platform level switch
TS13	Primary boom extend/retract switch
TS14	Drive speed switch
TS15	Drive enable switch
TS43	Heater switch (option)
TS46	Proximity kill switch (option)
TS47	Generator switch (option)
TS51	Auxiliary pump toggle switch
TS52	Engine start toggle switch
TS53	Fuel select toggle switch
TS54	Rpm select toggle switch
TS56	Glow plug toggle switch
TS57	Platform rotate toggle switch
TS58	Jib boom up/down toggle switch (option)
TS59	Platform level up/down toggle switch
TS60	Secondary boom up/down toggle switch
TS61	Primary boom up/down toggle switch
TS62	Turntable rotate toggle switch
TS63	Primary boom extend/retract toggle switch
TS64	Run/test toggle switch (Ford)
TS74	Run/test toggle switch (Deutz)

Electrical Component and Wire Color Legends

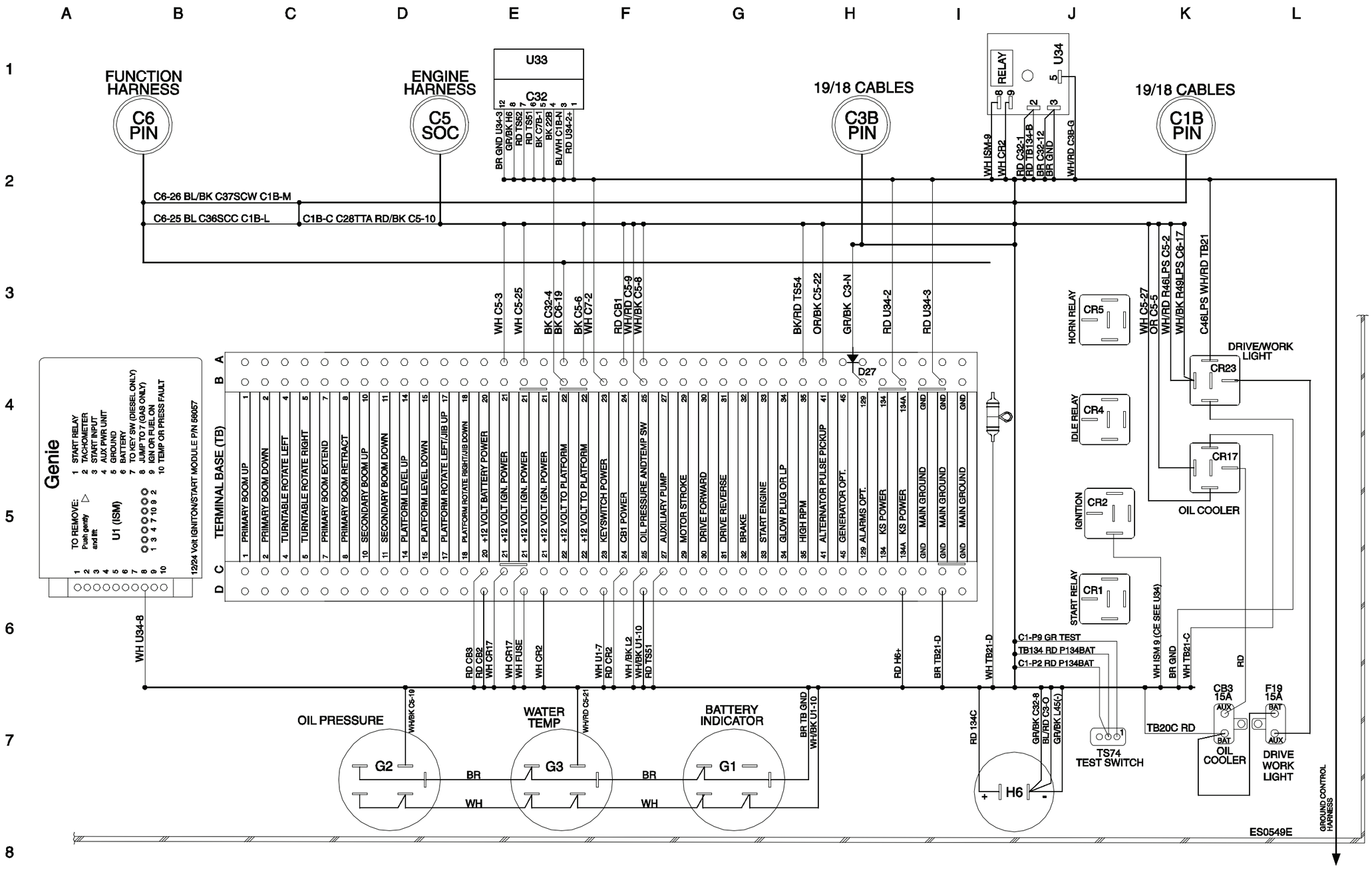
Item	Description
U	**Module**
U1	Ignition start module
U4	EDC - drive pump
U13	Alc 500 joystick controller card
U18	Control module
U33	Load sense module
U34	Time delay relay - 2 seconds, 10A
U35	Time delay relay
U38	Time delay relay
U39	J1939 Ground Control Box Display
X	**ALC500 connectors**
X101	ALC500 power connector
X102	ALC500 input/out connectors
X103	ALC500 input/out connectors
X104	ALC500 input/out connectors
X105	ALC500 input/out connectors
X106	ALC500 input/out connectors
X107	ALC500 input/out connectors
X108	ALC500 input/out connectors
X109	ALC500 input/out connectors
X1-4	Circuit splice

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

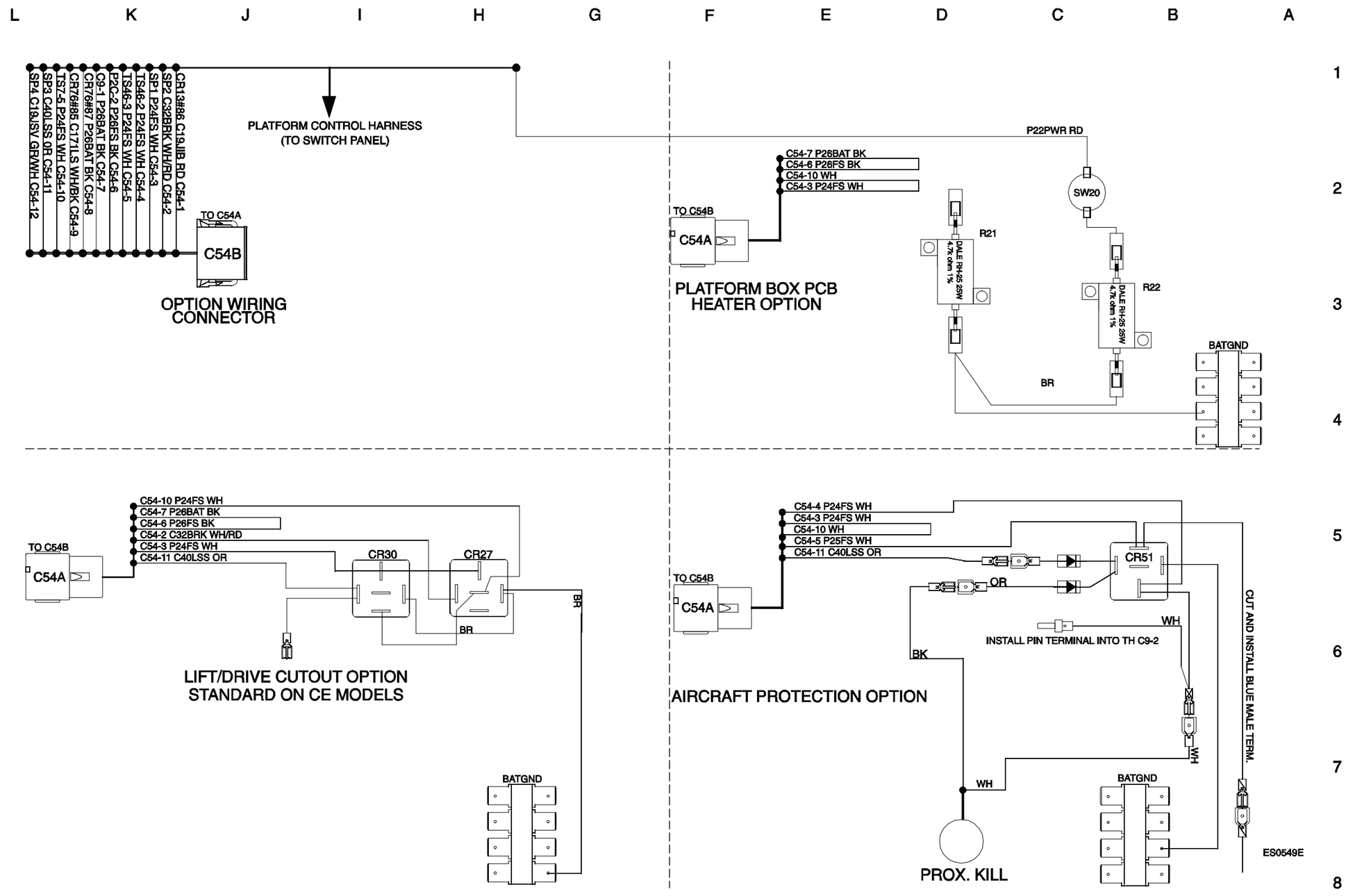
Ground Control Box Terminal Strip Wiring Diagram, Options



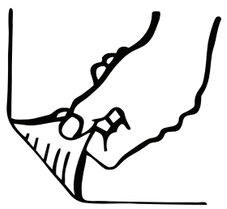
Ground Control Box Terminal Strip Wiring Diagram, Options



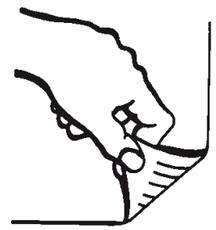
Platform Control Box Wiring Diagram, Options



Platform Control Box Wiring Diagram, Options

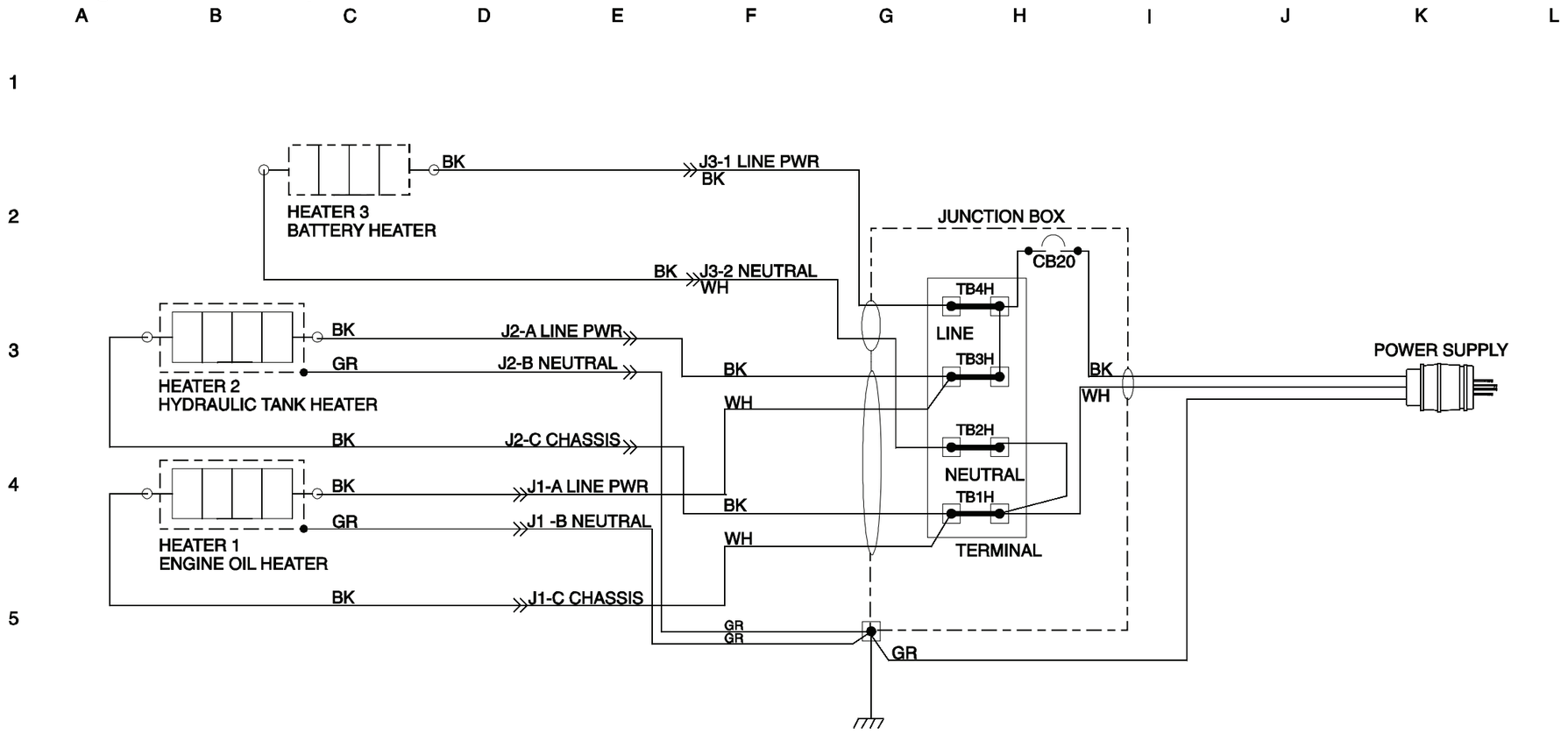


Wiring Diagram - Battery, Hydraulic Oil and Engine Oil Heater Options

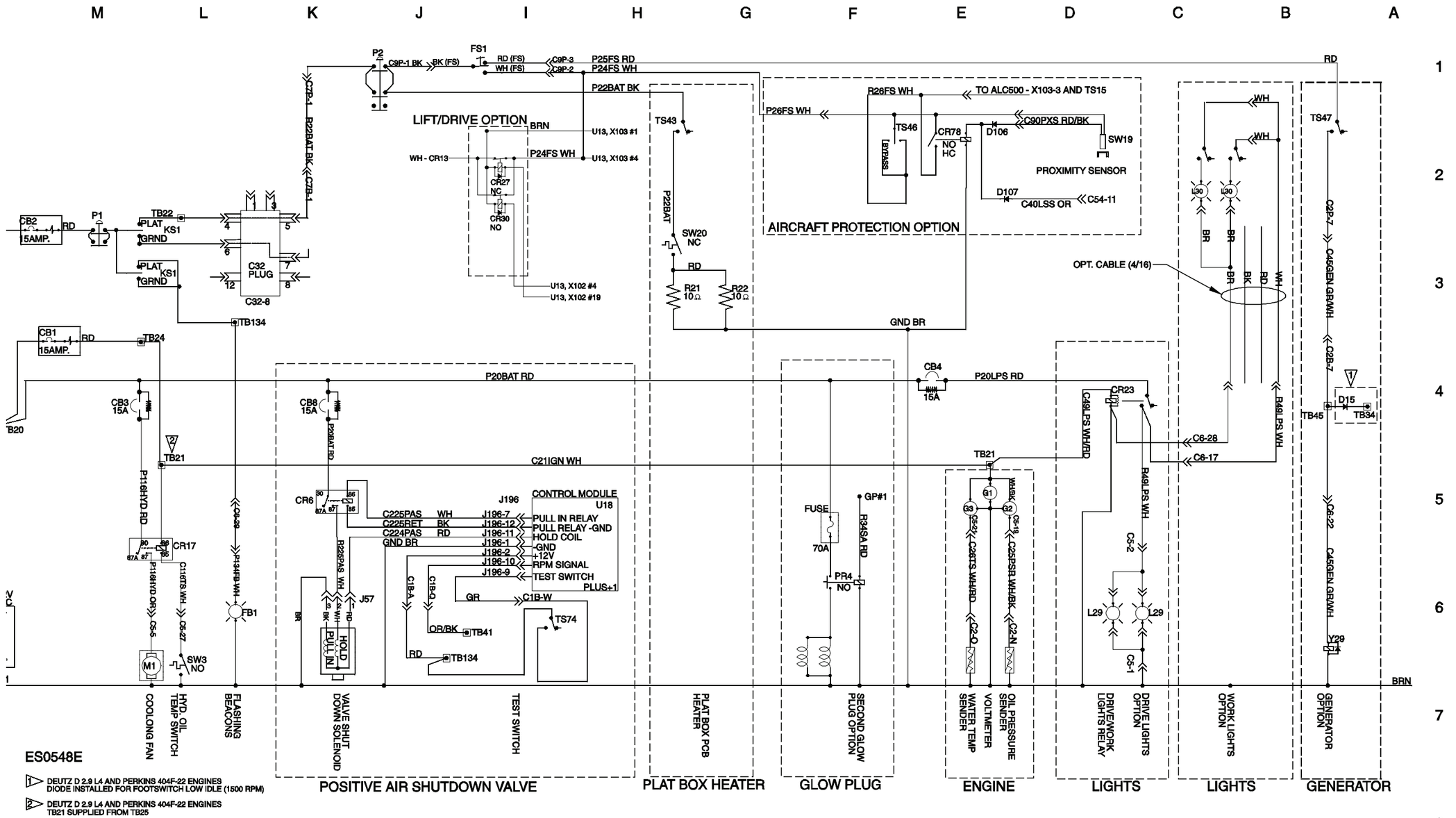


Wiring Diagram - Battery, Hydraulic Oil and Engine Oil Heater Options

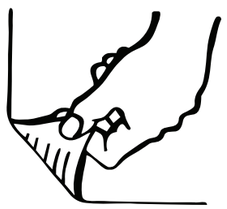
Wiring Diagram - Battery, Hydraulic Oil and Engine Oil Heater Options



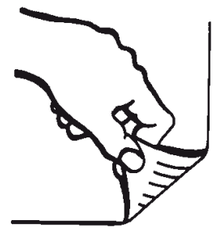
Electrical Schematic, Options



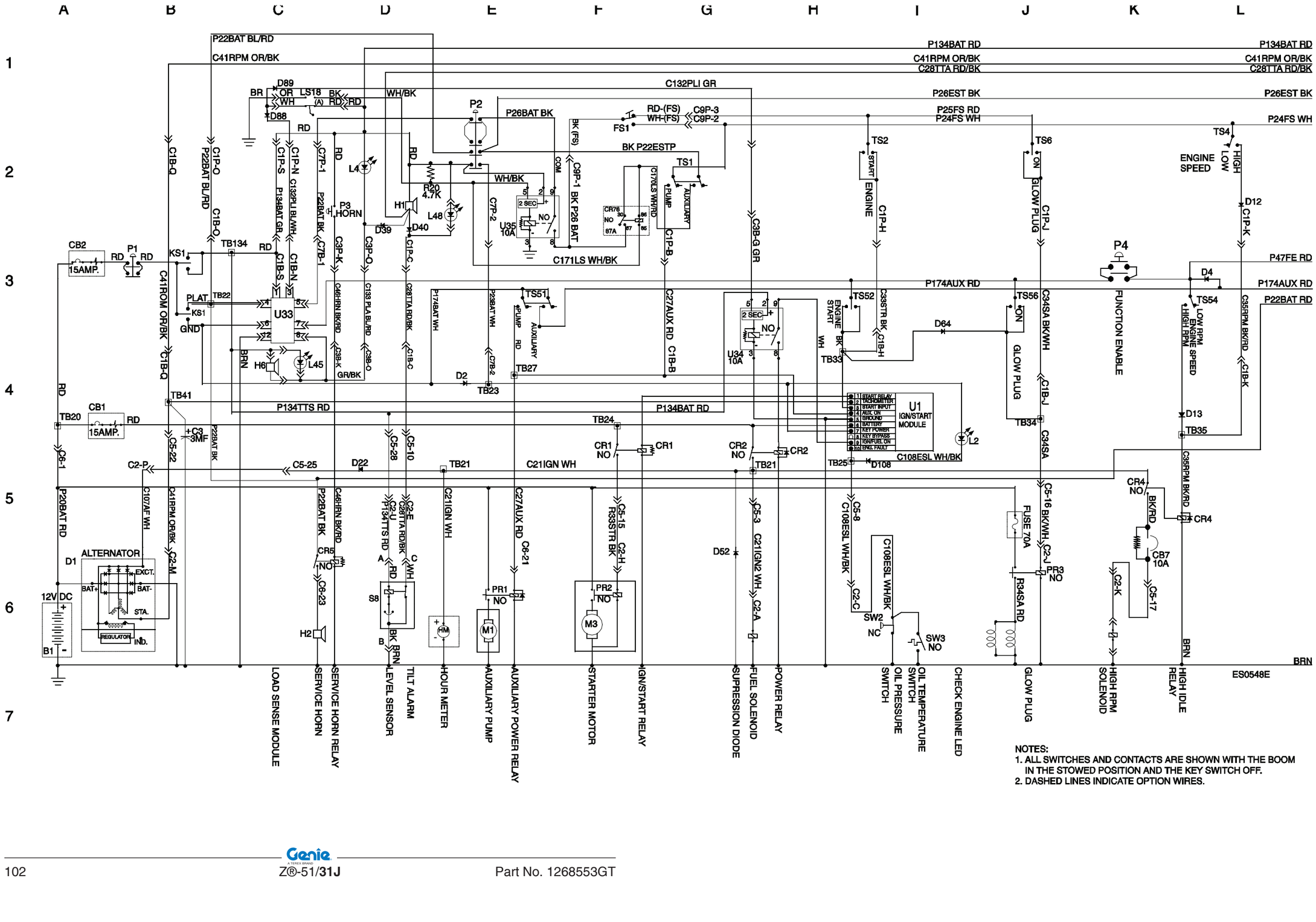
Electrical Schematic, Options



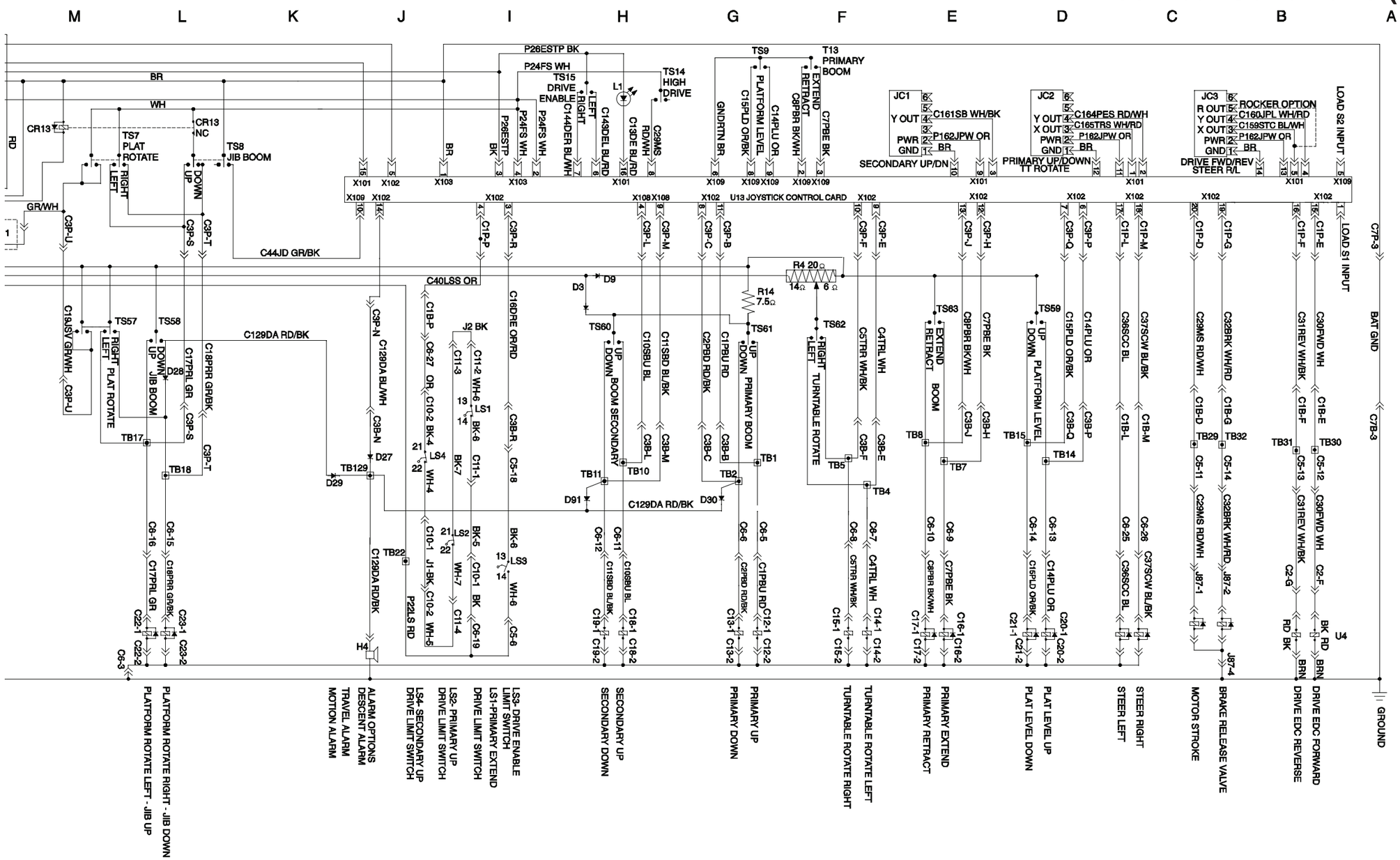
Electrical Schematic (AS)



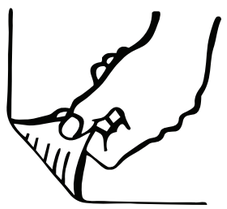
Electrical Schematic (AS)



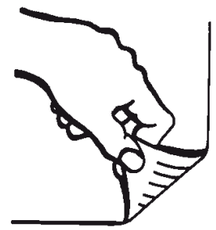
Electrical Schematic (AS)



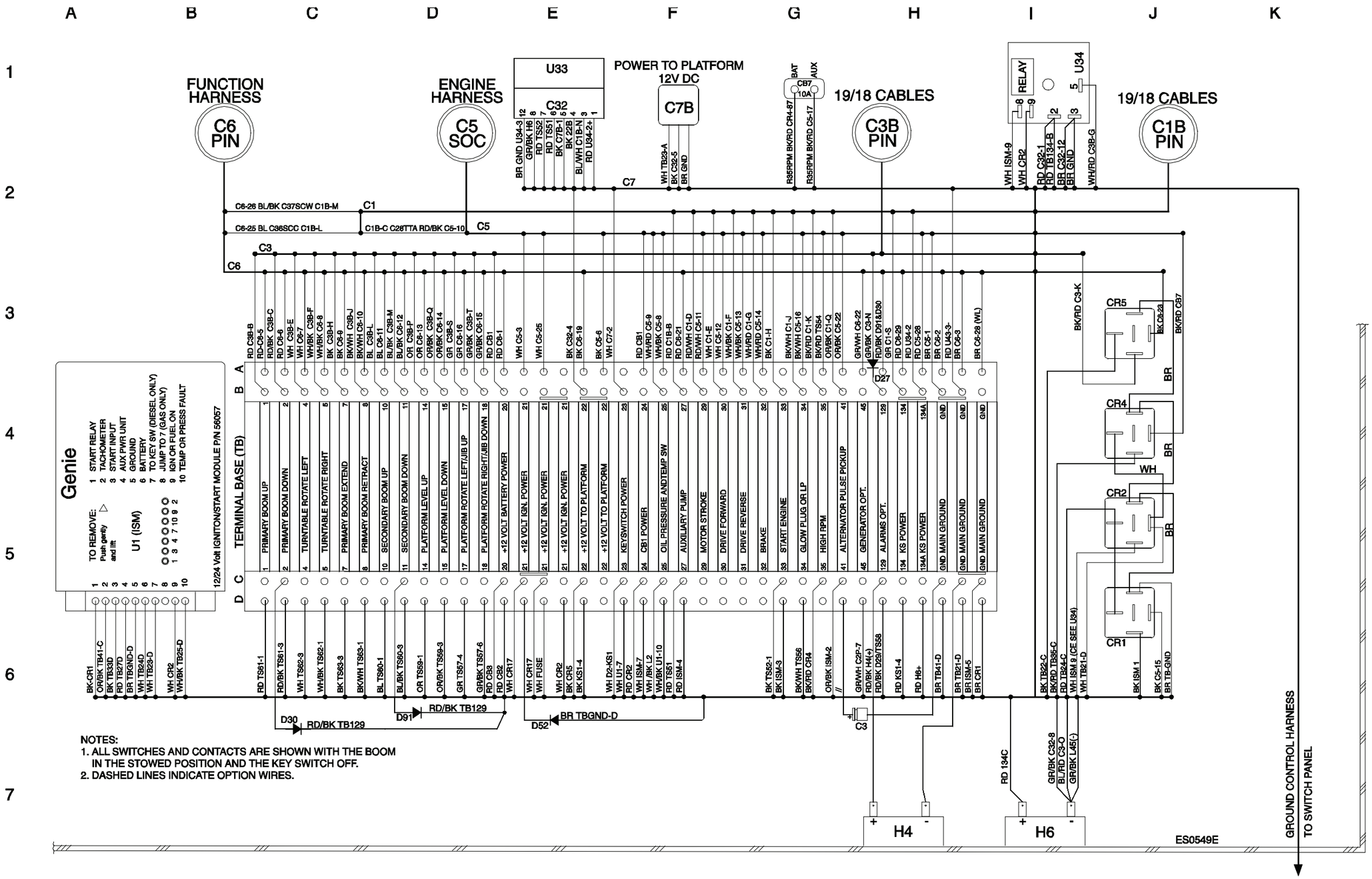
Electrical Schematic (AS)



Ground Control Box Terminal Strip Wiring Diagram (AS)

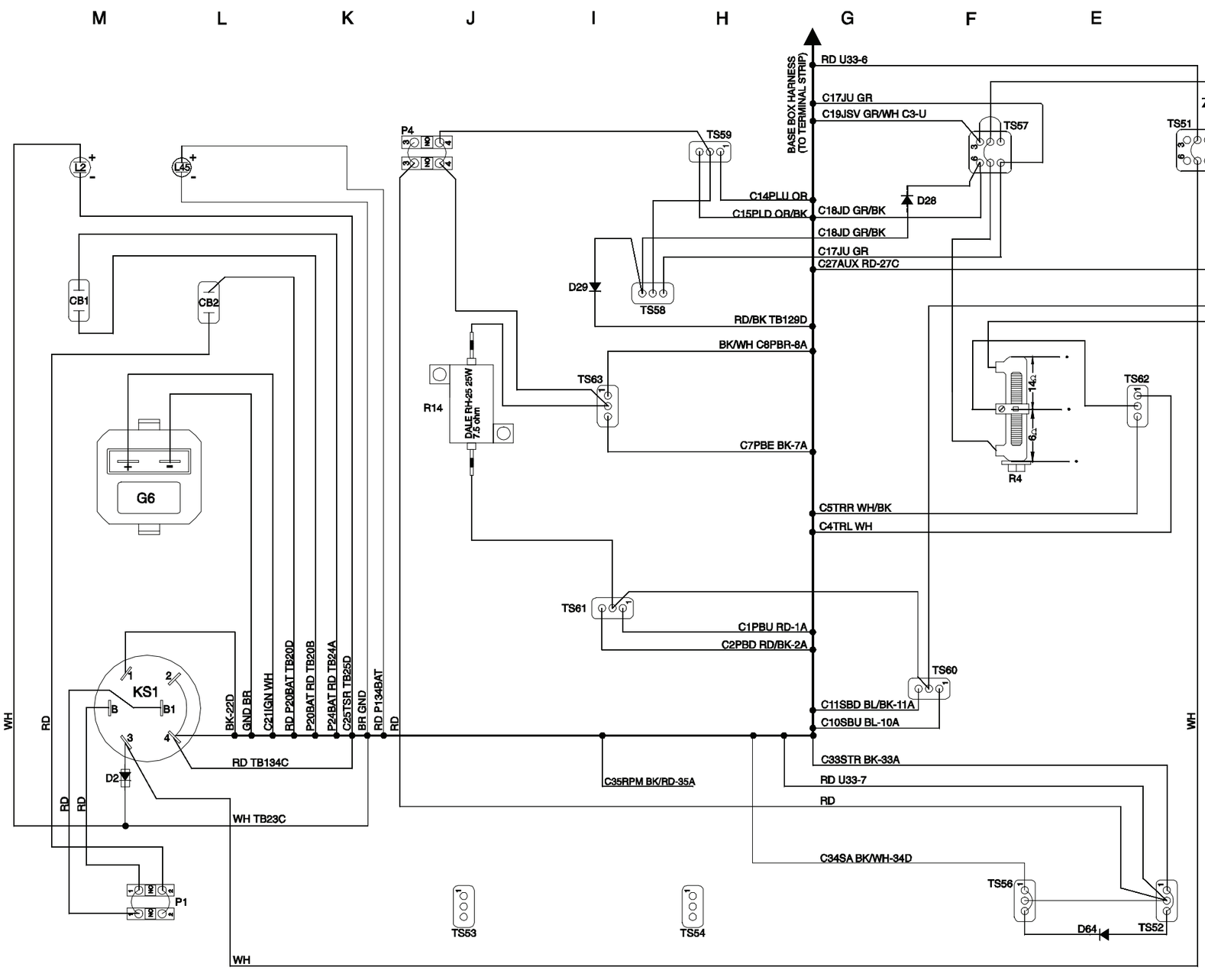


Ground Control Box Terminal Strip Wiring Diagram (AS)



NOTES:
1. ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND THE KEY SWITCH OFF.
2. DASHED LINES INDICATE OPTION WIRES.

Ground Control Box Switch Panel Wiring Diagram (AS)

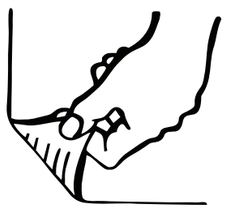


	COMPONENT INDEX
CB1	CIRCUIT BREAKER, ENGINE, 15A
CB2	CIRCUIT BREAKER, CONTROLS, 15A
CR1	START RELAY
CR2	INGITION POWER RELAY
CR4	HIGH IDLE RELAY
CR5	HORN RELAY
G6	HOUR METER
KS1	KEY SWITCH
L2	CHECK ENGINE LED
L45	PLATFORM OVERLOAD LED
P1	RED EMERGENCY STOP BUTTON
P4	FUNCTION ENABLE BUTTON
R4	SPEED LIMITING VARIABLE RESISTOR 20 OHMS
R14	UP/DOWN SPEED RESISTER 7.5 OHMS
TS51	AUXILIARY PUMP TOGGLE SWITCH
TS52	ENGINE START TOGGLE SWITCH
TS54	RPM SELECT TOGGLE SWITCH
TS56	GLOW PLUG TOGGLE SWITCH
TS57	PLATFORM ROTATE TOGGLE SWITCH
TS58	JIB BOOM UP/DOWN TOGGLE SWITCH
TS59	PLATFORM LEVEL UP/DOWN TOGGLE SWITCH
TS60	SECONDARY BOOM UP/DOWN TOGGLE SWITCH
TS61	PRIMARY BOOM UP/DOWN TOGGLE SWITCH
TS62	TURNTABLE ROTATE TOGGLE SWITCH
TS63	PRIMARY BOOM EXTEND/RETRACT TOGGLE SWITCH
TS64	RUN/TEST TOGGLE SWITCH

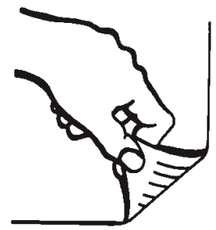
ES0549E

NOTE: DASHED LINES INDICATE OPTIONS.

Ground Control Box Switch Panel Wiring Diagram (AS)



Platform Control Box Wiring Diagram (AS)



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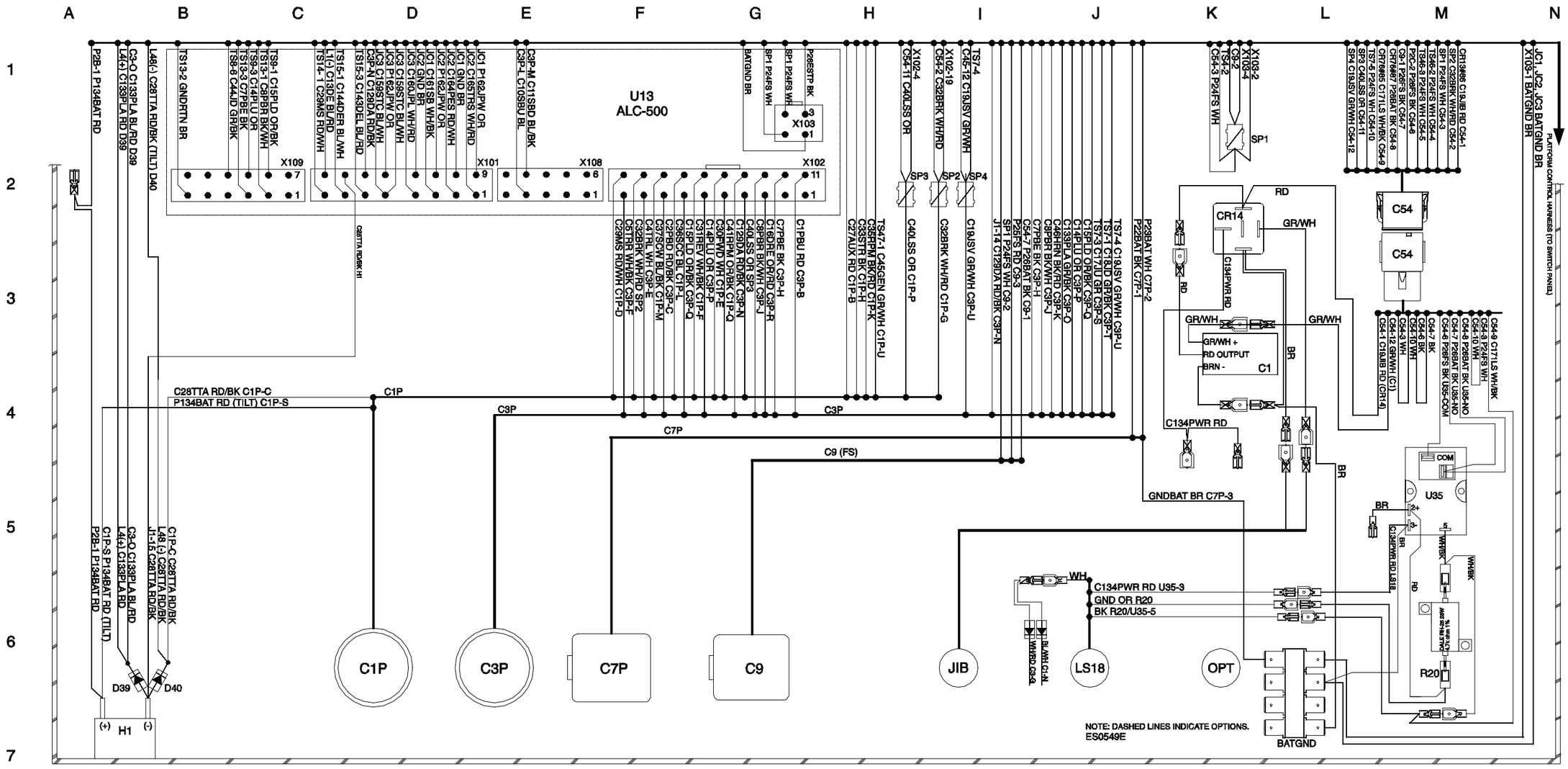
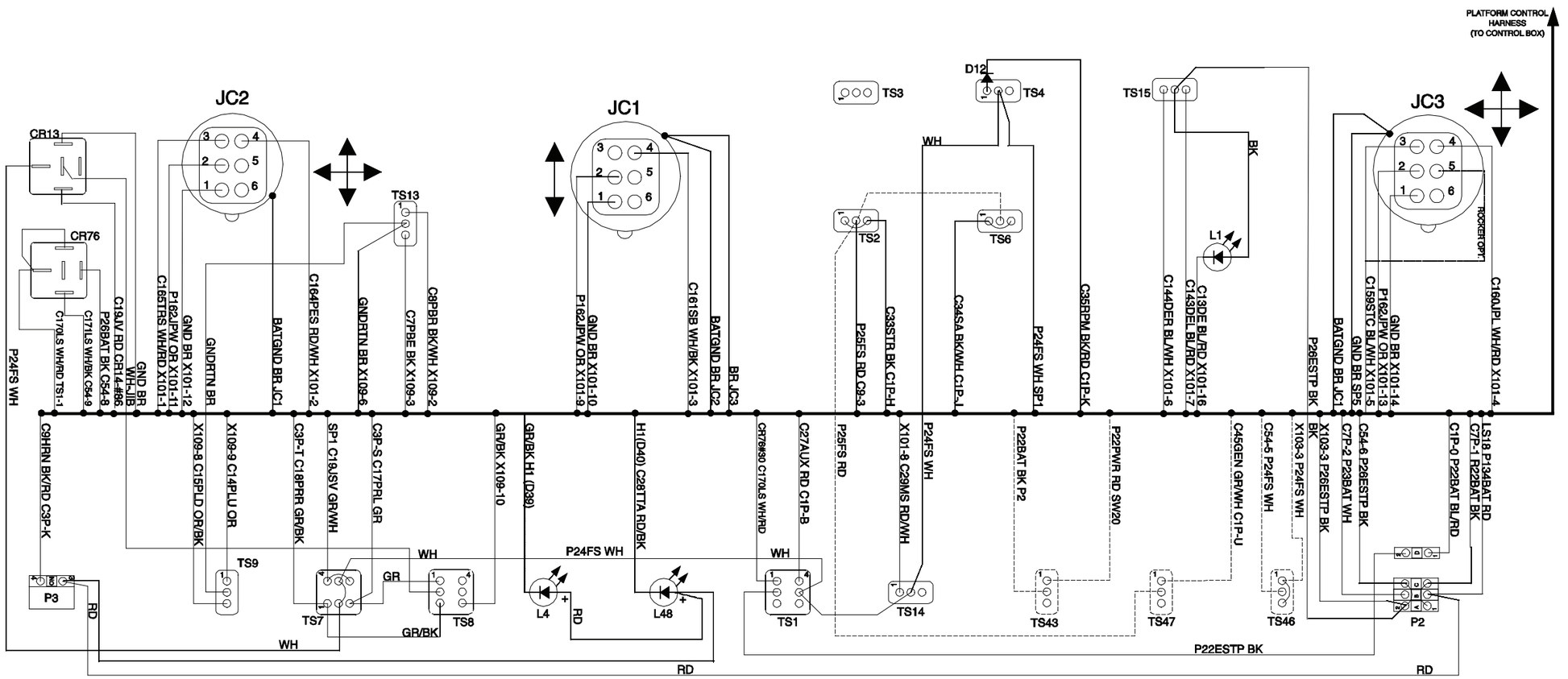


Platform Control Box Switch Panel Wiring Diagram (AS)



COMPONENT INDEX

C1	JIB TIMER CAPACITOR
C1,C2	BOOM CONTROL CABLE CONNECTORS
C7	POWER TO PLATFORM, 12V CABLE CONNECTOR
C9	FOOTSWITCH INPUT CONNECTOR
C54	OPTIONS CONNECTOR
CR13	JIB RELAY
CR14	JIB RELAY
CR27	BRAKE CIRCUIT RELAY (LIFT/DRIVE OPTION)
CR30	LIMIT SWITCH RELAY (LIFT/DRIVE OPTION)
CR76	LOAD SENSE AUX RECOVERY
H1	TILT/LOAD SENSE ALARM
JC1	BOOM PROPORTIONAL JOYSTICK: SECONDARY BOOM UP/DOWN
JC2	BOOM PROPORTIONAL JOYSTICK: PRIMARY UP/DOWN, TURNTABLE ROTATE
JC3	DRIVE PROPORTIONAL JOYSTICK
L1	DRIVE ENABLE LED
L4	PLATFORM OVERLOAD LED
L48	TILT ALARM LED (OPTION)
LS18	CE LIMIT SWITCH
P2	EMERGENCY STOP BUTTON
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TS1	AUXILIARY SWITCH
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TS43	HEATER SWITCH (OPTION)
TS46	PROXIMITY KILL SWITCH (OPTION)
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X1-4	CIRCUIT SPLICE
X101	ALC500 POWER CONNECTOR
X101-X109	ALC500 INPUT/OUT CONNECTORS

ES0549E

NOTE: DASHED LINES INDICATE OPTIONS.

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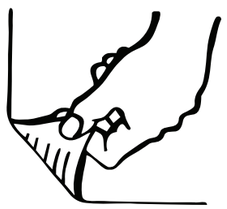
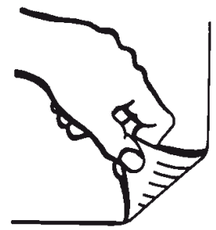


Electrical Schematic (CE)



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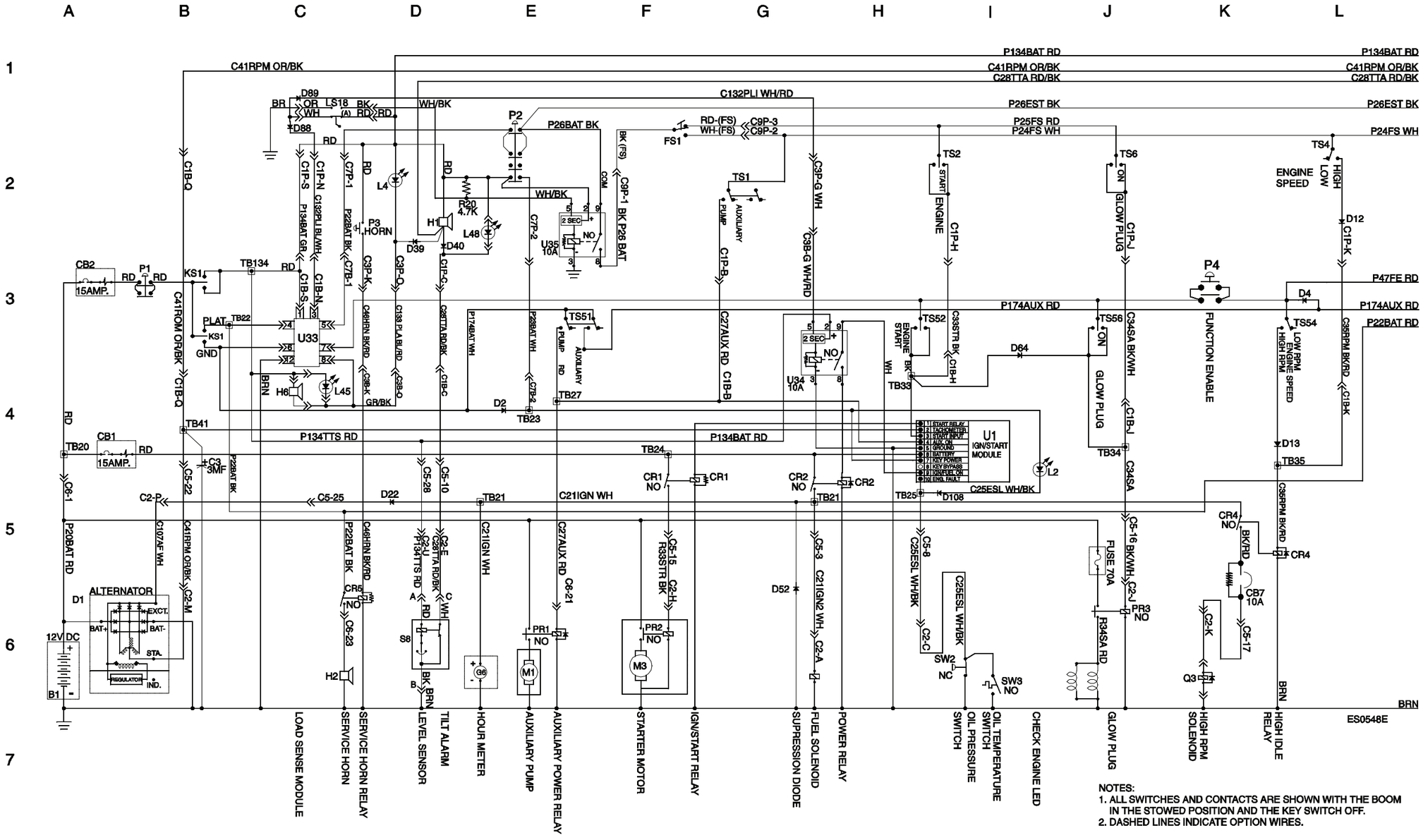

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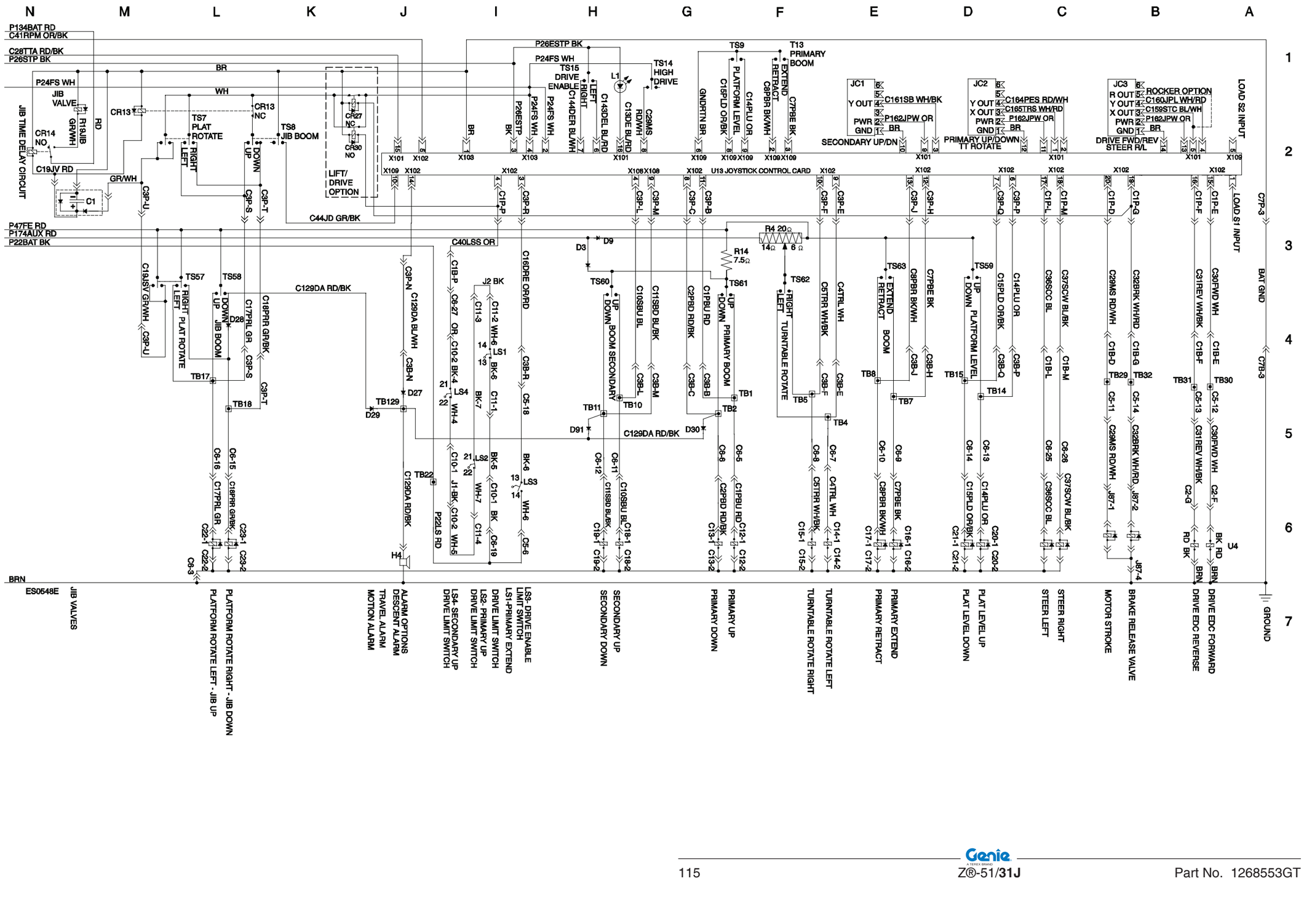

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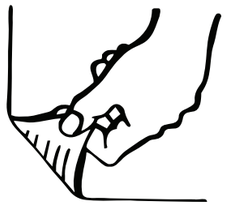
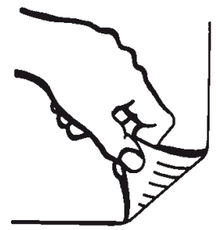


Ground Control Box Terminal Strip Wiring Diagram (CE)



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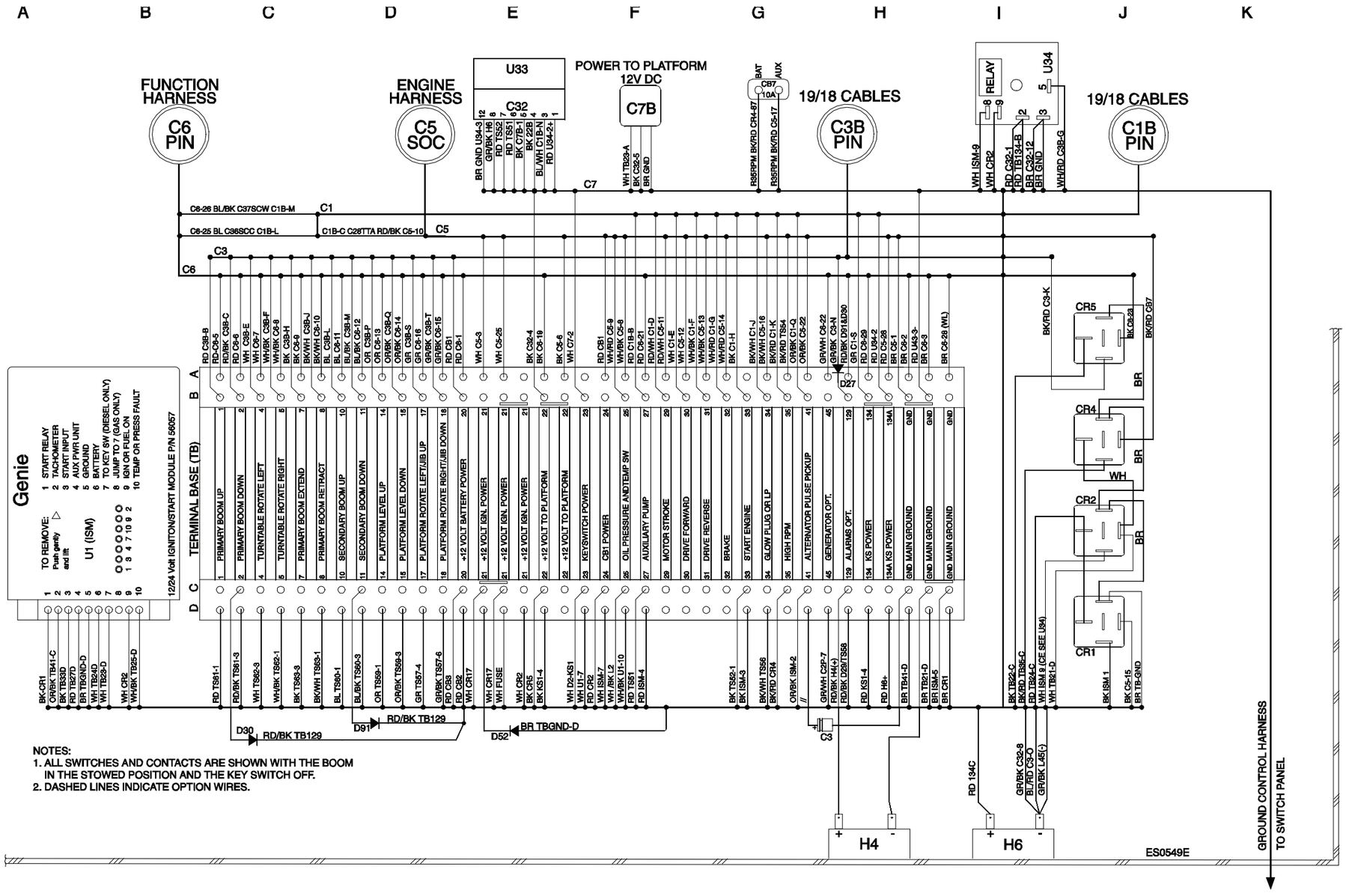

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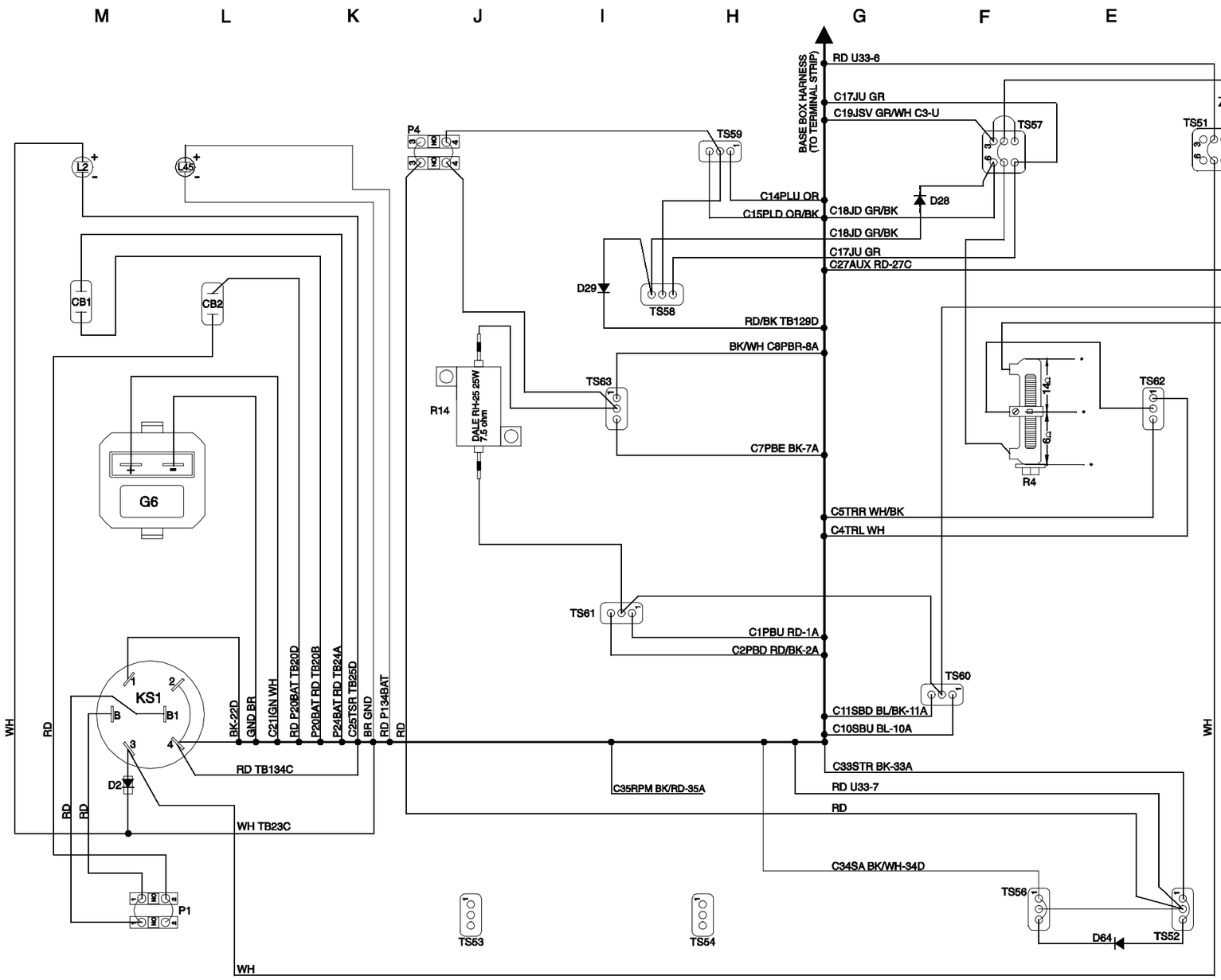

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NOTE: DASHED LINES INDICATE OPTIONS.

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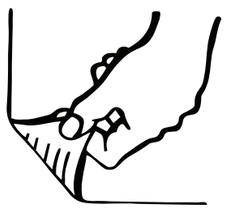
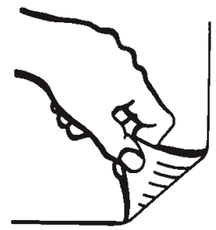


Platform Control Box Wiring Diagram (CE)



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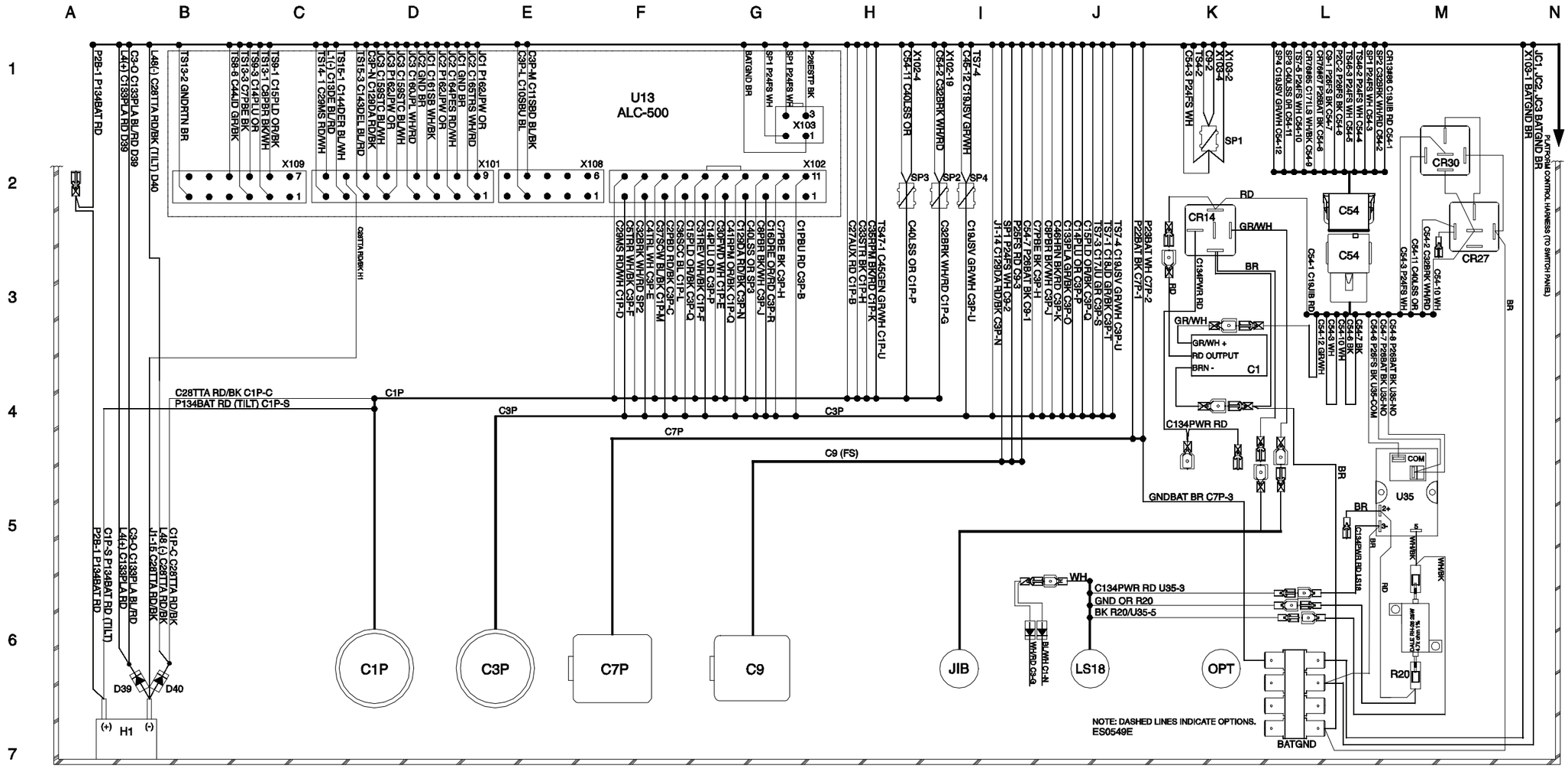
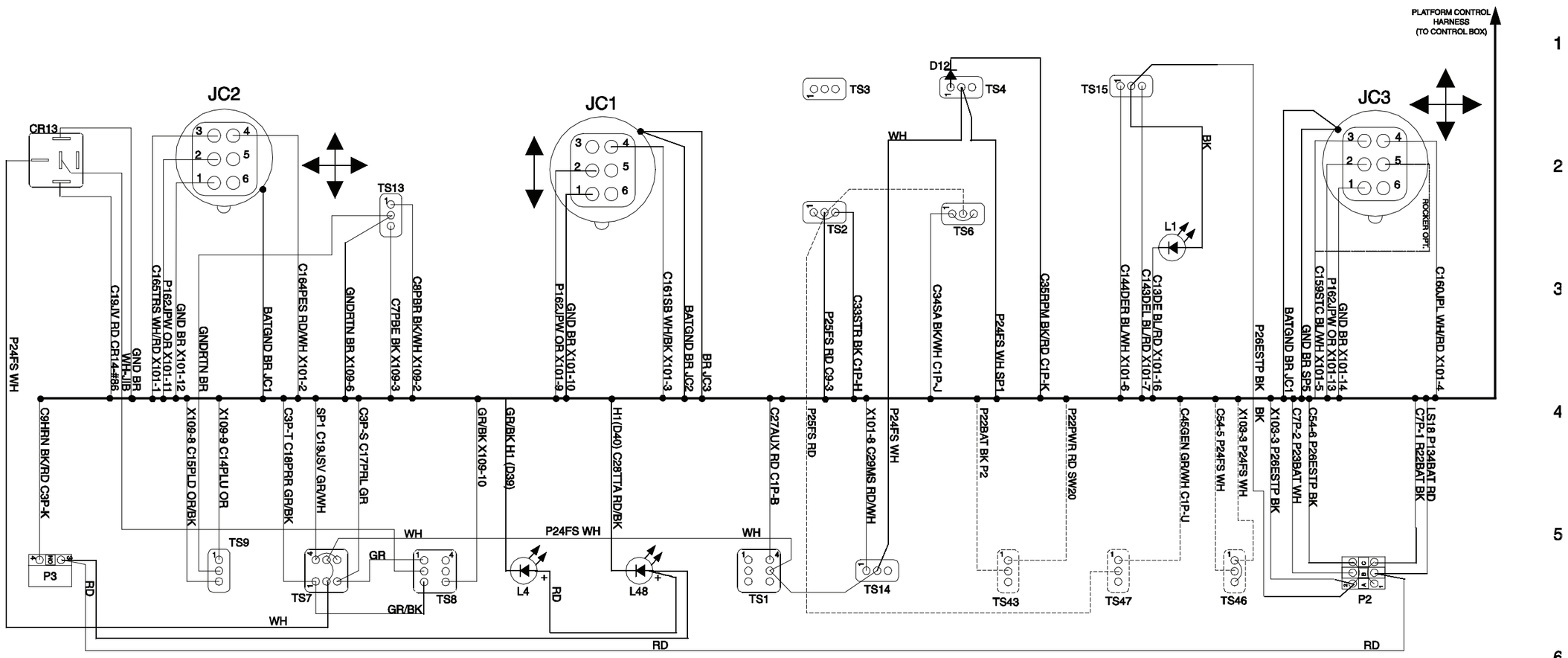


Platform Control Box Switch Panel Wiring Diagram (CE)



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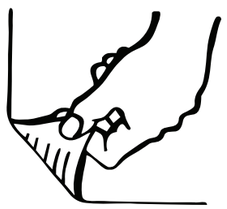
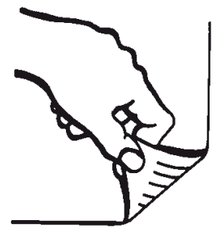
NOTE: DASHED LINES INDICATE OPTIONS.

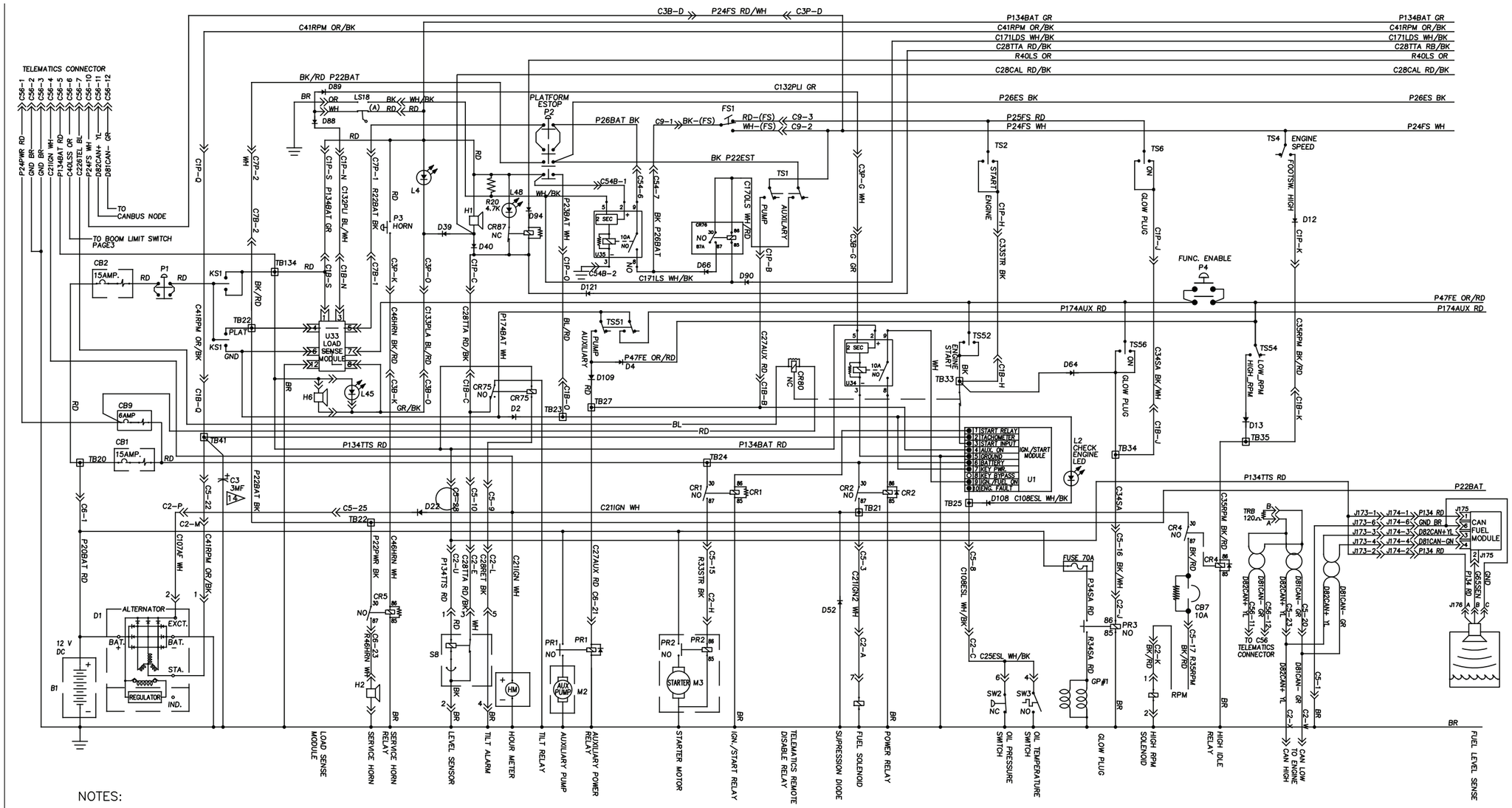
Platform Control Box Switch Panel Wiring Diagram (CE)



Electrical Schematic, Deutz TD 2.2 L3 Models (CE)



Electrical Schematic, Deutz TD 2.2 L3 Models (CE)



NOTES:

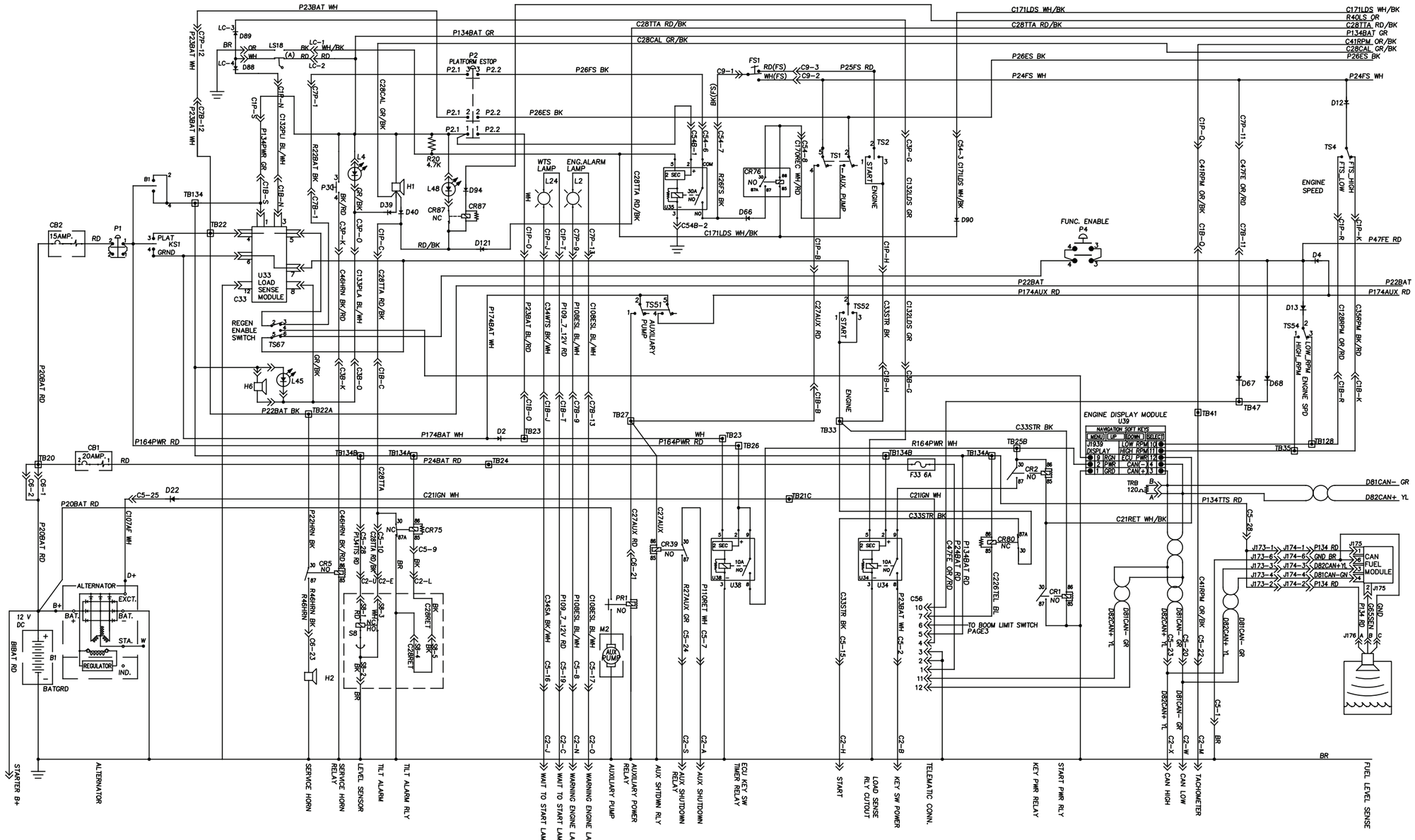
1. ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND THE KEYSWITCH OFF.
2. DASHED LINES INDICATED OPTION WIRES.
3. SEE SHEET 9 FOR PLATFORM LEVEL CUTOUT CTE OPTION.

8 REPLACES WIRE BETWEEN TS1 AND TS7 FOR CE LIFT/DRIVE OPTION. REPLACED BY CR27 AND CR30 FOR CE ONLY.

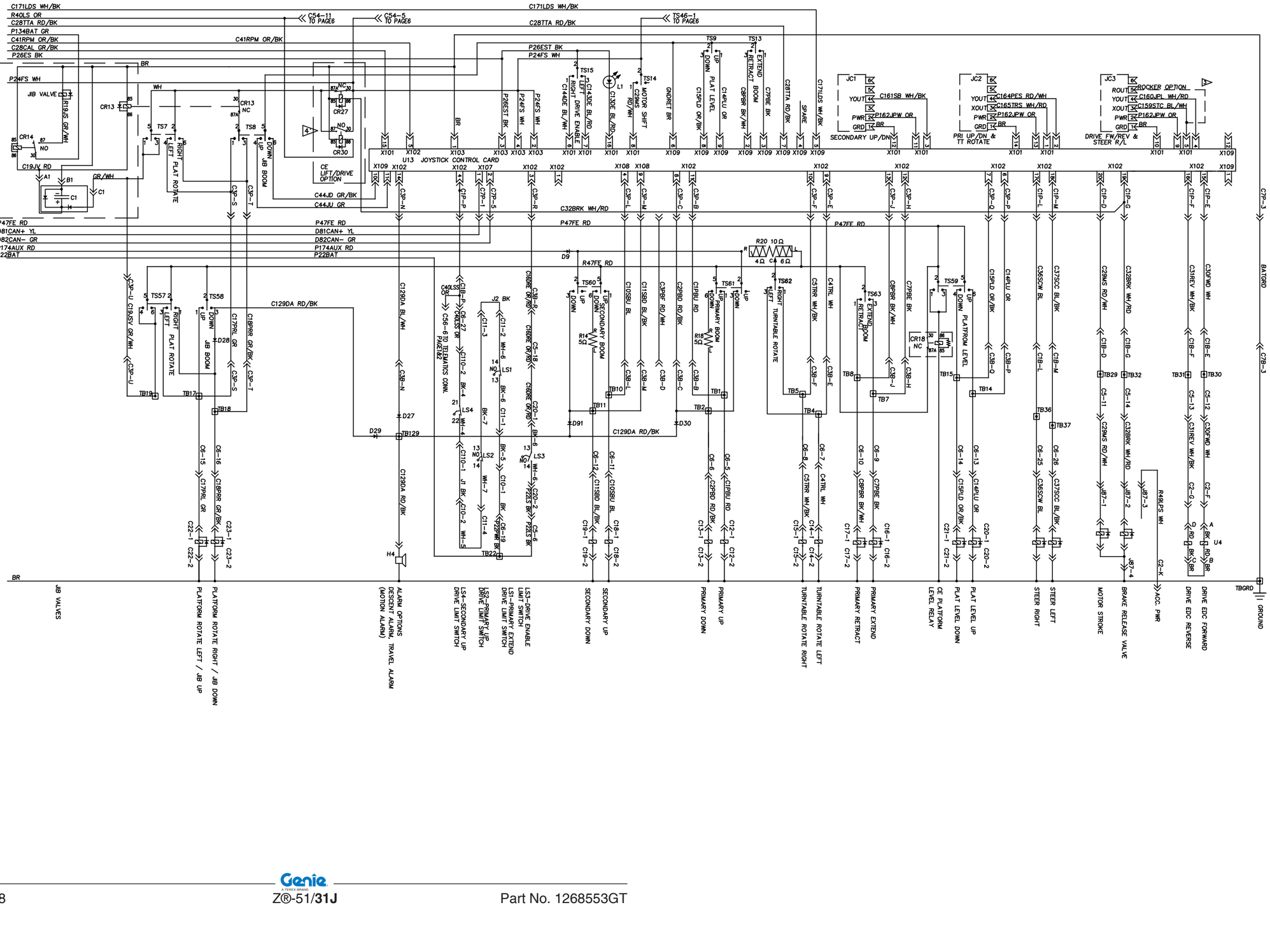
14 FOR DEUTZ ENGINE ONLY.

C1 & C3 – 23 SOCKET RECEPTACLE/ PIN PLUG, CONTROL CABLES
C2 – 23 SOCKET RECEP/ PIN , ENGINE INTERFACE
C5 – 23 PIN RECEP/PIN ENGINE CONTROL
C6 – 29 SOCKET RECEP/PIN, VALVE OUTPUT– FUNCTION MANIFOLD
C7 – 4 PIN RECEP/PIN, 12V POWER
C9 – FOOTSWITCH INPUT
C32 – LOAD SENSE OPTION
C54 – PLATFROM BOX OPTIONS

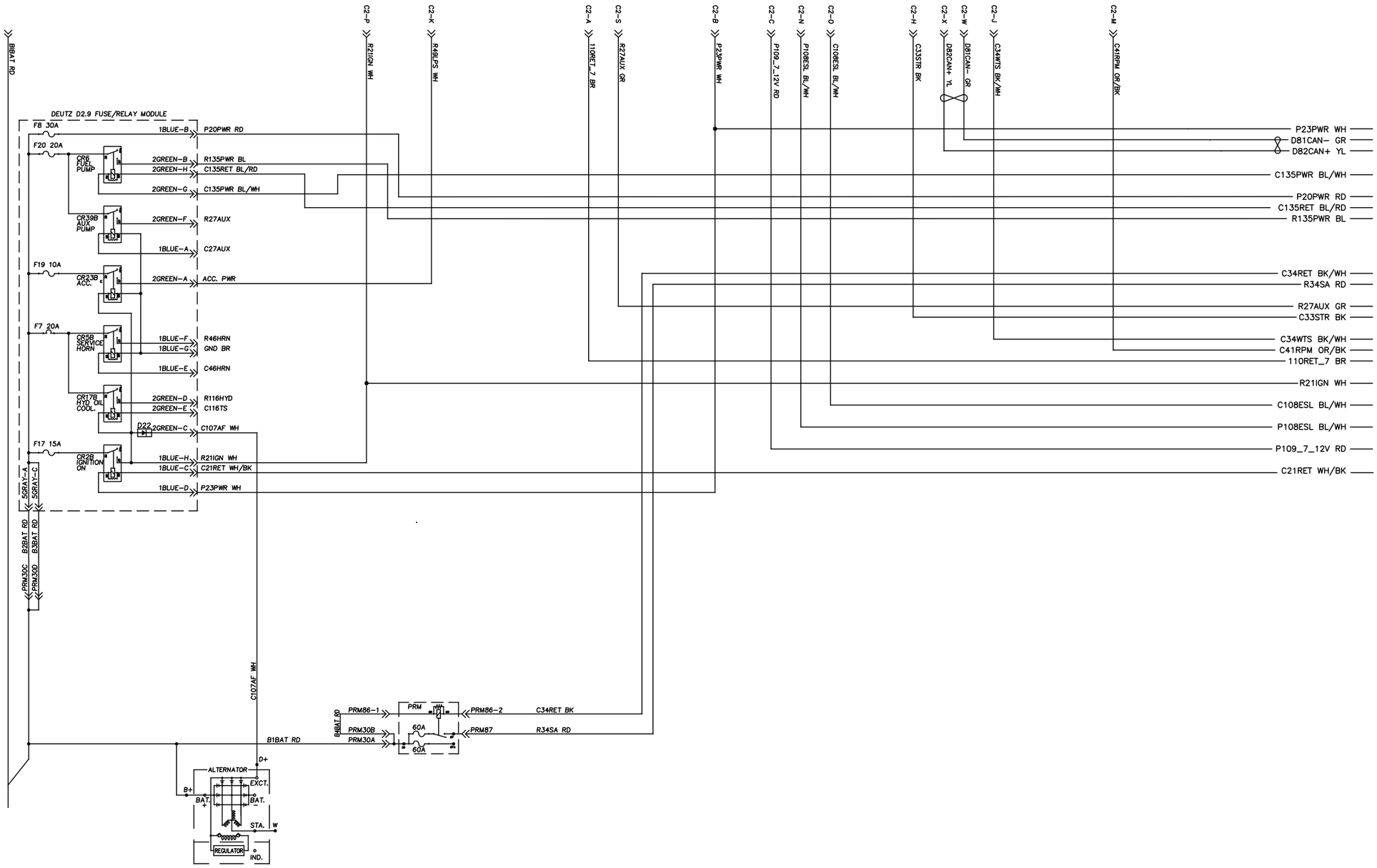
Electrical Schematic, Deutz TD 2.2 L3 Models (CE)



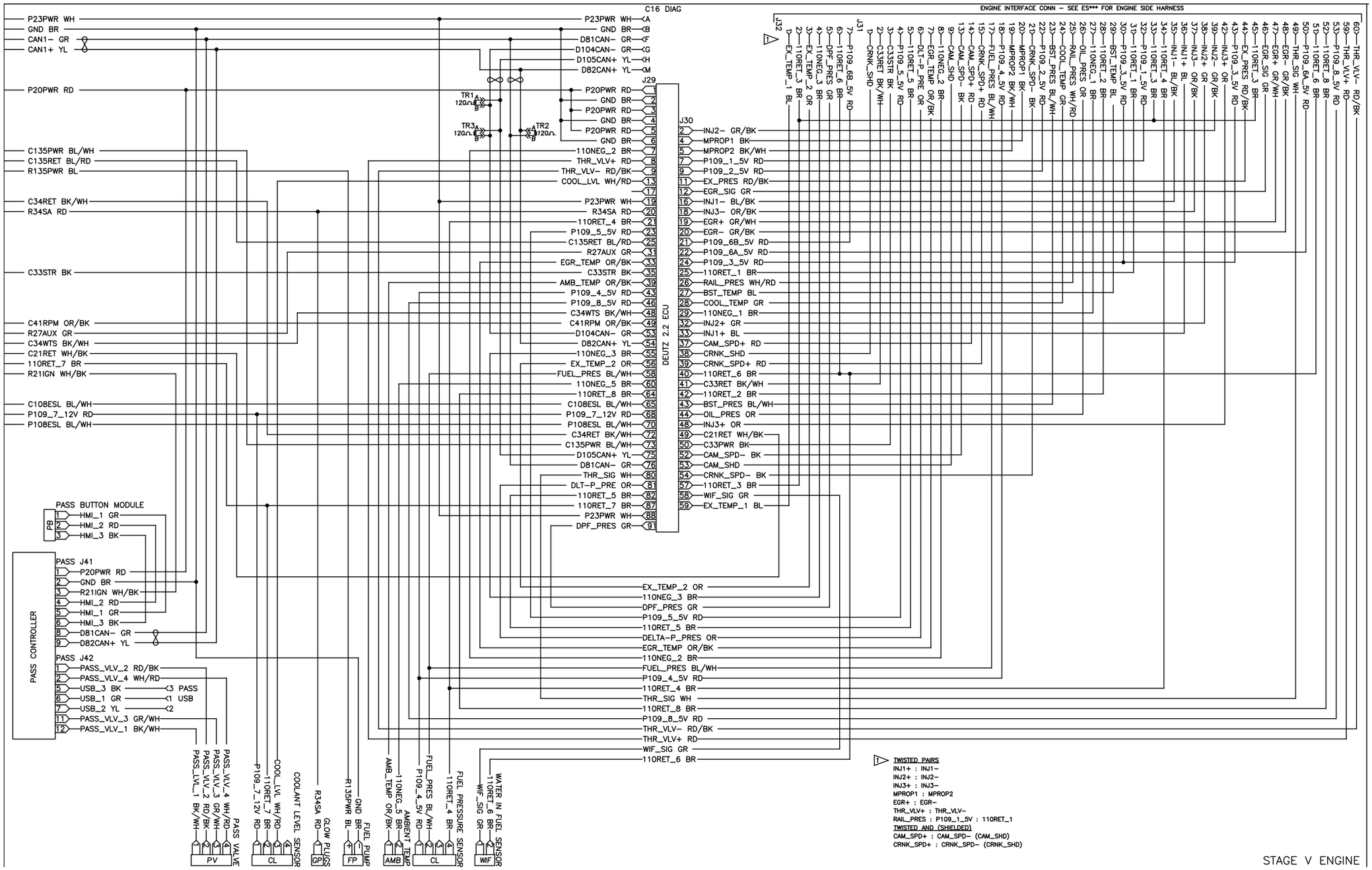
Electrical Schematic, Deutz TD 2.2 L3 Models (CE)



Electrical Schematic, Deutz TD 2.2 L3 Models (CE)



Electrical Schematic, Deutz TD 2.2 L3 Models (CE)



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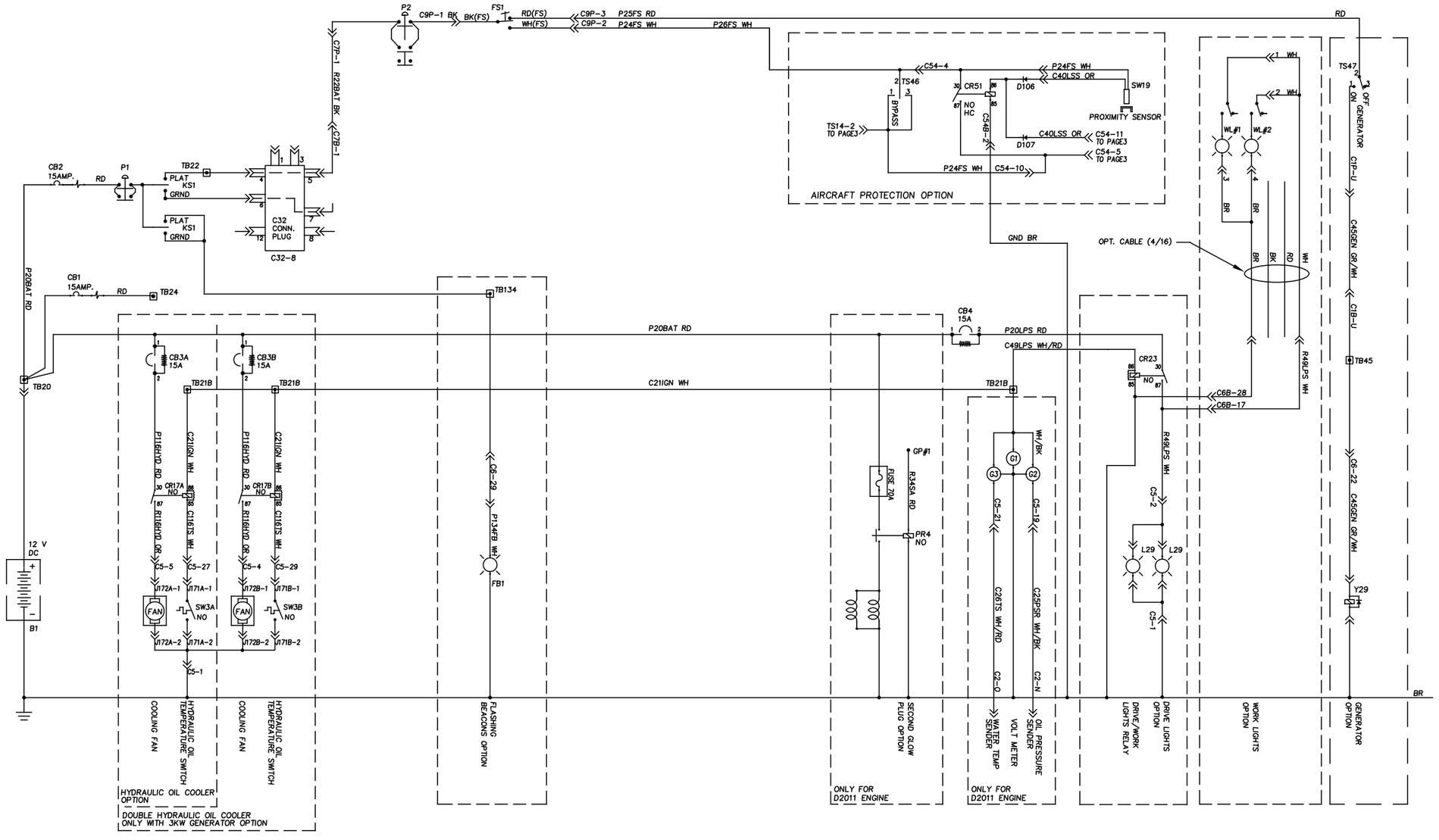
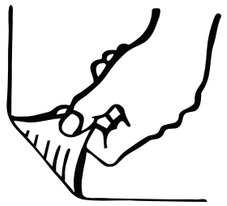
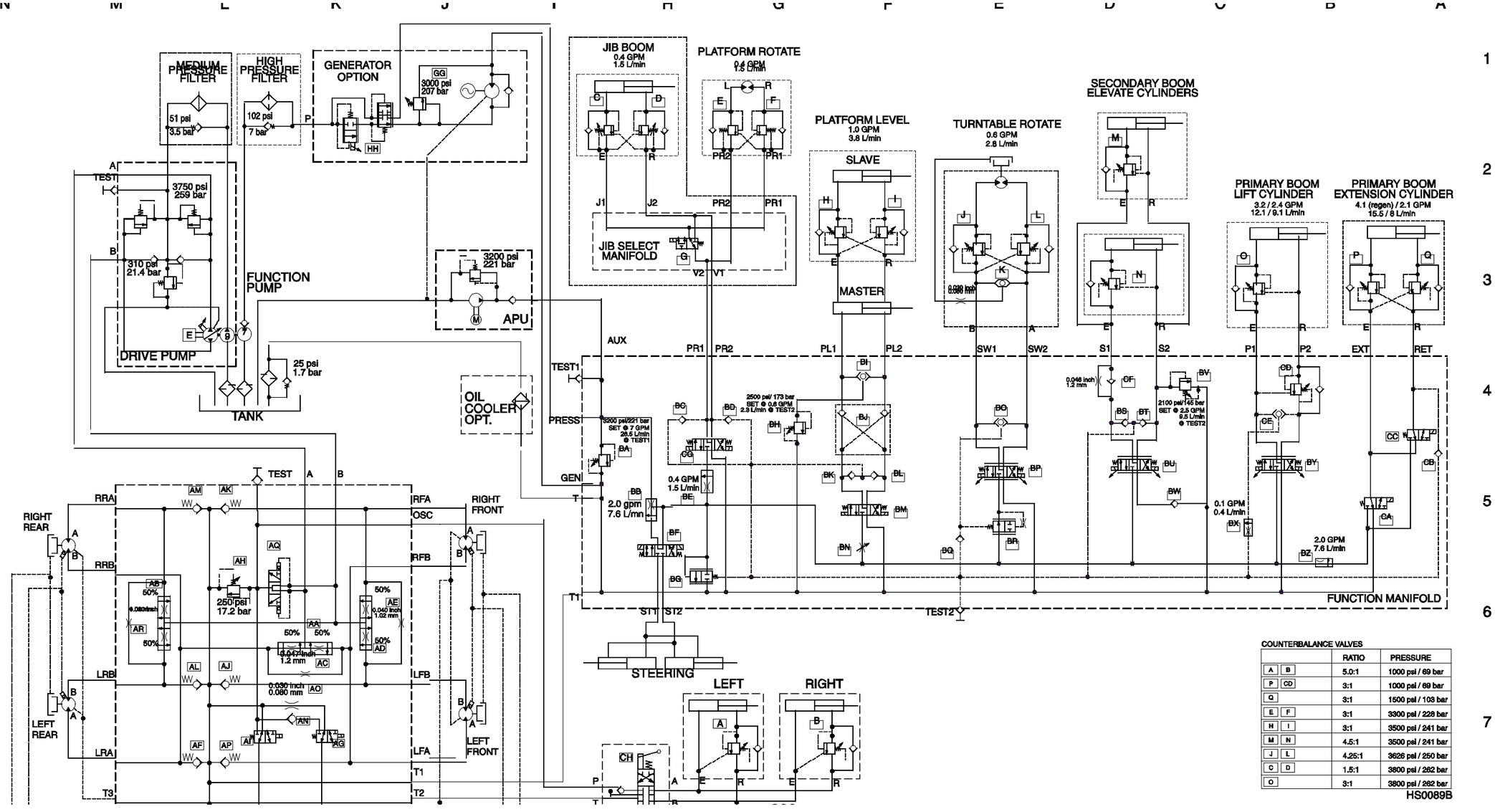


Hydraulic Schematic



Hydraulic Schematic



COUNTERBALANCE VALVES

	RATIO	PRESSURE
A B	5.0:1	1000 psi / 69 bar
P CD	3:1	1000 psi / 69 bar
Q	3:1	1500 psi / 103 bar
E F	3:1	3300 psi / 228 bar
H I	3:1	3500 psi / 241 bar
M N	4.5:1	3500 psi / 241 bar
J L	4.25:1	3626 psi / 250 bar
C D	1.5:1	3800 psi / 262 bar
O	3:1	3800 psi / 262 bar

HS0089B

California Proposition 65

WARNING

Operating, servicing and maintaining this equipment, passenger vehicle or off-highway motor vehicle 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.

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