Genie
A TEREX BRAND

# Service and Repair Manual

| | Serial Number Range |
|---|---|
| **S®-40 XC™** | from S40XCH-3291 |
| **S®-40 HF** | |
| **S®-40 TraX™** | |
| **S®-45 XC™** | from S45XCH-3292 |
| **S®-45 HF** | |
| **S®-45 TraX™** | |

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

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

Original Instructions
Part No. 1322629GT
Rev A
February 2023

# 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.

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Second Edition, First Printing

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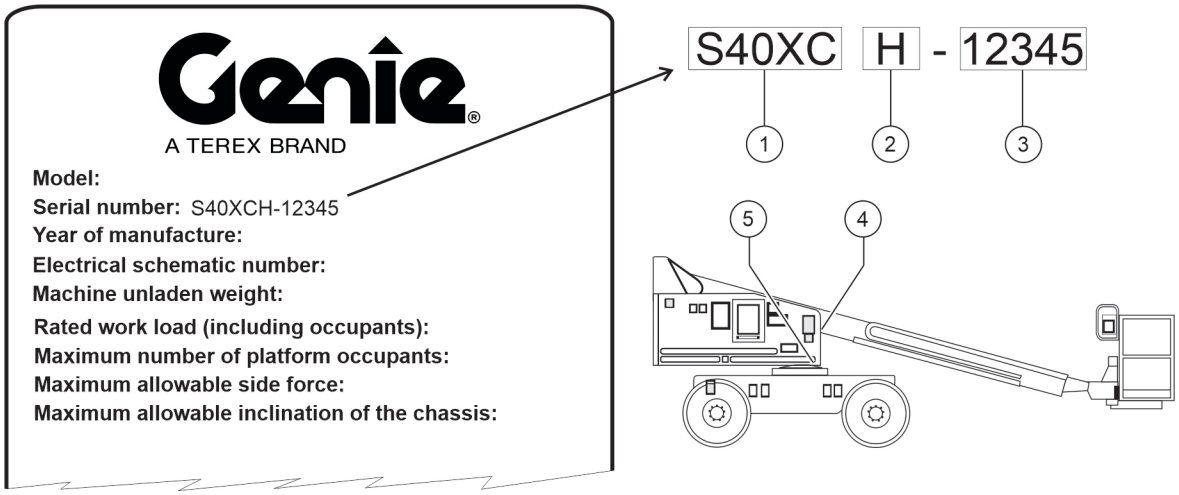
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## Revision History

| Revision | Date | Section | Procedure / Page / Description |
|---|---|---|---|
| A | 2/2023 | | Initial Release |
| | | | |
| **Reference Examples:** | | | **Electronic Version**<br>Click on any content or procedure in the Table of Contents to view the update. |
| Section – Repair Procedure, 4-2 | | | |
| Section – Fault Codes, All charts | | | |
| Section – Schematics, Legends and schematics | | | |

# Introduction

## Serial Number Legend




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

# Safety Rules



## Danger

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

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

Do not modify or alter a MEWP without prior written permission from the manufacturer.

## Do Not Perform Maintenance Unless:

☑ You are trained and qualified to perform maintenance on this machine.

☑ You read, understand and obey:

- manufacturer's instructions and safety rules
- employer's safety rules and worksite regulations
- applicable governmental regulations

☑ You have the appropriate tools, lifting equipment and a suitable workshop.

# Safety Rules

## Personal Safety

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



Read each procedure thoroughly. This manual and the decals on the machine, use signal words to identify the following:



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

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

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

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

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



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



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

## Workplace Safety

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



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



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



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



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



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



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

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# Specifications

## Machine Specifications

| Tires and wheels | |
|---|---|
| Tire size, rough terrain (foam filled) | 315/55D20<br>12 ply<br>20 in x 11 in wheel<br>50.8 cm x 27.9 cm wheel |
| Tire weight, rough terrain (minimum) | 290 lbs<br>312 kg |
| Tire size, high flotation | 33/16LL 500<br>10 ply<br>19.5 in x 14 in wheel<br>49.5 cm x 35.6 cm wheel |
| Tire pressure | 38 psi / 2.6 bar |
| Tire weight, high flotation (minimum) | 145 lbs<br>66 kg |
| Wheel lugs | 9 @ 5/8 - 18 |
| Lug nut torque, dry | 240 ft-lbs<br>325 Nm |
| Lug nut torque, lubricated | 180 ft-lbs<br>244 Nm |

| Track Components, TraX option | |
|---|---|
| Track material | Rubber |
| Weight (each) | 480 lbs<br>218 kg |

| Fluid capacities | |
|---|---|
| LPG tank | 33.5 pounds<br>15.2 kg |
| Fuel tank (standard) | 20 gallons<br>75.7 liters |
| Fuel tank (optional) | 30 gallons<br>113.6 liters |
| Hydraulic tank | 45 gallons<br>170 liters |
| Hydraulic system (including tank) | 55 gallons<br>208 liters |
| Drive hubs | 20 fl oz<br>592 cc |
| Turntable rotation drive hub | 8 fl oz<br>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 / 6.8 - 7.4 sec<br>12.2 m / 6.8 - 7.4 sec |
| Raised or extended | 40 ft / 40 - 45 sec<br>12.2 m / 40 - 45 sec |
| **Drive speeds, TraX option** | |
| Stowed | 40 ft / 9 - 11 sec<br>12.2 m / 9 - 11 sec |
| Raised or extended | 40 ft / 40 - 45 sec<br>12.2 m / 40 - 45 sec |
| **Gradeability** | See Operator's Manual |
| **Braking distance, maximum** | |
| High range on paved surface | 3 - 4 ft<br>0.9 - 1.2 m |
| **Boom function speeds, maximum from platform controls** | |
| Jib boom up, S-45 models | 48 - 53 seconds |
| Jib boom down, S-45 models | 28 - 33 seconds |
| Platform level (10° range of motion) | 3 - 5 seconds |
| Boom up | 50 - 60 seconds |
| Boom down | 50 - 60 seconds |
| Boom extend | 30 - 60 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 |
| ISO Grade | 32 |
| Viscosity index, maximum | 200 |
| **Optional Hydraulic Fluids** | |
| Mineral based | Shell Tellus S2 V 32<br>Shell Tellus S2 V 46<br>Shell Tellus S4 VX 32<br>Shell Donax TG (Dexron III)<br>Chevron 5606A |
| Biodegradable | Petro Canada Environ MV 46 |
| Fire resistant | UCON Hydrolube HP-5046 |

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

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

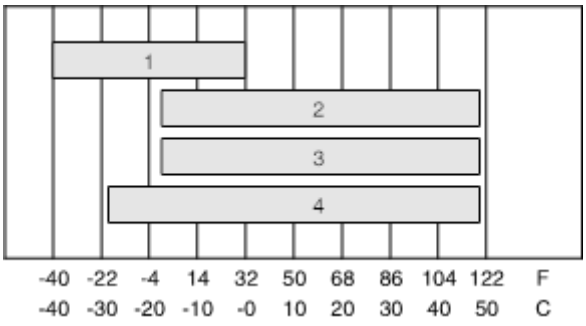
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond its maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

**NOTICE**

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

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

## Hydraulic Fluid Temperature Range




Ambient air temperature

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

## Chevron Rando HD Premium Oil MV Fluid Properties

| | |
|---|---|
| ISO Grade | 32 |
| Viscosity index, maximum | 200 |
| Kinematic Viscosity, maximum<br>cSt @ 200°F / 100°C<br>cSt @ 104°F / 40°C | <br>7.5<br>33.5 |
| Brookfield Viscosity, maximum<br>cP @ -4°F / -20°C<br>cP @ -22°F / -30°C | <br>1040<br>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.

# Specifications

## Chevron 5606A Hydraulic Oil Fluid Properties

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

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

**NOTICE**

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

## Petro-Canada Environ MV 46 Fluid Properties

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

## Shell Tellus S4 VX Fluid Properties

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

## UCON Hydrolube HP-5046 Fluid Properties

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

# Specifications

## Hydraulic Component Specifications

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

| **Function manifold** | |
|---|---|
| Function relief valve pressure | 3200 psi / 220.6 bar |
| Boom extend relief valve pressure | 1950 psi<br>134 bar |
| Steer regulator all models | 2 gpm / 7.6 lpm |
| Oscillate relief valve pressure (@2500 rpm) | 650 psi<br>49 bar |
| **Traction Manifold** | |
| Hot oil relief pressure | 280 psi<br>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<br>3.5 bar |
| Hydraulic tank return filter | 10 micron with 25 psi / 1.7 bar bypass |

# Specifications

## 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<br>2,5 liters |
| **Number of cylinders** | 4 |
| **Bore and Stroke** | 3.5 x 3.9 in<br>89 x 100 mm |
| **Horsepower** | 60 @ 2500 rpm<br>45 kW @ 2500 rpm |
| **Firing order** | 1 - 3 - 4 - 2 |
| **Low idle, standby** | 1000 rpm<br>33,3 Hz |
| **Low idle, function enable** | 1600 rpm<br>53,3 Hz |
| **High idle** | 2500 rpm<br>83,3 Hz |
| **Compression ratio** | 9.7:1 |
| **Compression pressure** | |
| Pressure (psi or bar) of lowest cylinder must be at least 75% of highest cylinder. | |
| **Lubrication system** | |
| Oil pressure (operating temperature @ 2000 rpm) | 29 - 39 psi<br>2,75 - 4,1 bar |
| Oil capacity (including filter) | 6.7 quarts<br>6,4 liters |
| **Oil Pressure switch** | |
| Oil pressure switch point | 7.5 psi<br>0,51 bar |
| **Normal engine cranking speedOil 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<br>4,1 bar |
| Fuel flow rate | 0.58 gpm<br>2,2 L/min |
| **Fuel requirement** | |
| For fuel requirements, refer to the engine Operator Manual for your engine. | |
| **Ignition system** | |
| Spark plug type | Motorcraft AYFS-32Y-R |
| Spark plug gap | 0.049 - 0.053 in<br>1,25 - 1,35 mm |
| **Engine coolant** | |
| Capacity | 11.5 quarts<br>10,9 liters |
| **Coolant temperature switch** | |
| Temperature switch point | 230°F<br>110°C |
| **Starter motor** | |
| Normal engine cranking speed | 200 - 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<br>2.33 liters |
| **Number of cylinders** | 3 |
| **Bore and stroke** | 3.7 x 4.4 inches<br>94 x 112 mm |
| **Horsepower** | 48 @ 2800 rpm<br>36 kW @ 2800 rpm |
| **Firing order** | 1 - 2 - 3 |
| **Low idle** | 1500 rpm<br>313 Hz |
| **High idle** | 2500 rpm<br>521.7 Hz |
| **Compression ratio** | 19:01 |
| **Compression pressure** | 362 to 435 psi<br>25 to 30 bar |
| Governor | centrifugal mechanical |
| **Valve clearance, cold** | |
| Intake | 0.012 in<br>0.3 mm |
| Exhaust | 0.020 in<br>0.5 mm |
| **Lubrication system** | |
| Oil pressure | 20 to 44 psi<br>1.4 to 3 bar |
| Oil capacity<br>(including filter) | 9.5 quarts<br>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<br>149°C |
| **Oil pressure switch** | |
| Oil pressure switch point | 22 psi<br>1.5 bar |
| **Fuel injection system** | |
| Injection pump make | Bosch |
| Injection pump pressure, maximum | 15000 psi<br>1034 bar |
| Injector opening pressure | 3046 psi<br>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<br>18.5 mm |
| Brush length, minimum | 0.27 in<br>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<br>9 to 12 mm |

# Specifications

## Deutz D 2.9 L4 Tier IV Engine

| | |
|---|---|
| **Displacement** | 177 cu in<br>2,9 liters |
| **Number of cylinders** | 4 |
| **Bore and stroke** | 3.6 x 4.3 inches<br>92 x 110 mm |
| **Horsepower** | 48.8 @ 2600 rpm<br>37 kW @ 2600 rpm |
| **Firing order** | 1 - 3 - 4 - 2 |
| **Low idle** | 1500 rpm<br>313 Hz |
| **High idle** | 2500 rpm<br>521.7 Hz |
| **Compression ratio** | 18.4:1 |
| **Compression pressure** | 362 - 435 psi<br>25 - 30 bar |
| **Governor** | electronic |
| **Lubrication system** | |
| Oil pressure (@ 2000 rpm) | 40 to 60 psi<br>1,4 to 3 bar |
| Oil capacity<br>(including filter) | 9.4 quarts<br>9 liters |
| **Oil viscosity requirements** | **Low ash oil required** |
| -22° F to 86° F/ -30° C to 30° C | 5W-30 (synthetic) |
| -4° F to 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<br>125°C |
| **Oil pressure switch** | |
| Oil pressure switch point | 20 psi<br>1,4 bar |
| **Engine coolant** | |
| Capacity | 10 quarts<br>9,4 liters |
| **Fuel injection system** | |
| Injection pump make | Bosch |
| Injection pump pressure, maximum | 15000 psi<br>1034 bar |
| Injector opening pressure | 3046 psi<br>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 - 1/2 inch<br>9 - 12 mm |

# Specifications

## Deutz D 2.9 L4 Stage IV Engine

| | |
|---|---|
| **Displacement** | 177 cu in<br>2,9 liters |
| **Number of cylinders** | 4 |
| **Bore and Stroke** | 3.6 x 4.3 in<br>92 x 110 mm |
| **Horsepower** | 48.8 @ 2600 rpm<br>36,4 kW @ 2600 rpm |
| **Firing order** | 1 - 3 - 4 - 2 |
| **Low idle, standby** | 1000 rpm |
| **Low idle, function enable** | 1500 rpm |
| **High idle** | 2500 rpm |
| **Compression ratio** | 18.4:1 |
| **Compression pressure** | 362 - 435 psi<br>25 - 30 bar |
| **Governor** | electronic |
| **Lubrication system** | |
| Oil pressure (@ 2000 rpm) | 40 - 60 psi<br>1,4 - 3 bar |
| Oil capacity (including filter) | 9.4 quarts<br>9 liters |
| **Oil viscosity requirements** | **Low ash oil required** |
| -22° F to 86° F/ -30° C to 30° C | 5W-30 (synthetic) |
| -4° F to 104° F / -20° C to 40° C | 10W-40 |
| Above 5° F / -15° C | 15W-40 |
| Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine. | |
| **Oil temperature switch** | |
| Temperature switch point | 257°F<br>125°C |
| **Oil Pressure switch** | |
| Oil pressure switch point | 20 psi<br>1,4 bar |
| Installation torque | 8 - 18 Ft-lbs<br>11 - 24 Nm |
| **Engine coolant** | |
| Capacity | 10.7 quarts<br>10,1 liters |
| **Fuel injection system** | |
| Injection pump make | Bosch |
| Injection pump pressure, maximum | 15000 psi<br>1034 bar |
| Injector opening pressure | 3046 psi<br>210 bar |
| **Fuel requirement** | |
| For fuel requirements, refer to the engine Operator Manual for your engine. | |
| **Starter motor** | |
| Current draw, normal load | 250A - 400A |
| Brush length, new | 0.72 in<br>18,5 mm |
| Brush length, minimum | 0.27 in<br>7 mm |
| **Battery** | |
| Type | 12V DC |
| Quantity | 1 |
| Cold cranking ampere | 1000A |
| Reserve capacity @ 25A rate | 220 minutes |
| **Alternator output** | 95A @ 14V DC |
| **Fan belt deflection** | 3/8 - 1/2 in<br>9 - 12 mm |

## Deutz TD 2.2 L3 Engine

| | |
|---|---|
| **Displacement** | 134 cu. in<br>2,2 liters |
| **Number of cylinders** | 3 |
| **Bore and Stroke** | 3.6 x 4.3 inches<br>92 x 110 mm |
| **Horsepower net intermittent @ 2600 rpm** | 49 hp<br>36 kW |
| **Induction system** | turbocharged |
| **Firing order** | 1 - 2 - 3 |
| **Low idle, standby** | 1000 rpm |
| **Low idle, function enable** | 1500 rpm |
| **High idle** | 2400 rpm |
| **Governor** | electronic |
| **Lubrication system** | **Low ash oil required** |
| Oil pressure, hot (@ 2000 rpm) | 40 to 60 psi<br>2,8 to 4,1 bar |
| Oil capacity (including filter) | 8 quarts<br>7,6 liters |
| **Oil viscosity requirements** | |
| -22°F to 86°F / -30°C to 30°C | 5W-30<br>(synthetic) |
| -4°F to 104°F / -20°C to 40°C | 10W-40 |
| Above 5°F / -15°C | 15W-40 |
| Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine. | |

| | |
|---|---|
| **Oil temperature switch** | |
| Installation torque | 8 - 18 ft-lbs<br>11 - 24 Nm |
| Temperature switch point | 257°F<br>125°C |
| **Oil Pressure switch** | |
| Installation torque | 8 - 18 ft-lbs<br>11 - 24 Nm |
| Pressure switch point | 17.4 psi<br>1,2 bar |
| **Fuel requirement** | |
| For fuel requirements, refer to the engine Operator Manual for your engine. | |
| **Engine coolant capacity** | 2.2 gallons<br>8,3 liters |
| Unit ships with Ethylene Glycol engine coolant. Consult your local supplier for compatibility before mixing alternative engine coolants. | |
| **Starter motor** | |
| Current draw, normal load | 140 - 200A |
| Cranking speed | 250 - 350 rpm |
| **Battery – Engine starting and control system** | |
| Type | 12V DC, Group 31 |
| Quantity | 1 |
| Battery capacity, maximum | 1000A |
| Reserve capacity @ 25A rate | 200 Minutes |
| Alternator output | 95A @ 14V DC |

# Specifications

## Perkins 404F-E22T Engine

| | |
|---|---|
| **Displacement** | 134 cu in<br>2,2 liters |
| **Number of cylinders** | 4 |
| **Bore and Stroke** | 3.31 x 3.94 in<br>84 x 100 mm |
| **Horsepower** | 48 @ 2800 rpm<br>38 kW @ 2500 rpm |
| **Firing order** | 1 - 3 - 4 - 2 |
| **Low idle, standby** | 1000 rpm<br>500 Hz |
| **Low idle, function enable** | 1500 rpm<br>750 Hz |
| **High idle** | 2500 rpm<br>1250 Hz |
| **Compression ratio** | 18:1 |
| **Compression pressure** | 426 psi<br>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<br>0,2 mm |
| Exhaust | 0.008 in<br>0,2 mm |
| **Lubrication system** | |
| Oil pressure (@ 2000 rpm) | 40 - 60 psi<br>1,4 - 3 bar |
| Oil capacity (including filter) | 9.4 - 11.2 quarts<br>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 |
| Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine. | |
| **Oil pressure sending unit** | |
| Oil pressure switch point | 14.2 psi<br>1 bar |
| **Fuel injection system** | |
| Injection pump make | Zexel |
| Injection pressure | 2133 psi<br>147 bar |
| **Fuel requirement** | |
| For fuel requirements, refer to the engine Operator Manual for your engine. | |
| **Alternator output** | 85A @ 12V DC |
| **Fan belt deflection** | 3/8 in<br>10 mm |
| **Starter motor** | |
| Current draw, no load | 140A - 200A |
| Brush length, new | 0.7480 in<br>19 mm |
| Brush length, minimum | 0.5 in<br>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<br>7,3 liters |
| **Coolant temperature switch** | |
| Temperature switch point | 221° F<br>105° C |

# Specifications

## Machine Torque Specifications

| | |
|---|---|
| **Platform rotator** | |
| **1-8 center bolt, GR 5** | |
| Dry | 615 ft-lbs<br>834 Nm |
| **3/8 -16 bolts, GR 8** | |
| Dry<br>*(use blue thread locking compound) | 35 ft-lbs*<br>47.5 Nm* |
| **Turntable rotate assembly** | |
| Rotate bearing mounting bolts, lubricated | 160 ft-lbs<br>217 Nm |
| Drive motor/brake mounting bolts, dry<br>*(use blue thread locking compound) | 49 ft-lbs*<br>66.4 Nm* |
| Drive motor/brake mounting bolts, lubricated | 37 ft-lbs<br>50 Nm |
| **Drive motor and hubs** | |
| Drive hub mounting bolts, dry | 210 ft-lbs<br>284 Nm |
| Drive hub mounting bolts, lubricated | 160 ft-lbs<br>217 Nm |

## Machine Component Weights

| | |
|---|---|
| Primary boom assembly, S-40 XC/HF | 2000 lbs<br>907 kg |
| Primary boom assembly, S-45 XC/HF | 2370 lbs<br>1075 kg |
| Turntable assembly<br>(does not include boom, jib or engine) | 3050 lbs<br>1385 kg |
| Counterweight, S-40 XC/HF | 1750 lbs<br>795 kg |
| Counterweight, S-45 XC/HF | 3250 lbs<br>1475 kg |
| Drive chassis assembly<br>(does not include tire options) | 4200 lbs<br>1905 kg |
| Drive motor and hub | 130 lbs<br>60 kg |
| Engine assembly, max. | 700 lbs<br>318 kg |
| Primary boom lift cylinder | 400 lbs<br>181 kg |
| Primary boom extend cylinder | 275 lbs<br>125 kg |
| Jib boom assembly<br>(does not include platform) | 350 lbs<br>160 kg |
| Jib boom cylinder | 65 lbs<br>30 kg |
| Oscillate cylinder | 35 lbs<br>16 kg |
| Platform, 6 ft / 1,8 m | 275 lbs<br>125 kg |
| Platform, 8 ft / 2,4 m | 315 lbs<br>143 kg |
| Battery | 30 lbs<br>14 kg |

# Specifications

## TraX™ Torque Specifications

| | |
|---|---|
| **Hub adapter to drive hub fasteners** | |
| Lug nut torque, lubricated | 180 ft-lbs<br>244 Nm |
| **Idler and bogey wheel fasteners** | |
| 3/4-10 bolts, GR 8, lubricated | 281 ft-lbs<br>381 Nm |

## Hydraulic Hose and Fitting Torque Specifications

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

### Seal-Lok™ Fittings

(hose end - ORFS)

| SAE Dash Size | Torque |
|---|---|
| -4 | 18 ft-lbs / 25 Nm |
| -6 | 30 ft-lbs / 41 Nm |
| -8 | 40 ft-lbs / 55 Nm |
| -10 | 60 ft-lbs / 81 Nm |
| -12 | 85 ft-lbs / 115 Nm |
| -16 | 110 ft-lbs / 150 Nm |
| -20 | 150 ft-lbs / 205 Nm |
| -24 | 230 ft-lbs / 315 Nm |

### JIC 37° Fittings

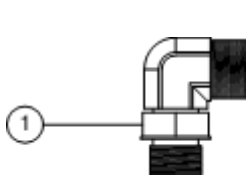
(swivel nut or hose connection)

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

### SAE O-ring Boss Port

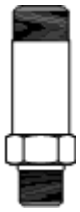
(tube fitting - installed into Aluminum)
(all types)

| SAE Dash Size | Torque |
|---|---|
| -4 | 14 ft-lbs / 19 Nm |
| -6 | 23 ft-lbs / 31,2 Nm |
| -8 | 36 ft-lbs / 49 Nm |
| -10 | 62 ft-lbs / 84 Nm |
| -12 | 84 ft-lbs / 114 Nm |
| -16 | 125 ft-lbs / 169,5 Nm |
| -20 | 151 ft-lbs / 204,7 Nm |
| -24 | 184 ft-lbs / 249,5 Nm |




Adjustable Fitting

1 jam nut



Non-adjustable fitting

### SAE O-ring Boss Port

(tube fitting - installed into Steel)

| SAE Dash Size | | Torque |
|---|---|---|
| -4 | ORFS / 37° (Adj)<br>ORFS (Non-adj)<br>37° (Non-adj) | 15 ft-lbs / 20,3 Nm<br>26 ft-lbs / 35,3 Nm<br>22 ft-lbs / 30 Nm |
| -6 | ORFS (Adj / Non-adj)<br>37° (Adj / Non-adj) | 35 ft-lbs / 47,5 Nm<br>29 ft-lbs / 39,3 Nm |
| -8 | ORFS (Adj / Non-adj)<br>37° (Adj / Non-adj) | 60 ft-lbs / 81,3 Nm<br>52 ft-lbs / 70,5 Nm |
| -10 | ORFS (Adj / Non-adj)<br>37° (Adj / Non-adj) | 100 ft-lbs / 135,6 Nm<br>85 ft-lbs / 115,3 Nm |
| -12 | (All types) | 135 ft-lbs / 183 Nm |
| -16 | (All types) | 200 ft-lbs / 271,2 Nm |
| -20 | (All types) | 250 ft-lbs / 339 Nm |
| -24 | (All types) | 305 ft-lbs / 413,5 Nm |

# Specifications

## Torque Procedure

### Seal-Lok™ fittings

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

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

2 Lubricate the O-ring before installation.

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

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

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

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

### JIC 37° fittings

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

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

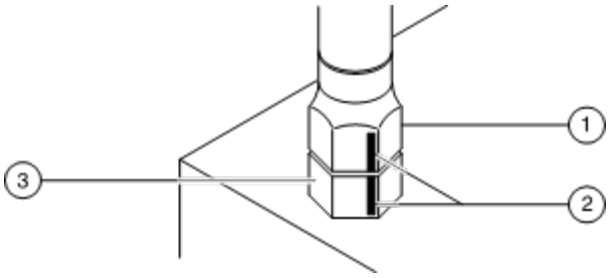



Illustration 1

1 hex nut
2 reference mark
3 body hex fitting

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

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

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

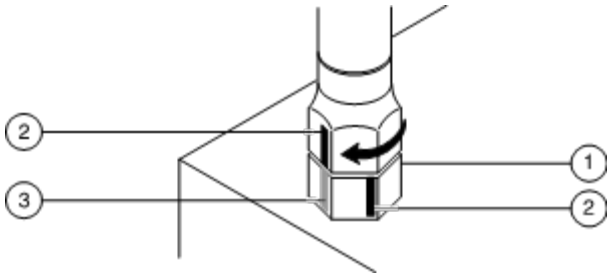



Illustration 2

1 body hex fitting
2 reference mark
3 second mark

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

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

# Repair Procedures



## Observe and Obey:

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

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

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

## Before Repairs Start:

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

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

☑ Use only Genie approved replacement parts.

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

## Machine Configuration:

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

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

## 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.

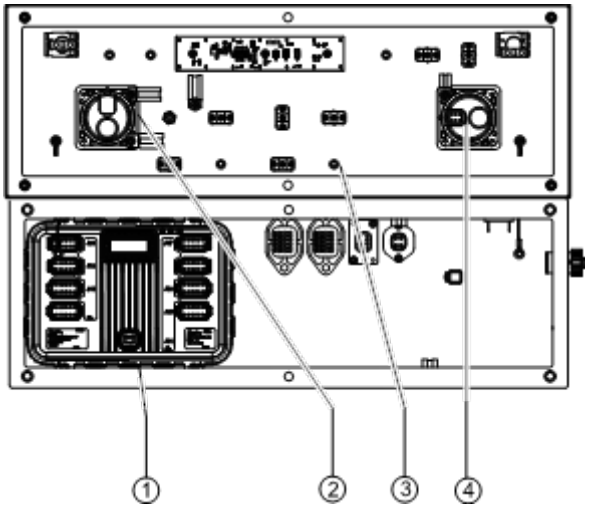
☒ Indicates that an incorrect result has occurred after performing a series of steps.

# Control System

## 1-1 ALC-600 Control Module

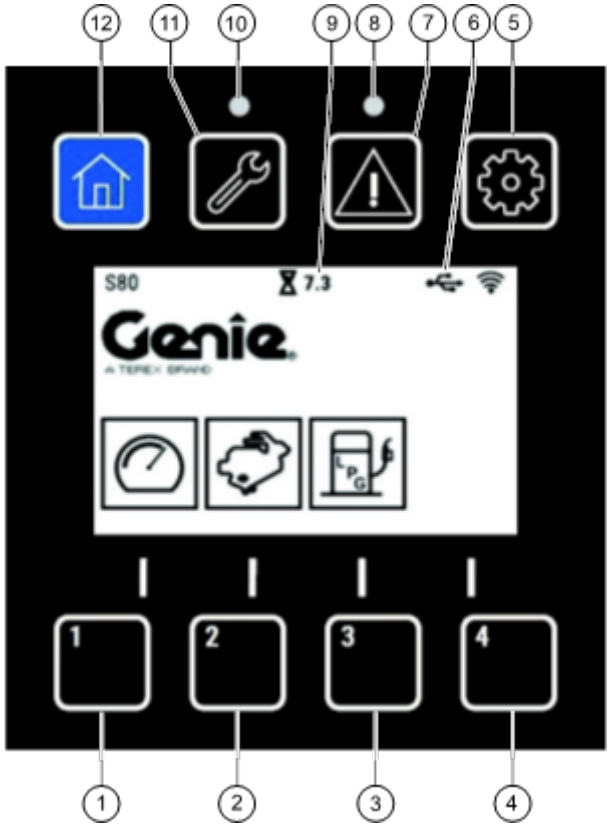
### Platform Controls

The platform control box contains the ALC-600 platform Control Module. The platform Control Module receives all signals from the platform switches, joysticks and foot switch, and provides operator feedback through an Indicator Module. The joystick controllers at the platform controls utilize Hall Effect technology and require no calibration. Automatic calibration of center voltage occurs on power up if the signal value is in the valid range. Each joystick controller should operate smoothly and provide proportional speed control over its entire range of motion. The remaining boom functions operate by on/off toggle switches.




1 ALC-600 platform control module
2 primary boom up/down and turntable rotate left/right joystick controller
3 LED indicator module
4 drive/steer joystick controller

## 1-2 How to Enter ALC-600 Service Mode




ALC-600 Control System Display

1 Number 1 or Escape
2 Number 2 or UP arrow
3 Number 3 or DOWN arrow
4 Number 4 or OK
5 Settings menu
6 USB drive detected
7 Faults menu
8 Fault LED Indicator
9 Engine hours
10 Maintenance LED indicator
11 Maintenance menu
12 Home menu

The Control System on this machine allows access to calibrations through the Service Mode. The procedures that follow will require the operator to be in Service Mode. Service Mode can only be entered at machine start up and requires a special code.

1 Turn the key switch to ground controls.

2 Push and hold buttons numbered **2** and **3** underneath the display screen.

3 Pull out the red Emergency Stop button.

4 You will be prompted for a password. Enter **3 - 3 - 2 - 4**.

5 Press the Gear button to access the settings menu.

Note: There will be a delay while the menu is being loaded on the display screen.

6 The machine will now operate normally and allow the viewing and modification of calibrations and parameters.

Note: When a parameter is changed in Service Mode, the change is effective immediately when button 4 (OK) is pushed. Machine restart is not required. A confirmation beep accompanies every save (button 4).

Note: Pushing in the red Emergency Stop button will exit Service Mode.

Note: If there has been no input for 10 minutes while in Service Mode, the ALC-600 will power down and Service Mode will be exited, unless the engine is running.

# 1-3 Full Machine Calibration

Full machine calibration must be completed in the proper sequence when the ALC-600 controller (TCON) in the ground control box has been replaced.

## How to Fully Calibrate the Machine

Calibration procedures shall only be completed by qualified technicians that have Genie factory service training.

**⚠WARNING** Tip-over hazard. Failure to calibrate the machine in the proper sequence could cause the machine to tip over resulting in death or serious injury.

Note: A digital level will be required to perform this procedure.

Note: Start this procedure with the machine in the fully stowed position.

# Control System

Full machine calibration must be completed in the following sequence:

- Select model, engine, tires, region, platform width and platform level then cycle power. Refer to Repair Section Display Module.
- Turntable level sensor. Refer to Repair Procedure, *How to Calibrate the Turntable Level Sensor*.
- Load cell sensor. Refer to Repair Procedure, *How to Calibrate the Load Cell Sensor.*
- Primary boom angle sensor. Refer to Repair Procedure, *How to Calibrate the Primary Boom Angle Sensor*.
- Primary boom length sensor. Refer to Repair Procedure, *How to Calibrate the Primary Boom Length Sensor*.
- Platform level angle sensor. Refer to Repair Procedure, *How to Calibrate the Platform Angle Level Sensor*.
- Select option configuration. Refer to Repair Section, Display Module, *Options.*

## 1-4 Machine Functions

## How to Adjust the Joystick Maximum Speed Setting

The maximum speed of a joystick controlled machine function can be modified from the ground controls display. Whenever a hydraulic cylinder, drive motor or hydraulic pump is replaced, the maximum speed setting should be adjusted to maintain optimum performance. The maximum speed 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 Enter the Service Mode. See Repair Procedure, *How to Enter the Service Mode*.

2 Press the **SETTINGS** button above the display screen.

3 Select **SPEEDS** from the display screen.

4 Navigate to the desired function's Maximum Speed setting.

5 Select the desired setting to change and press **OK**.

6 In the parameter adjustment screen, use the display buttons to change the parameter. Note that the factory default speed is considered 100% for maximum speeds.

7 Scroll and press **OK**. The change is effective immediately.

8 Start the engine from the ground controls.

9 Start a timer and activate the machine function that needs to be adjusted. Using the ground control functions is the same as asking for full joystick deflection at the platform.

10 Record the time it takes for that function to complete a full cycle (ie; boom up).

11 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.

12 Adjust the parameter in the ground display to achieve the proper function cycle time.

## How to Adjust the Joystick Ramp Rate Setting

The ramp rate setting is an adjustment that controls the way boom functions start and stop. There are two types of ramp rates to adjust on separate menus:

Ramp Up Time -- the amount of time it takes to accelerate to speed.

Ramp Down Time -- the amount of time it takes to decelerate to a stop

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 Enter the Service Mode. See Repair Procedure, *How to Enter the Service Mode*.

2 Press the **SETTINGS** button above the display screen.

3 Select **SPEEDS** from the display screen.

4 Navigate to the desired function's Ramp setting.

5 Select the desired setting to change and press **OK**.

6 In the parameter adjustment screen, use the display buttons to change the parameter. Note that the ramp rate is expressed in seconds to complete the ramp.

7 Scroll and press **OK**. The change is effective immediately.

# Control System

8 Start the engine from the ground controls.

9 Start a timer and activate the machine function that needs to be adjusted. Using the ground control functions is the same as asking for full joystick deflection at the platform.

10 Record the time it takes for that function to complete the ramp.

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

12 Adjust the parameter in the ground display to achieve the proper ramp time.

Note: Refer to Repair Procedure, *Display Module Menus* for ramp rates.

## 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.

The boom function threshold current should be operating at near zero speed, smoothly with no vibrations.

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

1 Enter the Service Mode.

2 Press the **SETTINGS** button above the display screen.

3 Select **SPEEDS** from the display screen.

4 Navigate to the desired function's Threshold setting.

5 Select the desired setting to change and press **OK**.

6 In the parameter adjustment screen, use the display buttons to change the parameter. Note that the factory default speed is considered 100% for threshold values.

7 Scroll and press **OK**. The change is effective immediately.

8 Switch the machine control to platform control and start the engine from the platform controls..

9 Using the joystick, verify that the function engages smoothly and without sudden movement or excessive joystick dead spots.

10 Adjust the parameter in the ground display to achieve a smooth function threshold.

## 1-5
## How to Enter ALC600 Software Update Mode

1 Go to the Genie website https://www.genielift.com/en/support/firmware, select your **Machine Model** and select **Search**.

2 Download the software to a USB flash drive. If zipped, extract the files to the USB flash drive.

3 With the machine off, open the GBOX (ground box) lid and then remove the four Torx head screws securing the Display Controller (DISCON) door and remove the door to expose the USB port.

4 Insert the flash drive into the USB port.

5 Set key switch to ground and pull out the red ground ESTOP while holding buttons 1 and 4.

6 The Display Controller will go into the bootloader mode.

7 Browse and select the desired software. Follow the on-screen guidance to start the update procedure.

8 When complete, turn off machine.

9 Remove USB flash drive, re-install the Display Controller door and close the GBOX (ground box).

10 Power up normally.

11 As the display controller starts, operator shall verify on the start-up screen that the proper software and revision are displayed.

12 Perform a function check.

# Control System

## 1-6
## Display Module Menus

| Screen or Menu | Item | Selection | Default |
|---|---|---|---|
| Display Settings | Backlight | 0 - 100% | |
| | Contrast | 0 - 100% | |
| | Display Inversion | Off • On | Off |
| **Screen or Menu** | **Item** | **Selection** | **Default** |
| Model Configuration | Model | S-40 • S-45 • S-60 • S-65 • S-80 • S-85 • S-60 J • S-80 J | Select Model |
| | Tires | Rough Terrain • High Float • Trax | Select Tires |
| (These are locked unless factory defaults are restored) | Engine | Deutz D 2.9L T4 • Deutz TD 2.9L T4 • Deutz D2.9 CN4 • Deutz TD2.9 CN4 • Deutz TCD 2.2L S5 • Deutz TCD 2.2L T4 • Deutz TD 2.2L S5 • Deutz 2011 L03i • Deutz TD2011 L04i • Deutz D436 • Ford MSG425 EFI • GM 3.0L • Kubota D1105 • Kubota D1803 • Perkins 404D 22 • Perkins 404D 22T • Perkins 404F E22T • Perkins 404F E22TA • Weichai WP3.2 | Select Engine |
| | Region: | ANSI/CSA • AUS • CE | Select Region |
| (Platform configuration is not locked) | Platform Width | Standard Platform<br>4m Platform | Standard Platform |
| | Platform Level | Hydraulic • eLevel | Select Platform Level |
| **Screen or Menu** | **Item** | **Selection** | **Default** |
| Options | Footswitch Timeout | 10 sec • 2 min • 30 min | 2 min |
| Note: Some options may not be visible with earlier software versions. | Drive Priority | Off • On | Off |
| | Drive Cutout | Off • On | Off |
| | Platform Level | **Priority** • Cutout | **Priority** |
| | Generator | No Generator • Generator Installed | No Generator |
| | Contact Alarm | Gen 2 • Gen 1 • Off | Gen 2 |
| | Platform Recirculation | Off • On | Off |
| | Units | US Customary • Metric | US Customary |
| | Aircraft Proximity | Off • On | Off |
| | Fuel Level Sensor | Installed • Not Installed | Installed |
| | Low Fuel Threshold | 10% - 100% | 10% |
| | Alarm Setting | Off • Travel • Motion | Off |
| | Standby RPM | Default • High RPM | Default |
| | Power Save Timeout | 10 min • 30 min • 60 min • 4 hrs • Off | Off |
| | Plat Level Threshold Cal | Off • On | On |
| | China IV | Off • On | Off |
| | White Noise Alarm | Off • On | Off |
| | Turntable Tilt Cutout | Off • On | Off |

| Screen or Menu | Item | Selection |
|---|---|---|
| Sensor Calibration | Chassis Tilt | Select OK to calibrate |
| | Load Sense | Select OK to calibrate |
| | Boom Angle | Select OK to calibrate |
| | Boom Length | Select OK to calibrate |
| | Platform Angle | Select OK to calibrate |
| **Screen or Menu** | **Item** | **Selection** |
| Auto Threshold Calibration | Boom Up / Down Threshold | Select OK to calibrate |
| | Boom Extend / Retract Threshold | Select OK to calibrate |
| **Screen or Menu** | **Item** | **Selection** |
| Drive Speeds XC / HF models | Forward Threshold | 1% - 122% |
| | Reverse Threshold | 1% - 122% |
| | Forward Max | 78% - 150% |
| | Reverse Max | 79% - 150% |
| | Forward Out of Stow Max | 85% - 150% |
| | Reverse Out of Stow Max | 85% - 150% |
| **Screen or Menu** | **Item** | **Selection** |
| Drive Speeds TraX models | Forward Threshold | 1% - 149% |
| | Reverse Threshold | 1% - 152% |
| | Forward Max | 64% - 150% |
| | Reverse Max | 65% - 150% |
| | Forward Out of Stow Max | 76% - 150% |
| | Reverse Out of Stow Max | 75% - 150% |
| **Screen or Menu** | **Item** | **Selection / Default** |
| Drive Ramps | Standard Acceleration | 0.1 - 10 sec / 4 sec |
| | Standard Deceleration | 0.1 - 5 sec / 1 sec |
| | Torque Switching Deceleration | 0.5 - 5 sec / 4 sec |
| **Screen or Menu** | **Item** | **Default** |
| Deutz D 2.9L T4 Anti-Stall | Threshold | 2375 rpm |
| | Drive Minimum | 50% |
| | Range | 125 rpm |
| | Hysteresis | 100 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Deutz D2.9 CN4 Anti-Stall | Threshold | 2375 rpm |
| | Drive Minimum | 60% |
| | Range | 125 rpm |
| | Hysteresis | 100 rpm |

# Control System

| Screen or Menu | Item | Default |
|---|---|---|
| Deutz TD 2.9L T4<br>Anti-Stall<br>XC / HF models | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2375 rpm<br>50%<br>125 rpm<br>100 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Deutz TD 2.9L T4<br>Anti-Stall<br>TraX models | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2060 rpm<br>50%<br>125 rpm<br>125 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Deutz TD 2.2L S5<br>Anti-Stall<br>XC / HF models | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2175 rpm<br>50%<br>125 rpm<br>100 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Deutz TD 2.2L S5<br>Anti-Stall<br>TraX models | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2250 rpm<br>40%<br>440 rpm<br>150 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Deutz D2011<br>Anti-Stall | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2200 rpm<br>60 %<br>700 rpm<br>200 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Deutz TD2011 L04i<br>Anti-Stall | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2100 rpm<br>50%<br>100 rpm<br>125 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Perkins 404D 22<br>Anti-Stall | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2250 rpm<br>75%<br>400 rpm<br>375 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Perkins 404F E22T<br>Anti-Stall<br>XC / HF models | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2375 rpm<br>80%<br>275 rpm<br>100 rpm |

| Screen or Menu | Item | Default |
|---|---|---|
| Perkins 404F E22T<br>Anti-Stall<br>Trax models | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2300 rpm<br>40%<br>275 rpm<br>100 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Ford MSG425<br>Anti-Stall | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2350 rpm<br>80%<br>120 rpm<br>170 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Weichai WP3.2<br>Anti-Stall | Threshold<br>Drive Minimum<br>Range<br>Hysteresis | 2375 rpm<br>50%<br>125 rpm<br>100 rpm |
| **Screen or Menu** | **Item** | **Selection** |
| Primary Lift Speeds | Extend Thresholds<br>Retract Threshold<br>Up Threshold<br>Down Threshold<br>Extend Max<br>Retract Max<br>Up Max<br>Down Max | 1% - 190%<br>1% - 179%<br>1% - 250%<br>1% - 253%<br>68% - 150%<br>70% - 150%<br>63% - 150%<br>63% - 150% |
| **Screen or Menu** | **Item** | **Selection / Default** |
| Primary Lift Ramps | Extend Accelerating Rate<br>Extend Decelerating Rate<br>Retract Accelerating Rate<br>Retract Decelerating Rate<br>Up Accelerating Rate<br>Up Decelerating Rate<br>Down Accelerating Rate<br>Down Decelerating Rate | 1 - 5 sec / 2.5 sec<br>0.25 - 5 sec / 1 sec<br>1 - 5 sec / 2.5 sec<br>0.5 - 5 sec / 1 sec<br>1 - 5 sec / 3 sec<br>0.5 - 5 sec / 3 sec<br>1 - 5 sec / 3 sec<br>1 - 5 sec / 1 sec |
| **Screen or Menu** | **Item** | **Selection** |
| Turntable Speeds | Rotate CW Max<br>Rotate CCW Max<br>Rotate CW Threshold<br>Rotate CCW Threshold<br>CW Out of Stow Max<br>CCW Out of Stow Max | 81% - 150%<br>81% - 150%<br>1% - 114%<br>1% - 114%<br>89% - 150%<br>89% - 150% |

# Control System

| Screen or Menu | Item | Selection / Default |
|---|---|---|
| Turntable Ramps | CW Accelerating | 1 - 10 sec / 3 sec |
| | CW Decelerating | 0.5 - 2 sec / 2 sec |
| | CCW Accelerating | 1 - 10 sec / 3 sec |
| | CCW Decelerating | 0.5 - 2 sec / 2 sec |
| **Screen or Menu** | **Item** | **Selection** |
| Jib Boom and Platform Speeds | Jib Up Threshold | 1% - 112% |
| | Jib Down Threshold | 1% - 118% |
| | Platform Level Up Threshold | 1% - 127% |
| | Platform Level Down Threshold | 1% - 127% |
| | Platform Rotate CW Threshold | 1% - 114% |
| | Platform Rotate CCW Threshold | 1% - 126% |
| | Jib Up Max Output | 90% - 150% |
| | Jib Down Max Output | 87% - 150% |
| | Platform Level Up Max Output | 83% - 150% |
| | Platform Level Down Max Output | 83% - 150% |
| | Platform Rotate CW Max Output | 89% - 150% |
| | Platform Rotate CCW Max Output | 83% - 150% |
| **Screen or Menu** | **Item** | **Selection / Default** |
| Jib Boom and Platform Ramps | Jib Up/Down Ramp | 0.2 - 2 sec / 0.75 sec |
| | Platform Level Ramp | 0.2 - 2 sec / 0.75 sec |
| | Platform Rotate Ramp | 0.2 - 2 sec / 0.6 sec |
| **Screen or Menu** | **Item** | **Selection** |
| Machine Disable Options | Drive Disable | On • Off |
| | Machine Disable | On • Off |
| | Remote Disable | Disable Engine Start • Drive Speed Cripple • Lift Speed Cripple |
| Reset Defaults | | OK to reset Model Configuration and Options |
| Software Update | | OK to enter Software Update Mode |

| Maintenance Menu | Item | Selection / Units |
|---|---|---|
| DISCON - Version | | OK to show DISCON Software version |
| CAN Data Recording | | OK + Up/Down to set On/Off<br>On: Starts recording Machine CAN bus Data<br>Off: Converts and writes log data to USB storage if device is plugged in, or data is lost |
| Real Time Data | Tilt Pitch Op. | deg. |
| | Tilt Roll Op. | deg. |
| | Boom Angle | deg. |
| | Boom Length | in • cm |
| | Platform Angle | deg. |
| | Platform Angle to Target | deg. |
| | Platform Load | lb • kg |
| | Bus Volts | V |
| | Ambient Temperature | F • C |
| | Boom Angle LSxx Status | 0 • 1 |
| | Boom Retracted LSxx Status | 0 • 1 |
| | Drive Enable LST1O | 0 • 1 |
| | Cable Tension LSB2S | 0 • 1 |
| | Tilt Pitch Secondary | deg. |
| | Tilt Roll Secondary | deg. |
| | Boom Angle Secondary | deg. |
| | Boom length Secondary | in • cm |
| | Platform Load Secondary | lb • kg |
| | Platform Angle Secondary | deg. |
| | Lift Connect | VALID DEVICE / INVALID DEVICE / NO_DEVICE |
| Stage V Info<br>Note: Not available in all markets. | | Regen Log<br>Service Regen |
| System Information | | Software Version |
| **Faults Menu** | **Item** | **Default** |
| Active Machine Faults | | List active fault codes and hours meter of occurrence |
| Machine Fault History | | List history fault codes and hours meter of occurrence |
| | Applies to all machine fault codes | OK on a fault code shows short description |
| Active Engine Faults | | List active engine SPN / FMI codes |
| | Applies to all engine fault codes | OK on a fault code shows reference to Engine Fault Codes section of manual |
| Download Fault Log | | OK to confirm writing machine faults log to USB storage device |
| Clear Faults | | OK confirms to clear machine history faults log |

# Control System

## 1-7 How to Replace the Display Controller (DISCON) Module

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

2 Disconnect the negative terminal from the start battery and auxiliary battery, if equipped.

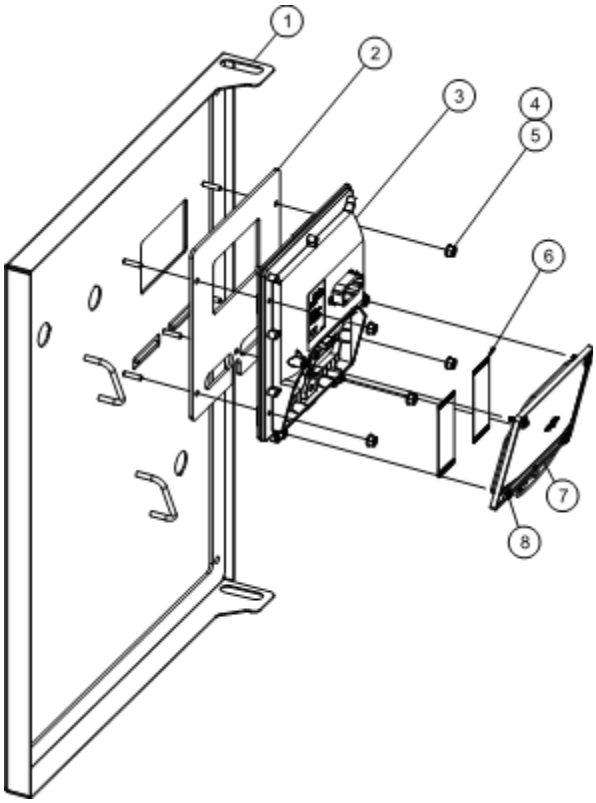



Illustration 1

1 ground box lid
2 DISCON gasket
3 DISCON
4 8/32 nylock nuts
5 #8 flat washers
6 ribbon cable
7 DISCON door
8 Torx head screws

3 Open the ground box lid (1) and disconnect the wire harness going to the display controller (DISCON).

4 Remove the DISCON door from the back by loosening the four Torx head screws (8) and remove the two ribbon cables (6) connecting the ground box overlay to the DISCON.

Note the orientation of the cables for reassembly.

5 Remove the DISCON from the ground control box lid by removing the five hex nuts and washers (4, 5). Discard the nuts and washers.

Note the lanyard attachment point for reassembly.

6 Remove the old DISCON gasket (2) from the ground box lid and clean the lid surface from any dirt, oil or old adhesive residue. Use a 99% solution of isopropyl alcohol to clean the surface. Allow the surface to completely dry.

Note: Both the ground box lid and new gasket must be 70° F / 21° C or higher at the time of application. Application of the new gasket at lower temperatures is not recommended.

7 Peel the adhesive protective film from the back of the new gasket. Carefully line up the new gasket over the ground box lid, making sure the cutouts for the LCD screen, ribbon cables and mounting studs are centered and lining up with the gasket. Apply the new gasket to the ground box lid and work from the center out to eliminate air bubbles and make sure all the gasket edges are securely fixed.

Note: Once applied it is not recommended to lift the gasket and attempt to reposition it.

8 Install the new DISCON onto the ground box lid and fasten it using the new hex nuts and washers. All five fastening points must be used. Attach the DISCON door's lanyard to the DISCON's mounting stud.

9 Evenly tighten the nuts, beginning with the lower center nut, working out and then up.

10 Install the new ribbon cables, connecting the ground box overlay to the DISCON and reinstall the DISCON door, using the Torx head screws removed in step 4. Be sure to fully lock the tabs after the ribbon cables have been fully inserted.

11 Reconnect the wire harness going to the DISCON, then close and fasten the ground box lid.

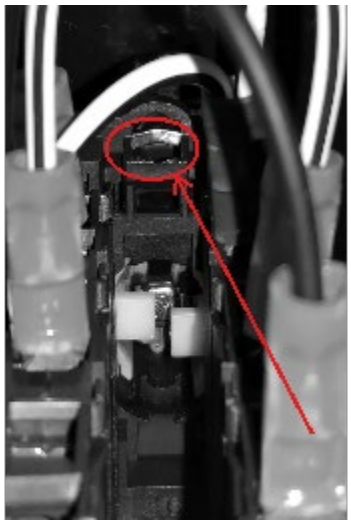
12 Reconnect the negative terminal to the start battery and auxiliary batteries, if equipped.

## 1-8 How to Replace the Ground Box Control Overlay

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

2 Disconnect the negative terminal from the start battery and auxiliary battery, if equipped.

3 Open the ground control box and remove the switch contacts from the function enable switch, key switch and the red emergency stop button. Do not disconnect the wires. Insert a small screwdriver into the loop at the base of the contacts and engage the release mechanism.



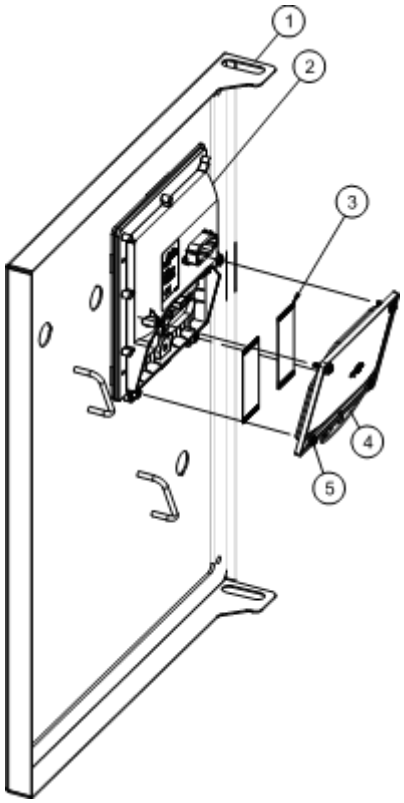
# Control System

4 Unscrew the nut holding the buttons and key switch and remove the key switch and buttons.

Note the orientation of the key switch so it can be reassembled in the same position.

5 Disconnect the wire harness connected to the DISCON and cut the zip ties securing the harness to the ground box lid. Do not remove the wire harness from the ground box.

6 Remove the DISCON door (4) and disconnect the ribbon cables (3) from the Display Controller (DISCON) (2). Note the orientation of the cables for reassembling.




1 ground box lid
2 DISCON
3 ribbon cables
4 DISCON door
5 Torx head screws

7 Remove the ground box lid (1) from the ground box.

8 Remove the old overlay and clean the ground box lid surface from any dirt, oils or old adhesive residue. Clean the lid with 99% isopropyl alcohol. Allow the surface to completely dry.

9 Before placing the new overlay, make sure the temperature of the lid and overlay is between 80-100° F / 26-38° C. Application below 80° F / 26° C is not recommended.

10 Peel the adhesive protective film from the back of the overlay. Carefully align the overlay, making sure the LCD screen cutout, push buttons and key switch are centered. Apply the overlay to the ground box, applying pressure evenly to eliminate any air bubbles.

Note: Pay particular attention to the outside edges, the LCD cutout edges and the area around the ribbon cables, making sure there is complete contact between the overlay and the ground box.

Note: It is not recommended peeling and reapplying the overlay, so take time to align the overlay before making contact with the ground box.

11 Maintain the temperature of 80-100° F / 26-38° C for a minimum of 20 minutes to allow the adhesive to cure.

12 Install the provided ribbon cables, first to the overlay and then the DISCON. Be sure the connectors are applied evenly in the sockets and the tabs are fully locked.

13 Reinstall the DISCON door using the Torx head screws (5). Tighten, but do not overtighten.

14 Reinstall the ground box door to the ground box, using the fasteners removed in step 7. Tighten the fasteners securely.

15 Reinstall the E-Stop button, function enable button and key switch and the contact assemblies.

16 Reinstall the wire harness from the ground box to the DISCON. Secure the harness to the ground box lid using zip ties.

17 Close and fasten the ground box lid.

18 Reconnect the negative terminal to the start battery and auxiliary batteries, if equipped.

# Platform Components

## 2-1 Platform Leveling Cylinder

The leveling cylinder and the rotator pivot are the two primary supports for the platform. The leveling cylinder keeps the platform level through the entire range of boom motion. The leveling cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

### How to Remove the Platform Leveling Cylinder

Note: When removing a hose assembly or fitting, the O-ring (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 leveling cylinder barrel-end pivot pin is accessible.

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

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

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

4 Remove the pin retaining fastener from the cylinder rod-end pivot pin. Use a soft metal drift to drive the rod-end pivot pin out.

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

5 Remove the external snap rings from the barrel-end pivot pin.

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

7 Carefully pull the cylinder out of the primary boom to access the hydraulic hoses.

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

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

### How to Bleed the Platform Leveling Cylinder

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

1 Raise the jib boom to a horizontal position.

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

## 2-2
## Platform Rotator

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

## How to Remove the Platform Rotator

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

Note: When removing a hose assembly or fitting, the O-ring (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. Refer to Repair Procedure, *How to Remove the Platform.*

Note: If the load cell components are disassembled and/or removed from the platform support, the platform overload system will need to be calibrated. Refer to Repair Procedure, *Platform Overload System.*

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

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

**S-45 XC**:

3 Support the jib boom leveling arms and the platform mounting weldment with an appropriate lifting device. Do not apply any lifting pressure.

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

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

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

# Platform Components

**S-40 XC:**

6 Support the rod end of the platform level cylinder.

7 Remove the pivot pin retaining fasteners from both the slave cylinder rod-end pivot pin and the rotator pivot pin.

8 Use a soft metal drift to remove both pivot pins. Remove the platform rotator from the machine.

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

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

9 Lower the jib boom leveling arms.

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

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

**S-45 XC:**

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

11 Support the jib boom leveling arms.

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

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

13 Lower the jib boom leveling arms.

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

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.

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.

# Platform Components

## 2-3 Platform Overload System

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

## How to Perform a Zero Load Platform Calibration

Perform this procedure when platform overload is not operating within the calibration parameters. This procedure will re-calibrate the zero load point without affecting a previous full load calibration. In most cases the machine will maintain full load capacity, however, in some situations the platform load capacity may be reduced until a full load calibration has been performed.

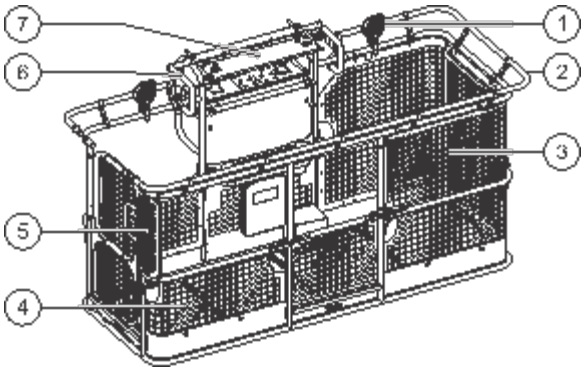
Note: Perform this procedure on a firm, level surface with the machine in the stowed position.

1 Fully retract and lower the boom. Level the platform.

2 Remove all weight, tools, accessories and equipment from the platform.

Note: Options and accessories that are considered integrated components of the platform do not require removal to perform calibration. Refer to *Integrated Options and Accessories*.

**⚠ DANGER** Tip-over hazard. Failure to remove all non-integrated factory and non-factory options and accessories could result in the machine tipping over, causing death or serious injury.




**Integrated Options and Accessories**

1 platform work lights
2 auxiliary top rail
3 platform full height mesh
4 platform half height mesh
5 swing gate latch guard
6 Contact alarm
7 control box cover

3 Enter Service Mode. Refer to Repair Procedure, *How to Enter the Service Mode*.

4 Press the settings button above the display and select the Calibrations menu.

5 Navigate to the Sensor calibration screen.

6 Navigate to the Load Sense calibration screen.

7 Select and start the calibration procedure.

8 Follow the on-screen prompts to set the zero load.

9 Follow the prompts to accept the weight.

10 Calibration is now complete.

11 Exit Service Mode.

## How to Perform a Full Load Platform Calibration

Perform this procedure if the platform support or load cell sensor has been replaced, or if a zero load platform calibration does not return the machine to full load capacity.

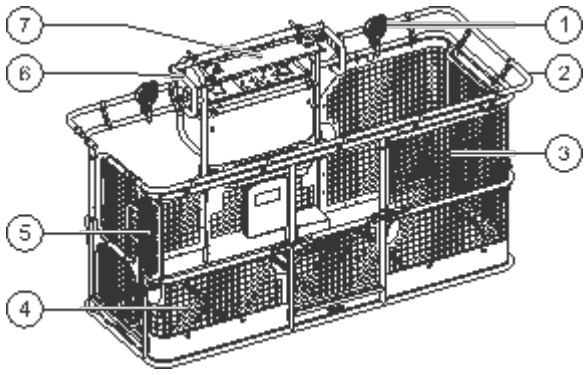
Note: Perform this procedure on a firm, level surface with the machine in the stowed position.

1 Fully retract and lower the boom. Level the platform.

2 Remove all weight, tools, accessories and equipment from the platform.

Note: Options and accessories that are considered integrated components of the platform do not require removal to perform calibration. Refer to *Integrated Options and Accessories*.

**⚠ DANGER** Tip-over hazard. Failure to remove all non-integrated factory and non-factory options and accessories could result in the machine tipping over, causing death or serious injury.




**Integrated Options and Accessories**

1 platform work lights
2 auxiliary top rail
3 platform full height mesh
4 platform half height mesh
5 swing gate latch guard
6 contact alarm
7 control box cover

3 Enter Service Mode. Refer to Repair Procedure, *How to Enter the Service Mode*.

4 Press the settings button above the display and select the Calibrations menu.

5 Navigate to the Sensor calibration screen.

6 Navigate to the Load Sense calibration screen.

7 Select and start the calibration procedure.

8 Follow the on-screen prompts to set the zero load.

9 Continue with the on screen prompts to set the maximum load.

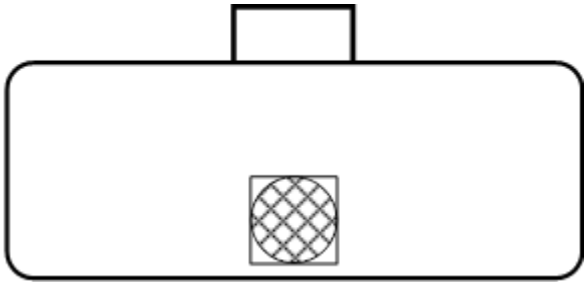
# Platform Components

10 Place a test weight on the platform floor using a suitable lifting device. Place the weight near the center entry point of the platform, as far away from the operator controls as possible.

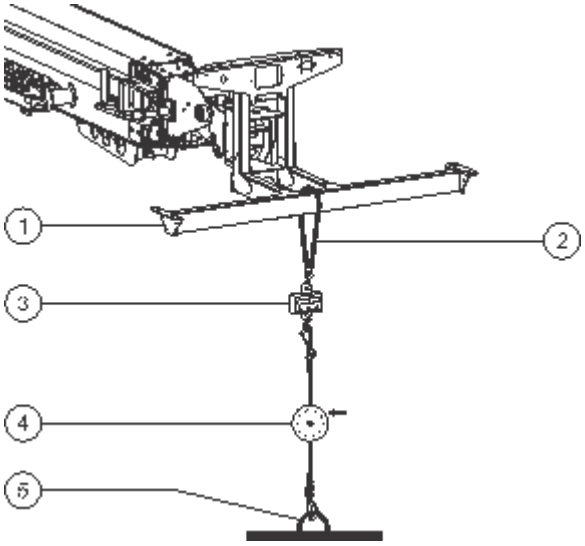
XC models = 1,000 lbs / 454 kg

HF models = 600 lbs / 272 kg

Note: If test weights are not available, you may use an industrial scale to weigh available objects until it equals the platform's maximum capacity.



Note: Alternate method for achieving rated load in the platform is to attach a hanging scale to the bottom of the platform and apply load using a winch or chain hoist until the readout displays the appropriate weight.




Platform hidden from illustration for clarity

1 platform support
2 hanging scale
3 winch or chain hoist
4 anchoring device

11 Follow the prompts to accept the weight.

12 Calibration is now complete.

13 Exit Service Mode.

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

**Confirm calibration:**

15 Start the engine from the ground controls.

16 Add an additional 50 lbs / 23 kg of weight or load to the platform.

⊙ Result: The alarm sounds. The engine turns off. The platform overload indicator light flashes at the platform controls and *Platform Overload* is displayed on the LCD screen at the ground controls.

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

17 Test all machine functions from the ground controls.

⊙ Result: Engine does not start. Limited APU functionality. Elevate and extend functions do not operate.

18 Remove the weight or rated load from the platform.

## How to Replace the Load Cell Sensor

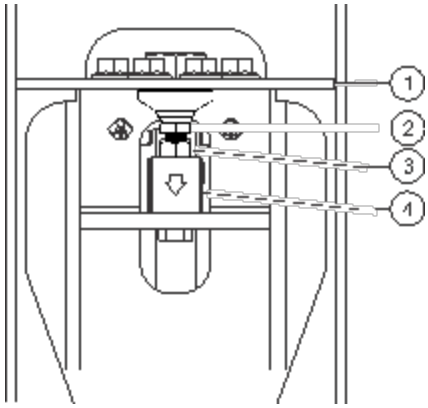
Note: The preload adjustment should only be performed after the load cell sensor has been replaced.

1 Remove all equipment or tools from the platform. Remove the welder if equipped.

2 At the platform, remove the plastic instruction holder from the document mount plate.

3 Tag and disconnect the load cell sensor harness.

4 Loosen the jam nut securing the load cell sensor foot and rotate the foot screw clockwise to remove the preload.




1 flex plate
2 load cell sensor foot
3 jam nut
4 load cell sensor

5 Remove the fasteners securing the load cell sensor and remove the sensor.

**Install the new Load Cell Sensor**

6 Screw the foot with jam nut into the top of the load cell sensor until the foot bolt extends out of the bottom of the sensor.The foot should not contact the flex plate when assembling onto the platform support.

7 Assemble the load cell and foot assembly to the platform and securely tighten the two mounting screws. Torque the bolts to 101 ft-lbs / 137 Nm.

**Set the Load Cell Sensor Preload**

8 Rotate the foot screw counter clockwise until the foot just contacts the flex plate (finger tight).

9 Using an open end wrench, continue to rotate the foot counter clockwise an additional 1/2 turn (180°). Then, while holding the foot bolt, securely tighten the jam nut. Torque the jam nut to 55 ft-lbs / 75 Nm.

10 Attach the load cell sensor harness.

11 Install the plastic instruction holder.

12 Calibrate the platform overload system. Refer to, *How to Perform a Full Load Platform Calibration.*

# Platform Components

## 2-4 Platform

## How to Remove the Platform

1 Remove the cable clamp from the top of the platform mounting weldment.

2 Remove the mounting fasteners from the power to platform outlet box bracket. Lay the outlet box and bracket assembly off to the side. Do not disconnect the wiring.

3 Remove the foot switch mounting fasteners.

4 Remove the cover plate from the bottom of the foot switch to access the foot switch wire terminals.

5 Tag and disconnect the foot switch wiring from the foot switch. Remove the cable from the back of the platform.

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

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

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

Note: If your machine is equipped with an airline to platform option, the airline must be disconnected from the platform before removal.

7 Support and secure the platform to an appropriate lifting device.

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

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

## 2-5
## Platform Level Sensor

The platform angle sensor is used to limit the angle of the platform relative to the angle of the primary boom. If a platform level sensor is replaced, it must be calibrated prior to machine operation.

## How to Calibrate the Platform Level Sensor

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

Note: Perform this procedure with all weight, tools, equipment and personnel removed from the platform.

Note: The turntable level sensor, load cell sensor, primary boom angle sensor and primary boom length sensor must be calibrated prior to calibrating the platform level sensor.

Note: Once calibration has started do not shut down power until calibration is complete to avoid corrupting the initial sensor setup process.

1 Raise the primary boom to a horizontal position.

2 Enter Service Mode. Refer to Repair Procedure, *How to Enter the Service Mode*.

3 Press the settings button above the display and select the Calibrations menu.

4 Start the engine from the ground controls.

5 When prompted, press and hold the function enable button and the platform down button until the display indicates that the lower calibration point has been obtained.

Note: This may require holding the buttons for several seconds after the platform has reached its lowest point.

6 Press OK on the display.

7 Press and hold the function enable button and the platform up button until the display indicates that the upper calibration point has been obtained.

Note: This may require holding the buttons for several seconds after the platform has reached its highest point.

8 Press OK on the display.

9 Exit Service Mode.

# Jib Boom Components

## 3-1
## Jib Boom

### How to Remove the Jib Boom

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

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

1 Remove the platform.

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

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

**⚠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 support.

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

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

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

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

9 Attach a lifting strap from an overhead supporting device to the jib boom.

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

11 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.

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

13 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 lifting device.

14 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 lifting device.

# 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 lifting device.

7 Attach a lifting strap from an overhead lifting device 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 lifting device.

# Primary Boom Components

## 4-1
## Cable Track

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

### How to 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 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 and pins 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.

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

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

9 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 1.5 ton / 1500 kg overhead lifting device 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 fasteners from the limit switch mounted to the turntable riser at the pivot end of the boom. Do not disconnect the wiring.

7 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.

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

9 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.

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

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

12 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 suitable lifting device.

## 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 supporting device 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.

**⚠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 lifting strap will need to be adjusted for proper balancing.

# Primary Boom Components

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 lifting strap will need to be adjusted for proper balancing.

12 Remove and label the wear pads from 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 1.5 ton / 1500 kg overhead supporting device to the primary boom for support.

4 Raise the primary boom with the overhead supporting device slightly to take 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 supporting 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, 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 Primary Boom Angle Sensor

The primary boom angle sensor is used to limit the angle of the primary boom relative to the angle of the turntable and gravity.

### How to Calibrate the Primary Boom Angle Sensor

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

Note: The turntable level sensor and platform load sensor must be calibrated prior to calibrating the primary boom angle sensor.

Note: This procedure will establish the cross-check angle with the boom limit switch LST3S. If LST3S does not switch its state properly during the calibration, the calibration will be invalidated.

1 Fully retract and lower the boom. Ensure the boom is in contact with the boom rest pad.

2 Enter Service Mode. Refer to Repair Procedure, *How to Enter the Service Mode*.

3 Press the settings button above the display and navigate to the Sensor Calibrations menu.

4 Navigate to the Boom Angle Sensor calibration screen.

5 Select and start the calibration procedure.

6 Start the engine.

7 When the display prompts the operator to lower the boom, press and hold the function enable button and the boom down buttons until the display indicates that the lower calibration point has been obtained. This may require holding the buttons for several seconds after the boom has touched the rest pad.

# Primary Boom Components

8 Press **OK** on the display to continue with the procedure to capture the maximum angle point.

9 Operate the boom up function until the boom reaches its maximum angle. Continue holding the function enable and boom up buttons for several seconds until the display indicates that the upper calibration point has been obtained. This may require holding the buttons for several seconds after the boom reaches its maximum angle.

10 Follow the on-screen prompts to lower the boom until the display indicates the calibration is complete. If this step isn't done, the boom will be in the safety envelope when the calibration procedure ends

11 The calibration is now complete.

12 Exit the Service Mode.

## 4-6
## Boom Length Sensor

### How to Calibrate the Primary Boom Length Sensor

Note: The turntable level sensor, platform load sensor and primary boom angle sensor must be calibrated before calibrating the boom length sensor.

Note: This procedure will establish the cross-check angle with the boom limit switch LSB1RS. If LSB1RS does not switch its state properly during calibration, the calibration will be invalidated.

1 Fully retract the boom. Ensure the boom angle is above 65°.

2 Enter Service Mode. See Repair Procedure, *How to Enter Service Mode*.

3 Press the settings button above the display and navigate to Sensor Calibrations.

4 Navigate to the Boom Length Sensor calibration screen.

5 Select and start the calibration procedure.

6 Start the engine.

7 When the display prompts the operator to retract the boom, press and hold the function enable and boom retract buttons until the display indicates the retracted calibration point has been obtained. This may require holding the buttons for several seconds after the boom has fully retracted.

8 Press the **OK** button to continue to capture the maximum extension point.

9 Press the function enable and boom extend buttons until the boom reaches its maximum extension. Continue holding the buttons for several seconds after the boom reaches its maximum extension until the display indicates the calibration point has been captured.

10 The calibration is complete.

Exit the Service Mode.

## 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.

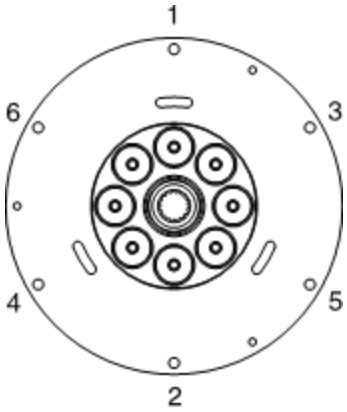
2 Apply Loctite® removable thread sealant to the flex plate fasteners and loosely install the fasteners.

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.

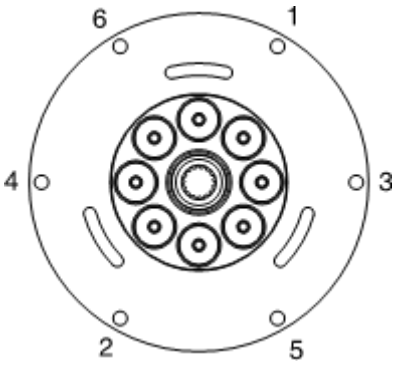
**Ford and Perkins models:** Torque the flex plate mounting bolts in sequence to 14 ft-lbs / 19 Nm. Then torque the flex plate mounting bolts in sequence to 20 ft-lbs / 27 Nm.

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

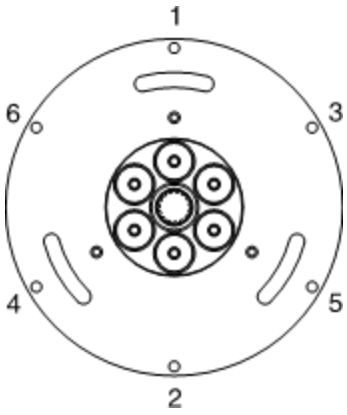
| Grease Specification |
| --- |
| Shell Alvania® Grease CG, NLGI 0/1 or equivalent. |




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 model**s: 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**.**

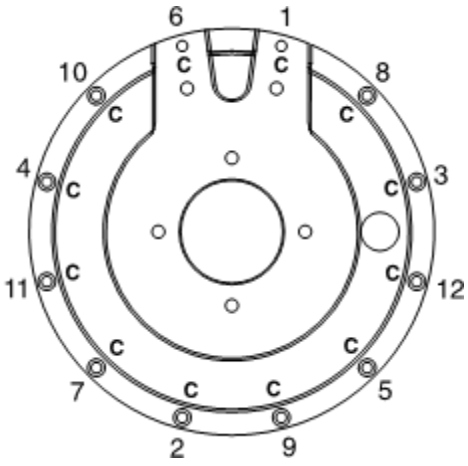
**Perkins mode**ls: Torque the bell housing mounting bolts labeled "B" in sequence to 28 ft-lbs / 38 Nm and the mounting bolts labeled "A" to 49 ft-lbs / 66 Nm. Then torque the bell housing mounting bolts labeled "B" in sequence to 40 ft-lbs / 54 Nm and the mounting bolts labeled "A" to 70 ft-lbs / 95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

**NOTICE**

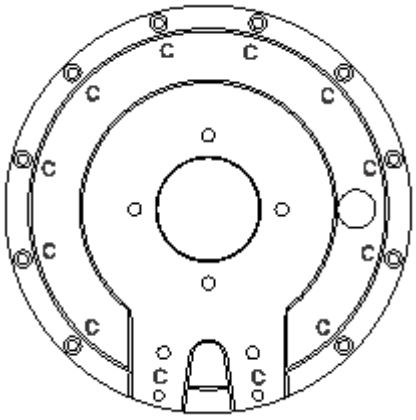
Component damage hazard. When installing the pump, do not force the pump coupler into the flexplate or damage to the pump shaft seal may occur.

**NOTICE**

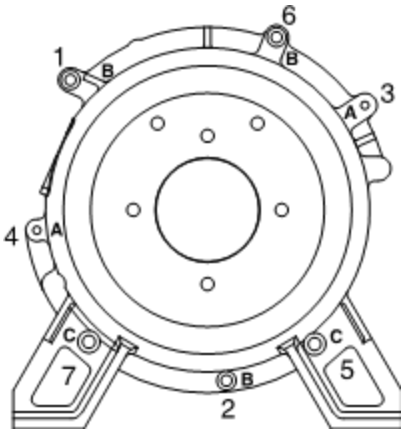
Component damage hazard. Do not force the drive pump during installation or the flex plate teeth may become damaged.



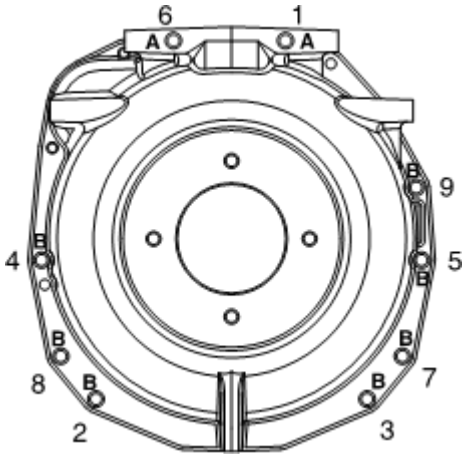

**Deutz Models** D2011L03i




**Deutz Models** D 2.9 L4, TD 2.2 L3




**Ford Models**




**Perkins Models**

## 5-4 Diesel Particle Filter Regeneration - Deutz TD 2.2 L3 Engine

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

### Passive regeneration:

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

### Standstill regeneration:

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

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

### Service regeneration:

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

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

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

# Hydraulic Pump

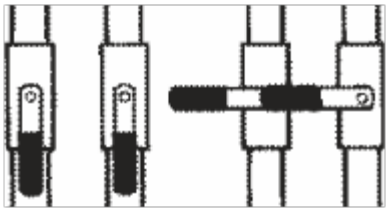
## 6-1
## Function Pump

### 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.

## 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

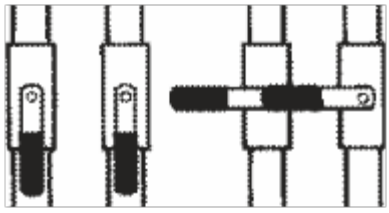
**NOTICE** Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system and cause severe component damage. Dealer service is recommended.

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.

# Hydraulic Pump

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.

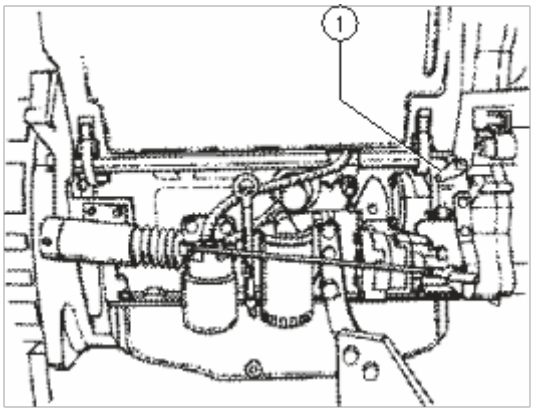
## How to Prime the Drive Pump

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.

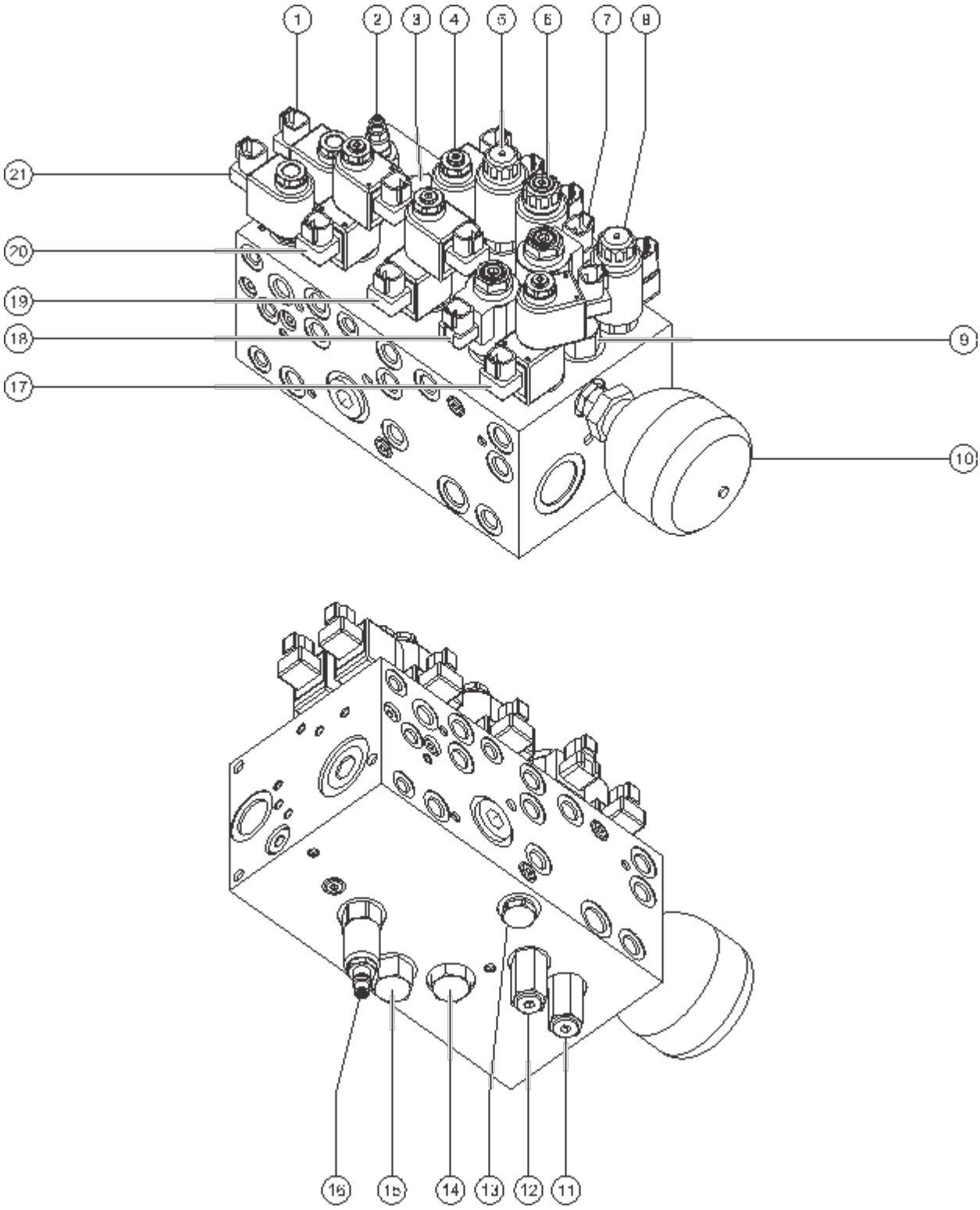
5 Start the engine from the ground controls and check for hydraulic leaks.

# 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 | Solenoid Valve, 2 position 3 way | AS | Brake release | 26-30 ft-lbs / 35-40 Nm |
| 2 | Pressure reducing valve 650 psi / 45 bar | BC | Oscillate circuit | 33-37 ft-lbs / 45-50 Nm |
| 3 | Flow control valve | JJ | Turntable rotate | 20-25 ft-lbs / 27-34 Nm |
| 4 | Solenoid valve, 2 position 2 way | A | Enables function pumps to provide hydraulic pressure for all boom and steer/axle functions | 26-30 ft-lbs / 35-40 Nm |
| 5 | Proportional solenoid valve | G | Turntable rotate | 20-25 ft-lbs / 27-34 Nm |
| 6 | Proportional solenoid valve | C | Primary boom extend/retract | 33-37 ft-lbs / 45-50 Nm |
| 7 | Solenoid valve, 2 position 2 way | E | Primary boom retract | 33-37 ft-lbs / 45-50 Nm |
| 8 | Proportional relief valve | R | Primary boom up/down | 20-25 ft-lbs / 27-34 Nm |
| 9 | Pressure compensator valve | AM | Primary boom up/down circuit, regulates pressure drop across primary boom up/down proportional valve | 30-35 ft-lbs / 41-47 Nm |
| 10 | Accumulator | ACC | Primary boom down | 60 ft-lbs / 81 Nm |
| 11 | Relief valve 3200 psi / 221 bar | B | System relief valve pressure, maximum | 20-25 ft-lbs / 27-34 Nm |
| 12 | Relief valve 1950 psi / 134 bar | CC | Primary boom extend relief pressure | 20-25 ft-lbs / 27-34 Nm |
| 13 | Check valve, 30 psi / 2 bar | LL | Blocks flow to platform manifold | 20-25 ft-lbs / 27-34 Nm |
| 14 | Pressure compensator valve | D | Primary boom up/down circuit, regulates pressure drop across primary boom up/down proportional valve | 50-55 ft-lbs / 68-75 Nm |
| 15 | Pressure compensator valve | H | Turntable rotate circuit, regulates pressure drop across turntable rotate proportional valve | 30-35 ft-lbs / 41-47 Nm |

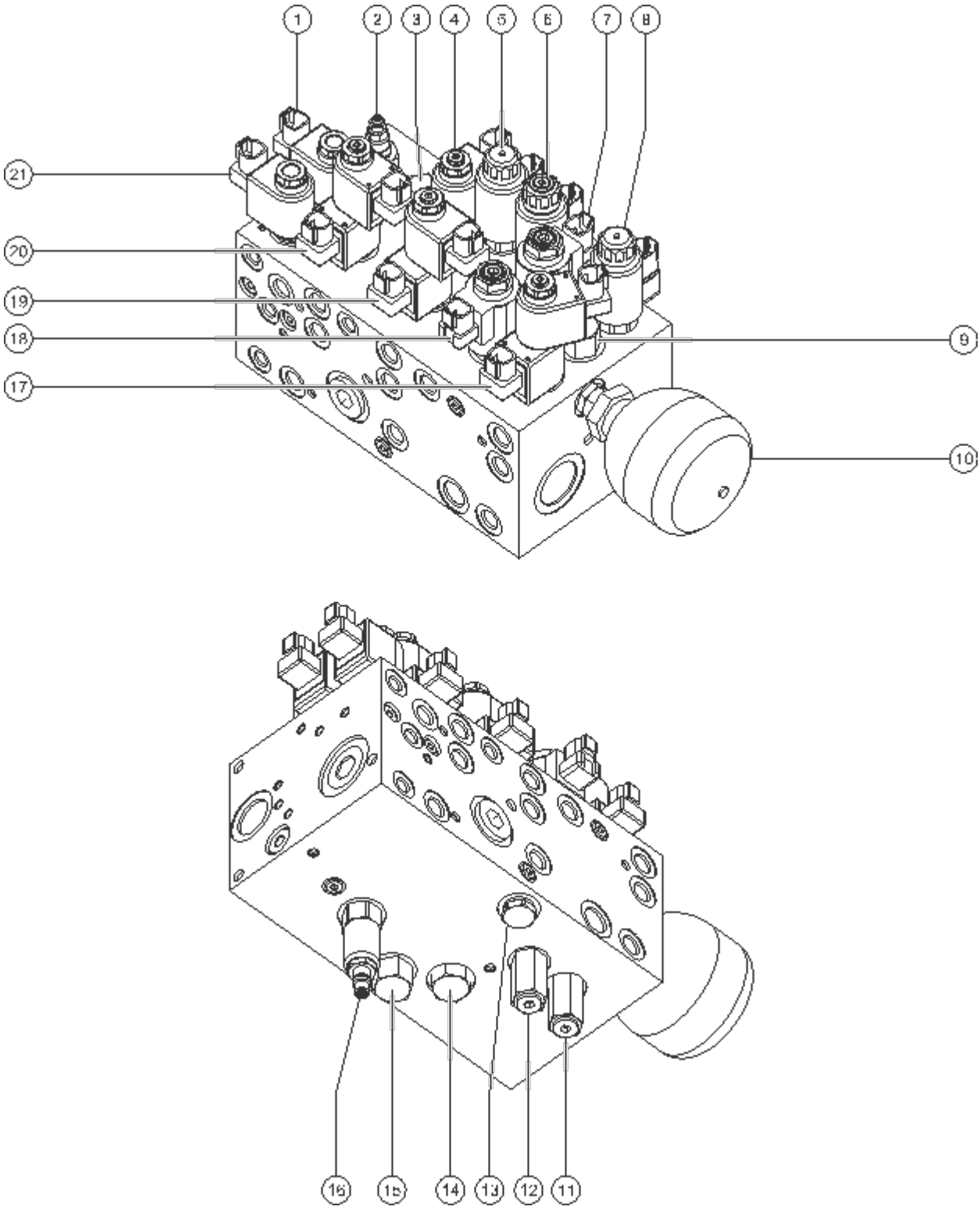
# Manifolds



## Function Manifold Components, continued

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 16 | Sequence valve 850 psi / 59 bar | AR | Oscillate circuit | 30-35 ft-lbs / 41-47 Nm |
| 17 | Solenoid valve, 3 position 4 way | J | Primary boom up/down | 26-30 ft-lbs / 35-40 Nm |
| 18 | Solenoid valve, 2 position 2 way | F | Primary boom extend | 33-37 ft-lbs / 45-50 Nm |
| 19 | Solenoid valve, 3 position 4 way | K | Turntable rotate left/right | 26-30 ft-lbs / 35-40 Nm |
| 20 | Solenoid valve, 3 position 4 way | KK | Steer left/right | 26-30 ft-lbs / 35-40 Nm |
| 21 | Solenoid Valve, 2 position 3 way | AH | 2-speed motor shift | 33-37 ft-lbs / 45-50 Nm |

# Manifolds



# 7-2 Valve Adjustments - Function Manifold

## How to Adjust the System Relief Valve

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

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

Note: Auxiliary power will be used to perform this procedure. Do not start the engine.

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the diagnostic nipple (P-TP) located on the function manifold.

2 Simultaneously activate and hold the auxiliary power button and the primary boom retract button with the primary boom fully retracted. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Specifications*.

3 Locate the system relief valve on the function manifold. Use a wrench to hold the relief valve and remove the cap.

4 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.

5 Repeat step 2 to confirm relief valve pressure.

6 Remove the pressure gauge.

## How to Adjust the Boom Extend Relief Valve

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

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

1 From the ground controls, start the engine and raise the boom to the horizontal position.

2 Fully extend the boom. Turn the engine off.

3 Connect a 0 to 3000 psi / 0 to 200 bar pressure gauge to the diagnostic nipple (PBE-TP) located on the function manifold.

4 Simultaneously activate and hold the auxiliary power button and the primary boom extend button with the boom fully extended. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Specifications*.

5 Locate the boom extend relief valve on the function manifold. 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 step 4 to confirm relief valve pressure.

8 Remove the pressure gauge.

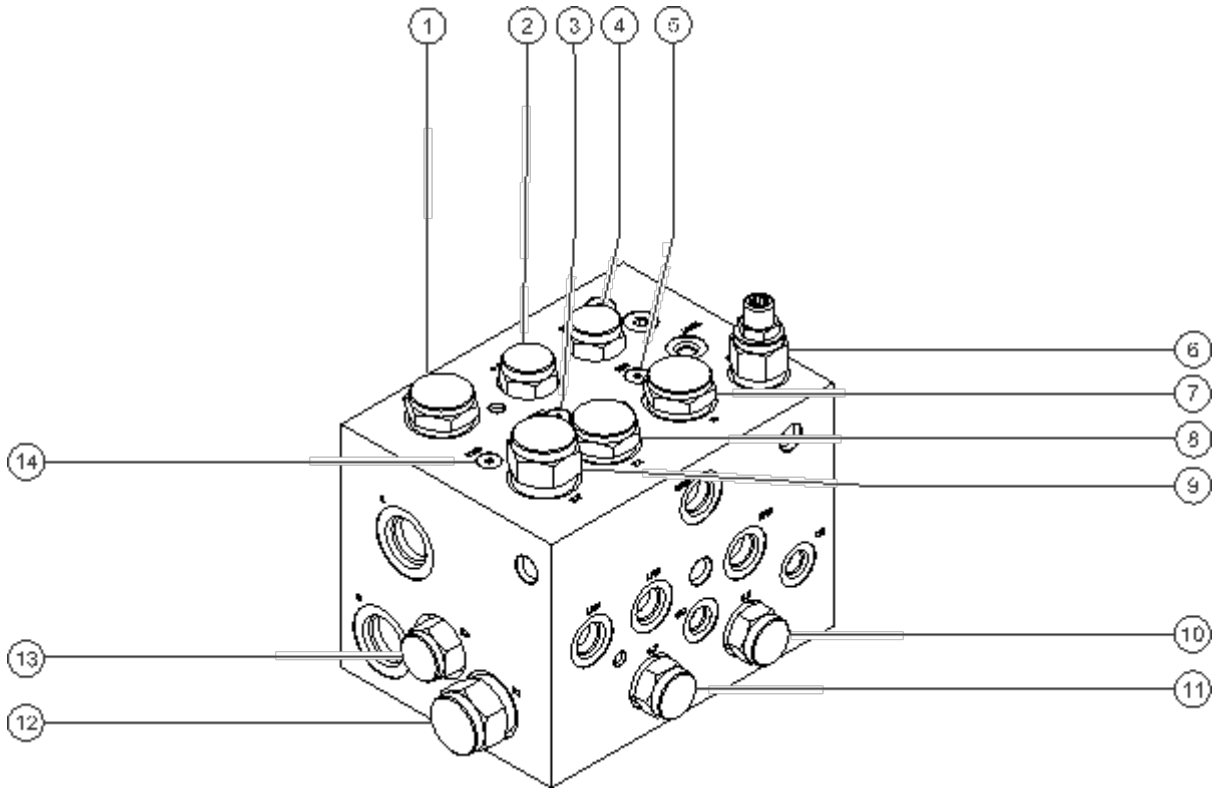
# Manifolds

## 7-3
## Traction Manifold Components

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 | DK | Divides flow between diagonal pairs of motors: LF+RR=50%, LR+RF=50% | 80-90 ft-lbs / 108-122 Nm |
| 2 | Check valve, 5 psi / 0,34 bar | DC | Prevents cavitation in LF motor | 35-40 ft-lbs / 14-16 Nm |
| 3 | Orifice, 0.040 inch / 1 mm | DA | Prevents scrub at high steer angles by allowing some bypass flow around the left flow divider | |
| 4 | Check valve, 5 psi / 0,34 bar | DF | Prevents cavitation in RF motor | 35-40 ft-lbs / 14-16 Nm |
| 5 | Orifice, 0.040 inch / 1 mm | DN | Prevents scrub at high steer angles by allowing some bypass flow around the left flow divider | |
| 6 | Relief valve, 280 psi / 19,3 bar | DI | Hot oil shuttle relief | 35-40 ft-lbs / 14-16 Nm |
| 7 | Flow divider/combiner valve, 24 gpm / 91 L/min | DM | Combines return flow from RF and RR motors | 80-90 ft-lbs / 108-122 Nm |
| 8 | Flow divider/combiner valve, 24 gpm / 91 L/min | DB | Combines return flow from LF and LR motors | 80-90 ft-lbs / 108-122 Nm |
| 9 | Check valve | DD | Prevents cavitation in LF and RR motors | 60-70 ft-lbs / 81-95 Nm |
| 10 | Check valve, 5 psi / 0,34 bar | DH | Prevents cavitation in RR motor | 35-40 ft-lbs / 14-16 Nm |
| 11 | Check valve, 5 psi / 0,34 bar | DE | Prevents cavitation in LR motor | 35-40 ft-lbs / 14-16 Nm |
| 12 | Check valve | DG | Prevents cavitation in RF and LR motors | 60-70 ft-lbs / 81-95 Nm |
| 13 | Shuttle valve, fixed | DJ | Directs oil from low pressure side to hot oil relief valve | 80-90 ft-lbs / 108-122 Nm |
| 14 | Orifice, 0.40 inch / 1 mm | DL | Prevents scrub at high steer angles by allowing some bypass flow around the left flow divider | |

# Manifolds



# Manifolds

## 7-4
## Valve Adjustments - Traction Manifold

### How to Adjust the Charge Pressure Relief Valve

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

2 Hold the charge pressure relief valve located on the traction manifold and loosen the jam nut.

3 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 Hold the charge pressure relief valve and loosen the jam nut.

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.

# 7-5 Valve Adjustments - Oscillate Relief Valve

## How to Adjust the Oscillate Relief Valve

1 Connect a 0 to 1500 psi / 0 to 100 bar pressure gauge to the diagnostic nipple located on the OSC-TEST port on the function manifold.

2 Start the engine from the Ground Control box and press the enable button.

3 Continue pressing the enable button and observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Specifications*.

4 Loosen the nut of the pressure reducing valve on the function manifold.

5 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 pressure reducing valve higher than specified.

6 Repeat step 3 to confirm the valve pressure.

7 Turn the engine off, remove the pressure gauge.

## 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 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 Disconnect the directional valve linkage from the axle.

5 To level the drive chassis, start the engine and use a floor jack to raise the right or left side of the steer axle until the drive chassis is level.

**Example:** Standing at the non-steer end of the machine, if the drive chassis is leaning to the left, jack up the right side of the steer axle.

6 Verify the drive chassis is level to the working surface.

# Manifolds

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

⊙ Result: The gap is between 0.15 to 0.17 inches / 3,8 to 4,3 mm.

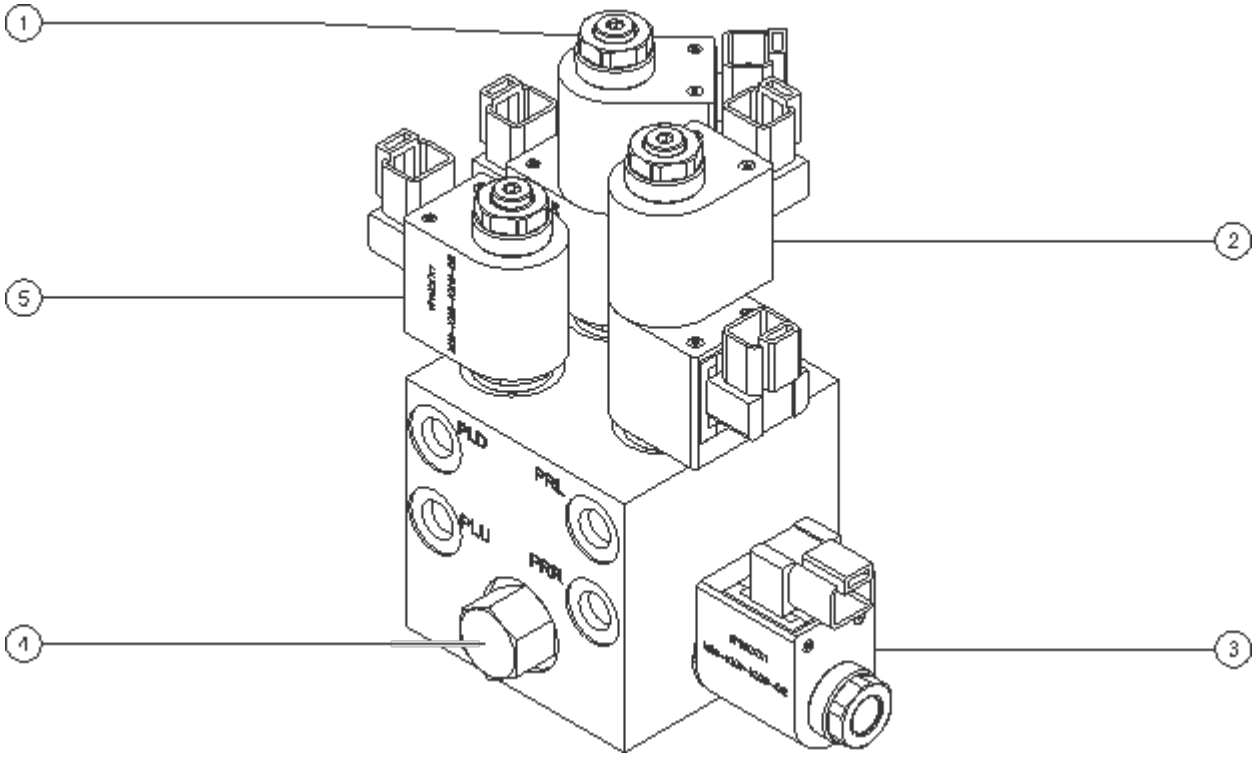
☒ Result: The gap is not within specification. Add or remove shims from the axle stop bars.

8 Adjust the ball joint and secure the linkage to the axle. Tighten the jam nut.

## 7-6
## Platform Manifold Components, S-40 XC, S-40 HF, S-40 TraX

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

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Proportional solenoid valve, 3 position 4 way | EA | Platform level up/down | 17-20 ft-lbs / 24-28 Nm |
| 2 | Solenoid valve, 3 position 4 way | EB | Platform rotate left/right | 26-30 ft-lbs / 35-40 Nm |
| 3 | Solenoid valve, 2 position 2 way, N.C. | EC | Allows flow to loop back to tank | 19-21 ft-lbs / 26-28 Nm |
| 4 | Flow control valve | ED | Platform rotate left/right circuit | 20-25 ft-lbs / 27-34 Nm |
| 5 | Solenoid valve, 2 position 2 way, N.O. | EE | Platform level | 19-21 ft-lbs / 26-28 Nm |

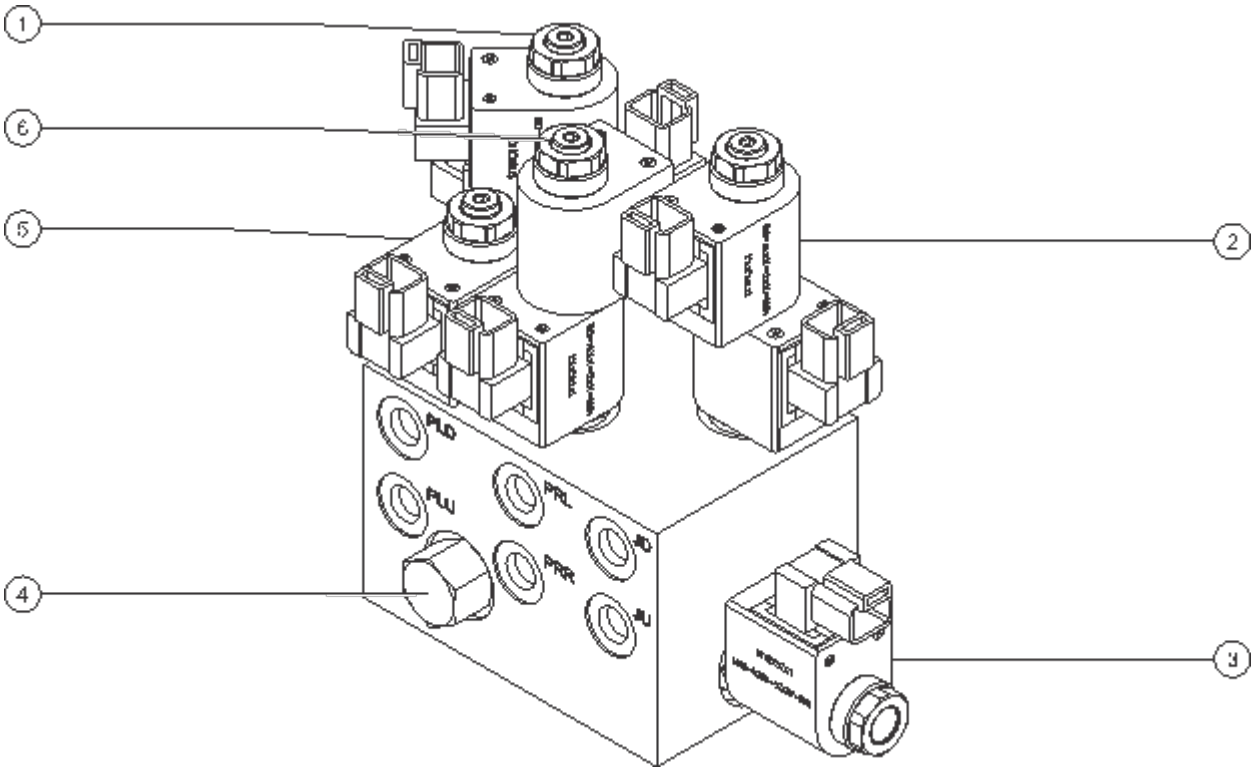


# Manifolds

## 7-7
## Platform Manifold Components, S-45 XC, S-45 HF, S-45 TraX

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

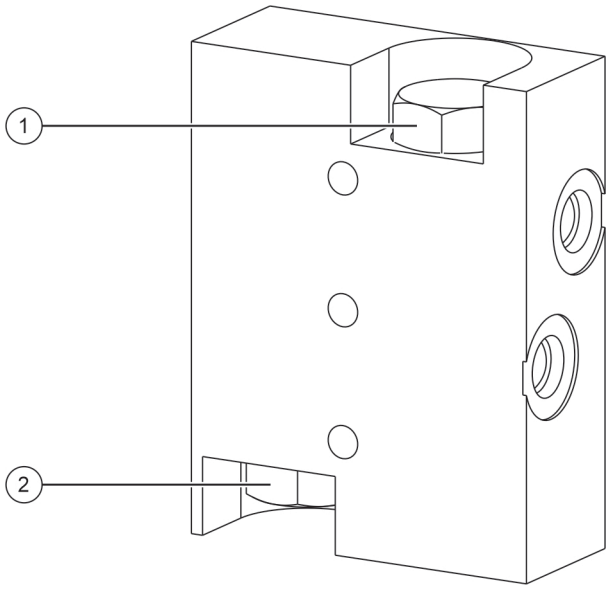
| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Proportional solenoid valve, 3 position 4 way | EA | Platform level up/down | 17-20 ft-lbs / 24-28 Nm |
| 2 | Proportional solenoid valve, 3 position 4 way | EB | Jib boom up/down | 17-20 ft-lbs / 24-28 Nm |
| 3 | Solenoid valve, 2 position 2 way, N.C. | EC | Allows flow to loop back to tank | 19-21 ft-lbs / 26-28 Nm |
| 4 | Flow control valve | ED | Platform rotate left/right circuit | 20-25 ft-lbs / 27-34 Nm |
| 5 | Solenoid valve, 2 position 2 way, N.O. | EE | Platform level circuit | 19-21 ft-lbs / 26-28 Nm |
| 6 | Solenoid valve, 3 position 4 way | EF | Platform rotate left/right | 26-30 ft-lbs / 35-40 Nm |



## 7-8
## Platform Rotate Manifold Components

The platform rotate manifold is mounted to the platform rotator.

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Counterbalance valve | FB | Platform rotate left | 30-35 ft-lbs / 41-47 Nm |
| 2 | Counterbalance valve | FA | Platform rotate right | 30-35 ft-lbs / 41-47 Nm |

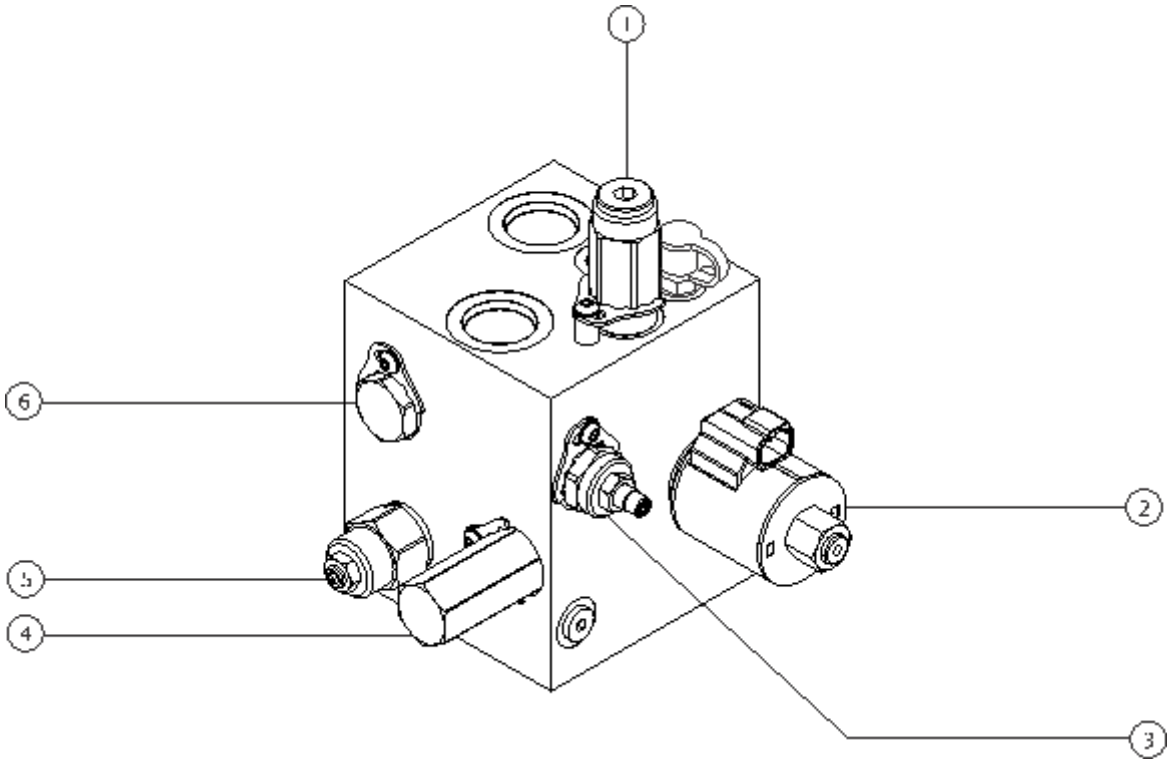


# Manifolds

## 7-9
## Generator Manifold Components

The generator manifold is mounted on the turntable tray by the fuel tank.

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Relief valve | GA | Generator relief valve | 50 ft-lbs / 67 Nm |
| 2 | Solenoid Valve | GB | Charge pressure circuit | 60-65 ft lbs / 81-88 Nm |
| 3 | Needle valve | GD | Charge pressure circuit | 50 ft-lbs / 67 Nm |
| 4 | Differential sensing valve | GC | Pilot valve to diverter valve | 50 ft-lbs / 67 Nm |
| 5 | Counterbalance valve | CF | Adds backpressure to generator circuit | |
| 6 | Check valve | GE | Prevents oil to generator | 24-26 ft-lbs / 32,5-35,3 Nm |



# 7-10 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, BZ) | 4Ω |
| Solenoid valve, 3 position 4 way, 10V DC schematic items (CD, CF) | 5Ω |
| Proportional solenoid valve, 12V DC schematic items(BI, 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 |

# Manifolds

## How to Test a Coil Diode

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

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

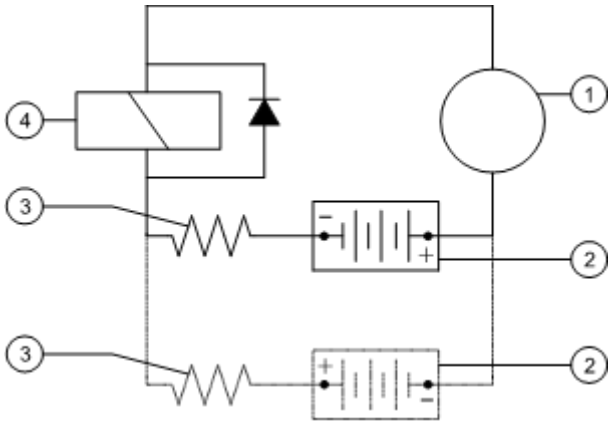
1 Test the coil for resistance. Refer to Repair Procedure, *How to Test a Coil*.

2 Connect a 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.

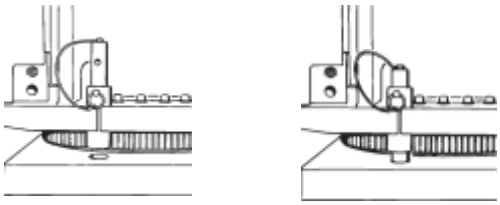
7 Result: If one or both of the current readings are 0 mA, or if the two current readings do not differ by a minimum of 20%, the coil and/or its internal diode are faulty and the coil should be replaced.

# 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.

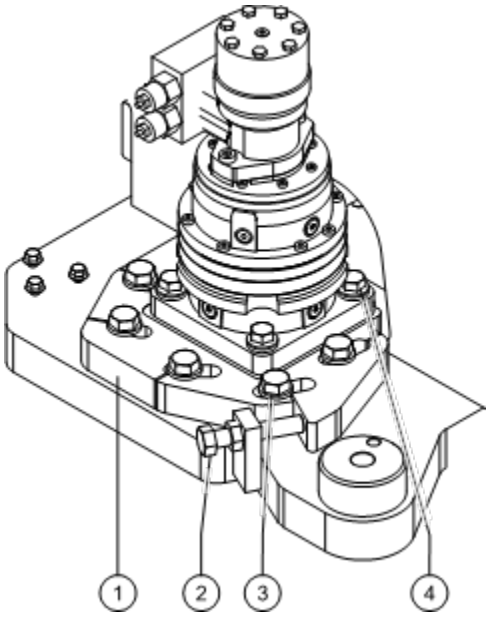


unlocked locked

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
2 adjustment bolt with locknut
3 backlash pivot plate mounting bolts
4 drive hub mounting bolts

4 Back off the locknut and loosen the adjustment bolt.

5 Loosen the backlash pivot plate mounting fasteners and slide the assembly away from the turntable rotate gear.

6 Remove the turntable drive hub mounting fasteners.

7 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.

# Turntable Rotation Components

**When installing the drive hub assembly:**

8 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.

## How to Adjust the Turntable Rotation Gear Backlash

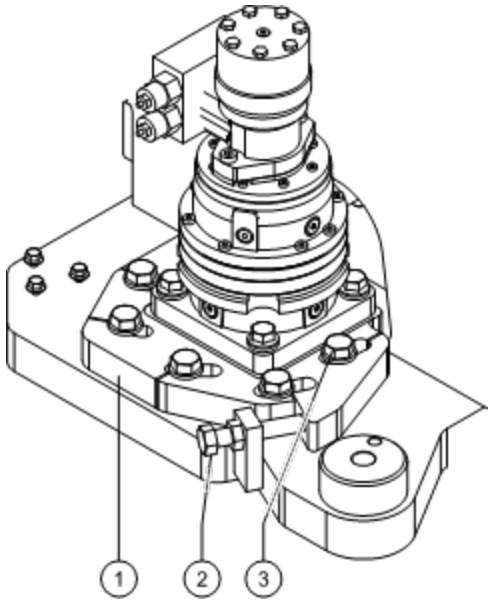
The turntable rotation drive hub is mounted on an adjustable plate that controls the gap between the rotation motor pinion gear and the turntable bearing ring gear.

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

1 Secure the turntable from rotating with the turntable rotation lock pin.

Note: The turntable rotation lock pin is located next to the boom rest pad.

2 Loosen the backlash pivot plate mounting fasteners.




1 backlash pivot plate
2 adjustment bolt with lock nut
3 backlash pivot plate mounting bolts

3 Push the backlash pivot plate towards the turntable as far as possible (this will push the rotation gear into the turntable bearing ring gear).

4 Loosen the lock nut on the adjustment bolt.

5 Turn the adjustment bolt clockwise until it contacts the backlash pivot plate.

6 Turn the adjustment bolt 1/2 turn counterclockwise. Tighten the lock nut on the adjustment bolt.

7 Rotate the backlash pivot plate away from the turntable until it contacts the adjustment bolt. Then torque the mounting fasteners on the backlash pivot plate to specification. Refer to Specifications, *Machine Torque Specifications*.

8 Rotate the turntable through an entire rotation. Check for tight spots that could cause binding. Readjust if necessary.

## How to Calibrate the Turntable Tilt Sensor

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

Note: A digital level will be required to perform this procedure.

1 Enter Service Mode. Refer to Repair Procedure, *How to Enter the Service Mode*.

2 Press the settings button above the display and navigate to the Sensor Calibrations menu.

3 Navigate to the Chassis Tilt Sensor calibration screen.

4 Select and start the calibration procedure.

5 If the machine is not sufficiently level, the procedure will fail with the message that the chassis no not sufficiently level. Move the machine to a more level location if this occurs.

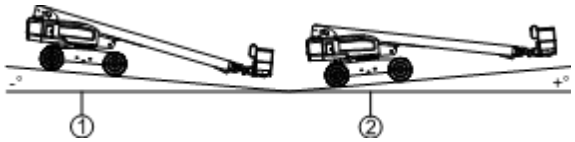
6 The first calibration is machine pitch. This is the pitch of the machine from the platform end to the counterweight end of the machine.

7 Place the digital level onto the swing chassis bearing plate, which is located to the left of the fuel tank. Orient the level along the pitch axis of the machine.

8 Enter the value as seen on the digital level into the ground control display. If the digital level is showing a negative value, enter it as a positive number. Press **OK** when the value on the ground control display matches the value of the digital level (excluding the plus/minus sign).

# Turntable Rotation Components

9 A graphic of the machine pitch will now be shown on the display. By pressing the **UP** or **DOWN** buttons, the graphic will change to show the counterweight being uphill or downhill. Select the image that corresponds to the current pitch of the machine and press **OK**.




Turntable Pitch

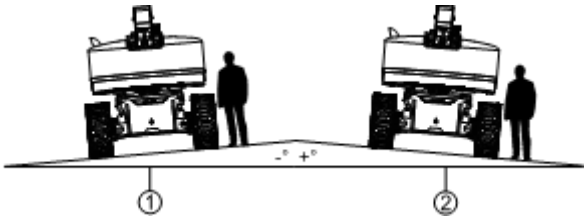
1 uphill
2 downhill

10 The next calibration of the machine is the machine roll. This is the angle of the machine from side to side.

11 Place the digital level onto the swing chassis bearing plate, which is located to the left of the fuel tank. Orient the level along the roll axis of the machine.

12 Enter the value as seen on the digital level onto the ground control display. If the level is showing a negative value, enter it as a positive number. Press **OK** when the value on the ground control display matches the value of the digital level sensor (excluding the plus/minus sign).

13 A graphic of the machine roll will now be shown on the display. By pressing the **UP** and **DOWN** buttons, the graphic will change to show whether the operator is on the uphill or downhill side of the machine.. Select the image that corresponds to the current roll of the machine and press **OK.**




Turntable Roll

1 uphill
2 downhill

14 The calibration is now complete.

15 Exit the Service Mode.

## 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 lifting device 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 lifting device.

# 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.

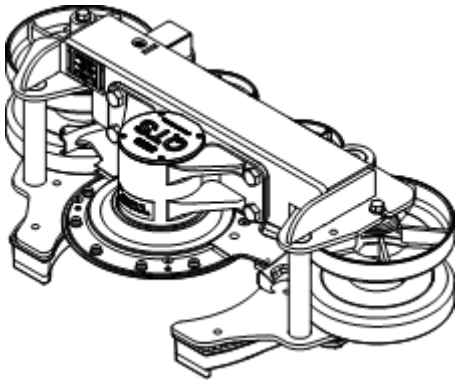
Note: The sprocket is comprised of two halves. Before removing the track assembly from the machine and to ease the removal of the sprocket, drive the machine until one complete half of the sprocket is located above the undercarriage of the track assembly.

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.



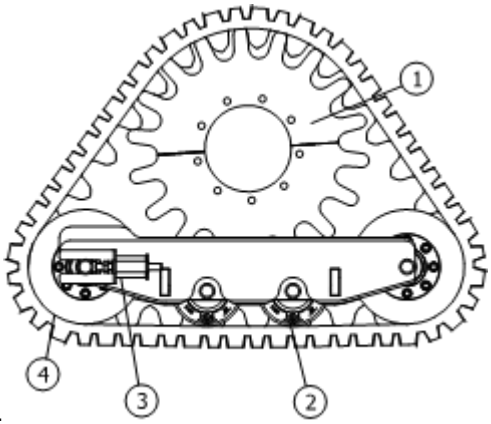
# Track Components

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




.

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.

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.

# 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

The machine control system contains two different types of fault codes

Active Faults: These faults have been detected in the current operating session. The presence of an active fault will be reflected by the System Fault Indicator lights and the alarm.

Logged Faults: The faults contained in the fault log have occurred in the past and may or may not still be in effect.

Both faults may be viewed by pressing the Fault Button above the ground display and navigating to either the Active Machine Faults screen or the Machine Fault Log screen. The list of faults will by shown by fault code and the hour meter of when it occurred.

The fault lists can be browsed. To learn more about a fault entry, select it and press OK. A screen will be shown that describes the fault in more detail.

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 1 | Engine Can Bus | 13 | Not detected | Engine CANBUS CAN+ or CAN- shorted to supply. | Disable engine start for tier 4F engines. | * Verify with a voltmeter that CAN+ and CAN- lines are not shorted.* Measure the resistance between D228CAN+ (YL, TCON J9-3) and D228CAN- (GR, TCON J9-4); should be between 55 and 65 ohms.<br>* D228CAN+ (YL, TCON J9-3) should be between 1V and 5V.<br>* D228CAN- (GR, TCON J9-4) should be between 1V and 5V. Remove short(s) and cycle power. |
| 6 | Key switch | 19 | Fault | Detects both ground and platform controls are selected. | Machine will not be functional. | * Verify wiring at the key switch.<br>* Replace key switch. |
| 7 | Engine Warning | 21 | Fault | The engine has triggered the Engine Warning Lamp condition. | Machine will function as normal. | * Check the engine fault codes with an engine diagnostic tool. |
| 8 | Engine Stop | 21 | Fault | The engine has triggered the Engine Stop Lamp condition. | Control system will not allow engine restart until power cycle. Engine may stop itself, depending on the engine option. | * Check the engine fault codes with an engine diagnostic tool.<br>Note: The control system shuts off the engine immediately upon receiving this fault from the engine. |
| 11 | Engine Start Switch | 27 | Active at startup | Engine Start Switch active at startup. | Engine will not start. | * Cycle power to allow the machine to re-test the fault. |
| 12 | Machine CAN Bus | 13 | Not detected | Machine CANBUS CAN+ or CAN- shorted to supply. | Machine will not be functional. | * Verify with a voltmeter that CAN+ and CAN- lines are not shorted. *Measure the resistance between D82CAN+ (YL, TCON J5-3) and D81CAN- (GR, TCON J5-4); should be between 55 and 65 ohms.<br>* D81CAN+ (YL, TCON J5-3) should be between 1V and 5V.<br>* D81CAN- (GR, TCON J5-4) should be between 1V and 5V.<br>* Remove short(s) and cycle power. |
| 13 | Jib Up/Down Switch | 27 | Active at startup | Toggle switch input was detected as HIGH at start-up. | The Jib Up or Down functions will not operate. | * Verify with a voltmeter that the Jib Up/Down Toggle Switch (TS8) is operating properly.<br>* C43JU (BL, PCON J17-6) should be 0 V with the switch OFF and 12 V with the switch held in the UP position.<br>* C44JD (BL/BK, PCON J17-8) should be 0 V with the switch OFF and 12 V with the switch held in the DOWN position.<br>* Cycle power to allow the machine to re-test the fault. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 14 | Alternator | 15 | Fault | Fault occurs if voltage is below 12.3 VDC for 10 seconds while engine is running. | None. | * Release foot switch and cycle power.<br>* Test / Replace alternator. |
| 15 | Foot Switch | 19 | Timeout | Foot switch depressed too long without action. | Machine will not be functional. | * Release foot switch and cycle power.<br>* If problem persists, with a voltmeter verify that C24FS (WH, PCON J12-2) is LOW when foot switch is released and 12 V when held down. |
| | | 27 | Active at startup | Foot switch input was detected as HIGH at start-up, or the foot switch was held for too long and caused the foot switch timer to elapse. | | |
| | | 28 | Timeout | Foot switch depressed too long without action. | | |
| 17 | Aux Pump Coil | 9 | Shorted to GND | TCON detected that C27AUX circuit is shorted to GND. | Machine will not be functional. | * Check C27AUX (RD, TCON J3-3) wiring.<br>*With a voltmeter verify that C27AUX (RD, TCON J3-3) is 0 V when the Auxiliary Power toggle switch is OFF and 12 V when switch is ON.<br>* Verify the terminals of the APU solenoid have a resistance greater than 5 ohms. If not, replace the solenoid. |
| | | 11 | Shorted to supply voltage | TCON detected that C27AUX circuit is shorted to 12 V. | | |
| 19 | Platform Aux Enable Switch | 27 | Active at startup | Aux button held at startup. | Machine will not be functional. | * Release Aux button, check DISCON overlay and ribbon cable if issue persists. |
| 21 | Pri Boom Up / Down Joystick | 8 | Shorted to GND | Circuit C164PUD is below 4.5 V or shorted to GND. | Boom Up and Down functions will not operate. | * Leave joystick in neutral position and cycle power.<br>* If fault persists, with a voltmeter check that C164PUD (RD/WH, PCON J18-3) is at 2. 5V +/- 0.2 V at startup and does not go above 4.5 V or below 0.5 V when fully stroked in each direction.<br>* Replace joystick if voltage check fails. |
| | | 11 | Shorted to supply voltage | Circuit C164PUD is above 4.5 V or shorted to 12 V. | | |
| | | 27 | Active at startup | Circuit C164PUD voltage was not within the startup voltage range of 2.5 V +/- 0.2 V. | | |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 22 | Pri Boom Up coil | 9 | Shorted to GND | TCON detected that C1PBU circuit is shorted to GND. | Boom Up function will not operate. | * With a voltmeter, measure Y22. Proper resistance should be between 5 - 60 ohms. Replace Y22 if resistance is outside of those values.<br>* Verify wiring for C1PBU (RD, TCON J4-10) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C1PBU circuit is shorted to 12 V. | Boom Up and Down functions will not operate. | |
| 24 | Pri Boom Angle | 13 | Not detected | No CAN messages have been received by the TCON from the Angle Sensor. | Machine limited to recovery functions. | * Verify sensor power P85PWR (GR, TCON J6-7) is at 12 V while the system is running.<br>* Verify the sensor is receiving power. Unplug the sensor and verify 12 V across pins 2 (+) and 1 (-) on the harness connector.<br>* Verify the CAN bus wiring. With the sensor still unplugged, measure resistance across harness connector pins 3 and 4. If resistance is not between 55 and 65 ohms, check CAN wire harnesses.<br>* Replace sensor if necessary. |
| | | 14 | Cross check failed | The two internal sensing channels inside the Angle Sensor have registered a significant difference. | | * Calibrate boom angle sensor.<br>* Check boom angle sensor mount, ensure all fasteners are tightened to spec.<br>* Replace sensor if issue persists. |
| | | 17 | Not calibrated | Sensor has been replaced and requires calibration, or calibration in memory has been erased. | | * Run the boom angle calibration process and verify fault is no longer active. |
| | | 19 | Value out of expected range | Min or max boom angle out of expected range.<br>Crosscheck limit switch disagrees with boom angle sensor. | Machine limited to recovery functions. | * Verify that with the boom stowed C68LS (BL, TCON J7-3) is 12V and that the boom is making contact with the LST3S limit switch arm.<br>* Verify that with the boom above 12 degrees C68LS (BL, TCON J7-3) is 0V and that the boom is not making contact with the LST3S limit switch arm.<br>* Check LST3S limit switch for physical damage.<br>* Check bearings in rotary base housing.<br>* Calibrate boom angle sensor. |
| 25 | Cable tension | 21 | Fault | Boom cable tension limit switch LSB2S indicates that the tension is loose on the boom cables. | Boom Up and Extend functions will not operate. | * Return boom to stowed position as quickly as possible.<br>* Verify both boom cables are properly tensioned and that LST3S is properly centered in the bracket.<br>* Verify LSB2S (C59CNK, BL/WH, TCON J7-5) operates properly. Signal should normally by 12 V. If cable tension is loose, signal should be 0 V. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 26 | Pri Boom Ext Coil | 9 | Shorted to GND | TCON detected that C7PBE circuit is shorted to GND. | Boom Extend function will not operate. | * With a voltmeter, measure Y26. Proper resistance should be between 5 - 60 ohms. Replace Y26 if resistance is outside of those values.<br>* Verify wiring for C7PBE (BK, TCON J4-7) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C7PBE circuit is shorted to 12 V. | Boom Extend and Retract functions will not operate. | |
| 27 | Pri Boom Ret Coil | 9 | Shorted to GND | TCON detected that C8PBR circuit is shorted to GND. | Boom Retract function will not operate. | * With a voltmeter, measure Y25. Proper resistance should be between 5 - 60 ohms. Replace Y25 if resistance is outside of those values.<br>* Verify wiring for C8PBR (BK/WH, TCON J4-8) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C8PBR circuit is shorted to 12 V. | Boom Extend and Retract functions will not operate. | |
| 35 | Ground Control Buttons | 27 | Active at startup | Buttons were held at system start, or are shorted on the ground control panel. | The function associated with the stuck button will not operate. | * Release the ground control buttons and cycle power.<br>* If problem persists, open ground control box and open the Display Controller access door, being careful to keep water out. Verify the ribbon cables are properly seated and dry.<br>* Re-seat and/or replace ribbon cables if necessary.<br>* Replace ground control overlay. |
| 36 | Jib Up Coil | 9 | Shorted to GND | PCON detected that V43JU circuit is shorted to GND. | Jip Up function will not operate. | * With a voltmeter, measure Y68. Proper resistance should be between 5 - 60 ohms. Replace Y68 if resistance is outside of those values.<br>* Verify wiring for V43JU (BL, PCON J13-5) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | PCON detected that V43JU circuit is shorted to 12 V. | | |
| 40 | Jib Select Coil | 9 | Shorted to GND | PCON detected V18PRR is short to GND. | Jib and platform rotate functions will not operate. | * With a voltmeter, measure Y18. Proper resistance should be between 5 - 60 ohms. Replace Y18 if resistance is outside of those values.<br>* Verify wiring for V18PRR (GR/BK, PCON J12-4) and check for short circuits. |
| | | 11 | Shorted to supply voltage | PCON detected V18PRR is short to 12 V. | | |
| 41 | Turntable Rotate Joystick | 9 | Shorted to GND | Circuit C165TTR is below 4.5 V or shorted to GND. | Turntable Rotate functions will not operate. | * Leave joystick in neutral position and cycle power.<br>* If fault persists, with a voltmeter check that C165TTR (WH/RD, PCON J18-2) is at 2. 5V +/- 0.2 V at startup and does not go above 4.5 V or below 0.5 V when fully stroked in each direction.<br>* Replace joystick if voltage check fails. |
| | | 11 | Shorted to supply voltage | Circuit C165TTR is above 4.5 V or shorted to 12 V. | | |
| | | 27 | Active at startup | Circuit C165TTR voltage was not within the startup voltage range of 2.5 V +/- 0.2 V. | Turntable Rotate functions will not operate from platform controls. | |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 42 | Turntable Rotate CW Coil | 9 | Shorted to GND | TCON detected that C4TRL circuit is shorted to GND. | Turntable Rotate CW function will not operate. | * With a voltmeter, measure Y24. Proper resistance should be between 5 - 60 ohms. Replace Y24 if resistance is outside of those values.<br>* Verify wiring for C4TRL (WH, TCON J3-12) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C4TRL circuit is shorted to 12 V. | Turntable Rotate functions will not operate. | |
| 43 | Turntable Rotate CCW Coil | 9 | Shorted to GND | TCON detected that C5TRR circuit is shorted to GND. | Turntable Rotate CCW function will not operate. | * With a voltmeter, measure Y23. Proper resistance should be between 5 - 60 ohms. Replace Y23 if resistance is outside of those values.<br>* Verify wiring for C5TRR (WH/BK, TCON J3-1) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C5TRR circuit is shorted to 12 V. | Turntable Rotate functions will not operate. | |
| 44 | Drive Enable Toggle Switch | 27 | Active at startup | Toggle switch input was detected as HIGH at start-up. | Drive Enable switch will not operate, possibly preventing drive while the turntable is rotated. | * Verify with a voltmeter that the Drive Enable Toggle Switch (TS15) is operating properly.<br>* C143DEL (BL/RD, PCON J16-7) should be 0 V with the switch OFF and 12 V with the switch held in the ON position.<br>* Cycle power to allow the machine to re-test the fault. |
| 45 | Platform Level Toggle Switch | 27 | Active at startup | Toggle switch input was detected as HIGH at start-up. | Platform Level Up or Down functions may not operate, depending on which direction the switch fault occurred. | * Verify with a voltmeter that the Platform Level Up/Down Toggle Switch (TS9) is operating properly.<br>* C14PLU (OR, PCON J17-2) should be 0 V with the switch OFF and 12 V with the switch held in the UP position.<br>* C15PLD (OR/BK, PCON J17-3) should be 0 V with the switch OFF and 12 V with the switch held in the DOWN position.<br>* Cycle power to allow the machine to re-test the fault. |
| 46 | Platform Rotate CW Coil | 9 | Shorted to GND | PCON detected that V17PRL circuit is shorted to GND. | Platform Rotate CW function will not operate. | * With a voltmeter, measure Y70. Proper resistance should be between 5 - 60 ohms. Replace Y70 if resistance is outside of those values.<br>* Verify wiring for V17PRL (GR, PCON J12-5) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | PCON detected that V17PRL circuit is shorted to 12 V. | | |
| 47 | Platform Rotate CCW Coil | 9 | Shorted to GND | PCON detected that V18PRR circuit is shorted to GND. | Platform Rotate CCW function will not operate. | * With a voltmeter, measure Y71. Proper resistance should be between 5 - 60 ohms. Replace Y71 if resistance is outside of those values.<br>* Verify wiring for V18PRR (GR/BK, PCON J12-4) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | PCON detected that V18PRR circuit is shorted to 12 V. | | |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 51 | Drive Joystick | 9 | Shorted to GND | Circuit C160DRV is below 4.5 V or shorted to GND. | Drive Forward and Reverse functions will not operate. | * Leave joystick in neutral position and cycle power.<br>* If fault persists, with a voltmeter check that C160DRV (WH/RD, PCON J18-10) is at 2. 5V +/- 0.2 V at startup and does not go above 4.5 V or below 0.5 V when fully stroked in each direction.<br>* Replace joystick if voltage check fails. |
| | | 11 | Shorted to supply voltage | Circuit C160DRV is above 4.5 V or shorted to 12 V. | | |
| | | 27 | Active at startup | Circuit C160DRV voltage was not within the startup voltage range of 2.5 V +/- 0.2 V. | | |
| 52 | Drive Forward Pump Coil | 9 | Shorted to GND | TCON detected that C30FWD circuit is shorted to GND. | Drive forward and brake release will not operate. | * With a voltmeter, measure Y6. Proper resistance should be between 5 - 60 ohms. Replace Y6 if resistance is outside of those values.<br>* Verify wiring for C30FWD (WH, TCON J2-6) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C30FWD circuit is shorted to 12 V. | Drive forward, brake release and engine will not operate. | |
| 53 | Drive Reverse Pump Coil | 9 | Shorted to GND | TCON detected that C31REV circuit is shorted to GND. | Drive reverse and brake release will not operate. | * With a voltmeter, measure Y5. Proper resistance should be between 5 - 60 ohms. Replace Y5 if resistance is outside of those values.<br>* Verify wiring for C31REV (WH/BK, TCON J2-7) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C31REV circuit is shorted to 12 V. | Drive reverse, brake release and engine will not operate. | |
| 54 | Brake Release Coil | 9 | Shorted to GND | TCON detected that C32BRK circuit is shorted to GND. | Drive, steer and brake release will not operate. | * With a voltmeter, measure Y2. Proper resistance should be between 5 - 60 ohms. Replace Y2 if resistance is outside of those values.<br>* Verify wiring for C32BRK (WH/RD, TCON J2-9) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C32BRK circuit is shorted to 12 V. | Machine will not be functional. | |
| 55 | High Drive Speed Coil | 9 | Shorted to GND | TCON detected that C29MS circuit is shorted to GND. | Drive functions will not operate. | * With a voltmeter, measure Y27. Proper resistance should be between 5 - 60 ohms. Replace Y27 if resistance is outside of those values.<br>* Verify wiring for C29MS (RD/WH, TCON J2-8) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C29MS circuit is shorted to 12 V. | | |
| 56 | Telematics Device | 13 | Not detected | M7 telematics device not detected. | Information only. | * Cycle power. If fault persists, check telematics ready connector wiring. If there are no wiring issues replace M7. |
| 61 | Steer Joystick | 9 | Shorted to GND | Circuit C159STD or C159STA is below 4.5 V or shorted to GND. | Drive and steer functions will not operate. | * Leave joystick in neutral position and cycle power.<br>* If fault persists, identify which circuit is the steer circuit. Check C159STA (BL/WH, PCON J18-11) for a joystick steer option. Check C159STD (BL/RD, PCON J18-9) for the rocker joystick steer option. With a voltmeter check that the circuit is at 2. 5V +/- 0.2 V at startup and does not go above 4.5 V or below 0.5 V when fully stroked in each direction.<br>* Replace joystick if voltage check fails. |
| | | 11 | Shorted to supply voltage | Circuit C159STD or C159STA is above 4.5 V or shorted to 12 V. | | |
| | | 27 | Active at startup | Circuit C159STD or C159STA voltage was not within the startup voltage range of 2.5 V +/- 0.2 V. | | |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 62 | Prox Override Toggle Switch | 27 | Active at startup | Toggle switch input was detected as HIGH at start-up. | Override will not operate. | * Verify with a voltmeter that the Jib Up/Down Toggle Switch (TS8) is operating properly.<br>* C43JU (BL, PCON J17-6) should be 0 V with the switch OFF and 12 V with the switch held in the UP position.<br>* C44JD (BL/BK, PCON J17-8) should be 0 V with the switch OFF and 12 V with the switch held in the DOWN position.<br>* Cycle power to allow the machine to re-test the fault. |
| 69 | AC Generator Output | 9 | Shorted to GND | TCON detected that C45GEN circuit is shorted to GND. | Generator function will not operate. | * With a voltmeter, measure Y29. Proper resistance should be between 5 - 60 ohms. Replace Y29 if resistance is outside of those values.<br>* Verify wiring for C45GEN (GR/WH, TCON J3-2) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C45GEN circuit is shorted to 12 V. | | |
| 71 | TCON | 9 | Fault | Output to the Estop Circuit is shorted to Ground (B-). | Unable to enter any ground or platform modes, as Estop is considered OFF in this state. | * Cycle power to allow the machine to re-test the fault. |
| 72 | Lift Guard Contact Alarm Switch | 14 | Cross check failed | PCON detected that inputs from SW30 (contact alarm proximity sensor) are the same voltage. | Boom Up, Extend and Turntable rotate functions will not operate.<br>All platform controls inhibited. | * Using a voltmeter, verify that the voltage on C248CA (OR/BK, PCON J12-1) is always the opposite of C247CA (OR, PCON J12-11).<br>* Check wiring for open or short circuits.<br>* Verify SW30 is receiving power and ground by verifying 12 V across C31 pins 1 and 3.<br>* Replace SW30 if necessary. |
| | | 21 | Fault | Switch failure. | | |
| 73 | Engine Oil Pressure | 12 | Sensor value too high | Engine oil pressure sender is shorted to 12V. | Engine will not operate. | * With a voltmeter, check that C25PSR ( WH/BK, TCON J6P9) is not shorted to 12V and voltage is between 0.1-11.5V.<br>* Replace sender if necessary |
| | | 24 | Too low | The engine oil pressure is measured as too low, potentially damaging the engine. | Engine may not attempt to start until system power cycle. Engine may be turned off by control system immediately. | * Stop engine as soon as possible.<br>* Verify the engine oil level.<br>* Verify the engine oil pump.<br>* Power on the machine and start the engine. At the ground controls display, view the engine oil pressure gauge for proper operation.<br>* If engine uses an analog oil pressure sensor, verify it is sending an analog voltage on C25PSR (WH/BK, TCON J6-9). |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 74 | Engine Temperature | 15 | Sensor value too low | Engine temperature sensor is shorted to ground. | Engine will not operate. | * With a voltmeter, check that C26TSR ( WH/RD, TCON J6P8) is not shorted to ground and voltage is between 0.1-11.5V.<br>* Replace sensor if necessary. |
| | | 23 | Too high | The engine coolant temperature is measured as too high, potentially damaging the engine. | Engine will not restart until machine power is cycled. Engine may stop itself, depending on the engine option. | * Stop engine as soon as possible.<br>* Verify the engine coolant level.<br>* Verify the engine coolant/water pump.<br>* Power on the machine and start the engine. At the ground controls display, view the engine temperature gauge for proper operation.<br>* If engine uses an analog temperature sensor, verify it is sending an analog voltage on C26TSR (WH/RD, TCON J6-10). |
| 76 | Platform Load Sensor | 13 | Not detected | Load sensor not detected on the communications bus. | Boom Up, Extend and Turntable Rotate functions will not operate. | * Verify sensor power P26PWR (BK, PCON J13-9) is at 12 V while the system is running.<br>* Verify 12 V across pins on C27-2 (+) and C27-3 (-) on the harness connector.<br>* Measure resistance across C27 pins 4 and 5 on the harness connector. If resistance is not between 55 and 65 ohms, check CAN wire harnesses.<br>* Replace sensor if necessary. |
| | | 14 | Cross check failed | The two internal sensing channels inside the Load Sensor have registered a significant difference. | Boom Up, Extend and Turntable Rotate functions will not operate. | * Check that the load sensor is mounted correctly and all fasteners are tightened to spec.<br>* Calibrate load sensor.<br>* Replace sensor if issue persists. |
| | | 15 | Value to low | Platform load sensor out of calibration. | Machine limited to recovery functions. | * Make sure the platform is not touching the ground or an overhead obstruction. Cycle power and check that fault is no longer reported.<br>* Perform the platform overload calibration procedure.<br>* Replace sensor if necessary. |
| | | 17 | Not calibrated | Platform load sensor out of calibration. | | * Calibrate load sensor.<br>* Replace sensor if issue persists. |
| | | 21 | Fault | Platform load sensor out of calibration. | | * Check that the load sensor is mounted correctly and all fasteners are tightened to spec.<br>* Calibrate load sensor.<br>* Replace sensor if issue persists. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 78 | Platform Controller (PCON) | 13 | Not detected | TCON has not detected the PCON primary processor on the communications bus. | Controls from the platform will not operate. | * Verify PCON is receiving power. Check for 12 V on J15-2 (+) and J15-1 (-).<br>* Verify PCON is receiving ESTOP signals. With ground ESTOP pulled out and keyswitch set to Platform, verify 12 V is reaching PCON J15-10.<br>* Verify CAN bus is functional. Pull out connector J15 from the PCON and with a voltmeter set to resistance verify that pins 3 and 4 on the harness connector measure between 110 and 130 Ohms. Check wiring and boom cable for open or short circuits if resistance check fails.<br>* Replace PCON if necessary. |
| | | 29 | Software version mismatch | PCON software is out of date. | Machine limited to recovery functions | * Download latest software from firmware site and update machine. |
| | | 36 | Not detected | PCON not detected. | Controls from the platform will not operate. | * Verify PCON is receiving power. Check for 12 V on J15-2 (+) and J15-1 (-).<br>* Verify PCON is receiving ESTOP signals. With ground ESTOP pulled out and keyswitch set to Platform, verify 12 V is reaching PCON J15-10.<br>* Verify CAN bus is functional. Pull out connector J15 from the PCON and with a voltmeter set to resistance verify that pins 3 and 4 on the harness connector measure between 110 and 130 Ohms. Check wiring and boom cable for open or short circuits if resistance check fails.<br>* Replace PCON if necessary. |
| 79 | Display Controller (DISCON) | 13 | Not detected | TCON has not detected the DISCON on the communications bus. | Controls from the ground will not operate. | * Verify DISCON is operating by checking that the display on the front is operating properly.<br>* If there is no display, try to power up the DISCON by setting the key switch to Ground, pull out the ground ESTOP and press the Ground Function Enable button. The display should start.<br>* If there is still no display, check DISCON power on J10 pins 2 (+) and 1 (-).<br>* If DISCON operates but fault persists, check the CAN bus wiring. Disconnect J10 and with a voltmeter set to resistance verify that the resistance between pins 3 and 4 on the harness connector are between 55 and 65 ohms. Check CAN wiring if resistance check fails.<br>* Replace DISCON if required. |
| | | 29 | Software version mismatch | DISCON software is out of date. | Machine limited to recovery functions. | * Download latest software from firmware site and update machine. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 80 | Turntable Controller (TCON) | 13 | Not detected | The DISCON has not detected the TCON on the CAN bus. | Machine limited to recovery functions. | * Verify TCON is receiving power. Check for 12 V on J5-2 (+) and J5-1 (-).<br>* Verify TCON is receiving ESTOP signals. With ground ESTOP pulled out and key switch set to Ground, verify 12 V is reaching TCON J5-9 and J5-12.<br>* Verify CAN bus is functional. Pull out connector J5 from the TCON and with a voltmeter set to resistance verify that pins 3 and 4 on the harness connector measure between 55 and 65 Ohms. Check wiring and boom cable for open or short circuits if resistance check fails.<br>* Replace TCON if necessary. |
| | | 29 | Software version mismatch | TCON software is out of date. | | * Download latest software from firmware site and update machine. |
| 82 | Overload | 21 | Recovery | This is a flag that indicates that the platform was overloaded and that auxiliary function enable was used while overloaded. | Advisory condition. Machine is fully functional. | * Power up the machine in service mode and clear the flag in the service menu on the ground control display. |
| 83 | Disabled | 21 | By owner | The telematics module has locked out machine operation. | Machine will not be functional, or have limited functionality, depending on the telematics option. | * Call machine owner to re-enable machine functions. |
| 84 | Chassis Angle | 13 | Not detected | The tilt sensor S80 has not been detected on the CAN bus. | Boom Up, Extend and Drive functions will not operate. | * Verify S8O is receiving power. Disconnect sensor connector and verify harness connector pins 1 and 2 measure 12 V.<br>* Verify CAN bus wiring. With a voltmeter set to resistance, check the resistance between pins 3 and 4 on the harness connector (not the sensor's integrated connector). Resistance should be between 55 and 65 ohms. Check CAN wiring if resistance check fails.<br>* Replace sensor if required. |
| | | 17 | Not calibrated | Tilt sensor not calibrated. | Machine limited to recovery functions. | * Calibrate tilt sensor. |
| | | 21 | Turntable Tilt Sensor Internal Error. | An internal error flag has been exhibited in the tilt sensors. | Boom Up, Extend, Turntable Rotate and Drive functions will not operate until stowed.<br>Boom Up and Extend inhibited while stowed. | * Cycle power to allow the machine to re-test the fault.<br>* Replace tilt sensor. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 88 | Function Enable Coil | 9 | Shorted to GND | TCON detected that C155PCE circuit is shorted to GND. | Only Auxiliary Power is available. | * With a voltmeter, measure Y74. Proper resistance should be between 5 - 60 ohms. Replace Y74 if resistance is outside of those values.<br>* Verify wiring for C155PCE (OR/RD, TCON J2-5) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C155PCE circuit is shorted to 12 V. | | |
| 89 | Fuel Level Sensor | 12 | Sensor value too high | Fuel level sensor shorted to 12 V. | None. Informational only. | * Verify sensor power.<br>* Replace sensor if necessary. |
| | | 15 | Sensor value too low | Fuel level sensor shorted to ground. | | |
| 92 | Turntable Rotate Flow Coil | 9 | Shorted to GND | TCON detected that C6TRF circuit is shorted to GND. | Turntable Rotate functions will not operate. | * With a voltmeter, measure Y13. Proper resistance should be between 5 - 60 ohms. Replace Y13 if resistance is outside of those values.<br>* Verify wiring for C6TRF (WH/RD, TCON J4-1) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C6TRF circuit is shorted to 12 V. | | |
| 94 | Primary Boom Length | 13 | Not detected | No CAN messages have been received by the TCON from the Length Sensor. | Boom Up, Extend and Turntable Rotate functions will not operate. | * Verify sensor power P85PWR (GR, TCON J6-7) is at 12 V while the system is running.<br>* Verify the sensor is receiving power. Unplug the sensor and verify 12 V across pins 1 (+) and 2 (-) on the harness connector.<br>* Verify the CAN bus wiring. With the sensor still unplugged, measure resistance across harness connector pins 3 and 4. If resistance is not between 55 and 65 ohms, check CAN wire harnesses.<br>* Replace sensor if necessary. |
| | | 14 | Cross check failed | The two internal sensing channels inside the Length Sensor have registered a significant difference. | Machine limited to recovery functions. | * Verify that the boom angle sensor cord is hooked up to the bracket on the boom and that the cord extends and retracts smoothly.<br>* Calibrate boom length sensor.<br>* Replace sensor if necessary. |
| | | 17 | Not calibrated | Boom length sensor not calibrated. | | * Calibrate boom length sensor. |
| | | 19 | Value out of expected range | Min or max length out of expected range.<br>Crosscheck limit switch disagrees with length sensor. | | * Verify that with the boom retracted C24LS (OR/RD TCON J7-4) is 12V and that the boom is making contact with the LSB1RS limit switch arm.<br>* Verify that when the boom is extended at least 10" C24LS (OR/RD, TCON J7-4) is OV and that the boom is not making contact with the LSB1RS limit switch arm.<br>* Check LSB1RS limit switch for physical damage.<br>* Calibrate length sensor. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 95 | Engine RPM | 13 | Not detected | Control system has detected no or too low RPM. | Engine start disabled. | * Verify wiring at the alternator.<br>* Check tach signal at alternator while trying to start the engine.<br>* Replace alternator. |
| 98 | Platform Level Angle | 10 | Envelope exceeded | Control system has detected that the platform angle's error from the set point exceeds 10 degrees. | All functions are disabled in engine mode. | * Operate manual platform level up or platform level down auxiliary power to reset the error or power the machine off and back on. |
| | | 13 | Not detected | No CAN messages have been received by the TCON from the Angle Sensor. | Boom Up and Extend functions will not operate. | * Verify sensor power.<br>* Verify the CAN bus wiring. |
| | | 14 | Cross check failed | The two internal sensing channels inside the Angle Sensor have registered a significant difference. | Machine limited to recovery functions. | * Calibrate boom length sensor.<br>* Replace sensor if necessary. |
| | | 17 | Not calibrated | Platform level angle sensor not calibrated. | Boom Up and Extend limited. | * Calibrate platform level angle sensor. |
| | | 19 | Value out of expected range | Platform angle is outside the min and max range by 2%. | Boom Up and Extend functions will not operate. | * Calibrate platform level angle sensor. |
| 99 | Primary Boom Extend / Retract Flow Coil | 9 | Shorted to GND | TCON detected that C9PEF circuit is shorted to GND. | Boom Extend and Retract functions will not operate. | * With a voltmeter, measure Y15. Resistance should be between 5 - 60 ohms. Replace Y15 if resistance is outside of those values.<br>* Verify wiring for C9PEF (BK/RD, TCON J4-5) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C9PEF circuit is shorted to 12 V. | | |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 100 | Platform Level Up Coil | 9 | Shorted to GND | PCON detected that V14PLU circuit is shorted to GND. | Platform Level Up function will not operate. | * With a voltmeter, measure Y20. Proper resistance should be between 5 - 60 ohms. Replace Y20 if resistance is outside of those values.<br>* Verify wiring for V14PLU (OR, PCON J12-6) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | PCON detected that V14PLU circuit is shorted to 12 V. | Platform Level Up and Level Down functions will not operate. | |
| 101 | Platform Level Down Coil | 9 | Shorted to GND | PCON detected that V15PLD circuit is shorted to GND. | Platform Level Down function will not operate. | * With a voltmeter, measure Y19. Proper resistance should be between 5 - 60 ohms. Replace Y19 if resistance is outside of those values.<br>* Verify wiring for V15PLD (OR/BK, PCON J12-7) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | PCON detected that V15PLD circuit is shorted to 12 V. | Platform Level Down and Level Up functions will not operate. | |
| 110 | Platform Rotate Toggle Switch | 27 | Active at startup | Toggle switch input was detected as HIGH at start-up. | Platform Rotate Left or Right will not operate, depending on which side of the switch was faulted. | * Verify with a voltmeter that the Platform Rotate Toggle Switch (TS7) is operating properly.<br>* C17PRL (GR, PCON J16-4) and C18PRR (GR/BK, PCON J17-5) should be 12 V when the switch is pressed in their respective directions.<br>* Cycle power to allow the machine to re-test the fault. |
| 116 | Model Configuration | 13 | Not detected | Machine is not fully configured. | Machine will not operate. | * If there are Sensor Not Detected faults, correct those faults first.<br>* Verify the correct sensors are present on the machine per model configuration.<br>• Boom angle sensor.<br>• Platform angle sensor. |
| | | 31 | Setup invalid | | | |
| 140 | Boom | 10 | Safety Envelope Exceeded | The system has determined that the platform position has exceeded the safety envelope boundary. | All functions will not operate except for the recovery procedure. | • Use Auxiliary Power and the boom retract and/or down functions to bring the platform back within the operational envelope. |
| 150 | Sensor Power P26PWR | 9 | Shorted to GND | PCON detected that P26PWR circuit is shorted to GND. | Boom Up and Extend functions will not operate. | * Turn on machine and verify sensor power P26PWR (BK, PCON J13-9) is at 12 V.<br>* Inspect wiring for open or shorts circuits. |
| | | 11 | Shorted to supply voltage | PCON detected that P26PWR circuit is shorted to 12 V. | | |
| 152 | Primary Boom Up/Down Flow Coil | 9 | Shorted to GND | TCON detected that C3PBF circuit is shorted to GND. | Boom Up and Down functions will not operate. | * With a voltmeter, measure Y12. Proper resistance should be between 5 - 60 ohms. Replace Y12 if resistance is outside of those values.<br>* Verify wiring for C3PBF (RD/WH, TCON J4-4) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C3PBF circuit is shorted to 12 V. | | |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 160 | LF Steer Coil | 9 | Shorted to GND | TCON detected that C37STL circuit is shorted to GND. | Steer Left function will not operate. | * With a voltmeter, measure Y3. Proper resistance should be between 5 - 60 ohms. Replace Y3 if resistance is outside of those values.<br>* Verify wiring for C37STL (BL/BK, TCON J4-11) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C37STL circuit is shorted to 12 V. | | |
| 161 | RF Steer Coil | 9 | Shorted to GND | TCON detected that C36STR circuit is shorted to GND. | Steer Right function will not operate. | * With a voltmeter, measure Y4. Proper resistance should be between 5 - 60 ohms. Replace Y4 if resistance is outside of those values.<br>* Verify wiring for C36STR (BL, TCON J4-12) and check for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that C36STR circuit is shorted to 12 V. | | |
| 179 | Platform Recirculation Coil | 9 | Shorted to GND | TCON detected the platform recirculation coil is shorted to GND. | None. Informational only. | * Verify wiring at J13-11. |
| | | 11 | Shorted to supply voltage | TCON detected the platform recirculation coil is shorted to 12 V. | | |
| 185 | ESTOP Source | 9 | Shorted to GND | TCON detected that ESTOP 1 is at 0 V but ESTOP 3 is at 12 V. | ESTOP circuit cannot complete, preventing machine functions. | * Using a voltmeter and with the system turned OFF, check the resistance between TCON J5 pins 9 and 10. Replace TCON if resistance is more than 5 ohms.<br>* Check P79PWR (BK, TCON J5-9) and P23PWR (RD, TCON J5-10) for open or short circuits. |
| | | 11 | Shorted to supply voltage | TCON detected that ESTOP 1 is at 12 V but ESTOP 3 is at 0 V. | | |
| 186 | ESTOP Return | 9 | Shorted to GND | Mismatched signals detected on ESTOP Return circuits. Either:<br>* PCON ESTOP 2 and ESTOP 4 do not match, or<br>* TCON ESTOP 2 and ESTOP 4 do not match. | ESTOP circuit cannot complete, preventing machine functions. | * Inspect PCON J15 pins 11 and 12 for open or short circuits. Using a voltmeter, set to diode test mode and make sure the diode tests ok with the anode at pin 12 and cathode at pin 11. If test fails, replace the PCON.<br>* Inspect TCON J5 pins 11 and 12 for open or short circuits. Using a voltmeter, set to diode test mode and make sure the diode tests ok with the anode at pin 12 and cathode at pin 11. If test fails, replace the PCON.<br>* Check P23RET (BK) for shorts to ground or power. |
| | | 11 | Shorted to supply voltage | | | |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 206 | TCON / PCON | 13 | TCON Bank Power Not Detected | The bank power on the TCON is no longer present. | None. | * Check J1, Bank Power, on TCON is making a good connection.<br>* Verify pin 1 is grounded.<br>* Verify pins 2, 3, 4 are 12V.<br>* Replace TCON. |
| | | | PCON Bank Power Not Detected | The bank power on the PCON is no longer present. | | * Check J11, Bank Power, on PCON is making a good connection.<br>* Verify pin 1 is grounded.<br>* Verify pins 3, 4 are 12V.<br>* Replace PCON. |
| 240 | Turntable Sensor Power | 9 | P85PWR Short to B- | P85PWR is shorted to B-. | Boom Up and Extend inhibited. | * Cycle power to allow the machine to re-test the fault. |
| | | 11 | P85PWR Short to B+ | P85PWR is shorted to B+. | | |
| 241 | Turntable Sensor Power | 9 | P109PWR is shorted to B- | P109PWR Short to B-. | Boom Up and Extend inhibited. | * Cycle power to allow the machine to re-test the fault. |
| | | 11 | P109PWR is shorted to B+ | P109PWR Short to B+. | | |
| 263 | Platform Level Loop Coil | 9 | Shorted to GND | TCON detected the platform level loop coil is shorted to GND. | None. Informational only. | * Verify wiring at J13-4. |
| | | 11 | Shorted to supply voltage | TCON detected the platform level loop coil is shorted to 12 V. | | |

## Engine Fault Codes

Some engine options have their own Electronic Control Module that contains more detailed fault information that is specific to the engine. This system can be accessed by using the engine's dedicated service tool. This service tool may be connected to the Engine Service Connector, located to the right of the battery tray.

The ground controls display and fault menu will show basic engine faults, such as low oil pressure and high coolant temperature. It will also show faults for engine warning and engine stop, which correspond to the engine warning lamp and engine stop lamp indicators that the engine may require.

More advanced faults specific to the engine will require the use of a corresponding engine service tool.

# Deutz D 2.9 L4 Tier IV 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 Tier IV 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 | Sensor 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 Tier IV 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 Tier IV 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 Tier IV Engine Fault Codes

SPN = Suspect Parameter Number
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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 Tier IV 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 Tier IV 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 Tier IV Engine Fault Codes

SPN = Suspect Parameter Number
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| 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 Tier IV Engine Fault Codes

SPN = Suspect Parameter Number
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| 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 Tier IV Engine Fault Codes

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| 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 Tier IV 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 |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 1000 | 98 | 2 | Engine oil level sensor internal error. Sensor reports error. Open/short transducer. |
| 1001 | 98 | 31 | Engine oil level out of range. Level low, high, foaming. |
| 1002 | 98 | 31 | Oil sensor voltage out of range. <8,5V ±0,5V; >16,5V ±0,5V. |
| 1003 | 98 | 2 | Oil sensor invalid sensor status. |
| 1004 | 98 | 31 | Oil sensor temperature out of range. |
| 1005 | 98 | 14 | Oil sensor is broken or disconnected. |
| 1021 | 100 | 3 | Oil pressure voltage above normal or shorted to high. |
| 1022 | 100 | 4 | Oil pressure voltage below normal or shorted to low. |
| 1025 | 100 | 1 | Low oil pressure. Warning threshold exceeded. |
| 1026 | 100 | 1 | Low oil pressure. Shut off threshold exceeded. |
| 1043 | 107 | 0 | Air filter differential pressure. Air filter clogged. |
| 1071 | 411 | 2 | Engine exhaust gas recirculation. Pressure does not change between engine operating points. |
| 1072 | 411 | 0 | Engine exhaust gas recirculation. Pressure above normal operational range. |
| 1073 | 411 | 1 | Engine exhaust gas recirculation. Pressure below normal operational range. |
| 1074 | 411 | 2 | Engine exhaust gas recirculation. Negative measured differential pressure. |
| 1075 | 411 | 2 | Engine exhaust gas recirculation. Positive measured differential pressure. |
| 1077 | 411 | 3 | Engine exhaust gas recirculation. Signal value above maximum limit. |
| 1078 | 411 | 4 | Engine exhaust gas recirculation. Signal value below maximum limit. |
| 1079 | 108 | 0 | Ambient air pressure sensor above normal operational range. |
| 1080 | 108 | 1 | Ambient air pressure sensor below normal operational range. |
| 1081 | 108 | 15 | Fault check max signal range violated for ambient air pressure sensor. |
| 1082 | 108 | 17 | Fault check min signal range violated for ambient air pressure sensor. |
| 1083 | 108 | 2 | Ambient air pressure sensor error by component self diagnosis. |
| 1084 | 3720 | 0 | DPF ash load above normal operational range. |
| 1086 | 3734 | 0 | DPF soot load exceeded. Remove filter level. |
| 1087 | 4781 | 14 | DPF soot load exceeded shut off level. |
| 1088 | 4781 | 0 | DPF soot load exceeded warning level. |
| 1089 | 4781 | 16 | DPF. Too much standstill time in short time interval. |
| 1090 | 10156 | 0 | DPF. The standstill-regeneration mode time exceeds the short-limit. |
| 1091 | 3735 | 16 | DPF. Standstill required and no successful standstill longer than escalation threshold. Moderately severe. |
| 1092 | 3735 | 0 | DPF. Standstill required and no successful standstill longer than escalation threshold. Most severe. |
| 1093 | 4766 | 1 | DOC. Regeneration temperature in standstill main phase not reached. |
| 1102 | 171 | 2 | Ambient air temperature shows a deviation from expected value at cold start conditions. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 111 | 102 | 0 | Engine intake manifold pressure above normal operational range. |
| 1114 | 102 | 1 | Engine intake manifold pressure below normal operational range. |
| 1115 | 102 | 3 | Intake manifold pressure sensor voltage above normal or shorted to high. |
| 1116 | 102 | 4 | Intake manifold pressure sensor voltage below normal or shorted to low. |
| 1118 | 102 | 1 | Intake manifold pressure below normal operational range. |
| 1121 | 102 | 2 | DFC for signal variation check for pressure sensor of the intake manifold. |
| 1122 | 102 | 0 | Intake air pressure valve sensor, warning condition exceeded. |
| 1123 | 102 | 1 | Intake air pressure valve sensor, shutoff condition exceeded. |
| 1124 | 1209 | 2 | Engine exhaust pressure turbine upstream differs from ambient pressure while engine not running. |
| 1125 | 1209 | 15 | Engine exhaust pressure turbine upstream above upper limit. |
| 1126 | 1176 | 1 | Engine turbocharger compressor intake pressure below normal operational range. |
| 1127 | 1209 | 2 | Engine exhaust pressure turbine upstream tuck check failed. Pressure does not change between engine operating points. |
| 1130 | 1209 | 3 | Engine exhaust pressure sensor voltage above normal or shorted to high. |
| 1131 | 1209 | 4 | Engine exhaust pressure sensor voltage below normal or shorted to low. |
| 1134 | 3251 | 3 | DPF voltage above normal or shorted to high. |
| 1135 | 3251 | 4 | DPF voltage below normal or shorted to low. |
| 1136 | 3251 | 14 | DPF reporting communication error. |
| 1137 | 3251 | 14 | DPF reporting data error. |
| 1138 | 3251 | 14 | DPF reporting fast channel 1 error. |
| 1139 | 3251 | 14 | DPF reporting fast channel 2 signal range error. |
| 1149 | 3251 | 2 | DPF difference pressure value not plausible. |
| 1150 | 3251 | 0 | DPF difference pressure above shut off threshold. |
| 1151 | 3251 | 16 | DPF difference pressure above warning threshold. |
| 1152 | 3251 | 1 | DPF difference pressure below shut off threshold. |
| 1153 | 3251 | 18 | DPF difference pressure below warning threshold. |
| 1161 | 5571 | 16 | Rail fuel pressure relief valve above normal operational range. |
| 1162 | 5571 | 2 | Rail fuel pressure relief valve is forced to open, perform pressure increase. |
| 1163 | 5571 | 2 | Rail fuel pressure relief valve is forced to open. Performed by pressure increase. |
| 1164 | 5571 | 16 | Rail fuel pressure relief valve is forced to open. Shutoff conditions. |
| 1165 | 5571 | 15 | Rail fuel pressure relief valve is forced to open. Warning conditions. |
| 1166 | 5571 | 0 | Open rail fuel pressure relief valve was detected. |
| 1167 | 5571 | 2 | Unexpected opening of the rail fuel pressure relief valve. |
| 1168 | 5571 | 2 | Successful rail fuel pressure relief valve opening cannot be ensured. |
| 1169 | 5571 | 13 | Averaged rail fuel pressure after valve opening is outside the expected tolerance range. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 1170 | 5571 | 16 | Open time of rail fuel pressure relief valve for wear out monitoring had exceeded. |
| 1171 | 94 | 1 | Fuel pressure build up during engine start not successful. |
| 1172 | 1347 | 5 | Electrical fuel pump current below normal or open circuit. |
| 1174 | 1347 | 3 | Electrical fuel pump voltage above normal or shorted to high. |
| 1175 | 1347 | 4 | Electrical fuel pump voltage below normal or shorted to low. |
| 119 | 1231 | 14 | CAN Bus 2 off Error for Application CAN. |
| 1190 | 7103 | 13 | Rail fuel pressure below set point, speed-dependent threshold exceeded. |
| 1191 | 7103 | 13 | Rail fuel pressure metering unit. Fuel quantity balance is disrupted. |
| 1194 | 7103 | 13 | Negative rail fuel pressure governor deviation at zero delivery by metering unit. |
| 1195 | 7103 | 1 | Rail fuel pressure value is below minimum rail pressure threshold. |
| 1197 | 7103 | 0 | Maximum rail fuel pressure exceeded. |
| 1198 | 7103 | 2 | Set point of fuel metering unit in overrun mode not plausible. |
| 120 | 639 | 14 | CAN Bus 1 off Error for Power train CAN. |
| 1200 | 5357 | 14 | Shut-off due to undershoot of minimum rail pressure. |
| 1202 | 157 | 0 | Maximum rail pressure exceeded in limp home mode. |
| 1208 | 157 | 3 | Engine fuel injector metering rail pressure voltage above normal or shorted to high. |
| 1209 | 157 | 4 | Engine fuel injector metering rail pressure voltage below normal or shorted to low. |
| 121 | 520252 | 2 | Wrong checksum in the CAN message EAT Control. |
| 1212 | 629 | 12 | ECU. Keep alive error during runtime at an external device. |
| 1213 | 629 | 12 | ECU. Keep alive error during initialization phase at an external device. |
| 1215 | 629 | 12 | ECU. Read diagnosis error for non volatile memory. |
| 1216 | 629 | 12 | ECU. Write diagnosis error for non volatile memory. |
| 1218 | 629 | 12 | ECU. Stack memory threshold overrun. |
| 1219 | 629 | 12 | ECU. Observation counter irregular switch off counter triggered by engine running. |
| 122 | 4207 | 2 | TSC1 message checksum fault. |
| 123 | 4207 | 2 | TSC1 message checksum fault. |
| 1233 | 5826 | 15 | Emission control system operator inducement level 1 severity above normal operational range. |
| 1235 | 5826 | 0 | Emission control system operator inducement level 2 severity above normal operational range. |
| 1236 | 5826 | 14 | Emission control system operator pre-trigger inducement level 2 severity. |
| 124 | 4207 | 2 | TSC1 message checksum fault. |
| 125 | 4207 | 2 | TSC1 message checksum fault. |
| 1274 | 91 | 3 | Accelerator pedal sensor position 1 voltage above normal or shorted to high. |
| 1275 | 2623 | 3 | Accelerator pedal 1, channel 2 voltage above normal or shorted to high. |
| 1276 | 29 | 3 | Accelerator pedal 2 voltage above normal or shorted to high. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 1277 | 2625 | 3 | Accelerator pedal 2, channel 2 voltage above normal or shorted to high. |
| 1280 | 91 | 4 | Accelerator pedal sensor position 1 voltage below normal or shorted to low. |
| 1281 | 2623 | 4 | Accelerator pedal 1, channel 2 voltage below normal or shorted to low. |
| 1282 | 29 | 4 | Accelerator pedal 2 voltage below normal or shorted to low. |
| 1283 | 2625 | 4 | Accelerator pedal 2, channel 2 voltage below normal or shorted to low. |
| 1289 | 3509 | 14 | Failure of sensor supply voltage 1 from ECU. |
| 1290 | 3509 | 0 | Sensor supply voltage 1 from ECU above normal operational range. |
| 1291 | 3509 | 6 | Sensor supply voltage 1 from ECU current above normal or grounded circuit. |
| 1292 | 3509 | 1 | Sensor supply voltage 1 from ECU below normal operational range. |
| 1293 | 3510 | 14 | Failure of sensor supply voltage 2 from ECU. |
| 1294 | 3510 | 0 | Sensor supply voltage 2 from ECU above normal operational range. |
| 1295 | 3510 | 6 | Sensor supply voltage 2 from ECU current above normal or grounded circuit. |
| 1296 | 3510 | 1 | Sensor supply voltage 2 from ECU below normal operational range. |
| 1306 | 677 | 3 | Engine starter motor relay voltage above normal or shorted to high. |
| 1307 | 677 | 4 | Engine starter motor relay voltage below normal or shorted to low. |
| 1308 | 677 | 5 | Engine starter motor relay current below normal or shorted to low. |
| 1310 | 677 | 3 | Engine starter motor relay voltage above normal or shorted to high. |
| 1311 | 677 | 4 | Engine starter motor relay voltage below normal or shorted to low. |
| 1323 | 91 | 11 | Accelerator pedal position 1. Possible error between APP1 and APP2 or APP1 and idle switch. |
| 1326 | 29 | 11 | Accelerator Pedal 2 Position. Possible error between APP1 and idle switch. |
| 1346 | 1041 | 14 | Start signal indicator. Terminal 50 was operated too long. |
| 1354 | 105 | 0 | Engine intake manifold 1 temperature data above normal operational range. Warning threshold exceeded. |
| 1355 | 105 | 0 | Engine intake manifold 1 temperature above normal operational range. Shutoff threshold exceeded. |
| 1357 | 1136 | 0 | Engine ECU temperature above normal operational range. Most severe. |
| 1358 | 1136 | 1 | Engine ECU temperature below normal operational range. Most severe. |
| 1359 | 1136 | 15 | Engine ECU temperature above normal operational range. Least severe. |
| 1360 | 1136 | 17 | Engine ECU temperature below normal operational range. Least severe. |
| 1361 | 1136 | 2 | Engine ECU temperature fault check. |
| 1362 | 412 | 15 | Engine exhaust gas recirculation temperature above normal operational range. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 1363 | 412 | 17 | Engine exhaust gas recirculation temperature below normal operational range. |
| 1364 | 412 | 3 | Engine exhaust gas recirculation temperature voltage above normal or shorted to high. |
| 1365 | 412 | 4 | Engine exhaust gas recirculation temperature voltage below normal or shorted to low. |
| 1372 | 51 | 5 | Engine throttle valve 1, position 1 current below normal or open circuit. |
| 1375 | 51 | 3 | Engine throttle valve 1, position 1 voltage above normal or shorted to high. Short circuit to battery 1. |
| 1376 | 51 | 3 | Engine throttle valve 1, position 1 voltage above normal or shorted to high. Short circuit to battery 2. |
| 1377 | 51 | 4 | Engine throttle valve 1, position 1 voltage below normal or shorted to low. Short circuit to ground 1. |
| 1378 | 51 | 4 | Engine throttle valve 1, position 1 voltage below normal or shorted to low. Short circuit to ground 2. |
| 1379 | 51 | 6 | Engine throttle valve 1, position 1 current above normal or grounded circuit. |
| 1382 | 51 | 7 | Engine throttle valve 1 position 1 mechanical system not responding or out of adjustment. Valve stuck closed. |
| 1383 | 51 | 7 | Engine throttle valve 1 position 1 mechanical system not responding or out of adjustment. Valve stuck open. |
| 1391 | 51 | 3 | Engine throttle valve 1, position 1 voltage above normal or shorted to high. |
| 1392 | 51 | 4 | Engine throttle valve 1, position 1 voltage below normal or shorted to low. |
| 1397 | 105 | 0 | Engine intake manifold 1 temperature above normal operational range. |
| 1398 | 105 | 1 | Engine intake manifold 1 temperature below normal operational range. |
| 1399 | 4766 | 2 | DOC temperature too high. |
| 1400 | 4766 | 2 | DOC temperature too low. |
| 1401 | 4766 | 15 | DOC outlet temperature above normal operational range. |
| 1402 | 4766 | 3 | DOC outlet temperature voltage above normal or shorted to high. |
| 1403 | 4766 | 4 | DOC outlet temperature voltage below normal or shorted to low. |
| 1404 | 4766 | 2 | DOC intake temperature error. |
| 1405 | 4766 | 15 | DOC Intake temperature above normal operational range. |
| 1406 | 4766 | 3 | DOC intake temperature voltage above normal or shorted to high. |
| 1407 | 4766 | 4 | DOC intake temperature voltage below normal or shorted to low. |
| 1408 | 4766 | 2 | DOC intake temperature does not change. |
| 142 | 520256 | 9 | Timeout of EAT control receive message. CAN message is not received. |
| 144 | 523211 | 9 | Timeout error of CAN receive frame EBC1. |
| 154 | 523212 | 9 | Timeout error of CAN receive frame engine protection. |
| 1540 | 520254 | 8 | The stand still regeneration mode time exceeds the long limit threshold. |
| 1541 | 520255 | 2 | Hoses connected to the dp DPF SENT sensor inverted. Swap hoses. |
| 155 | 523741 | 14 | Engine shutdown request via CAN. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 1587 | 97 | 0 | Water in fuel level prefilter; maximum value exceeded. |
| 188 | 523240 | 9 | Timeout CAN message function mode control. |
| 219 | 520253 | 2 | Rolling counter fault CAN message EAT Control. |
| 220 | 4206 | 2 | Fault check for Rolling Counter of TSC1AE. |
| 221 | 4206 | 2 | Fault check for Rolling Counter of TSC1AR. |
| 222 | 4206 | 2 | Fault check for Rolling Counter of TSC1TE. |
| 223 | 4206 | 2 | Fault check for Rolling Counter of TSC1TR. |
| 349 | 3349 | 0 | Timeout error of CAN receive frame active TSC1AE. |
| 350 | 3349 | 0 | Timeout error of CAN receive frame passive TSC1AE. |
| 351 | 3349 | 0 | Timeout error of CAN receive frame active TSC1AR. |
| 352 | 3349 | 0 | Timeout error of CAN receive frame passive TSC1AR. |
| 353 | 3349 | 0 | Timeout error of CAN receive frame TSC1TE active. |
| 354 | 3349 | 0 | TSC1 receive timeout error. Short circuit to ground error. |
| 355 | 3349 | 0 | Timeout error of CAN receive frame TSC1TR. |
| 356 | 3349 | 0 | Passive timeout error of CAN receive frame TSC1TR. |
| 361 | 3349 | 0 | Timeout error of CAN receive frame TSC1AE. Traction Control. |
| 363 | 3349 | 0 | Timeout error of CAN receive frame TSC1AR. Retarder. |
| 365 | 3349 | 0 | Timeout error of CAN receive frame TSC1TE. Setpoint. |
| 367 | 3349 | 0 | Timeout Error of CAN receive frame TSC1TR; control signal. |
| 38 | 1485 | 3 | ECM main relay voltage above normal or shorted to high. |
| 39 | 1485 | 3 | ECM main relay voltage above normal or shorted to high of actuator relay 2. |
| 40 | 1485 | 3 | ECM main relay voltage above normal or shorted to high of actuator relay 3. |
| 41 | 1485 | 4 | ECM main relay voltage below normal or shorted to low. |
| 42 | 1485 | 4 | ECM main relay voltage below normal or shorted to low of actuator relay 2. |
| 43 | 1485 | 4 | ECM main relay voltage below normal or shorted to low of actuator relay 3. |
| 48 | 168 | 0 | Battery voltage above normal operational range. |
| 49 | 168 | 1 | Battery voltage low normal operational range. |
| 50 | 168 | 3 | Battery voltage above normal or shorted to high. |
| 51 | 168 | 4 | Battery voltage above normal or shorted to low. |
| 516 | 523982 | 0 | Power stage diagnosis disabled. High battery voltage. |
| 517 | 523982 | 1 | Power stage diagnosis disabled. Low battery voltage. |
| 52 | 168 | 0 | High battery voltage. Warning threshold is exceeded. |
| 567 | 27 | 5 | Engine exhaust gas recirculation 1 valve position current below normal or open circuit. |
| 570 | 27 | 3 | Engine exhaust gas recirculation 1 valve position voltage above normal or shorted to battery 1. |
| 571 | 27 | 3 | Engine exhaust gas recirculation 1 valve position voltage above normal or shorted to battery 2. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 572 | 27 | 4 | Engine exhaust gas recirculation 1 valve position voltage below normal or shorted to ground 1. |
| 573 | 27 | 4 | Engine exhaust gas recirculation 1 valve position voltage below normal or shorted to ground 2. |
| 574 | 27 | 6 | Engine exhaust gas recirculation 1 valve position current above normal or grounded circuit. |
| 577 | 27 | 7 | Engine exhaust gas recirculation 1 valve position. Mechanical system not responding or out of adjustment. Valve stuck closed. |
| 578 | 27 | 7 | Engine exhaust gas recirculation 1 valve position. Mechanical system not responding or out of adjustment. Valve stuck open. |
| 582 | 5763 | 3 | Engine exhaust gas recirculation 1, actuator 1 voltage above normal or shorted to high. |
| 583 | 5763 | 4 | Engine exhaust gas recirculation 1, actuator 1 voltage below normal or shorted to low. |
| 586 | 3055 | 14 | Internal software error ECU. Injection cut off. |
| 587 | 190 | 0 | Engine speed above warning threshold. Over speed detection in component engine protection. |
| 588 | 190 | 0 | Engine speed above warning threshold. FOC-Level 1. |
| 589 | 190 | 0 | Engine speed above warning threshold. FOC-Level 2. |
| 590 | 190 | 0 | Engine speed above warning threshold. Overrun Mode. |
| 610 | 171 | 15 | Environment temperature sensor, temperature above upper physical threshold. |
| 613 | 171 | 3 | Ambient air temperature sensor voltage above normal or shorted to high. |
| 614 | 171 | 4 | Ambient air temperature sensor voltage below normal or shorted to low. |
| 615 | 723 | 8 | Camshaft speed sensor abnormal frequency or pulse width or period. |
| 616 | 723 | 14 | Camshaft sensor detection. Out of range, signal disrupted, no signal. |
| 617 | 723 | 13 | Offset angle between crank and camshaft sensor is too large. |
| 618 | 4201 | 8 | Crankshaft sensor detection. Out of range, signal disrupted, no signal. |
| 619 | 4201 | 14 | Crankshaft speed sensor. Speed detection, out of range, signal disrupted or no signal. |
| 68 | 1669 | 14 | CAN Bus ID-5. CAN Hardware registers are not updated within the expected time. |
| 70 | 110 | 2 | Engine Coolant Temperature. Data erratic, intermittent or incorrect. |
| 709 | 97 | 3 | Water in fuel indicator 1. Voltage above normal or shorted to high. |
| 710 | 97 | 4 | Water in fuel indicator 1. Voltage below normal or shorted to low. |
| 721 | 94 | 15 | Low fuel pressure system, max. physical range exceeded. |
| 723 | 94 | 3 | Engine fuel pressure sensor voltage above normal or shorted to high. |
| 724 | 94 | 4 | Engine fuel pressure sensor voltage below normal or shorted to low. |
| 725 | 94 | 1 | Low fuel pressure system, warning threshold exceeded. |
| 726 | 94 | 1 | Low fuel pressure, shut off threshold exceeded. |
| 75 | 110 | 3 | Engine coolant temperature voltage above normal or shorted to high. |
| 76 | 110 | 4 | Engine coolant temperature voltage below normal or shorted to low. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 77 | 110 | 0 | High coolant temperature. Warning threshold exceeded. |
| 78 | 110 | 0 | Coolant temperature. System reaction initiated. |
| 797 | 676 | 12 | Engine cold start aid relay error. |
| 798 | 676 | 5 | Engine cold start aid relay current below normal or open circuit. |
| 799 | 676 | 5 | Engine cold start aid relay current below normal or open circuit. |
| 80 | 411 | 2 | Intake air massflow not in expected range. |
| 803 | 676 | 3 | Engine cold start aid relay voltage above normal or shorted to high. |
| 805 | 676 | 4 | Engine cold start aid relay voltage below normal or shorted to low. |
| 807 | 2797 | 14 | Engine fuel 1 injector, Group 1. Number of possible injections limited by the injection valve. |
| 815 | 2797 | 4 | Engine fuel 1 injector, Group 1 voltage below normal or shorted to low. |
| 816 | 5358 | 5 | Engine cylinder 1 fuel injection quantity current below normal or open circuit. |
| 817 | 5359 | 5 | Engine cylinder 2 fuel injection quantity current below normal or open circuit. |
| 818 | 5360 | 5 | Engine cylinder 3 fuel injection quantity current below normal or open circuit. |
| 819 | 5361 | 5 | Engine cylinder 4 fuel injection quantity current below normal or open circuit. |
| 820 | 5362 | 5 | Engine cylinder 5 fuel injection quantity current below normal or open circuit. |
| 821 | 5363 | 5 | Engine cylinder 6 fuel injection quantity current below normal or open circuit. |
| 822 | 2797 | 6 | Engine fuel 1 injector, Group 1 current above normal or grounded circuit. |
| 823 | 2798 | 6 | Engine fuel 1 injector, Group 2 current above normal or grounded circuit. |
| 824 | 5358 | 6 | Engine cylinder 1 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side. |
| 825 | 5359 | 6 | Engine cylinder 2 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side. |
| 826 | 5360 | 6 | Engine cylinder 3 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side. |
| 827 | 5361 | 6 | Engine cylinder 4 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side. |
| 828 | 5362 | 6 | Engine cylinder 5 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side. |
| 829 | 5363 | 6 | Engine cylinder 6 fuel injection quantity above normal or grounded circuit. Short circuit of the power stage low-side. |
| 83 | 111 | 1 | Coolant level too low. |
| 830 | 5358 | 6 | Engine cylinder 1 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 831 | 5359 | 6 | Engine cylinder 2 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage. |
| 832 | 5360 | 6 | Engine cylinder 3 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage. |
| 833 | 5361 | 6 | Engine cylinder 4 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage. |
| 834 | 5362 | 6 | Engine cylinder 5 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage. |
| 835 | 5363 | 6 | Engine cylinder 6 fuel injection quantity above normal or grounded circuit. Short circuit between high-side and low-side of the power stage. |
| 836 | 105 | 3 | Engine intake manifold temperature voltage above normal or shorted to high. |
| 837 | 105 | 4 | Engine intake manifold temperature voltage below normal or shorted to low. |
| 838 | 2797 | 14 | Engine fuel 1 injector, group 1 missing injector adjustment value programming injector 1. |
| 839 | 2798 | 14 | Engine fuel 1 injector, group 2 missing injector adjustment value programming injector 2. |
| 840 | 4257 | 14 | Engine fuel 1 injector, group 3 missing injector adjustment value programming injector 3. |
| 854 | 7103 | 5 | Engine fuel metering rail pump current below normal or open circuit. |
| 855 | 7103 | 3 | Engine fuel metering rail pump voltage above normal or shorted to high. Short circuit to battery on the high side power stage. |
| 856 | 7103 | 3 | Engine fuel metering rail pump voltage above normal or shorted to high. Short circuit to battery on the low side power stage. |
| 857 | 7103 | 4 | Engine fuel metering rail pump voltage below normal or shorted to low. Short circuit to battery on the high side power stage. |
| 858 | 7103 | 4 | Engine fuel metering rail pump voltage below normal or shorted to low. Short circuit to battery on the low side power stage. |
| 859 | 7103 | 6 | Engine fuel metering rail pump current above normal or grounded circuit. |
| 868 | 629 | 12 | Function monitoring: fault of ECU ADC. Null load test pulse. |
| 869 | 629 | 12 | Function monitoring: fault of ECU ADC. Test voltage. |
| 870 | 629 | 12 | ECU. DFC to indicate ICO request from MoCSOP module. |
| 871 | 91 | 14 | Function monitoring: Monitoring of accelerator pedal position. |
| 875 | 190 | 2 | Function monitoring: Fault of engine speed check. |
| 876 | 5357 | 2 | Engine fuel injection error for multiple cylinders. Diagnostic fault check error between level 1 energizing time and level 2 information. |

# Deutz TD 2.2 L3, D/TD 2.9 L4 Stage IV Engine Fault Codes

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

| DTC | SPN | FMI | Description |
|---|---|---|---|
| 877 | 5441 | 2 | Engine fuel injection timing error for multiple cylinders. |
| 878 | 5357 | 2 | Engine fuel injection error for multiple cylinders. Diagnostic fault check to report the error due to non plausibility in ZFC. |
| 879 | 523612 | 12 | Internal recovery. Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI2 shut-off. |
| 88 | 598 | 10 | Clutch switch. Abnormal rate of change. |
| 880 | 523612 | 12 | Internal recovery. Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI3 efficiency factor. |
| 881 | 523612 | 12 | Internal recovery. Diagnosis fault check to report the error to demand for an ICO due to an error in change of EOM. |
| 882 | 5357 | 2 | Engine fuel injection error for multiple cylinders. Diagnosis fault check to report the error to demand for an ICO due to an error in total torque relevant quantity. |
| 883 | 5357 | 2 | Engine fuel injection error for multiple cylinders. Diagnostic fault check to report the error due to injection quantity correction. |
| 884 | 5442 | 2 | Engine fuel injection pressure error for multiple cylinders. |
| 885 | 29 | 2 | Accelerator pedal 2 position. |
| 886 | 677 | 2 | Engine starter motor relay. Function monitoring: Fault of ECU power train active. |
| 887 | 513 | 2 | Actual engine percent torque. DFC to report the fault in energizing time comparison. |
| 888 | 513 | 2 | Actual engine percent torque. DFC to report in torque comparison error. |
| 889 | 520250 | 2 | Function monitoring: Error in the post-build selectable monitoring. |
| 890 | 629 | 12 | ECU. Status of the EMM alarm FCCU0 which is read out of the FCCU hardware module. |
| 91 | 1109 | 2 | Engine protection system approaching shutdown. Engine shut off demand ignored. |
| 92 | 1109 | 14 | Engine protection system approaching shutdown. Shut off request from supervisory monitoring function. |
| 996 | 629 | 12 | ECU. Diagnostic fault check to report ABE active state. |
| 997 | 629 | 12 | Function monitoring: Fault of ECU, WDA active by inquiry/response communication. |
| 998 | 629 | 12 | Function monitoring: Fault of ECU, Error Pin active suspision of HW fault. |
| 999 | 629 | 12 | Function monitoring: Fault of ECU, WDA active by overvoltage detection. |

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

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

# Perkins 404F-E22T 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-E22T 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

| 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 |

| Code | Description |
|---|---|
| 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 |

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# 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 |

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# 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 |

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# 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 |
| 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 |

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# 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 |

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# Schematics



## Observe and Obey:

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

## Before Troubleshooting:

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

## About This Section

There are two groups of schematics in this section.

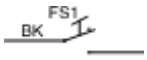
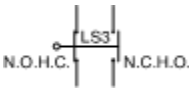
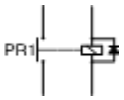
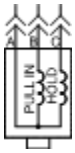
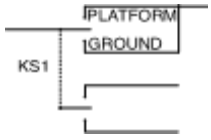
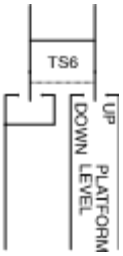
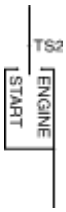
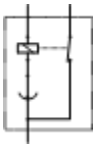
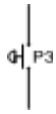
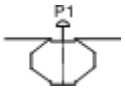
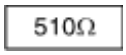
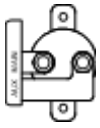
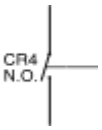
### Electrical Schematics

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

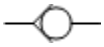
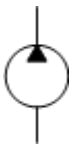
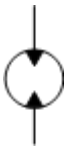
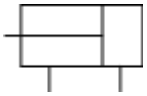
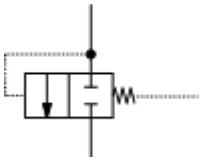
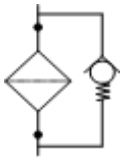
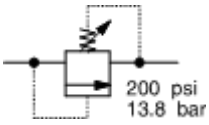
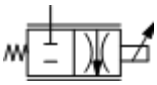
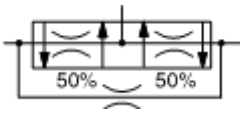
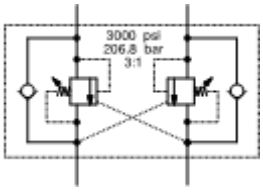
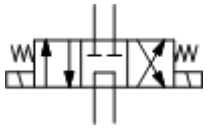
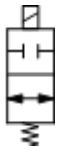
### Hydraulic Schematics

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

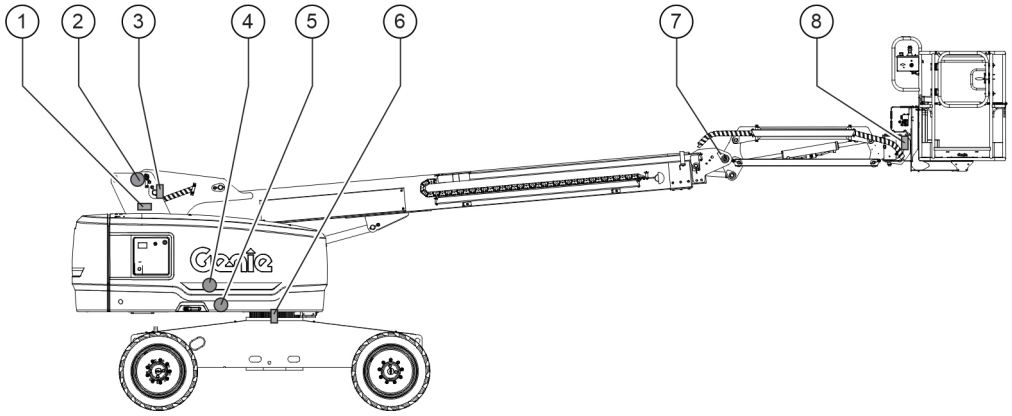
# Electrical Symbol Legend

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

# Hydraulic Symbols Legend

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

# Limit Switch Location Legend

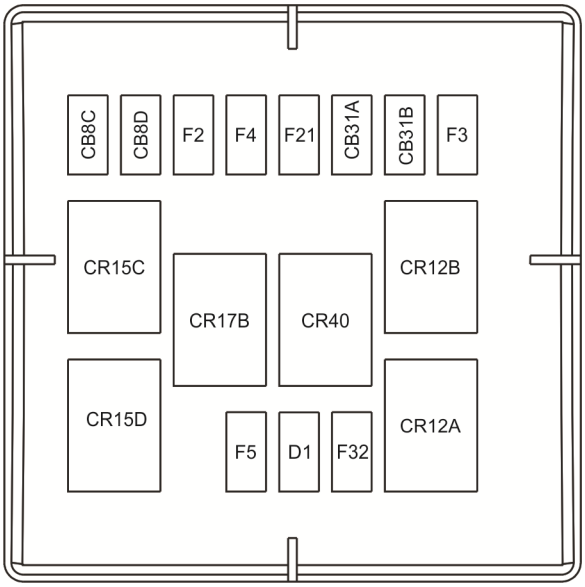



1 LSB1RS
2 String Potentiometer
3 LST3S
4 S17
5 S8O, S8S
6 LST1O
7 S6
8 S24

**Limit Switches and Sensors**

| | |
|---|---|
| LSB1RS | Limit switch boom fully retracted - safety |
| String pot | Measures boom extension |
| LST3S | Limit switch boom angle - safety |
| S17 | Boom angle sensor |
| S8O | Universal tilt sensor - operational |
| S8S | Universal tilt sensor - safety |
| LST1O | Limit switch turntable - operational |
| S6 | Platform angle sensor |
| S24 | Load cell - platform overload |

# Engine Relay Layout - All engines except Perkins 404F




**All engines**

**Fuses**

| | | |
|---|---|---|
| F19 | 10A | Drive light |
| F21 | 5A | Telematic option |
| CB1 | 30A | Engine control power |
| CB2 | 15A | System control logic power |
| CB8A | 30A | Glow plug 1 |
| CB8B | 30A | Glow plug 2 |
| CB9 | 30A | Engine run / options/ acc |
| CB10 | 20A | System control driver power |

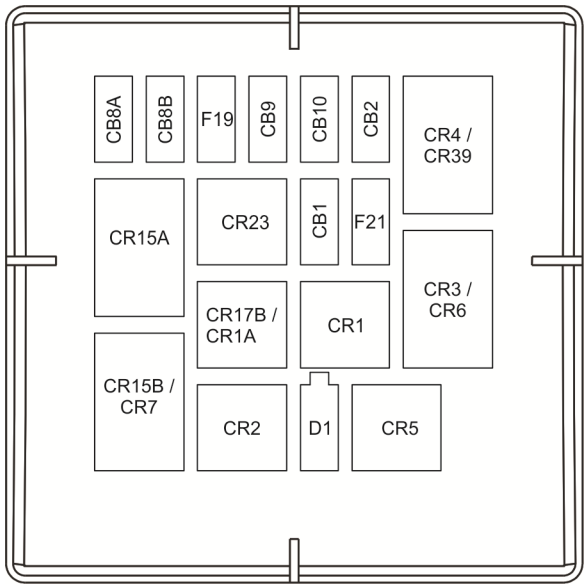
**Diode**

| | | |
|---|---|---|
| D1 | 6A | Alternator Ext. |

**Relays**

| | |
|---|---|
| CR1 | Engine start |
| CR2 | Engine run |
| CR3 / CR6 | low RPM / Fuel pump |
| CR4 / CR39 | High RPM / Aux shut down |
| CR5 | Horn |
| C15A | Engine glow plug A |
| CR15B / CR7 | Engine glow plug B / LPG solenoid |
| CR17 | Hydraulic oil cooler (option) |
| CR23 | Drive light |
| CR39 | Aux shut down |

# Engine Relay Layout - Perkins 404F-22T




**Perkins 404F-22T only (second relay box)**

**Fuses**

| | | |
|---|---|---|
| F2 | 25A | Hyd / Start |
| F3 | 1A | Relay power |
| F4 | 5A | Eng ECU power |
| F5 | 1A | Spare |
| F21 | 10A | Fuel / Alt exct |
| F32 | 15A | Heater |

**Circuit Breakers**

| | | |
|---|---|---|
| CB8C | 30A | Glow plug 1 |
| CB8D | 30A | Glow plug 2 |
| CB31A | 20A | Eng ECU 1 |
| CB32B | 20A | Eng ECU 2 |

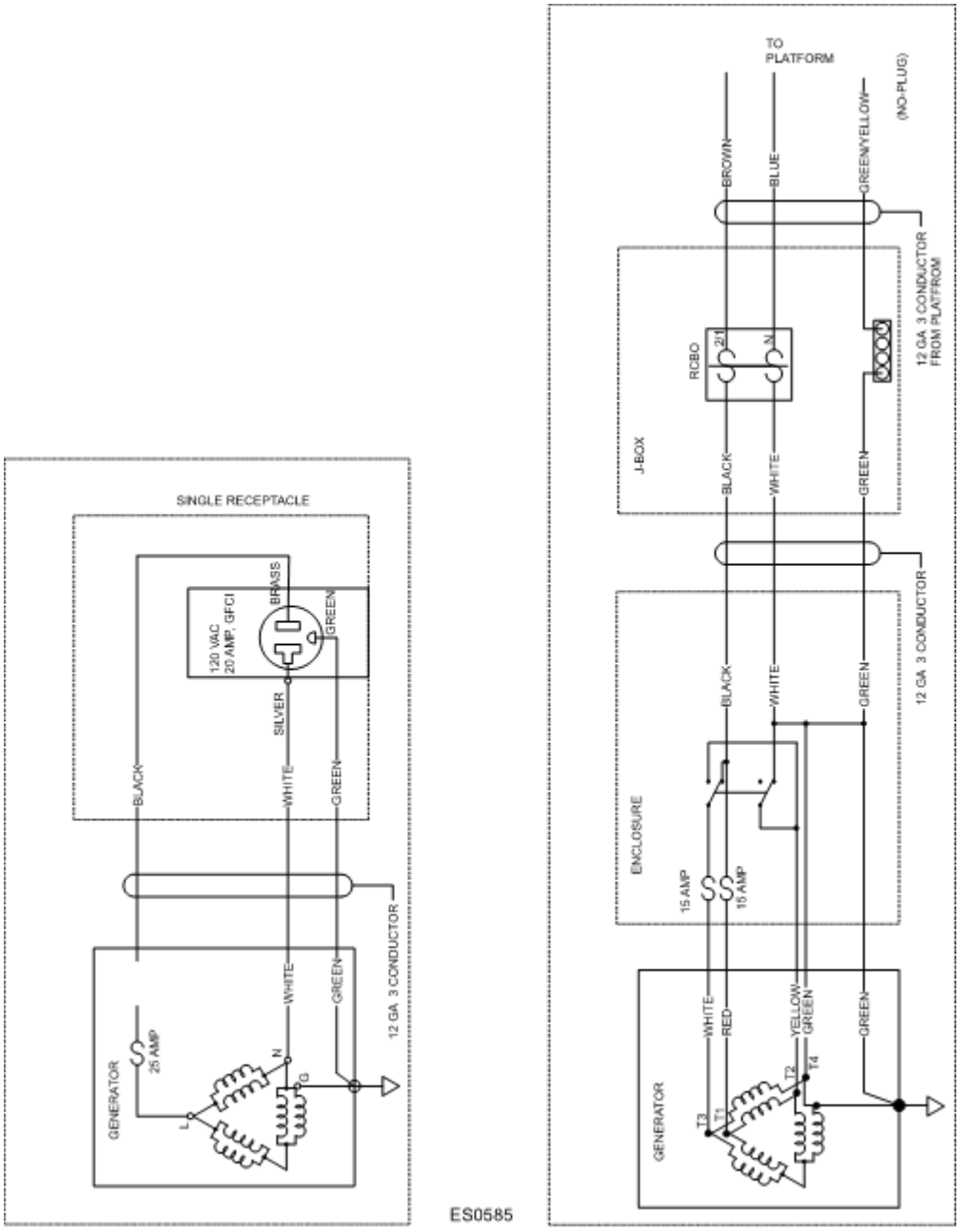
**Diode**

| | | |
|---|---|---|
| D1 | 6A | Alternator Ext. |

**Relays**

| | |
|---|---|
| CR12A | Engine ECU 1 |
| CR12B | Engine ECU 2 |
| CR15C | Glow plug 1 |
| CR15D | Glow plug 2 |
| CR17B / CR1A | Hyd fan / Start |
| CR40 | Fuel pump |

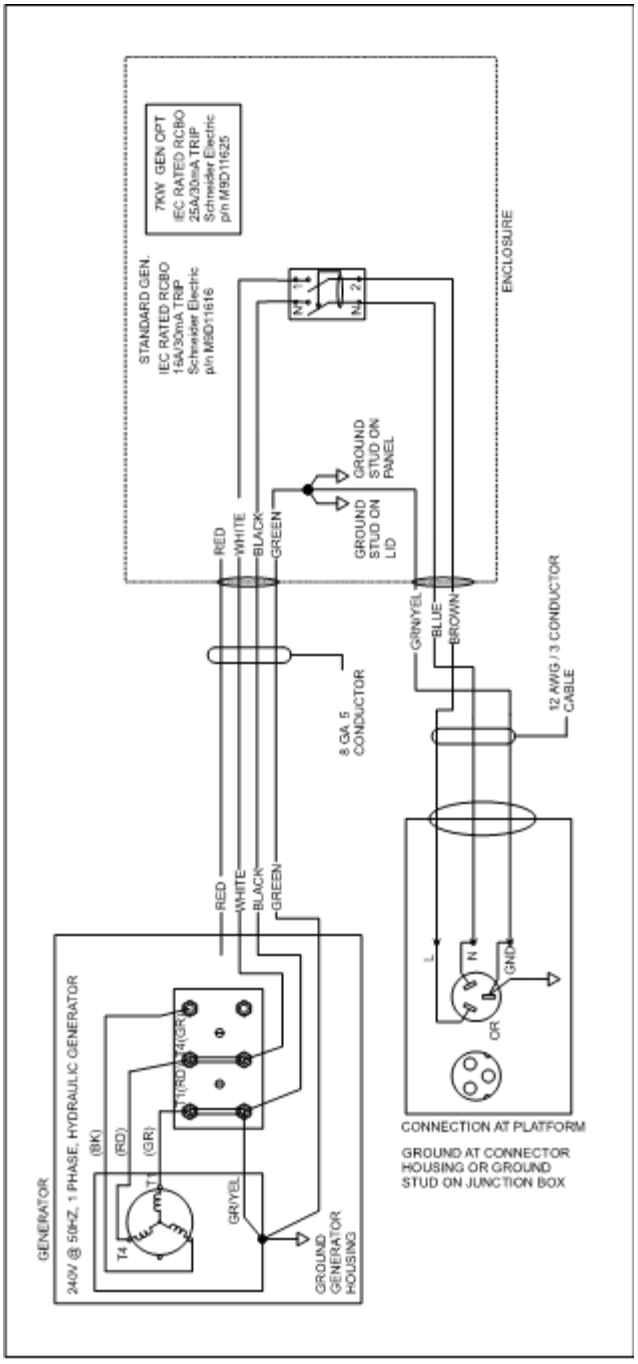
# 3 kW Generator Receptacle Wiring




3kW 120V/60Hz GENERATOR AC WIRING

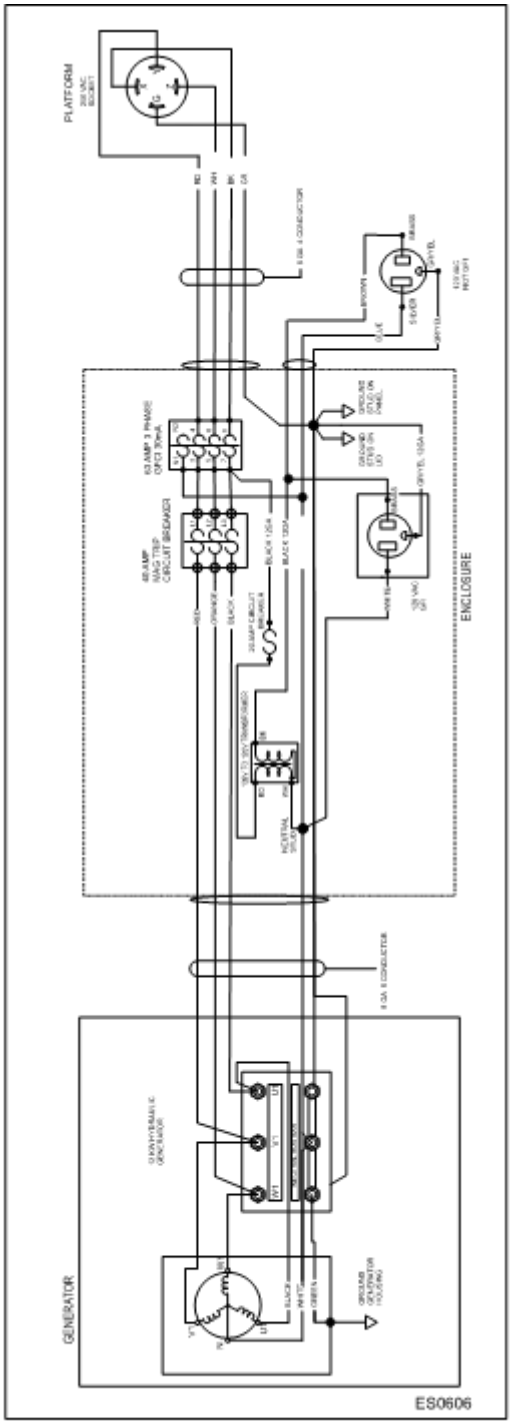
3kW 115V-230V/50Hz GENERATOR AC WIRING

# 7 kW Generator Receptacle Wiring




7KW WELDER GENERATOR AC WIRING, ES0605

# 12 kW Generator Receptacle Wiring




12kW WELDER GENERATOR AC SCHEMATIC AND WIRING

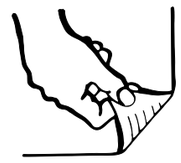
# Connector Pin Legend

| Number | Description |
|---|---|
| C1 | Boom cable - Controls |
| C2 | Boom cable - Power |
| C3 | Boom sensors |
| C4 | Function manifold |
| C5 | Function manifold |
| C6 | Engine |
| C7 | Engine |
| C8 | Engine - Power |
| C9 | Footswitch |
| C10 | Platform options |
| C11 | Platform manifold |
| C12 | Boom cable (platform) - Controls |
| C13 | Drive lights |
| C14 | Hydraulic oil cooler |
| C15 | Flashing beacons |
| C16 | Engine diagnostic port |
| C17 | Boom cable (platform) - power |
| C18 | D2.9 engine connector |
| C19 | LST3S |
| C20 | LST1O |
| C21 | LSB1RS |
| C22 | LSB2S |
| C23 | Generator from engine harness |
| C24 | Welder encloser |
| C25 | GM3.0 vehicle interface conn. 1 |
| C26 | GM3.0 vehicle interface conn. 2 |
| C27 | Load sense |
| C28 | Boom angle sensor |
| C29 | Boom extension string pot |
| C30 | Canbus terminating resistor |
| C31 | Crew alarm proximity switch |
| C32 | Crew alarm lights |
| C33 | GBOX service port |
| C34 | PBOX service port |
| C35 | 404D speed sensor |
| C36 | 404D fuel solenoid |
| C37 | Work lights |
| C41 | VEC - black - 8 pin |
| C42 | VEC - gray - 8 pin |
| C43 | VEC - blue - 8 pin |
| C44 | VEC - green - 8 pin |
| C45 | VEC- gray - 2 pin |
| C46 | VEC - black - 2 pin |
| C47 | Function enable |
| C48 | Brake |
| C49 | Motor stroke |
| C50 | Drive pump |
| C51 | Engine ECG |
| C52 | Engine ECG |
| C53 | Platform recirculation valve |
| C56 | Telematics |
| C57 | ACP |
| C61 | VEC2-black- 8 pin |
| C62 | VEC2-black- 8 pin |
| C63 | VEC2-blue- 8 pin |
| C64 | VEC2-green- 8 pin |
| C65 | VEC2-gray- 8 pin |
| C66 | VEC2-black- 8 pin |
| C72 | ECU |

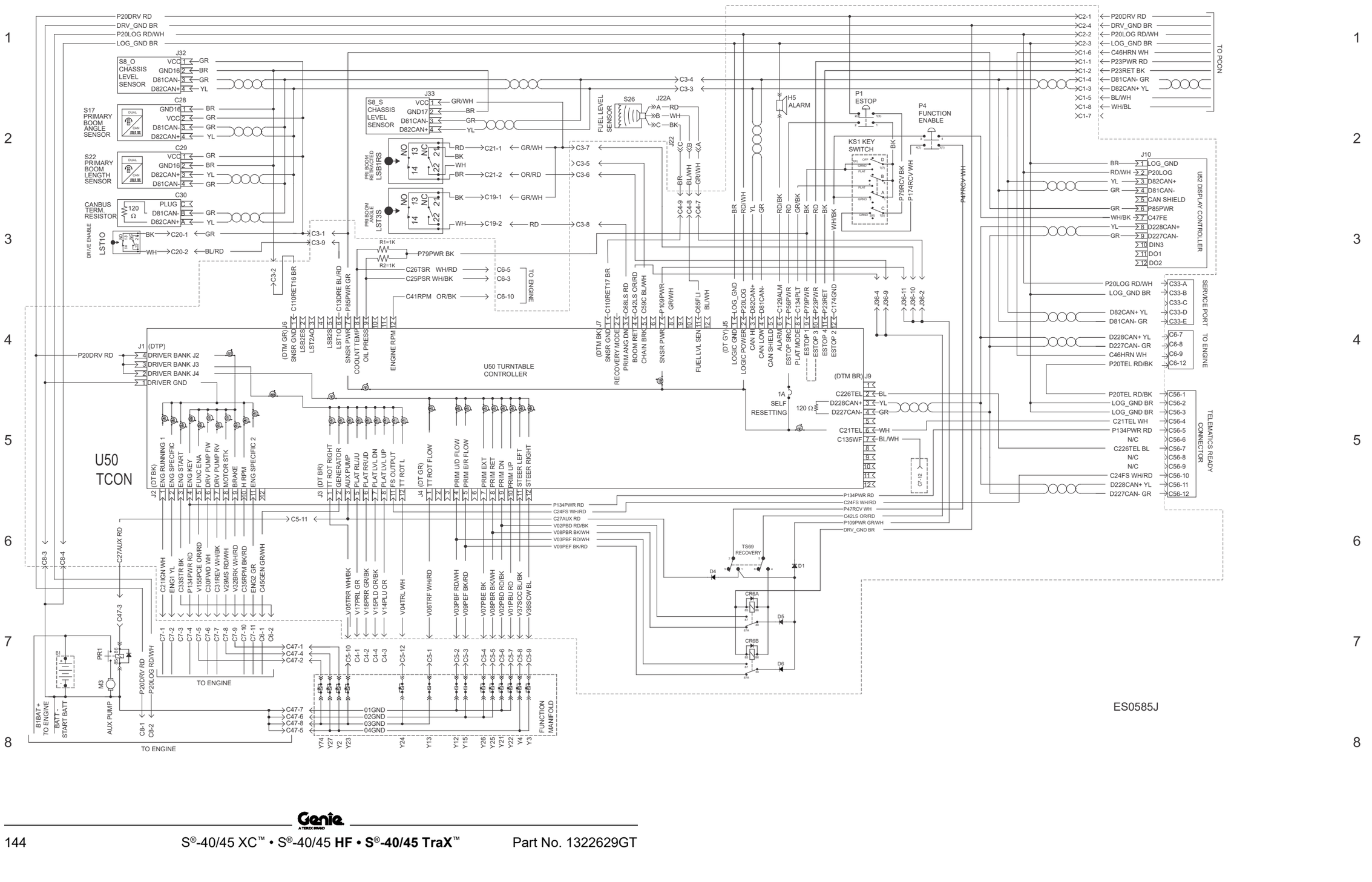
# Connector Pin Legend

| Number | Description |
|---|---|
| J1 | TCON power |
| J2 | TCON engine |
| J3 | TCON functions |
| J4 | TCON functions |
| J5 | TCON logic |
| J6 | TCON limit switches |
| J7 | TCON limit switches |
| J8 | TCON unused |
| J9 | TCON communication |
| J10 | DISCON |
| J12 | PCON power |
| J13 | PCON functions |
| J14 | PCON functions |
| J15 | PCON logic |
| J16 | PCON toggles |
| J17 | PCON toggles |
| J18 | PCON joysticks |
| J19 | PCON unused |
| J20 | Boom angle sensor operational- not used |
| J21 | Boom angle sensor safety- not used |
| J22 | Fuel level sensor |
| J23 | Platform level sensor operational- not used |
| J24 | Platform level sensor safety- not used |
| J25 | Boom function- joystick |
| J26 | Drive function- joystick |
| J27 | 404D ECG - black |
| J28 | 404D ECG - gray |
| J29 | D2.9 ECU 1 |
| J30 | D2.9 ECU 2 |
| J31 | D2.9 engine interface |
| J32 | Chassis tilt sensor operational |
| J33 | Chassis tilt sensor safety |
| J34 | D2011 engine interface |
| J35 | LED PCB |
| J36 | Recovery module power |
| J37 | Recovery module I/O |

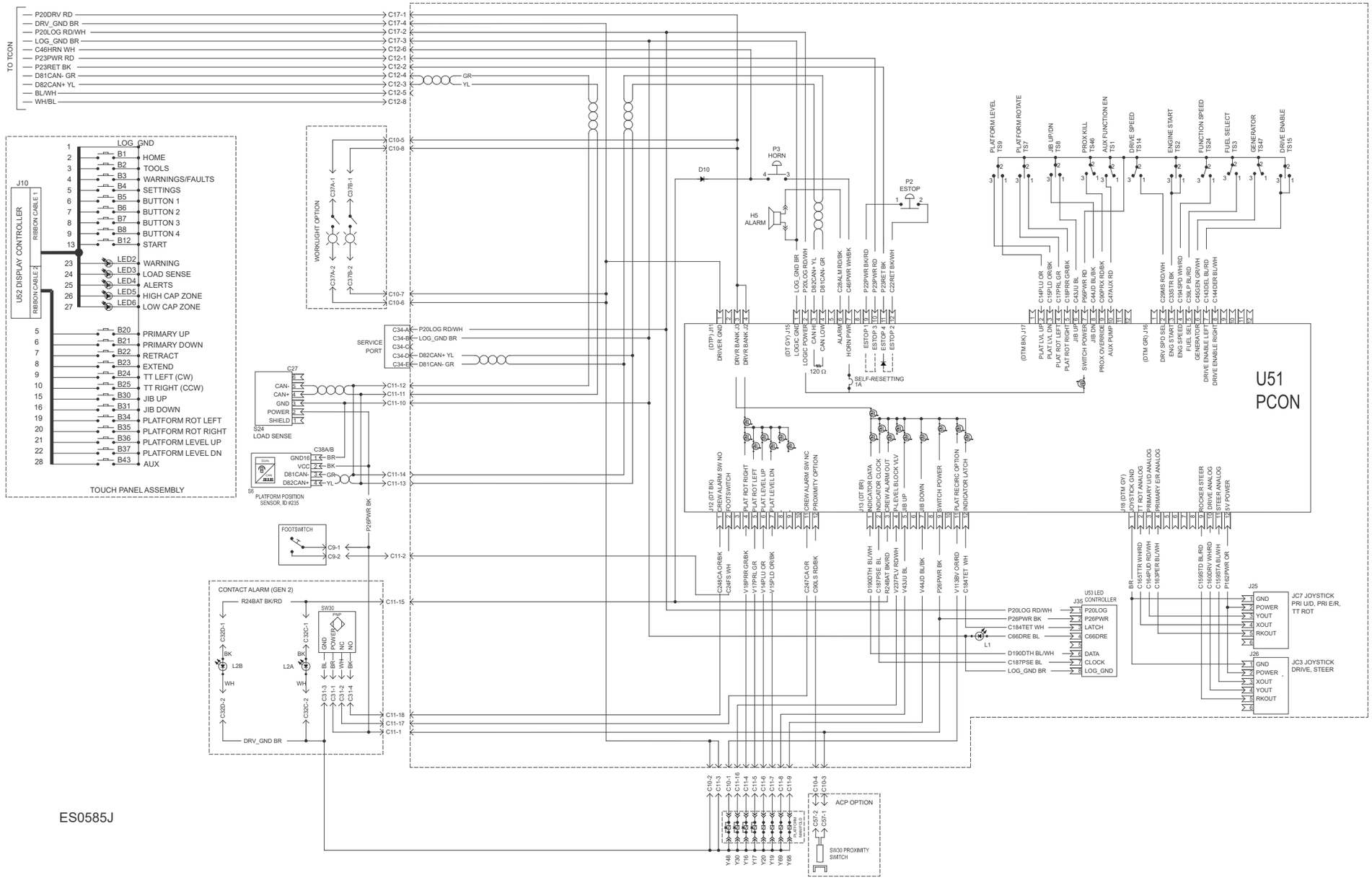
# Electrical Schematic, Turntable Controller



# Electrical Schematic, Turntable Controller



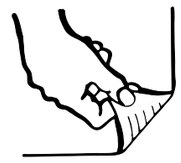
# Electrical Schematic, Platform Controller



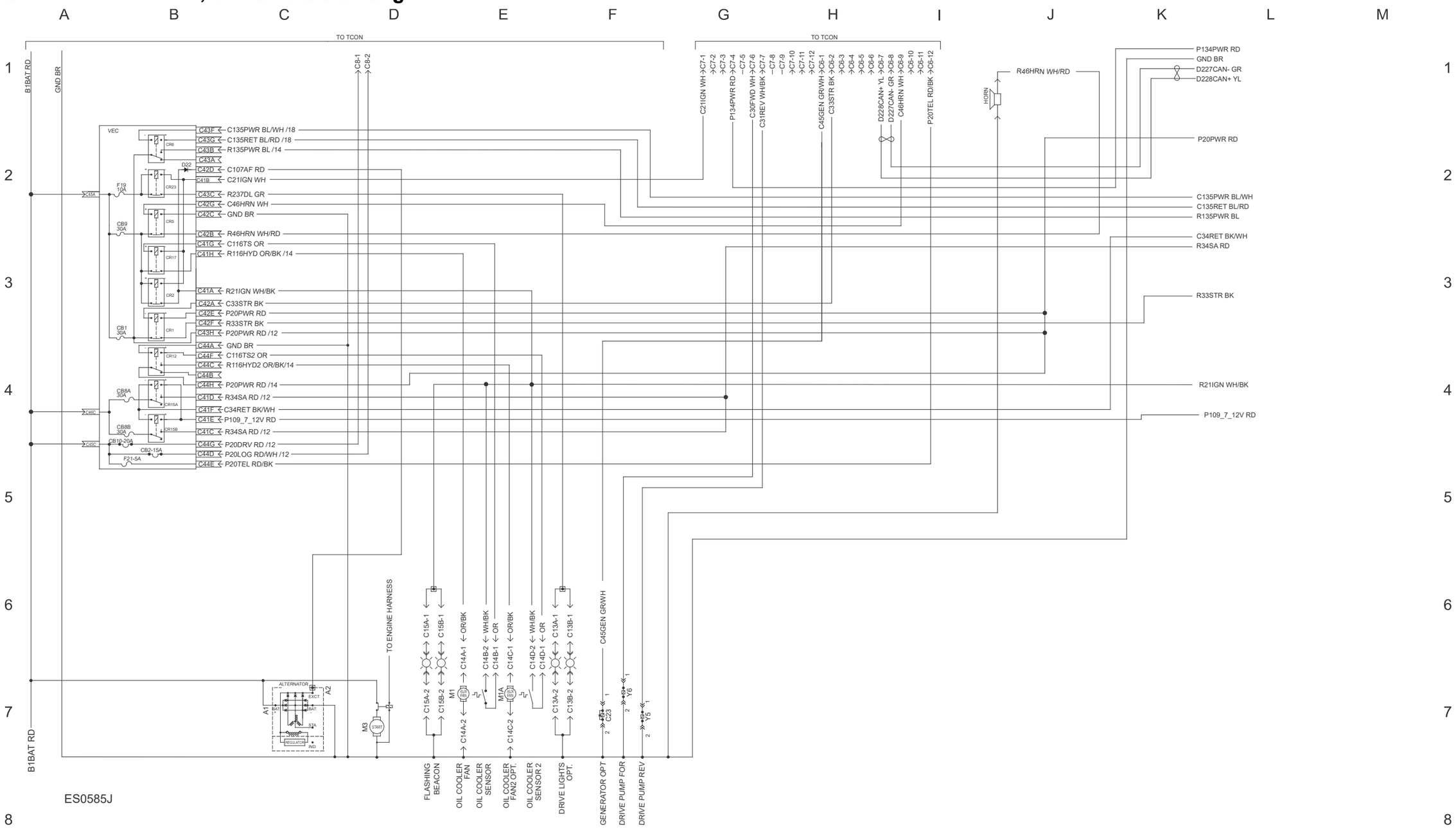

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# Electrical Schematic, Platform Controller

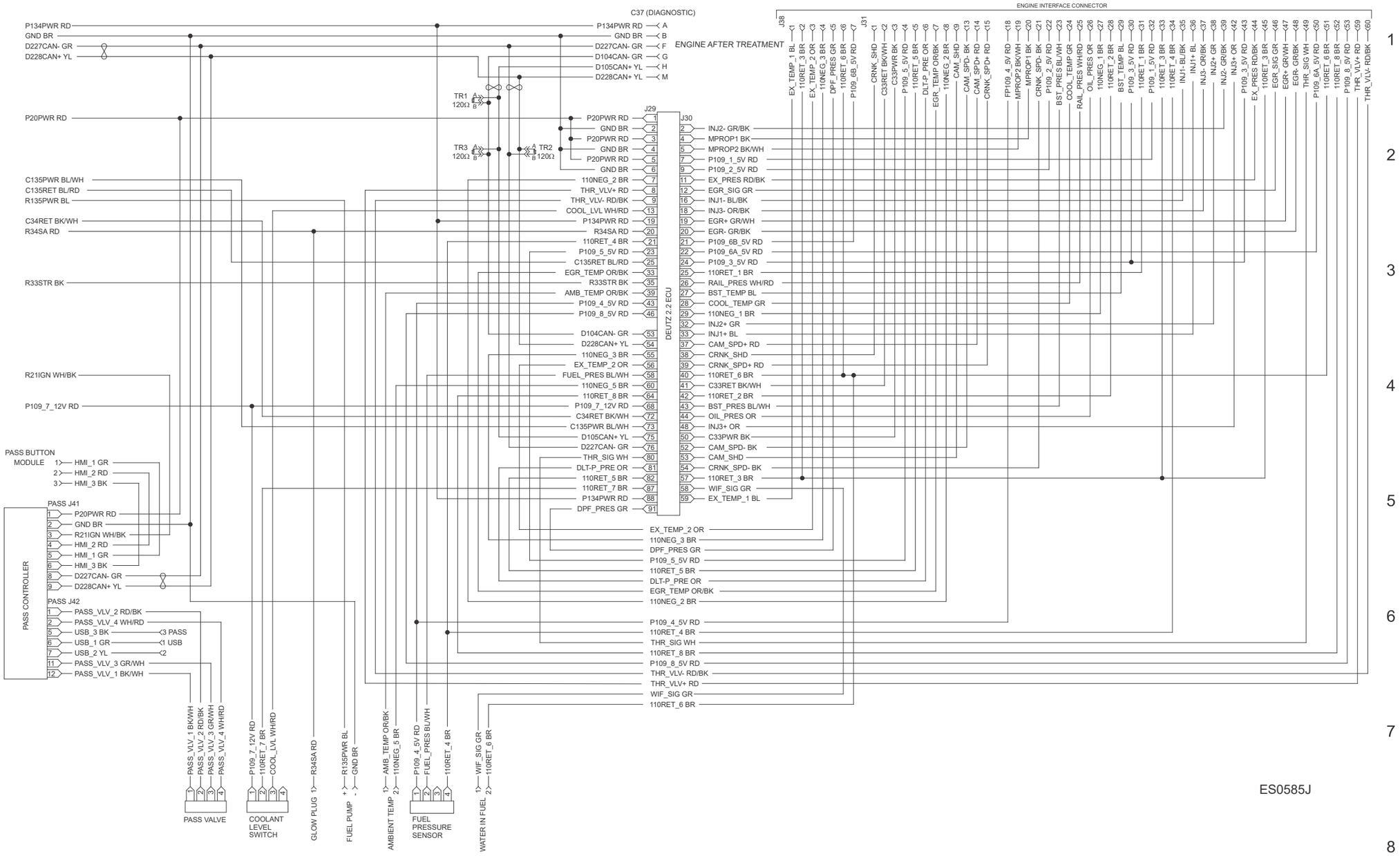
# Electrical Schematic, Deutz TD 2.2 L3 Engine



# Electrical Schematic, Deutz TD 2.2 L3 Engine

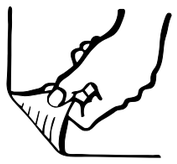


# Electrical Schematic, Deutz TD 2.2 L3 Engine

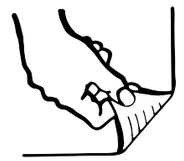



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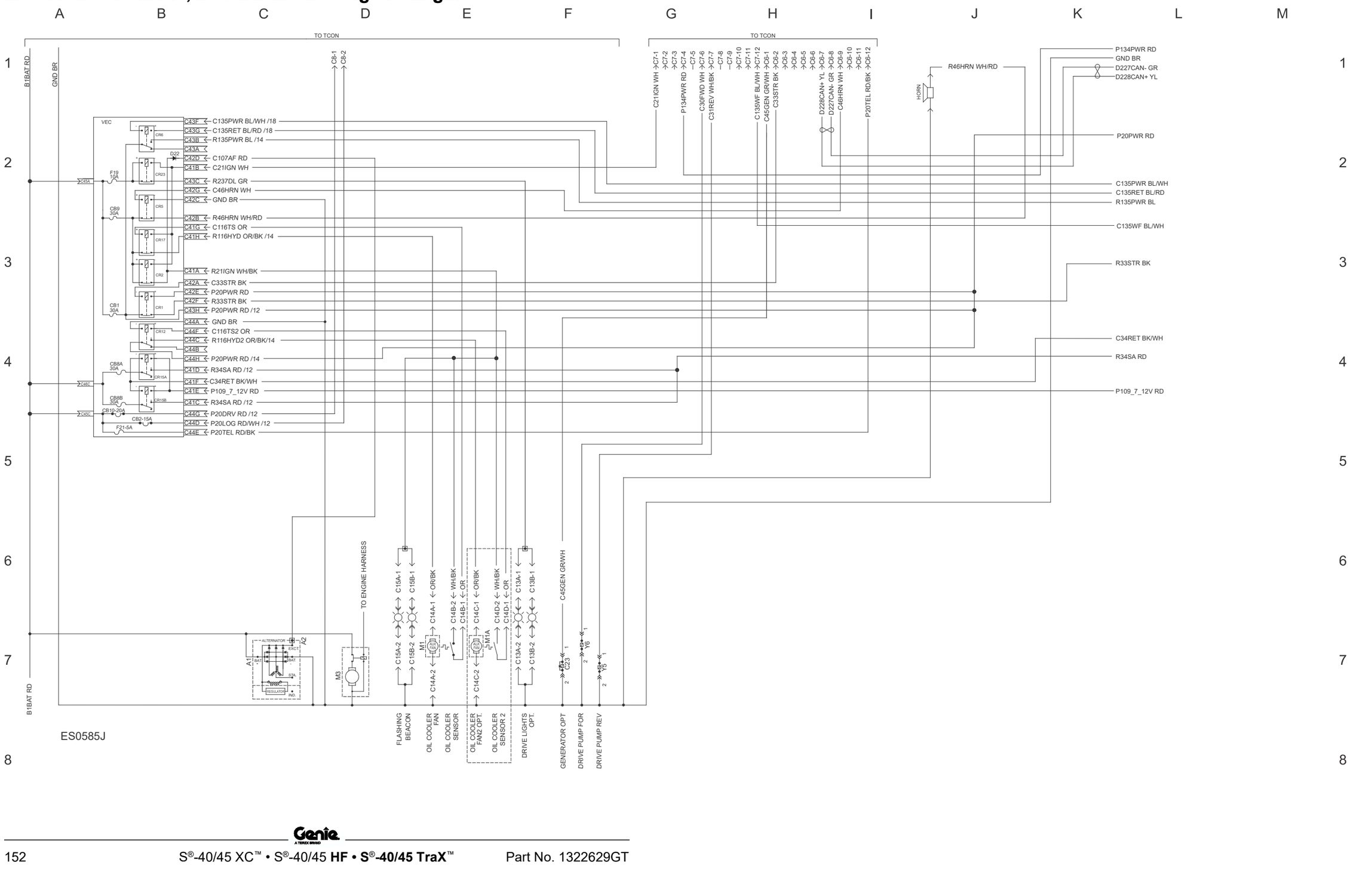
# Electrical Schematic, Deutz TD 2.2 L3 Engine



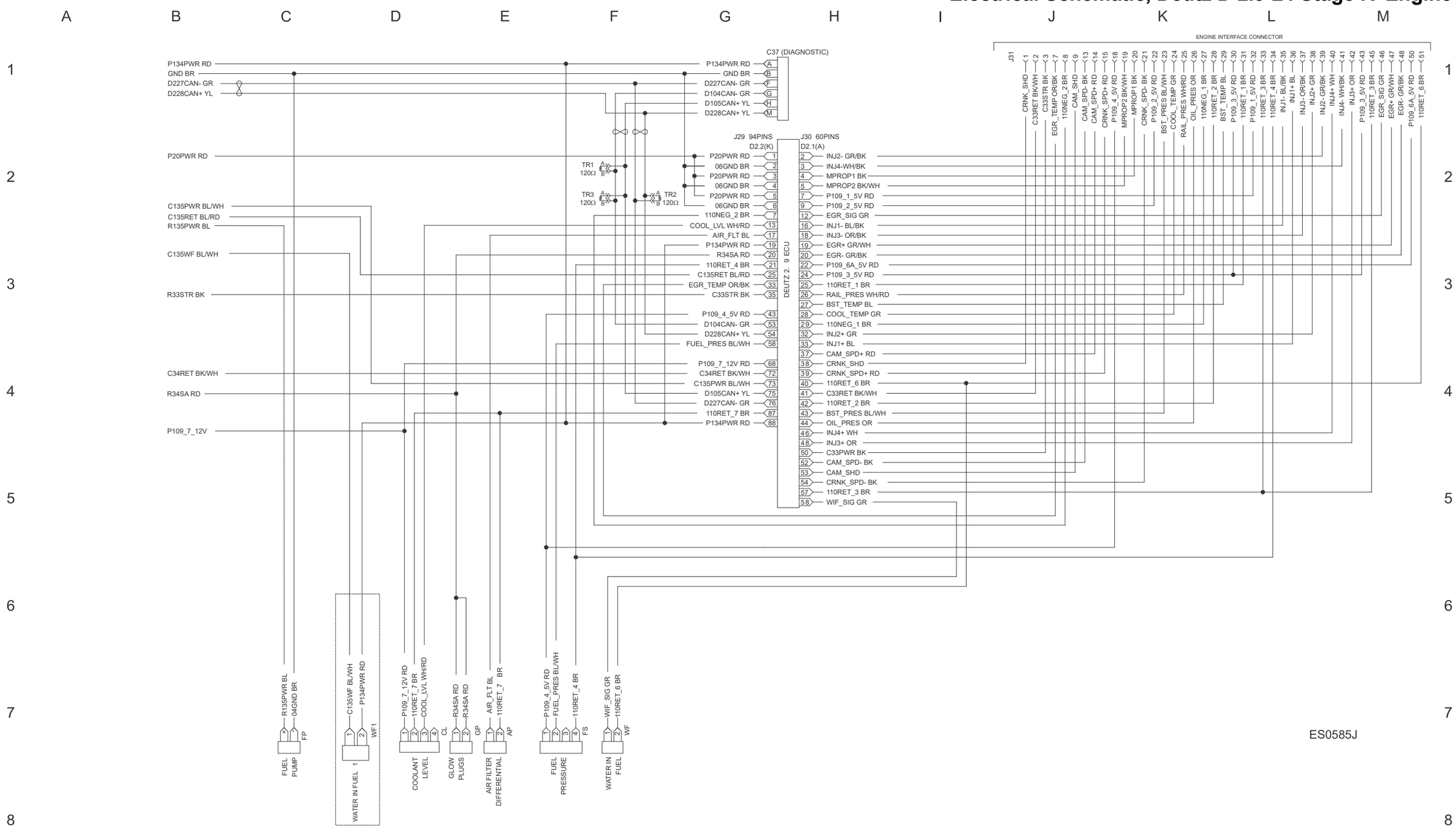
# Electrical Schematic, Deutz D 2.9 L4 Stage IV Engine



# Electrical Schematic, Deutz D 2.9 L4 Stage IV Engine

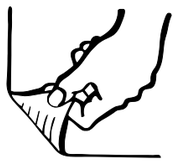


# Electrical Schematic, Deutz D 2.9 L4 Stage IV Engine

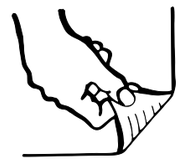



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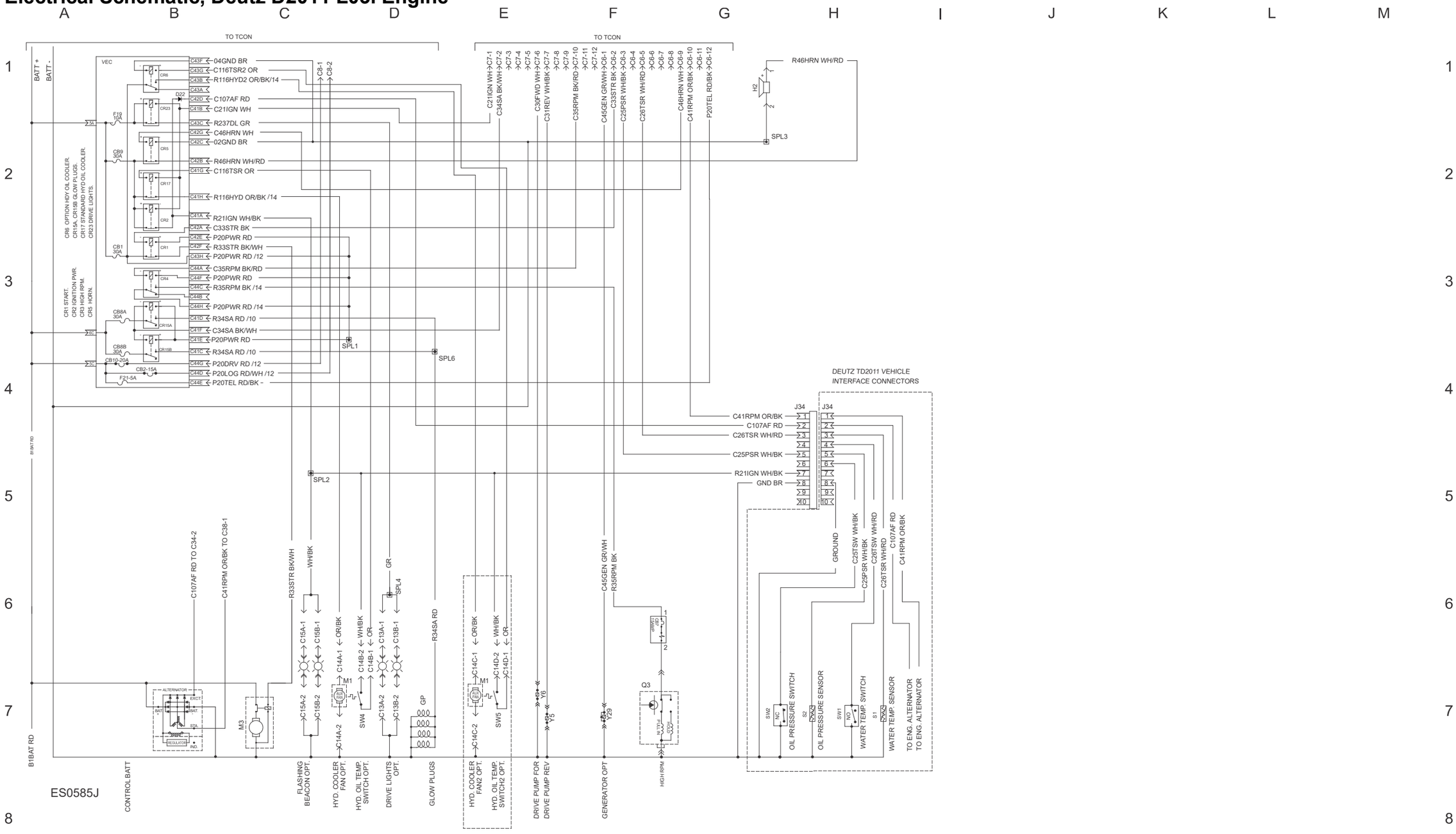
# Electrical Schematic, Deutz D 2.9 L4 Stage IV Engine



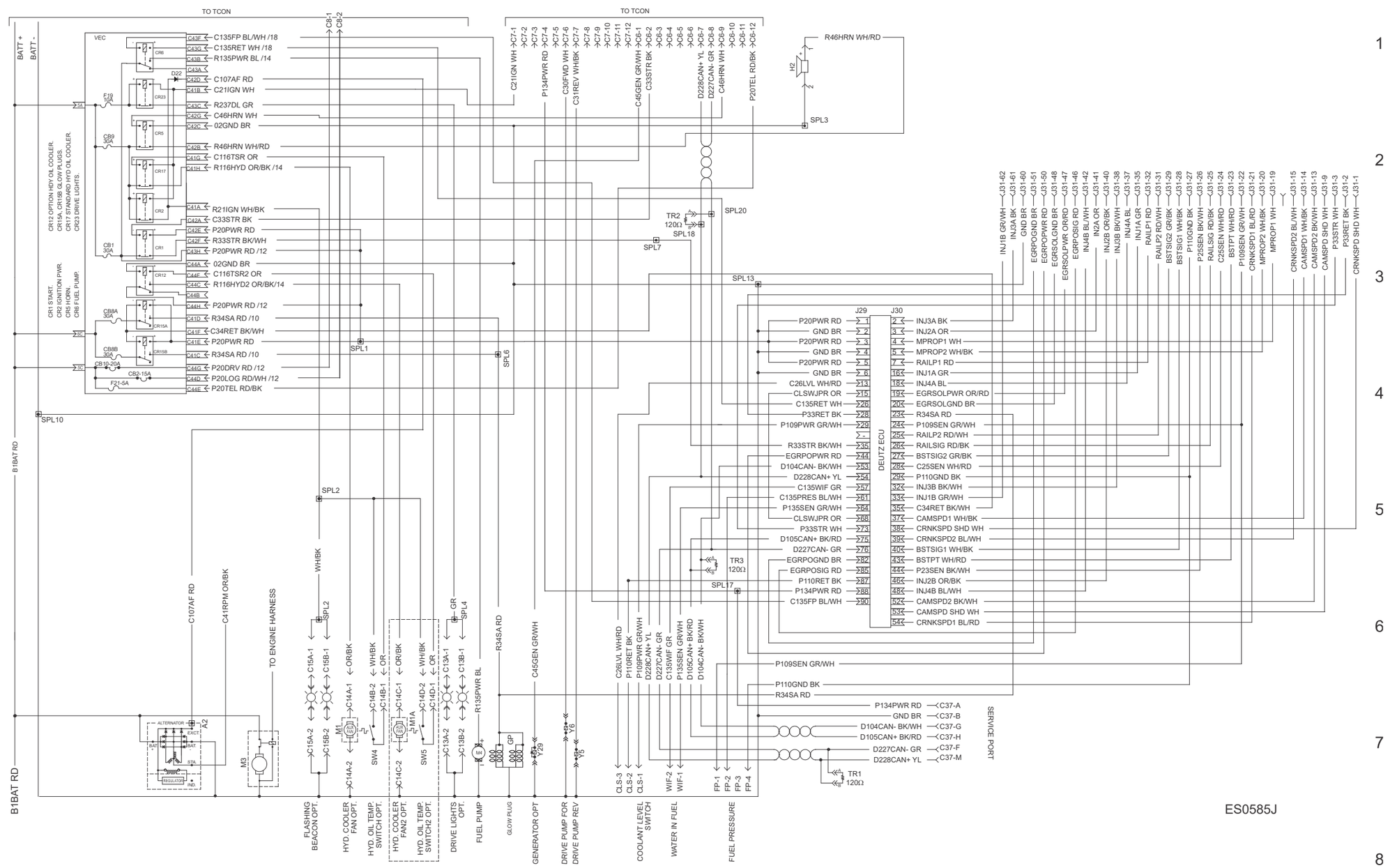
# Electrical Schematic, Deutz D2011 L03i Engine



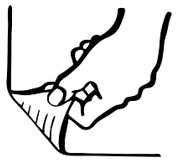
# Electrical Schematic, Deutz D2011 L03i Engine



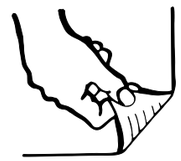
# Electrical Schematic, Deutz D 2.9 L4 Tier IV Engine



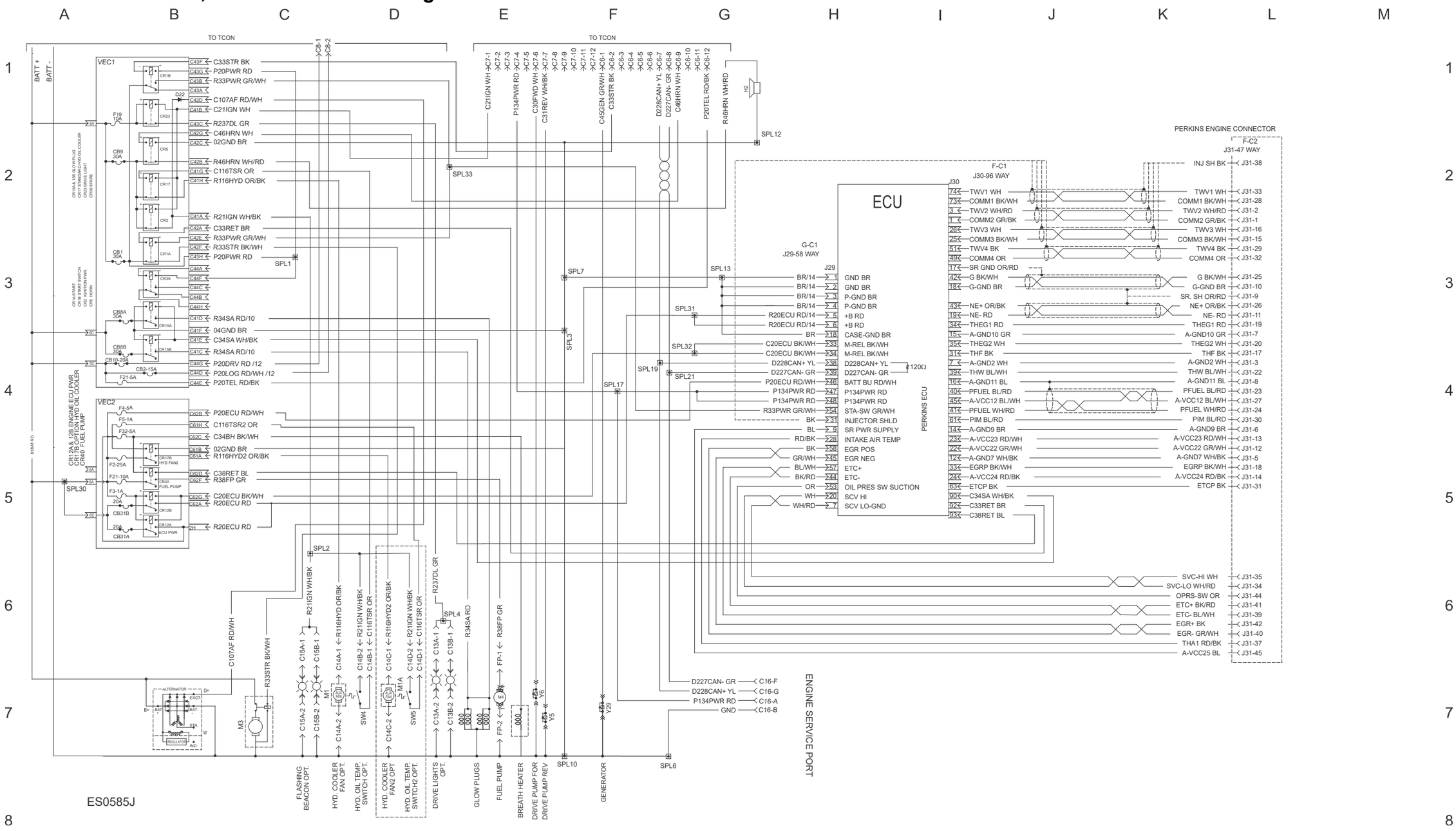
# Electrical Schematic, Deutz D 2.9 L4 Tier IV Engine



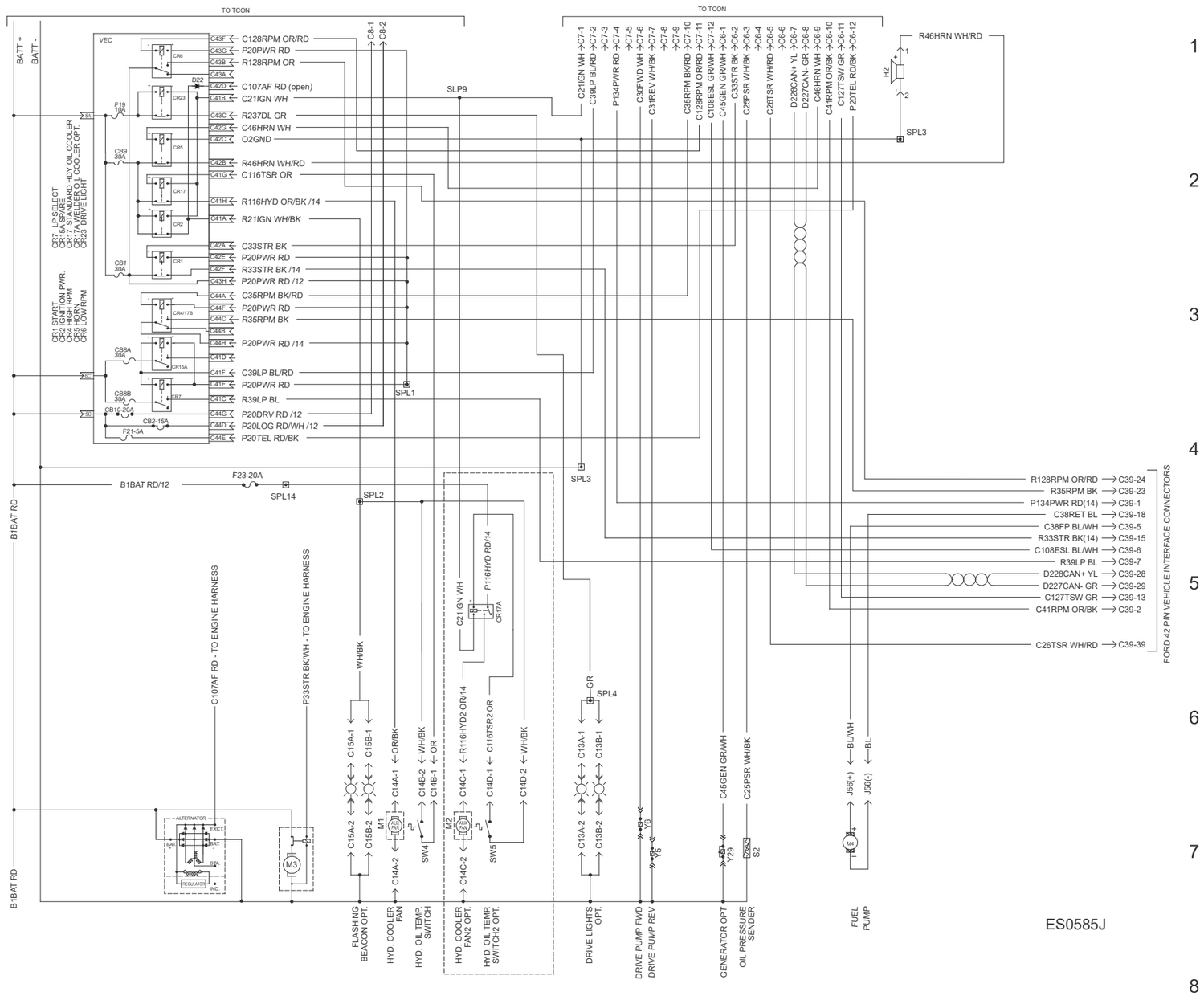
# Electrical Schematic, Perkins 404F-E22T Engine



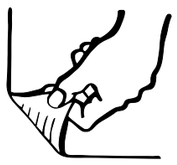
# Electrical Schematic, Perkins 404F-E22T Engine



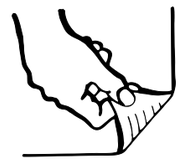
# Electrical Schematic, Ford MSG-425 EFI Engine



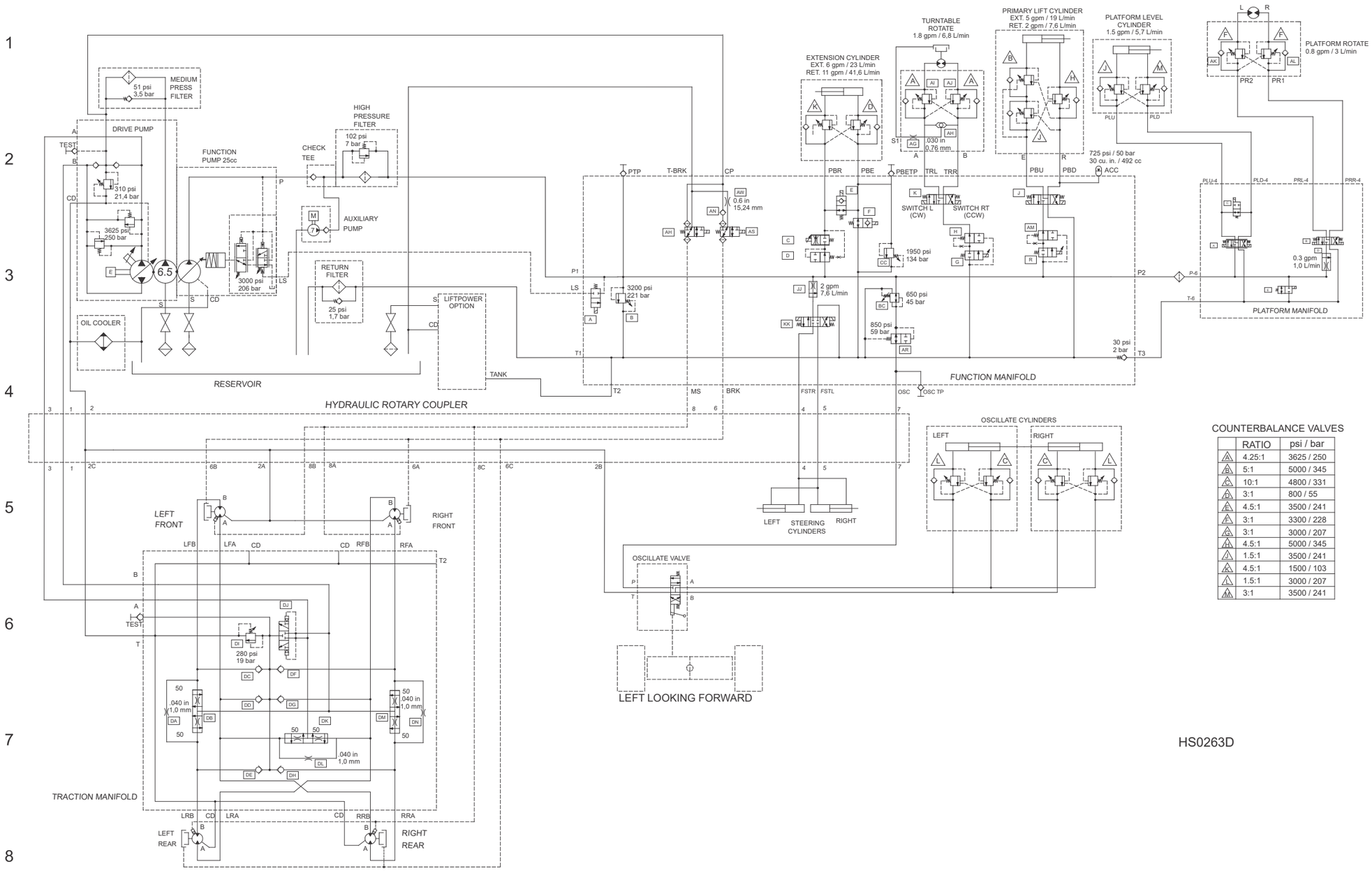
# Electrical Schematic, Ford MSG-425 EFI Engine



# Hydraulic Schematic, S-40XC / HF / TraX



# Hydraulic Schematic, S-40XC / HF/ TraX

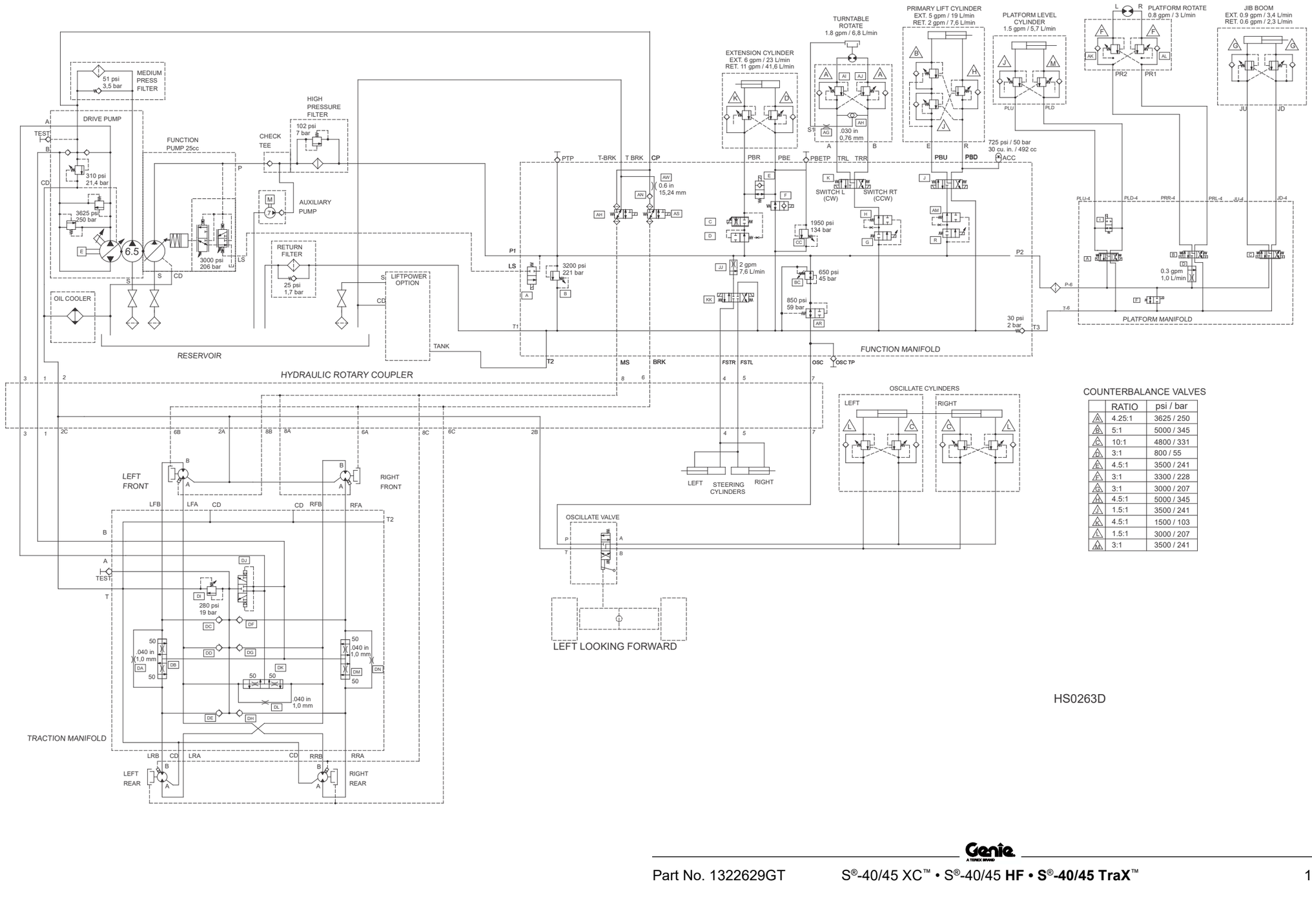



COUNTERBALANCE VALVES

| | RATIO | psi / bar |
|---|---|---|
| A | 4.25:1 | 3625 / 250 |
| B | 5:1 | 5000 / 345 |
| C | 10:1 | 4800 / 331 |
| D | 3:1 | 800 / 55 |
| E | 4.5:1 | 3500 / 241 |
| F | 3:1 | 3300 / 228 |
| G | 3:1 | 3000 / 207 |
| H | 4.5:1 | 5000 / 345 |
| J | 1.5:1 | 3500 / 241 |
| K | 4.5:1 | 1500 / 103 |
| L | 1.5:1 | 3000 / 207 |
| M | 3:1 | 3500 / 241 |

HS0263D

# Hydraulic Schematic, S-45XC / HF / TraX

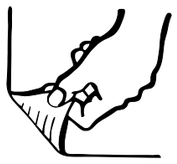



COUNTERBALANCE VALVES

| | RATIO | psi / bar |
|---|---|---|
| A | 4.25:1 | 3625 / 250 |
| B | 5:1 | 5000 / 345 |
| C | 10:1 | 4800 / 331 |
| D | 3:1 | 800 / 55 |
| E | 4.5:1 | 3500 / 241 |
| F | 3:1 | 3300 / 228 |
| G | 3:1 | 3000 / 207 |
| H | 4.5:1 | 5000 / 345 |
| I | 1.5:1 | 3500 / 241 |
| J | 4.5:1 | 1500 / 103 |
| K | 1.5:1 | 3000 / 207 |
| L | 3:1 | 3500 / 241 |

HS0263D

# Hydraulic Schematic, S-45XC / HF / TraX



California Proposition 65

**WARNING**

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

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

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

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



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