Genie®
A TEREX BRAND

# Service and Repair Manual

Serial Number Range

## S®-60 J

from S60JH-101

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

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

Part No. 1285305GT
Rev A
Decenber 2019

# 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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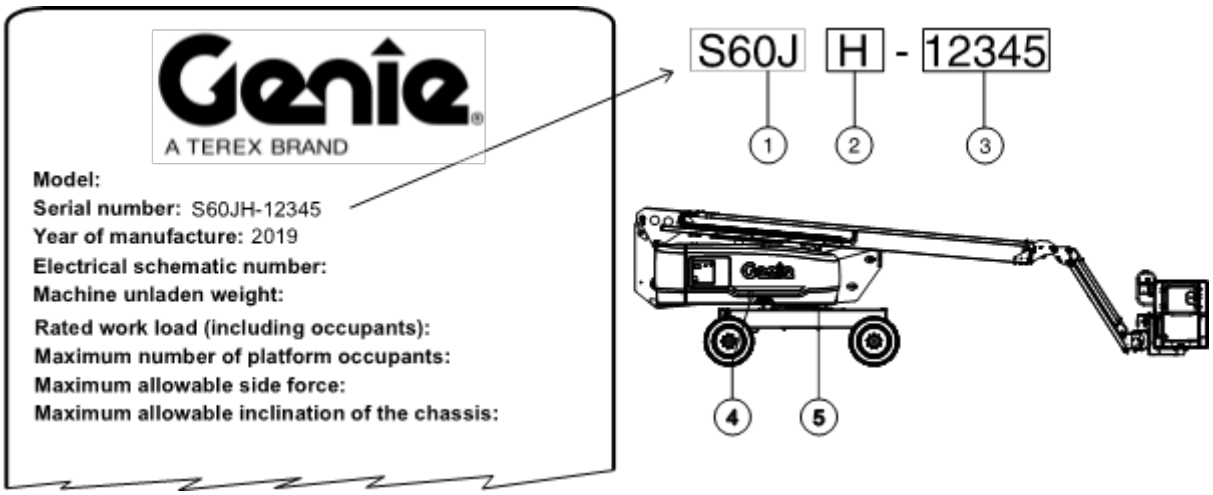
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## Revision History

| Revision | Date | Section | Procedure / Page / Description |
|---|---|---|---|
| A | 9/2019 | | 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) | 315/55D20 |
| Tire weight (foam filled) | 290 lbs<br>132 kg |
| Tire ply rating | 12 |
| Overall tire diameter | 32.5 in<br>82,5 cm |
| Wheel diameter | 20 in x 11 in<br>50,8 cm x 28 cm |
| 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 |
| **Fuel capacities** | |
| Fuel tank | 30 gallons<br>114 liters |
| Hydraulic tank | 21 gallons<br>80 liters |
| Hydraulic system (including tank) | 25 gallons<br>95 liters |
| Drive hubs | 24.5 fl oz<br>724 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.

## Performance Specifications

| | |
|---|---|
| **Boom function speeds, maximum from platform controls** | |
| Jib boom up | 25 to 35 seconds |
| Jib boom down | 15 to 25 seconds |
| Primary boom up | 60 to 66 seconds |
| Primary boom down | 60 to 66 seconds |
| Primary boom extend | 30 to 33 seconds |
| Primary boom retract | 30 to 33 seconds |
| Turntable rotate, 360°<br>Boom stowed | 67 to 84 seconds |
| Turntable rotate, 360°<br>Boom extended | 107 to 118 seconds |
| Platform rotate, 160° | 18 to 22 seconds |
| **Braking distance, maximum** | |
| High range on paved surface | 3 to 6 ft<br>0.9 to 1.8 m |
| **Drive speed, maximum stowed position** | |
| | 40 ft / 9.1 sec<br>12.2 m / 9.1 sec |
| **Drive speed, maximum raised or extended position** | |
| Gradeability | 40 ft / 40 sec<br>12.2 m / 40 sec |
| | See Operator's Manual |

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

# Specifications

## Hydraulic Oil Specifications

| Hydraulic Fluid Specifications | |
|---|---|
| Genie specifications require hydraulic oils which are designed to give maximum protection to hydraulic systems, have the ability to perform over a wide temperature range, and the viscosity index should exceed 140. They should provide excellent antiwear, oxidation prevention, corrosion inhibition, seal conditioning, and foam and aeration suppression properties. | |
| Cleanliness level, minimum | ISO 15/13 |
| Water content, maximum | 250 ppm |
| **Recommended Hydraulic Fluid** | |
| Hydraulic oil type | Chevron Rando HD Premium |
| Viscosity grade | 32 |
| Viscosity index | 200 |
| **Optional Hydraulic Fluids** | |
| Mineral based | Shell Tellus S2 V 32<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.

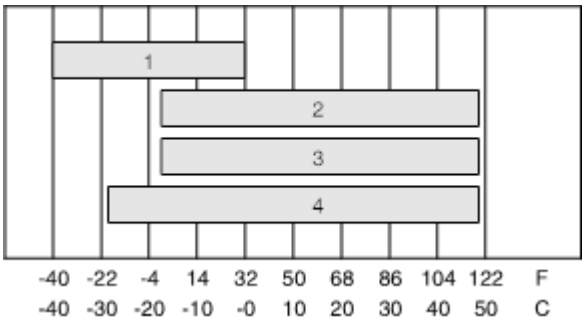
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond its maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

**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

# Specifications

## Chevron Rando HD Premium Oil MV Fluid Properties

| | |
|---|---|
| ISO Grade | 32 |
| Viscosity index | 200 |
| Kinematic Viscosity<br>cSt @ 200°F / 100°C<br>cSt @ 104°F / 40°C | <br>7.5<br>33.5 |
| Brookfield Viscosity<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.

## Chevron 5606A Hydraulic Oil Fluid Properties

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

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

**NOTICE**

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

# Specifications

## Petro-Canada Environ MV 46 Fluid Properties

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

## Shell Tellus S4 VX Fluid Properties

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

## UCON Hydrolube HP-5046 Fluid Properties

| | |
|---|---|
| ISO Grade | 46 |
| Viscosity index | 192 |
| Kinematic Viscosity<br>cSt @ 149°F / 65°C<br>cSt @ 104°F / 40°C<br>cSt @ 0°F / -18°C | <br>22<br>46<br>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 | 21.1 gpm<br>80 L/min |
| Drive pressure, maximum | 3625 psi<br>250 bar |
| **Charge Pump** | |
| Type: gerotor | |
| Displacement | 0.85 cu in<br>13,9 cc |
| Flow rate @ 2500 rpm | 9.2 gpm<br>34,8 L/min |
| Charge pressure @ 2500 rpm | 310 psi<br>21,4 bar |
| **Function Pump** | |
| Type: fixed displacement gear pump | |
| Displacement | 1.52 cu in<br>25 cc |
| Flow rate @ 2500 rpm | 16.5 gpm<br>62,5 L/min |
| **Auxiliary Pump** | |
| Type: fixed displacement gear pump | |
| Displacement | 1.75 gpm<br>2,8 L/min |
| **Function manifold** | |
| System relief valve pressure, maximum | 3200 psi<br>220 bar |
| Steer flow regulator | 2 gpm<br>7,6 L/min |
| Oscillate relief valve pressure @ 2500 rpm | 650 psi<br>45 bar |
| **Drive manifold** | |
| Hot oil relief valve pressure | 280 psi<br>19,3 bar |
| Drive motor | |
| Displacement per revolution, high speed | 1.53 cu in<br>25 cc |
| Displacement per revolution, low speed | .54 cu in<br>8.77 cc |
| **Hydraulic Filters** | |
| High pressure filter: | Beta 5 |
| High pressure filter bypass pressure | 102 psi<br>7 bar |
| Medium pressure filter | Beta 6 |
| Medium pressure filter bypass pressure | 51 psi<br>3,5 bar |
| Hydraulic tank return filter | 10 micron with 25 psi /<br>1,7 bar bypass |

## Manifold Component Specifications

| | |
|---|---|
| **Plug torque** | |
| SAE No. 2 | 36 in-lbs / 4 Nm |
| SAE No. 4 | 10 ft-lbs / 13 Nm |
| SAE No. 6 | 14 ft-lbs / 19 Nm |
| SAE No. 8 | 38 ft-lbs / 51 Nm |
| SAE No.10 | 41 ft-lbs / 55 Nm |
| SAE No. 12 | 56 ft-lbs / 76 Nm |

# 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 | 40 to 60 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 |
| 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 | 220°F<br>104°C |
| **Oil Pressure switch** | |
| Oil pressure switch point | 22 psi<br>1.5 bar |

# Specifications

| | |
|---|---|
| **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 | 140A to 200A |
| 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 | 1000A |
| 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

## Kubota D1105-E4B Engine

| | |
|---|---|
| **Displacement** | 68.53 cu in<br>1,123 liters |
| **Number of cylinders** | 3 |
| **Bore and Stroke** | 3.07 x 3.09 inches<br>78 x 78,4 mm |
| **Horsepower, gross intermittent** | 24.8 @ 3000 rpm<br>18.5 kW @ 3000 rpm |
| **Firing order** | 1 - 2 - 3 |
| **Low idle** | 1500 rpm<br>250 Hz |
| **High idle** | 2700 rpm<br>450 Hz |
| **Compression ratio** | 24:1 |
| **Compression pressure** | 412 to 469 psi<br>28,4 to 32,3 bar |
| **Governor** | centrifugal mechanical |
| **Valve clearance, cold** | 0.0057 to 0.0072 in<br>0,145 to 0,185 mm |
| **Lubrication system** | |
| Oil pressure | 28 to 64 psi<br>1,9 to 4,4 bar |
| Oil capacity (including filter) | 5.4 quarts<br>5,1 liters |
| **Oil viscosity requirements** | |
| -22° F to 86° F/ -30° C to 30° C | 5W-30 (synthetic) |
| -4° F to 90° F / -20° C to 32° C | 10W-40 |
| Above 23° F / -5° C | 20W-50 |
| Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine. | |
| **Engine coolant** | |
| Capacity | 3.2 quarts<br>3 liters |
| **Fuel injection system** | |
| Injection pump make | Bosch MD |
| Injection pump pressure, maximum | 1991 psi<br>137 bar |
| Injection timing | 18° BTDC |
| **Fuel requirement** | |
| For fuel requirements, refer to the engine Operator Manual for your engine. | |
| **Starter motor** | |
| Cranking speed | 200 - 300 RPM |
| Current draw, normal load | 155A |
| **Battery** | |
| Type | 12V DC |
| Group | 31 |
| Quantity | 1 |
| Ampere hour | 120AH |
| Cold cranking ampere | 1000A |
| Reserve capacity @ 25A rate | 175 minutes |
| **Alternator output** | 40A @ 12V DC |
| **Fan belt deflection** | 1/4 to 3/8 inch<br>7 to 9 mm |

# Specifications

## Kubota D1803-CR-TIE4 Engine

| | |
|---|---|
| **Displacement** | 111.4 cu in<br>1,825 liters |
| **Number of cylinders** | 3 |
| **Bore and Stroke** | 3.43 x 4.031 inches<br>87 x 102,4 mm |
| **Horsepower, gross intermittent** | 49.6 @ 2700 rpm<br>37 kW @ 2700 rpm |
| **Firing order** | 1 - 2 - 3 |
| **Low idle, standby** | 1200 rpm<br>200 Hz |
| **Low idle, function enable** | 1500 rpm<br>250 Hz |
| **High idle** | 2700 rpm<br>450 Hz |
| **Compression ratio** | 16:0 |
| **Compression pressure** | 428 to 468 psi<br>29,5 to 32,3 bar |
| **Governor** | centrifugal mechanical |
| **Valve clearance, cold** | 0.0071 to 0.0086 in<br>0,18 to 0,22 mm |
| **Lubrication system** | |
| Oil pressure | 35 to 64 psi<br>2,4 to 4,4 bar |
| Oil capacity (including filter) | 8.6 quarts<br>8,1 liters |
| **Oil viscosity requirements** | |
| -22° F to 86° F/ -30° C to 30° C | 5W-30 (synthetic) |
| -4° F to 90° F / -20° C to 32° C | 10W-40 |
| Above 23° F / -5° C | 20W-50 |
| Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine. | |
| **Engine coolant** | |
| Capacity | 10 quarts<br>9,5 liters |

| | |
|---|---|
| **Fuel injection system** | |
| Injection pump make | Bosch MD |
| Injection pump pressure, maximum | |
| Low idle | 3700 - 4300 psi<br>255 - 296 bar |
| High idle | 14500 - 15900 psi<br>1000 - 1096 bar |
| Injection timing | 18° BTDC |
| **Fuel requirement** | |
| For fuel requirements, refer to the engine Operator Manual for your engine. | |
| **Starter motor** | |
| Cranking speed | 200 - 300 RPM |
| Current draw, normal load | 155A |
| **Battery** | |
| Type | 12V DC |
| Group | 31 |
| Quantity | 1 |
| Ampere hour | 120AH |
| Cold cranking ampere | 1000A |
| Reserve capacity @ 25A rate | 175 minutes |
| **Alternator output** | 40A @ 12V DC |
| **Fan belt deflection** | 1/4 to 3/8 inch<br>7 to 9 mm |

# Specifications

## Machine Torque Specifications

Note: All torque values are shown lubricated unless otherwise noted.

| | |
|---|---|
| **Platform Rotator** | |
| 1-8 center bolt, GR 5 | 483 ft-lbs<br>655 Nm |
| 1/2 -13 bolts, GR 8 | 80 ft-lbs<br>108 Nm |
| **Drive motor and hub** | |
| Drive hub mounting bolts | 159 ft-lbs<br>216 Nm |
| Drive motor mounting bolts | 52 ft-lbs<br>70.5 Nm |
| **Turntable bearing** | |
| Rotate bearing mounting bolts | 159 ft-lbs<br>216 Nm |
| **Turntable rotate assembly** | |
| Turntable rotate motor mounting bolts<br>Removable threadlocker | 170 ft-lbs<br>230 Nm |
| Backlash plate mounting bolts | 282 ft-lbs<br>382 Nm |

## Machine Component Weights

| | |
|---|---|
| Lift structure | 5300 lbs<br>2404 kg |
| Turntable assembly without lift structure, includes counterweights | 6700 lbs<br>3040 kg |
| Counterweight, (x2) | 1100 lbs<br>500 kg |
| Drive chassis assembly | 4800 lbs<br>2177 kg |
| Tire and wheel assembly | 290 lbs<br>132 kg |
| Drive motor and hub | 140 lbs<br>64 kg |
| Engine assembly | 475 lbs<br>215 kg |
| Primary boom | 1920 lbs<br>871 kg |
| Primary boom lift cylinder | 330 lbs<br>150 kg |
| Primary boom extend cylinder | 330 lbs<br>150 kg |
| Jib boom assembly, with 6 ft / 1,8 m platform | 800 lbs<br>363 kg |
| Jib boom cylinder | 106 lbs<br>48 kg |
| Oscillate cylinder | 97 lbs<br>44 kg |
| Platform, 6 ft / 1,8 m | 275 lbs<br>125 kg |
| Platform, 8 ft / 2,4 m | 315 lbs<br>143 kg |
| Battery | 63 lbs<br>29 kg |

## 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

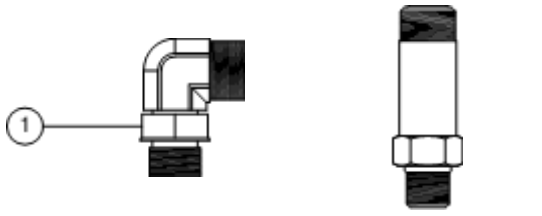
(swivel nut or hose connection)

| 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.

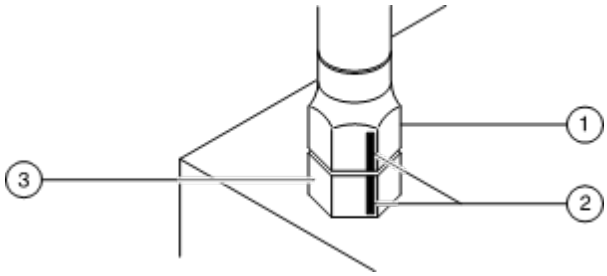



Illustration 1

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.

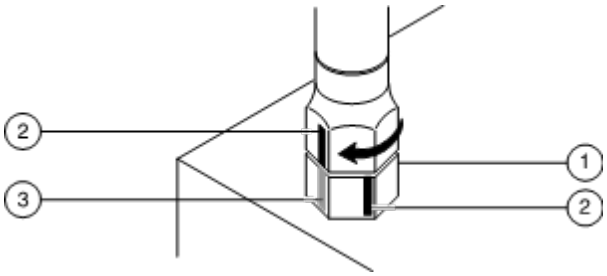



Illustration 2

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

# Repair Procedures

## About This Section

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

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

### Symbols Legend



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

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

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

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

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

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

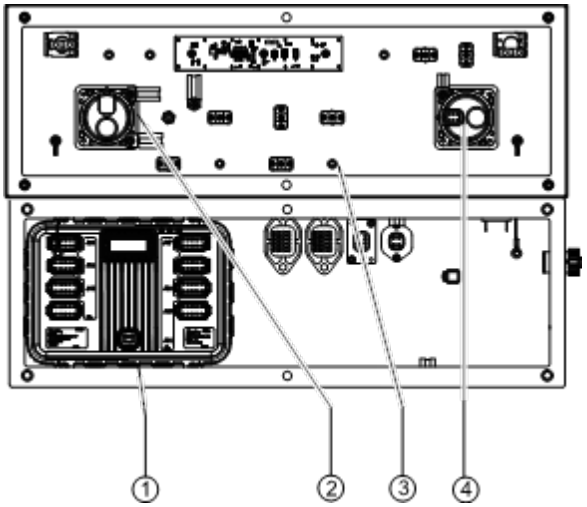
☒ Indicates that an incorrect result has occurred after performing a series of steps.

# Control System

## 1-1 ALC-600 Control Module

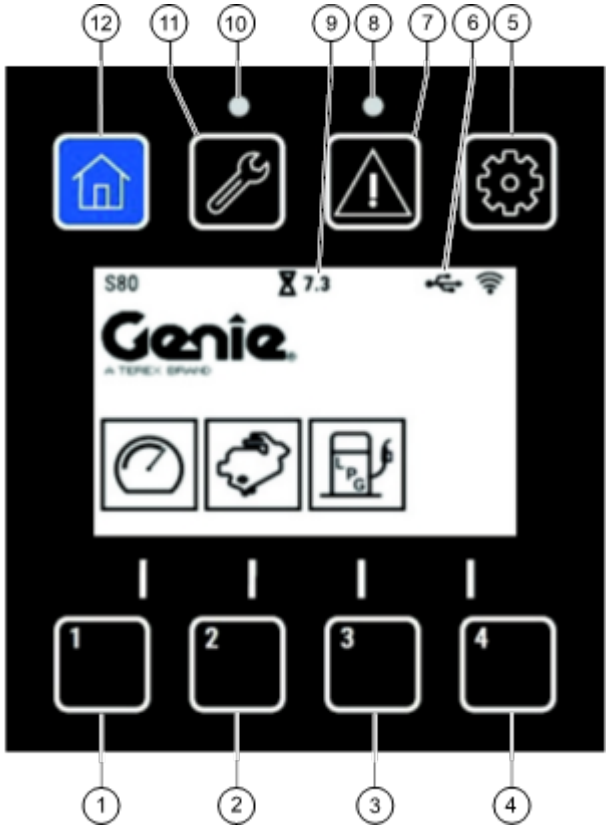
### Platform Controls

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 (not implemented)
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 At the ground controls, select the ground control mode using the key switch.

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 boom in the stowed position.

Full machine calibration must be completed in the following sequence:

- Select model, engine, tires, and region, 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*.
- Select option configuration. Refer to Repair Section, Display Module, *Options.*

# Control System

## 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.

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.

# Control System

## 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 http://firmware.genielift.com/ http://firmware.genielift.com, 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.

# 1-6
# Display Module Menus

| Screen or Menu | Item | Selection | Default |
|---|---|---|---|
| Display Settings | Backlight | 0 - 100% | |
| | Contrast | 0 - 100% | |
| | Display Inversion | On / Off | Off |
| **Screen or Menu** | **Item** | **Selection** | **Default** |
| Model Configuration | Model | S-40 / S-45 / S-60 / S-65 / S-80 / S-85 / S-60J / S-80J | Select Model |
| | Tires | Rough Terrain / High Float / Trax | Select Tires |
| (These are locked unless factory defaults are restored) | Engine | Deutz 2.9L T4 / Deutz TD 2.9L T4 / Deutz TCD 2.2L S5 / Deutz TD 2.2L S5 / Deutz D2011 L03i / Deutz TD2011 L04i / Ford MSG425 EFI / GM 3.0L / Kubota D1105 / Kubota D1803 / Perkins 404D 22 / Perkins 404D 22T / Perkins 404F E22T / Perkins 404F E22TA | Select Engine |
| (Platform configuration is not locked) | Platform | Standard Platform<br>4m Platform | Standard Platform |
| | Region | ANSI/CSA / AUS / CE | Select Region |
| **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 revisions. | Drive Priority | On / Off | Off |
| | Drive Cutout | On / Off | Off |
| | Platform Level | On / Priority / Cutout | On |
| | Generator | No Generator / Generator Installed | No Generator |
| | Contact Alarm | On / Off | On |
| | Platform Recirculation | On / Off | Off |
| | Units | US Customary / Metric | US Customary |
| | Aircraft Proximity | On / Off | Off |
| | Fuel Level Sensor | Not Installed / Installed | Installed |
| | Glowplug Preglow Time | 1 sec - 100 sec | 12 sec |
| | Lift Connect | Not Installed / Installed | Installed |
| | Alarm Setting | Off / Travel / Motion | Off |
| | Standby RPM | Default / High RPM | Default |

# Control System

| Screen or Menu | Item | Default |
|---|---|---|
| Sensor Calibration | Chassis Tilt | Select OK to calibrate |
| | Load Sense | Select OK to calibrate |
| | Boom Angle | Select OK to calibrate |
| **Screen or Menu** | **Item** | **Default** |
| Auto Threshold Calibration | Boom Up / Down Threshold | Select OK to calibrate |
| | Boom Extend / Retract Threshold | Select OK to calibrate |
| **Screen or Menu** | **Item** | **Default** |
| Drive Speeds XC and HF | Forward Threshold | 122% max, 1% min, 100% = 755 mA |
| | Reverse Threshold | 122% max, 1% min, 100% = 731 mA |
| | Forward Max | 150% max, 78% min, 100% = 1365 mA |
| | Reverse Max | 150% max, 79% min, 100% = 1275 mA |
| | Forward Out of Stow Max | 150% max, 85% min, 100% = 1092 mA |
| | Reverse Out of Stow Max | 150% max, 85% min, 100% = 1059mA |
| **Screen or Menu** | **Item** | **Default** |
| Drive Ramps | Standard Acceleration | 5000 ms max, 100 ms min, 4000 ms |
| | Standard Deceleration | 5000 ms max, 100 ms min, 1000 ms |
| | Torque Switching Deceleration | 5000 ms max, 500 ms min, 4000 ms |
| **Screen or Menu** | **Item** | **Default** |
| Kubota D1105 Anti-Stall | Threshold | 2400 rpm |
| | Drive Minimum | 30% |
| | Range | 700 rpm |
| | Hysteresis | 200 rpm |
| **Screen or Menu** | **Item** | **Default** |
| Kubota D1803 Anti-Stall | Threshold | 2400 rpm |
| | Drive Minimum | 30% |
| | Range | 700 rpm |
| | Hysteresis | 200 rpm |

| Screen or Menu | Item | Default |
|---|---|---|
| Primary Lift Speeds | Extend Thresholds | 190% max, 1% min, 100% = 506 mA |
| | Retract Threshold | 179% max, 1% min, 100% = 513 mA |
| | Up Threshold | 250% max, 1% min, 100% = 450 mA |
| | Down Threshold | 253% max, 1% min, 100% = 443 mA |
| | Extend Max | 150% max, 68% min, 100% = 1425 mA |
| | Retract Max | 150% max, 70% min, 100% = 1325 mA |
| | Up Max | 150% max, 63% min, 100% = 1800 mA |
| | Down Max | 150% max, 63% min, 100% = 1800 mA |
| **Screen or Menu** | **Item** | **Default** |
| Primary Lift Ramps | Extend Accelerating Rate | 5000 ms max, 1000 ms min, 2500 ms |
| | Extend Decelerating Rate | 5000 ms max, 250 ms min, 1000 ms |
| | Retract Accelerating Rate | 5000 ms max, 1000 ms min, 2500 ms |
| | Retract Decelerating Rate | 5000 ms max, 500 ms min, 1000 ms |
| | Up Accelerating Rate | 5000 ms max, 1000 ms min, 3000 ms |
| | Up Decelerating Rate | 5000 ms max, 500 ms min, 3000 ms |
| | Down Accelerating Rate | 5000 ms max, 1000 ms min, 3000 ms |
| | Down Decelerating Rate | 5000 ms max, 1000 ms min, 1000 ms |
| **Screen or Menu** | **Item** | **Default** |
| Turntable Speeds | Rotate CW Max | 150% max, 81% min, 100% = 1294 mA |
| | Rotate CCW Max | 150% max, 81% min, 100% = 1284 mA |
| | Rotate CW Threshold | 114% max, 1% min, 100% = 800 mA |
| | Rotate CCW Threshold | 114% max, 1% min, 100% = 800 mA |
| | CW Out of Stow Max | 150% max, 89% min, 100% = 1039 mA |
| | CCW Out of Stow Max | 150% max, 89% min, 100% = 1039 mA |
| **Screen or Menu** | **Item** | **Default** |
| Turntable Ramps | CW Accelerating | 5000 ms max, 1000 ms min, 3000 ms |
| | CW Decelerating | 5000 ms max, 500 ms min, 2000 ms |
| | CCW Accelerating | 5000 ms max, 1000 ms min, 3000 ms |
| | CCW Decelerating | 5000 ms max, 500 ms min, 2000 ms |

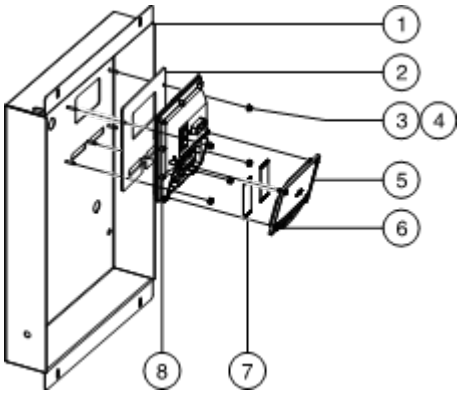
# Control System

| Screen or Menu | Item | Default |
|---|---|---|
| Jib Boom and Platform Speeds | Jib Up Threshold | max 112% / min 1% / default 551 mA = 100% |
| | Jib Down Threshold | max 118% / min 1% / default 500 mA = 100% |
| | Platform Level Up Threshold | max 127% / min 1% / default 450 mA = 100% |
| | Platform Level Down Threshold | max 127% / min 1% / default 450 mA = 100% |
| | Platform Rotate CW Threshold | max 114% / min 1% / default 510 mA = 100% |
| | Platform Rotate CCW Threshold | max 126% / min 1% / default 521 mA = 100% |
| | Jib Up Max Output | max 150% / min 90% / default 680 mA = 100% |
| | Jib Down Max Output | max 150% / min 87% / default 680 mA = 100% |
| | Platform Level Up Max Output | max 150% / min 83% / default 700 mA = 100% |
| | Platform Level Down Max Output | max 150% / min 83% / default 700 mA = 100% |
| | Platform Rotate CW Max Output | max 150% / min 89% / default 654 mA = 100% |
| | Platform Rotate CCW Max Output | max 150% / min 83% / default 795 mA = 100% |
| **Screen or Menu** | **Item** | **Default** |
| Jib and Platform Ramps | Jib Up/Down Ramp | max 2000 ms / min 200 ms / default 750 ms |
| | Platform Level Ramp | max 2000 ms / min 200 ms / default 750 ms |
| | Platform Rotate Ramp | max 2000 ms / min 200 ms / default 600 ms |
| **Screen or Menu** | **Item** | **Default** |
| Machine Disable Options | Drive Disable | On / Off |
| | Machine Disable | On / Off |
| | Remote Disable | Disable Engine Start / Drive Speed Cripple / Lift Speed Cripple |
| Reset to Defaults | | OK to reset Model Configuration and Options |
| Software Update | | OK to enter Software Update Mode |

## 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.




1 ground box lid
2 DISCON gasket
3 flat washer
4 hex nut
5 DISCON door
6 Torx head screws
7 ribbon cable
8 DISCON

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.

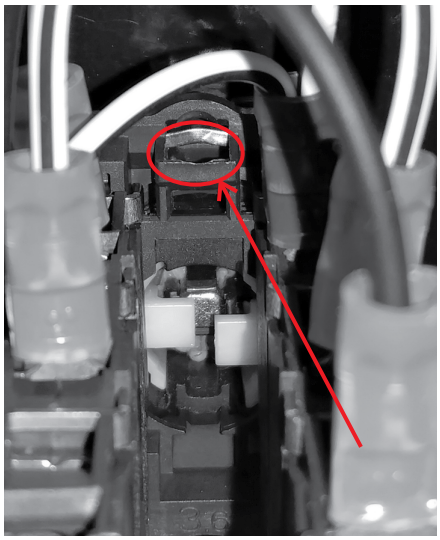
# Control System

## 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 box lid and remove the switch contacts from the function enable and E-Stop buttons and key switch. Do not disconnect the wires. Insert a small screwdriver into the loop at the base of the contacts and engage the release mechanism. Refer to Illustration 1.

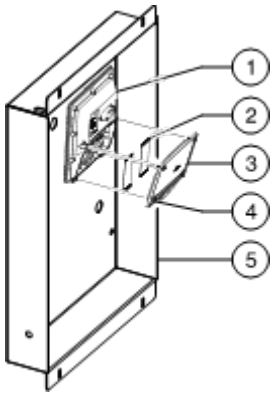


4 Unscrew the nut holding the buttons and key switch and remove the key switch and buttons.

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

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 Slave Cylinder

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

### How to Remove the Platform Leveling Slave Cylinder

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

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

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

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

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

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

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

5 From the ground controls, use auxiliary power and activate platform level down to retract the slave cylinder rod.

6 Tag, disconnect and plug the hydraulic hoses from the slave cylinder.

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

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

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

9 Carefully pull the cylinder out of the boom.

### How to Bleed the Platform Leveling Cylinder

Note: Do not start the engine. Use auxiliary power for this procedure.

1 Raise the jib boom to the horizontal position.

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

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

## 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 and platform support.

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

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

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

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

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

5 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.

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

# Platform Components

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

8 Support the jib boom leveling arms.

9 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.

10 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 oil that may have spilled.

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

## 2-3 Platform Overload System

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.

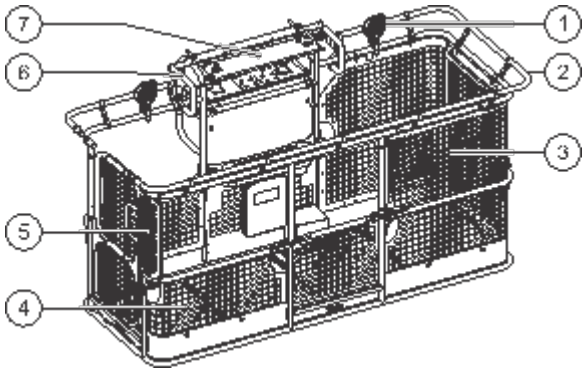
1 Fully retract and lower the boom. Level the platform.

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.

# Platform Components




**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.

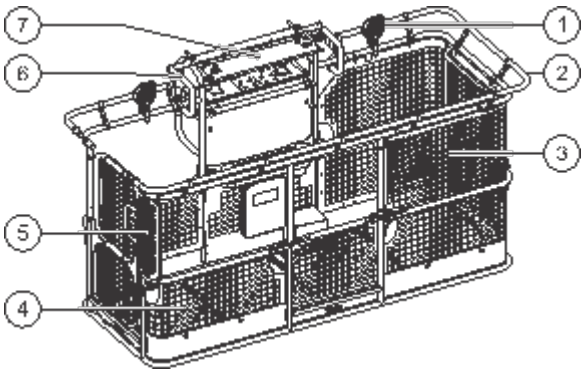
Note: Perform this procedure on a firm, level surface with the machine in the stowed position.

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

# Platform Components

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.

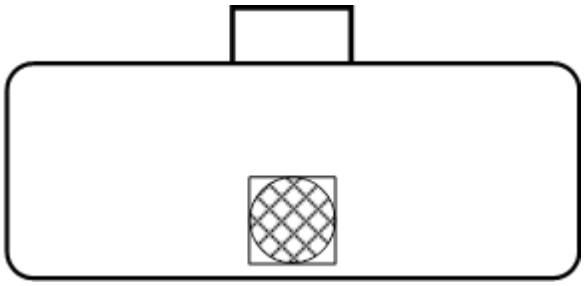
8 Follow the on-screen prompts to set the zero load.

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

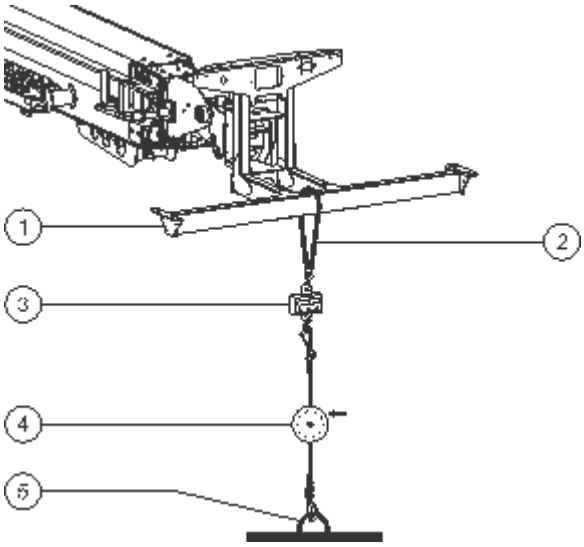
10 Place a test weight on the platform floor using a suitable lifting device. Place the weight near the center entry point of the platform, as far away from the operator controls as possible.

Weight = 660 lbs / 300 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 sling
3 hanging scale
4 winch or chain hoist
5 anchoring device

# Platform Components

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.

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.

# 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.

# Jib Boom Components

## 3-1
## Jib Boom

### How to Remove the Jib Boom

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

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

1 Remove the platform.

2 Remove the platform mounting weldment.

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

4 Remove the hose and cable clamp from the jib boom pivot pin. Lay all hoses and cables to the side.

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

5 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.

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

7 Place blocks under the platform leveling cylinder for support. Protect the cylinder rod from damage.

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

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

9 Remove the pin retaining fastener from the jib boom bellcrank to primary boom pivot pin.

10 Use a soft metal drift to remove the pin and carefully remove the jib boom assembly from the primary boom.

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

# 3-2
# Jib Boom Lift Cylinder

## How to Remove the Jib Boom Lift Cylinder

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

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

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

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

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

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

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

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

5 Support the jib boom lift cylinder with a 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.

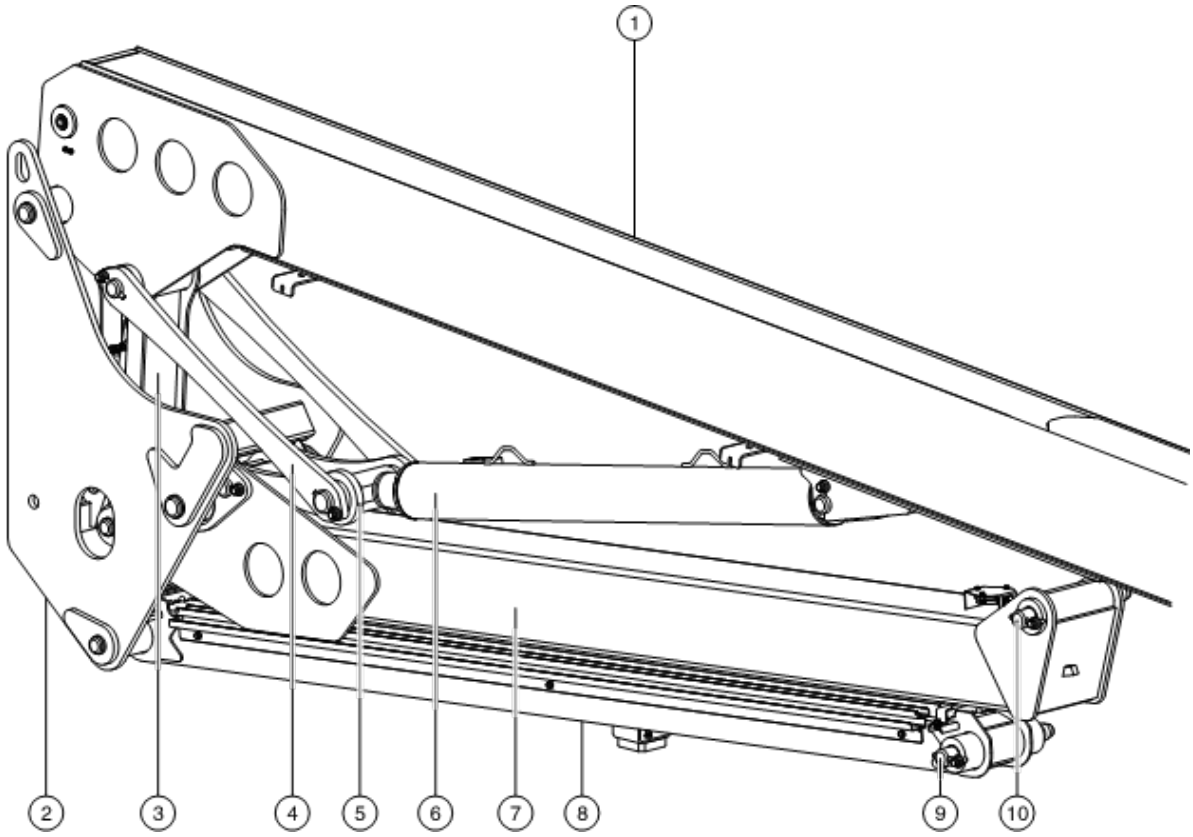
**⚠WARNING** Crushing hazard. The platform and jib boom could become unbalanced and fall when the jib boom barrel-end pivot pin is removed if not properly supported.

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

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

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

# Boom Components




1 primary boom
2 mid-pivot
3 timing link
4 pivot lever
5 pivot link
6 lift cylinder
7 upper riser arm
8 lower riser arm
9 lower riser arm to turntable pivot pin
10 upper riser arm to turntable pivot pin

## 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 Open the platform control box.

2 Tag and disconnect the foot switch wiring from the terminal strip inside the platform control box. Pull the wiring out of the platform control box.

3 Raise the boom to a horizontal position.

4 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.

5 Remove the mounting fasteners from the power to platform outlet box bracket. Lay the outlet box and bracket assembly off to the side.

6 Remove the hose and cable clamps from the platform support and jib boom.

7 Tag, disconnect and plug the platform leveling slave cylinder hydraulic hoses from the bulkhead fittings on the side 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.

8 Tag, disconnect and plug the hydraulic hoses from the "V1" and "V2" ports of the jib boom/platform rotate manifold. Cap the fittings on the manifold.

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

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

10 Locate all electrical cables under the boom at the pivot end that enter the cable track.

11 Tag and disconnect the electrical connectors for all cables that enter the cable track.

12 Remove the retaining fasteners from the electrical connector receptacles for the cables that enter the cable track.

13 Carefully pull the cables and connector receptacles out of the primary boom.

# Boom Components

14 Tag, disconnect and plug all hydraulic hoses that enter the cable track from the bulkhead fittings at the pivot end of the boom.

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

15 Pull the hydraulic hoses out of the primary boom.

16 Remove the cotter pin from the upper cable track at the platform end of the boom.

Note: Always replace the cotter pin with a new one.

17 Remove the cable track pull tube guide fasteners from the cable track guide at the platform end of the boom. Remove the cable track guide from the boom.

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

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

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

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

21 Carefully remove the cable track from the machine and place it on a structure capable of supporting it.

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

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

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

## How to Repair the Cable Track

**NOTICE**

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

Note: A 4 link repair section of cable track is available through the Genie Service Parts Department.

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

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

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

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

**NOTICE**

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

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

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

**NOTICE**

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

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

# Boom Components

## 4-2
## Primary Boom

### How to Remove the Primary Boom

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

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

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

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

2 Raise the boom approximately 6 inches / 15 cm.

3 Place a block of wood 4x4x18 inches / 10x10x45 cm across the boom rest and lower the boom onto the block of wood.

4 Remove the covers from the pivot end of the boom assembly and the mid-pivot.

5 Working at the pivot end of the boom, remove the boom retract limit switch.

6 Tag, disconnect and plug the hydraulic hoses from the boom extend cylinder. Cap the fittings.Remove the cable tracks from both sides of the boom. Set them onto the machine side covers.

**⚠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 Using an overhead crane with a strap of adequate capacity, support the platform end of the boom. Do not apply any lifting pressure.

8 Using an overhead crane with a strap of adequate capacity, support the barrel end of the primary boom lift cylinder.

9 Using a soft metal drift, remove the pivot pin securing the barrel end of the cylinder. Lower the cylinder onto the boom structure.

**⚠CAUTION** Crushing hazard. The cylinder could fall if not properly supported.

10 Using an overhead crane with a strap of adequate capacity, support the pivot end of the boom. Do not apply any lifting pressure.

11 Tag, disconnect and plug the hydraulic hoses from the platform level master cylinder at the pivot end of the boom. 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.

12 Using a soft metal drift, remove the pivot pin securing the barrel end of the cylinder.

Note: Use the access hole on the right side of the mid-pivot to remove the pivot pin.

13 Remove the boom lower pivot pin retaining fasteners. Use a soft metal drift to remove the pin.

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

15 Using an overhead supporting device, support one of the pivot levers.

16 Using a soft metal drift, push the pivot pin in far enough that it can be lowered onto the boom structure.

**⚠WARNING** Crushing hazard. The pivot lever could fall if not properly supported.

17 Using an overhead supporting device, support the other pivot lever.

18 Using a soft metal drift, finish removing the pivot pin.

Note: Do not remove the metal drift. Only pull it back far enough to lower the pivot lever.

**⚠WARNING** Crushing hazard. The timing link will fall if the metal drift is removed before it has been properly supported.

19 Using an overhead supporting device, support the timing link.

20 Remove the metal drift and lower the timing link onto the mid-pivot of the boom structure.

21 Using a soft metal drift, remove the pivot pin securing the boom to the mid-pivot.

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

22 Remove the boom from the machine.

## 4-3 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 Boom Lift Cylinder

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

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

1 Raise the boom until the lift cylinder rod-end pivot pin is above the side covers.

2 Attach a 5 ton / 5000 kg overhead crane to the platform end of the boom for support. Do not apply any lifting pressure.

3 Attach a 5 ton / 5000 kg overhead crane to the two lifting eyes located at the top of the mid-pivot. Do not apply any lifting pressure.

# Boom Components

4 Tag, disconnect and plug the 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.

5 Using a suitable lifting device, secure the barrel-end of lift cylinder.

6 Place a block of wood measuring 4x4x24 inches / 10x10x50 cm across the top of the turntable bulkhead and below the cylinder.

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

8 Using a soft metal drift, remove the pivot pin. Lower the cylinder onto the wooden block.

**⚠ CAUTION** Crushing hazard. The lift cylinder will fall if not properly supported when the pivot pin is removed.

9 Adjust the lifting strap to the center of the lift cylinder.

10 Remove the pin retaining fastener from the boom lift cylinder rod-end pivot pin.

11 Using a soft metal drift, remove the pivot pin.

Note: Apply slight lifting pressure to the mid-pivot to remove pressure from the pivot pin.

12 Carefully remove the boom lift cylinder from the machine.

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

## 4-4 Primary Boom Extension Cylinder

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

### How to Remove the Primary Boom Extension Cylinder

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

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

1 Raise the jib boom to a horizontal position.

2 Extend the boom until the extension cylinder rod-end pivot pins are accessible in the extension tube.

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 boom tube.

5 Remove the boom extend limit switch.

6 Tag, disconnect and plug the 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.

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

7 At the pivot end of the boom, remove the retaining fasteners and blocks securing the extend cylinder to the boom tube.

8 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.

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.

# 4-5 Platform Leveling Master Cylinder

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

## How to Remove the Platform Leveling Master Cylinder

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.*

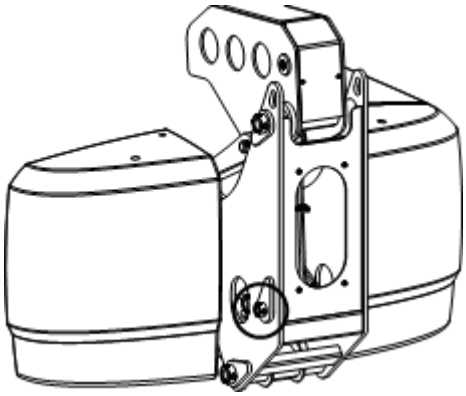
1 Remove the cover from the mid-pivot.

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

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

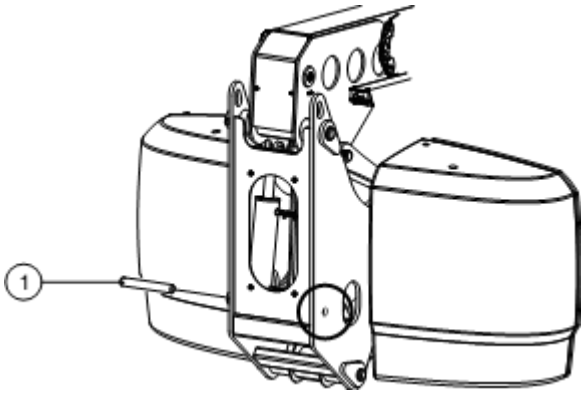
# Boom Components

3 Remove the retaining fastener securing the barrel end pivot pin.



4 Using a soft metal drift, remove the pivot pin.

Note: Use the access hole on the right side of the mid-pivot to remove the pivot pin.




1 pivot pin

5 Raise the boom until the rod end pivot pin of the master cylinder is accessible.

6 Using an overhead supporting device, support the master cylinder.

7 Remove the retaining fastener securing the rod end pivot pin.

8 Using a soft metal drift, remove the pivot pin.

**⚠ CAUTION** Crushing hazard. The cylinder could fall if not properly supported.

9 Remove the master cylinder from the machine.

## 4-6
## 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.

1 Fully retract and lower the boom.

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.

8 Press **OK**.

9 Exit Service Mode.

## How to Replace the Primary Boom Angle Sensor

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

2 Locate the boom angle sensor at the platform end of the upper riser arm.

3 Tag and disconnect the electrical connector from the angle sensor.

4 Remove the retaining fasteners. Remove the angle sensor from the machine.

5 Install the new angle sensor onto the machine.

6 Securely connect the angle sensor harness to the main harness.

7 Calibrate the angle sensor. Refer to Repair Procedure, *How to Calibrate the Primary Boom Angle Sensor*.

# Engines

## 5-1
## RPM Adjustment - Kubota D1105 and Deutz D2011Models

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

## 5-2
## Flex Plate

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

### How to Remove the Flex Plate

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

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

3 Remove the flex plate mounting fasteners.

4 Remove the flex plate from the engine.

## How to Install the Flex Plate

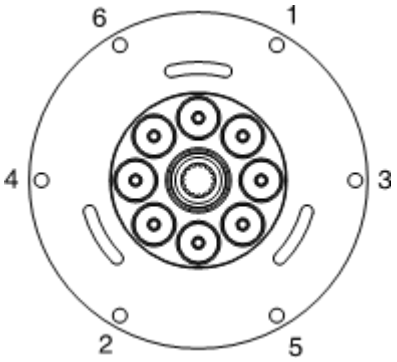
1 Install the flex plate onto the engine flywheel with the raised spline towards the pump.

2 Apply Loctite® removable thread locker to the flex plate mounting fasteners. Torque the flex plate mounting fasteners in sequence.

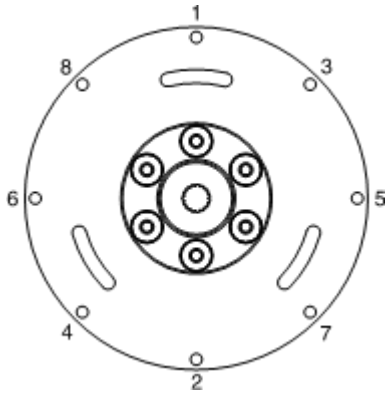
**Deutz D2011:** Pre-torque to 15 ft-lbs / 20 Nm. Then torque the flex plate mounting fasteners in sequence to 42.5 ft-lbs / 57,5 Nm.

**Kubota D1105:** Pre-torque to 13 ft-lbs / 17,5 Nm. Then torque the flex plate mounting fasteners in sequence to 36 ft-lbs / 49 Nm.

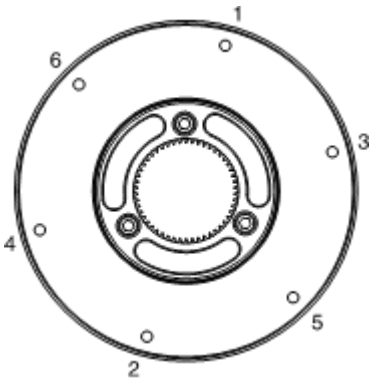
**Kubota D1803:** Pre-torque to 14 ft-lbs / 19 Nm. Then torque the flex plate mounting fasteners in sequence to 40.5 ft-lbs / 55 Nm.




Deutz D2011




Kubota D1105




Kubota D1803

3 Apply high viscosity coupling grease to the splines of the flex plate.

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

# Engines

## How to Install the Pump and Bell Housing Assembly

1 Install the pump and bell housing assembly.

Apply Loctite® removable threadlocker to the bell housing mounting fasteners. Torque the bell housing mounting fasteners in sequence.

**Deutz D2011**: Pre-torque the bell housing mounting fasteners labeled "C" in sequence to 17.5 ft-lbs / 24 Nm. Then torque the bell housing mounting fasteners in sequence to 50 ft-lbs / 67,5 Nm.

**Kubota D1105**: Pre-torque the bell housing mounting fasteners labeled "A" in sequence to 5 ft-lbs / 7 Nm. Pre-torque the bell housing mounting fasteners labeled "B" in sequence to 10 ft-lbs / 13 Nm.

Then torque the bell housing mounting fasteners labeled "A" in sequence to 15 ft-lbs / 20 Nm.

Then torque the bell housing mounting fasteners labeled "B" in sequence to 29 ft-lbs / 40 Nm.

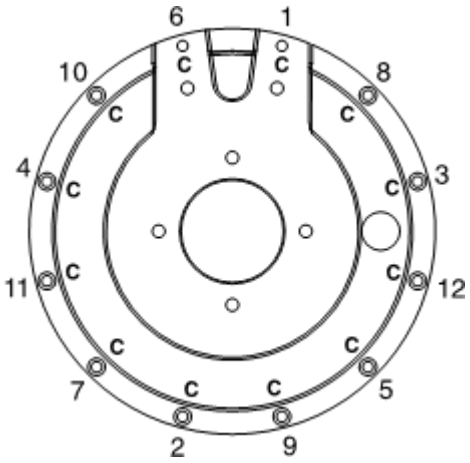
**Kubota D1803**: Pre-torque the bell housing mounting fasteners in sequence to 17 ft-lbs / 23 Nm. Then torque the bell housing mounting fasteners in sequence to 49 ft-lbs / 66 Nm.

**NOTICE**

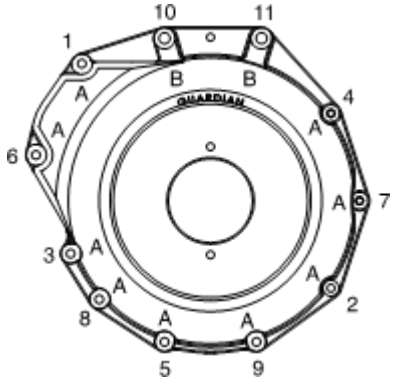
Component damage hazard. When installing the pump, do not force the pump coupler into the flexplate or damage to the pump shaft seal may occur.

**NOTICE**

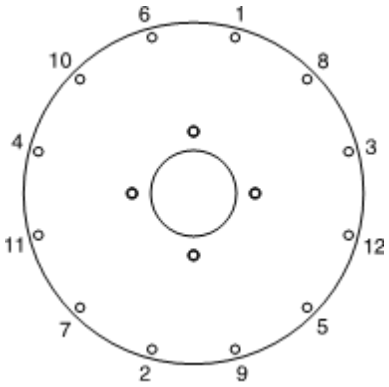
Component damage hazard. Do not force the drive pump during installation or the flex plate teeth may become damaged.




Deutz D2011




Kubota D1105




Kubota D1803

# 5-3
# Engine Fault Codes - Kubota D1803 Models

## How to Retrieve Engine Fault Codes

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

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

Refer to Fault Codes Section, *How to Retrieve Kubota D1803 Engine Fault Codes*. Use the Fault Code Charts to aid in identifying the fault.

# 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 Remove the fasteners securing the generator pump to the function pump.

2 With hoses attached, remove the generator pump from the function pump.

3 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.

4 Support the function pump with a strap and appropriate lifting device. Do not apply any lifting pressure.

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

NOTE: When installing a new pump, it is necessary to prime the pump. Refer to Repair Procedure *How to Prime the Pump*.

## 6-2 Drive Pump

### How to Remove the Drive 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 Remove the fasteners securing the function pump to the drive pump.

2 With hoses attached, remove the function pump (and generator pump, if equipped) from the drive pump.

3 Tag, disconnect and plug the drive 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.

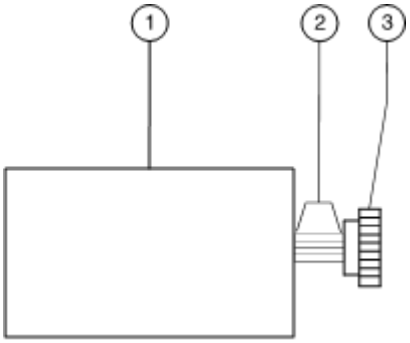
4 Support the generator pump with a strap and appropriate lifting device. Do not apply any lifting pressure.

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

NOTE: When installing a new pump, it is necessary to prime the pump. Refer to Repair Procedure *How to Prime the Pump*.

## How to Install the Drive Pump Coupler

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




1 drive pump
2 coupler spacing
3 pump coupler

2 Apply Loctite® removable thread locker to the coupler set screw. Torque the set screw to 70 ft-lbs / 95 Nm.

## 6-3 How to Prime the Drive and Function Pumps

1 Fill the tank with hydraulic oil until the fluid level is in the center of the sight glass at the rear of the tank. Do not overfill.

2 If any of the pumps are new and have not been previously used, they must be primed.

**Drive Pump:** After the pump is installed, fasteners torqued and all hoses connected, remove one of the hoses at the top of the pump (port E or port F) and add a minimum of 0.75 liter / 25 ounces of hydraulic oil to the pump. Install and torque the hose to specification.

**Function Pump:** After the pump is installed, fasteners torqued and all hoses connected, remove the plug at the uppermost port of the pump and add a minimum of 0.375 liter / 13 ounces of hydraulic oil to the pump. Install and torque the port plug to 77 Nm / 57 ft-lbs.

3 Locate the quick-disconnect port at the top of the siphon riser hydraulic oil supply line from tank to the pumps.

4 Use a clear line to connect an air-powered vacuum pump to the test port.

5 Activate the pump until no bubbles are seen in the clear vacuum pump hose while the pump is running. Disconnect the vacuum pump from the quick-disconnect port.

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

# Hydraulic Pump

## 6-4
## Generator Pump

### How to Remove the Generator Pump

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

1 Tag, disconnect and plug the generator 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.

2 Support the pump with a strap and appropriate lifting device. Do not apply any lifting pressure.

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

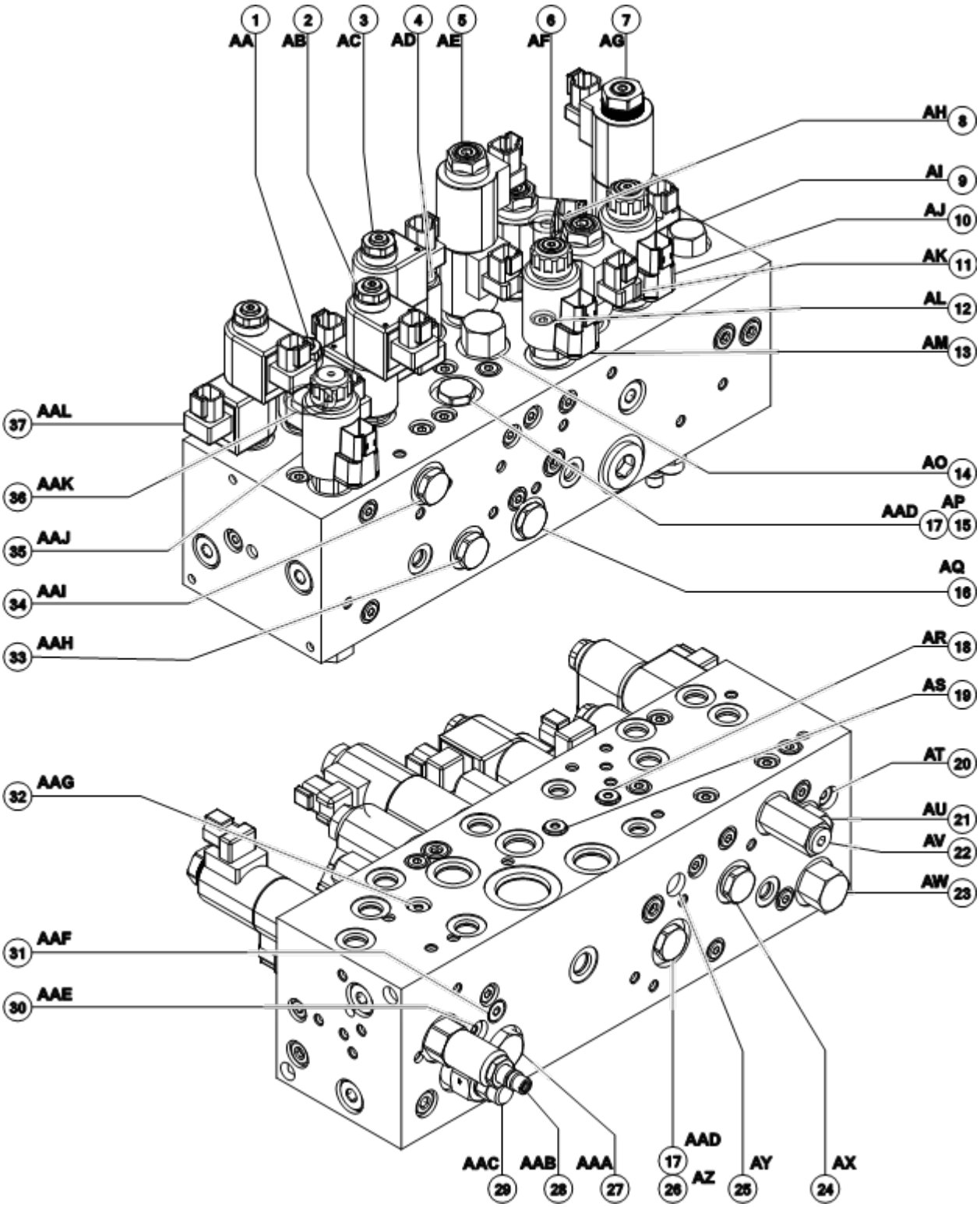
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# Manifolds

## 7-1
## Function Manifold Components

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Solenoid valve, 2 position 2 way | AA | Function enable valve | 15-20 ft-lbs / 20-27 Nm |
| 2 | Proportional directional valve, 3 position 4 way | AB | Platform rotate left/right and jib boom up/down | 25-30 ft-lbs / 34-41 Nm |
| 3 | Proportional directional valve, 3 position 4 way | AC | Platform level up/down | 25-30 ft-lbs / 34-41 Nm |
| 4 | Relief valve, 3000 psi / 207 bar | AD | Platform level circuit | 25-30 ft-lbs / 34-41 Nm |
| 5 | Solenoid valve, 3 position 4 way | AE | Primary boom up/down | 20-25 ft-lbs / 27-34 Nm |
| 6 | Solenoid valve, 2 position 2 way | AF | Primary boom extend | 30-35 ft-lbs / 41-47 Nm |
| 7 | Solenoid valve, 3 position 4 way | AG | Steer left/right | 20-25 ft-lbs / 27-34 Nm |
| 8 | Relief valve, 2000 psi / 138 bar | AH | Primary boom extend | 25-30 ft-lbs / 34-41 Nm |
| 9 | Flow regulator valve, 2 GPM / 7,6 L/min | AI | Steer left/right | 25-30 ft-lbs / 34-41 Nm |
| 10 | Proportional solenoid valve, 2 position 2 way | AJ | Primary boom extend/retract | 30-35 ft-lbs / 41-47 Nm |
| 11 | Solenoid valve, 2 position 2 way | AK | Primary boom extend/retract | 30-35 ft-lbs / 41-47 Nm |
| 12 | Check valve | AL | Primary boom extend/retract circuit | 8-10 ft-lbs / 11-13 Nm |
| 13 | Proportional solenoid valve, 2 position 2 way | AM | Primary boom up/down | 30-35 ft-lbs / 41-47 Nm |
| 14 | Differential sensing valve | AO | Primary boom up/down | 30-35 ft-lbs / 41-47 Nm |
| 15 | Check valve | AP | Platform level down | 20-25 ft-lbs / 27-34 Nm |
| 16 | Piston, not shown | AAD | Platform level up/down | |
| 17 | Shuttle valve | AQ | Platform level circuit | 25-30 ft-lbs / 34-41 Nm |
| 18 | Check valve | AR | Platform level circuit | 8-10 ft-lbs / 11-13 Nm |
| 19 | Check valve | AS | Primary boom up/down circuit | 8-10 ft-lbs / 11-13 Nm |
| 20 | Check valve | AT | Turntable rotate circuit | 8-10 ft-lbs / 11-13 Nm |

# Manifolds

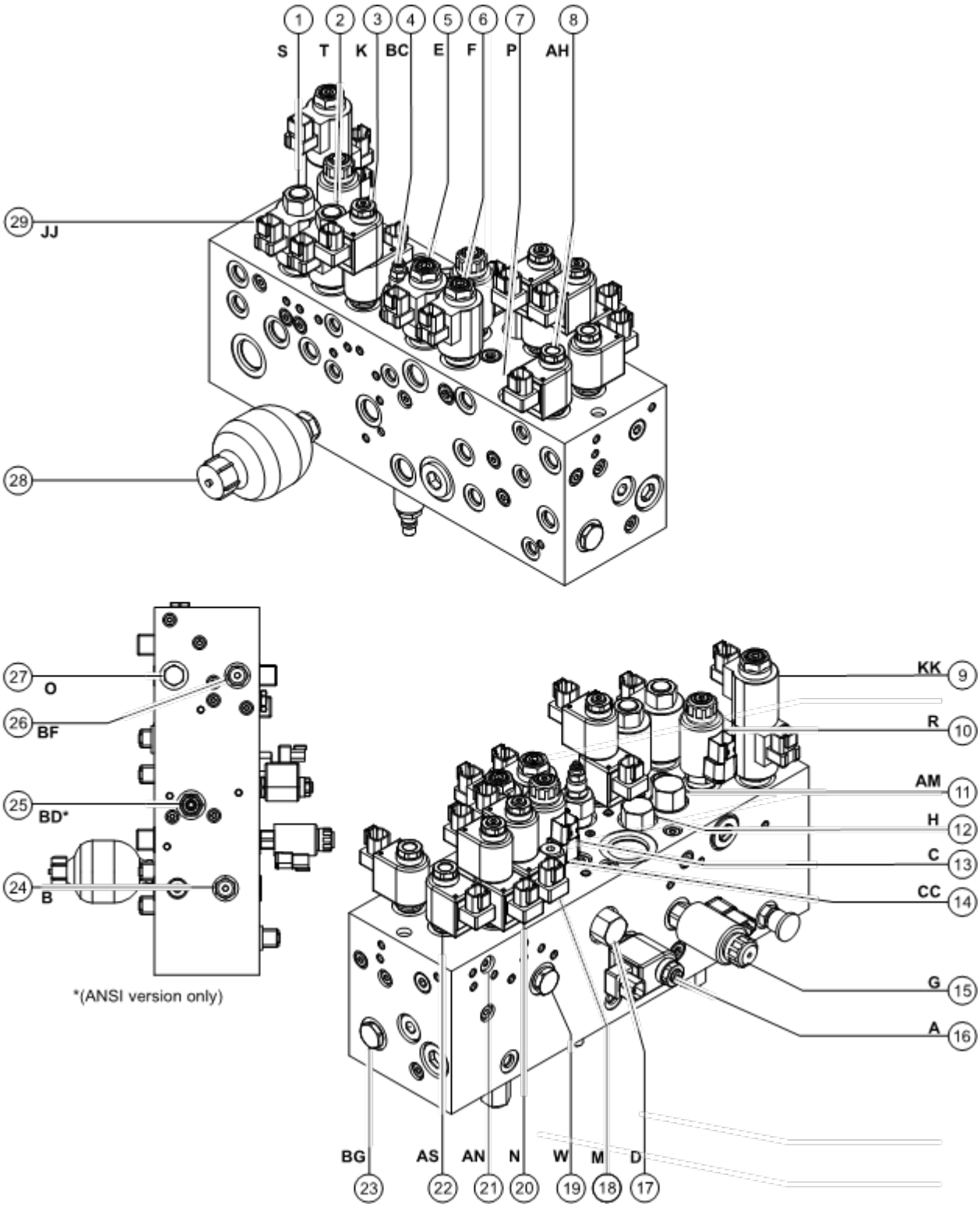

1 AA
2 AB
3 AC
4 AD
5 AE
6 AF
7 AG
AH 8
AI 9
AJ 10
AK 11
AL 12
AM 13
AO 14
AP 15
AQ 16
AAD 17
AR 18
AS 19
AT 20
AU 21
AV 22
AW 23
AX 24
AY 25
AZ 26
AAD 17
AAA 27
AAB 28
AAC 29
AAE 30
AAF 31
AAG 32
AAH 33
AAI 34
AAJ 35
AAK 36
AAL 37

# Manifolds

## Function Manifold Components, continued

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 21 | Flow regulator valve, 0.1 GPM / 0,37 L\mon | AU | Differential sensing circuit | 25-30 ft-lbs / 34-41 Nm |
| 22 | Relief valve, 3200 psi / 221 bar | AV | System relief | 20-25 ft-lbs / 27-34 Nm |
| 23 | Differential sensing valve | AW | Turntable rotate | 30-35 ft-lbs / 41-47 Nm |
| 24 | Check valve, 30 psi / 2,1 bar | AX | Platform rotate left/right and jib boom up/down | 20-25 ft-lbs / 27-34 Nm |
| 25 | Check valve | AY | Platform level up | 8-10 ft-lbs / 11-13 Nm |
| 26 | Check valve | AZ | Platform level up | 20-25 ft-lbs / 27-34 Nm |
| 27 | Differential sensing valve | AAA | Primary boom extend/retract | 50-55 ft-lbs / 68-74 Nm |
| 28 | Sequence valve, 850 psi / 59 bar | AAB | Oscillate circuit | 30-35 ft-lbs / 41-47 Nm |
| 29 | Pressure reducing valve, 650 psi / 45 bar | AAC | Oscillate circuit | 30-35 ft-lbs / 41-47 Nm |
| 30 | Check valve | AAE | Steer circuit | 8-10 ft-lbs / 11-13 Nm |
| 31 | Orifice, 0.031 in / 0.79 mm | AAF | Primary boom extend/retract circuit | |
| 32 | Check valve | AAG | Oscillate circuit | 8-10 ft-lbs / 11-13 Nm |
| 33 | Check valve, 30 psi / 2,1 bar | AAH | Platform level up/down | 20-25 ft-lbs / 27-34 Nm |
| 34 | Check valve, 30 psi / 2,1 bar | AAI | Platform rotate right and jib boom down | 20-25 ft-lbs / 27-34 Nm |
| 35 | Proportional solenoid valve, 2 position 2 way | AAJ | Turntable rotate | 20-25 ft-lbs / 27-34 Nm |
| 36 | Check valve, 30 psi / 2,1 bar | AAK | Platform rotate left and jib boom up | 20-25 ft-lbs / 27-34 Nm |
| 37 | Solenoid valve, 3 position 4 way | AAL | Turntable rotate | 25-30 ft-lbs / 34-41 Nm |

# Manifolds


1 S
2 T
3 K
4 BC
5 E
6 F
7 P
8 AH
29 JJ
28
27 O
26 BF
25 BD*
24 B
*(ANSI version only)
KK 9
R 10
AM 11
H 12
C 13
CC 14
G 15
A 16
BG 23
AS 22
AN 21
N 20
W 19
M 18
D 17

# 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: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 ptest port 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.

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

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

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

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

6 Repeat step 2 to confirm relief valve pressure.

7 Remove the pressure gauge.

### How to Adjust the Boom Extend Relief Valve

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

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

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

1 Connect a 0 to 3000 psi / 0 to 200 bar pressure gauge to the diagnostic nipple located next to the auxiliary pump.

2 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*.

3 Locate the boom extend 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.

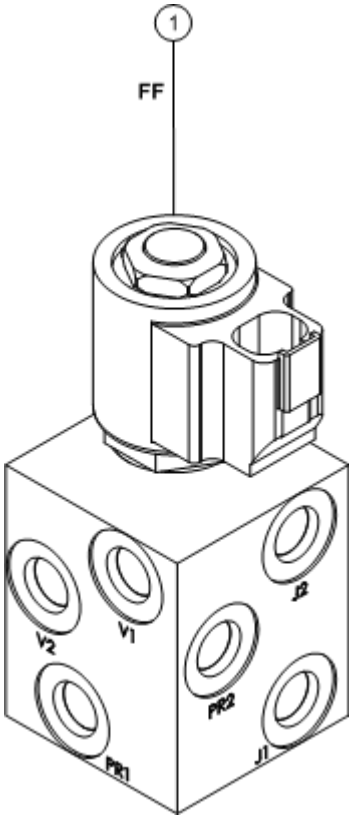
5 Repeat step2 to confirm relief valve pressure.

6 Remove the pressure gauge.

## 7-3
## Jib Boom / Platform Rotate Manifold Components

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

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Solenoid valve, 2 position 3 way | FF | Platform rotate/jib boom select | 20-25 ft-lbs / 27-34 Nm |

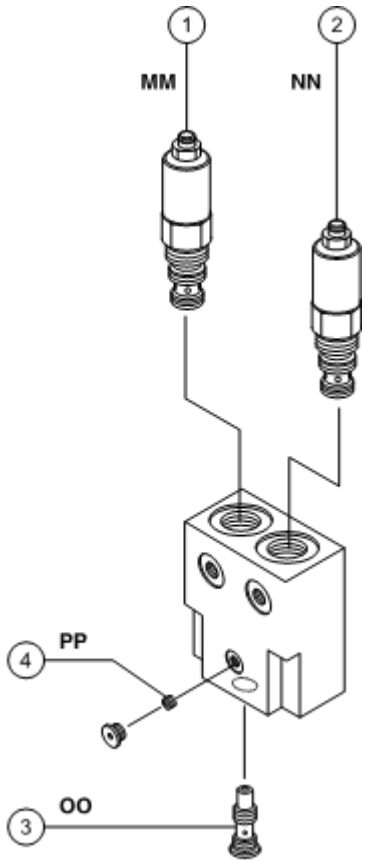


# Manifolds

## 7-4
## Turntable Rotation Manifold Components

The turntable rotation manifold is mounted to the turntable rotation motor.

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Counterbalance valve | MM | Turntable rotate right | 35-40 ft-lbs / 47-54 Nm |
| 2 | Counterbalance valve | NN | Turntable rotate left | 35-40 ft-lbs / 47-54 Nm |
| 3 | Shuttle valve, 2 position 3 way | OO | Turntable rotation brake release | 10-13 ft-lbs / 14-18 Nm |
| 4 | Orifice, 0.030 inch / 0.76 mm | PP | Brake release circuit(located inside port) | |



# 7-5
# Valve Adjustments - Oscillate Relief Valve

## How to Adjust the Oscillate Relief Valve Pressure

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 oscillate valve (BC) on the function manifold.

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

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

6 Repeat step 3 to confirm the valve pressure.

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

## How to Set Up the Oscillate Directional Valve Linkage

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

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

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

1 Use a "bubble type" level to verify the floor is completely level.

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

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

3 Place a "bubble type" level across the drive chassis non-steer end. Verify the drive chassis is completely level.

4 Remove the heim joint retaining fastener from the axle.

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

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

# Manifolds

7 Adjust the heim joint until the hole lines up with the retaining fastener hole in the axle.

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

9 Verify the drive chassis is completely level.

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

Note: If the distance is not within 0.15in / 3.8mm to 0.17in / 4.3mm and the adjustment to the linkage was completed with the ground and drive chassis level, repeat steps 6 through 11 OR consult Genie Product Support.

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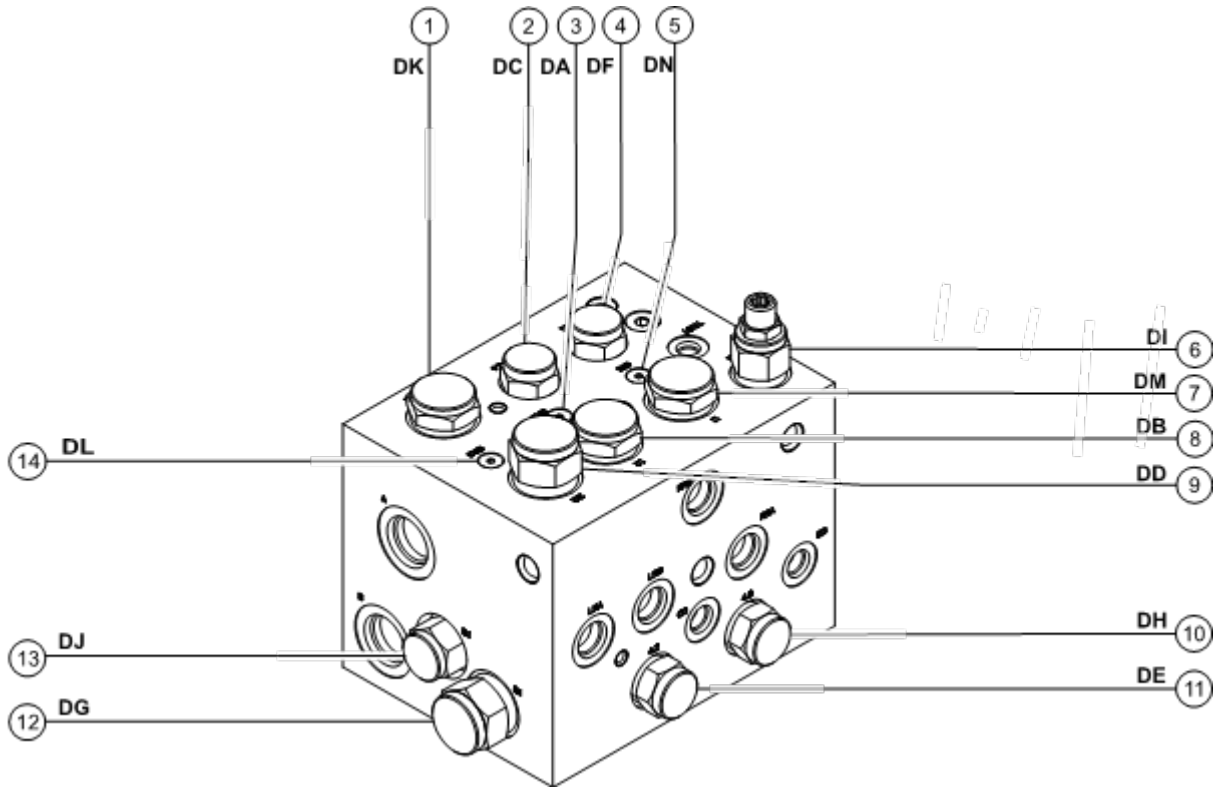
# Manifolds

## 7-6
## Traction Manifold Components, 4WD

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

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Flow divider/combiner valve | DK | Divides flow between diagonal pairs of motors | 80-90 ft-lbs / 108-122 Nm |
| 2 | Check valve, 5 psi | 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 | 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 right 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 | DM | Combines return flow from RF and RR motors | 80-90 ft-lbs / 108-122 Nm |
| 8 | Flow divider/combiner valve, 24 gpm | DB | Combines return flow from LF and RR motors | 80-90 ft-lbs / 108-122 Nm |
| 9 | Check valve, 5 psi | DD | Prevents cavitation in LF and RR motors | 55-60 ft-lbs / 75-81 Nm |
| 10 | Check valve, 5 psi | DH | Prevents cavitation in RR motor | 35-40 ft-lbs / 14-16 Nm |
| 11 | Check valve, 5 psi | DE | Prevents cavitation in LR motor | 35-40 ft-lbs / 14-16 Nm |
| 12 | Check valve, 5 psi | DG | Prents cavitation in RF and LR motor | 55-60 ft-lbs / 75-81 Nm |
| 13 | Shuttle valve, fixed | DJ | Directs oil from low pressure side to hot oil relief valve | 55-60 ft-lbs / 75-81 Nm |
| 14 | Orifice, 0.040 inch / 1 mm | DL | Prevents scrub at high steer angles by allowing some bypass flow around the right flow divider | |

# Manifolds



# Manifolds

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

### How to Adjust the Charge Pressure Relief Valve

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

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

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

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

5 Turn the engine off.

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

7 Start the engine from the platform controls. Press down the foot switch and slowly move the drive control handle off center just until the machine begins to move. Note the reading on the pressure gauge. Turn the machine off.

8 Hold the charge pressure relief valve and remove the cap (item DI).

9 Adjust the internal hex socket 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.

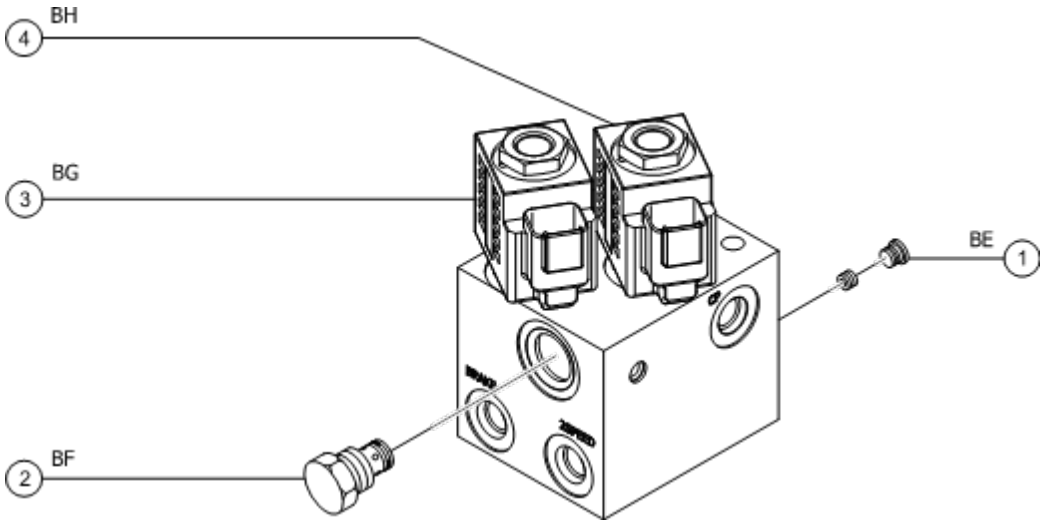
10 Repeat steps 7 through 9 until the pressure reading at the drive manifold is 30 psi / 2 bar less than the pressure reading at the pump.

11 Turn the engine off and remove the pressure gauge.

## 7-8
## Brake / Two Speed Manifold Components

The brake/two speed manifold is mounted inside the drive chassis.

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Orifice, 0.025 inch / 0.63 mm | BE | Turntable rotation brake release | |
| 2 | Check valve | BF | Brake release circuit | 20-25 ft-lbs / 27-34 Nm |
| 3 | Solenoid Valve, 2 position 3 way | BG | Brake release | 20-25 ft-lbs / 27-34 Nm |
| 4 | Solenoid Valve, 2 position 3 way | BH | Two-speed motor shift | 20-25 ft-lbs / 27-34 Nm |

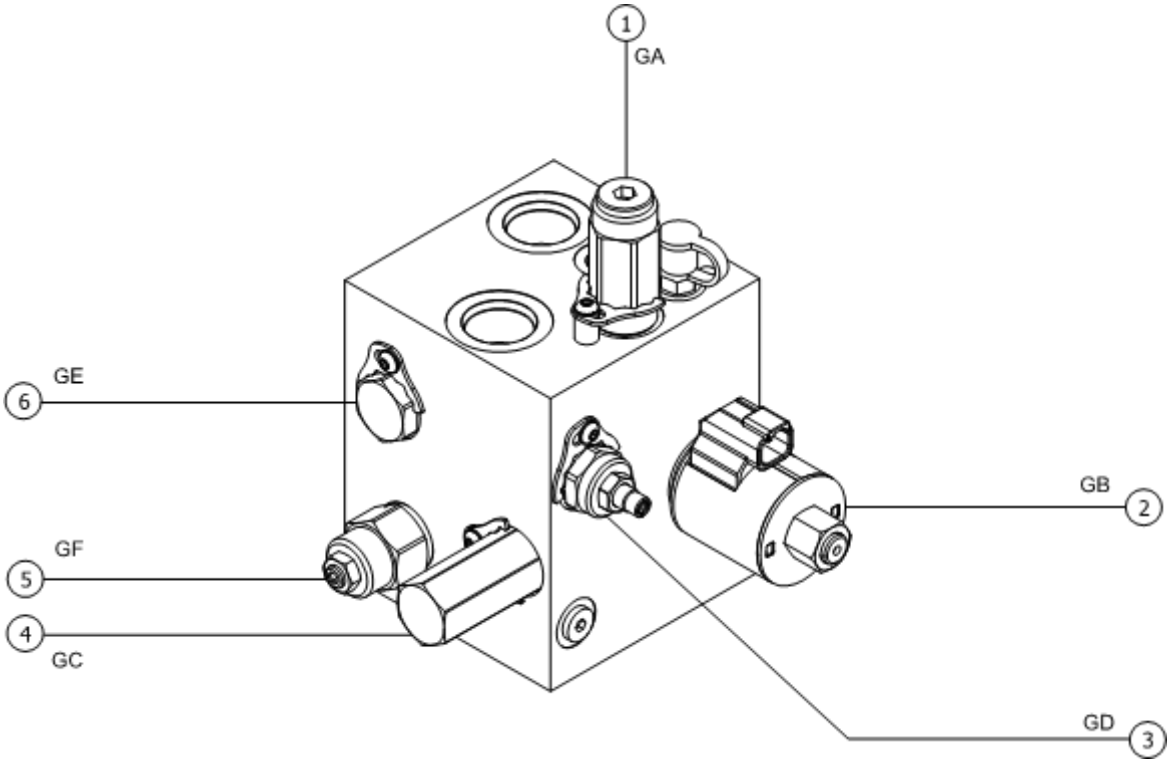


# Manifolds

## 7-9
## 12 Kw Generator Manifold

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

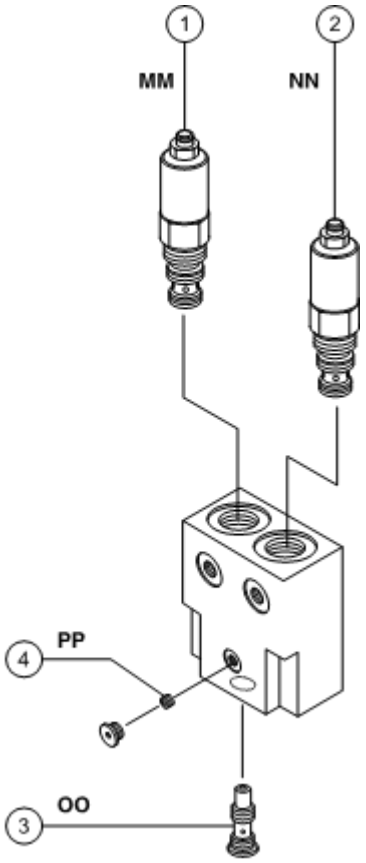
| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Relief valve | GA | Generator relief valve | 50 ft-lbs / 67 Nm |
| 2 | Solenoid Valve | GB | Charge pressure circuit | 60-65 ft lbs / 81-88 Nm |
| 3 | Needle valve | GD | Charge pressure circuit | 50 ft-lbs / 67 Nm |
| 4 | Differential sensing valve | GC | Pilot valve to diverter valve | 50 ft-lbs / 67 Nm |
| 5 | Counterbalance valve | GF | Adds backpressure to generator circuit | |
| 6 | Check valve | GE | Prevents oil to generator | 24-26 ft-lbs / 32.5-35.3 Nm |



## 7-10
## Turntable Rotation Manifold Components

The turntable rotation manifold is mounted to the turntable rotation motor.

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Counterbalance valve | MM | Turntable rotate right | 35-40 ft-lbs / 47-54 Nm |
| 2 | Counterbalance valve | NN | Turntable rotate left | 35-40 ft-lbs / 47-54 Nm |
| 3 | Shuttle valve. 2 position, 3 way | OO | Turntable rotation brake release | 10-13 ft-lbs / 14-18 Nm |
| 4 | Orifice, 0.030 inch / 0.76 mm | PP | Brake release circuit | |



# Manifolds

## 7-11 Valve Coils

### How to Test a Coil

A properly functioning coil provides an electromagnetic force which operates the solenoid valve. Critical to normal operation is continuity within the coil. Zero resistance or infinite resistance indicates the coil has failed.

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

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

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

Note: If the machine has been in operation, allow the coil to cool at least 3 hours before performing this test.

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

2 Test the coil resistance using a multimeter set to resistance (W). Refer to the Valve Coil Resistance Specification table.

⊙ Result: If the resistance is not within the adjusted specification, plus or minus 10%, 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.

| Description | Specification |
|---|---|
| Solenoid Valve, 10V DC (schematic items BE and BF) | 5.5 to 7.5 Ω |
| Solenoid Valve, 10V DC (schematic item GB) | 4 to 6 Ω |
| Solenoid Valve, 10V DC (schematic item FF) | 5 to 7 Ω |
| Proportional solenoid valve, 12V DC (schematic items AB, AC) | 7.6 to 9.6 Ω |
| Proportional solenoid valve, 12V DC (schematic item AAJ) | 6.2 to 8.2 Ω |
| Proportional solenoid valve, 12V DC (schematic item AJ and AM) | 4.9 to 6.9 Ω |
| Solenoid Valve, 12V DC (schematic item AA, AE, AG and AAL) | 7.6 to 9.6 Ω |
| Solenoid Valve, 12V DC (schematic item AF, AK) | 4.9 to 6.9 Ω |

# Turntable Rotation Components

## 8-1
## Turntable Rotation Assembly

### How to Remove the Turntable Rotation Assembly

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

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

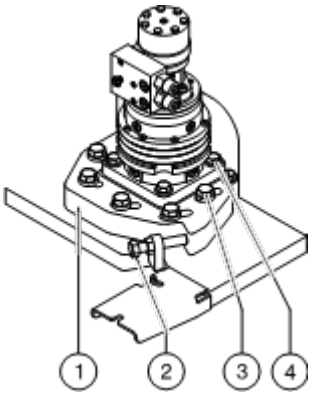
1 Secure the turntable from rotating with the turntable rotation lock pin.

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

2 Tag, disconnect and plug the hydraulic hoses from the turntable rotation drive motor. Cap the fittings on the drive 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 Loosen the backlash pivot plate mounting bolts and adjustment bolts. Pull the turntable rotation assembly away from the turntable bearing.




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

4 Attach a suitable lifting device to the lifting eyes on the drive hub assembly.

# Turntable Rotation Components

5 Remove the drive hub mounting bolts. Carefully remove the drive hub assembly from the machine.

**⚠ WARNING** Crushing hazard. The turntable could rotate unexpectedly when the rotation drive hub assembly is removed if the turntable is not secured with the turntable rotation lock pin.

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

When installing the drive hub assembly:

6 Install the drive hub. Torque the drive hub mounting bolts to specification. Refer to Specifications, *Machine Torque Specifications*.

7 Adjust turntable rotation gear backlash. Refer to Repair Procedure, *How to Adjust the Turntable Rotation Gear Backlash*.

## How to Adjust the Turntable Rotation Gear Backlash

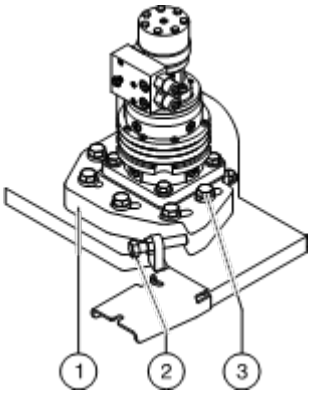
The turntable rotation drive hub is mounted on an adjustable plate that controls the gap between the rotation motor pinion gear and the turntable bearing ring gear.

Note: Perform this procedure with the boom between the non-steer end tires and with the machine on a firm and level surface.

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.

## 8-2
## How to Replace the Turntable Angle Sensor

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

2 Locate the turntable angle sensor behind the function manifold.

3 Tag and disconnect the electrical connector from the angle sensor.

4 Remove the retaining fasteners. Remove the angle sensor from the machine.

5 Install the new angle sensor onto the machine.

6 Securely connect the angle sensor harness to the main harness.

7 Calibrate the angle sensor. Refer to Repair Procedure, *How to Calibrate the Turntable Tilt Sensor*.

# Turntable Rotation Components

## 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.

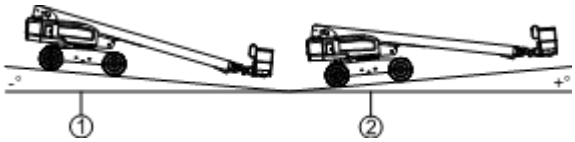
5 If the machine is not sufficiently level, the procedure will fail with the message that the chassis no not sufficiently level. Move the machine to a more level location if this occurs.

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).

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

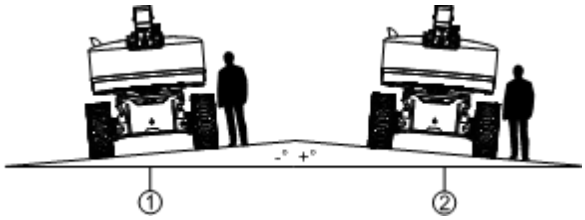
10 The next calibration of the machine is the machine roll. This is the angle of the machine from side to side.

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).

# Turntable Rotation Components

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.

# Axle Components

## 9-1 Oscillating Axle Cylinders

The oscillate system is designed so that all four tires maintain firm contact to the ground on unlevel terrain improving traction and machine stability.

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 the Oscillate Cylinder

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

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

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

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

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

6 Remove the cylinder from the machine.

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

# 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. |
| 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. |
| 10 | Ground Controls Engine Start Switch | 27 | Active at startup | Engine start button held at startup. | Engine start is disabled | Release engine start button, check DISCON overlay and ribbon cable if issue persists. |
| 11 | Platform Controls Engine Start Switch | 27 | Active at startup | Platform controls engine start switch active at startup. | Engine start switch will not operate. | *Verify with a voltmeter that the Engine Start Toggle Switch (TS2) is operating properly.<br>* C33STR (BK, PCON J16-3) should be 0 V with the switch OFF and 12 V with the switch ON.<br>*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. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 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. |
| 15 | Foot Switch | 27 | Active at startup | Foot switch input was detected as HIGH at start-up, or the footswitch was held for too long and caused the footswitch timer to elapse. | 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. |
| | | 28 | Timeout | Foot switch depressed too long without action | Machine will not be functional. | |
| 17 | Aux Pump Coil | 11 | Shorted to supply voltage | TCON detected that C27AUX circuit is shorted to 12V. | Machine will not be functional. | *Check C27AUX (RD, TCON J3-3) wiring. *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. |
| 19 | 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. |
| 20 | Pri Boom Ext / Ret Joystick | 11 | Shorted to supply voltage | Circuit C163PER is above 4.5 V. | Boom Extend and Retract functions will not operate. | * Leave joystick in neutral position and cycle power.<br>* If fault persists, with a voltmeter check that C163PER (BL/WH, PCON J18-4) 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. |
| | | 27 | Active at startup | Circuit C163PER 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 |
|---|---|---|---|---|---|---|
| 21 | Pri Boom Up / Down Joystick | 11 | Shorted to supply voltage | Circuit C164PUD is above 4.5 V. | 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. |
| | | 28 | Active at startup | Circuit C164PUD voltage was not within the startup voltage range of 2.5 V +/- 0.2 V. | | |
| 22 | Pri Boom Up coil | 11 | Shorted to supply voltage | TCON detected that C1PBU circuit is shorted to 12 V. | Boom Up function will not operate. Boom Down will also not operate if short is to 12 V. | * 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. |
| 23 | Pri Boom Down Coil | 11 | Shorted to supply voltage | TCON detected that C2PBD circuit is shorted to 12 V or GND. | Boom Up and Down functions will not operate. | * With a voltmeter, measure Y21. Proper resistance should be between 5 - 60 ohms. Replace Y21 if resistance is outside of those values.<br>* Verify wiring for C2PBD (RD/BK, TCON J4-9) and check for open or short circuits.<br>* Verify resistance between Recovery Module pins J37-2 and J37-11 is zero ohms. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 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 | Boom stowed crosscheck switch value not as expected | | *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. |
| | | 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. | Machine limited to recovery functions | * Calibrate boom angle snesor.<br>* Check boom angle sensor mount, ensure all fasteners are tightened to spec.<br>* Replace sensor if issue persists. |
| 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 | 11 | Shorted to supply voltage | TCON detected that C7PBE circuit is shorted to 12 V or GND. | Boom Extend and Retract functions 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. |
| 27 | Pri Boom Ret Coil | 11 | Shorted to supply voltage | TCON detected that C8PBR circuit is shorted to 12 V or GND. | Boom Extend and Retract functions 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.<br>* Verify resistance between Recovery Module pins J37-5 and J37-8 is zero ohms. |
| 35 | Ground Control Button | 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 | 11 | Shorted to supply voltage | PCON detected that V43JU circuit is shorted to 12 V or 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 J12-8) and check for open or short circuits. |
| 37 | Jib Down Coil | 11 | Shorted to supply voltage | PCON detected that V44JD circuit is shorted to 12 V or GND. | Jib Down function will not operate. | * With a voltmeter, measure Y69. Proper resistance should be between 5 - 60 ohms. Replace Y69 if resistance is outside of those values.<br>* Verify wiring for V44JD (BL/BK, PCON J12-9) and check for open or short circuits. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 40 | Jib Select Coil | 11 | Shorted to supply voltage | PCON detected V18PRR is short to supply | Jib and platform 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. |
| 41 | Turntable Rotate Joystick | 11 | Shorted to supply voltage | Circuit C165TTR is above 4.5 V. | 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. |
| | | 27 | Active at startup | Circuit C165TTR voltage was not within the startup voltage range of 2.5 V +/- 0.2 V. | | |
| 42 | Turntable Rotate CW Coil | 11 | Shorted to supply voltage | TCON detected that C4TRL circuit is shorted to 12 V or GND. | Turntable Rotate functions 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. |
| 43 | Turntable Rotate CCW Coil | 11 | Shorted to supply voltage | TCON detected that C5TRR circuit is shorted to 12 V or GND. | Turntable Rotate functions 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. |
| 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. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 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 | 11 | Shorted to supply voltage | PCON detected that V17PRL circuit is shorted to 12 V or 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. |
| 47 | Platform Rotate CCW Coil | 11 | Shorted to supply voltage | PCON detected that V18PRR circuit is shorted to 12 V or 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. |
| 51 | Drive Joystick | 11 | Shorted to supply voltage | Circuit C160DRV is above 4.5 V. | 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. |
| | | 27 | Active at startup | Circuit C160DRV 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 |
|---|---|---|---|---|---|---|
| 52 | Drive Forward Pump Coil | 11 | Shorted to supply voltage | TCON detected that C30FWD circuit is shorted to 12 V or GND. | Drive Forward, Brake Release and possibly Engine 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. |
| 53 | Drive Reverse Pump Coil | 11 | Shorted to supply voltage | TCON detected that C31REV circuit is shorted to 12 V or GND. | Drive Reverse, Brake Release and possibly Engine 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. |
| 54 | Brake Release Coil | 11 | Shorted to supply voltage | TCON detected that C32BRK circuit is shorted to 12 V or GND. | Machine will not be functional. | * 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. |
| 55 | High Drive Speed Coil | 11 | Shorted to supply voltage | TCON detected that C29MS circuit is shorted to 12 V or 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. |
| 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. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 61 | Steer Joystick | 11 | Shorted to supply voltage | Circuit C159STD or C159STA is above 4.5 V. | 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. |
| | | 27 | Active at startup | Circuit C159STD or C159STA voltage was not within the startup voltage range of 2.5 V +/- 0.2 V. | | |
| 62 | Prox Override Togggle 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. |
| 68 | Ground Function Enable Button | 27 | Active at startup | Button was held at system start, or is shorted on the ground control panel. | The function associated with the stuck button will not operate. | * Release the ground control buttons and cycle power. * 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. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 69 | AC Generator Output | 11 | Shorted to supply voltage | TCON detected that C45GEN circuit is shorted to 12 V. | 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. |
| 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 and Extend functions will not operate. | * 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 | | | |
| 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 | TCON has not detected the DISCON 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 | TCON has not detected the DISCON on the communications bus. | 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 key switch 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. |
| 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. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 85 | Chassis Angle Safety | 13 | Not detected | Tilt sensor not calibrated | Machine limited to recovery functions | Calibrate tilt sensor. |
| 88 | Function Enable Coil | 11 | Shorted to supply voltage | TCON detected that C155PCE circuit is shorted to 12 V or 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. |
| 89 | Fuel Level Sensor | 12 | Value to high | Fuel sensor shorted to B+ | Information only | With a voltmeter, check voltage on C65FLI (BL/WH, TCON J7-11). The voltage should be between 1V and 5V. Check for shorts to B+. |
| | | 15 | Value to low | Fuel sensor shorted to GND | | With a voltmeter, check voltage on C65FLI (BL/WH, TCON J7-11). The voltage should be between 1V and 5V. Check for shorts to ground. |
| 92 | Turntable Rotate Flow Coil | 11 | Shorted to supply voltage | TCON detected that C6TRF circuit is shorted to 12 V or 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. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 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 | * Ensure 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. | | * 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. |
| 99 | Primary Boom Extend / Retract Flow Coil | 11 | Shorted to supply voltage | TCON detected that C9PEF circuit is shorted to 12 V or GND. | Boom Extend and Retract functions will not operate. | * With a voltmeter, measure Y15. Proper 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.<br>* Verify resistance between Recovery Module pins J37-6 and J37-7 is zero ohms. |

# Control System Fault Codes

| ID | Component | ID | Name | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 100 | Platform Level Up Coil | 11 | Shorted to supply voltage | PCON detected that V14PLU circuit is shorted to 12 V or GND. | Platform Level Up and possibly Level Down functions 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. |
| 101 | Platform Level Down Coil | 11 | Shorted to supply voltage | PCON detected that V15PLD circuit is shorted to 12 V or GND. | Platform Level Down and possibly Level Up functions 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. |
| 110 | Platform Rotate Toggle Switch @PC | 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 | 31 | Setup invalid. | Machine is not fully configured or set to wrong model. | Machine will not operate. | Navigate to Settings -> Model Configuration and ensure model, engine, tires, and region are set and correct. |
| 141 | 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 | 11 | Shorted to supply voltage | PCON detected that P26PWR circuit is shorted to 12 V or 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. |
| 152 | Primary Boom Up/Down Flow Coil | 11 | Shorted to supply voltage | TCON detected that C3PBF circuit is shorted to 12 V or 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.<br>* Verify resistance between Recovery Module pins J37-3 and J37-10 is zero ohms. |

# Control System Fault Codes

| ID | Component | ID | | Cause | Effect | Solution |
|---|---|---|---|---|---|---|
| 160 | LF Steer (L or R) Coil | 11 | Shorted to supply voltage | TCON detected that C37STL circuit is shorted to 12 V or 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. |
| 161 | RF Steer (L or R) Coil | 11 | Shorted to supply voltage | TCON detected that C36STR circuit is shorted to 12 V or 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. |
| 185 | ESTOP Source | 11 | Shorted to supply voltage | TCON detected that ESTOP 1 is at 12 V but ESTOP 3 is at 0 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. |
| 186 | ESTOP Return | 11 | Shorted to supply voltage | 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. |

# Engine Fault Codes

## 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.

# Kubota D1803-CR-TIE4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description |
|---|---|---|
| 29 | 3 | Accelerator Position Sensor 2 Abnormality |
| 29 | 4 | |
| 91 | 2 | Accelerator Position Sensor Correlation Errorl |
| 91 | 3 | Accelerator Position Sensor 1 Abnormality |
| 91 | 4 | |
| 100 | 1 | Oil Pressure Error |
| 102 | 3 | Boost Pressure Sensor Abnormality |
| 102 | 4 | |
| 108 | 3 | Barometric Pressure Sensor Error |
| 108 | 4 | |
| 110 | 0 | Engine Overheat |
| 110 | 3 | Coolant Temperature Sensor Abnormality |
| 110 | 4 | |
| 132 | 1 | Intake Air Volume Low |
| 132 | 3 | MAF Sensor Abnormality |
| 132 | 4 | |
| 132 | 15 | Boost Pressure Low |
| 157 | 0 | High Rail Pressure |
| 157 | 3 | Rail Pressure Sensor Abnormality |
| 157 | 4 | |
| 168 | 3 | Battery Voltage Abnormality |
| 168 | 4 | |
| 171 | 3 | Intake Air Temperature Built-in MAF Sensor Abnormality |
| 171 | 4 | |
| 172 | 3 | Intake Air Temperature Error |
| 172 | 4 | |
| 190 | 0 | Engine Overrun |
| 628 | 2 | ECU Flash ROM and CPU Abnormality |
| 633 | 7 | Pressure Limiter Emergency Open |
| 636 | 2 | Crankshaft Position Sensor (NE Sensor) Abnormality |
| 636 | 8 | |
| 636 | 7 | NE-G Phase Shift |
| 651 | 3 | |
| 652 | 3 | Open Circuit of Harness / Coil |
| 653 | 3 | |
| 654 | 3 | |
| 676 | 0 | Glow Plug Abnormality |
| 676 | 5 | |
| 677 | 4 | Ground Short of Starter Relay Driving Circuit |
| 679 | 7 | Pressure Limiter Abnormality |
| 679 | 16 | |
| 723 | 2 | Camshaft Position Sensor (G Sensor) Abnormality |
| 723 | 8 | |

# Kubota D1803-CR-TIE4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description |
|---|---|---|
| 1077 | 2 | ECU Flash ROM and CPU Abnormality |
| 1077 | 12 | Internal Injector Drive Circuit Abnormality |
| 1239 | 1 | Fuel Leak in High Pressured Fuel Sysytem |
| 1347 | 3 | SCV (MPROP) Drive System Abnormality |
| 1347 | 4 | |
| 1347 | 5 | |
| 1347 | 7 | SCV (MPROP) Stuck |
| 1485 | 2 | Main Relay Locked in Closed Position |
| 3242 | 0 | Exhaust Gas Temperature Sensor 1: Emergency High |
| 3242 | 3 | Exhaust Gas Temperature Sensor 1 (T1) Abnormality |
| 3242 | 4 | |
| 3246 | 0 | Exhaust Gas Temperature Sensor 2: Emergency High |
| 3246 | 3 | Exhaust Gas Temperature Sensor 2 (T@) Abnormality |
| 3246 | 4 | |
| 3251 | 3 | Differential Pressure Sensor 1 Abnormality |
| 3251 | 4 | |
| 3252 | 0 | Emission Deterioration |
| 3509 | 3 | Sensor Supply Voltage 1 Abnormality |
| 3509 | 4 | |
| 3510 | 3 | Sensor Supply Voltage 2 Abnormality |
| 3510 | 4 | |
| 3511 | 3 | Sensor Supply Voltage 3 Abnormality |
| 3511 | 4 | |
| 3701 | 0 | Excessive PM5 |
| 3701 | 15 | Excessive PM3 |
| 3701 | 16 | Excessive PM4 |
| 4765 | 0 | Exhaust Gas Temperature Sensor 0: Emergency High |
| 4765 | 3 | Exhaust Gas Temperature Sensor 0 (T0) Abnormality |
| 4765 | 4 | |
| 523523 | 3 | Injector Short |
| 523524 | 3 | |
| 523525 | 1 | Injector Charge Voltage Abnormality |
| 523527 | 2 | ECU Flash ROM and CPU Abnormality |
| 523535 | 0 | Injector Charge Voltage High |

# Kubota D1803-CR-TIE4 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description |
|---|---|---|
| 523538 | 2 | QR (IQA) Data Abnormality |
| 523538 | 7 | |
| 523543 | 2 | Accelerator Position Sensor Error (CAN) |
| 523544 | 3 | Glow Relay Abnormality |
| 523544 | 4 | |
| 523547 | 2 | CAN2 Bus Off |
| 523548 | 2 | CAN2 Frame Error |
| 523572 | 4 | |
| 523574 | 3 | EGR Actuator Abnormality |
| 523574 | 4 | |
| 523575 | 7 | |
| 523576 | 2 | EGR (DC Motor) Abnormality |
| 523577 | 2 | |
| 523578 | 2 | No Communication with EGR |
| 523580 | 2 | Intake Throttle Feedback Error |
| 523582 | 3 | Intake Throttle Lift Sensor Abnormality |
| 523582 | 4 | |
| 523589 | 17 | Low Coolant Temperature in Parked Regeneration |
| 523590 | 16 | Parked Regeneration Tmi OUY |
| 523591 | 2 | |
| 523592 | 2 | |
| 523595 | 2 | CAN2 Frame Error |
| 523596 | 2 | |
| 523598 | 2 | |
| 523599 | 0 | All Exhaust Gas temperature Sensor Failure |
| 523601 | 0 | High Exhaust Gas Temperature After Emergency High Temperature DTC |
| 523602 | 0 | High Frequency of Regeneration. |
| 523603 | 15 | Over Heat pre-caution |
| 523604 | 2 | CAN1 Bus Off |
| 523605 | 6 | Internal Injector drive Circuit Abnormality |
| 523700 | 13 | EEPROM Check Sum Error |

# 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.

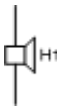
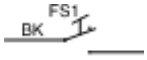
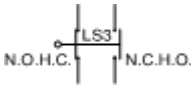
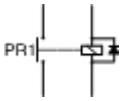
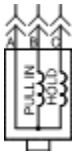
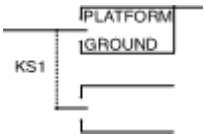
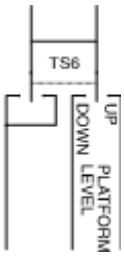
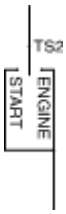
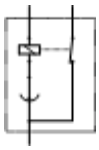
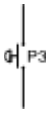
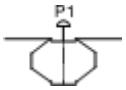
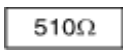
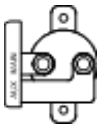
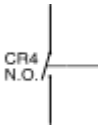
## Important

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

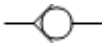
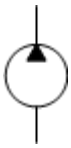
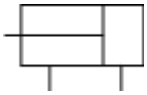
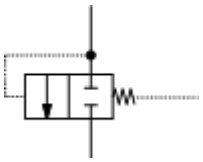
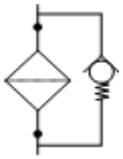
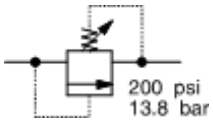
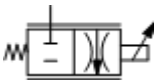
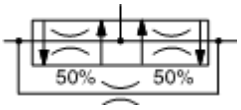
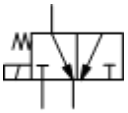
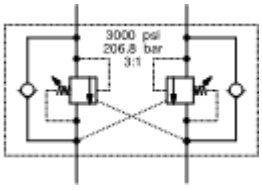
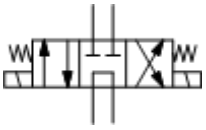
This manual provides troubleshooting and repair procedures for qualified service professionals.

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.

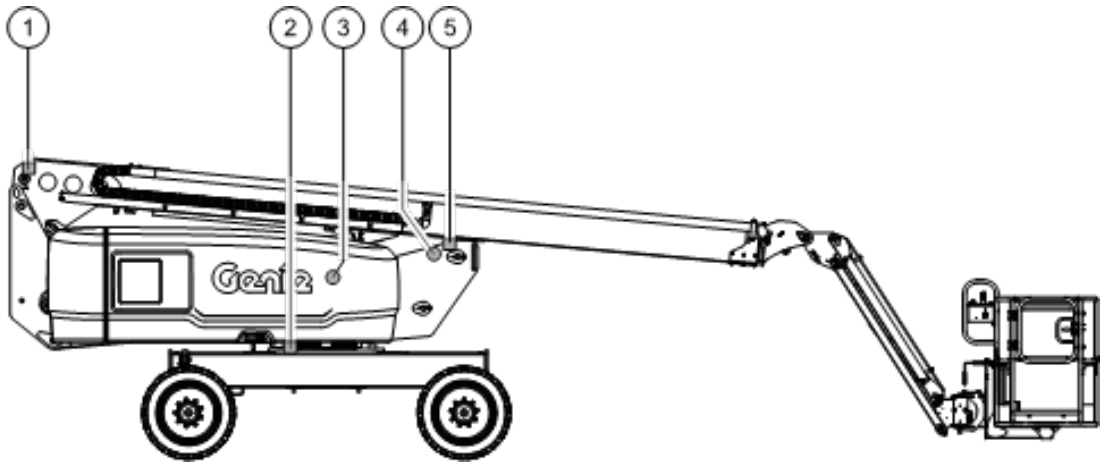
# Electrical Symbol Legend

| | | | | |
|---|---|---|---|---|
|  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




**S-60 J**

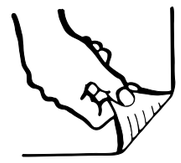
1 LSB1RO
2 LST1O
3 UTS
4 PBAS
5 LSB1DO

**Limit Switches and Sensors**

| | |
|---|---|
| LSB1RO | Limit switch boom fully retracted - operational |
| LST1O | Limit switch drive turntable - operational |
| UTS | Universal tilt sensors |
| PBAS | Primary boom angle sensor |
| LSB1DO | Limit switch boom down - operational |

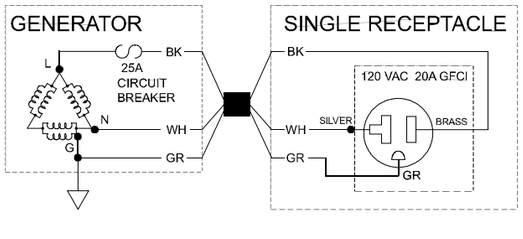
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# Electrical Schematic, Generator Options



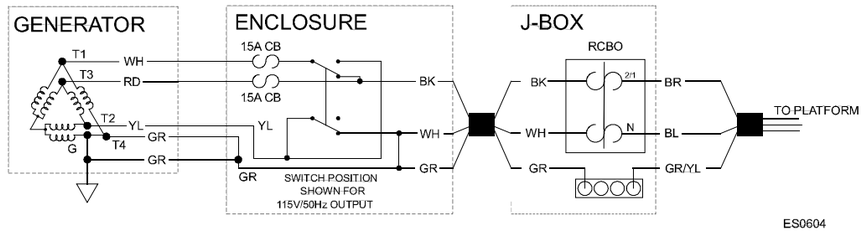
# Electrical Schematic, Generator Options

## 3kW 120V/60Hz
## GENERATOR AC WIRING



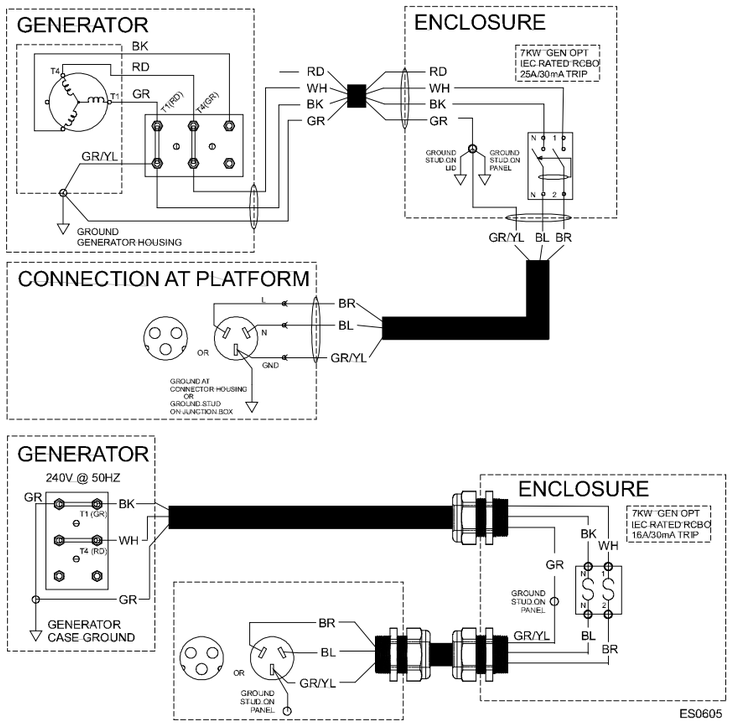

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## 3kW 115V-230V/50Hz
## GENERATOR AC WIRING



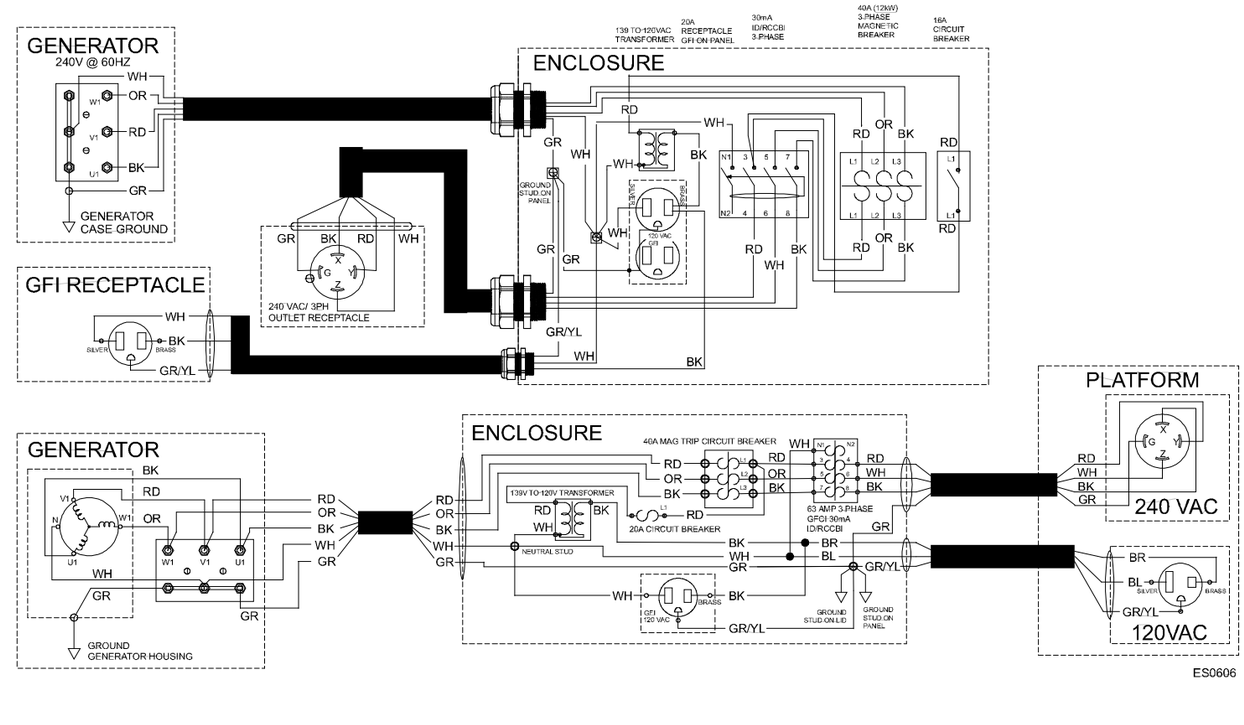

ES0604

## 7kW 240V/50Hz, 1 PHASE



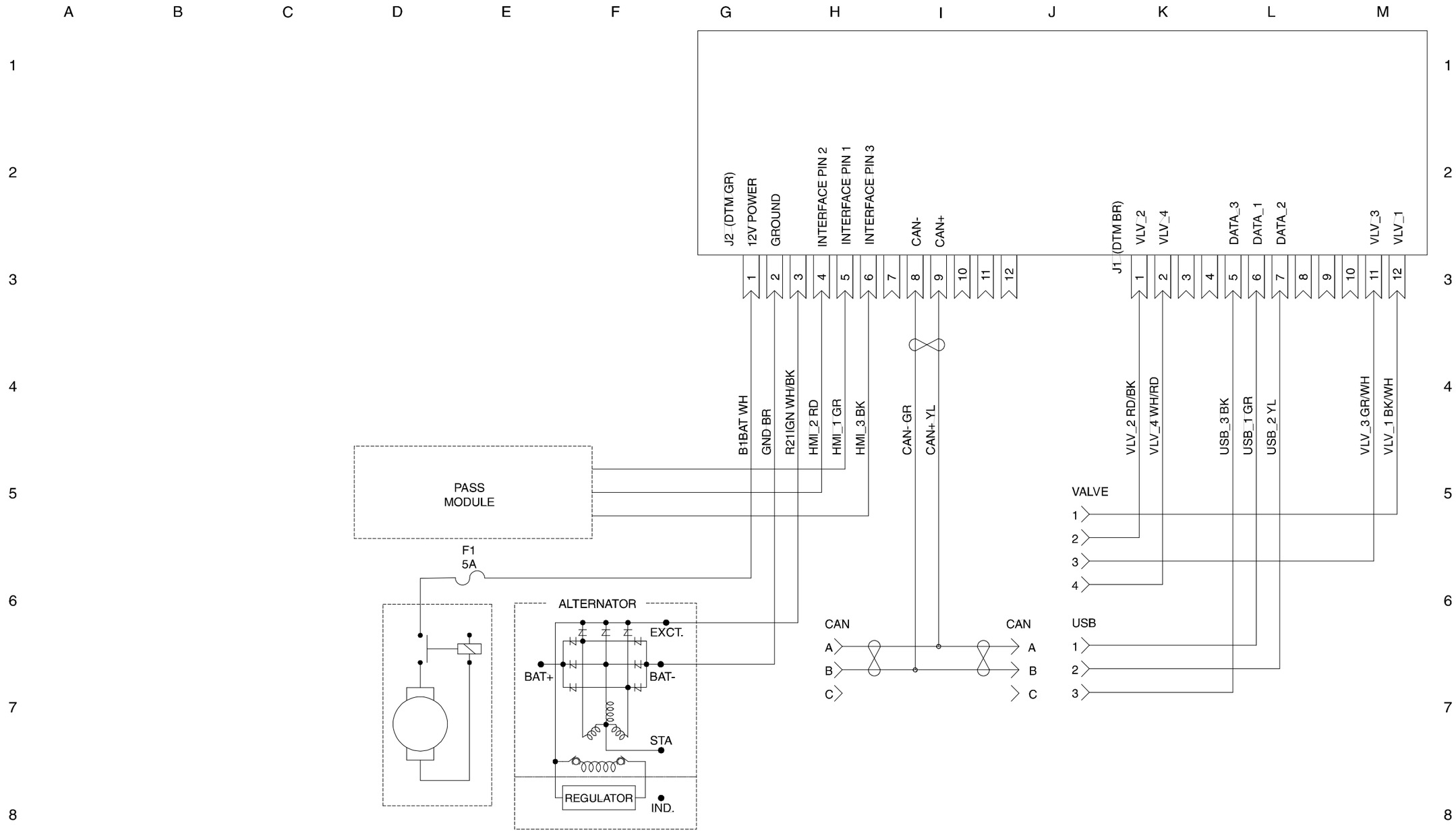

ES0605

## 12kW 240V/60Hz, 1 PHASE

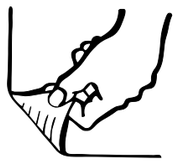



ES0606

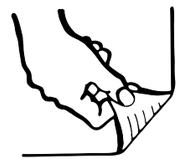
# Electrical Schematic, Positive Air Shutdown



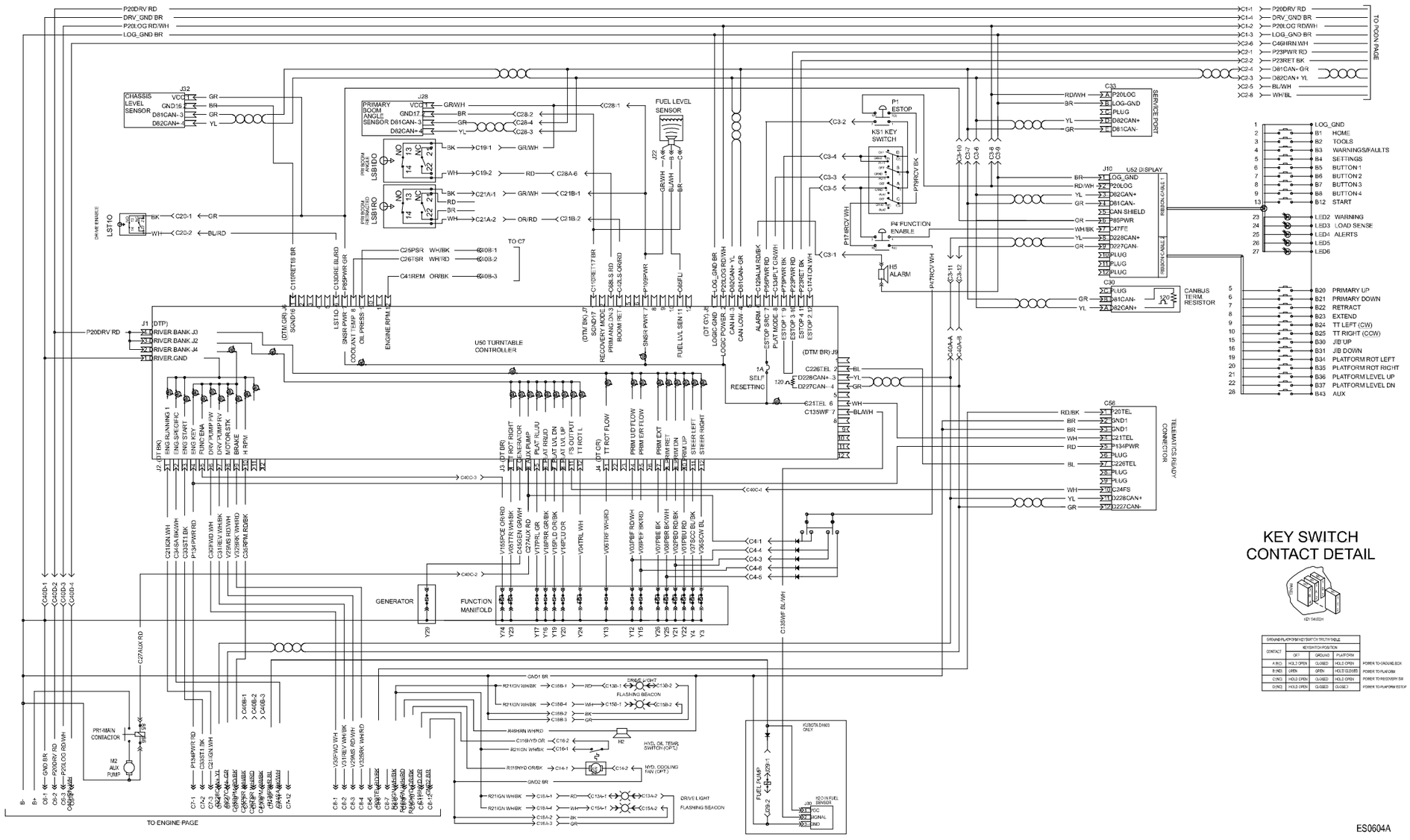
# Electrical Schematic, Positive Air Shutdown



## Electrical Schematic, Turntable Controller



# Electrical Schematic, Turntable Controller



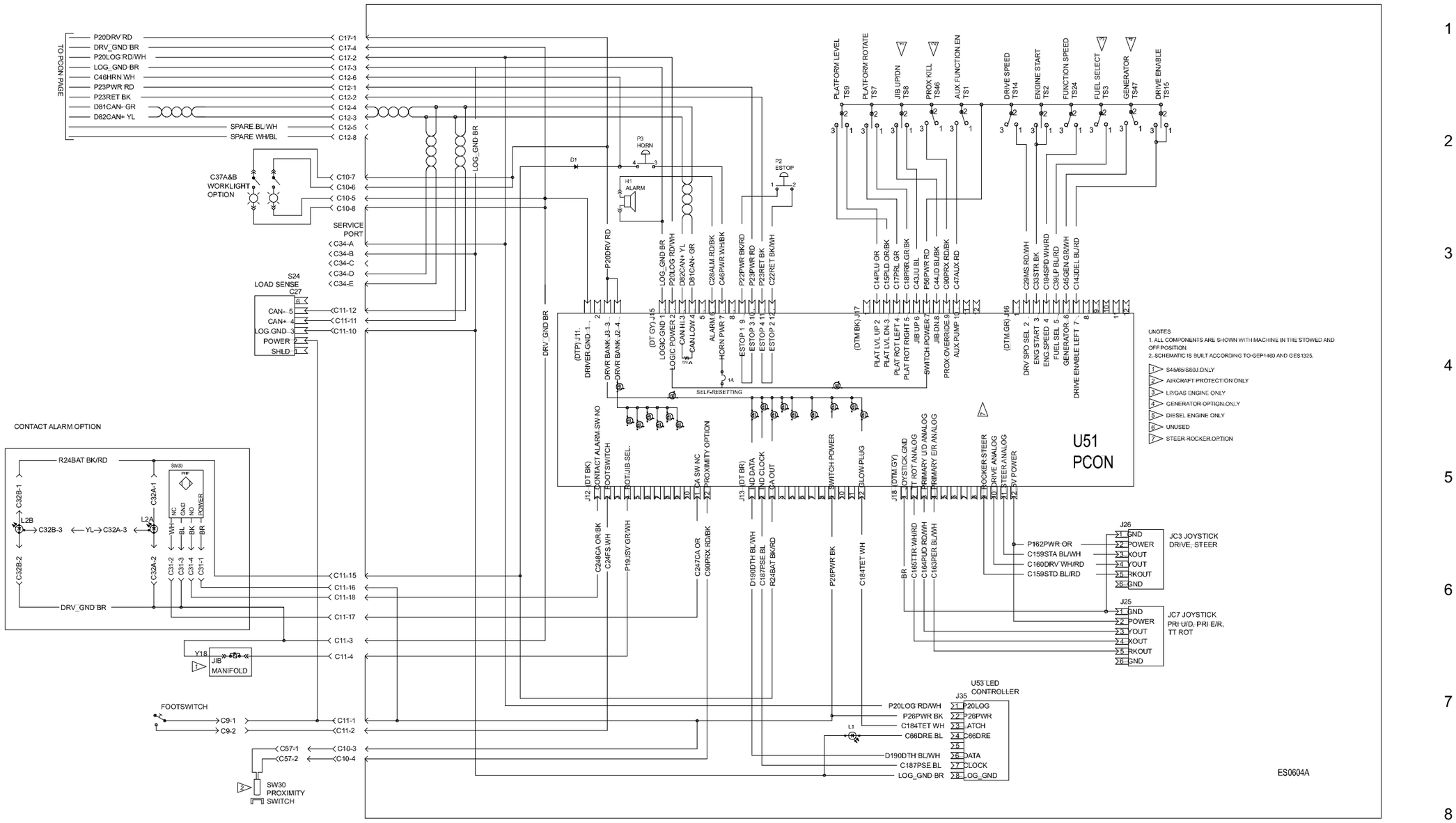

## KEY SWITCH CONTACT DETAIL



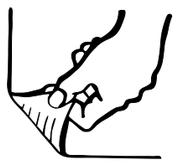

| GROUND PLATFORM KEY SWITCH TRUTH TABLE | | | |
|---|---|---|---|
| CONTACT | KEY SWITCH POSITION | | |
| | OFF | GROUND | PLATFORM |
| A (NC) | HOLD OPEN | CLOSED | HOLD OPEN |
| B (NO) | OPEN | OPEN | HOLD CLOSED |
| C (NC) | HOLD OPEN | CLOSED | HOLD OPEN |
| D (NC) | HOLD OPEN | CLOSED | CLOSED |

ES0604A

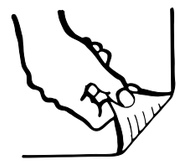
# Electrical Schematic, Platform Controller



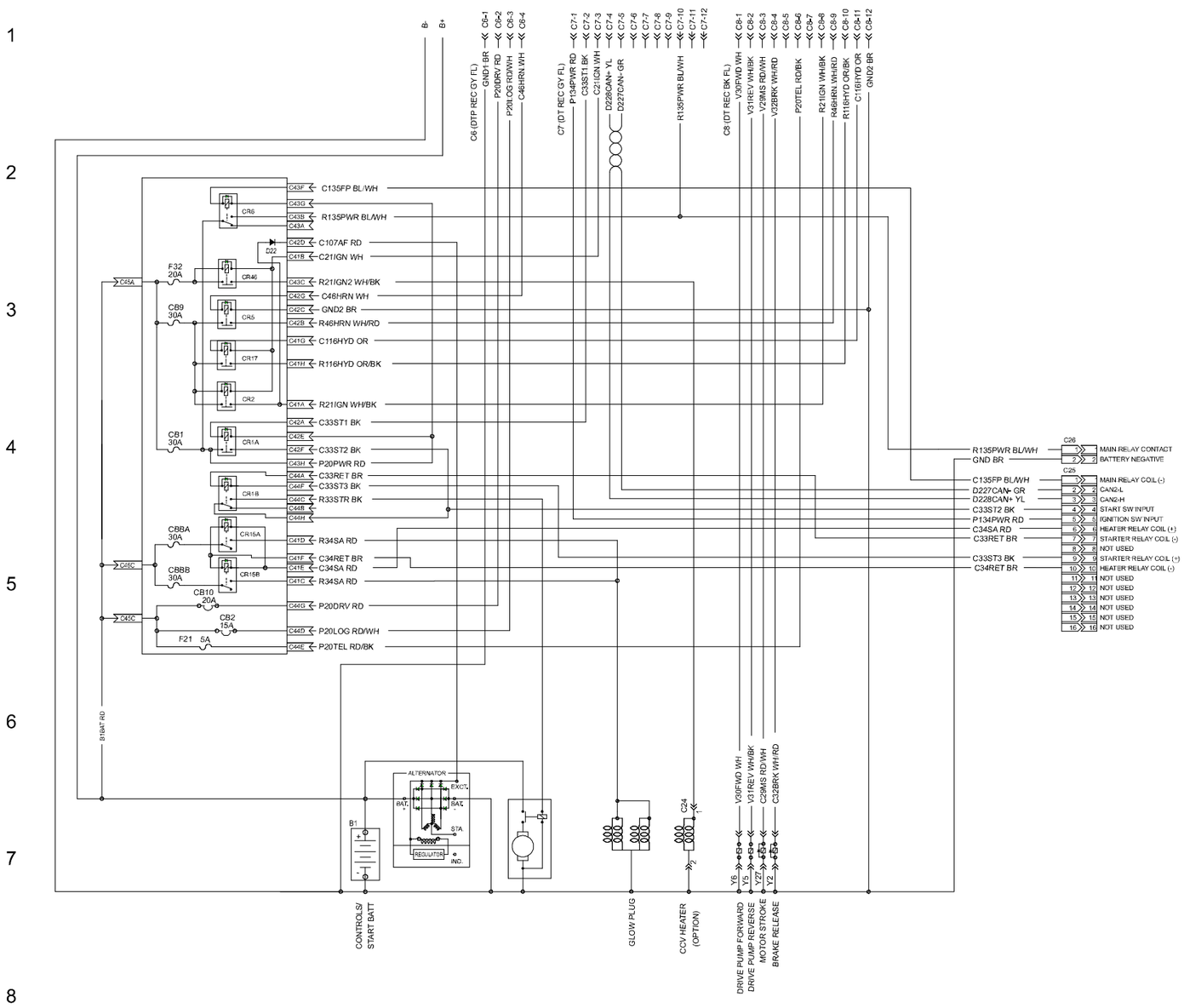
# Electrical Schematic, Platform Controller



# Electrical Schematic, Kubota D1803

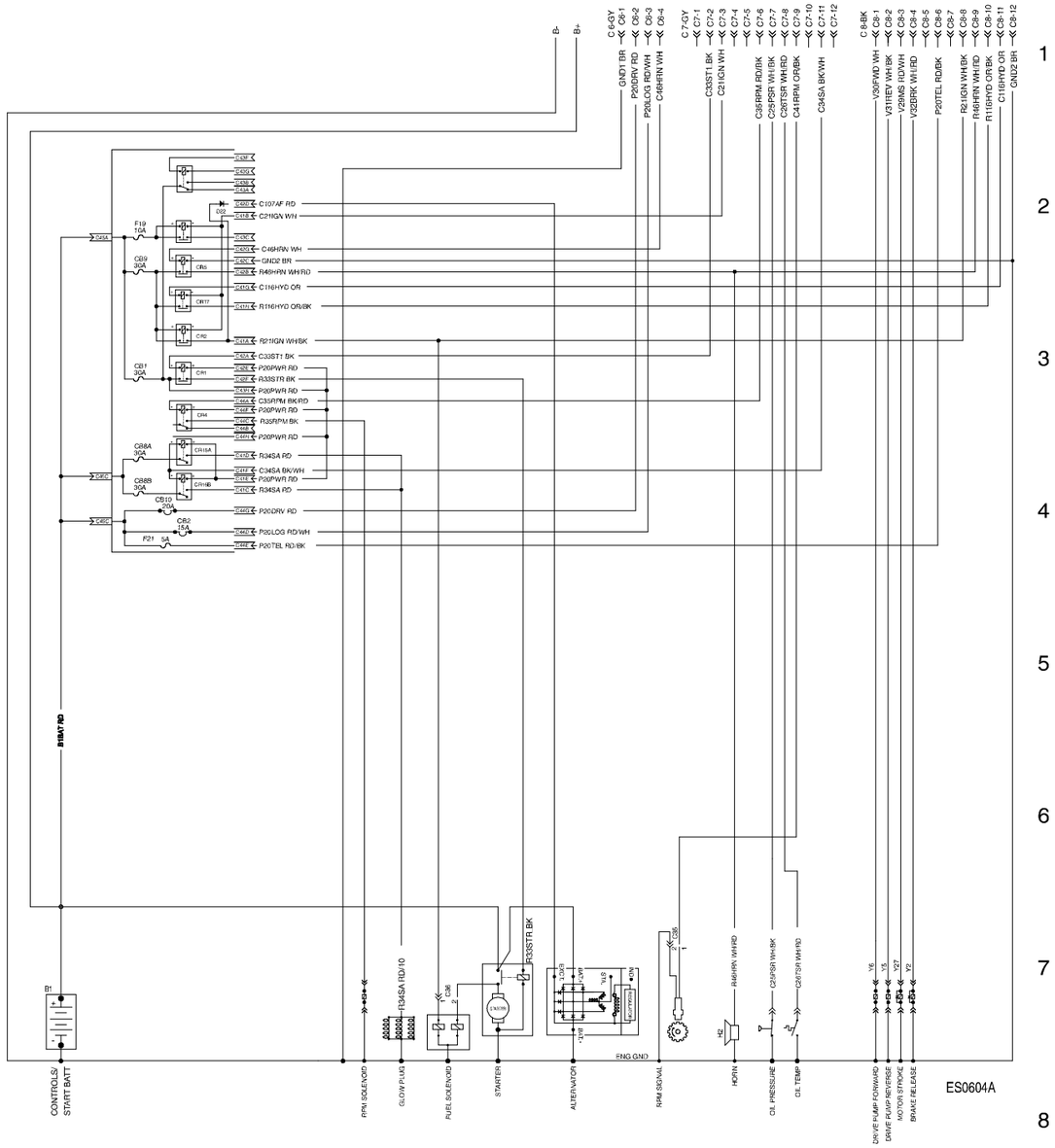


# Electrical Schematic, Kubota D1803

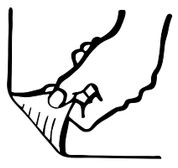



ES0604A

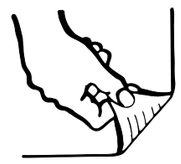
# Electrical Schematic, Kubota D1105



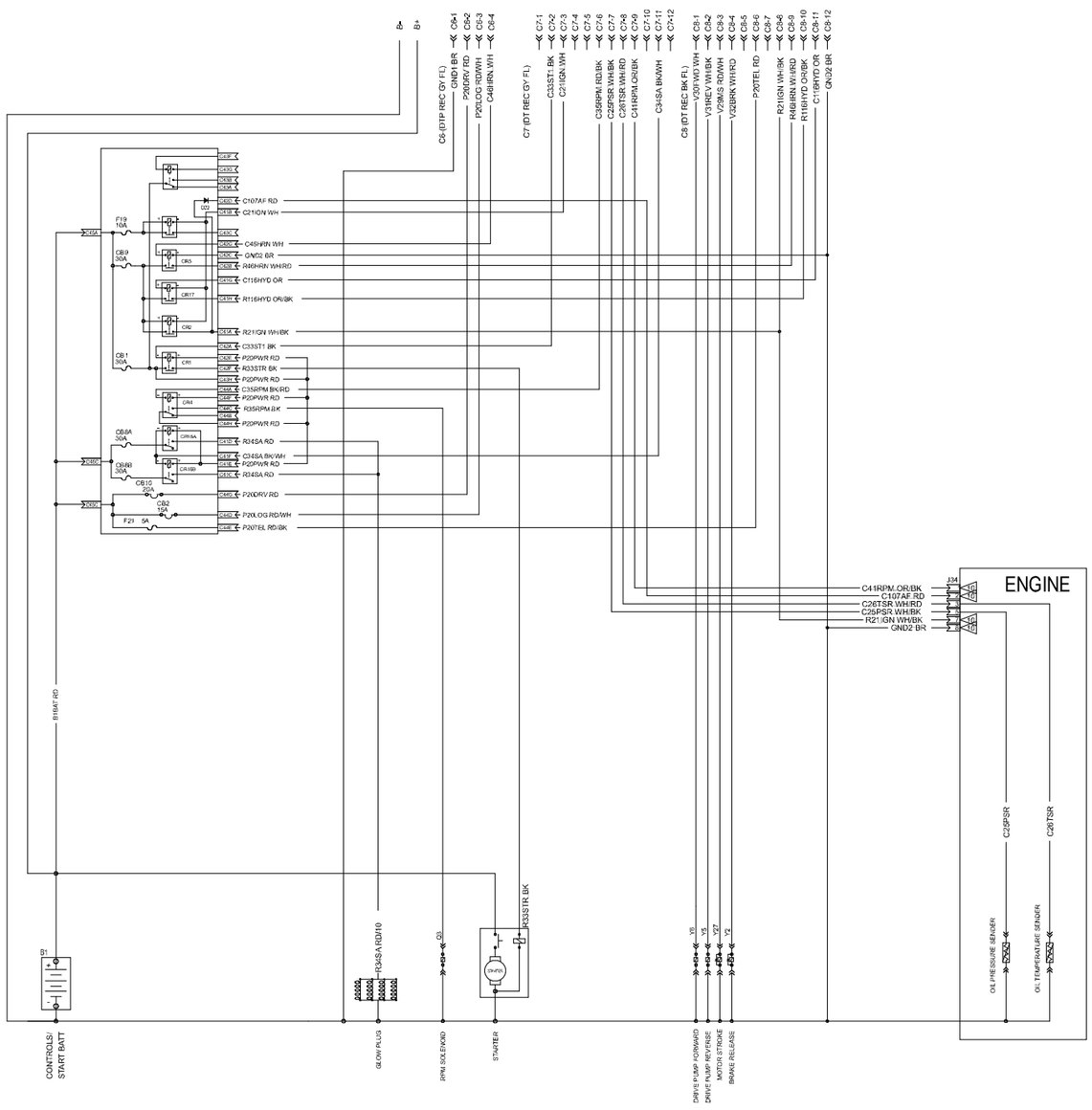
# Electrical Schematic, Kubota D1105



# Electrical Schematic, Deutz D2011

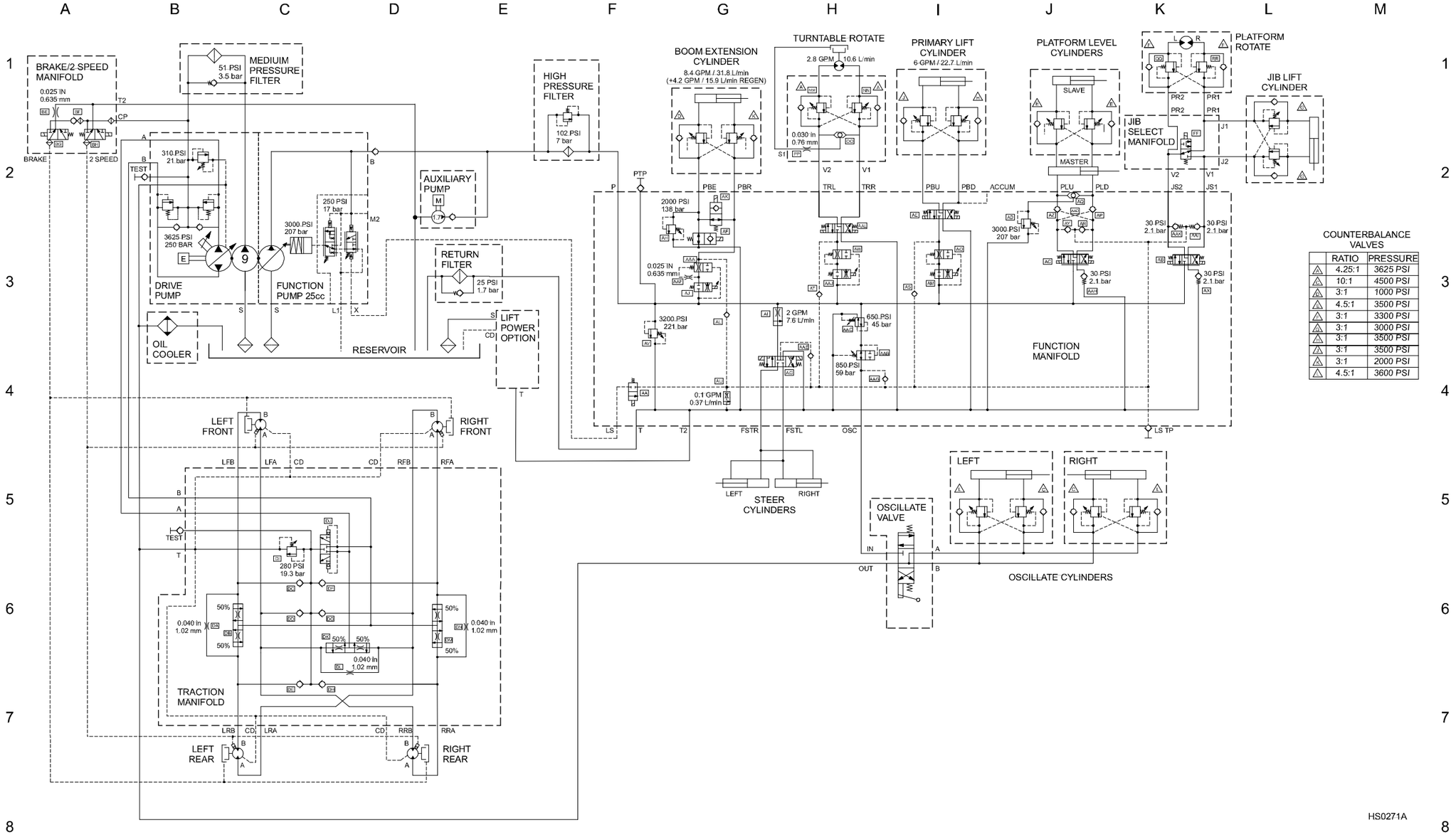


# Electrical Schematic, Deutz D2011




ES0604A

# Hydraulic Schematic

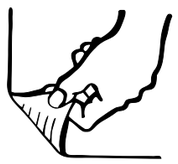



COUNTERBALANCE VALVES

| | RATIO | PRESSURE |
|---|---|---|
| 1 | 4.25:1 | 3625 PSI |
| 2 | 10:1 | 4500 PSI |
| 3 | 3:1 | 1000 PSI |
| 4 | 4.5:1 | 3500 PSI |
| 5 | 3:1 | 3300 PSI |
| 6 | 3:1 | 3000 PSI |
| 7 | 3:1 | 3500 PSI |
| 8 | 3:1 | 3500 PSI |
| 9 | 3:1 | 2000 PSI |
| 10 | 4.5:1 | 3600 PSI |

HS0271A

## Hydraulic Schematic



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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