Genie®
A TEREX BRAND

Service and Repair Manual

Serial Number Range

S-40
S-45
S-40 TRAX
S-45 TRAX

from S4015-20505 to S4016H-23499
from S4515-20505 to S4516H-23499
from S40H-23500
fromS45H-23500

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. 1268491
Rev A3
May 2018

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:

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

Find a Manual for this Model

Go to http://www.genielift.com

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

1268491 Rev A, September 2016

First Edition, First Printing

Revision History

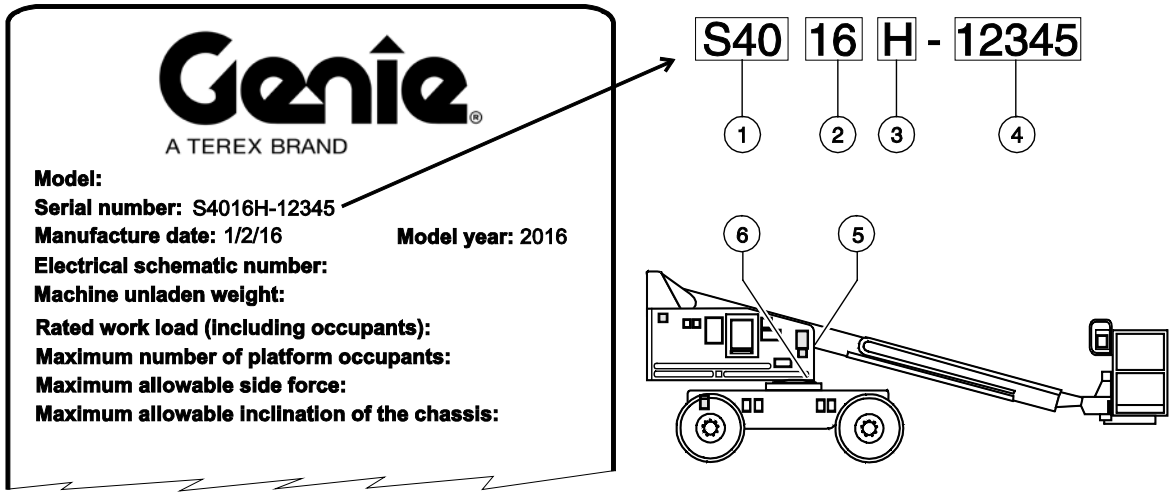
Revision	Date	Section	Procedure / Page / Description
A	9/2015		Initial Release
A1	7/2016	Repair Procedures	Added Primary Boom Down and Extend Relief Valve adjustment procedures.
A2	9/2016	Introduction	Serial Number Legend
A3	5-2018	Schematics	Fixed Deutz 2.9 ANSI/CSA Elec. Schematic

Reference Examples:	**Electronic Version**
Section – Repair Procedure, 4-2	Click on any content or procedure in the Table of Contents to view the update.
Section – Fault Codes, All charts	
Section – Schematics, Legends and schematics	

Introduction

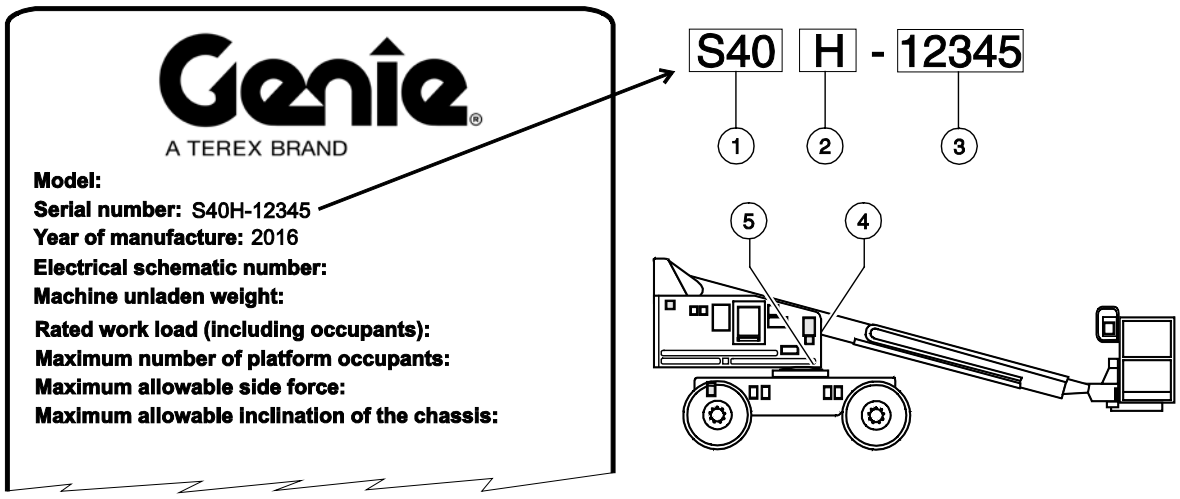
Serial Number Legend

To August 31, 2016



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

From September 1, 2016



1 Model
2 Facility code
3 Sequence number
4 Serial label (located under cover)
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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 a imminently hazardous situation which, if not avoided, will result in death or serious injury.

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

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

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

Be sure to wear protective eye wear and other protective clothing if the situation warrants it.

Be aware of potential crushing hazards such as moving parts, free swinging or unsecured components when lifting or placing loads. Always wear approved steel-toed shoes.

Workplace Safety

Any person working on or around a machine must be aware of all known safety hazards. Personal safety and the continued safe operation of the machine should be your top priority.

Be sure to keep sparks, flames and lighted tobacco away from flammable and combustible materials like battery gases and engine fuels. Always have an approved fire extinguisher within easy reach.

Be sure that all tools and working areas are properly maintained and ready for use. Keep work surfaces clean and free of debris that could get into machine components and cause damage.

Be sure any forklift, overhead crane or other lifting or supporting device is fully capable of supporting and stabilizing the weight to be lifted. Use only chains or straps that are in good condition and of ample capacity.

Be sure that fasteners intended for one time use (i.e., cotter pins and self-locking nuts) are not reused. These components may fail if they are used a second time.

Be sure to properly dispose of old oil or other fluids. Use an approved container. Please be environmentally safe.

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

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Specifications

Machine Specifications

Tires and wheels	
Tire size, 2WD front tires only	12.5L - 16SL 14 ply 16 in x 10 in wheel 40.6 cm x 25.4 cm wheel
Tire pressure	52 psi / 3.58 bar
Tire size, 2WD & 4 WD (Rough Terrain)	12 - 16.5 NHS 8 ply 16.5 in x 9.75 in wheel 41.9 cm x 24.8 cm wheel
Tire pressure	45 psi / 3.1 bar
Tire weight, new foam-filled (minimum) (Rough terrain)	300 lbs 136 kg
Tire size, 4WD (High flotation)	33/16LL 500 10 ply 19.5 in x 14 in wheel 49.5 cm x 35.6 cm wheel
Tire pressure	38 psi / 2.62 bar
Tire weight, new foam-filled (minimum) (Rough terrain)	300 lbs 136 kg
Wheel lugs	9 @ 5/8 - 18
Lug nut torque, dry	230 ft-lbs 325 Nm
Lug nut torque, lubricated	170 ft-lbs 244 Nm

Track Components, TRAX option	
Track material	Rubber
Weight, assembly (each)	480 lbs 218 kg

Fluid capacities	
LPG tank	33.5 pounds 15.2 kg
Fuel tank	20 gallons 75.7 liters
Fuel tank (option)	30 gallons 113.6 liters
Hydraulic tank	45 gallons 170 liters
Hydraulic system (including tank)	55 gallons 208 liters
Drive hubs	20 fl oz 592 cc
Turntable rotate drive hub	8 fl oz 237 cc

Drive hub oil type:

SAE 90 multipurpose hypoid gear oil API service classification GL5

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

Specifications

Performance Specifications

Drive speeds, 2WD and 4WD	
Stowed	40 ft / 5.2 - 5.9 sec 12.2 m / 5.2 - 5.9 sec
Raised or extended	40 ft / 40 - 45 sec 12.2 m / 40 - 45 sec
Drive speeds, TRAX option	
Stowed	40 ft / 9 - 11 sec 12.2 m / 9 - 11 sec
Raised or extended	40 ft / 40 - 45 sec 12.2 m / 40 - 45 sec
Gradeability	See Operator's Manual
Braking distance, maximum	
High range on paved surface	3 - 4 ft 0.9 - 1.2 m
Boom function speeds, maximum from platform controls	
Jib boom up, S-45 models	35 - 45 seconds
Jib boom down, S-45 models	20 - 30 seconds
Platform level (10° range of motion) ANSI CE/Australia	 3 -5 seconds 20 - 22 seconds
Boom up	50 - 60 seconds
Boom down	45 - 60 seconds
Boom extend	30 - 30 seconds
Boom retract	15 - 35 seconds
Turntable rotate, 360° Stowed	70 - 100 seconds
Turntable rotate, 360° Not stowed	120 - 140 seconds

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

Hydraulic Oil Specifications

Hydraulic Fluid Specifications

Genie specifications require hydraulic oils which are designed to give maximum protection to hydraulic systems, have the ability to perform over a wide temperature range, and the viscosity index should exceed 140. They should provide excellent antiwear, oxidation prevention, corrosion inhibition, seal conditioning, and foam and aeration suppression properties.

Cleanliness level, minimum	ISO 15/13
Water content, maximum	250 ppm
Recommended Hydraulic Fluid	
Hydraulic oil type	Chevron Rando HD Premium
Viscosity grade	32
Viscosity index	200
Optional Hydraulic Fluids	
Mineral based	Shell Tellus S2 V 32 Shell Tellus S2 V 46 Shell Tellus S4 VX 32 Shell Shell Donax TG (Dexron III) Chevron 5606A
Biodegradable	Petro Canada Environ MV 46
Fire resistant	UCON Hydrolube HP-5046

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

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

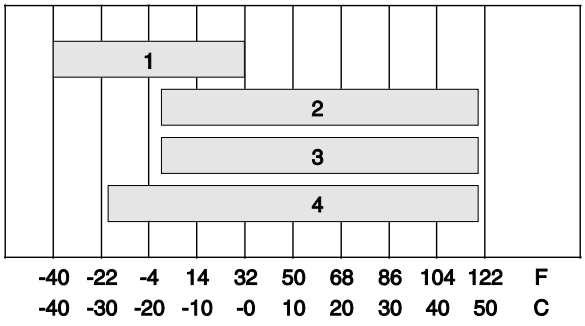
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond it's maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

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

Chevron Rando HD Premium Oil MV Fluid Properties

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

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

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

Chevron 5606A Hydraulic Oil Fluid Properties

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

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

NOTICE

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

Specifications

Petro-Canada Environ MV 46 Fluid Properties

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

Shell Tellus S4 VX Fluid Properties

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

UCON Hydrolube HP-5046 Fluid Properties

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

Hydraulic Component Specifications

Drive Pump	
Type: bi-directional variable displacement piston pump	
Flow rate @ 2500 rpm	0 - 28 gpm 0 - 122.6 L/min
Drive pressure, maximum	3625 psi 250 bar
Charge Pump	
Type	gerotor
Displacement per revolution	0.85 cu in 13.9 cc
Flow rate @ 2500 rpm	9 gpm 34 L/min
Charge pressure @ 2500 rpm	310 psi 21.4 bar
Function pump	
Type	gear, pressure balanced
Displacement	1.04 cu in 17 cc
Flow rate @ 2500 rpm	10.69 gpm 40.5 L/min
Auxiliary Pump	
Type: fixed displacement gear pump	
Displacement per revolution	1.75 gpm 6.62 L/min
Auxiliary pump relief pressure	3200 psi 220.6 bar

Specifications

Function manifold	
Function relief valve pressure S-40 S-45	 2600 psi / 179 bar 2900 psi / 200 bar
Boom down relief valve pressure	2200 psi 152 bar
Boom extend relief valve pressure	1950 psi 134 bar
Steer regulator all models	2 gpm / 7.6 lpm
Oscillate relief valve pressure (@2500 rpm)	950 psi 66 bar
Traction Manifold	
Hot oil relief pressure	280 psi 19.3 bar
Two-speed drive motors, 2WD and 4WD models	
Displacement per revolution low speed	0.99 cu in / 16.3 cc
Displacement per revolution high speed	1.83 cu in / 30 cc
Hydraulic Filters	
Medium pressure filter	Beta 3 ˆ 200
Medium pressure filter bypass pressure	51 psi 3.5 bar
Hydraulic tank return filter	10 micron with 25 psi / 1.7 bar bypass

Manifold Component Specifications

Plug torque	
SAE No. 4	13 ft-lbs / 18 Nm
SAE No. 6	18 ft-lbs / 24 Nm
SAE No. 8	50 ft-lbs / 68 Nm
SAE No.10	55 ft-lbs / 75 Nm
SAE No. 12	56 ft-lbs / 75.9 Nm

Specifications

Ford MSG-425 EFI Engine

Displacement	153 cu in 2.5 liters
Number of cylinders	4
Bore & stroke	3.5 x 3.9 inches 89 x 100 mm
Horsepower	60 @ 2500 rpm 45 kW @ 2500 rpm
Firing order	1 - 3 - 4 - 2
Low engine idle (computer controlled)	1000 rpm 33.3 Hz
Low function idle (computer controlled)	1600 rpm 53.3 Hz
High function idle (computer controlled)	2500 rpm 83.3 Hz
Compression ratio	9.7:1
Compression pressure (approx.)	
Pressure (psi or bar) of lowest cylinder must be at least 75% of highest cylinder	
Lubrication system	
Oil pressure (operating temperature @ 2000 rpm)	29 to 39 psi 2.75 to 4.1 bar
Oil capacity (including filter)	6.7 quarts 6.4 liters
Oil pressure switch	
Oil pressure switch point	7.5 psi 0.51 bar
Oil viscosity requirements	
Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Handbook on your machine.	
Electronic fuel pump	
Fuel pressure, static	60 psi 4.1 bar
Fuel flow rate	0.58 gpm 2.2 L/min
Fuel requirement	
For fuel requirements, refer to the engine Operator's Manual on your machine.	
Ignition system	
Spark plug type	Motorcraft AYFS-32Y-R
Spark plug gap	0.049 to 0.053 inches 1.25 to 1.35 mm
Engine coolant	
Capacity	11.5 quarts 10.9 liters
Coolant temperature switch	
Temperature switch point	230°F 110°C
Starter motor	
Normal engine cranking speed	200 to 250 rpm
Current draw, normal load	140-200A
Current draw, maximum load	800A
Alternator	
Output	95A, 13.8V DC
Battery	
Type	12V DC, Group 34/78
Quantity	1
Cold cranking ampere @ 0°F	900A
Reserve capacity @ 25A rate	200 minutes

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 bar
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

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

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 D 2.9 L4 Engine

Displacement	177 cu in 2.9 liters
Number of cylinders	4
Bore and stroke	3.6 x 4.3 inches 92 x 110 mm
Horsepower	48.8 @ 2600 rpm 37 kW @ 2600 rpm
Firing order	1 - 3 - 4 - 2
Low idle	1500 rpm 313 Hz
High idle	2500 rpm 521.7 Hz
Compression ratio	18.4:1
Compression pressure	362 to 435 psi 25 to 30 bar
Governor	electronic
Lubrication system	
Oil pressure (@ 2000 rpm)	40 to 60 psi 1.4 to 3 bar
Oil capacity (including filter)	9.4 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
Units ship with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Handbook on your machine.	
Oil temperature switch	
Temperature switch point	257°F 125°C
Oil pressure switch	
Oil pressure switch point	20 psi 1.4 bar
Engine coolant	
Capacity	10 quarts 9.4 liters
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	
Cranking speed	150-250 RPM
Current draw, normal load	250A to 400A
Output	3.2kW
Battery	
Type	12V DC
Quantity	1
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	200 minutes
Alternator output	95A @ 14V DC
Fan belt deflection	3/8 to 1/2 inch 9 to 12 mm

Specifications

Perkins 404D-22 Engine

Displacement	134 cu in 2.2 liters
Number of cylinders	4
Bore and stroke	3.31 x 3.94 inches 84 x 100 mm
Horsepower	51 @ 2500 rpm 38 kW @ 2500 rpm
Firing order	1 - 3 - 4 - 2
Low idle	1300 rpm 229.7 Hz
High idle	2500 rpm 441.7 Hz
Compression ratio	23.3:1
Compression pressure	426 psi 29.4 bar
Pressure (psi) of lowest cylinder must be within 50 psi / 3.45 bar of highest cylinder	
Governor	centrifugal mechanical
Valve clearance, cold	
Intake	0.008 in 0.2 mm
Exhaust	0.008 in 0.2 mm
Lubrication system	
Oil pressure, cold (at 2500 rpm)	60 psi 4.1 bar
Oil capacity (including filter)	9.3 quarts 8.8 liters
Oil viscosity requirements	
Below 86°F / 30°C	5W-20
-4°F to 104°F / -20°C to 40°C	10W-30
Above 14°F / -10°C	15W-40
Units ship with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Handbook on your machine.	
Oil pressure sending unit	
Oil pressure switch point	14.2 psi 1 bar
Fuel injection system	
Injection pump make	Zexel
Injection pressure	2133 psi 147 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator's Manual on your machine.	
Alternator output	55A @ 12V DC
Fan belt deflection	3/8 in 10 mm
Starter motor	
Current draw, no load	140-200A
Brush length, new	0.7480 in 19 mm
Brush length, minimum	0.5 in 12.7 mm
Battery	
Type	12V DC, Group 34/78
Quantity	1
Cold cranking ampere	900A
Reserve capacity @ 25A rate	200 minutes
Engine coolant	
Capacity	7.7 quarts 7.3 liters
Coolant temperature sending unit	
Temperature switch point	221° F 105° C

Specifications

Perkins 404F-22 Engine

Displacement	134 cu in 2.2 liters
Number of cylinders	4
Bore and stroke	3.31 x 3.94 inches 84 x 100 mm
Horsepower	48 @ 2800 rpm 38 kW @ 2500 rpm
Firing order	1 - 3 - 4 - 2
Low idle	1300 rpm 229.7 Hz
High idle	2500 rpm 441.7 Hz
Compression ratio	23.3:1
Compression pressure	426 psi 29.4 bar
Pressure (psi) of lowest cylinder must be within 50 psi / 3.45 bar of highest cylinder	
Governor	electronic
Valve clearance, cold	
Intake	0.008 in 0.2 mm
Exhaust	0.008 in 0.2 mm
Lubrication system	
Oil pressure (@ 2000 rpm)	40 to 60 psi 1.4 to 3 bar
Oil capacity (including filter)	9.4 - 11.2 quarts 8.9 - 10.6 liters
Oil viscosity requirements	
Below 86°F / 30°C	5W-20
-4°F to 104°F / -20°C to 40°C	10W-30
Above 14°F / -10°C	15W-40
Units ship with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Handbook on your machine.	
Oil pressure sending unit	
Oil pressure switch point	14.2 psi 1 bar
Fuel injection system	
Injection pump make	Zexel
Injection pressure	2133 psi 147 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator's Manual on your machine.	
Alternator output	85A @ 12V DC
Fan belt deflection	3/8 in 10 mm
Starter motor	
Current draw, normal load	140A - 200A
Brush length, new	0.7480 in 19 mm
Brush length, minimum	0.5 in 12.7 mm
Battery	
Type	12V DC
Quantity	1
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	200 minutes
Engine coolant	
Capacity	7.7 quarts 7.3 liters
Coolant temperature sending unit	
Temperature switch point	221° F 105° C

Specifications

Machine Torque Specifications

Platform rotator	
1-8 center bolt, GR 5	
Lubricated, (before SN 15-21460)	480 ft-lbs 650 Nm
Dry, (before SN 15-21460)	640 ft-lbs 867 Nm
Dry, (from SN 15-21460)	615 ft-lbs 834 Nm
3/8 -16 bolts, GR 8	
Lubricated, (before SN 15-21460)	33 ft-lbs 45 Nm
Dry, (before SN 15-21460	44 ft-lbs 60 Nm
Dry, (from SN 15-21460) ***(use blue thread locking compound)**	35 ft-lbs* 47.5 Nm*
Turntable rotate assembly	
Rotate bearing mounting bolts, lubricated	160 ft-lbs 217 Nm
Drive motor/brake mounting bolts, dry *(use blue thread locking compound)	49 ft-lbs* 66.4 Nm*
Drive motor/brake mounting bolts, lubricated	37 ft-lbs 50 Nm
Drive motor and hubs	
Drive hub mounting bolts, dry	210 ft-lbs 284 Nm
Drive hub mounting bolts, lubricated	160 ft-lbs 217 Nm

TRAX Torque Specifications

Hub adapter to drive hub fasteners	
Lug nut torque, dry	230 ft-lbs 312 Nm
Lug nut torque, lubricated	170 ft-lbs 230 Nm
Idler and bogey wheel fasteners	
3/4-10 bolts, GR 8, dry	375 ft-lbs 508 Nm
3/4-10 bolts, GR 8, lubricated	281 ft-lbs 381 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	10 ft-lbs / 13.6 Nm
-6	30 ft-lbs / 40.7 Nm
-8	40 ft-lbs / 54.2 Nm
-10	60 ft-lbs / 81.3 Nm
-12	85 ft-lbs / 115 Nm
-16	110 ft-lbs / 150 Nm
-20	140 ft-lbs / 190 Nm
-24	180 ft-lbs / 245 Nm

JIC 37° Fittings

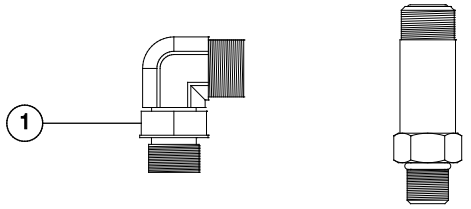
(swivel nut or hose connection)

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

SAE O-ring Boss Port

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

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



Adjustable Fitting

Non-adjustable fitting

1 jam nut

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

Torque Procedure

Seal-Lok™ fittings

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

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

2 Lubricate the O-ring before installation.

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

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

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

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

JIC 37° fittings

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

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

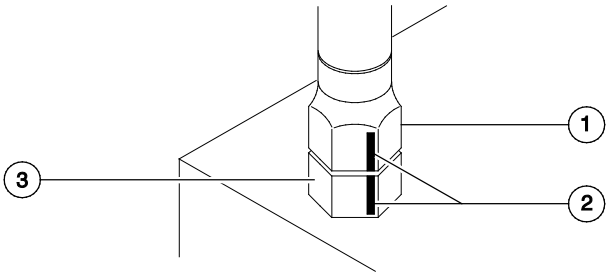


Illustration 1

1 hex nut
2 reference mark
3 body hex fitting

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

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

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

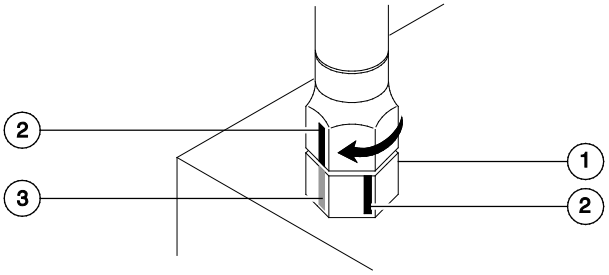


Illustration 2

1 body hex fitting
2 reference mark
3 second mark

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

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

Specifications

SAE FASTENER TORQUE CHART

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

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

METRIC FASTENER TORQUE CHART

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

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

Repair Procedures

Observe and Obey:

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

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

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

Before Repairs Start:

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

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

☑ Use only Genie approved replacement parts.

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

Machine Configuration:

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

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

Repair Procedures

About This Section

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

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

Symbols Legend

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

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

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

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

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

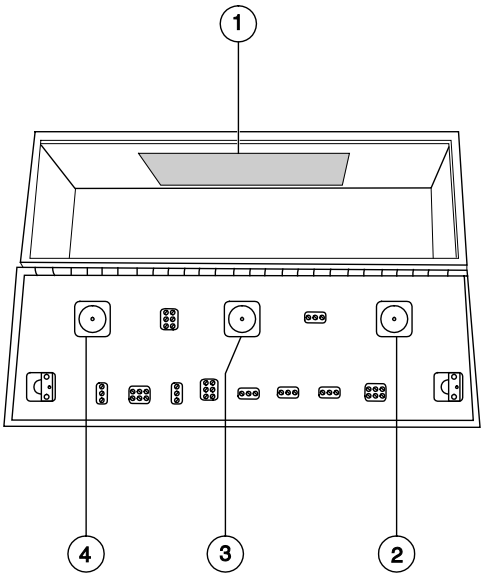
⊙ Indicates that a specific result is expected after performing a series of steps.

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

Platform Controls

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

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

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.

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

Note: The joystick must be calibrated before the threshold, max-out or ramping 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.

⊠ Result: The alarm does not sound. Check the electrical connections or replace the joystick.

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.

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.

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

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.

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.

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).

Platform Controls

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.

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.

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 5% 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.

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

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

Platform Components

2-1 Platform Leveling 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 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, *Hydraulic Hose and Fitting Torque Specifications.*

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

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

3 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 jib boom on the blocks.

4 Tag, disconnect and cap the hydraulic hoses from the slave cylinder. Plug the union hoses from the master 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.

How to Bleed the Slave Cylinder

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

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

Platform Components

2-2 Platform Rotator

How to Remove the Platform Rotator

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

Note: When removing a hose assembly or fitting, the O-ring (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 and platform support.

2 Tag, disconnect and plug the hydraulic hoses from the platform rotator manifold. Cap the fittings on the 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.

3 Support the platform rotator with an appropriate lifting device. Do not apply any lifting pressure.

⚠WARNING Crushing hazard. The platform rotator could fall when removed from the machine if not properly supported.

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

5 Support the jib boom leveling arms.

⚠ CAUTION Bodily injury hazard. The jib boom leveling arms may fall if not properly supported.

6 Use a soft metal drift to drive both pins out, then remove the platform rotator from the machine.

Note: When installing the platform rotator fasteners, torque the fasteners to specifications.

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.

Platform Components

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

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

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

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

7 Clean up any hydraulic oil that may have spilled.

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

2-3 Platform Overload System (if equipped)

How to Calibrate the Platform Overload System

Calibrating the platform overload system regularly is essential to safe machine operation. Continued use of an improperly operating platform overload system, could result in the system not sensing an overloaded platform condition. Machine stability could be compromised resulting in the machine tipping 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. Refer to the machine serial plate.

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. Repeat 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 light and alarm responds.

6 Turn the key switch to ground controls, pull out the red Emergency Stop Button and start the engine.

7 Add an additional weight to the platform that is equal to, but does not exceed 15% of the maximum rated load.

⊙ Result: The overload indicator light is flashing at both the ground and platform controls, the alarm is sounding and the engine shuts down. Proceed to step 8.

⊠ Result: The overload indicator lights are off at the platform and ground controls, the alarm does not sound and the engine continues to run. 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, the alarm sounds and the engine shuts down. Remove the additional weight. Repeat the procedure starting with step 5.

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

8 Using auxiliary power, test all machine functions from the ground controls.

⊙ Result: All ground control functions should operate.

9 Using a suitable lifting device, remove the additional weight from the platform.

⊙ 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.

10 Start the engine and test all machine functions from the ground controls.

⊙ Result: All ground control functions should operate.

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 and platform support.

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.

⚠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 rotator. Refer to Repair Procedure, *How to Remove the Platform rotator*.

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

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

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

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

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

10 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.

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

12 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.

13 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.

⚠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.

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 support. 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.

4 Use a soft metal drift to tap the jib boom lift cylinder rod-end pivot pin out enough to 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 Disconnect the wire connectors from the bottom of the platform control box.

Note: When installing the wire connectors to the bottom of the platform control box, match the color of the connectors to those on the control box to be sure they are installed in the correct location.

2 Disconnect the power to plat cable from the AC outlet box.

3 Remove the hose and cable clamps from the platform support.

4 Tag, disconnect and plug the platform leveling slave cylinder hydraulic hoses from the bulkhead fittings on the top of the primary boom. Cap the bulkhead fittings.

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

5 Tag, disconnect and plug ports V1 and V2 on the platform rotate/jib manifold. Cap the fittings.

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

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

7 Remove the retaining fasteners securing the cable track to the upper tube.

8 Pull the cable track back from the upper tube.

9 Remove the hose and cable clamps from inside the cable track at both ends.

10 Pull the hoses and cables out of the upper tube.

11 Pull the hoses and cables out of the cable track.

12 Remove the retaining fasteners that attach the cable track to the lower tube.

13 Remove the cable track from the machine.

Primary Boom Components

How to Repair the Cable Track

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

Note: A cable track repair kit is available through the Genie Service Parts Department.

1 Visually inspect the cable track and determine which 4 link section needs to be replaced.

2 Carefully remove the snap rings from each end of the damaged section of cable track.

3 Remove the retaining fasteners from the upper black rollers from the 4 link section of cable track to be replaced. Remove the rollers.

4 Lift up the hoses and cables and carefully remove the damaged 4 link section of cable track.

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

5 Remove the upper rollers from the replacement section of cable track.

6 Lift up the hoses and cables and carefully insert the new 4 link section of cable track.

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

Connect the ends of the replacement cable track section to the existing cable track using the snap rings.

7 Install the rollers onto the new section of cable track.

8 Operate the boom extend/retract function through a full cycle to ensure smooth operation of the new section of cable track.

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

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

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

3 Raise the primary boom to the horizontal position.

4 Attach lifting straps from a 5 ton / 5000 kg overhead crane to the center point of the boom. Support the boom. Do not apply lifting pressure.

5 Remove the turntable end cover.

Primary Boom Components

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

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

7 Remove the fasteners from the limit switch mounted to the turntable riser at the pivot end of the boom. Do not disconnect the wiring.

8 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.

9 Using an overhead supporting device, attach a strap to the rod-end of the primary boom lift cylinder.

10 Remove the 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.

11 Place a support block across the turntable and lower the lift cylinder on it.

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

13 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 extension cylinder for support.

3 Remove the external snap rings from the extension cylinder barrel-end pivot pin at the pivot end of the primary end of the primary boom tube. Use a soft metal drift to remove the pin.

4 Remove and label the wear pads from the top side of the primary boom tube at the platform end of the boom.

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

5 Attach a lifting strap from an overhead crane to the secondary boom tube at the platform end of the boom for support.

6 Support and slide the secondary boom tube out of the primary boom tube. Place the secondary boom tube on blocks for support.

Primary Boom Components

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

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

7 Remove and label the wear pads from the top side of the secondary boom tube at the platform end of the boom.

8 Remove the trunnion pin retaining fasteners at the base end of the secondary boom tube. Use a slide hammer to remove the trunnion pins.

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

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

11 Support and slide the extension cylinder out of the base end of the secondary boom 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.

12 Remove and label the wear pads from each extension cylinder.

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

4-3 Primary Boom Lift Cylinder

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

How to Remove the Primary Boom Lift Cylinder

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

1 Raise the primary boom to a horizontal position.

2 Place support blocks across the turntable under the boom lift cylinder

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.

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.

Primary Boom Components

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

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

8 Remove the four mounting fasteners from the lift cylinder barrel-end pivot pin mounting plate.

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

9 With the lift cylinder being supported by the overhead crane, carefully pull the lift cylinder toward the platform to remove it 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 Extend the boom until the extension cylinder rod-end pivot pins are accessible in the extension tube.

2 Remove the master cylinder. See the repair procedure, *How to Remove the Master Cylinder*.

3 Raise the primary boom to a horizontal position.

4 At the pivot end of the boom, remove the cover from the end of the #1 boom tube.

5 At the pivot end of the boom, remove the retaining fasteners and blocks securing the extend cylinder to the #2 boom tube through the access holes in the #1 boom tube.

Primary Boom Components

6 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.

7 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.

8 At the pivot end of the boom, remove the retaining fasteners and blocks securing the extend cylinder to the #1 boom tube'

9 Support and slide the extension cylinder out of the primary boom.

⚠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 Use an overhead supporting device to support the platform. Do not apply lifting pressure.

3 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.

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

Primary Boom Components

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

6 Use a soft metal drift to remove the pin.

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

8 Use a soft metal drift to remove the pin.

9 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.

5-1
RPM Adjustment - Deutz Models

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

5-2
RPM Adjustment - Perkins Models

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

5-3
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

Deutz models:

1 Remove the tailpipe bracket mounting fasteners from the engine bell housing.

2 Support the drive pump assembly with an appropriate lifting device.

3 Remove all of the engine bell housing fasteners.

4 Carefully pull the pump and bell housing assembly 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. Remove the flex plate from the flywheel.

Ford models:

1 Disconnect the electrical connectors from both oxygen sensors at the tailpipe and exhaust manifold. Do not remove the oxygen sensors.

2 Remove the exhaust pipe fasteners at the muffler.

3 Support the muffler and bracket assembly with a suitable lifting device.

4 Remove the muffler bracket mounting fasteners from the bell housing. Carefully remove the muffler and bracket assembly from the engine.

Engines

5 Support the engine with an overhead crane or other suitable lifting device. Do not lift it.

6 Remove the engine mounting plate to bell housing fasteners.

7 Raise the engine slightly using the overhead crane and place a block of wood under the oil pan for support.

8 Support the drive pump assembly with an overhead crane or other suitable lifting device. Do not apply any lifting pressure.

9 Remove all of the engine bell housing retaining fasteners.

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

Perkins models:

1 Remove the fuel filter/water separator mounting fasteners.

2 Remove the fuel filter/water separator and lay it to the side. Do not disconnect the hoses.

3 Support the drive pump assembly with an appropriate lifting device.

4 Remove all of the engine bell housing fasteners.

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

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

6 Remove the flex plate mounting fasteners.

7 Remove the flex plate from the flywheel.

How to Install the Flex Plate

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

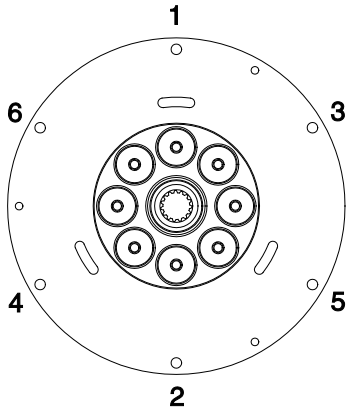
2 Apply Loctite® removable thread sealant to the flex plate fasteners and loosely install the fasteners.

3 **Deutz models:** 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.

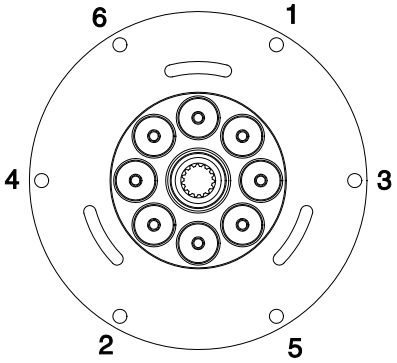
Ford and Perkins models: Torque the flex plate mounting bolts in sequence to 14 ft-lbs / 19 Nm. Then torque the flex plate mounting bolts in sequence to 20 ft-lbs / 27 Nm.

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

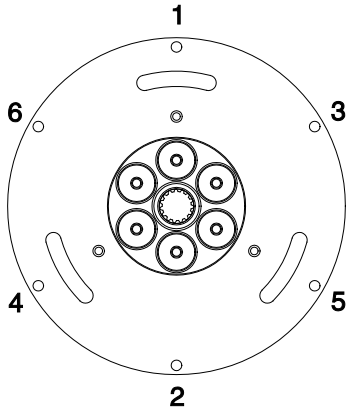
Grease Specification
Shell Alvania® Grease CG, NLGI 0/1 or equivalent.



Ford Models



Deutz Models



Perkins Models

Engines

How to Install the Pump and Bell Housing Assembly

1 Install the pump and bell housing assembly.

Deutz models: 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.

Ford models: Torque the bell housing mounting bolts labeled "A" and "B" in sequence to 28 ft-lbs / 38 Nm and the mounting bolts labeled "C" to 49 ft-lbs / 66 Nm. Then torque the bell housing mounting bolts labeled "A" and "B" in sequence to 40 ft-lbs / 54 Nm and the mounting bolts labeled "C" to 70 ft-lbs / 95 Nm.

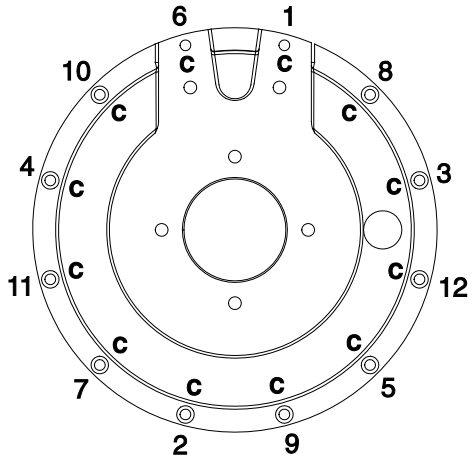
Perkins models: Torque the bell housing mounting bolts labeled "B" in sequence to 28 ft-lbs / 38 Nm and the mounting bolts labeled "A" to 49 ft-lbs / 66 Nm. Then torque the bell housing mounting bolts labeled "B" in sequence to 40 ft-lbs / 54 Nm and the mounting bolts labeled "A" to 70 ft-lbs / 95 Nm.

NOTICE

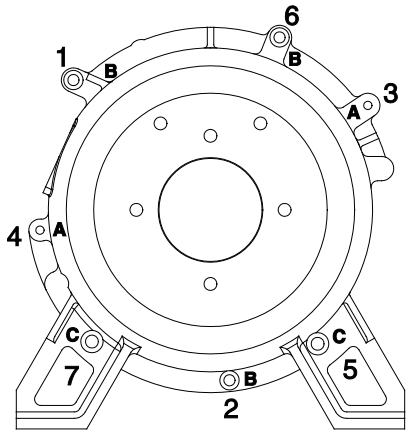
Component damage hazard. When installing the pump, do not force the pump coupler into the flexplate or damage to the pump shaft seal may occur.

NOTICE

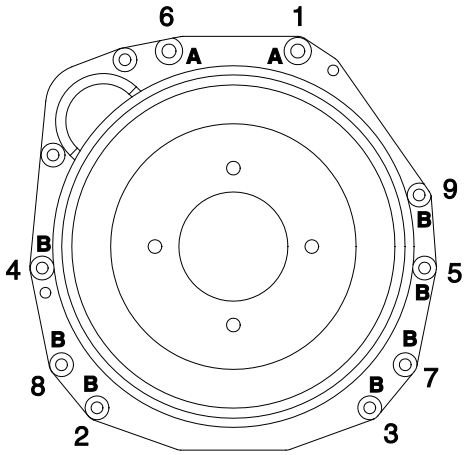
Component damage hazard. Do not force the drive pump during installation or the flex plate teeth may become damaged.



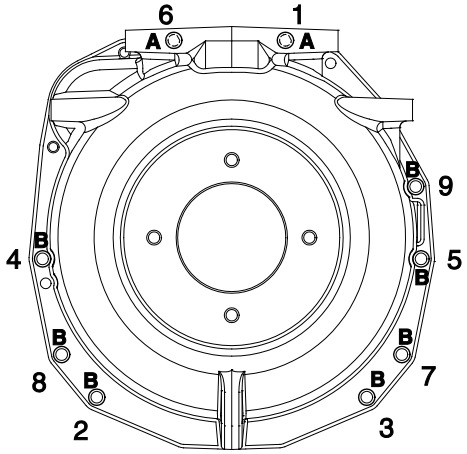
Deutz models



Ford models



Perkins 404D-22 models



Perkins 404F-22 models

5-4
Engine Fault Codes - Ford MSG-425 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 and will turn on the Check Engine Light.

Refer to Fault Code Section, *How to Retrieve Ford Engine Fault Codes*. Use the Fault Code Chart to aid in identifying the fault.

Engines

5-5
Engine Fault Codes - Deutz D 2.9 L4 and Perkins 404F-22 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 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 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.

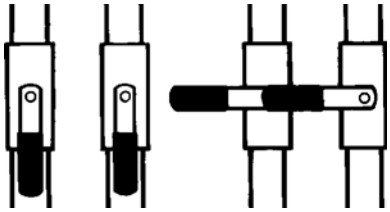
6-1 Function Pump

How to Remove the Function Pump

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

1 Locate the two hydraulic tank valves at the hydraulic tank. 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 function 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 Support the pump with a suitable lifting device.

4 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

6-2 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 Product Support to locate your local authorized service center.

How to Remove the Drive Pump

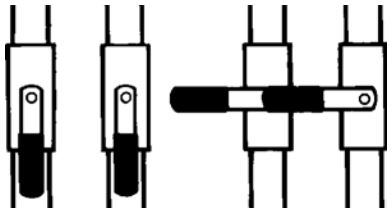
NOTICE Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system and cause severe component damage. Dealer service is recommended.

Note: When removing a hose assembly or fitting, the O-ring (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. 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 function pumps. Cap the fittings on the pumps.

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

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

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.

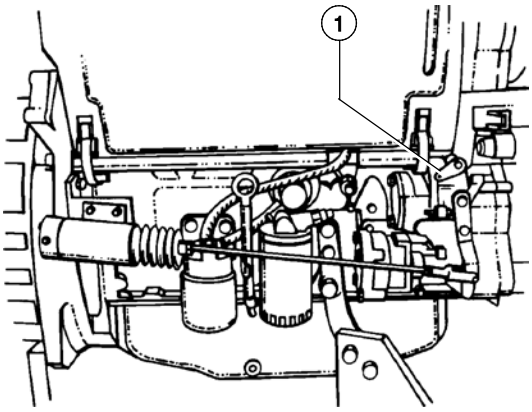
How to Prime the Drive Pump

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

2 **Ford models:** Close the valve on the LPG tank then disconnect the hose from the tank. Then move the fuel select switch to the LPG position.

Perkins 404D-22 models: Disconnect the engine wiring harness from the fuel solenoid at the injector pump.

Deutz D2011 L03i models: Hold the manual fuel shutoff valve clockwise to the closed position.



1 manual fuel shutoff valve

3 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 310 psi / 21 bar.

4 **Ford models:** Connect the LPG hose to the LPG tank and open the valve on the tank.

Perkins 404D-22 models: Connect the engine wiring harness to the fuel solenoid.

Deutz D2011 L03i models: Release the manual fuel shutoff valve.

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

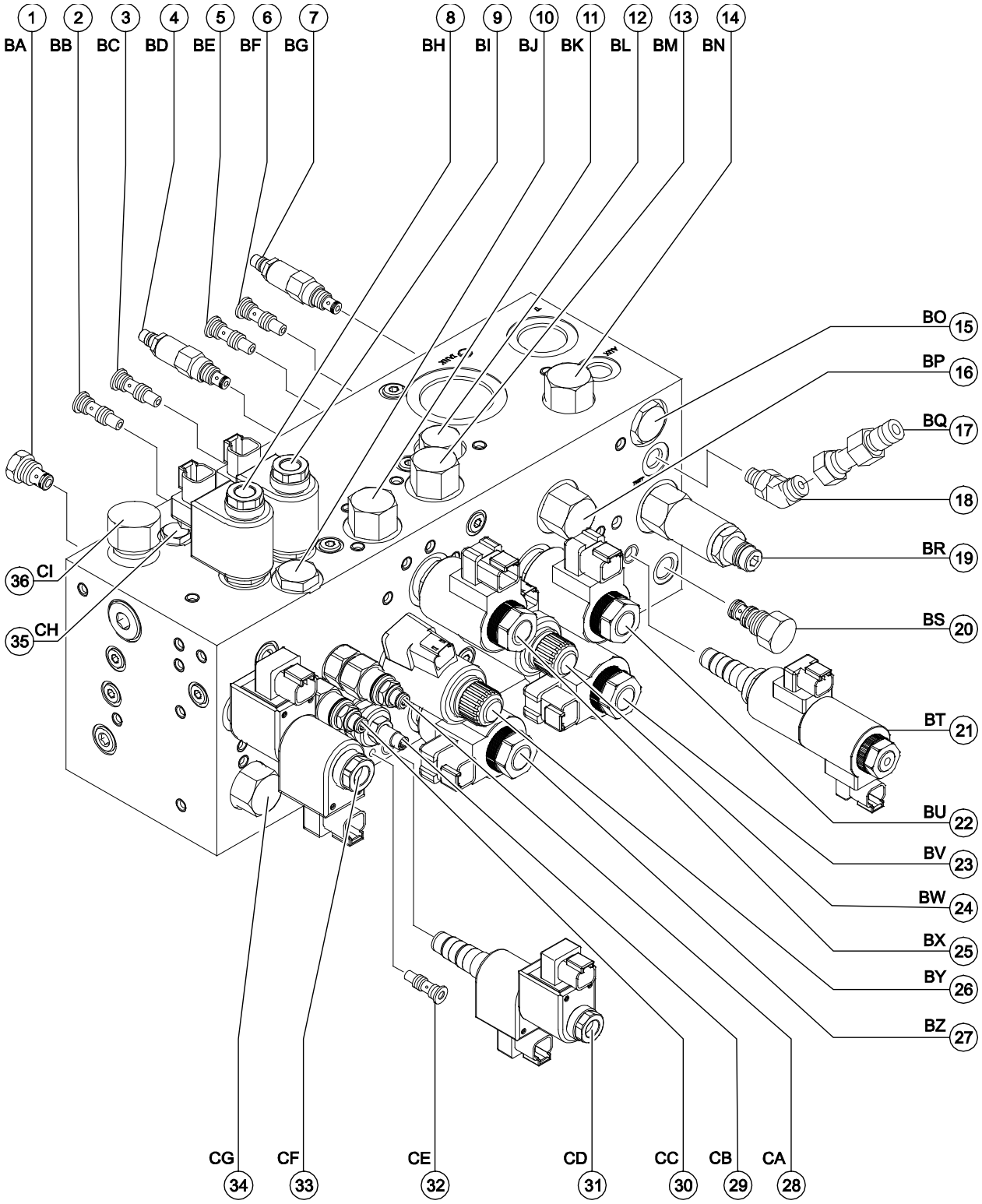
Manifolds

7-1
Function Manifold Components

The function manifold is located underneath the ground controls side turntable cover.

Index No.	Description	Schematic Item	Function	Torque
1	Check valve	BA	Platform rotate circuit, prevents fluid from draining back to tank	20-25 ft-lbs / 27-34 Nm
2	Check valve	BB	Differential sensing circuit, platform rotate right and jib boom down	8-10 ft-lbs / 10-15 Nm
3	Check valve	BC	Differential sensing circuit, platform level down	8-10 ft-lbs / 10-15 Nm
4	Relief valve, 2200 psi / 152 bar	BD	Boom down relief	20-25 ft-lbs / 27-34 Nm
5	Check valve	BE	Differential sensing circuit, boom up/down	8-10 ft-lbs / 10-15 Nm
6	Check valve	BF	Differential sensing circuit, boom extend/retract	8-10 ft-lbs / 10-15 Nm
7	Relief valve, 1950 psi / 134 bar	BG	Extend cylinder relief	20-25 ft-lbs / 27-34 Nm
8	Solenoid Valve, 2 position 3 way	BH	Platform level up/down	26-30 ft-lbs / 35-40 Nm
9	Solenoid Valve, 2 position 3 way	BI	Platform level up/down	26-30 ft-lbs / 35-40 Nm
10	Check valve	BJ	Platform rotate circuit, prevents fluid from draining back to tank	20-25 ft-lbs / 27-34 Nm
11	Differential sensing valve	BK	Turntable rotate circuit	30-35 ft-lbs / 41-47 Nm
12	Flow regulator valve, 0.1 gpm / 0.38 L/min	BL	Bleeds off differential sensing valves to tank	20-25 ft-lbs / 27-34 Nm
13	Differential sensing valve	BM	Boom up/down circuit	30-35 ft-lbs / 41-47 Nm
14	Flow regulator valve, 2.0 gpm / 7.6 L/min	BN	Steer left/right circuit	30-35 ft-lbs / 41-47 Nm
15	Check valve	BO	Platform level up circuit	20-25 ft-lbs / 27-34 Nm
16	Flow regulator valve	BP	Bleeds off differential sensing valves to tank	30-35 ft-lbs / 41-47 Nm
17	Diagnostic nipple	BQ	Testing	

Manifolds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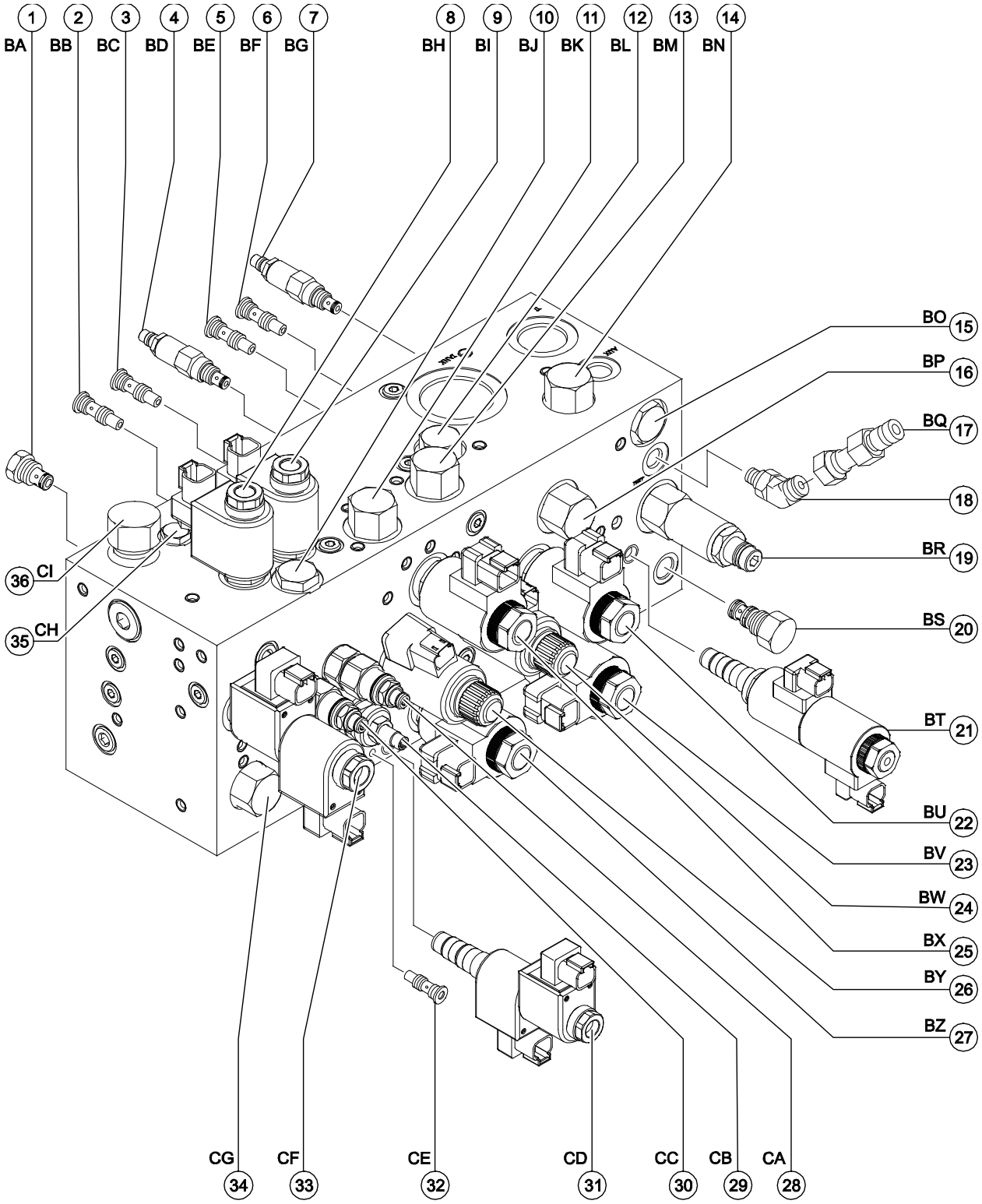
17 BQ
18
19 BR
20 BS
21 BT
22 BU
23 BV
24 BW
25 BX
26 BY
27 BZ
28 CA
29 CB
30 CC
31 CD
32 CE
33 CF
34 CG
35 CH
36 CI

Manifolds

Function Manifold Components, continued

Index No.	Description	Schematic Item	Function	Torque
19	Relief valve 2600 psi / 179 bar 2900 psi / 200 bar	BR	 System relief (S-40) System relief (S-45)	30-35 ft-lbs / 41-47 Nm
20	Check valve	BS	Blocks flow from auxiliary pump to function pump	30-35 ft-lbs / 41-47 Nm
21	Solenoid operated 3 position 4 way directional valve	BT	Steer left/right	26-30 ft-lbs / 35-40 Nm
22	Solenoid Valve, 2 position 3 way	BU	Primary boom extend	35-40 ft-lbs / 47-54 Nm
23	Solenoid Valve, 2 position 3 way	BV	Primary boom retract	25 ft-lbs / 34 Nm
24	Proportional solenoid valve	BW	Primary boom up/down circuit	20-25 ft-lbs / 27-34 Nm
25	Solenoid Valve, 2 position 3 way	BX	Primary boom up	20-25 ft-lbs / 27-34 Nm
26	Proportional solenoid valve	BY	Turntable rotate left/right	8-10 ft-lbs / 10-15 Nm
27	Solenoid Valve, 2 position 3 way	BZ	Primary boom down	8-10 ft-lbs / 10-15 Nm
28	Counterbalance valve	CA	Platform level up circuit	8-10 ft-lbs / 10-15 Nm
29	Pressure regulator valve	CB	Platform level circuit	30-35 ft-lbs / 41-47 Nm
30	Counterbalance valve	CC	Platform level down circuit	8-10 ft-lbs / 10-15 Nm
31	Solenoid valve, 3 position 4 way	CD	Turntable rotate left/right, (S-45)	20 ft-lbs / 27 Nm
32	Check valve	CE	Platform level down circuit	30-35 ft-lbs / 41-47 Nm
33	Solenoid valve, 3 position 4 way	CF	Platform rotate left/right and jib boom up/down	35-40 ft-lbs / 47-54 Nm
34	Differential sensing valve	CG	Differential sensing circuit, meters flow to functions	8-10 ft-lbs / 10-15 Nm
35	Check valve	CH	Platform rotate circuit prevents hydraulic fluid from draining back to tank	35-40 ft-lbs / 47-54 Nm
36	Flow control valve 0.4 gpm / 1.5 L/min 0.6 gpm / 2.3 L/min	CI	 Platform rotate left/right, (S-40) Platform rotate/jib boom select, (S-45)	20-25 ft-lbs / 27-34 Nm

Manifolds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16 BP
17 BQ
18
19 BR
20 BS
21 BT
22 BU
23 BV
24 BW
25 BX
26 BY
27 BZ
28 CA
29 CB
30 CC
31 CD
32 CE
33 CF
34 CG
35 CH
36 CI

Manifolds

7-2 Valve Adjustments - Function Manifold

How to Adjust the System Relief Valve

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

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

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

2 Start the engine from the ground controls.

3 Press and hold the function enable button. 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 Component 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 this procedure beginning with step 2 to confirm the relief valve pressure.

8 Remove the pressure gauge.

How to Adjust the Boom Down Relief Valve

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

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

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

2 Start the engine from the ground controls.

3 Press and hold the function enable button. Activate and hold the primary boom down switch with the boom in a fully stowed position.

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

5 Turn the engine off. Use a wrench to hold the relief valve and remove the cap. Refer to Repair Procedures, *Function Manifold Components,* item BD.

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

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

Repeat this procedure beginning with step 2 to confirm the relief valve pressure.

7 Remove the pressure gauge.

How to Adjust the Boom Extend Relief Valve

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

Note: Refer to the Function Manifold Component list to locate the Boom Extend Relief valve.

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

2 Start the engine from the ground controls.

3 Press and hold the function enable button. Activate and hold the primary boom extend switch with the boom fully extended.

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

5 Turn the engine off. Use a wrench to hold the relief valve and remove the cap. Refer to Repair Procedures, *Function Manifold Components,* item BG*.*

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 this procedure beginning with step 2 to confirm the relief valve pressure.

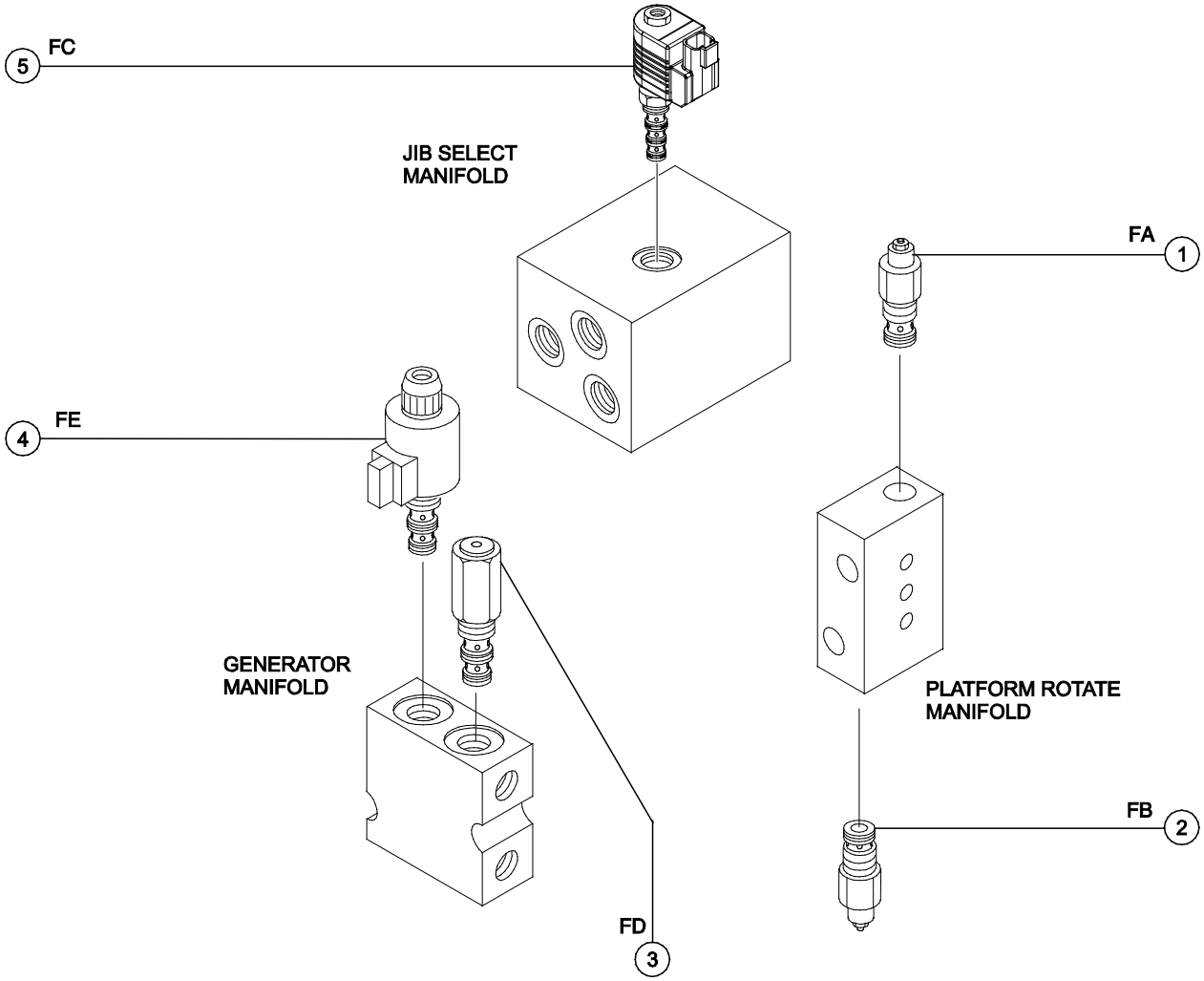
8 Remove the pressure gauge.

Manifolds

7-3
Jib Boom / Platform Rotate and Generator Manifold Components

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

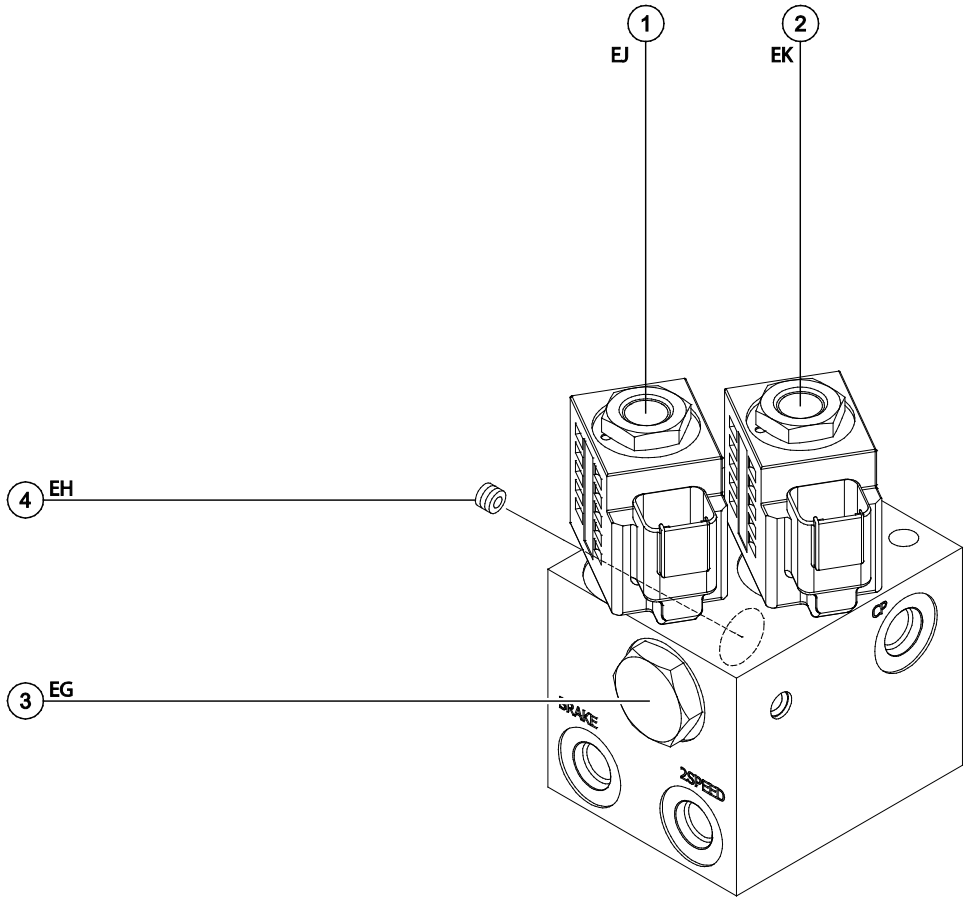
Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve	FA	Platform rotate right	30-35 ft-lbs / 41-47 Nm
2	Counterbalance valve	FB	Platform rotate left	30-35 ft-lbs / 41-47 Nm
3	Relief valve	FD	Generator relief valve	30-35 ft-lbs / 41-47 Nm
4	Solenoid Valve	FE	Controls generator on / off	50-55 ft-lbs / 68-75 Nm
5	Solenoid Valve, 2 position 3 way	FC	Platform rotate/jib boom select	18-20 ft-lbs / 25-27 Nm



7-4
Brake / Two Speed Manifold Components

The brake / two speed manifold is located under the turntable cover at the platform end.

Index No.	Description	Schematic Item	Function	Torque
1	Solenoid Valve, 2 position 3 way	EJ	Brake release	8-10 ft-lbs / 11-14 Nm
2	Solenoid Valve, 2 position 3 way	EK	Two-speed drive motor shift	
3	Check valve	EG	Brake circuit	
4	Orifice	EH	Brake and two-speed circuit	

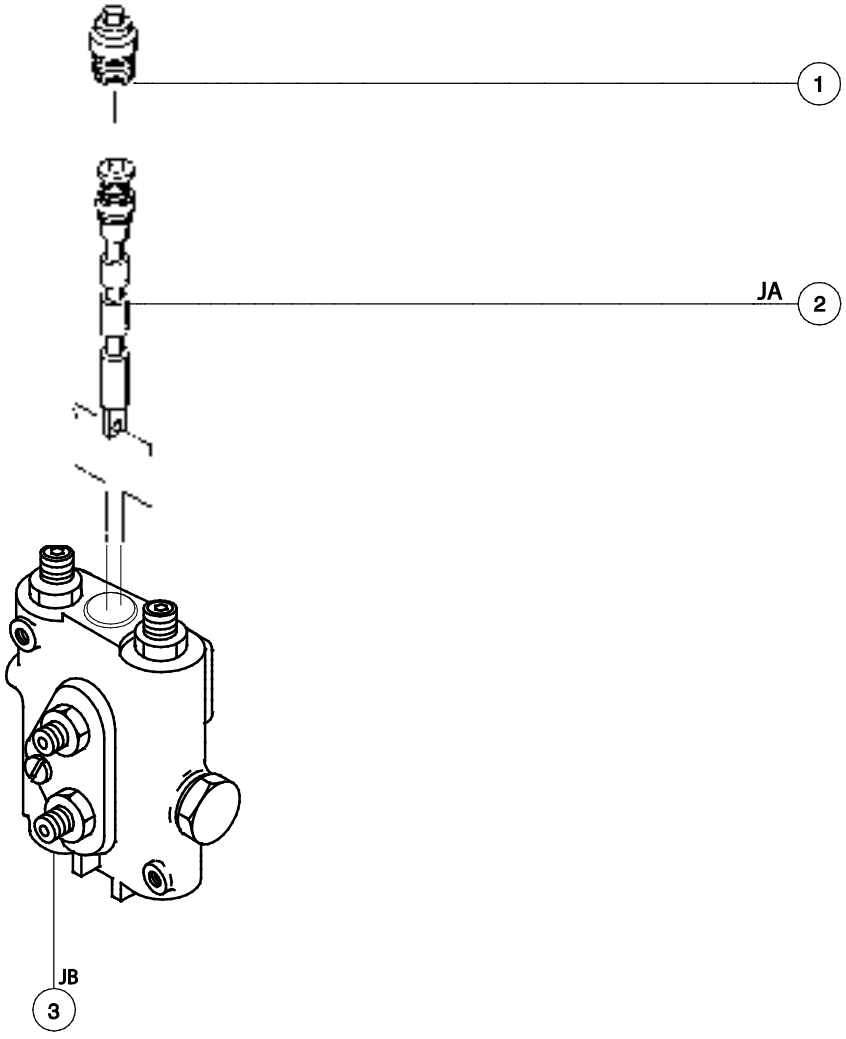


Manifolds

7-5
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	JA	Directional control	
3	Relief valve, 800 psi / 55 bar	JB	Oscillate relief	30-35 ft-lbs / 41-47 Nm



7-6
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.

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

1 Use a "bubble type" level to verify the working surface 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.

2 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.

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

4 Remove the ball joint retaining fastener from the bracket.

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

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

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

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

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

10 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 5 through 10 OR consult Genie Product Support.

Manifolds

7-7
Valve Adjustments - Oscillate Relief Valve

How to Adjust the Oscillate Relief Valve

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

1 Remove the drive chassis cover from the non-steer end of the machine.

2 Connect a 0 to 2000 psi / 0 to 150 bar pressure gauge to the diagnostic nipple located near the oscillate directional valve.

3 Disconnect the directional valve linkage, by removing the heim joint and retaining fastener from the axle.

4 Start the engine from the platform controls. Move the engine idle toggle switch to the high idle position. Activate the foot switch.

5 With the engine running in high rpm, manually activate the directional valve linkage in either direction. Observe the pressure spike on the pressure gauge when the machine fully oscillates. Refer to Specifications, *Hydraulic Component Specifications*.

6 Turn the engine off.

7 Locate the relief valve on the directional valve and loosen the jamb nut.

8 Adjust the hex screw. Turn it clockwise to increase the pressure or counterclockwise to decrease the pressure. Tighten the jamb nut.

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

9 Repeat steps 4 and 5 to confirm the valve pressure.

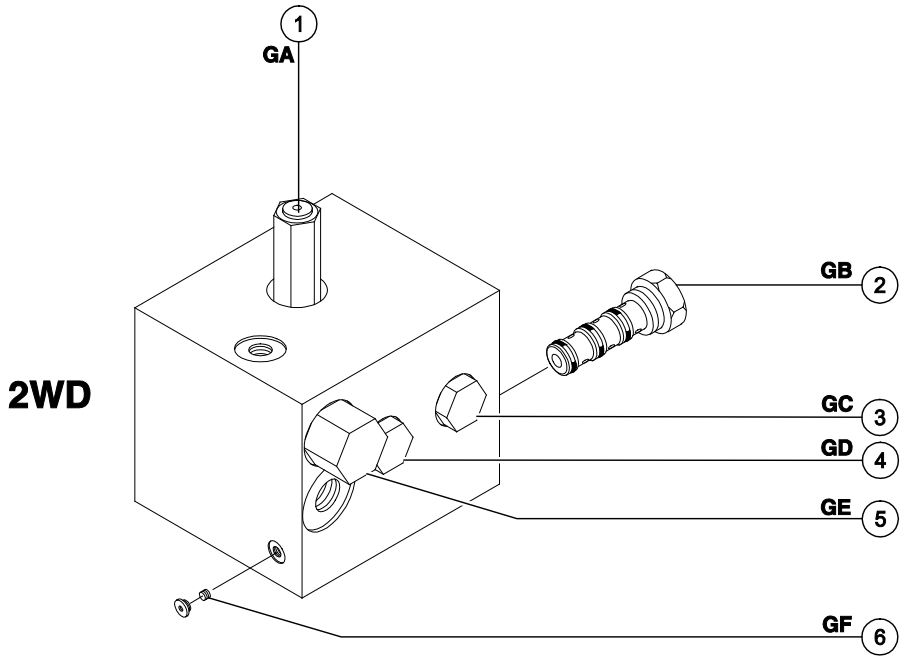
10 Turn the engine off, remove the pressure gauge and assemble the directional valve linkage.

11 Install the cover on the non-steer end of the drive chassis.

7-8
Traction Manifold Components, 2WD

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

Index No.	Description	Schematic Item	Function	Torque
1	Relief valve, 280 psi / 19.3 bar	GA	Charge pressure circuit	30-35 ft-lbs / 41-47 Nm
2	Flow divider/combiner valve	GB	Controls flow to drive motors in forward and reverse	80-90 ft-lbs / 108-122 Nm
3	Check valve	GC	Drive circuit	90-100 ft-lbs / 122-136 Nm
4	Check valve	GD	Drive circuit	30-35 ft-lbs / 41-47 Nm
5	Shuttle Valve, 3 position 3 way	GE	Charge pressure circuit that directs hot oil out of low pressure side of drive pump	30-35 ft-lbs / 41-47 Nm
6	Orifice	GF	Equalizes pressure on both sides of divider/combiner valve.	



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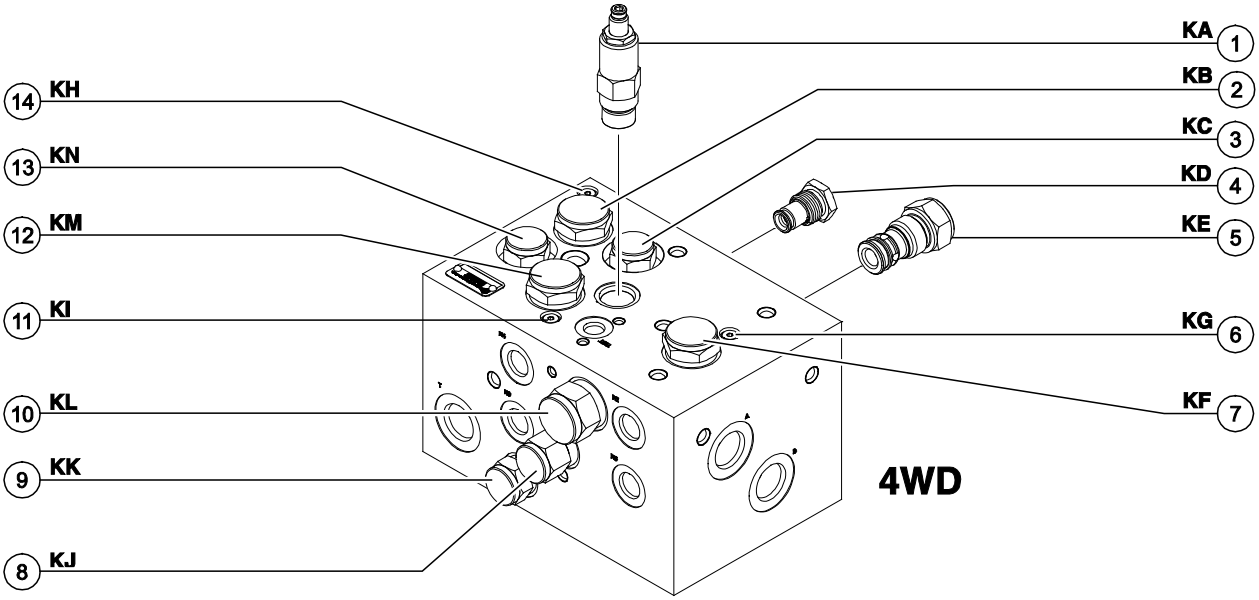
7-9
Traction Manifold Components, 4WD

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

Index No.	Description	Schematic Item	Function	Torque
1	Flow divider/combiner valve	KB	Controls flow to non-steer end drive motors in forward and reverse	80-90 ft-lbs / 108-122 Nm
2	Relief valve, 280 psi / 19.3 bar	KA	Charge pressure circuit	35-40 ft-lbs / 14-16 Nm
3	Check valve	KC	Steer end drive motor circuit	35-40 ft-lbs / 14-16 Nm
4	Flow divider/combiner valve	KF	Controls flow to divider/combiner valves 1 and 13	80-90 ft-lbs / 108-122 Nm
5	Orifice, 0.040 inch / 1 mm	KH	Equalizes pressure on both sides of divider/combiner valve 1	
6	Orifice, 0.040 inch / 1 mm	KI	Equalizes pressure on both sides of divider/combiner valve 13	
7	Orifice, 0.040 inch / 1 mm	KG	Equalizes pressure on both sides of divider/combiner valve 4	
8	Check valve	KD	Non-steer end drive motor circuit	35-40 ft-lbs / 14-16 Nm
9	Check valve	KE	Non-steer end drive motor circuit	60-70 ft-lbs / 81-95 Nm
10	Check valve	KK	Steer end drive motor circuit	35-40 ft-lbs / 14-16 Nm
11	Check valve	KL	Steer end drive motor circuit	60-70 ft-lbs / 81-95 Nm
12	Shuttle Valve, 3 position 3 way	KJ	Charge pressure circuit that directs hot oil out of low pressure side of drive pump	80-90 ft-lbs / 108-122 Nm
13	Flow divider/combiner valve	KM	Controls flow to steer end drive motors in forward and reverse	80-90 ft-lbs / 108-122 Nm
14	Check valve	KN	Non-steer end drive motor circuit	35-40 ft-lbs / 14-16 Nm

Manifolds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4WD

7-10 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 **2WD models:** Hold the charge pressure relief valve located on the traction manifold and remove the cap (item GA).
4WD models: Hold the charge pressure relief valve located on the traction manifold and loosen the jam nut (item KA).

3 **2WD models:** Turn the internal hex socket clockwise fully until it stops. Install the cap.
4WD models: Turn the external stem clockwise fully until it stops. Tighten the jam nut.

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 **2WD models:** Hold the charge pressure relief valve and remove the cap (item GA).
4WD models: Hold the charge pressure relief valve and loosen the jam nut. (item KA).

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 relief valve until the pressure reading on the gauge is 30 psi / 2 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 or tighten the jam nut.

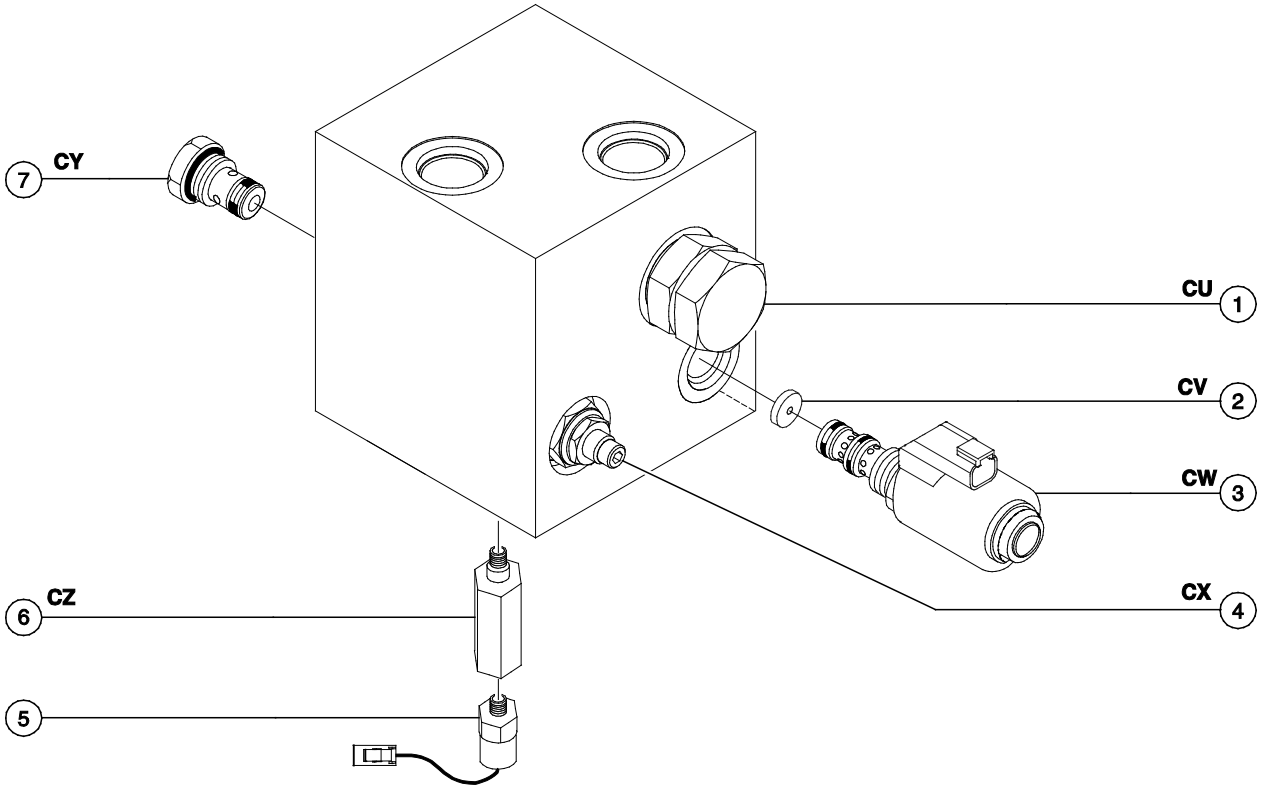
10 Turn the engine off and remove the pressure gauge.

Manifolds

7-11
Diverter Manifold Components (welder option)

The oil diverter manifold is mounted to the hydraulic generator located in the engine compartment.

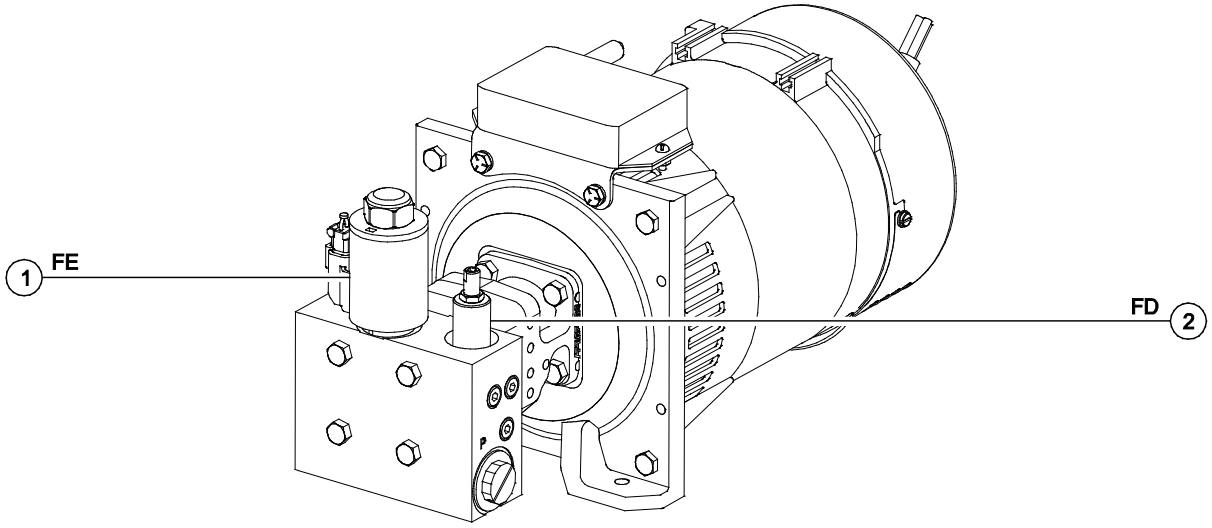
Index No.	Description	Schematic Item	Function	Torque
1	Directional valve	CU	Diverts oil from the drive circuit to the welder	80-90 ft-lbs / 108-122 Nm
2	Orifice	CV	Delays shift to drive	
3	Solenoid Valve	CW	Pilot valve to diverter	35-40 ft-lbs / 47-54 Nm
4	Relief valve, 3500 psi / 241 bar	CX	Charge pressure circuit	30-35 ft-lbs / 41-47 Nm
5	Pressure switch	CZ	Power to relay	16 ft-lbs / 22 Nm
6	Connector			11 ft-lbs / 15 Nm
7	Check valve	CY	Prevents oil to generator	35-40 ft-lbs / 47-54 Nm



7-12
Hydraulic Generator Manifold Components, 3kW

The generator manifold is mounted to the hydraulic generator located in the ground controls compartment.

Index No.	Description	Schematic Item	Function	Torque
1	Proportional solenoid valve	FE	Controls generator speed	33-37 ft-lbs / 45-50 Nm
2	Relief valve, 3000 psi / 207 bar	FD	Generator relief valve	20-25 ft-lbs / 27-34 Nm



Manifolds

7-13 Valve Coils

How to Test a Coil

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

Since coil resistance is sensitive to temperature, resistance values outside specification can produce erratic operation. When coil resistance decreases below specification, amperage increases. As resistance rises above specification, voltage increases.

While valves may operate when coil resistance is outside specification, maintaining coils within specification will help ensure proper valve function over a wide range of operating temperatures.

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

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

2 Test the coil resistance.

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

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

Valve Coil Resistance Specification

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

Valve Coil Resistance Specification	
Solenoid valve, 3 position 4 way, 10V DC schematic item (BT)	4Ω
Solenoid Valve, 2 position 3 way, 10V DC schematic items (BU, BV, BX, and BZ)	4Ω
Solenoid valve, 3 position 4 way, 10V DC schematic items (CD and CF)	5Ω
Proportional solenoid valve, 12V DC schematic items(BI and CH)	5Ω
Solenoid Valve, 2 position 3 way, 10V DC schematic item (CC)	6.8Ω
Solenoid Valve, 2 position 3 way, 12V DC (schematic item CE)	4.8Ω

How to Test a Coil Diode

Properly functioning coil diodes protect the electrical circuit by suppressing voltage spikes. Voltage spikes naturally occur within a function circuit following the interruption of electrical current to a coil. Faulty diodes can fail to protect the electrical system, resulting in a tripped circuit breaker or component damage.

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

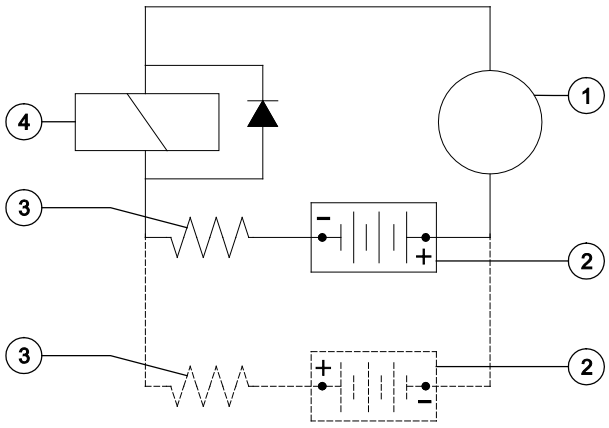
1 Test the coil for resistance. Refer to Repair Procedure, *How to Test a Coil*.

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

Resistor 10Ω

Genie part number 27287

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



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

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

3 Set a multimeter to read DC current.

Note: The multimeter, when set to read DC current, should be capable of reading up to 800 mA.

4 Connect the negative lead to the other terminal on the coil.

5 Momentarily connect the positive lead from the multimeter to the positive terminal on the 9V DC battery. Note and record the current reading.

6 At the battery or coil terminals, reverse the connections. Note and record the current reading.

⊙ Result: Both current readings are greater than 0 mA and are different by a minimum of 20%. The coil is good.

7 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.

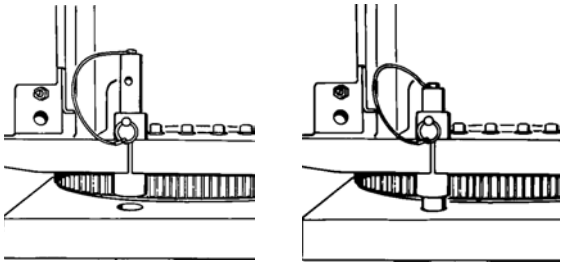
Turntable Rotation Components

8-1
Turntable Rotation Assembly

How to Remove the Turntable Rotation Drive Hub 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 Secure the turntable from rotating with the turntable rotation lock pin.

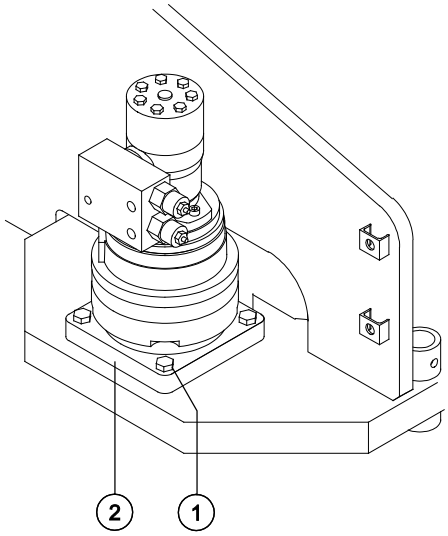


unlocked locked

2 Tag, disconnect and plug the hydraulic hoses from the drive motor. Cap the fittings on the motor.

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

3 Attach a suitable lifting device to the turntable rotator assembly.



1 backlash pivot plate mounting bolts
2 backlash pivot plate

4 Remove the turntable rotation assembly mounting fasteners.

5 Carefully remove the drive hub assembly from the machine.

⚠WARNING Crushing hazard. The turntable rotate drive hub assembly could become unbalanced and fall when removed from the machine if not properly supported by the lifting device.

When installing the drive hub assembly:

6 Install the turntable rotator assembly. Apply removable thread locking compound to fastener threads.Torque the backlash pivot plate mounting fasteners to 160 ft-lbs / 217 Nm.

9-1
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 with the machine 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 Rotate the turntable until the boom is between the steer tires or tracks.

2 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.

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

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

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

6 Remove the oscillate cylinder from the machine.

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

Track Components

10-1 Track Assembly

How to Remove a Track Assembly

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

1 Chock the tracks at the opposite end of the machine to prevent the machine from rolling.

2 Center a lifting jack of ample capacity (20,000 lbs / 10,000 kg) under the drive chassis between the tracks.

3 Lift the machine until the tracks are off the ground and then place jack stands under the drive chassis for support.

4 Remove the lug nut bolts holding each half sprocket on the drive hub. Rotate the sprockets until only one sprocket is contacting the track. Remove the lower half sprocket from the track assembly.

5 Rotate the remaining half sprocket 180° so that it is free of the track.

6 Attach a lifting strap from an overhead crane to the center-point of the track assembly, above the sprocket.

7 Remove the fasteners holding the TRAX mounting pin located underneath the axle. Remove the pin supporting the TRAX assembly.

8 Carefully remove the track assembly from the drive hub and set aside.

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

How to Replace the Track

1 Remove the track assembly from the machine. See How to Remove a Track Assembly.

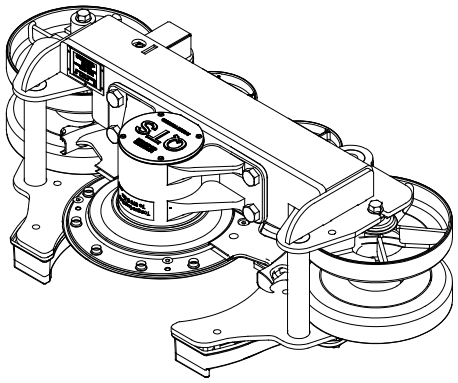
Note: The sprocket is comprised of two halves. Before removing the track assembly from the machine and to ease the removal of the sprocket, drive the machine until one complete half of the sprocket is located above the undercarriage of the track assembly.

2 Loosen the grease plug on the track tension cylinder to relieve the track tension. Clean up any grease that has spilled.

3 Remove the 2 sprocket retaining fasteners. Remove the sprocket half from the track assembly.

4 Carefully remove the track from the undercarriage.

5 Use an overhead crane to lay the undercarriage on its side with the drive sprocket bearing assembly facing upward and the track tension cylinder towards the ground.

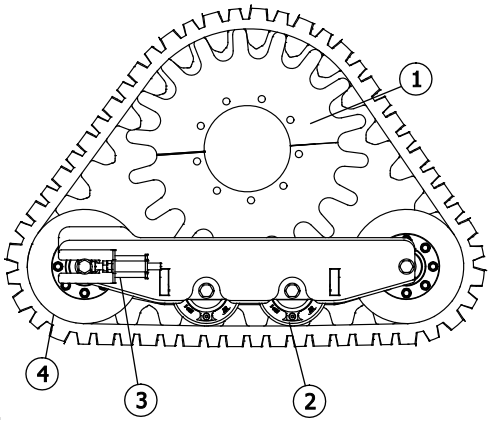


6 Install the new track onto the undercarriage.

7 Attach a lifting strap from an overhead crane to the center-point of the track, above the sprocket.

8 Use the overhead crane to raise the track assembly to an upright position. Rest the assembly on the floor or ground to remove any slack in the lower portion of the track.

Note: Be sure the idler and bogey wheels are aligned with the inside surface of the track



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1 half sprocket
2 bogey wheel
3 tensioner assembly
4 idler wheel

9 Rotate the sprocket half until the split tooth of the sprocket is lower than the other side.

10 Using an overhead crane or other suitable lifting device, lift up on the rubber track to create enough room to install the other sprocket half.

11 Install the sprocket half, removed in step 3, while engaging the sprocket teeth with the rubber track.

Note: Be sure to align the split tooth in both of the sprocket halves.

12 Insert a pin or rod through the wheel stud hole closest to the split tooth to hold the sprocket in place.

13 Insert a pointed pry bar into the wheel stud hole near the top of the sprocket. Insert another pointed pry bar into the wheel stud hole at the opposite side of the split tooth.

Track Components

14 Using the pry bars, lift the sprocket half into position. Install the 2 sprocket retaining fasteners and torque to specification. Refer to Section 2, Specifications.

15 Attach a lifting strap from an overhead crane to the center-point of the track assembly, above the sprocket.

16 Install the track assembly onto the drive hub. Install the lug nuts and torque to specification. Refer to Specifications.

⚠ CAUTION Crushing hazard. The track assembly could become unbalanced and fall when installed onto the machine if not properly supported by the overhead crane.

17 Adjust the track tension. Tighten the tensioner nut on both sides of the idler wheel until there is about 0.75-1.0 inch / 19-25 mm of droop between the inside of the rubber track and the bottom surface of the bogey wheels.

11-1
Hydraulic Generator

How to Purge the Hydraulic Line on the MTE Generator

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

Note: This procedure should be performed if the hydraulic line to the generator has been removed.

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

1 Locate the blue purge wire with the male spade connector from the MTE generator harness.

2 Connect a jumper wire of sufficient length from the positive battery terminal to the spade connector on the purge wire.

3 Start the engine and turn on the generator. Allow the generator to run for three minutes.

4 Turn off the generator and turn off the engine.

5 Remove the jumper wire from the positive battery terminal and disconnect from the purge wire.

6 Start the engine and turn on the generator. Using a digital multimeter check the voltage at the outlet.

⊙ Result: The generator produces a voltage ±10% of rated output. The generator is ready for use.

⊠ Result: The generator output voltage is outside the ±10% voltage range. Repeat the procedure beginning with step 2.

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. 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.
24	Angle sensor	11	Value at 5V	Reduced speed function. 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 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	Fully retract, then lower boom
				1000lb. Mode: Required retract into FULLY RETRACTED state before lowering	Check and service ext/ret and fully stowed switches
				500lb. Mode: Operates normally	
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.

Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	**Name**	**ID**	**Name**		
45	Platform Level Switch	21	Fault	Platform level frozen at neutral	Power up controller with problem corrected
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		Calibrate joystick.
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.

Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
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.
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 low		
		16	Value at 0V		
		17	Not calibrated		Calibrate joystick.
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 Code Display - Deutz and Perkins Models

How to Retrieve Active Engine Fault Codes - Deutz D 2.9 L4 and Perkins 404F-22 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.

Note: The Perkins 404F-22 is equipped with an engine fault LED located at the platform control box.

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.

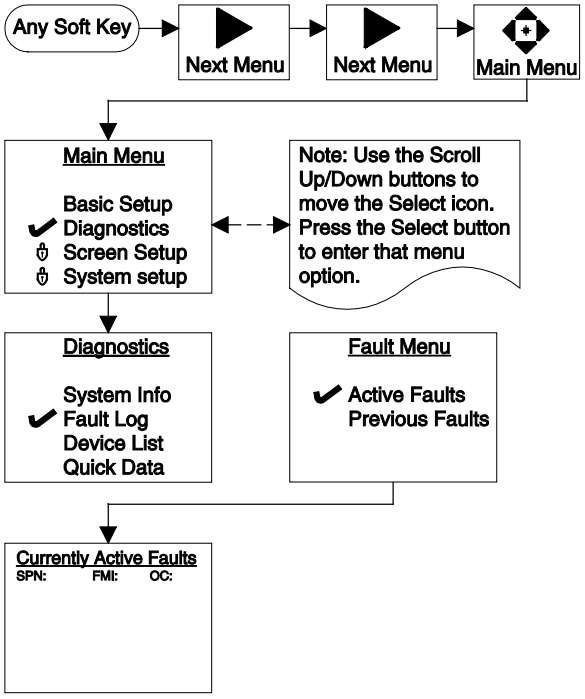
2 Press any soft key below the display.

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

With the engine not running:

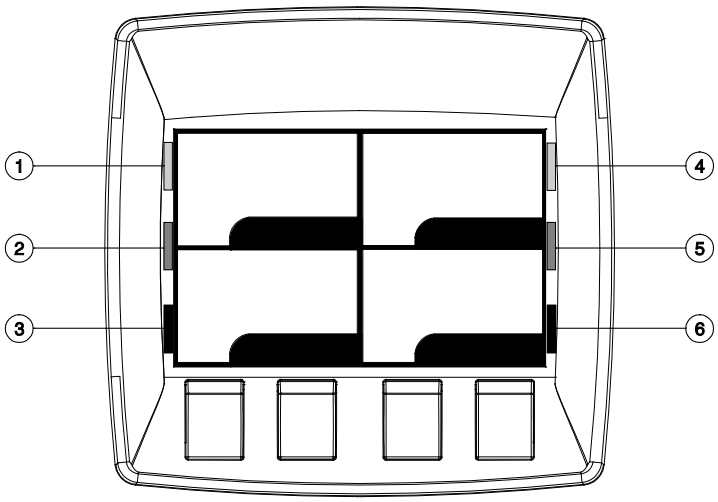
1 At the ground controls, turn the key switch to ground controls and pull out the red Emergency Stop button.

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



Fault Code Display - Deutz and Perkins Models

Flashing and Solid LED's - Deutz D 2.9 L4 and Perkins 404F-22 Models



1 Left green LED:

Flashing, engine fault detected. Contact service.

Solid, fault acknowledged. Contact service.

2 Left amber LED: (Perkins models)

Solid,

a) Regeneration is inhibited. No service required.

b) High exhaust temperature during regeneration mode. No service required.

3 Left red LED:

Flashing, engine fault detected. Contact service.

Flashing with right flashing amber LED, engine soot level over 140%. Engine shut down. Contact service.

4 Right green LED:

Flashing, engine fault detected. Contact service.

Solid, fault acknowledged. Contact service.

5 Right amber LED: (Perkins models)

Solid with left amber LED on solid, regeneration has been inhibited and engine soot level is between 80 - 100%. Regeneration is required.

Flashing with left amber LED on solid, regeneration has been inhibited and soot level is between 100 - 140%. Engine rpm is de-rated. Regeneration is required.

Flashing with left and right red LED's flashing, engine soot level over 140%. Engine shut down. Contact service.

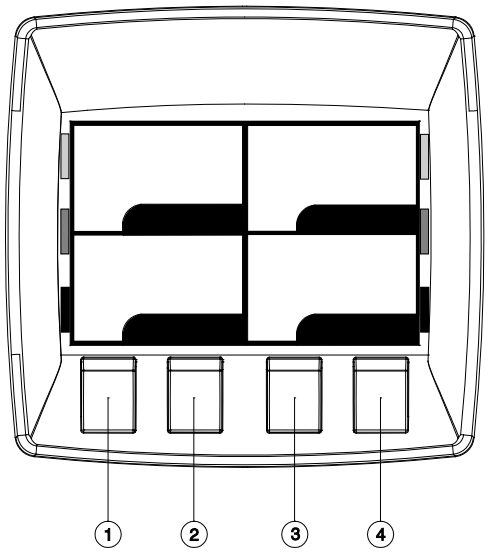
6 Right red LED:

Flashing, engine fault detected. Contact service.

Flashing with right flashing amber LED, engine soot level over 140%. Engine shut down. Contact service.

Fault Code Display - Deutz and Perkins Models

Soft Key Functions and Icons - Deutz D 2.9 L4 and Perkins 404F-22 Models



1 Next menu • Exit / Back one screen • Decrease brightness (-)

2 Brightness / Contrast • Scroll up • Increase • Increase brightness (+)

3 Regeneration forced • Scroll down • Decrease • Decrease contrast (-)

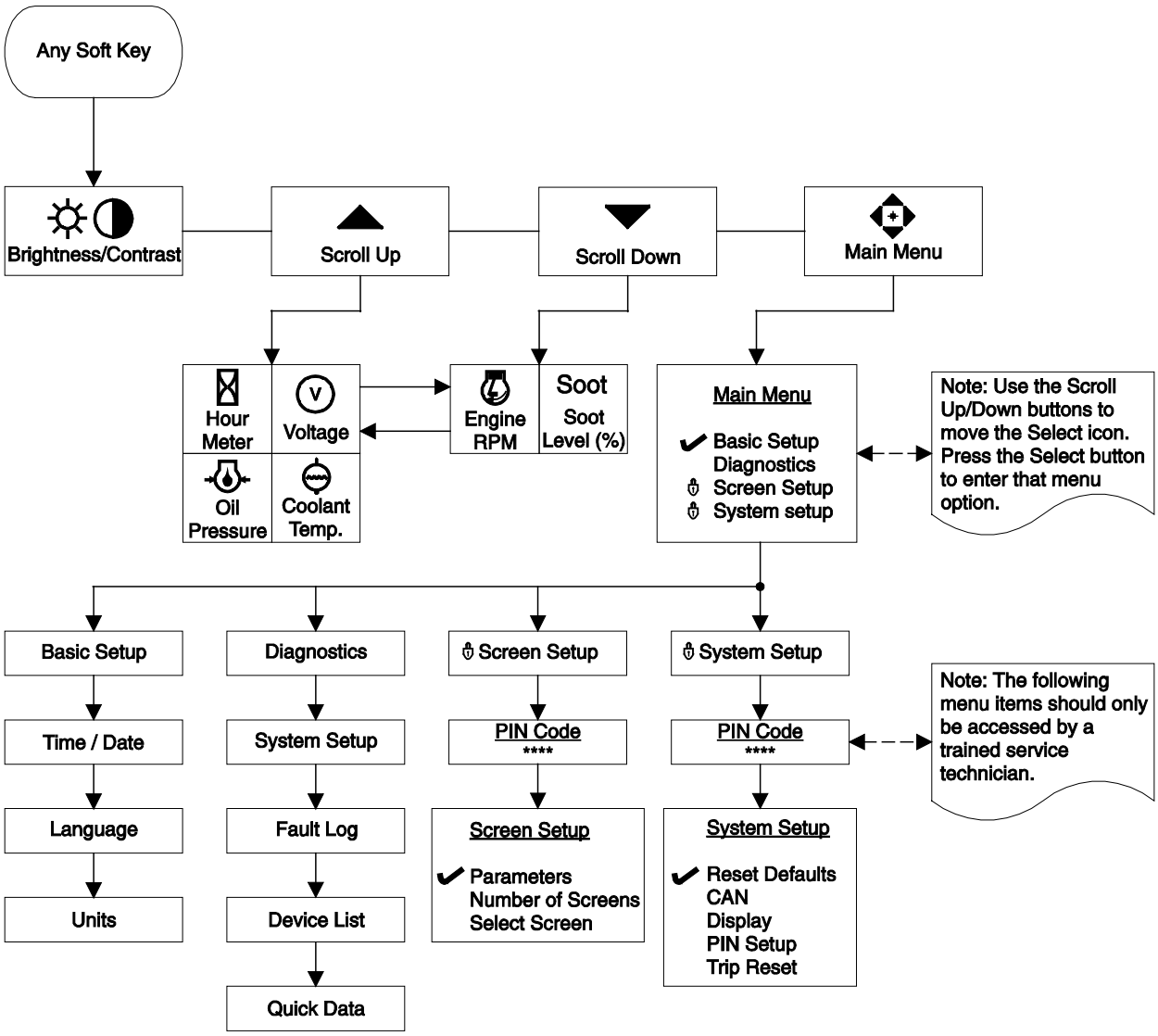
4 Regeneration inhibited • Select / Next • Main menu • Increase contarst (+)

Next Menu	Brightness/ Contrast	Initiate Switch	Inhibit Switch
Exit / Back One Screen	Scroll Up	Scroll Down	Select
Main Menu	Hour Meter	Oil Pressure	Coolant Temp.
Engine RPM	Soot Soot Level Percent (%)	V Voltage	Pin # Protected

Note: Regeneration, initiate, inhibit and soot only apply to the Perkins 404F-22 models.

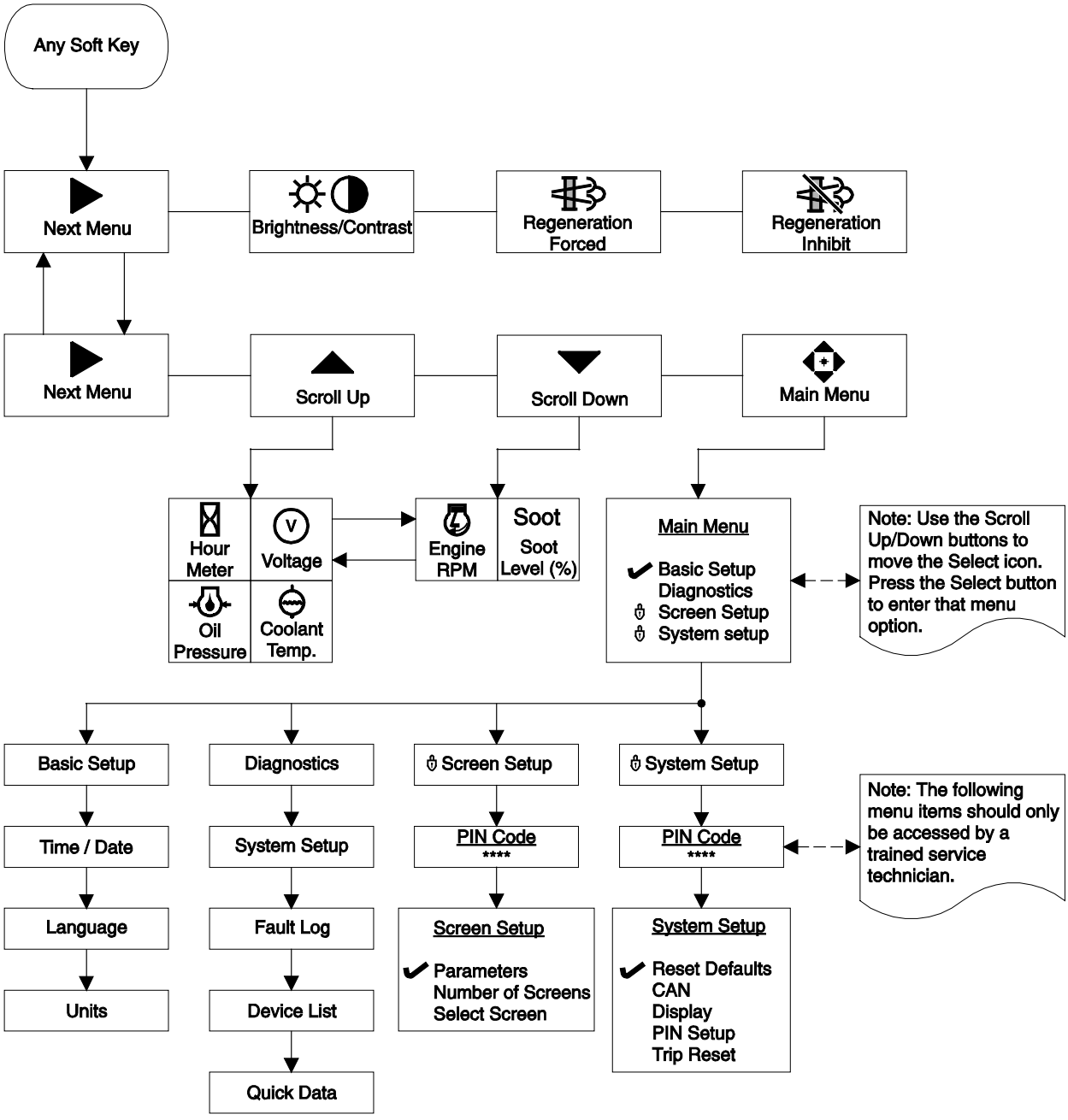
Fault Code Display - Deutz and Perkins Models

Main Menu Structure - Deutz D 2.9 L4 Models



Fault Code Display - Deutz and Perkins Models

Main Menu Structure - Perkins 404F-22 Models



Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
51	3	1019	EGR-Valve, short circuit to battery
51	3	1024	Position sensor error of actuator EGR-Valve; signal range check high
51	3	1226	EGR-Valve; short circuit to battery (A02)
51	3	1227	EGR-Valve; short circuit to battery (A67)
51	4	1020	EGR-Valve; short circuit to ground
51	4	1025	Position sensor error actuator EGR-Valve; signal range check low
51	4	1228	EGR-Valve; short circuit to ground (A02)
51	4	1229	EGR-Valve; short circuit to ground (A67)
1	4	1232	Actuator error EGR-Valve; Voltage below threshold
51	5	1015	Actuator error EGR-Valve; signal range check low
51	5	1017	Actuator EGR-Valve; open load
51	5	1023	Actuator error EGR-Valve; signal range check low
51	5	1223	Actuator EGR-Valve; open load
51	6	1014	Actuator error EGR-Valve; signal range check high
51	6	1022	Actuator error EGR-Valve; signal range check high
51	6	1224	Actuator EGR-Valve; over current
51	6	1230	Actuator error EGR-Valve; Overload by short-circuit
51	7	1016	Actuator position for EGR-Valve not plausible
51	11	1231	Actuator error EGR-Valve; Power stage over temp due to high current
51	12	1018	Actuator EGR-Valve; powerstage over temperature
51	12	1021	Mechanical actuator defect EGR-Valve
51	12	1225	Actuator EGR-Valve; over temperature
94	1	474	Low fuel pressure; warning threshold exceeded
94	1	475	Low fuel pressure; shut off threshold exceeded
94	3	472	Sensor error low fuel pressure; signal range check high
94	4	473	Sensor error low fuel pressure; signal range check low
97	3	464	Sensor error water in fuel; signal range check high
97	4	465	Sensor error water in fuel; signal range check low
97	12	1157	Water in fuel level prefilter; maximum value exceeded
100	0	734	High oil pressure; warning threshold exceeded
100	0	735	High oil pressure; shut off threshold exceeded
100	1	736	Low oil pressure; warning threshold exceeded
100	1	737	Low oil pressure; shut off threshold exceeded
100	3	732	Sensor error oil pressure; signal range check high
100	4	733	Sensor error oil pressure sensor; signal range check low
102	2	88	Charged air pressure above warning threshold
102	2	89	Charged air pressure above shut off threshold
102	4	777	Sensor error charged air press.; signal range check low

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
105	0	996	High charged air cooler temperature; warning threshold exceeded
105	0	997	High charged air cooler temperature; shut off threshold exceeded
105	3	994	Sensor error charged air temperature; signal range check high
105	4	995	Sensor error charged air temperature; signal range check low
108	3	412	Sensor error ambient air press.; signal range check high
108	4	413	Sensor error ambient air press.; signal range check low
110	0	98	High coolant temperature; warning threshold exceeded
110	0	99	High coolant temperature; shut off threshold exceeded
110	3	96	Sensor error coolant temp.; signal range check high
110	4	97	Sensor error coolant temp.; signal range check low
111	1	101	Coolant level too low
132	11	1	Air flow sensor load correction factor exceeding the maximum drift limit; plausibility error
132	11	2	Air flow sensor load correction factor exceeding drift limit; plausibility error
132	11	3	Air flow sensor low idle correction factor exceeding the maximum drift limit
132	11	4	Air flow sensor load correction factor exceeding the maximum drift limit
157	3	877	Sesnor error rail pressure; signal range check high
157	4	878	Sensor error rail pressure; signal range check low
168	0	1180	Physical range check high for battery voltage
168	1	1181	Physical range check low for battery voltage
168	2	47	High battery voltage; warning threshold exceeded
168	2	48	Low battery voltage; warning threshold exceeded
168	3	45	Sensor error battery voltage; signal range check high
168	4	46	Sensor error battery voltage; signal range check low
171	3	417	Sensor error environment temperature; signal range check high
171	4	418	Sensor error environment temperature; signal range check low
172	0	1182	Physical range check high for intake air temperature
172	1	1183	Physical range check low for intake air temperature
172	2	9	Sensor ambient air temperature; plausibility error
172	2	983	Intake air sensor; plausibility error
172	3	981	Sensor error intake air; signal range check high
172	4	982	Sensor error intake air sensor; signal range check low
174	0	481	High low fuel temperature; warning threshold exceeded
174	0	482	High Low fuel temperature; shut off threshold exceeded
175	0	740	Physical range check high for oil temperature
175	0	745	High oil temperature; warning threshold exceeded
175	0	746	High oil temperature; shut off threshold exceeded
175	1	741	Physical range check low for oil temperature

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
175	2	738	Sensor oil temperature; plausibility error
175	2	739	Sensor oil temperature; plausibility error oil temperature too high
175	3	743	Sensor error oil temperature; signal range check high
175	4	744	Sensor error oil temperature; signal range check low
190	0	389	Engine speed above warning threshold (FOC-Level 1)
190	2	421	Offset angle between crank- and camshaft sensor is too large
190	8	419	Sensor camshaft speed; disturbed signal
190	8	422	Sensor crankshaft speed; disturbed signal
190	11	390	Engine speed above warning threshold (FOC-Level 2)
190	12	420	Sensor camshaft speed; no signal
190	12	423	Sensor crankshaft speed; no signal
190	14	391	Engine speed above warning threshold (Overrun Mode)
190	14	1222	Camshaft- and Crankshaft speed sensor signal not available on CAN
411	0	791	Physical range check high for differential pressure Venturiunit (EGR)
411	1	792	Physical range check low for differential pressure Venturiunit (EGR)
411	3	795	Sensor error differential pressure Venturiunit (EGR); signal range check high
411	4	381	Physical range check low for EGR differential pressure
411	4	796	Sensor error differential pressure Venturiunit (EGR); signal range check low
412	3	1007	Sensor error EGR cooler downstream temperature; signal range check high
412	4	1008	Sensor error EGR cooler downstream temperature; signal range check low
520	9	306	Timeout Error of CAN-Receive-Frame TSC1TR; Setpoint
597	2	49	Break lever mainswitch and break lever redundancy switch status not plausible
624	3	971	SVS lamp; short circuit to batt.
624	4	972	SVS lamp; short circuit to grd.
624	5	969	SVS lamp; open load
624	12	970	SVS lamp; powerstage over temperature
630	12	376	Access error EEPROM memory (delete)
630	12	377	Access error EEPROM memory (read)
630	12	378	Access error EEPROM memory (write)
639	14	84	CAN-Bus 0 "BusOff-Status"
651	3	580	Injector 1 (in firing order); short circuit
651	4	586	High side to low side short circuit in the injector 1 (in firing order)
651	5	568	Injector 1 (in firing order); interruption of electric connection
652	3	581	Injector 2 (in firing order); short circuit
652	4	587	High side to low side short circuit in the injector 2 (in firing order)
652	5	569	Injector 2 (in firing order); interruption of electric connection
653	3	582	Injector 3 (in firing order); short circuit
653	4	588	High side to low side short circuit in the injector 3 (in firing order)
653	5	570	Injector 3 (in firing order); interruption of electric connection

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
654	3	583	Injector 4 (in firing order); short circuit
654	4	589	High side to low side short circuit in the injector 4 (in firing order)
654	5	571	Injector 4 (in firing order); interruption of electric connection
676	11	543	Cold start aid relay error.
676	11	544	Cold start aid relay open load
677	3	956	Starter relay high side; short circuit to battery
677	3	960	Starter relay low side; short circuit to battery
677	4	957	Starter relay high side; short circuit to ground
677	4	961	Starter relay low side; short circuit to ground
677	5	958	Starter relay; no load error
677	12	959	Starter relay; powerstage over temperature
703	3	426	Engine running lamp; short circuit to battery
703	4	427	Engine running lamp; short circuit to ground
703	5	424	Engine running lamp; open load
703	12	425	Engine running lamp; powerstage over temperature
729	5	545	Cold start aid relay open load
729	12	547	Cold start aid relay; over temperature error
898	9	305	Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
1079	13	946	Sensor supply voltage monitor 1 error (ECU)
1080	13	947	Sensor supply voltage monitor 2 error (ECU)
1109	2	121	Engine shut off demand ignored
1136	0	1398	Physikal range check high for ECU temperature
1136	1	1399	Physikal range check low for ECU temperature
1136	3	1400	Sensor error ECU temperature; signal range check high
1136	4	1401	Sensor error ECU temperature; signal range check low
1176	3	849	Sensor error pressure sensor upstream turbine; signal range check high
1176	4	850	Sensor error pressure sensor downstream turbine; signal range check high
1180	0	1193	Physical range check high for exhaust gas temperature upstream turbine
1180	0	1460	Turbocharger Wastegate CAN feedback; warning threshold exceeded
1180	0	1462	Exhaust gas temperature upstream turbine; warning threshold exceeded
1180	1	1194	Physical range check low for exhaust gas temperature upstream turbine
1180	1	1461	Turbocharger Wastegate CAN feedback; shut off threshold exceeded
1180	1	1463	Exhaust gas temperature upstream turbine; shut off threshold exceeded
1180	3	1067	Sensor error exhaust gas temperature upstream turbine; signal range check high
1180	11	1066	Sensor exhaust gas temperature upstream turbine; plausibility error
1188	2	1414	Wastegate; status message from ECU missing

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
1188	7	1415	Wastegate actuator; blocked
1188	11	1411	Wastegate actuator; internal error
1188	11	1412	Wastegate actuator; EOL calibration not performed correctly
1188	11	1416	Wastegate actuator; over temperature (> 145øC)
1188	11	1417	Wastegate actuator; over temperature (> 135øC)
1188	11	1418	Wastegate actuator; operating voltage error
1188	13	1413	Wastegate actuator calibration deviation too large, recalibration required
1231	14	85	CAN-Bus 1 "BusOff-Status"
1235	14	86	CAN-Bus 2 "BusOff-Status"
1237	2	747	Override switch; plausibility error
1322	12	610	Too many recognized misfires in more than one cylinder
1323	12	604	Too many recognized misfires in cylinder 1 (in firing order)
1324	12	605	Too many recognized misfires in cylinder 2 (in firing order)
1325	12	606	Too many recognized misfires in cylinder 3 (in firing order)
1326	12	607	Too many recognized misfires in cylinder 4 (in firing order)
2659	0	1524	Physical range check high for EGR exhaust gas mass flow
2659	1	1525	Physical range check low for EGR exhaust gas mass flow
2659	2	1523	Exhaust gas recirculation AGS sensor; plausibility error
2659	2	1527	AGS sensor temperature exhaust gas mass flow; plausibility error
2659	12	1526	Exhaust gas recirculation; AGS sensor has "burn off" not performed
2797	4	1337	Injector diagnostics; timeout error of short circuit to ground measurement cyl. Bank 0
2798	4	1338	Injector diagnostics; timeout error of short circuit to ground measurement cyl. Bank 1
2798	4	1339	Injector diagnostics; short circuit to ground monitoring Test in Cyl. Bank 0
2798	4	1340	Injector diagnostics; short circuit to ground monitoring Test in Cyl. Bank 1
3224	2	127	DLC Error of CAN-Receive-Frame AT1IG1 NOX Sensor (SCR-system upstream cat; DPF-system downstream cat); length of frame incorrect
3224	9	128	Timeout Error of CAN-Receive-Frame AT1IG1; NOX sensor upstream
3248	4	1047	Sensor error particle filter downstream temperature; signal range check low
3699	2	1616	DPF differential pressure sensor and a further sensor or actuator CRT system defective
3699	2	1617	Temperature sensor us. and ds. DOC simultaneously defect
3699	14	1615	Maximum stand-still-duration reached; oil exchange required
4765	0	1039	Physical range check high for exhaust gas temperature upstream (DOC)
4765	1	1042	Physical range check low for exhaust gas temperature upstream (DOC)

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
4766	0	1029	Physical range check high for exhaust gas temperature downstream (DOC)
4766	1	1032	Physical range check low for exhaust gas temperature downstream (DOC)
4768	2	1036	Sensor exhaust gas temperature upstream (DOC); plausibility error
4768	3	1044	Sensor error exhaust gas temperature upstream (DOC); signal range check high
4768	4	1045	Sensor error exhaust gas temperature upstream (DOC) signal range check low
4769	2	1026	Sensor exhaust gas temperature downstream (DOC); plausibility error
4769	3	1034	Sensor error exhaust gas temperature downstream (DOC); signal range check high
4769	4	1035	Sensor error exhaust gas temperature downstream (DOC); signal range check low
523006	3	34	Controller mode switch; short circuit to battery
523006	4	35	Controller mode switch; short circuit to ground
523008	1	648	Manipulation control was triggered
523008	2	649	Timeout error in Manipulation control
523009	9	825	Pressure Relief Valve (PRV) reached maximun allowed opening count
523009	10	833	Pressure relief valve (PRV) reached maximun allowed open time
523212	9	171	Timeout Error of CAN-Receive-Frame ComEngPrt; Engine Protection
523216	9	198	Timeout Error of CAN-Receive-Frame PrHtEnCmd; pre-heat command, engine command
523240	9	179	Timeout CAN-message FunModCtl; Function Mode Control
523350	4	565	Injector cylinder-bank 1; short circuit
523352	4	566	Injector cylinder-bank 2; short circuit
523354	12	567	Injector powerstage output defect
523470	2	826	Pressure Relief Valve (PRV) forced to open; performed by pressure increase
523470	2	827	Pressure Relief Valve (PRV) forced to open; performed by pressure shock
523470	7	876	Maximum rail pressure in limp home mode exceeded (PRV)
523470	11	831	The PRV can not be opened at this operating point with a pressure shock
523470	11	832	Rail pressure out of tolerance range
523470	12	828	Open Pressure Relief Valve (PRV); shut off condition
523470	12	829	Open Pressure Relief Valve (PRV); warning condition
523470	14	830	Pressure Relief Valve (PRV) is open
523550	12	980	T50 start switch active for too long
523601	13	948	Sensor supply voltage monitor 3 error (ECU)
523603	9	126	Timeout Error of CAN-Receive-Frame AMB; Ambient Temperature Sensor

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
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SPN	FMI	KWP	Description
523605	9	300	Timeout Error of CAN-Receive-Frame TSC1AE; Traction Control
523606	9	301	Timeout Error of CAN-Receive-Frame TSC1AR; Retarder
523612	12	387	Internal software error ECU; injection cut off
523612	12	612	Internal ECU monitoring detection reported error
523612	12	613	Internal ECU monitoring detection reported error
523612	12	614	Internal ECU monitoring detection reported error
523612	12	615	Internal ECU monitoring detection reported error
523612	12	616	Internal ECU monitoring detection reported error
523612	12	617	Internal ECU monitoring detection reported error
523612	12	618	Internal ECU monitoring detection reported error
523612	12	619	Internal ECU monitoring detection reported error
523612	12	620	Internal ECU monitoring detection reported error
523612	12	621	Internal ECU monitoring detection reported error
523612	12	623	Internal ECU monitoring detection reported error
523612	12	624	Internal ECU monitoring detection reported error
523612	12	625	Internal ECU monitoring detection reported error
523612	12	627	Internal ECU monitoring detection reported error
523612	12	628	Internal ECU monitoring detection reported error
523612	12	637	Internal ECU monitoring detection reported error
523612	12	1170	Internal software error ECU
523612	14	973	Softwarereset CPU SWReset_0
523612	14	974	Softwarereset CPU SWReset_1
523612	14	975	Softwarereset CPU SWReset_2
523613	0	856	Maximum positive deviation of rail pressure exceeded (RailMeUn0)
523613	0	857	Maximum positive deviation of rail pressure in metering unit exceeded (RailMeUn1)
523613	0	858	Railsystem leakage detected (RailMeUn10)
523613	0	859	Maximum negative deviation of rail pressure in metering unit exceeded (RailMeUn2)
523613	0	860	Negative deviation of rail pressure second stage (RailMeUn22)
523613	0	862	Maximum rail pressure exceeded (RailMeUn4)
523613	1	861	Minimum rail pressure exceeded (RailMeUn3)
523613	2	864	Setpoint of metering unit in overrun mode not plausible
523615	3	594	Metering unit (Fuel-System); short circuit to battery highside
523615	3	596	Metering unit (Fuel-System); short circuit to battery low side
523615	4	595	Metering unit (Fuel-System); short circuit to ground high side
523615	4	597	Metering Unit (Fuel-System); short circuit to ground low side
523615	5	592	Metering unit (Fuel-System); open load
523615	12	593	Metering unit (Fuel-System); powerstage over temperature
523619	2	488	Physical range check high for exhaust gas temperature upstrem (SCR-CAT)
523698	11	122	Shut off request from supervisory monitoring function

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
523717	12	125	Timeout Error of CAN-Transmit-Frame AmbCon; Weather environments
523718	3	1488	SCR mainrelay; short circuit to battery (only CV56B)
523718	4	1489	SCR mainrelay; short circuit to ground (only CV56B)
523718	5	1486	SCR mainrelay; open load (only CV56B)
523718	12	1487	SCR mainrelay; powerstage over temperature (only CV56B)
523766	9	281	Timeout Error of CAN-Receive-Frame Active TSC1AE
523767	9	282	Timeout Error of CAN-Receive-Frame Passive TSC1AE
523768	9	283	Timeout Error of CAN-Receive-Frame Active TSC1AR
523769	9	284	Timeout Error of CAN-Receive-Frame Passive TSC1AR
523770	9	285	Timeout Error of CAN-Receive-Frame Passive TSC1DE
523776	9	291	Timeout Error of CAN-Receive-Frame TSC1TE - active
523777	9	292	Passive Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
523778	9	293	Active Timeout Errorof CAN-Receive-Frame TSC1TR
523779	9	294	Passive Timeout Error of CAN-Receive-Frame TSC1TR
523788	12	299	Timeout Error of CAN-Transmit-Frame TrbCH; Status Wastegate
523793	9	202	Timeout Error of CAN-Receive-Frame UAA10; AGS sensor service message
523794	9	203	Timeout Error of CAN-Receive-Frame UAA11; AGS sensor data
523895	13	559	Check of missing injector adjustment value programming (IMA) injector 1 (in firing order)
523896	13	560	check of missing injector adjustment value programming (IMA) injector 2 (in firing order)
523897	13	561	check of missing injector adjustment value programming (IMA) injector 3 (in firing order)
523898	13	562	check of missing injector adjustment value programming (IMA) injector 4 (in firing order)
523910	6	1261	Air Pump; over current
523913	3	74	Sensor error glow plug control diagnostic line voltage; signal range check high
523913	4	75	Sensor error glow plug control diagnostic line voltage; signal range check low
523914	3	78	Glow plug control; short circuit to battery
523914	4	79	Glow plug control; short circuit to ground
523914	5	76	Glow plug control; open load
523914	5	1216	Glow plug control release line; short circuit error
523914	11	1217	Glow plug control; internal error
523914	12	77	Glow plug control; powerstage over temperature
523919	2	1378	Sensor air pump airpressure; plausibility error
523920	2	1379	Sensor exhaust gas back pressure burner; plausibility error

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
523922	7	1262	Burner Shut Off Valve; blocked closed
523922	7	1264	Burner Shut Off Valve; blocked closed
523929	0	109	Fuel Balance Control integrator injector 1 (in firing order); maximum value exceeded
523929	1	115	Fuel Balance Control integrator injector 1 (in firing order); minimum value exceeded
523930	0	110	Fuel Balance Control integrator injector 2 (in firing order); maximum value exceeded
523930	1	116	Fuel Balance Control integrator injector 2 (in firing order); minimum value exceeded
523931	0	111	Fuel Balance Control integrator injector 3 (in firing order); maximum value exceeded
523931	1	117	Fuel Balance Control integrator injector 3 (in firing order); minimum value exceeded
523932	0	112	Fuel Balance Control integrator injector 4 (in firing order); maximum value exceeded
523932	1	118	Fuel Balance Control integrator injector 4 (in firing order); minimum value exceeded
523935	12	168	Timeout Error of CAN-Transmit-Frame EEC3VOL1; Engine send messages
523936	12	169	Timeout Error of CAN-Transmit-Frame EEC3VOL2; Engine send messages
523946	0	1158	Zero fuel calibration injector 1 (in firing order); maximum value exceeded
523946	1	1164	Zero fuel calibration injector 1 (in firing order); minimum value exceeded
523947	0	1159	Zerofuel calibration injector 2 (in firing order); maximum value exceeded
523947	1	1165	Zerofuel calibration injector 2 (in firing order); minimum value exceeded
523948	0	1160	Zerofuel calibration injector 3 (in firing order); maximum value exceeded
523948	1	1166	Zerofuel calibration injector 3 (in firing order); minimum value exceeded
523949	0	1161	Zerofuel calibration injector 4 (in firing order); maximum value exceeded
523949	1	1167	Zerofuel calibration injector 4 (in firing order); minimum value exceeded
523960	0	1011	Physical range check high for EGR cooler downstream temp.
523960	0	1458	High exhaust gas temperature EGR cooler downstream; warning threshold exceeded
523960	1	1012	Physical range check low for EGR cooler downstream temp.
523960	1	1459	High exhaust gas temperature EGR cooler downstream; shut off threshold exceeded
523980	14	1187	Bad quality of reduction agent detected
523981	11	918	Urea-tank without heating function (heating phase)
523982	0	360	Powerstage diagnosis disabled; high battery voltage
523982	1	361	Powerstage diagnosis disabled; low battery voltage

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
523988	3	1245	Charging lamp; short circuit to battery
523988	4	1246	Charging lamp; short circuit to ground
523988	5	1243	Charging lamp; open load
523988	12	1244	Charging lamp; over temp.
523998	4	1327	Injector cylinder bank 2 slave; short circuit
523999	12	1328	Injector powerstage output Slave defect
524014	1	1254	Air pressure glow plug flush line; below limit
524016	2	1259	Amount of air is not plausible to pump speed
524016	2	1260	Calculated amount of air is not plausible to HFM reading
524016	11	1258	HFM sensor; electrical fault
524021	11	1263	Burner fuel line pipe leak behind Shut Off Valve
524024	11	1302	Deviation of the exhaust gas temp. setpoint to actual value downstream (DOC) too high
524028	2	1431	CAN message PROEGRActr; plausibility error
524029	2	1432	Timeout Error of CAN-Receive-Frame ComEGRActr - exhaust gas recirculation positioner
524030	7	1440	EGR actuator; internal error
524031	13	1441	EGR actuator; calibration error
524032	2	1442	EGR actuator; status message EGRCust is missing
524033	7	1443	EGR actuator; due to overload in Save Mode
524034	3	1438	Disc separator; short circuit to battery
524034	4	1439	Disc separator; short circuit to ground
524034	5	1436	Disc Separator; open load
524034	12	1437	Disc Separator; powerstage over temperature
524035	12	1341	Injector diagnostics; time out error in the SPI communication
524057	2	1505	Electric fuel pump; fuel pressure build up error
524097	9	1663	Timeout error of CAN-Transmit-Frame DPFBrnAirPmpCtl
524098	9	1664	Timeout error of CAN-Transmit-Frame ComDPFBrnPT
524099	9	1665	Timeout error of CAN-Transmit-Frame ComDPFC1
524100	9	1666	Timeout error of CAN-Transmit-Frame ComDPFHisDat
524101	9	1667	Timeout error of CAN-Transmit-Frame ComDPFTstMon

Deutz D 2.9 L4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier
KWP = Keyword Protocol

SPN	FMI	KWP	Description
524102	9	1674	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmpCtl
524103	9	1675	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmp
524104	9	1676	Timeout error of CAN-Receive-Frame ComRxDPFCtl
524105	9	1668	Timeout error of CAN-Transmit-Frame ComEGRMsFlw
524106	9	1677	Timeout error of CAN-Receive-Frame ComRxEGRMsFlw1
524107	9	1678	Timeout error of CAN-Receive-Frame ComRxEGRMsFlw2
524108	9	1669	Timeout error of CAN-Transmit-Frame ComEGRTVActr
524109	9	1679	Timeout error of CAN-Receive-Frame ComRxEGRTVActr
524110	9	1670	Timeout error of CAN-Transmit-Frame ComETVActr
524111	9	1680	Timeout error of CAN-Receive-Frame ComRxETVActr
524112	9	1671	Timeout ComITVActr
524113	9	1681	Timeout error of CAN-Receive-Frame ComRxITVActr
524114	9	1659	Timeout error of CAN-Transmit-Frame A1DOC
524115	9	1660	Timeout error of CAN-Transmit-Frame AT1S
524116	9	1661	Timeout error of CAN-Transmit-Frame SCR2
524117	9	1662	Timeout error of CAN-Transmit-Frame SCR3
524118	9	1672	Timeout error of CAN-Receive-Frame ComRxCM1
524119	9	1673	Timeout error of CAN-Receive-Frame ComRxCustSCR3
524120	9	1682	Timeout error of CAN-Receive-Frame ComRxSCRHtDiag
524121	9	1683	Timeout error of CAN-Receive-Frame ComRxTrbChActr
524122	9	1684	Timeout error of CAN-Receive-Frame ComRxUQSens
524123	9	1685	Timeout error of CAN-Receive-Frame ComSCRHtCtl
524124	9	1686	Timeout error of CAN-Receive-Frame ComTxAT1IMG
524125	9	1687	Timeout error of CAN-Receive-Frame ComTxTrbChActr

Perkins 404F-22 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
29	3	Accelerator Pedal Position 2: Voltage Above Normal
29	4	Accelerator Pedal Position 2: Voltage Below Normal
91	3	Accelerator Pedal Position 1: Voltage Above Normal
91	4	Accelerator Pedal Position 1: Voltage Below Normal
100	1	Engine Oil Pressure :Low- most severe (3)
108	3	Barometric Pressure : Voltage Above Normal
108	4	Barometric Pressure : Voltage Below Normal
110	3	Engine Coolant Temperature : Voltage Above Normal
110	4	Engine Coolant Temperature : Voltage Below Normal
110	15	Engine Coolant Temperature : High -least severe (1)
168	0	Battery Potential/ Power Input 1 : High- most severe (3)
168	3	Battery Potential/ Power Input 1: Voltage Above Normal
168	4	Battery Potential/ Power Input 1: Voltage Below Normal
172	3	Engine Air Inlet Temperature: Voltage Above Normal
172	4	Engine Air Inlet Temperature: Voltage Below Normal
190	0	Engine Speed : High- most severe (3)
190	8	Engine Speed : Abnormal Frequency, Pulse Width or Period
558	3	Accelerator Pedal1 Low Idle Switch: Voltage Above Normal
558	4	Accelerator Pedal1 Low Idle Switch: Voltage Below Normal
638	6	Engine Fuel Rack Actuator: Current Above Normal
639	14	J1939 Network#1: Special Instruction
723	3	Engine Speed Sensor #2: Voltage Above Normal
723	4	Engine Speed Sensor #2: Voltage Below Normal
723	8	Engine Speed Sensor#2: Abnormal Frequency, Pulse Width or Period"
723	10	Engine Speed Sensor #2: Abnormal Rate of Change
733	3	Engine Rack Position Sensor: Voltage Above Normal
733	4	Engine Rack Position Sensor: Voltage Below Normal
1485	7	ECU Main Relay : Not Responding Property
2840	11	ECU Instance: Other Failure Mode
2840	12	ECU Instance: Failure
2840	13	ECU Instance: Out of Calibration
2970	3	Accelerator Pedal 2 Low Idle Switch: Voltage Above Normal
2970	4	Accelerator Pedal 2 Low Idle Switch: Voltage Below Normal
3241	1	Exhaust Gas Temperature 1: Low-most severe (3)
3241	3	Exhaust Gas Temperature 1: Voltage Above Normal
241	4	Exhaust Gas Temperature 1: Voltage Below Normal
3241	15	Exhaust Gas Temperature 1: High-least severe (1)
3241	16	Exhaust Gas Temperature 1: High-moderate severity (2)
3242	1	Particulate Trap Intake Gas Temp: Low- most severe(3)"
3242	3	Particulate Trap Intake Gas Temp: Voltage Above Normal"
3242	4	Particulate Trap Intake Gas Temp: Voltage Below Normal"
3242	15	Particulate Trap Intake Gas Temp: High - least severe(1)"
3242	16	Particulate Trap Intake Gas Temp: High-moderate severity (2)

Perkins 404F-22 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

SPN	FMI	Description
3251	3	Particulate Trap Differential Pressure: Voltage Above Normal
3251	4	Particulate Trap Differential Pressure: Voltage Below Normal
3473	7	Aftertreatmert #1 Failed to Ignite: Not Responding Properly
3473	11	Aftertreatmert #1 Failed to Ignite : Other Failure Mode
3484	0	Aftertreatmert #1 Ignition : High-most severe (3)
3484	3	Aftertreatmert #1 Ignition : Voltage Above Normal
3484	4	Aftertreatmert #1 Ignition : Voltage Below Normal
3556	6	Aftertreatmert 1 Hydrocarbon Doser 1: Current Above Normal
3610	3	Diesel Particulate Filter Outlet Pressure or 1: Voltage Above Normal"
3610	4	DieselParticulate Filter Outlet Pressure Sensor 1: Voltage Below Normal
3713	7	DPF Active Regeneration Inhibited Due to System Timeout: Not Responding Properly
3713	31	DPF Active Regeneration Inhibited Due to System Timeout
3719	0	Particulate Trap #1 Soot Load Percent: High- most severe (3)
3719	16	Particulate Trap #1 Soot Load Percent: High-moderate severity (2)
4016	6	High Current Auxiliary Power Relay 1: Current Above Normal
4201	3	Engine Speed Sensor #1: Voltage Above Normal
4201	4	Engine Speed Sensor #1: Voltage Below Normal
4201	8	Engine Speed Sensor #1: Abnormal Frequency, Pulse \Nidth, or Period
4201	10	Engine Speed Sensor #1: Abnormal Rate of Change
4765	1	Aftertreatmert #1 Diesel Oxidation Catalyst Intake Gas Temperature: Low-most severe (3)
4765	3	Aftertreatmert #1 Diesel Oxidation Catalyst Intake Gas Temperature: Voltage Above Normal
4765	4	Aftertreatmert #1 Diesel Oxidation Catalyst Intake Gas Temperature: Voltage Below Normal
4765	15	Aftertreatmert #1Diesel Oxidation Catalyst Intake Gas Temperature: High-least severe (1)
4765	16	Aftertreatmert #1 Diesel Oxidation Catalyst Intake Gas Temperature: High-moderate severity (2)
5487	3	Aftertreatmert 1 Burner Unit Combustion Chamber Temperature: Voltage Above Normal
5487	4	Aftertreatmert 1 Burner Unit Combustion Chamber Temperature: Voltage Below Normal
6581	6	Aftertreatmert 1 Hydrocarbon Doser 2 : Current Above Normal

Ford MSG-425 Engine Fault Codes

How to Retrieve Ford 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 and will turn on the Check Engine Light.

Note: Perform this procedure with the key switch in the off position.

1 Open the ground controls side cover and locate the run/test toggle switch on the side of the ground control box.

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

3 Move and hold the run/test toggle switch to the test position.

⊙ Result: The check engine light should turn on. The check engine light should begin to blink.

4 Continue to hold the run/test toggle switch in the test position and count the blinks.

Note: Before the fault codes are displayed, the check engine light will blink a code 1-6-5-4 three times. After the fault codes, the check engine light will blink a code 1-6-5-4 three times again indicating the end of the stored codes.

Note: If any fault codes are present, the ECM will blink a three digit code three times for each code stored in memory. It will blink the first digit of a three digit code, pause, blink the second digit, pause, and then blink the third digit. For example: the check engine light blinks 5 consecutive times, blinks 3 times and then 1 time. That would indicate code 531.

Note: Once a fault code has been retrieved and the repair has been completed, the ECM memory must be reset to clear the fault code from the ECM. Refer to Fault Codes Procedure, *How to Clear Engine Fault Codes from the ECM*.

How to Clear Engine Fault Codes from the ECM

Note: Perform this procedure with the engine off and the key switch in the off position.

1 Open the engine side turntable cover and locate the battery.

2 Disconnect the negative battery cable from the battery for a minimum of 5 minutes.

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

3 Connect the negative battery cable to the battery.

Ford MSG-425 Engine Fault Codes

Code	Description
16	Never crank synced at start
91	FP low voltage
92	FP high voltage
107	MAP Low Voltage
108	MAP High Pressure
111	IAT higher than expected 1
112	IAT low voltage
113	IAT high voltage
116	ECT higher than expected 1
117	ECT/CHT Low Voltage
118	ECT/CHT High Voltage
121	TPS1 lower than TPS2
122	TPS1 low voltage
123	TPS1 high voltage
127	IAT higher than expected 2
129	BP low pressure
134	EGO open/lazy pre-cat 1
140	EGO open/lazy post-cat 1
154	EGO open/lazy pre-cat 2/post-cat 1
160	EGO open/lazy post-cat 2
171	AL high gasoline bank1
172	AL low gasoline bank1
174	AL high gasoline bank2
175	AL low gasoline bank2
182	FT Gasoline Low Voltage
183	FT Gasoline High Voltage
187	FT Gaseaous fuel low voltage
188	FT Gaseaous fuel high voltage
217	ECT higher than expected 2
219	Max govern speed override
221	TPS1 higher than TPS2
222	TPS2 low voltage
223	TPS2 high voltage
236	TIP Active
237	TIP Low Voltage
238	TIP High Voltage
261	Injector Loop Open or Low-side short to Ground
262	Injector Coil Shorted
264	Injector Loop Open or Low-side short to Ground
265	Injector Coil Shorted
267	Injector Loop Open or Low-side short to Ground
268	Injector Coil Shorted
270	Injector Loop Open or Low-side short to Ground
271	Injector Coil Shorted
273	Injector Loop Open or Low-side short to Ground
274	Injector Coil Shorted
276	Injector Loop Open or Low-side short to Ground
277	Injector Coil Shorted
279	Injector Loop Open or Low-side short to Ground
280	Injector Coil Shorted
282	Injector Loop Open or Low- side short to Ground
283	Injector Coil Shorted
285	Injector Loop Open or Low-side short to Ground
286	Injector Coil Shorted
288	Injector Loop Open or Low-side short to Ground
289	Injector Coil Shorted

For further engine fault code troubleshooting and diagnostic information, refer to the Ford MSG-425 EFI Diagnostic Manual (EDI part number 1080030).

Ford MSG-425 EFI Diagnostic Manual	
Genie part number	162067

Ford MSG-425 Engine Fault Codes

Code	Description
301	Emissions/catalyst damaging misfire
302	Emissions/catalyst damaging misfire
303	Emissions/catalyst damaging misfire
304	Emissions/catalyst damaging misfire
305	Emissions/catalyst damaging misfire
306	Emissions/catalyst damaging misfire
307	Emissions/catalyst damaging misfire
308	Emissions/catalyst damaging misfire
326	Knock 1 Excessive Signal
327	Knock 1 sensor Open
331	Knock 2 Excessive Signal
332	Knock 2 sensor Open
336	Crank sync noise
337	Crank loss
341	Cam sync noise
342	Cam loss
420	Gasoline cat monitor
430	Gasoline cat monitor
524	Oil pressure low
562	Battery Voltage Low
563	Battery Voltage High
601	Flash checksum invalid
604	RAM failure
606	COP failure
615	Start relay coil open
616	Start relay control ground short
617	Start relay coil short to power
627	Fpump relay coil open
628	FPump motor loop open or high-side shorted to ground
628	Fpump relay control ground short
629	FPump motor high-side shorted to power
629	Fpump relay coil short to power

Code	Description
642	5VE1 low voltage
643	5VE1 high voltage
650	MIL open
652	5VE2 low voltage
653	5VE2 high voltage
685	Relay Coil Open
686	Relay Control ground short
687	Relay coil short to power
1111	Fuel rev limit
1112	Spark rev limit
1121	FPP1/2 simultaneous voltages out of range
1122	FPP1/2 do not match each other or the IVS
1151	CL high LPG
1152	CL low LPG
1153	CL high NG
1154	CL low NG
1155	CL high gasoline bank1
1156	CL low gasoline bank1
1157	CL high gasoline bank2
1158	CL low gasoline bank2
1161	AL high LPG
1162	AL low LPG
1163	AL high NG
1164	AL low NG
1165	LPG cat monitor
1166	NG cat monitor
1171	Megajector delivery pressure higher than expected
1172	Megajector delivery pressure lower than expected

For further engine fault code troubleshooting and diagnostic information, refer to the Ford MSG-425 EFI Diagnostic Manual (EDI part number 1080030).

Ford MSG-425 EFI Diagnostic Manual	
Genie part number	162067

Ford MSG-425 Engine Fault Codes

Code	Description
1173	Megajector comm lost
1174	Megajector voltage supply high
1175	Megajector voltage supply low
1176	Megajector internal actuator fault detection
1177	Megajector internal circuitry fault detection
1178	Megajector internal comm fault detection
1311	Misfire detected
1312	Misfire detected
1313	Misfire detected
1314	Misfire detected
1315	Misfire detected
1316	Misfire detected
1317	Misfire detected
1318	Misfire detected
1511	AUX analog PU1 high
1512	AUX analog PU1 low
1513	AUX analog PU2 high
1514	AUX analog PU2 low
1515	AUX analog PD1 high
1516	AUX analog PD1 low
1517	AUX analog PU3 high
1518	AUX analog PU3 low
1521	CHT higher than expected 1
1522	CHT higher than expected 2
1531	IVS/Brake/Trans-Park interlock failure
1541	AUX analog PUD1 high
1542	AUX analog PUD1 low
1543	AUX analog PUD2 high
1544	AUX analog PUD2 low
1545	AUX analog PUD3 high

Code	Description
1551	AUX DIG1 high
1552	AUX DIG1 low
1553	AUX DIG2 high
1554	AUX DIG2 low
1555	AUX DIG3 high
1556	AUX DIG3 low
1561	AUX analog PD2 high
1562	AUX analog PD2 low
1563	AUX analog PD3 high
1564	AUX analog PD3 low
1611	5VE 1/2 simultaneous out of range
1612	RTI 1 loss
1613	RTI 2 loss
1614	RTI 3 loss
1615	A/D loss
1616	Invalid interrupt
1621	Rx Inactive
1622	Rx Noise
1623	Invalid Packet Format
1624	Shutdown Request
1625	Shutdown Request
1626	CAN Tx failure
1627	CAN Rx failure
1628	CAN addresss conflict failure

For further engine fault code troubleshooting and diagnostic information, refer to the Ford MSG-425 EFI Diagnostic Manual (EDI part number 1080030).

Ford MSG-425 EFI Diagnostic Manual	
Genie part number	162067

Ford MSG-425 Engine Fault Codes

Code	Description
1629	J1939 TSC1 message receipt lost
1630	J1939 ETC message receipt lost
1631	PWM1-Gauge1 open / ground short
1632	PWM1-Gauge1 short to power
1633	PWM2-Gauge2 open /ground short
1634	PWM2-Gauge2 short to power
1635	PWM3-Gauge3 open / ground short
1636	PWM3-Gauge3 short to power
1641	Buzzer control ground short
1642	Buzzer open
1643	Buzzer control short to power
1644	MIL control ground short
1645	MIL control short to power
2111	Unable to reach lower TPS
2112	Unable to reach higher TPS
2115	FPP1 higher than IVS limit
2116	FPP2 higher than IVS limit
2120	FPP1 invalid voltage and FPP2 disagrees with IVS
2121	FPP1 lower than FPP2
2122	FPP1 high voltage
2123	FPP1 low voltage
2125	FPP2 invalid voltage and FPP1 disagrees with IVS
2126	FPP1 higher than FPP2
2127	FPP2 low voltage
2128	FPP2 high voltage

Code	Description
2130	IVS stuck at-idle, FPP1/2 match
2131	IVS stuck off-idle, FPP1/2 match
2135	TPS1/2 simultaneous voltages out of range
2139	FPP1 lower than IVS limit
2140	FPP2 lower than IVS limit
2229	BP high pressure
2300	Primary Loop Open or Low-side Short to Ground
2301	Primary Coil Shorted
2303	Primary Loop Open or Low-side Short to Ground
2304	Primary Coil Shorted
2306	Primary Loop Open or Low-side Short to Ground
2307	Primary Coil Shorted

For further engine fault code troubleshooting and diagnostic information, refer to the Ford MSG-425 EFI Diagnostic Manual (EDI part number 1080030).

Ford MSG-425 EFI Diagnostic Manual	
Genie part number	162067

Ford MSG-425 Engine Fault Codes

Code	Description
2309	Primary Loop Open or Low-side Short to Ground
2310	Primary Coil Shorted
2312	Primary Loop Open or Low-side Short to Ground
2313	Primary Coil Shorted
2315	Primary Loop Open or Low-side Short to Ground
2316	Primary Coil Shorted
2318	Primary Loop Open or Low-side Short to Ground
2319	Primary Coil Shorted
2321	Primary Loop Open or Low-side Short to Ground
2322	Primary Coil Shorted
2618	Tach output ground short
2619	Tach output short to power

For further engine fault code troubleshooting and diagnostic information, refer to the Ford MSG-425 EFI Diagnostic Manual (EDI part number 1080030).

Ford MSG-425 EFI Diagnostic Manual	
Genie part number	162067

Schematics

Observe and Obey:

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

Before Troubleshooting:

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

About This Section

There are two groups of schematics in this section.

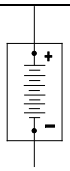
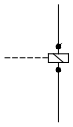
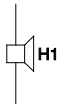
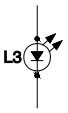
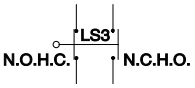
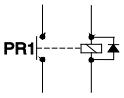
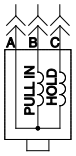
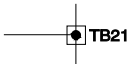
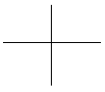
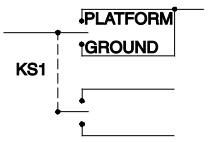
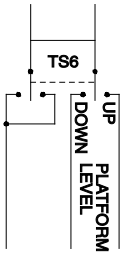
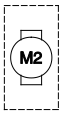
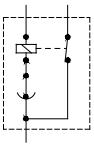
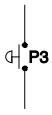
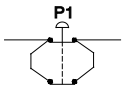
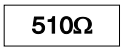
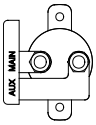
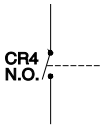
Electrical Schematics

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

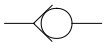
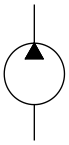
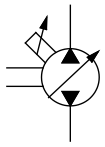
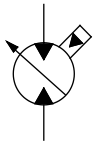
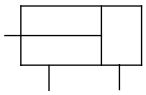
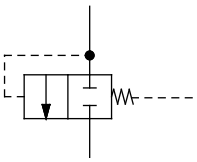
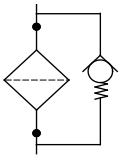
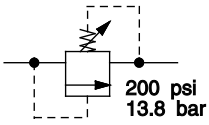
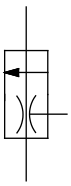
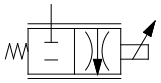
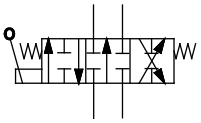
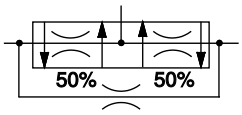
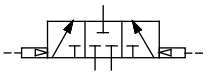
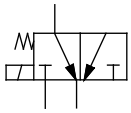
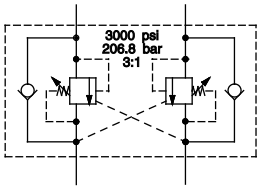
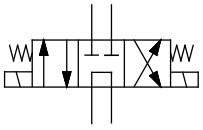
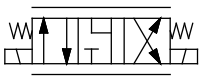
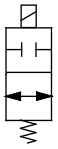
Hydraulic Schematics

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

Electrical Symbol Legend

				
Battery	Coil, solenoid or relay	Horn or alarm	Flashing beacon	Gauge
				
Diode	Hour meter	LED	Fuse with amperage	Foot switch
				
T-circuits connect	Limit Switch	Power relay	Coil with suppression	Fuel or RPM solenoid
				
Connection - no terminal	T-circuits connect at terminal	Circuits crossing - no connection	Quick disconnect terminal	Circuit breaker with amperage
				
Key switch	Toggle switch DPDT	Toggle switch SPDT	Pump or Motor	Tilt sensor
				
Horn button - normally open	Emergency stop button - normally closed	Resistor with ohm value	Battery 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 Legend

 Orifice with size	 Check valve	 Shut off valve	 Brake
 Pump, fixed displacement	 Pump, bi-directional variable displacement	 Motor, bi-directional	 Motor, 2 speed bi-directional
 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**
C1, C3	Controls cables
C5	Engine
C6	Functions
C7	Power to platform, 12V DC
C9	Foot switch
C32	U33 (AS and CE models)
C54	Options
C56	Telematics
CB	**Circuit Breaker**
CB1	Engine power, 15A
CB2	Controls power, 15A
CB3	Oil cooler, 15A
CB4	Drive lights, 10A (option)
CB7	Engine rpm, 10A
CR	**Control Relay**
CR1	Engine start
CR2	Ignition power
CR2A	Ignition power
CR4	High idle
CR5	Horn
CR13	Jib (jib option)
CR14	Jib (jib option)
CR17	Hydraulic oil cooling fan (option)
CR18	Platform level cutout (CE models)
CR23	Drive lights
CR27	Brake circuit (lift/drive option)
CR30	Limit switch (lift/drive option)
CR39	High idle
CR51	Aircraft package (option)
CR75	Tilt alarm
CR76	Load sense aux recovery
CR80	Telematics
F	**Fuse**
F18	Work lights, 5A
F33	Telematics, 6A
G	**Gauge**
G1	Battery Charge Indicator
G2	Engine oil pressure
G3	Engine coolant temp.
G4	Engine oil temp.
G6	Hour meter

Electrical Component and Wire Color Legends

Item	Description
H	**Horn or Alarm**
H1	Tilt / Platform overload
H2	Horn
H4	Descent / Travel
H6	Platform overload
JC	**Joystick**
JC1	Boom proportional joystick: secondary boom up/down
JC2	Boom proportional joystick: primary up/down, turntable rotate
JC3	Drive proportional joystick
KS	**Keyswitch**
KS1	Key switch
L	**LED or Light**
L1	Drive enable led
L2	Check engine led
L4	Platform overload led (AS/CE models)
L29	Drive lights
L45	Platform overload led (AS/CE models)
L48	Tilt alarm led (ANSI/CSA models)
LS	**Limit Switch**
LS1	Primary boom extend
LS2	Primary boom up
LS3	Drive enable
LS4	Secondary boom up
LS18	Platform overload (AS/CE models)
LS18A	Platform overload (AS/CE models)

Item	Description
M	**Motor**
M1	Oil cooler fan
M2	Auxiliary pump
M3	Engine starter
M4	Fuel pump
P	**Button**
P1	Red emergency stop (ground)
P2	Red emergency stop (platform)
P3	Horn
P4	Function enable
PR	**Power Relay**
PR1	Auxiliary pump (M2)
PR2	Engine starter (M3)
PR3	Starting aid / glow plugs
R	**Resistor**
R4	Speed limiting variable 20 ohms
R14	Secondary boom down, 5 ohms
R18	Primary boom down, 5 ohms
R20	Platform overload, 4.7k ohms (AS/CE)
R21	Platform box heater, 4.7k ohms (Option)
R22	Platform box heater, 4.7k ohms (Option)
SW	**Switch**
SW2	Engine oil pressure
SW3	Engine oil temperature

Electrical Component and Wire Color Legends

Item	Description
TS	**Toggle Switch**
TS1	Auxiliary pump
TS2	Start engine
TS3	Fuel select (MSG-425 models)
TS4	Hi/low rpm
TS6	Glow plug (diesel models)
TS7	Platform rotate
TS8	Jib boom (jib option)
TS9	Platform level
TS13	Primary boom extend/retract
TS14	Drive speed
TS15	Drive enable
TS43	Platform box heater (option)
TS46	Proximity kill (option)
TS47	Generator (option)
TS51	Auxiliary pump
TS52	Engine start
TS53	Fuel select (MSG-425 models)
TS54	Rpm select
TS56	Glow plug (diesel models)
TS57	Platform rotate
TS58	Jib boom up/down (option)
TS59	Platform level up/down
TS60	Secondary boom up/down
TS61	Primary boom up/down
TS62	Turntable rotate
TS63	Primary boom extend/retract
TS64	Run/test (Ford)
TS74	Run/test (Deutz)

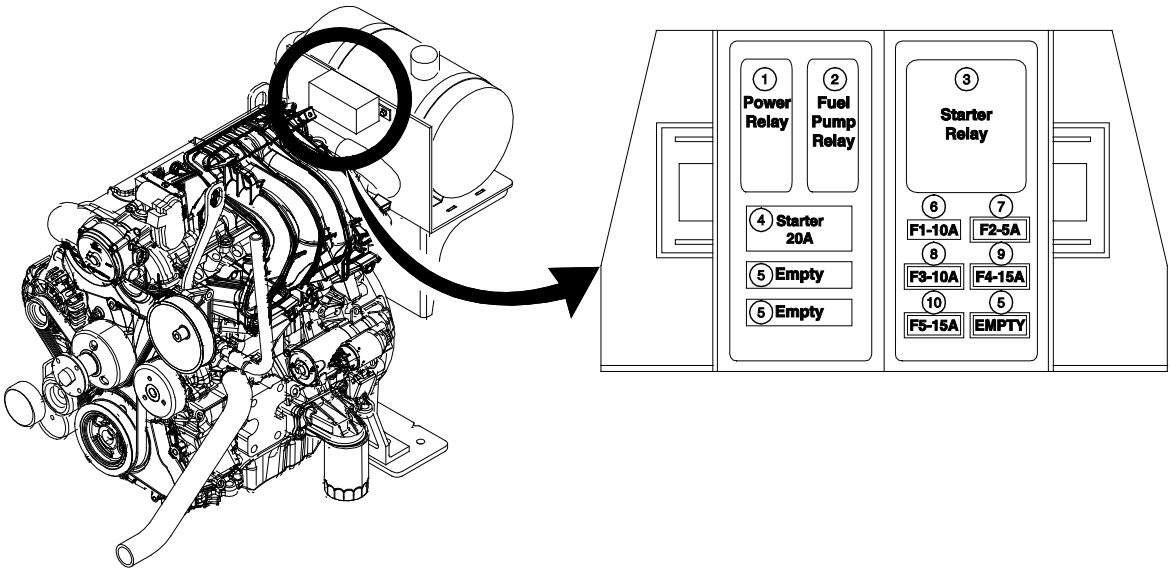
Item	Description
U	**Module**
U1	Ignition start module
U4	EDC - drive pump
U13	ALC-500 joystick controller card
U33	Load sense module
U34	Time delay relay - 2 seconds, 10A
U35	Time delay relay - 2 seconds, 30A
U38	Time delay relay - 2 seconds, 10A
U39	J1939 Ground Control Box Display
X	**ALC500 connectors**
X101	ALC500 input/out connectors
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

Electrical Component and Wire Color Legends

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

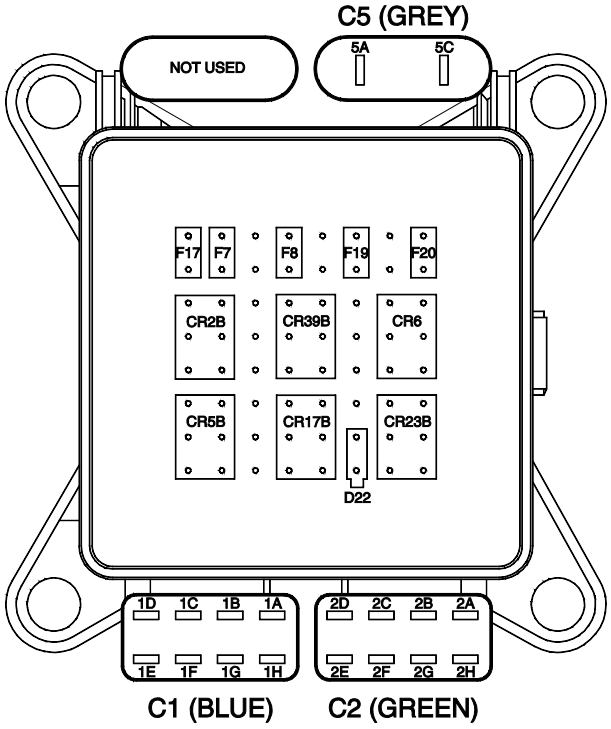
Ford Engine Relay Layout

Ford MSG-425 EFI



1 Power Relay
2 Fuel Pump Relay
3 Starter Relay
4 Starter - 20A
5 Empty
6 Fuse 1 - 10A
7 Fuse 2 - 5A
8 Fuse 3 - 10A
9 Fuse 4 - 15A
10 Fuse 5 - 15A

Engine Relay Layout - Deutz D 2.9 L4 and Perkins 404F-22



Deutz D 2.9 L4

Fuses

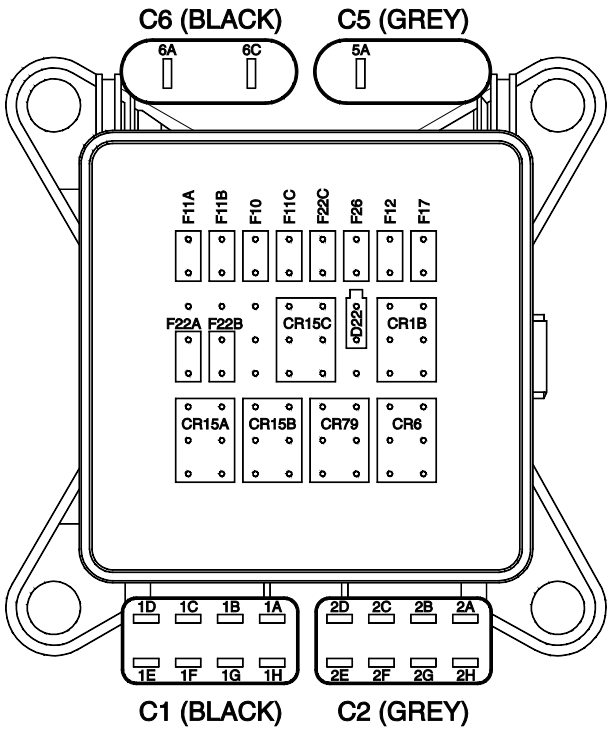
F7	20A	Horn, Hydraulic Oil Cooler
F8	30A	ECU Power
F17	15A	Ignition
F19	10A	Engine accessory
F20	20A	Fuel Pump

Diode

D22	6A	Alternator Ext.

Relays

CR2B	Ignition on
CR5B	Horn
CR6	Fuel pump
CR17B	Hydraulic oil cooler (option)
CR23B	Engine accessory
CR39B	Auxiliary pump



Perkins 404F-22

Fuses

F10	15A	Relay power
F11A	15A	ARD Injector 1
F11B	15A	ARD Injector 2
F11C	5A	Linear solenoid
F12	7.5A	Engine start
F17	10A	Fuel, Alternator Ext.
F22A	15A	Glow plug 1
F22B	20A	Glow plug 2
F22C	20A	ARD Glow plug

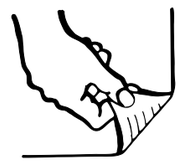
Diode

D22	6A	Alternator Ext.

Relays

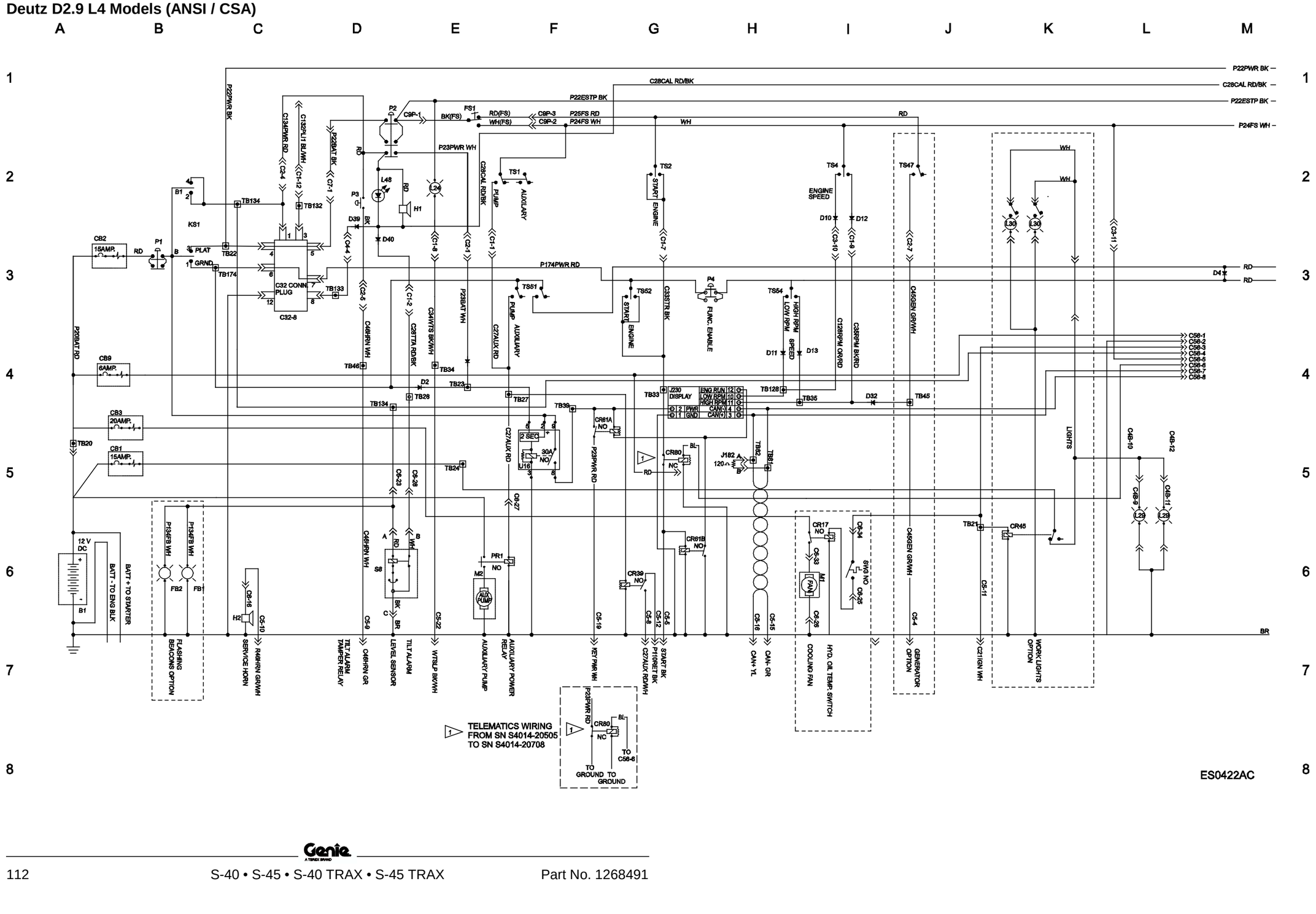
CR1B	Engine start
CR6	Fuel, Alternator Ext.
CR15A	Glow plug 1
CR15B	Glow plug 2
CR15C	ARD Glow plug
CR79	Burner air pump

Electrical Schematic - Deutz D2.9 L4 Models (ANSI / CSA)



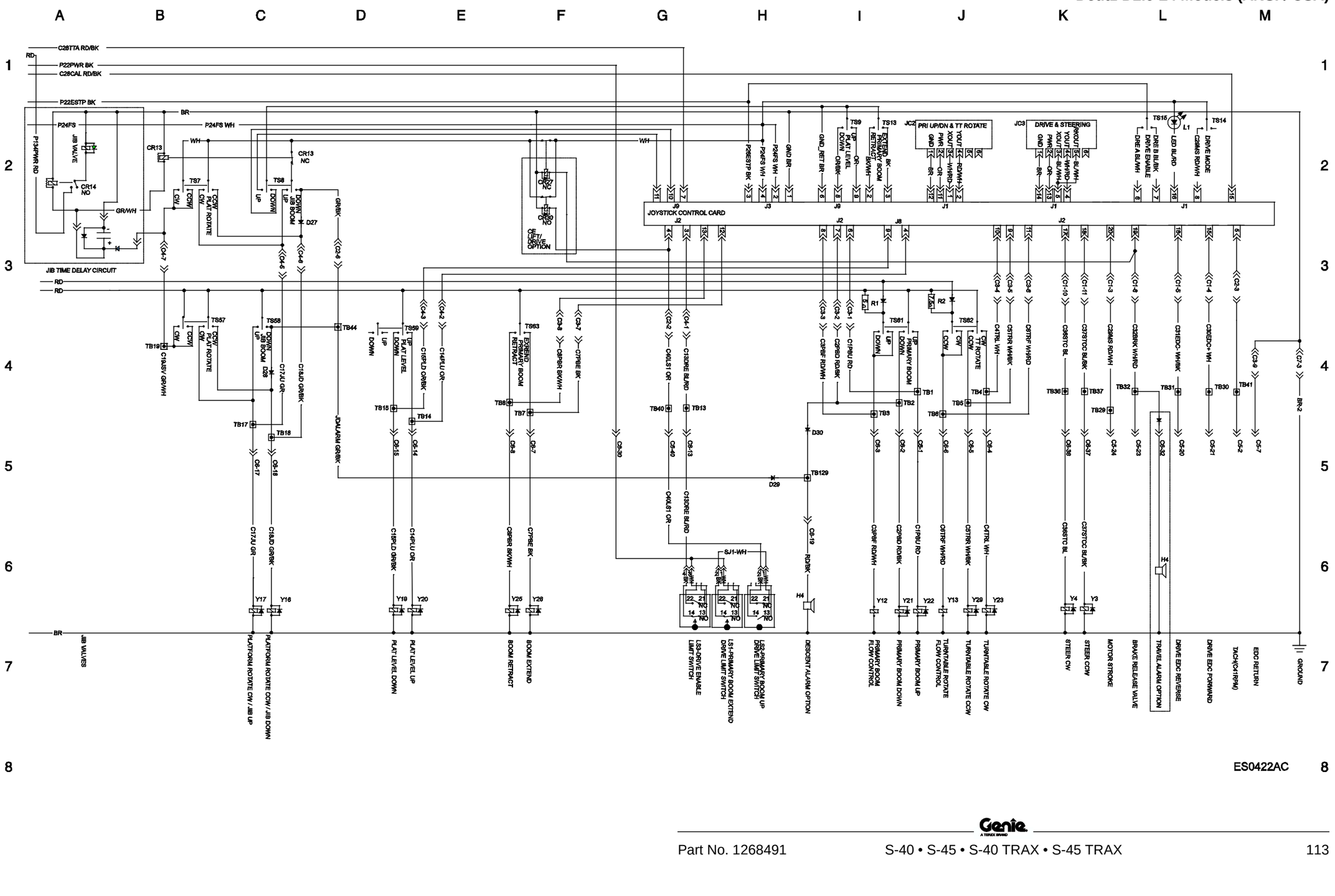
Electrical Schematic

Deutz D2.9 L4 Models (ANSI / CSA)

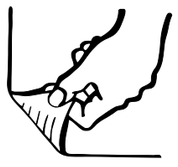


Electrical Schematic

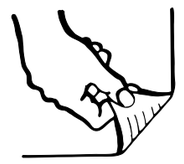
Deutz D2.9 L4 Models (ANSI / CSA)



Electrical Schematic - Deutz TD2.9 L4 Models (ANSI / CSA)

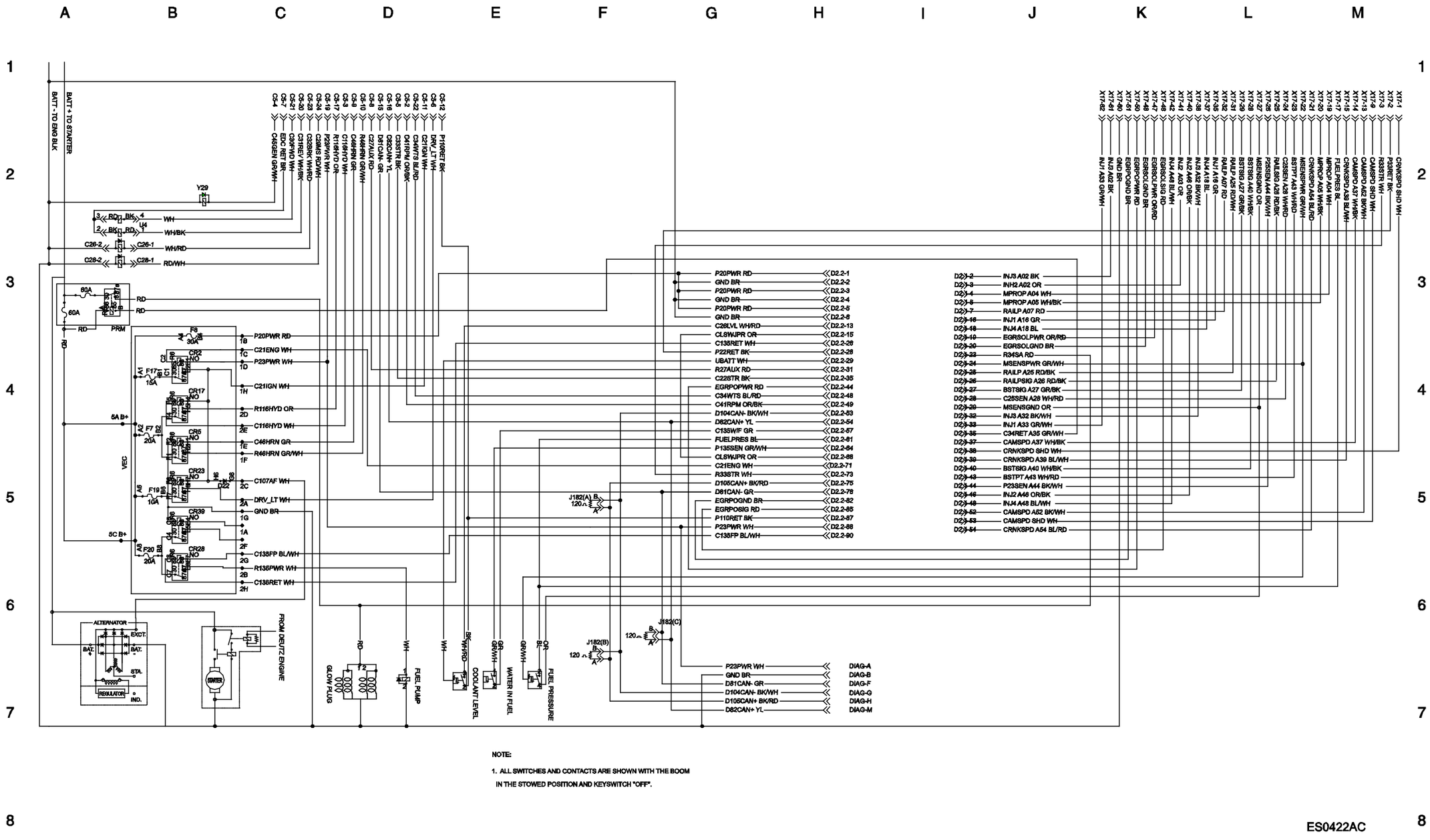


Engine Harness - Deutz D2.9 L4 Models (ANSI / CSA)



Engine Harness

Deutz D2.9 L4 Models (ANSI / CSA)



NOTE:

1. ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND KEYSWITCH "OFF".

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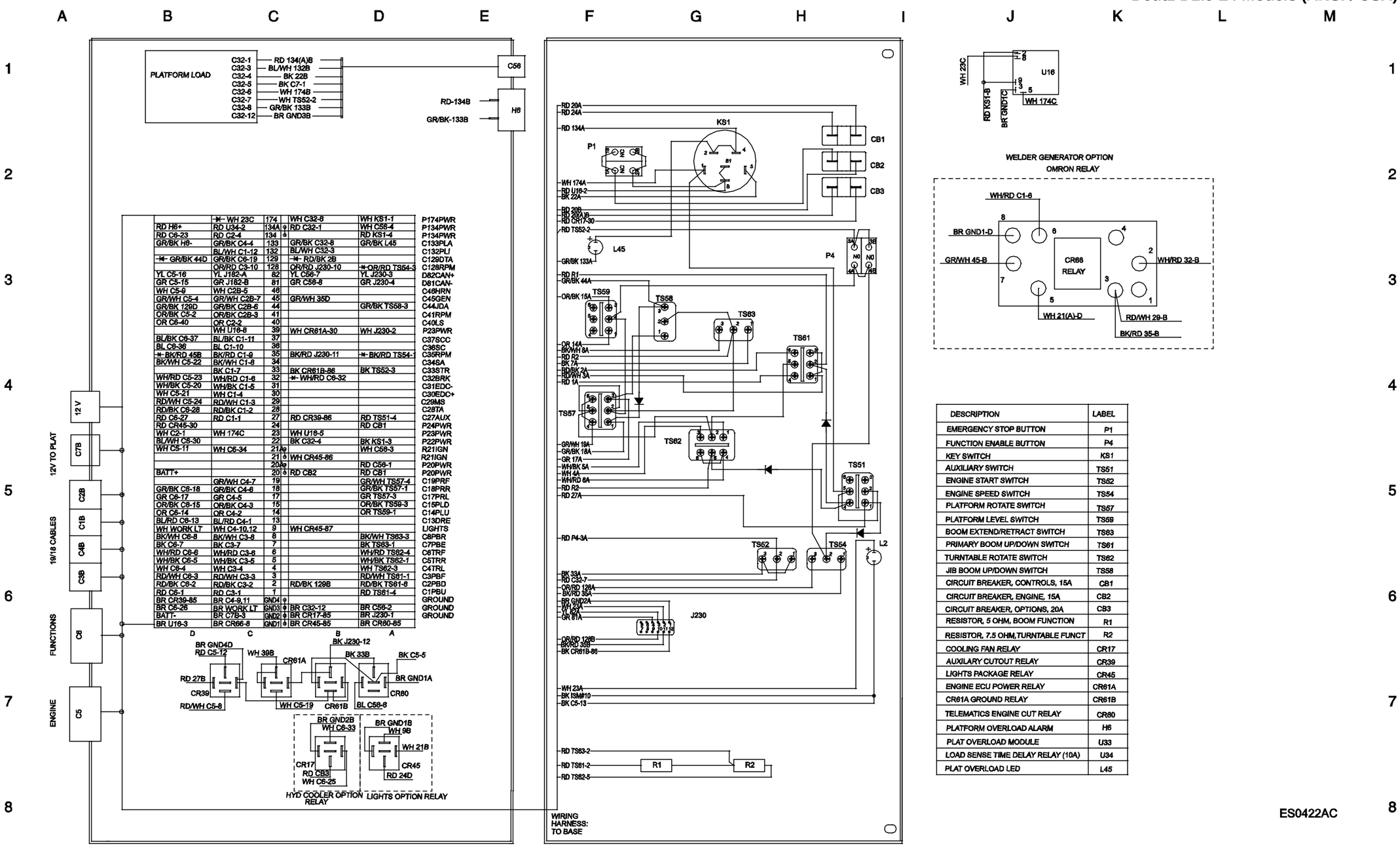
Ground Control Box

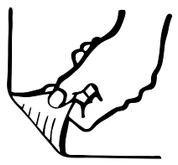
Deutz D2.9 L4 Models (ANSI / CSA)



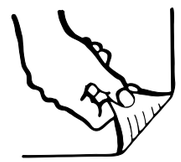
DESCRIPTION	LABEL
EMERGENCY STOP BUTTON	P1
FUNCTION ENABLE BUTTON	P4
KEY SWITCH	KS1
AUXILIARY SWITCH	TS51
ENGINE START SWITCH	TS52
ENGINE SPEED SWITCH	TS54
PLATFORM ROTATE SWITCH	TS57
PLATFORM LEVEL SWITCH	TS59
BOOM EXTEND/RETRACT SWITCH	TS63
PRIMARY BOOM UP/DOWN SWITCH	TS61
TURNTABLE ROTATE SWITCH	TS62
JIB BOOM UP/DOWN SWITCH	TS58
CIRCUIT BREAKER, CONTROLS, 15A	CB1
CIRCUIT BREAKER, ENGINE, 15A	CB2
CIRCUIT BREAKER, OPTIONS, 20A	CB3
RESISTOR, 5 OHM, BOOM FUNCTION	R1
RESISTOR, 7.5 OHM, TURNTABLE FUNCT	R2
COOLING FAN RELAY	CR17
AUXILARY CUTOUT RELAY	CR39
LIGHTS PACKAGE RELAY	CR45
ENGINE ECU POWER RELAY	CR61A
CR61A GROUND RELAY	CR61B
TELEMATICS ENGINE CUT RELAY	CR80
PLATFORM OVERLOAD ALARM	H6
PLAT OVERLOAD MODULE	U33
LOAD SENSE TIME DELAY RELAY (10A)	U34
PLAT OVERLOAD LED	L45

ES0422AC

Ground Control Box - Deutz D2.9 L4 Models (ANSI / CSA)

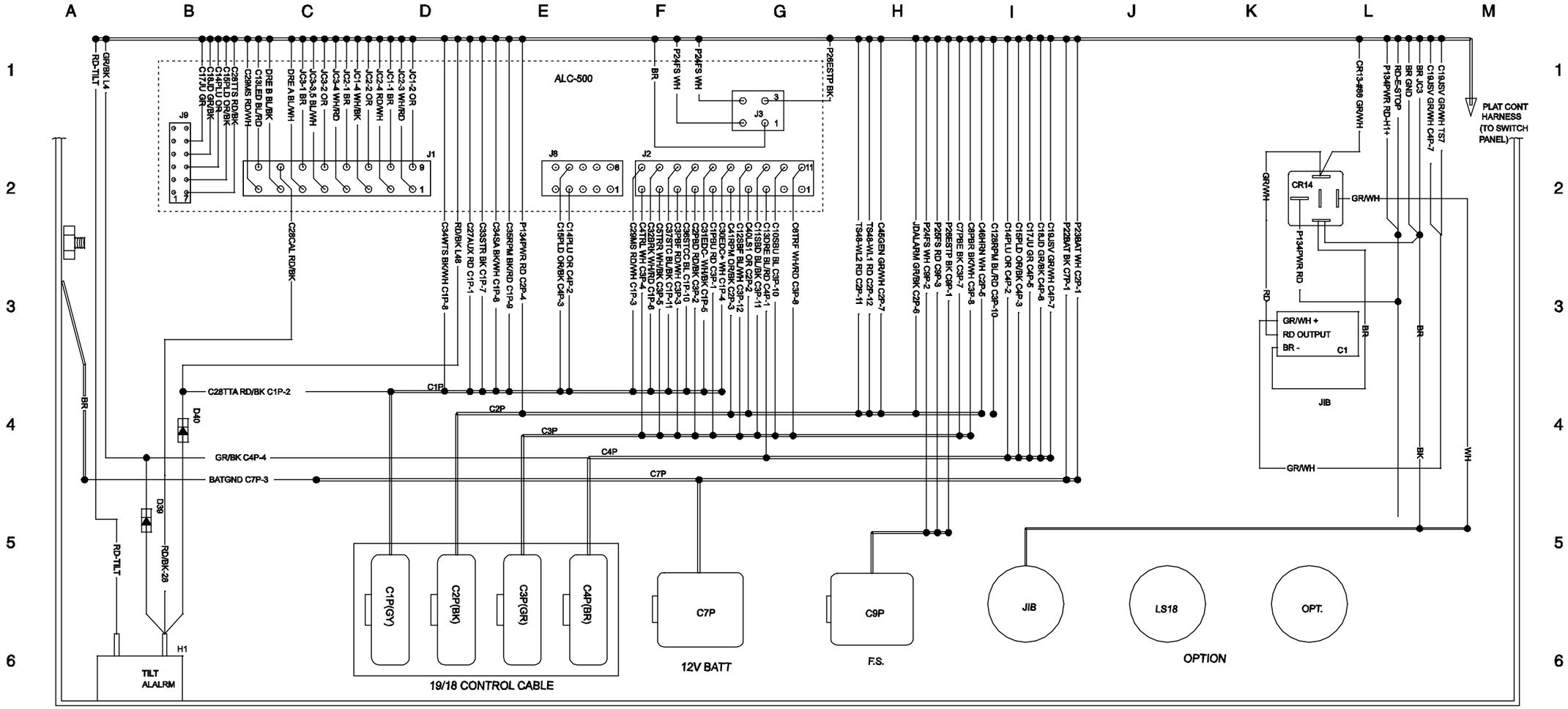


Platform Control Box - Deutz D2.9 L4 Models (ANSI / CSA)



Platform Control Box

Deutz D2.9 L4 Models (ANSI / CSA)



COMPONENT INDEX	
H1	TILT ALARM
C1	JIB TIME DELAY
CR14	JIB DELAY RELAY

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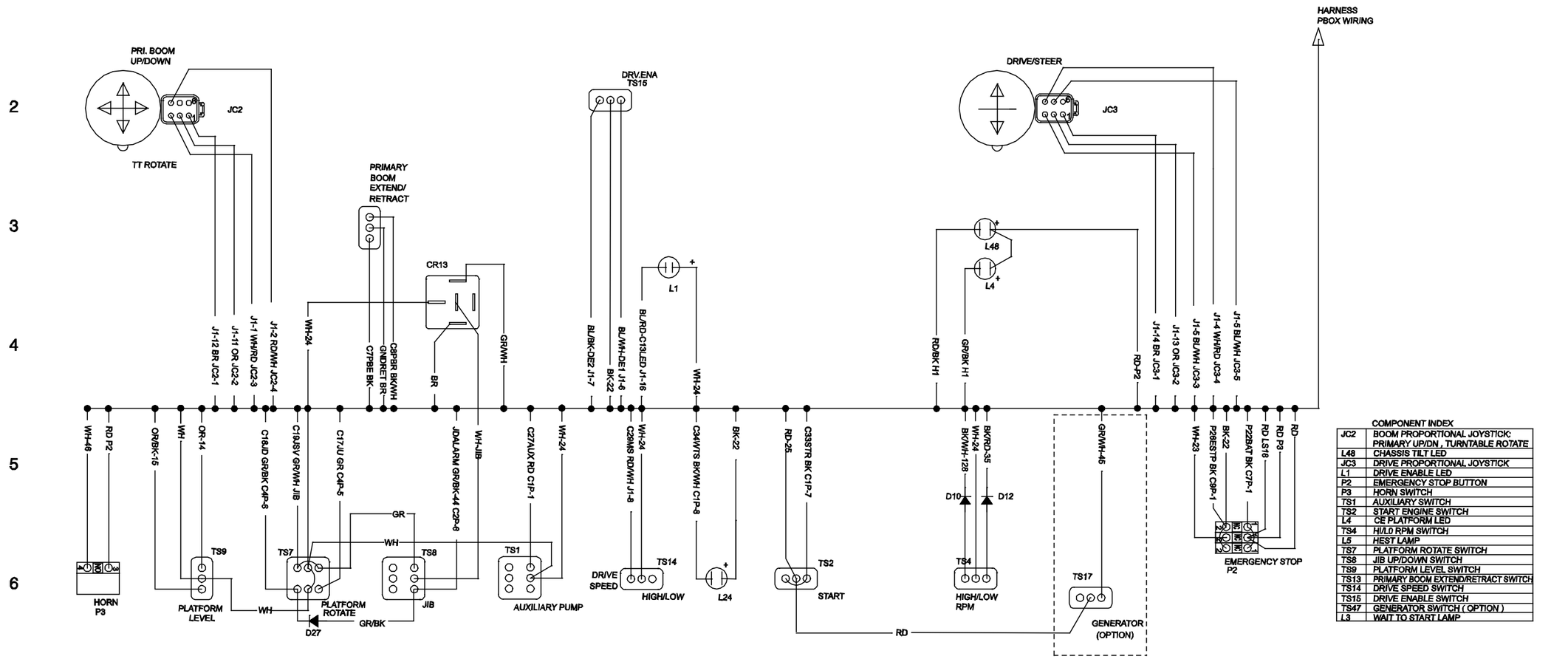
Platform Control Box Switch Panel

Deutz D2.9 L4 Models (ANSI / CSA)



COMPONENT INDEX	
JC2	BOOM PROPORTIONAL JOYSTICK: PRIMARY UP/DN , TURNTABLE ROTATE
L48	CHASSIS TILT LED
JC3	DRIVE PROPORTIONAL JOYSTICK
L1	DRIVE ENABLE LED
P2	EMERGENCY STOP BUTTON
P3	HORN SWITCH
TS1	AUXILIARY SWITCH
TS2	START ENGINE SWITCH
L4	CE PLATFORM LED
TS4	HI/LO RPM SWITCH
L5	HEST LAMP
TS7	PLATFORM ROTATE SWITCH
TS8	JIB UP/DOWN SWITCH
TS9	PLATFORM LEVEL SWITCH
TS13	PRIMARY BOOM EXTEND/RETRACT SWITCH
TS14	DRIVE SPEED SWITCH
TS15	DRIVE ENABLE SWITCH
TS47	GENERATOR SWITCH (OPTION)
L3	WAIT TO START LAMP

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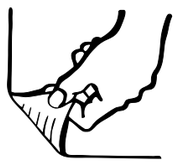
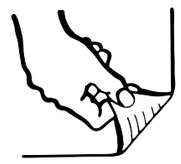
Platform Control Box - Deutz TD2.9 L4 Models (ANSI / CSA)

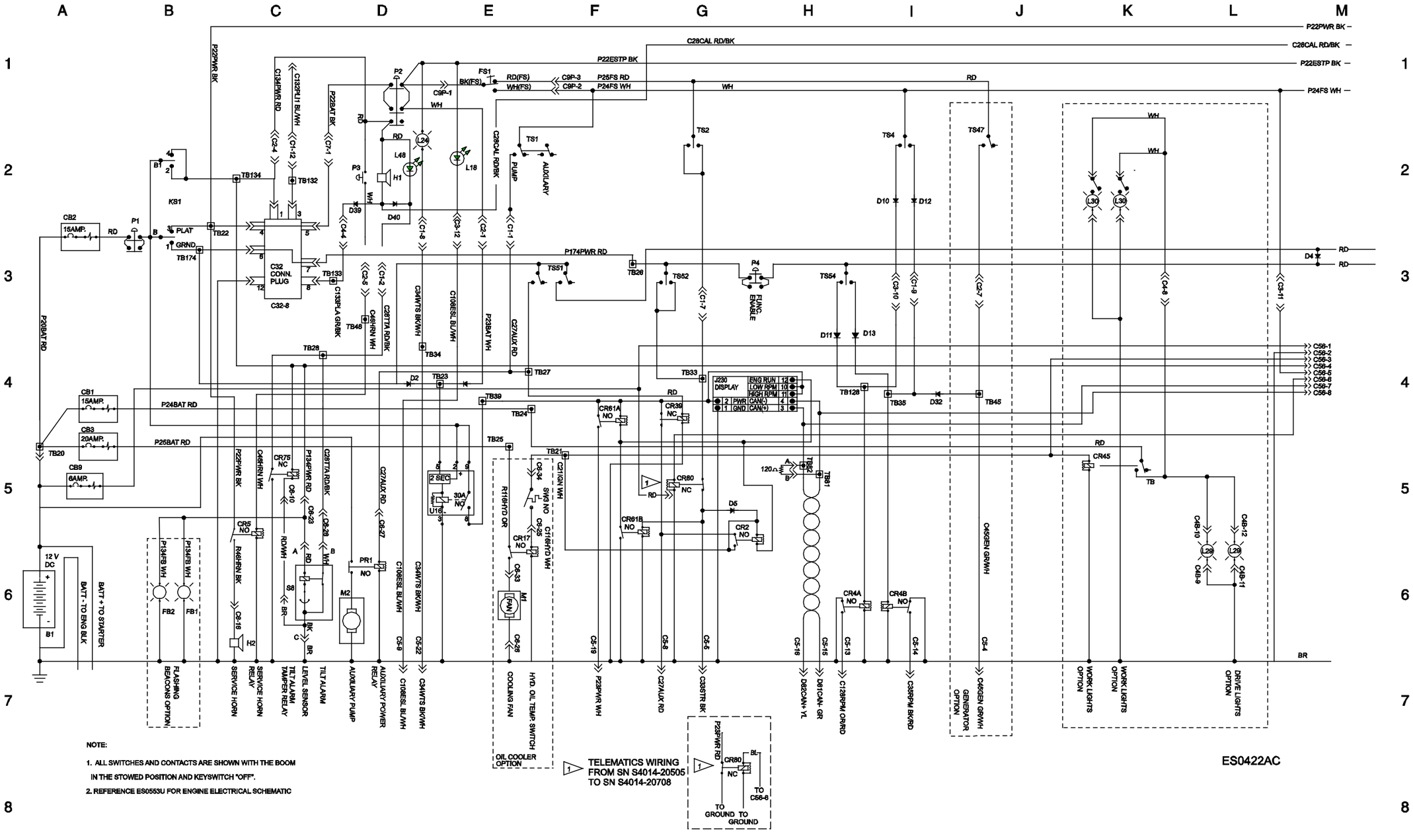


Electrical Schematic - Perkins 404F Models (ANSI / CSA)



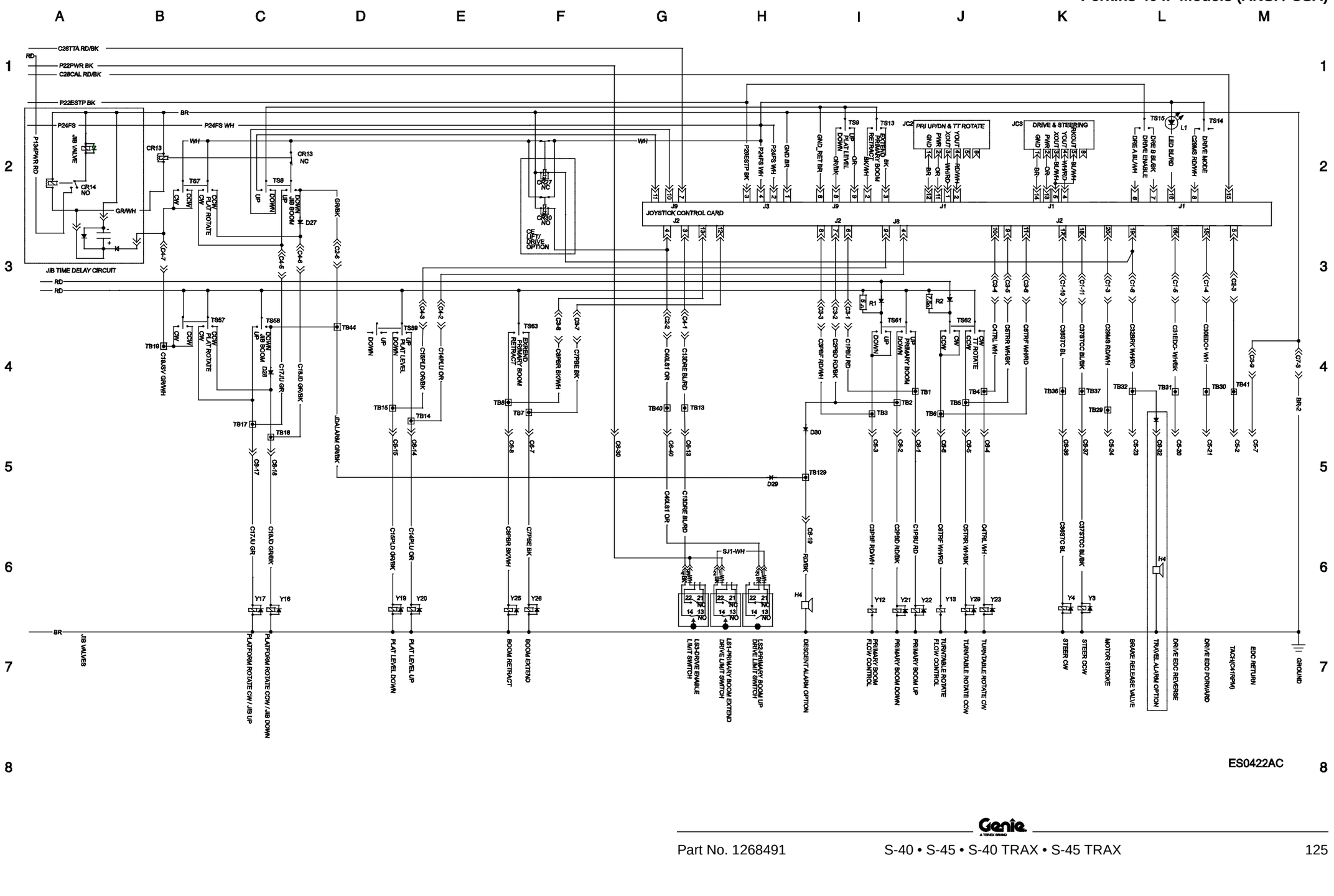
Electrical Schematic

Perkins 404F Models (ANSI / CSA)

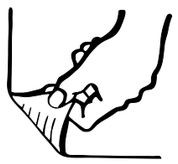


Electrical Schematic

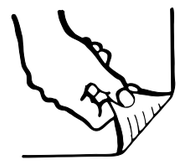
Perkins 404F Models (ANSI / CSA)



Electrical Schematic - Perkins 404F Models (ANSI / CSA)

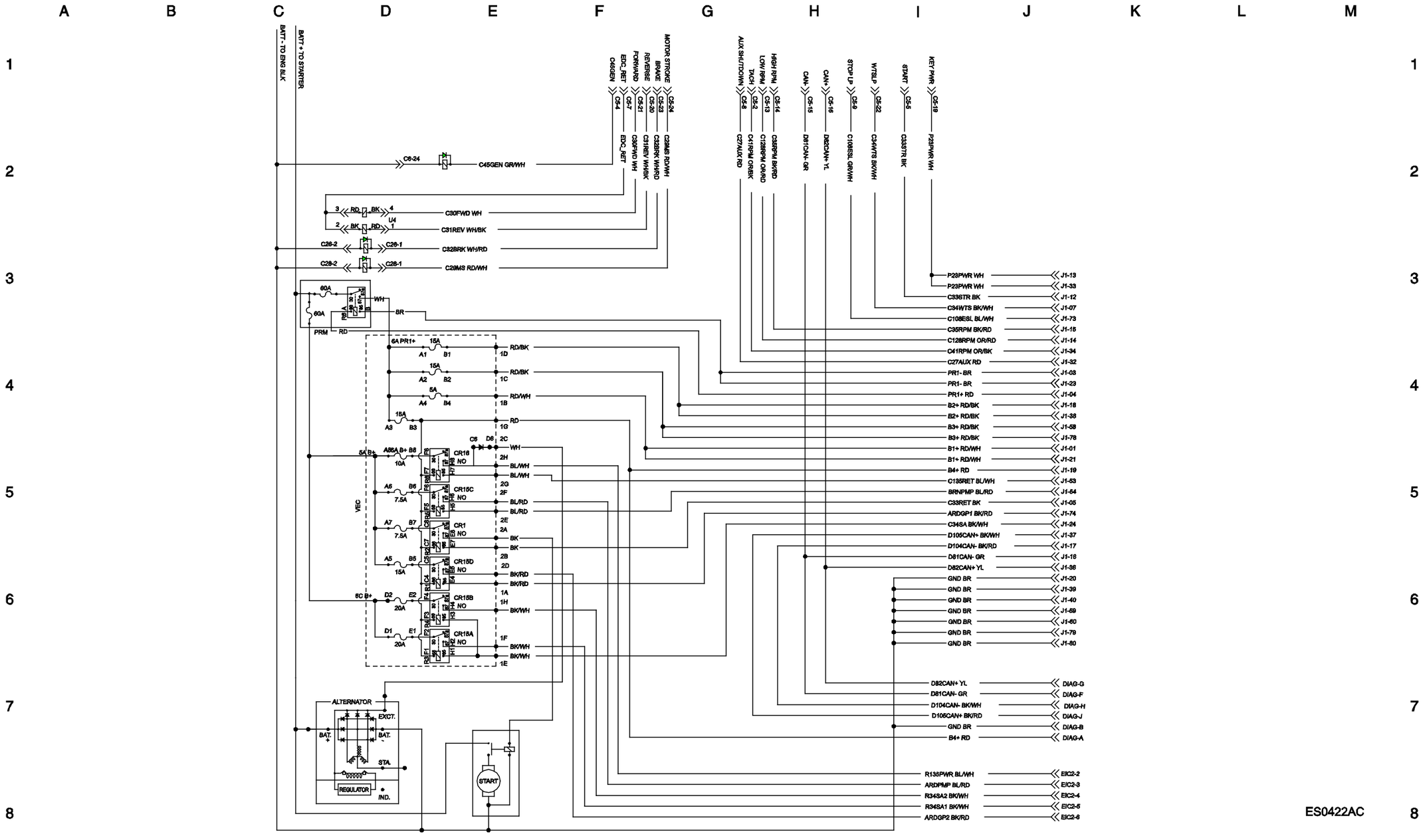


Engine Harness - Perkins 404F Models (ANSI / CSA)



Engine Harness

Perkins 404F Models (ANSI / CSA)



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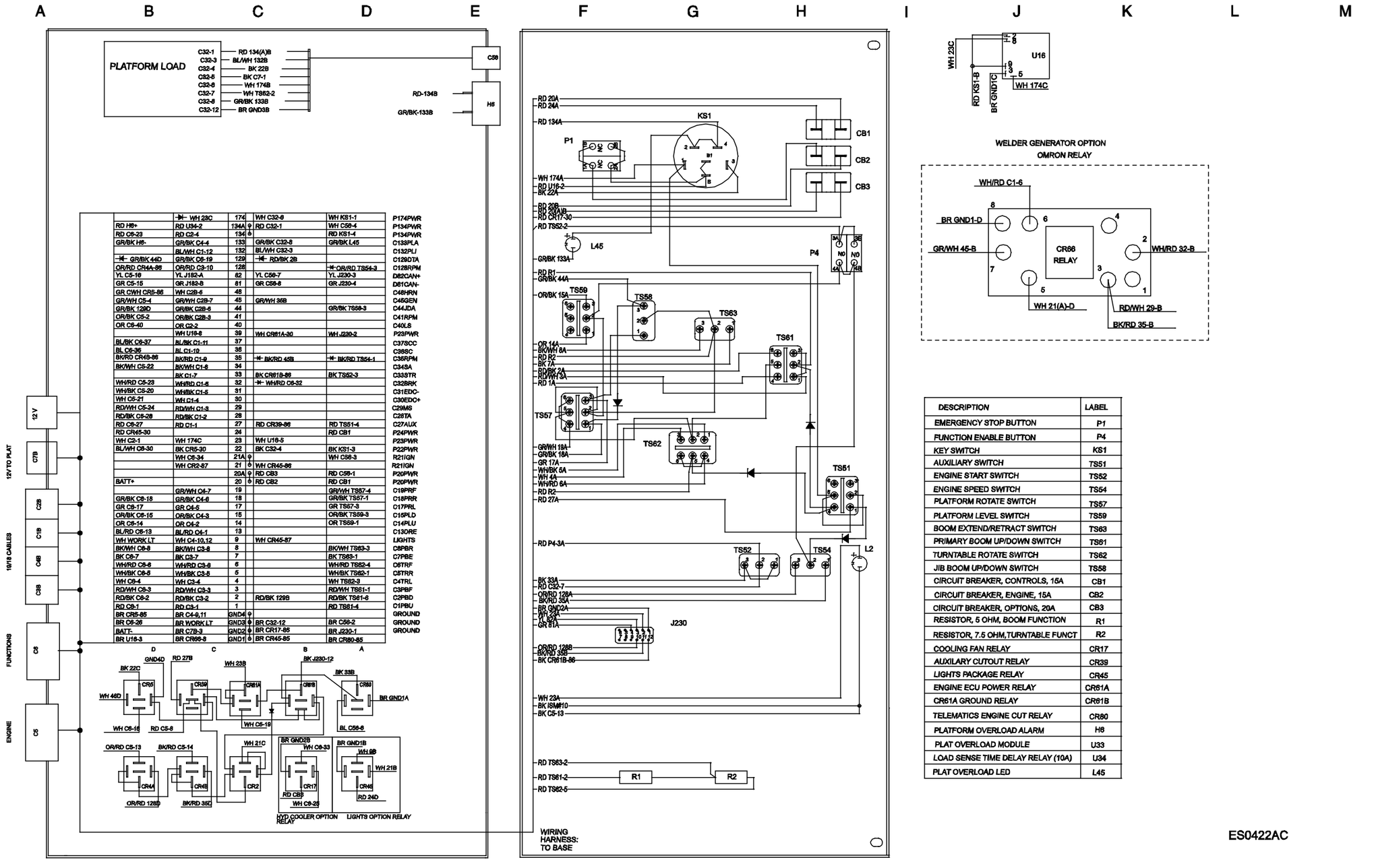
Ground Control Box

Perkins 404F Models (ANSI / CSA)



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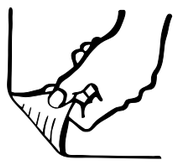
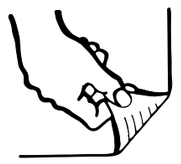
ES0422AC

Ground Control Box - Perkins 404F Models (ANSI / CSA)

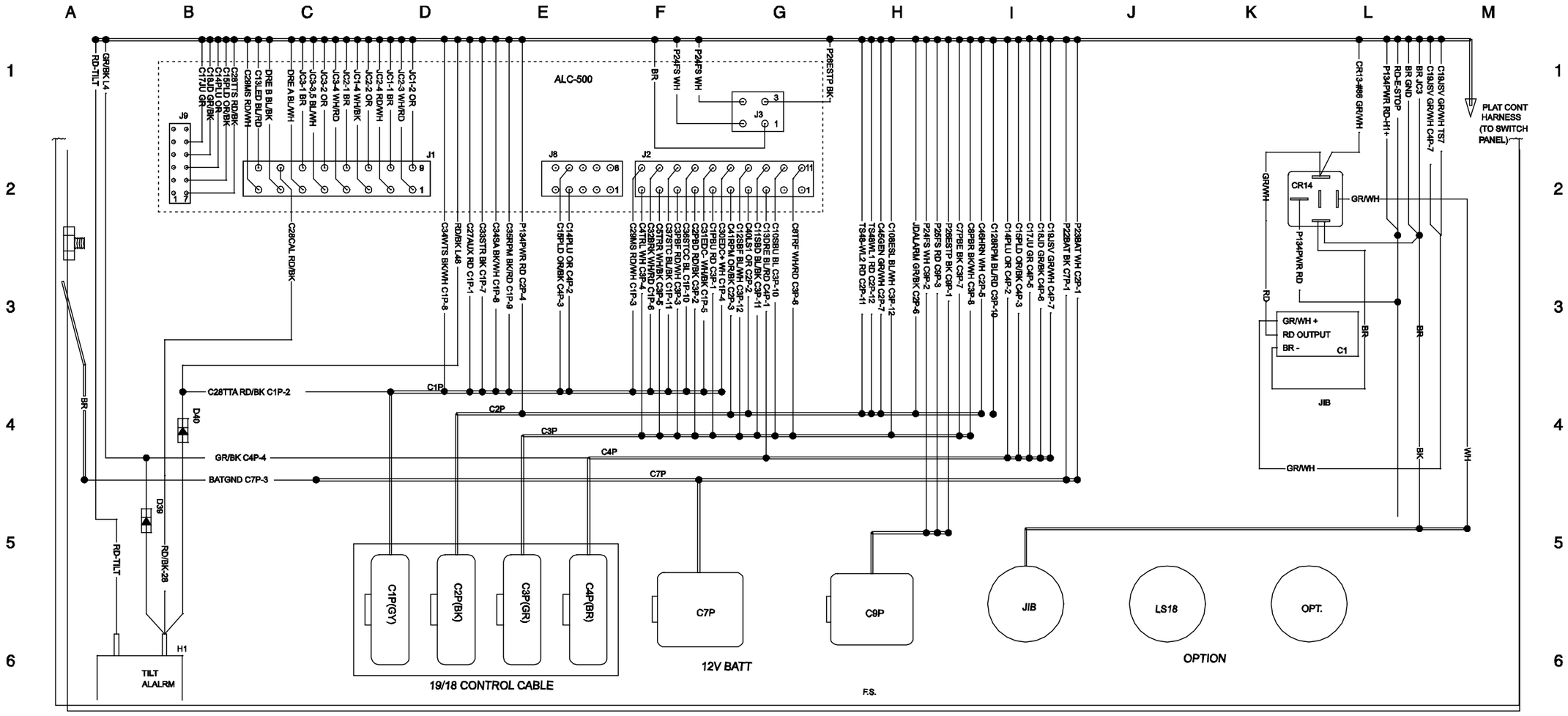


Platform Control Box - Perkins 404F Models (ANSI / CSA)



Platform Control Box

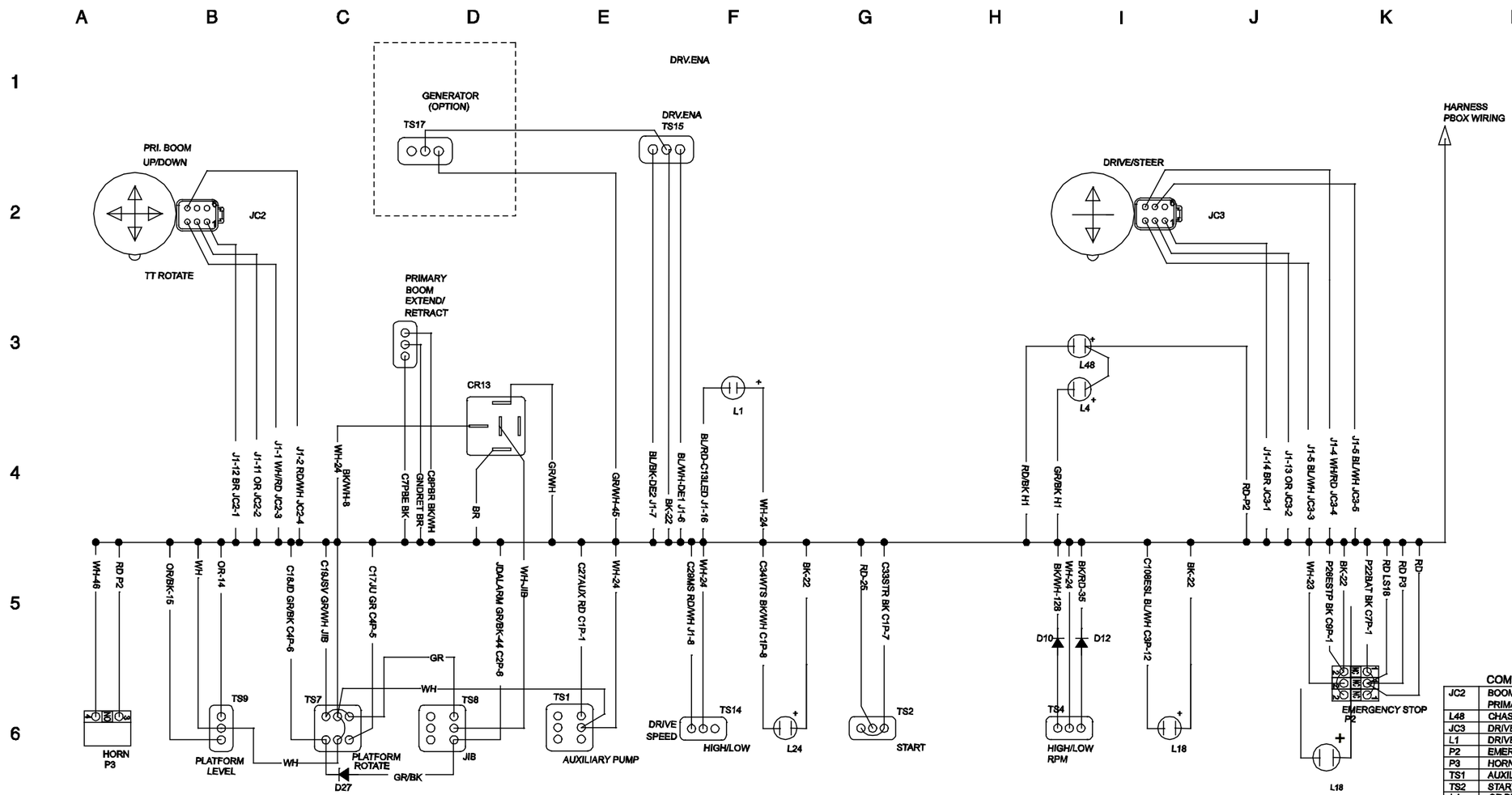
Perkins 404F Models (ANSI / CSA)



COMPONENT INDEX	
H1	TILT ALARM
C1	JIB TIME DELAY
CR14	JIB DELAY RELAY

Platform Control Box Switch Panel

Perkins 404F Models (ANSI / CSA)



COMPONENT INDEX	
JC2	BOOM PROPORTIONAL JOYSTICK: PRIMARY UP/DN , TURNTABLE ROTATE
L48	CHASSIS TILT LED
JC3	DRIVE PROPORTIONAL JOYSTICK
L1	DRIVE ENABLE LED
P2	EMERGENCY STOP BUTTON
P3	HORN SWITCH
TS1	AUXILIARY SWITCH
TS2	START ENGINE SWITCH
L4	CE PLATFORM LED
TS4	HI/LO RPM SWITCH
TS7	PLATFORM ROTATE SWITCH
TS8	JIB UP/DOWN SWITCH
TS9	PLATFORM LEVEL SWITCH
TS13	PRIMARY BOOM EXTEND/RETRACT SWITCH
TS14	DRIVE SPEED SWITCH
TS15	DRIVE ENABLE SWITCH
TS47	GENERATOR SWITCH (OPTION)
L3	WAIT TO START LAMP

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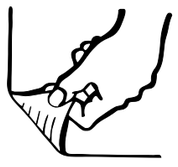
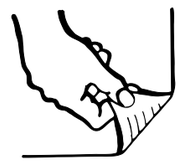
Platform Control Box Switch Panel - Perkins 404F Models (ANSI / CSA)

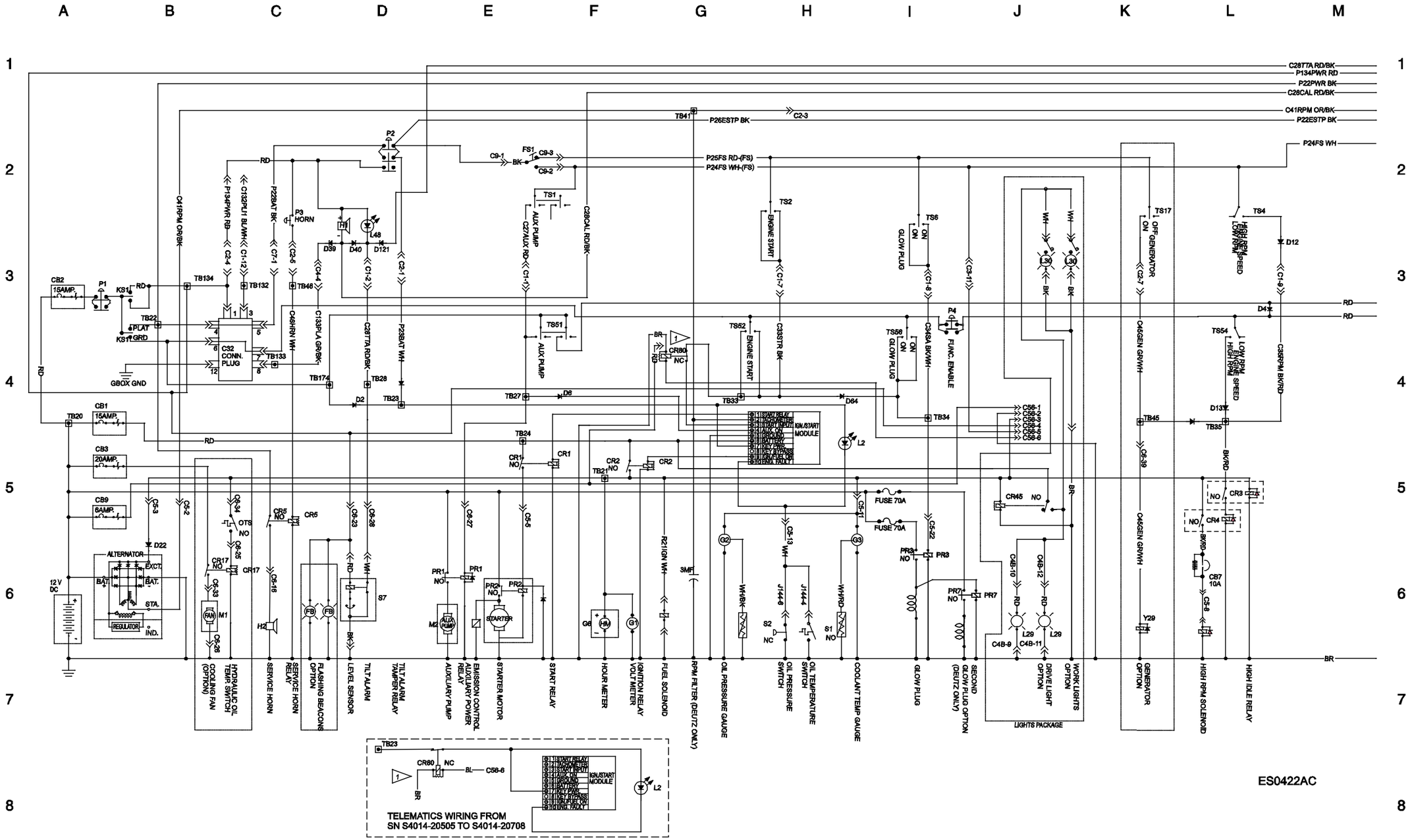


Electrical Schematic - Deutz D2011L03i and Perkins 404D Models (ANSI / CSA)



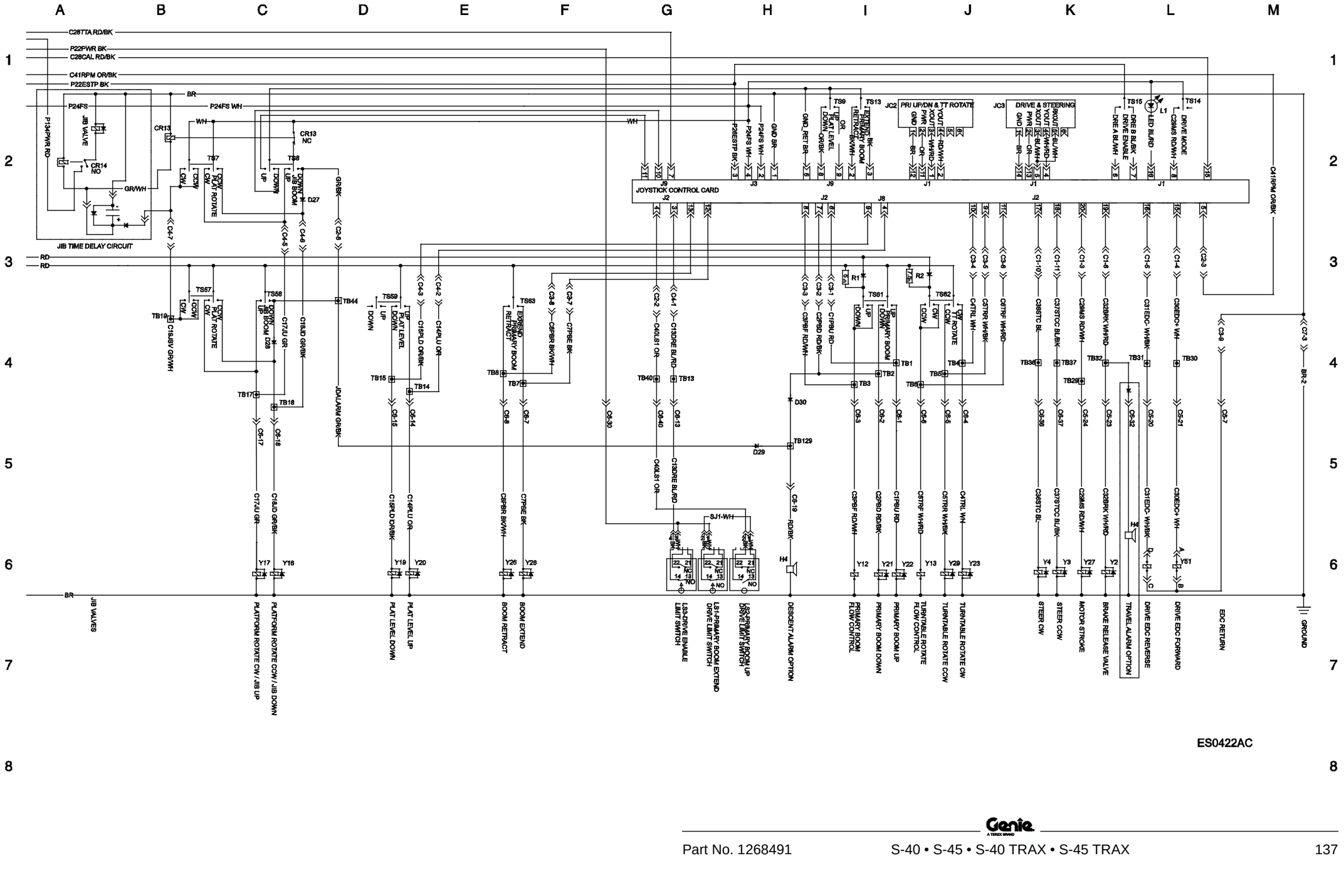
Electrical Schematic

Deutz D2011L03i and Perkins 404D Models (ANSI / CSA)



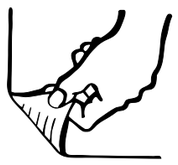
Electrical Schematic

Deutz D2011L03i and Perkins 404D Models (ANSI / CSA)

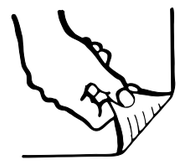


ES0422AC

Electrical Schematic - Deutz D2011L03i and Perkins 404D Models (ANSI / CSA)

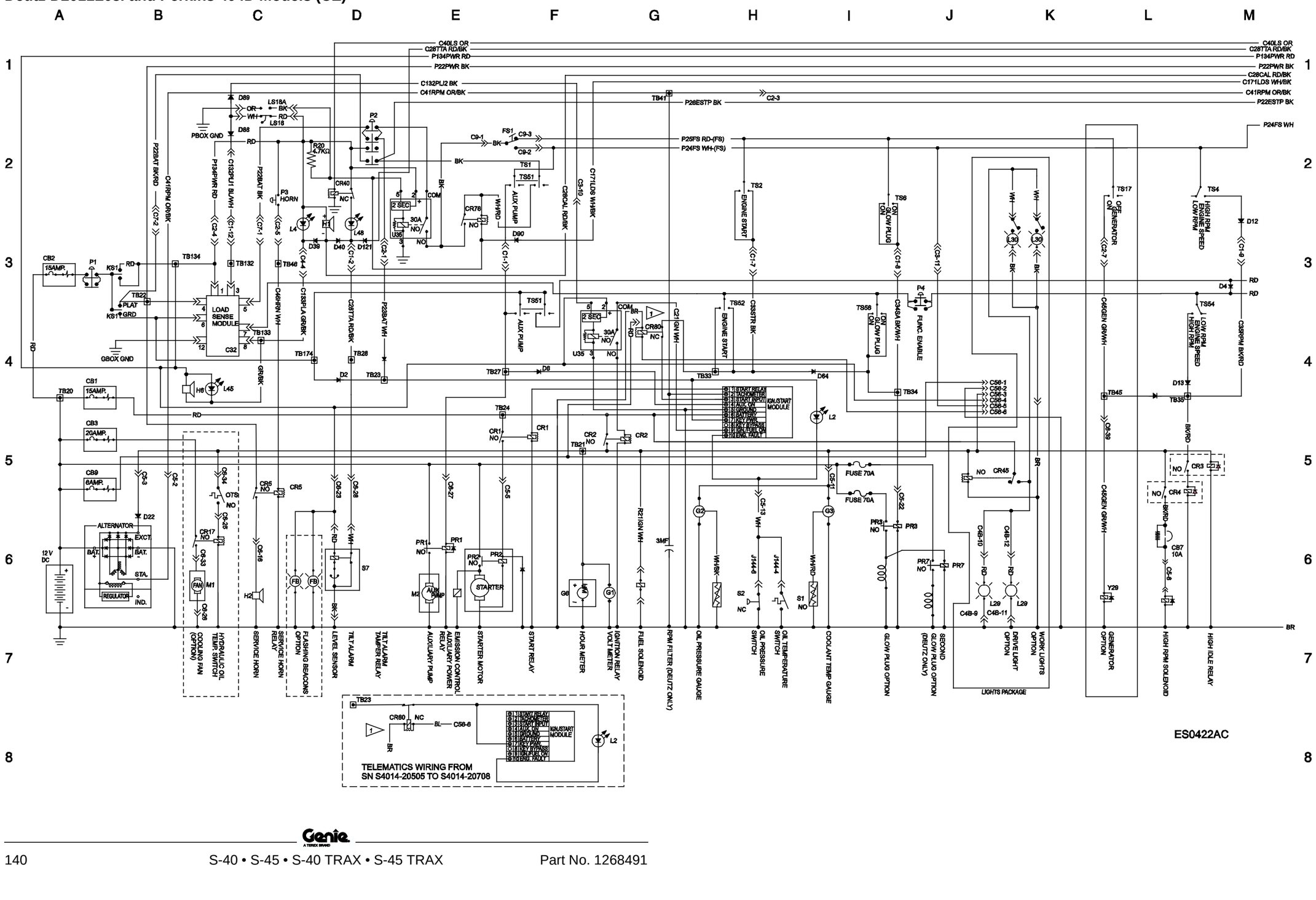


Electrical Schematic - Deutz D2011L03i and Perkins 404D Models (CE)



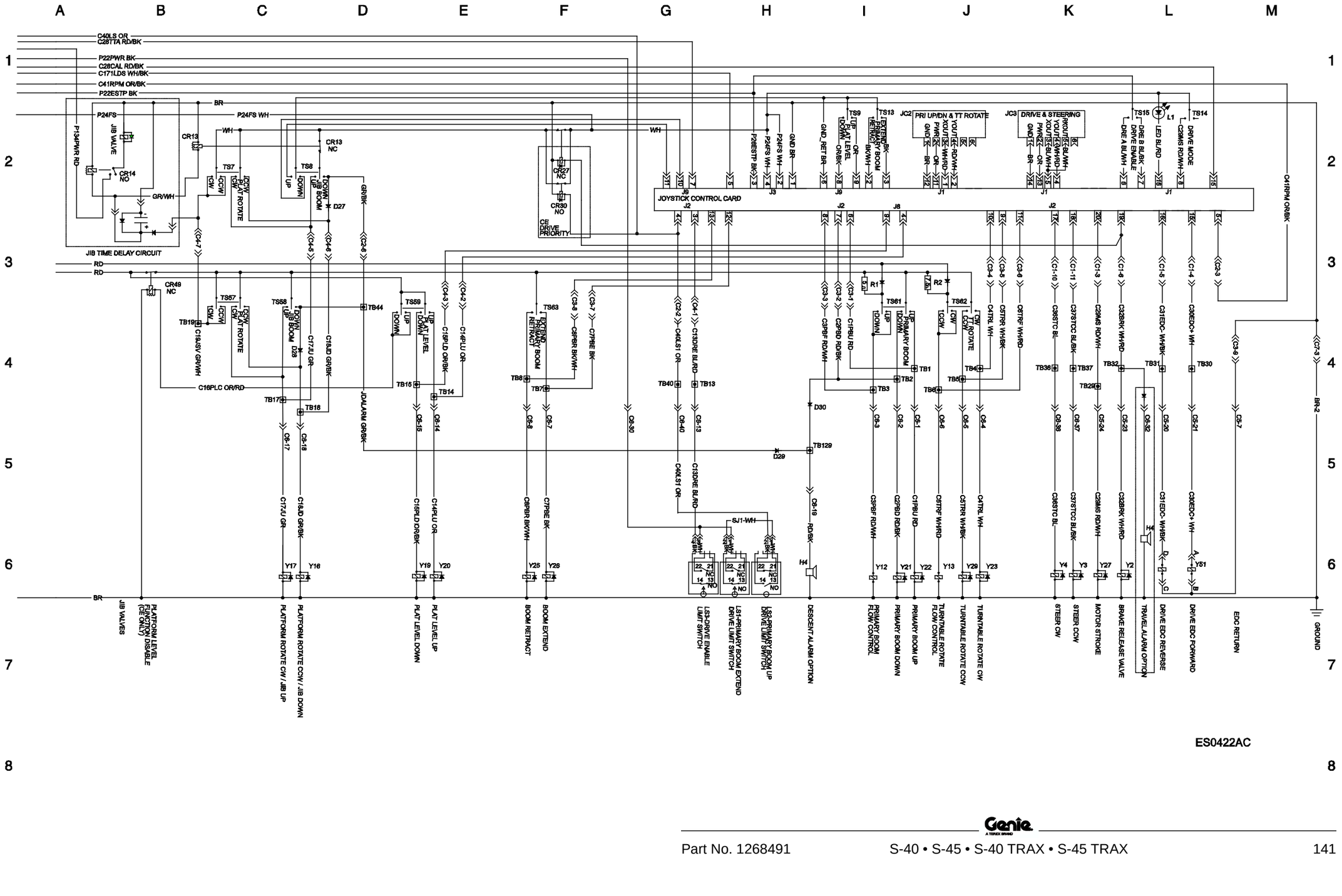
Electrical Schematic

Deutz D2011L03i and Perkins 404D Models (CE)



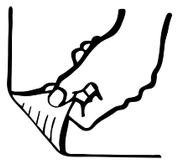
Electrical Schematic

Deutz D2011L03i and Perkins 404D Models (CE)

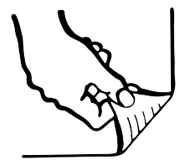


ES0422AC

Electrical Schematic - Deutz D2011L03i and Perkins 404D Models (CE)

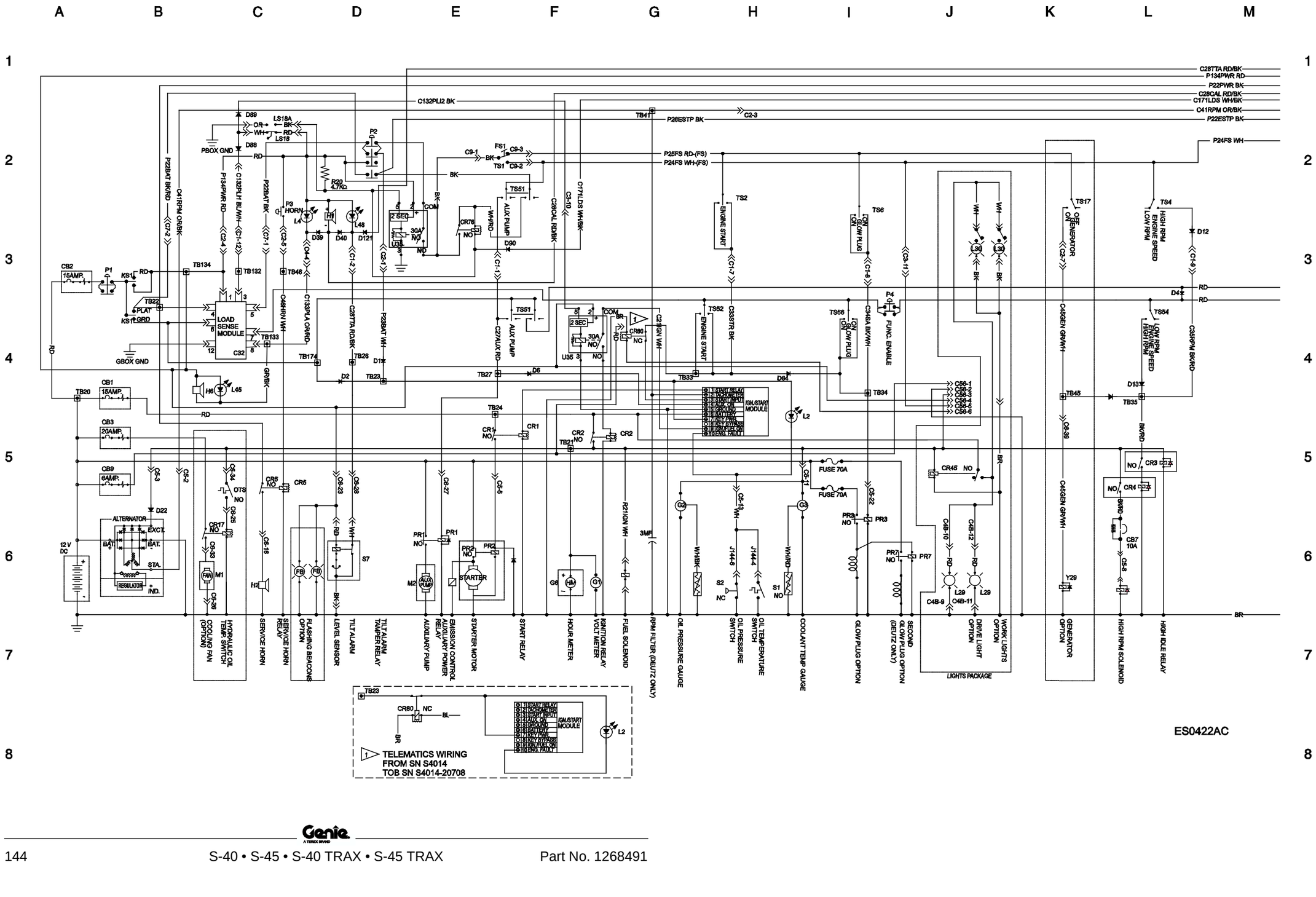


Electrical Schematic - Deutz D2011L03i and Perkins 404D Models (AS)



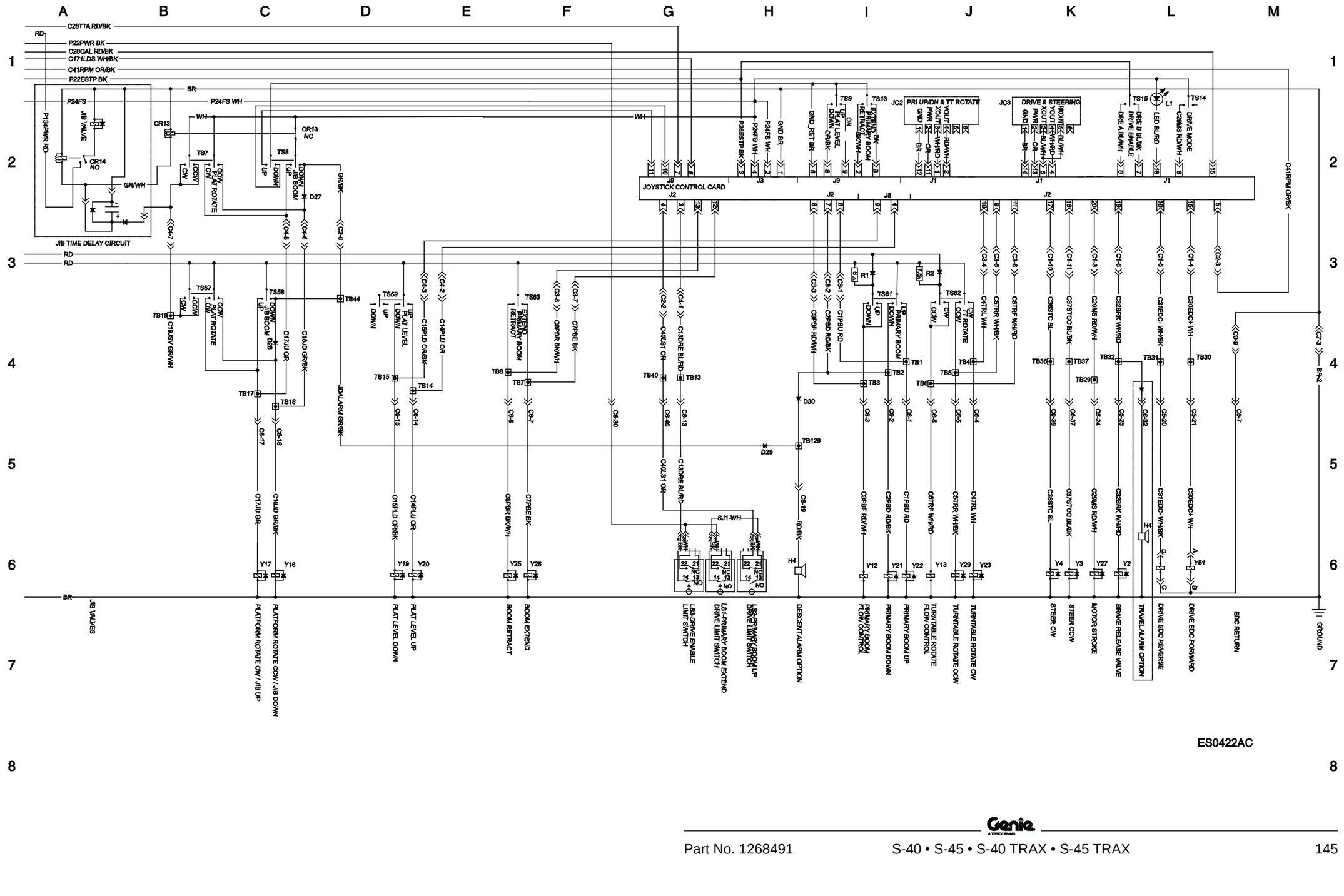
Electrical Schematic

Deutz D2011L03i and Perkins 404D Models (AS)

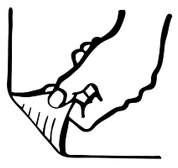


Electrical Schematic

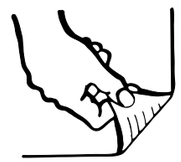
Deutz D2011L03i and Perkins 404D Models (AS)



Electrical Schematic - Deutz D2011L03i and Perkins 404D Models (AS)

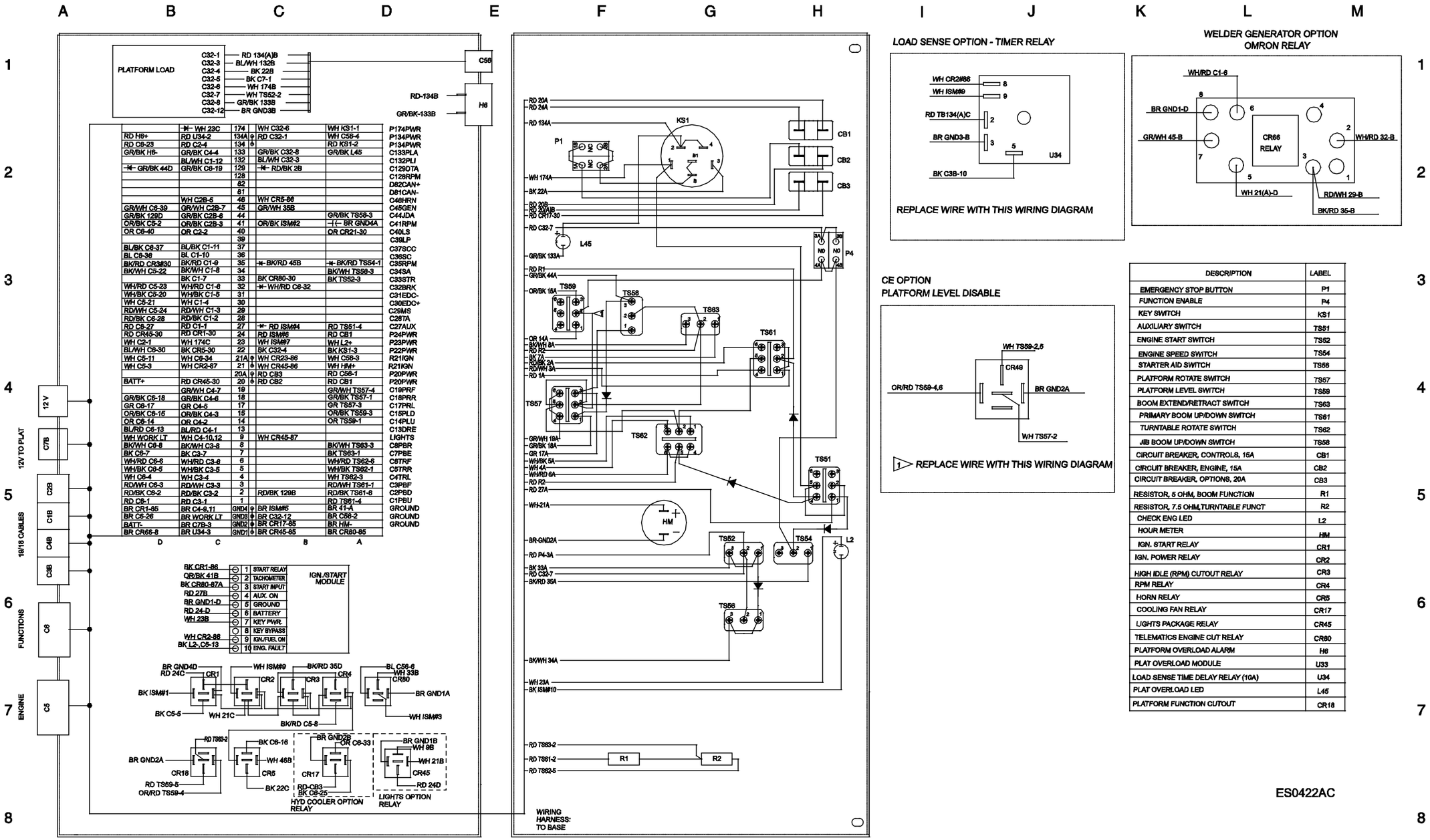


Ground Control Box - Deutz D2011L03i Models (ANSI / CSA_CE_AS)



Ground Control Box

Deutz D2011L03i and Perkins 404D Models (ANSI/CSA_CE_AS)



DESCRIPTION	LABEL
EMERGENCY STOP BUTTON	P1
FUNCTION ENABLE	P4
KEY SWITCH	KS1
AUXILIARY SWITCH	TS51
ENGINE START SWITCH	TS52
ENGINE SPEED SWITCH	TS54
STARTER AID SWITCH	TS56
PLATFORM ROTATE SWITCH	TS57
PLATFORM LEVEL SWITCH	TS59
BOOM EXTEND/RETRACT SWITCH	TS63
PRIMARY BOOM UP/DOWN SWITCH	TS61
TURNTABLE ROTATE SWITCH	TS62
JIB BOOM UP/DOWN SWITCH	TS58
CIRCUIT BREAKER, CONTROLS, 15A	CB1
CIRCUIT BREAKER, ENGINE, 15A	CB2
CIRCUIT BREAKER, OPTIONS, 20A	CB3
RESISTOR, 5 OHM, BOOM FUNCTION	R1
RESISTOR, 7.5 OHM,TURNTABLE FUNCT	R2
CHECK ENG LED	L2
HOUR METER	HM
IGN. START RELAY	CR1
IGN. POWER RELAY	CR2
HIGH IDLE (RPM) CUTOUT RELAY	CR3
RPM RELAY	CR4
HORN RELAY	CR5
COOLING FAN RELAY	CR17
LIGHTS PACKAGE RELAY	CR45
TELEMATICS ENGINE CUT RELAY	CR80
PLATFORM OVERLOAD ALARM	H6
PLAT OVERLOAD MODULE	U33
LOAD SENSE TIME DELAY RELAY (10A)	U34
PLAT OVERLOAD LED	L45
PLATFORM FUNCTION CUTOUT	CR18

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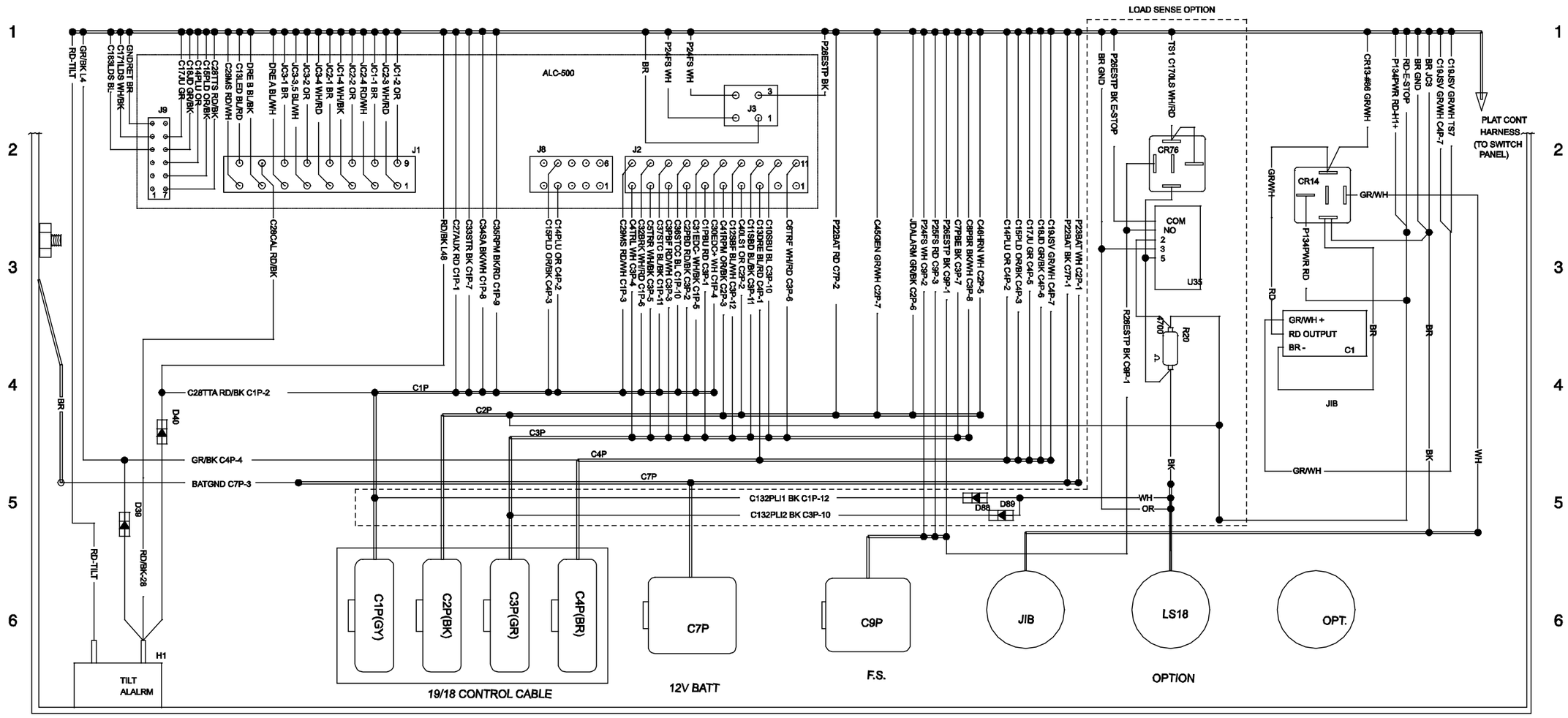
Platform Control Box - Deutz D2011L03i and Perkins 404D Models (ANSI / CSA_CE_AS)

Platform Control Box

Deutz D2011L03i and Perkins 404D Models (ANSI / CSA_CE_AS)



COMPONENT INDEX	
H1	TILT ALARM
C1	JIB TIME DELAY
CR14	JIB DELAY RELAY
CR76	LOAD SENSE RECOVERY RELAY
U35	LOAD SENSE TIME DELAY RELAY (30A)

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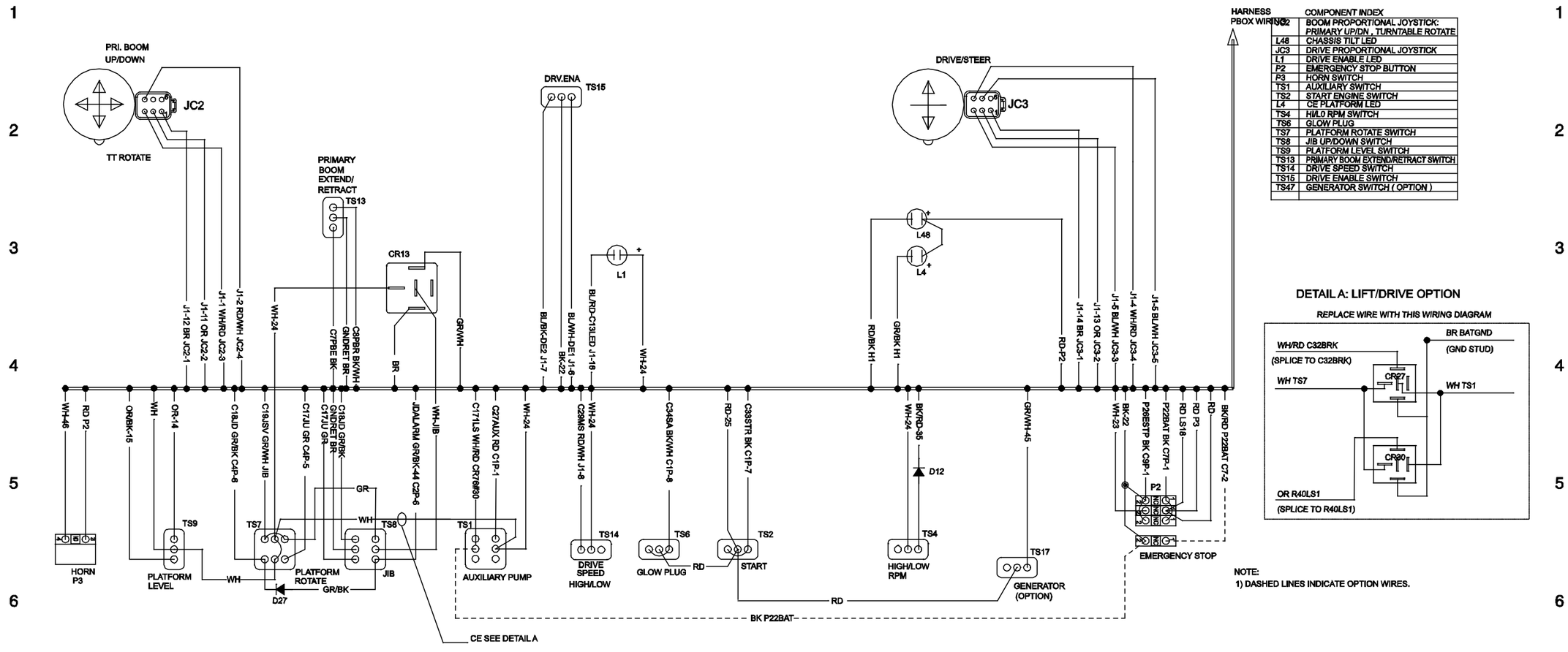
Platform Control Box Switch Panel

Deutz D2011L03i and Perkins 404D Models (ANSI / CSA_CE_AS)



COMPONENT INDEX	
JC2	BOOM PROPORTIONAL JOYSTICK: PRIMARY UP/DN , TURNTABLE ROTATE
L48	CHASSIS TILT LED
JC3	DRIVE PROPORTIONAL JOYSTICK
L1	DRIVE ENABLE LED
P2	EMERGENCY STOP BUTTON
P3	HORN SWITCH
TS1	AUXILIARY SWITCH
TS2	START ENGINE SWITCH
L4	CE PLATFORM LED
TS4	HI/LO RPM SWITCH
TS6	GLOW PLUG
TS7	PLATFORM ROTATE SWITCH
TS8	JIB UP/DOWN SWITCH
TS9	PLATFORM LEVEL SWITCH
TS13	PRIMARY BOOM EXTEND/RETRACT SWITCH
TS14	DRIVE SPEED SWITCH
TS15	DRIVE ENABLE SWITCH
TS17	GENERATOR SWITCH (OPTION)

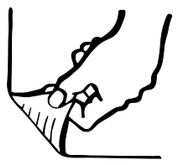
DETAIL A: LIFT/DRIVE OPTION

REPLACE WIRE WITH THIS WIRING DIAGRAM

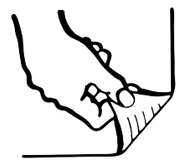
NOTE:
1) DASHED LINES INDICATE OPTION WIRES.

ES0422AC

Platform Control Box Switch Panel - Deutz D2011L03i and Perkins 404D Models (ANSI / CSA_CE_AS)

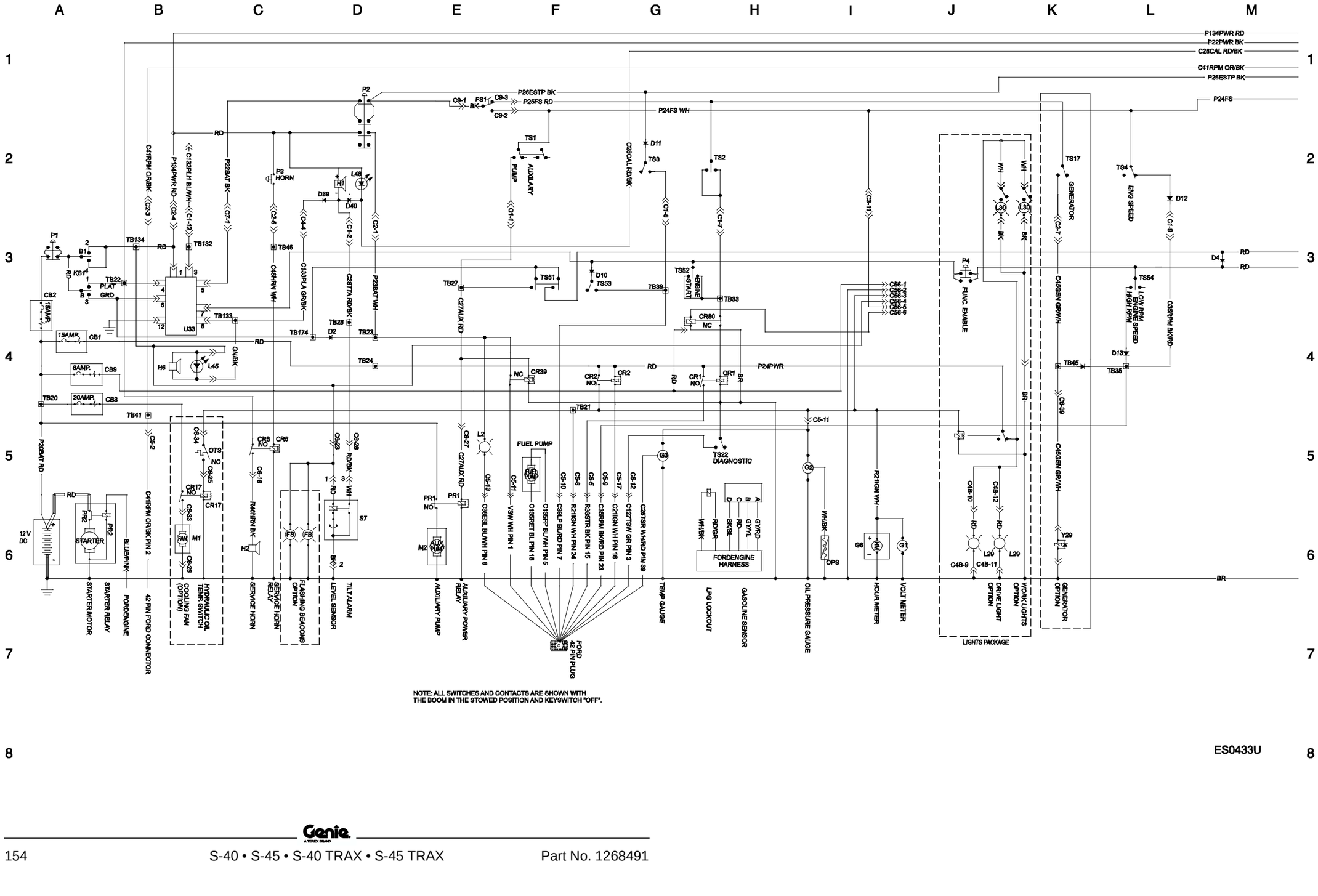


Electrical Schematic - Ford MSG-425 Models (ANSI / CSA)



Electrical Schematic

Ford MSG-425 Models (ANSI / CSA)

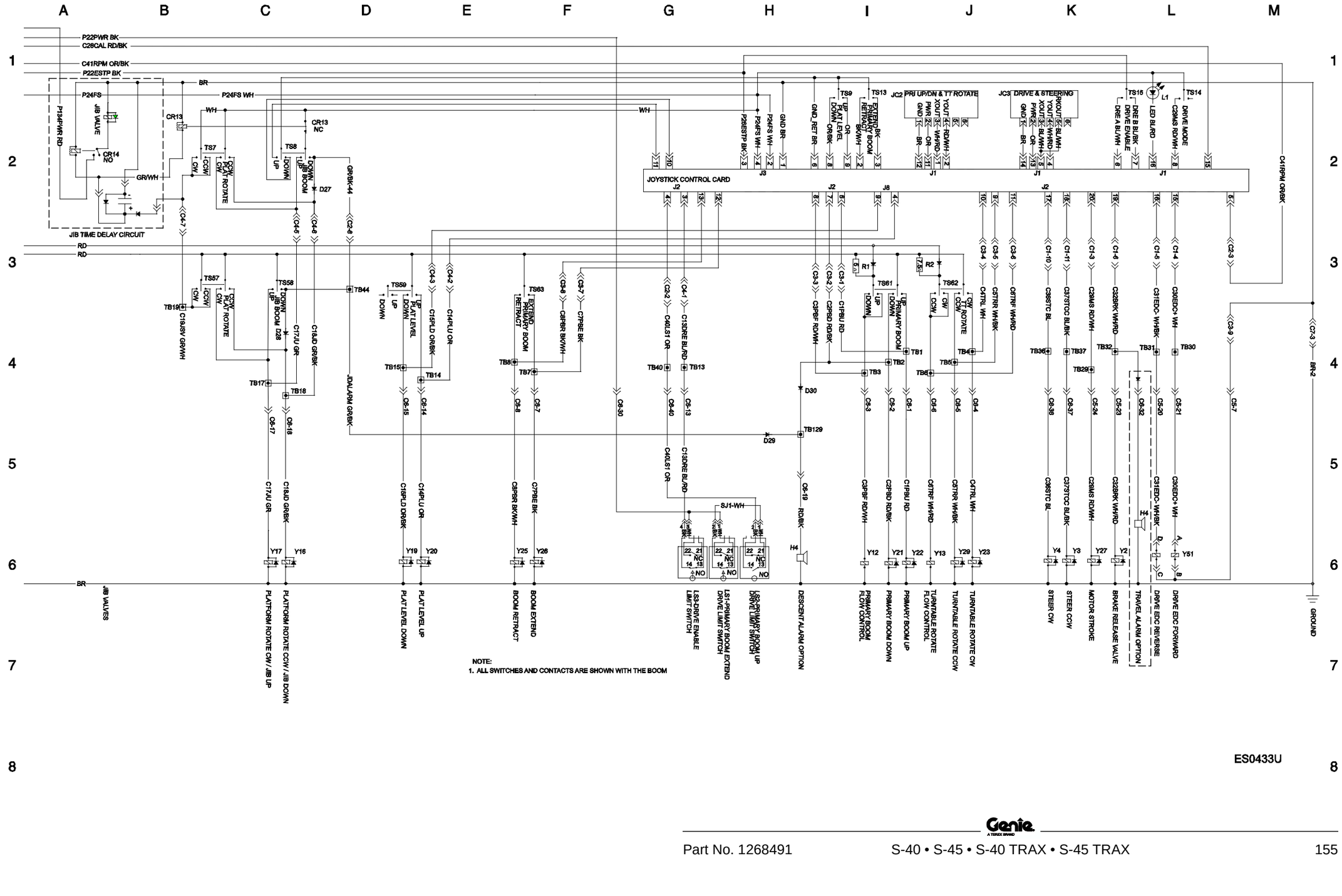


NOTE: ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND KEYSWITCH "OFF".

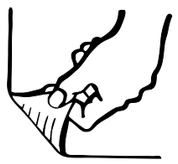
ES0433U

Electrical Schematic

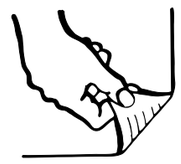
Ford MSG-425 Models (ANSI / CSA)



Electrical Schematic - Ford MSG-425 Models (ANSI / CSA)

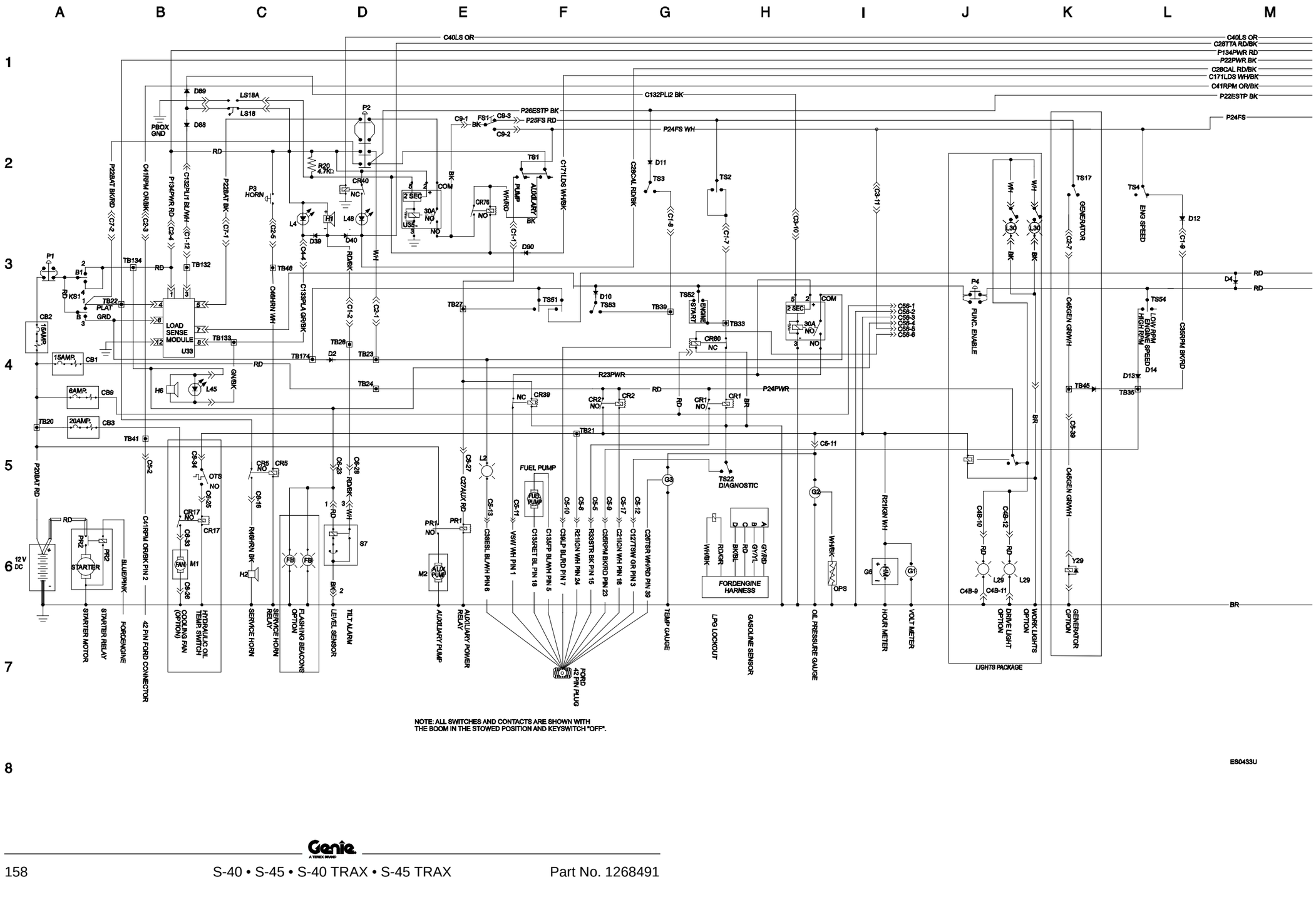


Electrical Schematic - Ford MSG-425 Models (CE)



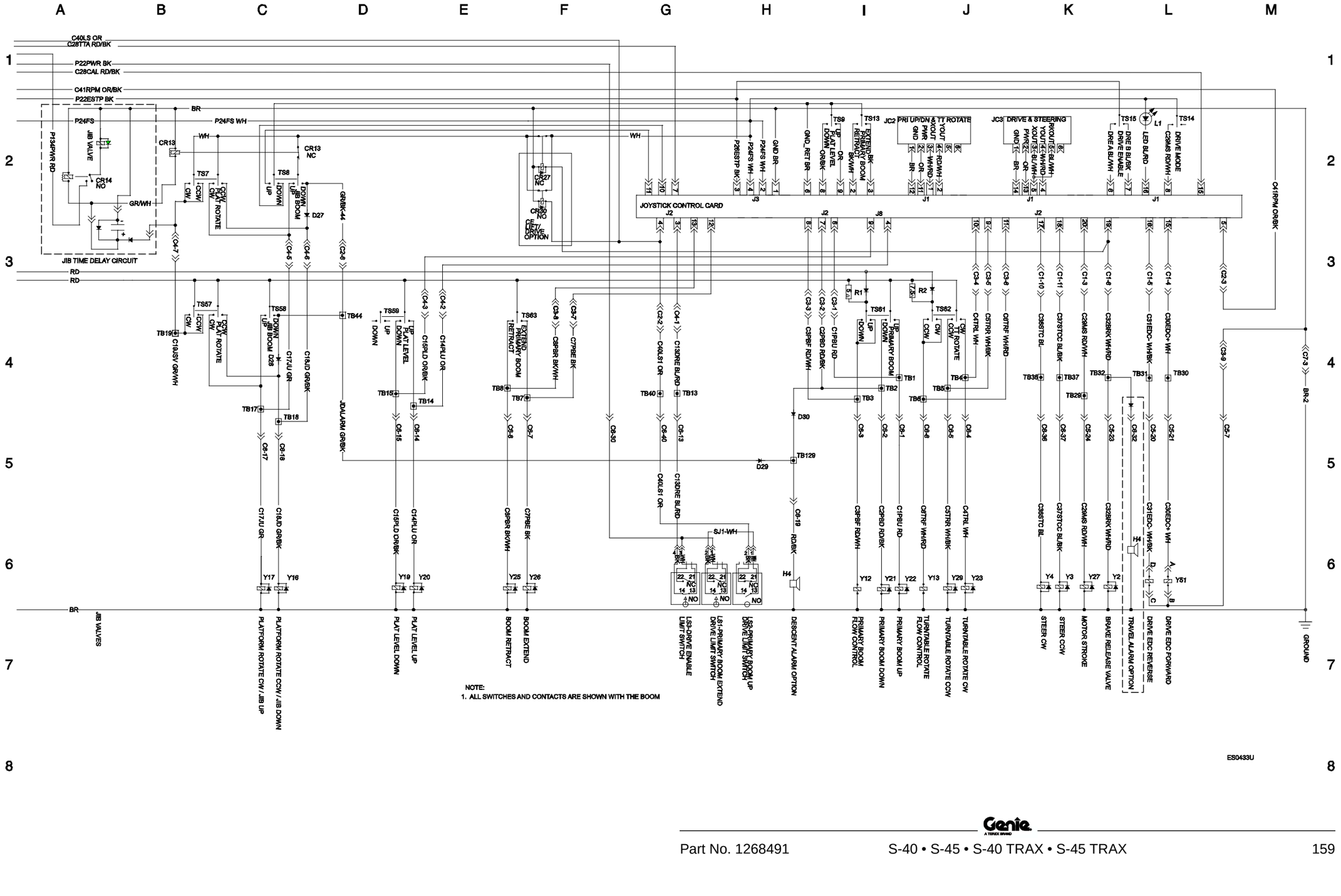
Electrical Schematic

Ford MSG-425 Models (CE)

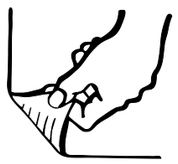


Electrical Schematic

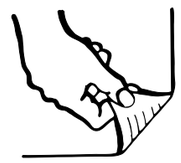
Ford MSG-425 Models (CE)



Electrical Schematic - Ford MSG-425 Models (CE)

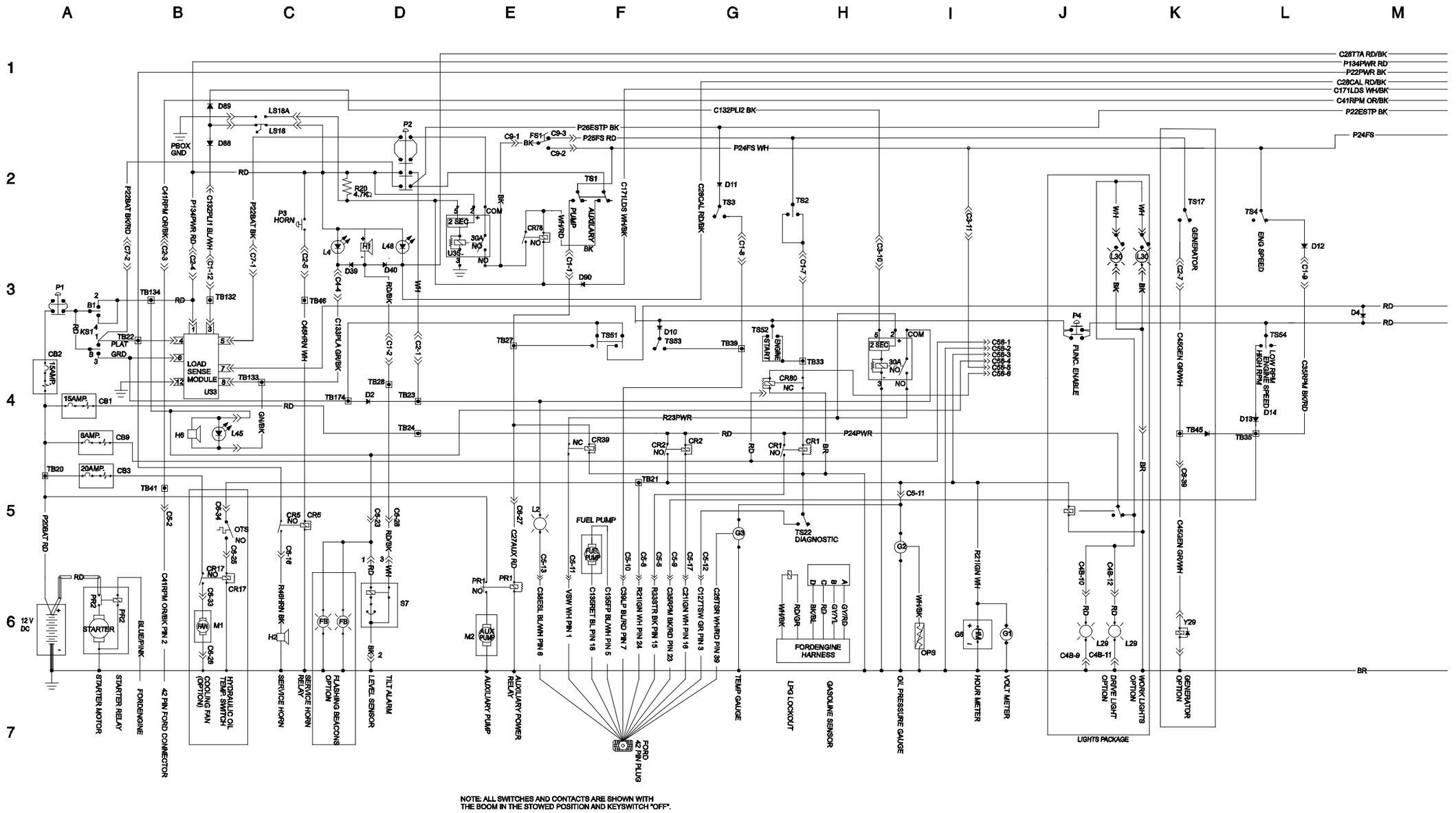


Electrical Schematic - Ford MSG-425 Models (AS)



Electrical Schematic

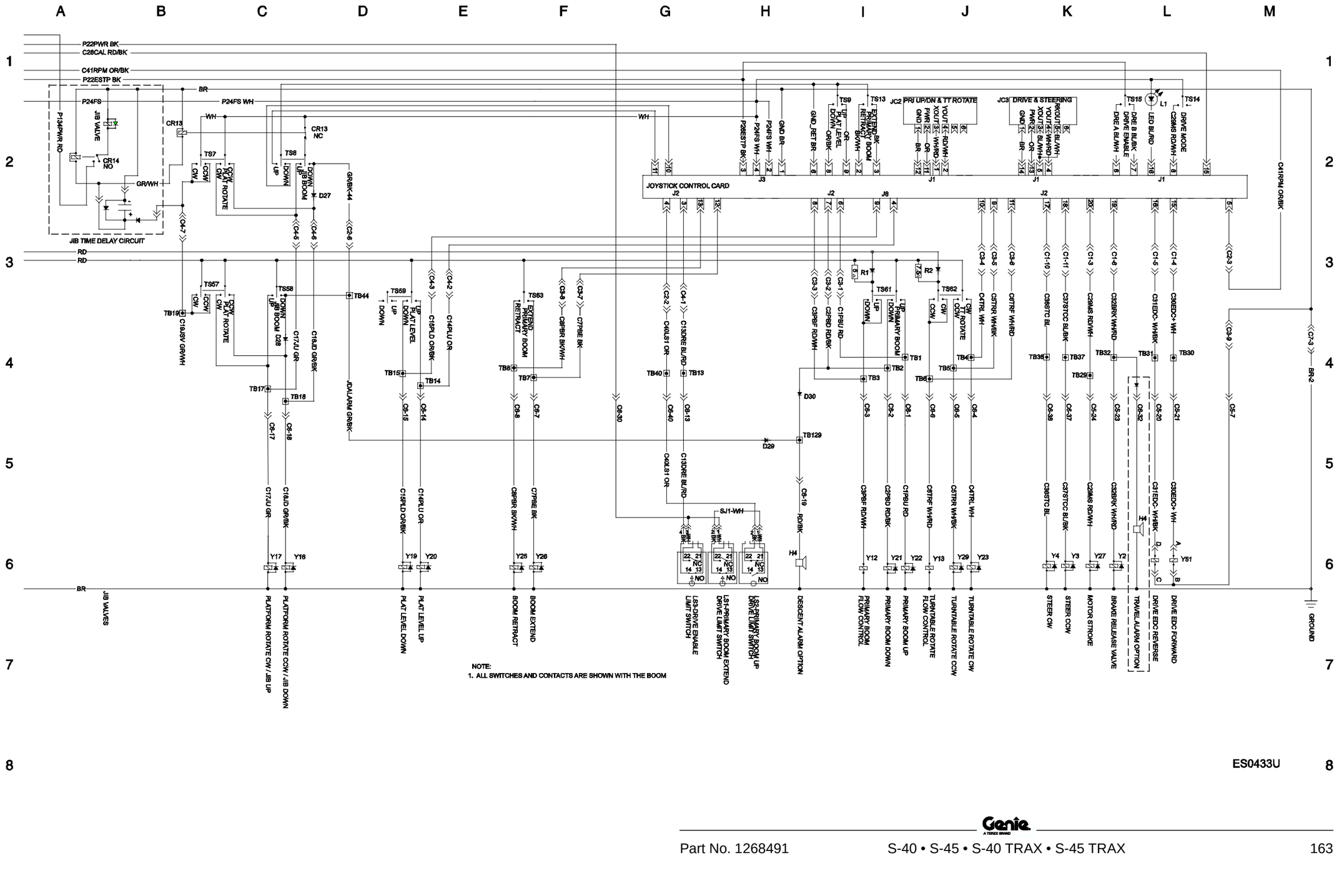
Ford MSG-425 Models (AS)



NOTE: ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND KEYSWITCH "OFF".

Electrical Schematic

Ford MSG-425 Models (AS)



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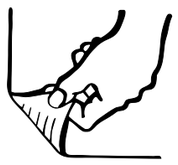
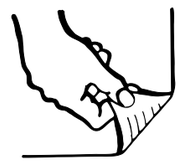
Electrical Schematic - Ford MSG-425 Models (AS)

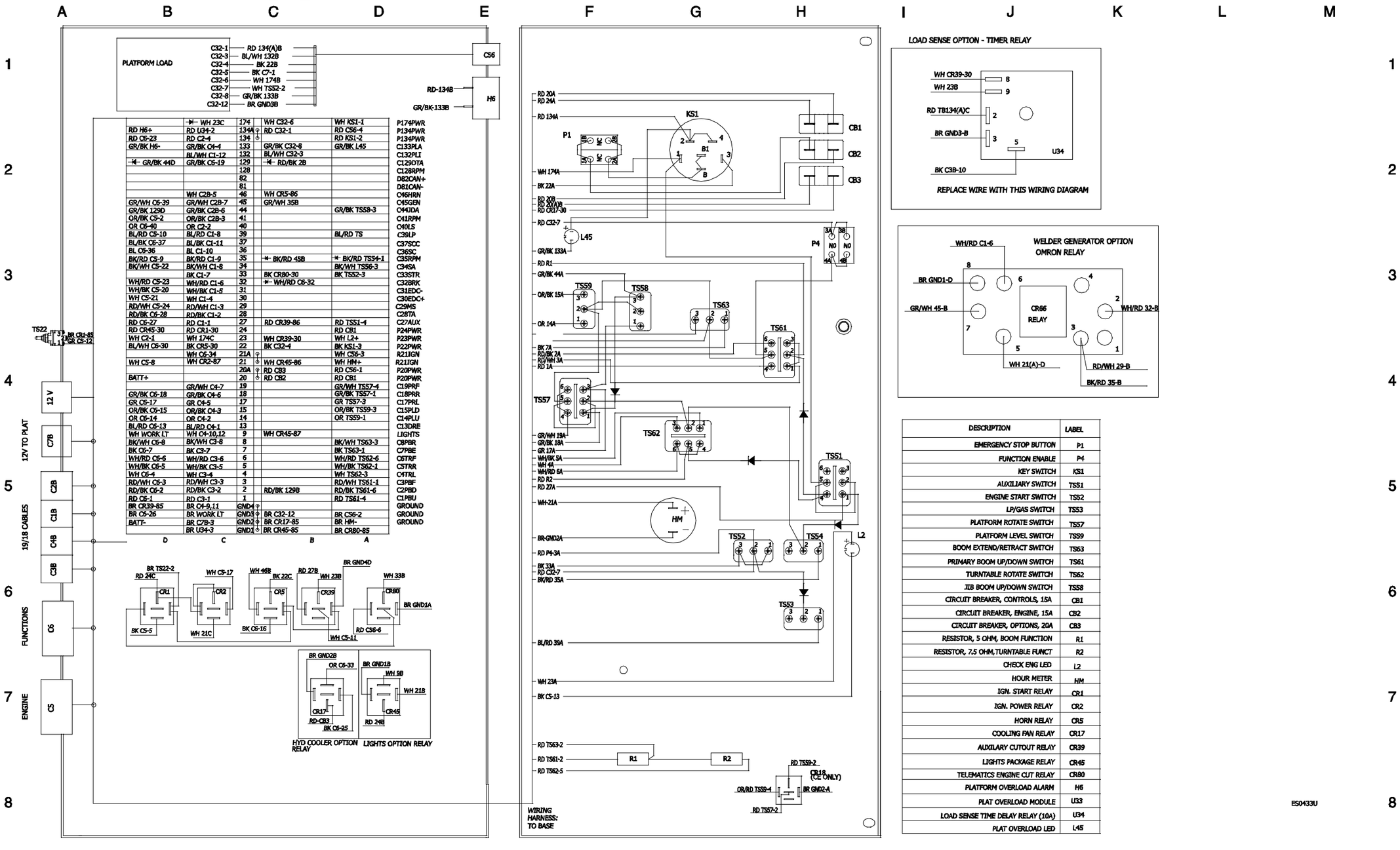


Ground Control Box - Ford MSG-425 Models (ANSI / CSA_CE_AS)



Ground Control Box

Ford MSG-425 Models (ANSI / CSA_CE_AS)



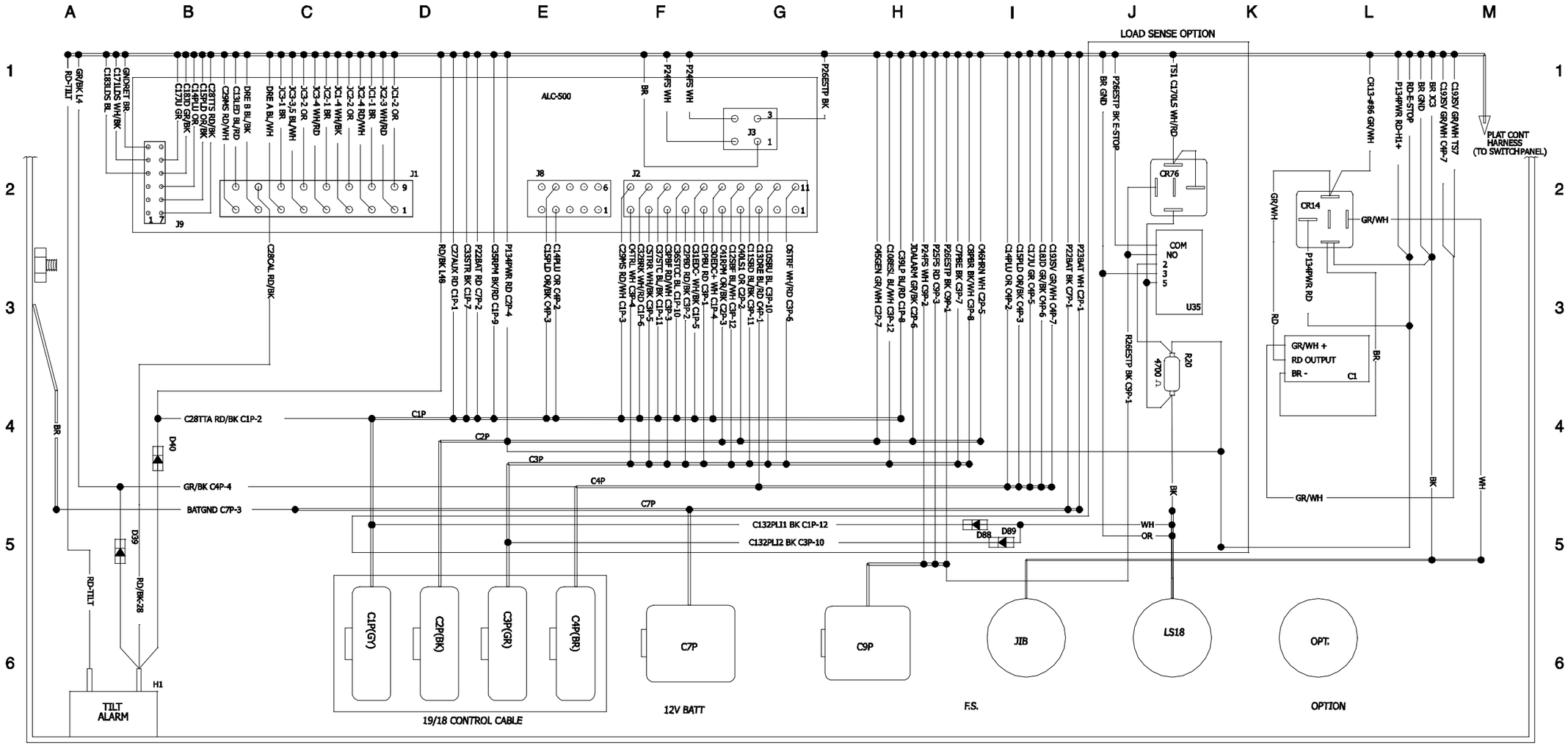
DESCRIPTION	LABEL
EMERGENCY STOP BUTTON	P1
FUNCTION ENABLE	P4
KEY SWITCH	KS1
AUXILIARY SWITCH	TS51
ENGINE START SWITCH	TS52
LP/GAS SWITCH	TS53
PLATFORM ROTATE SWITCH	TS57
PLATFORM LEVEL SWITCH	TS59
BOOM EXTEND/RETRACT SWITCH	TS63
PRIMARY BOOM UP/DOWN SWITCH	TS61
TURNTABLE ROTATE SWITCH	TS62
JIB BOOM UP/DOWN SWITCH	TS58
CIRCUIT BREAKER, CONTROLS, 15A	CB1
CIRCUIT BREAKER, ENGINE, 15A	CB2
CIRCUIT BREAKER, OPTIONS, 20A	CB3
RESISTOR, 5 OHM, BOOM FUNCTION	R1
RESISTOR, 7.5 OHM,TURNTABLE FUNCT	R2
CHECK ENG LED	L2
HOUR METER	HM
IGN. START RELAY	CR1
IGN. POWER RELAY	CR2
HORN RELAY	CR5
COOLING FAN RELAY	CR17
AUXILARY CUTOUT RELAY	CR39
LIGHTS PACKAGE RELAY	CR45
TELEMATICS ENGINE CUT RELAY	CR80
PLATFORM OVERLOAD ALARM	H6
PLAT OVERLOAD MODULE	U33
LOAD SENSE TIME DELAY RELAY (10A)	U34
PLAT OVERLOAD LED	L45

ES0433U

Platform Control Box - Ford MSG-425 Models (ANSI / CSA_CE_AS)

Platform Control Box

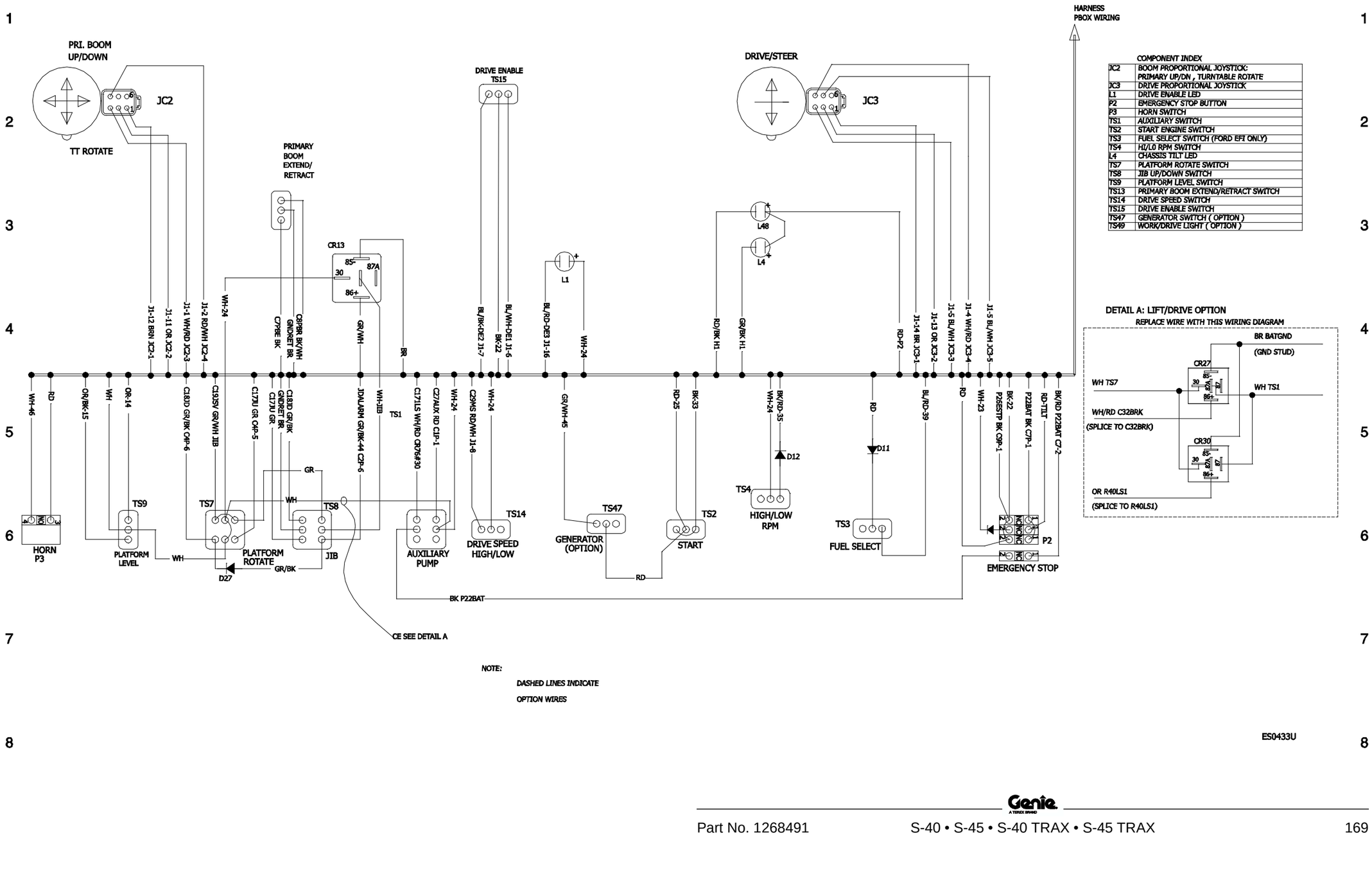
Ford MSG-425 Models (ANSI / CSA_CE_AS)



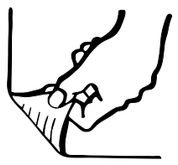
COMPONENT INDEX	
H1	TILT ALARM
C1	JIB TIME DELAY
CR14	JIB DELAY RELAY
CR76	LOAD SENSE RECOVERY RELAY
U35	LOAD SENSE TIME DELAY RELAY (30A)

Platform Control Box Switch Panel

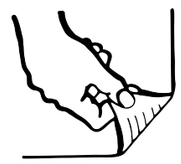
Ford MSG-425 Models (ANSI / CSA_CE_AS)



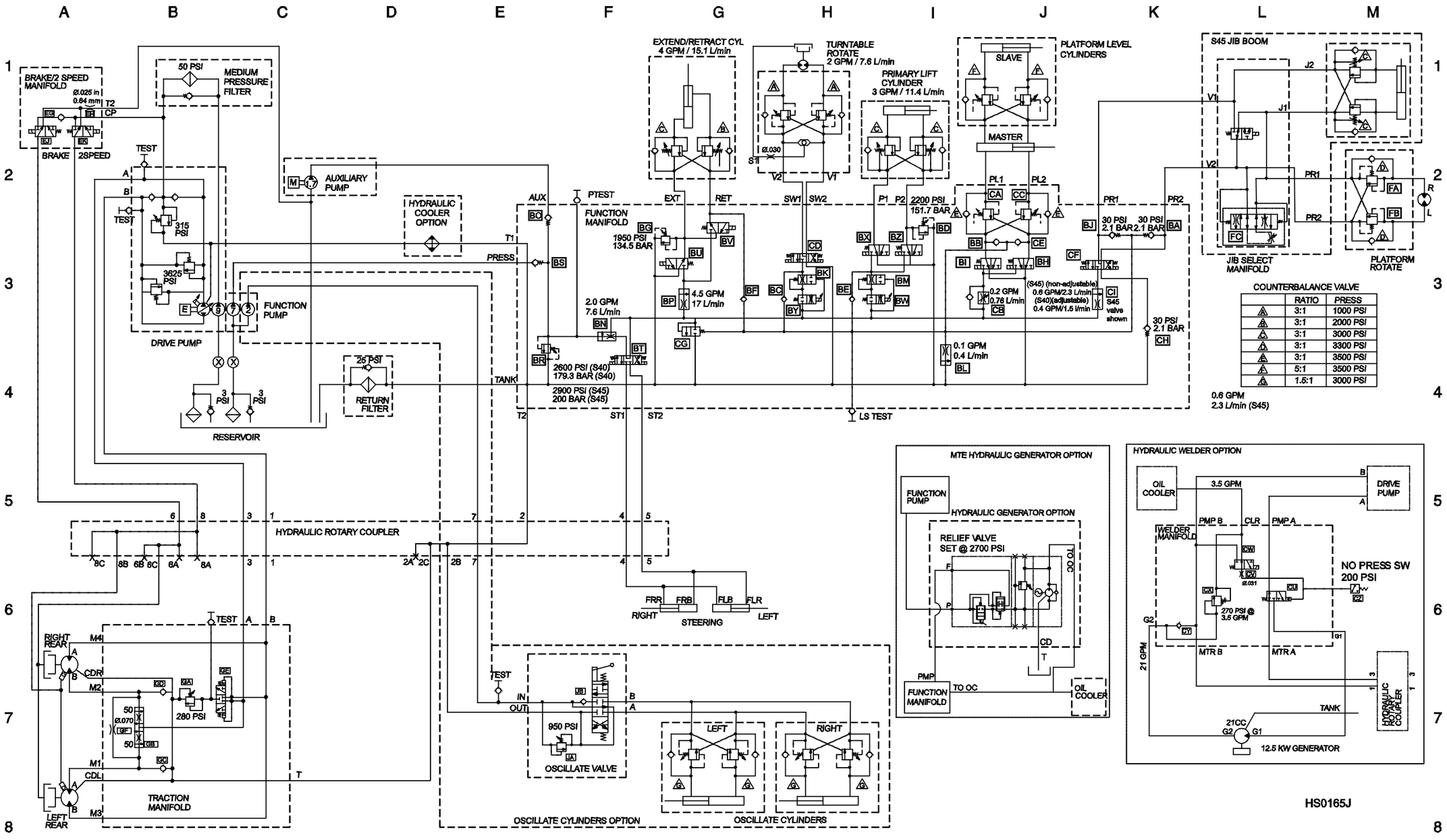
Platform Control Box Switch Panel - Ford MSG-425 Models (ANSI / CSA_CE_AS)



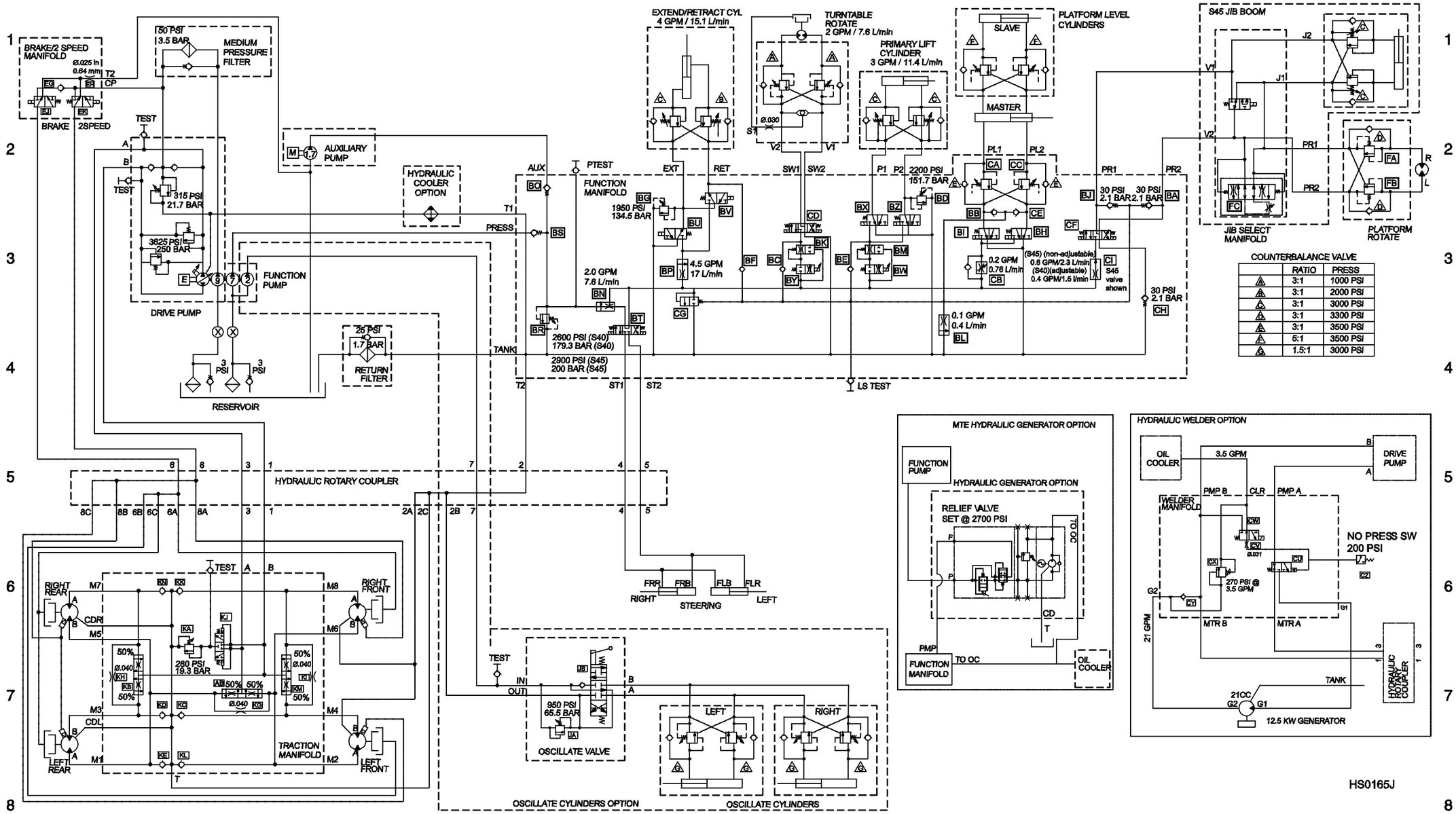
Hydraulic Schematic, 2WD



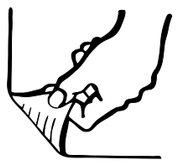
Hydraulic Schematic, 2WD



Hydraulic Schematic, 4WD



Hydraulic Schematic, 4WD - 2 Wheel Steer Models



California Proposition 65

Warning

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

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