Genie®
A TEREX BRAND

# Service Manual

Serial Number Range

## GTH-1048
## GTH-1056

from GTH1007A-11443 to GTH1009A-14000

from GTH1007B-7101 to GTH1007B-7251

Part No. 123701
Rev G
March 2016

# Introduction

## Important

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

This manual provides detailed scheduled maintenance information for the machine owner and user. It also provides troubleshooting and repair procedures for qualified service professionals.

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

## Compliance

### Machine Design Life

Unrestricted with proper operation, inspection and scheduled maintenance.

## Technical Publications

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

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

## Contact Us:

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## 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.



123701 Rev G, March 2016

Second Edition, Seventh Printing

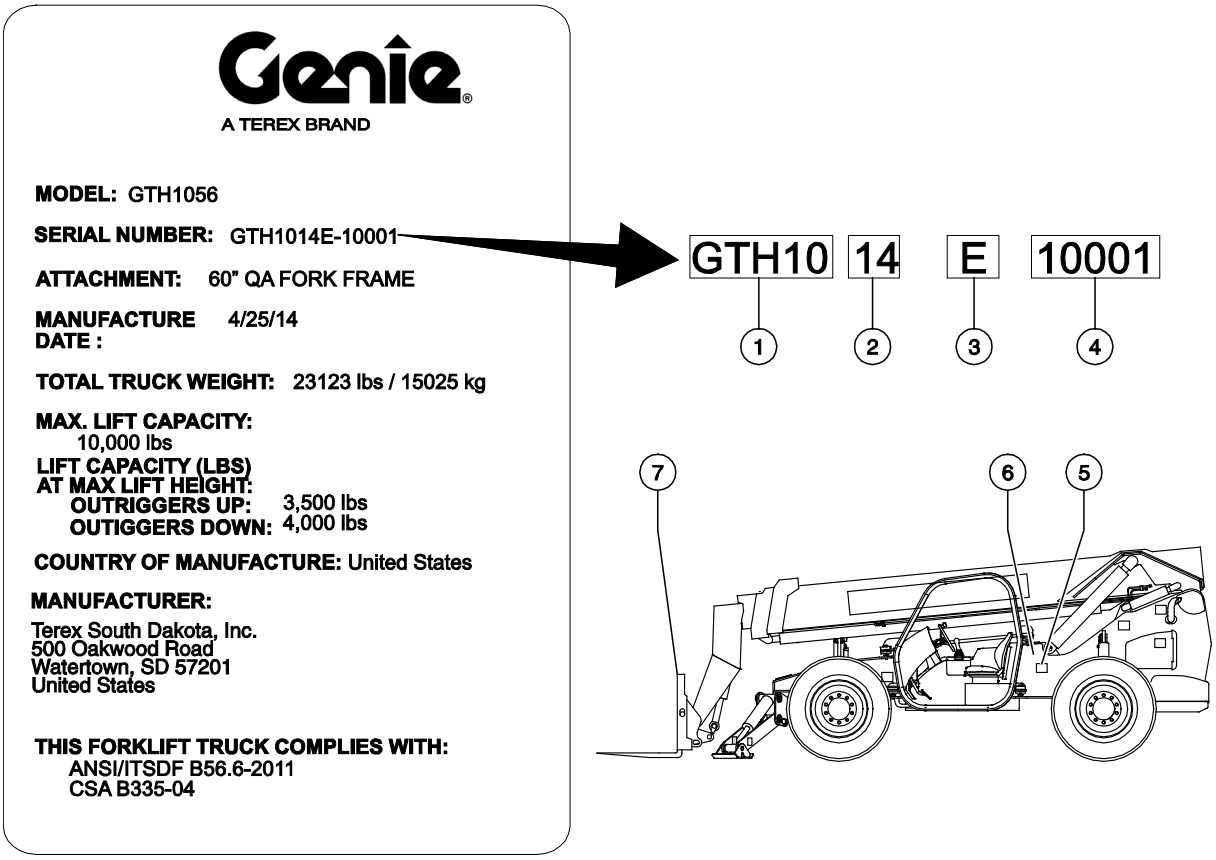
## Revision History

| Revision | Date | Section | Procedure / Page / Description |
|---|---|---|---|
| C | 7/2012 | | Spec, Maint, Repair, Fault and Schematics |
| C1 | 3/2013 | | Spec, Maint and Schematics |
| D | 6/2013 | | Fault |
| E | 8/2013 | | Maint |
| F | 9/2014 | Spec | Hydraulic Oil |
| | | Maint | ZF Transmission |
| | | Fault | Deutz Fault Codes |
| | | Schem | Telematics |
| F1 | 3/2015 | Schem | Electrical and Hydraulic |
| F2 | 5/2015 | Schem | Fuse Box Layout / Electrical |
| G | 3/2016 | All | Ending SN for GTH-1048<br>Ending SN for GTH-1056 for MM/SRM |

| **Reference Examples:** | **Electronic Version**<br>Click on any content or procedure in the Table of Contents to view the update. |
|---|---|
| Section – Maintenance, B-3 | |
| Section – Repair Procedure, 4-2 | |
| Section – Fault Codes, All charts | |
| Section – Schematics, Legends and schematics | |

# Introduction

## Serial Number Legend




1 Model
2 Model year
3 Facility code (for models manufactured in multiple facilities)
4 Sequence number
5 Serial label
6 Serial number (stamped on chassis)
7 Serial label (located inside fork frame)

# Safety Rules

## Danger

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

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

## Do Not 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 | 14.00 x 24 |
| Tire ply rating | 12 |
| Weight, rough terrain tire (air filled) | 315 lbs<br>142.9 kg |
| Weight, rough terrain tire (foam filled) | 967 ±35 lbs<br>439 ±16 kg |
| Weight, rock lug tire (foam filled) | 1013 ±35 lbs<br>459 ±16 kg |
| Tire pressure (models with air-filled tires) | 50 psi<br>3.45 bar |
| Lug nut torque | 465 ft-lbs<br>630 Nm |
| Lug Pattern | 10 x 13.189 |
| Wheel diameter | 24 in<br>60.1 cm |
| Wheel width | 9 in<br>22.9 cm |

| Fluid capacities | |
|---|---|
| Fuel tank | 35 gallons<br>132.5 liters |
| Hydraulic tank | 44 gallons<br>166.5 liters |
| Hydraulic system (including tank) | 55 gallons<br>208.2 liters |

# Specifications

## Performance Specifications

| | |
|---|---|
| **Drive speed, maximum** | 18 mph<br>29 km/h |
| **Draw bar pull** | 29,000 lbs<br>13,154 kg |
| **Lift capacity, maximum** | 10,000 lbs<br>4545 kg |

| **Boom function speeds, maximum** | |
|---|---|
| **GTH-1048** | |
| Boom up | 12 to 14 seconds |
| Boom down | 13 to 15 seconds |
| Boom extend | 16 to 18 seconds |
| Boom retract | 15 to 17 seconds |
| Fork rotate | 19 to 21 seconds |
| **GTH-1056** | |
| Boom up | 17 to 19 seconds |
| Boom down | 23 to 25 seconds |
| Boom extend | 14 to 16 seconds |
| Boom retract | 13 to 15 seconds |
| Fork rotate | 3 to 6 seconds |

## Hydraulic Oil Specifications

| Hydraulic Fluid Specifications | |
|---|---|
| Genie specifications require hydraulic oils which are designed to give maximum protection to hydraulic systems, have the ability to perform over a wide temperature range, and the viscosity index should exceed 140. They should provide excellent antiwear, oxidation prevention, corrosion inhibition, seal conditioning, and foam and aeration suppression properties. | |
| Cleanliness level, minimum | ISO 15/13 |
| Water content, maximum | 250 ppm |
| **Recommended Hydraulic Fluid** | |
| Hydraulic oil type | Chevron Rando HD Premium |
| Viscosity grade | 32 |
| Viscosity index | 200 |
| **Optional Hydraulic Fluids** | |
| Mineral based | Shell Tellus S2 V 32<br>Shell Tellus S2 V 46<br>Shell Tellus S4 VX 32 Shell<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.

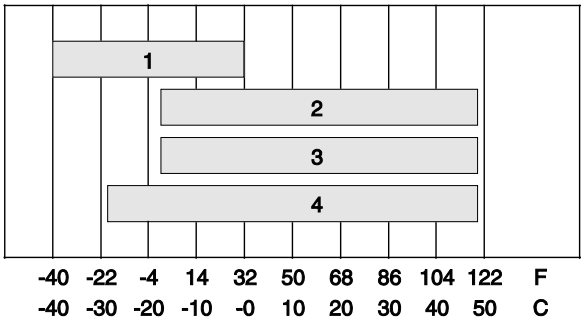
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond it's maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

**NOTICE**

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

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

## Hydraulic Fluid Temperature Range




Ambient air temperature

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

# Specifications

## Petro-Canada Environ MV 46 Fluid Properties

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

## UCON Hydrolube HP-5046 Fluid Properties

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

## Shell Tellus S4 VX Fluid Properties

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

## 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

## Hydraulic Component Specifications

| Function pump | |
|---|---|
| Type: variable displacement piston pump | |
| Displacement | 0 to 3.66 cu in<br>0 to 60 cc |
| Flow rate @ 2400 rpm | 38 gpm<br>144 L/min |
| Pump pressure, maximum | 3190 psi<br>220 bar |
| Pressure compensator | 3190 psi<br>220 bar |
| Standby pressure | 464 psi<br>32 bar |

| Primary Function Manifold | |
|---|---|
| System relief valve pressure, maximum (measured at test port TP) | 3500 psi<br>241 bar |
| Boom extend relief valve pressure, maximum | 3500 psi<br>241 bar |
| Fork tilt relief valve pressure, maximum | 3500 psi<br>241 bar |
| Flow regulator, Fork tilt circuit | 14 gpm<br>53 L/min |
| Flow regulator, Sway circuit | 2 gpm<br>7.5 L/min |
| Flow regulator, Pilot pressure bleed circuit | 0.1 gpm<br>1.4 L/min |
| **Secondary Function Manifold** | |
| Steer relief valve pressure, maximum (measured at test port TS) | 2500 psi<br>172 bar |
| Parking brake relief valve pressure, maximum (measured at test port TPB) | 400 psi<br>27.5 bar |
| Diff lock relief valve pressure, maximum (measured at test port TJ) | 400 psi<br>27.5 bar |
| Rear lock-up relief valve pressure, maximum (measured at test port TR) | 50 psi<br>3.4 bar |
| **Outrigger Manifold** | |
| Flow regulator, Outrigger circuit | 6 gpm<br>22.7 L/min |

# Specifications

## Manifold Component Specifications

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

## Air Conditioner Refrigerant Specifications

| System Full Charge | |
|---|---|
| R134a | 1 lb 14 oz |

# Specifications

## John Deere 4045HF485 Engine

| | |
|---|---|
| **Displacement** | 275 cu. in<br>4.5 liters |
| **Number of cylinders** | 4 |
| **Bore and Stroke** | 4.19 x 5 inches<br>106 x 127 mm |
| **Horsepower** | 125 @ 2400 rpm<br>93.2 kW @ 2400 rpm |
| **Firing order** | 1 - 3 - 4 - 2 |
| **Low idle** | 800 rpm |
| **High idle** | 2400 rpm |
| **Compression ratio** | 17:1 |
| **Valve clearances, cold** | |
| Intake | 0.14 in<br>0.36 mm |
| Exhaust | 0.18 in<br>0.46 mm |
| **Lubrication system** | |
| Oil pressure<br>(warm, at rated speed with full load) | 60±25 psi<br>4.13±1.7 bar |
| Oil pressure<br>(warm, at low idle) | 15 psi<br>1 bar |
| Oil capacity (including filter) | 14 quarts<br>13.2 liters |
| **Oil viscosity requirements**<br>**Oil Type** | 15W-40 |

Units ship with John Deere Engine Break-In Oil. During the break-in period, add John Deere Engine Break-In Oil as needed to maintain the specified oil level.
Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator's Manual on your machine.

| | |
|---|---|
| **Fuel requirement** | |
| For fuel requirements, refer to the engine Operator Manual for your engine. | |
| **Injection system** | |
| Injection pump make | Stanadyne |
| Peak injection pressure | 10,000 psi<br>690 bar |
| **Alternator output** | 95A @ 14V DC |
| **Battery Specifications** | |
| Type | 12V DC, Group C31 |
| Quantity | 1 |
| Battery capacity, maximum | 1000A |
| Reserve capacity @ 25A rate | 200 Minutes |
| **Engine coolant** | |
| Capacity | 7 gallons<br>26.5 liters |

# Specifications

## Perkins 1104D-E44TA Engine

| | |
|---|---|
| **Displacement** | 269 cu. in<br>4.4 liters |
| **Number of cylinders** | 4 |
| **Bore and Stroke** | 4.13 x 5 inches<br>105 x 127 mm |
| **Horsepower** | 125 @ 2400 rpm<br>93.2 kW @ 2400 rpm |
| **Valve clearance, cold** | |
| Intake | 0.013 in<br>0.35 mm |
| Exhaust | 0.013 in<br>0.35 mm |
| **Firing order** | 1 - 3 - 4 - 2 |
| **Low idle** | 1000 rpm |
| **High idle** | 2500 rpm |
| **Compression ratio** | 16.2:1 |
| **Lubrication system** | |
| Oil pressure at operating temperature | 43 to 58 psi<br>2.9 to 4 bar |
| Oil capacity (including filter) | 10 quarts<br>9.5 liters |

**Oil viscosity requirements**

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.

**Fuel requirement**

For fuel requirements, refer to the engine Operator Manual for your engine.

| | |
|---|---|
| **Fuel injection pressure, minimum** | 23700 psi<br>1635 bar |
| **Starter motor** | |
| Normal load | 68A |
| Relay max | 50A |
| Relay continuous | 20A |
| Cranking speed | 130 - 200 rpm |
| **Battery Specifications** | |
| Type | 12V DC, Group C31 |
| Quantity | 1 |
| Battery capacity, maximum | 1000A |
| Reserve capacity @ 25A rate | 200 Minutes |
| **Engine coolant** | |
| Capacity | 4.6 gallons<br>17.4 liters |
| Type | Extended Life |
| **Glow Plugs** | |
| Initial load (0-4 sec) | 20A (EA) |
| Continuous load (>4 sec) | 15A (EA) |
| **Alternator output** | 85A @ 14V DC |

# Specifications

## Dana T20000 Transmission

| | |
|---|---|
| **Transmission Type** | 3 speed powershift converter |
| Speeds, Forward | 3 |
| Speeds, Reverse | 3 |
| **Torque Converter** | |
| Maximum input | 3100 rpm |
| Size | 12 inches |
| **Lubrication** | |
| Oil capacity | 20 quarts<br>18.9 liters |
| **Oil viscosity requirements** | |
| Extreme operating temperatures may require the use of alternative transmission oils. For oil requirements, refer to the Dana T20000 Maintenance Manual. | |
| **Dana T20000 Service Manual** | |
| Genie part number | 115025 |

## Dana Planetary 213 Drive Axle

| | |
|---|---|
| **Steering** | Integrated steer cylinder |
| **Joints** | Heavy duty double U-joints |
| **Steering angle, maximum** | 45° |
| **Front Axle Lubrication** | |
| Front differential | 15 quarts<br>14.2 liters |
| Axle planetary end (each) | 2 quarts<br>1.9 liters |
| **Rear Axle Lubrication** | |
| Rear differential | 15 quarts<br>14.2 liters |
| Axle planetary end (each) | 2 quarts<br>1.9 liters |
| **Oil viscosity requirements** | |
| Differential | Chevron Supreme 80W90 LS |
| Planetary ends | Chevron Supreme 80W90 LS |
| For additional axle information, refer to the Dana 213 Axle Maintenance and Repair Manual | |
| **Dana 213 Axle Maintenance and Repair Manual** | |
| Genie part number | 115026 |

## Hydraulic Hose and Fitting Torque Specifications

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

### Seal-Lok™ Fittings

(hose end - ORFS)

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

### JIC 37° Fittings

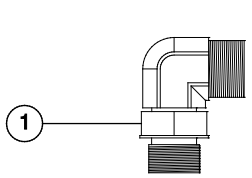
(swivel nut or hose connection)

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

### SAE O-ring Boss Port

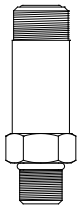
(tube fitting - installed into Aluminum)
(all types)

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




Adjustable Fitting

1 jam nut



Non-adjustable fitting

### SAE O-ring Boss Port

(tube fitting - installed into Steel)

| SAE Dash Size | | Torque |
|---|---|---|
| -4 | ORFS / 37° (Adj)<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.

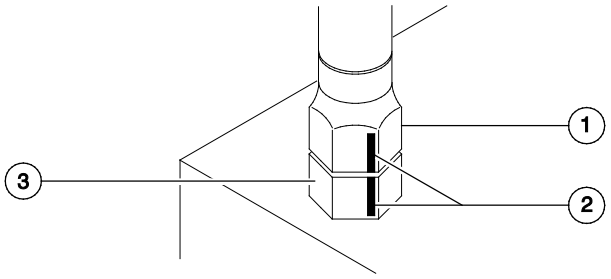



Illustration 1

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.

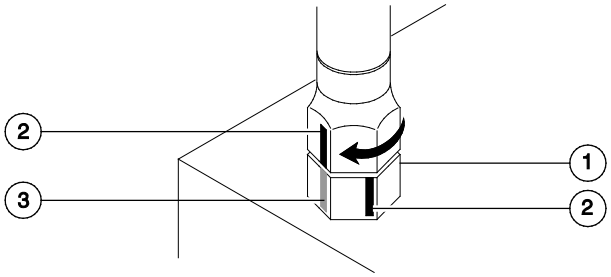



Illustration 2

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.

# Scheduled Maintenance Procedures

## Observe and Obey:

☑ Maintenance inspections shall be completed by a person trained and qualified on the maintenance of this machine.

☑ Scheduled maintenance inspections shall be completed daily, quarterly, semi-annually, annually and every 2 years as specified of the *Maintenance inspection Report*. The frequency and extent of periodic examinations and tests may also depend on national regulations.

**⚠WARNING** Failure to perform each procedure as presented and scheduled may cause death, serious injury or substantial damage.

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

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

☑ Use only Genie approved replacement parts.

☑ Machines that have been out of service for a period longer than 3 months must complete the quarterly inspection.

## Machine Configuration:

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

- Machine parked on a firm, level surface
- Boom in the stowed position
- Key switch in the off position with the key removed
- Wheels chocked

# Scheduled Maintenance Procedures

## About This Section

This section contains detailed procedures for each scheduled maintenance inspection.

Each procedure includes a description, safety warnings and step-by-step instructions.

### 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.

# Scheduled Maintenance Procedures

## Maintenance Symbols Legend

Note: The following symbols have been used in this manual to help communicate the intent of the instructions. When one or more of the symbols appear at the beginning of a maintenance procedure, it conveys the meaning below.

Indicates that tools will be required to perform this procedure.

Indicates that new parts will be required to perform this procedure.

Indicates that dealer service will be required to perform this procedure.

Indicates that a cold engine will be required to perform this procedure.

Indicates that a warm engine will be required to perform this procedure.

## Pre-delivery Preparation Report

The pre-delivery preparation report contains checklists for each type of scheduled inspection.

Make copies for each inspection. Store completed forms as required.

## Maintenance Schedule

The *Scheduled Maintenance Procedures* section and the *Maintenance Inspection Report* have been divided into subsections. Use the following chart to determine which group(s) of procedures are required to perform a scheduled inspection.

| Inspection | Checklist |
|---|---|
| Daily or every 8 hours | A |
| Quarterly or every 250 hours | A + B |
| Semi-annually or every 500 hours | A + B + C |
| Annually or every 1000 hours | A + B + C + D |
| Two-year or every 2000 hours | A + B + C + D + E |

## Maintenance Inspection Report

The maintenance inspection report contains checklists for each type of scheduled inspection.

Make copies of the *Maintenance Inspection Repor*t to use for each inspection. Maintain completed forms for a minimum of 4 years or in compliance with your employer, jobsite and governmental regulations and requirements.

# Pre-Delivery Preparation Report

## Fundamentals

It is the responsibility of the owner or dealer to perform the Pre-delivery Preparation.

The Pre-delivery Preparation is performed prior to each delivery. The inspection is designed to discover if anything is apparently wrong with a machine before it is put into service.

A damaged or modified machine must never be used. If damage or any variation from factory delivered condition is discovered, the machine must be tagged and removed from service.

Repairs to the machine may only be made by a qualified service technician, according to the manufacturer's specifications.

Scheduled maintenance inspections shall be performed by qualified service technicians, according to the manufacturer's specifications and the requirements listed in the responsibilities manual.

## Instructions

Use the operator's manual on your machine.

The Pre-delivery Preparation consists of completing the Pre-operation Inspection, the Maintenance items and the Function Tests.

Use this form to record the results. Place a check in the appropriate box after each part is completed. Follow the instructions in the operator's manual.

If any inspection receives an N, remove the machine from service, repair and re-inspect it. After repair, place a check in the R box.

**Legend**

Y = yes, acceptable
N = no, remove from service
R = repaired

**Comments**

| Pre-delivery Preparation | Y | N | R |
|---|---|---|---|
| Pre-operation inspection completed | | | |
| Maintenance items completed | | | |
| Function tests completed | | | |

A TEREX BRAND

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PO Box 1150
Watertown, SD 57201-6150
(605) 882-4000

**Genie UK**
The Maltings, Wharf Road
Grantham, Lincolnshire
NG31- 6BH England
(44) 1476-584333

**Model**

**Serial number**

**Date**

**Machine owner**

**Inspected by (print)**

**Inspector signature**

**Inspector title**

**Inspector company**

# Maintenance Inspection Report

| | |
|---|---|
| **Model** | |
| **Serial number** | |
| **Date** | |
| **Hour meter** | |
| **Machine owner** | |
| **Inspected by (print)** | |
| **Inspector signature** | |
| **Inspector title** | |
| **Inspector company** | |

## Instructions

- Make copies of this report to use for each inspection.
- Select the appropriate checklist(s) for the type of inspection(s) to perform.

| | | |
|---|---|---|
| ☐ | **Daily or every 8 hours** | **A** |
| ☐ | **Quarterly or every 250 hours** | **A + B** |
| ☐ | **Semi-annually or every 500 hours** | **A + B + C** |
| ☐ | **Annually or every 1000 hours** | **A + B + C + D** |
| ☐ | **Two-year or every 2000 hours** | **A + B + C + D + E** |

- Place a check in the appropriate box after each inspection procedure is completed.
- Use the step-by-step procedures in this section to learn how to perform these inspections.
- If any inspection receives an "N," tag and remove the machine from service, repair and re-inspect it. After repair, place a check in the "R" box.

**Legend**

Y = yes, acceptable
N = no, remove from service
R = repaired

| **Checklist A** | | **Y** | **N** | **R** |
|---|---|---|---|---|
| A-1 | Inspect the manuals and decals | | | |
| A-2 | Pre-operation inspection | | | |
| A-3 | Function tests | | | |
| A-4 | Lubricate boom | | | |
| A-5 | Engine maintenance | | | |
| A-6 | Transmission | | | |
| **Perform after 40 hours:** | | | | |
| A-7 | 30-day service | | | |
| **Perform after 50 hours:** | | | | |
| A-8 | Axle maintenance | | | |
| **Perform after 100 hours:** | | | | |
| A-9 | Engine maintenance | | | |
| A-10 | Axle maintenance | | | |
| **Perform after 200 hours:** | | | | |
| A-11 | Axle maintenance | | | |

| **Checklist B** | | **Y** | **N** | **R** |
|---|---|---|---|---|
| B-1 | Batteries | | | |
| B-2 | Electrical wiring | | | |
| B-3 | Exhaust system | | | |
| B-4 | Engine air filter | | | |
| B-5 | Tires and wheels | | | |
| B-6 | Hydraulic oil analysis | | | |
| B-7 | Tank venting systems | | | |
| B-8 | Boom wear pads | | | |
| B-9 | Driveshaft | | | |
| B-10 | Engine Maintenance | | | |

| **Checklist C** | | **Y** | **N** | **R** |
|---|---|---|---|---|
| C-1 | Inspect sequencing chains | | | |
| C-2 | Engine maintenance | | | |
| C-3 | Axle maintenance | | | |
| C-4 | Transmission maintenance | | | |
| C-5 | Engine maintenance | | | |
| C-6 | Engine maintenance | | | |
| C-7 | Adjust sequencing chains | | | |
| Perform every 700 hours | | | | |
| C-8 | Axle maintenance | | | |
| Perform every 800 hours: | | | | |
| C-9 | Axle maintenance | | | |

**Comments**

# Maintenance Inspection Report

| | |
|---|---|
| **Model** | |
| **Serial number** | |
| **Date** | |
| **Hour meter** | |
| **Machine owner** | |
| **Inspected by (print)** | |
| **Inspector signature** | |
| **Inspector title** | |
| **Inspector company** | |

## Instructions

- Make copies of this report to use for each inspection.
- Select the appropriate checklist(s) for the type of inspection(s) to perform.

| | | |
|---|---|---|
| ☐ | **Daily or every 8 hours** | **A** |
| ☐ | **Quarterly or every 250 hours** | **A + B** |
| ☐ | **Semi-annually or every 500 hours** | **A + B + C** |
| ☐ | **Annually or every 1000 hours** | **A + B + C + D** |
| ☐ | **Two-year or every 2000 hours** | **A + B + C + D + E** |

- Place a check in the appropriate box after each inspection procedure is completed.
- Use the step-by-step procedures in this section to learn how to perform these inspections.
- If any inspection receives an "N," tag and remove the machine from service, repair and re-inspect it. After repair, place a check in the "R" box.

**Legend**

Y = yes, acceptable
N = no, remove from service
R = repaired

| **Checklist D** | | **Y** | **N** | **R** |
|---|---|---|---|---|
| D-1 | Forks | | | |
| D-2 | Transmission | | | |
| D-3 | Hydraulic return filter | | | |
| D-4 | Axle maintenance | | | |
| D-5 | Engine maintenance | | | |

| **Checklist E** | | **Y** | **N** | **R** |
|---|---|---|---|---|
| E-1 | Hydraulic oil | | | |
| E-2 | Engine maintenance | | | |
| E-3 | Engine maintenance | | | |
| **Perform every 3000 hours:** | | | | |
| E-4 | Engine maintenance | | | |
| **Perform every 4500 hours or 60 months:** | | | | |
| E-5 | Engine maintenance | | | |
| **Perform every 12,000 hours:** | | | | |
| E-6 | Engine maintenance | | | |

**Comments**

## A-1
## Inspect the Manuals and Decals

Genie specifications require that this procedure be performed every 8 hours or daily, whichever comes first.

Maintaining the operator’s and safety manuals in good condition is essential to safe machine operation. Manuals are included with each machine and should be stored in the container provided in the platform. An illegible or missing manual will not provide safety and operational information necessary for a safe operating condition.

In addition, maintaining all of the safety and instructional decals in good condition is mandatory for safe machine operation. Decals alert operators and personnel to the many possible hazards associated with using this machine. They also provide users with operation and maintenance information. An illegible decal will fail to alert personnel of a procedure or hazard and could result in unsafe operating conditions.

1 Check to make sure that the operator's and safety manuals are present and complete in the storage container on the platform.

2 Examine the pages of each manual to be sure that they are legible and in good condition.

⊙ Result: The operator's manual is appropriate for the machine and all manuals are legible and in good condition.

☒ Result: The operator's manual is not appropriate for the machine or all manuals are not in good condition or is illegible. Remove the machine from service until the manual is replaced.

3 Open the operator's manual to the decals inspection section. Carefully and thoroughly inspect all decals on the machine for legibility and damage.

⊙ Result: The machine is equipped with all required decals, and all decals are legible and in good condition.

☒ Result: The machine is not equipped with all required decals, or one or more decals are illegible or in poor condition. Remove the machine from service until the decals are replaced.

4 Always return the manuals to the storage container after use.

Note: Contact your authorized Genie distributor or Genie if replacement manuals or decals are needed.

# Checklist A Procedures

## A-2
## Perform Pre-operation Inspection

Genie specifications require that this procedure be performed every 8 hours or daily, whichever comes first.

Completing a Pre-operation Inspection is essential to safe machine operation. The Pre-operation Inspection is a visual inspection performed by the operator prior to each work shift. The inspection is designed to discover if anything is apparently wrong with a machine before the operator performs the function tests. The Pre-operation Inspection also serves to determine if routine maintenance procedures are required.

Complete information to perform this procedure is available in the appropriate operator's manual. Refer to the Operator's Manual on your machine.

## A-3
## Perform Function Tests

Genie specifications require that this procedure be performed every 8 hours or daily, whichever comes first.

Completing the function tests is essential to safe machine operation. Function tests are designed to discover any malfunctions before the machine is put into service. A malfunctioning machine must never be used. If malfunctions are discovered, the machine must be tagged and removed from service.

Complete information to perform this procedure is available in the appropriate operator's manual. Refer to the Operator's Manual on your machine.

## A-4
## Lubricate the Boom

Genie specifications require that this procedure be performed every 8 hours or daily, whichever comes first.

Greasing the specified locations is essential for good machine performance and service life. Operating the machine with little or no grease may cause the machine to perform poorly and continued use may cause component damage.

1 Fully extend and raise the boom, then retract the boom, checking to insure it operates smoothly. There should be a light film of lubricant on wear pad contact surfaces.

⊙ Result: Boom operates smoothly and a thin film of lubricant is visible. Proceed to step 5.

⊠ Result: Boom does not extend or retract smoothly and no lubricant is visible on wear pad contact surfaces. Proceed to step 2.

2 Apply a thin layer of grease to the underside of the number 3 boom tube where it makes contact with the number 2 boom tube lower wear pads.

3 Apply a thin layer of grease to the underside of the number 2 boom tube where it makes contact with the number 1 boom tube lower wear pads.

4 Lubricate the top and side boom tube wear pads.

5 Return the boom to the stowed position.

| **Grease specification** |
|---|
| EP NLGI 2 (lithium based) or equivalent |
| Lube-A-Boom grease, 7 lb pail (recommended)<br>Genie part number 110147 |
| Chevron Ultra-Duty EP 2 grease (alternate) |

## A-5
## Perform Engine Maintenance - All Models

Engine specifications require that this procedure be performed daily or every 8 hours, whichever comes first.

- Engine oil level - check
- Coolant level - check/add
- Fuel system filter/water separator - drain
- Engine tightness - check or leaks
- Exhaust system - check for leaks

Required maintenance procedures and additional engine information is available in the Perkins 1100D Operation and Maintenance Manual OR the John Deere 4045HF485 Operator's Manual.

| **Perkins 1100D Operation and Maintenance Manual** | |
|---|---|
| Genie part number | 123702 |
| **John Deere 4045HF485 Operator's Manual** | |
| Genie part number | 123703 |

# Checklist A Procedures

## A-6
## Perform Transmission Maintenance

Transmission specifications require that this procedure be performed every 8 hours or daily, whichever comes first.

- Transmission oil level - check/add*

Required maintenance procedures and additional transmission information is available in the Dana T20000 Maintenance Manual.

| **Dana T20000 Service Manual** | |
|---|---|
| Genie part number | 115025 |

## A-7
## Perform 30 Day Service

The 30 day maintenance procedure is a one-time sequence of procedures to be performed after the first 30 days or 40 hours of usage. After this interval, refer to the maintenance checklists for continued scheduled maintenance.

1 Perform the following maintenance procedures:

**John Deere models**:

- A-9 Perform Engine Maintenance - John Deere Models

**All models:**

- B-5 Inspect the Tires, Wheels and Lug Nut Torque
- D-2 Replace the Hydraulic Tank Return Filter Element

# Checklist A Procedures

## A-8
## Perform Axle Maintenance

Axle specifications require that this procedure be performed every 50 hours or monthly, whichever comes first.

Required maintenance procedures and additional axle information is available in the Dana 213 Axle Maintenance and Repair Manual.

| **Dana 213 Axle Maintenance and Repair Manual** | |
|---|---|
| Genie part number | 115026 |

## A-9
## Perform Engine Maintenance - John Deere Models

Engine specifications requires that this one-time procedure be performed after 100 hours of operation.

Required maintenance procedures and additional engine information is available in the John Deere 4045HF485 Operator's Manual.

| **John Deere 4045HF485 Operator's Manual** | |
|---|---|
| Genie part number | 123703 |

# Checklist A Procedures

## A-10
## Perform Axle Maintenance

Axle specifications require that this one-time procedure be performed after 100 hours of operation.

Required maintenance procedures and additional axle information is available in the Dana 213 Axle Maintenance and Repair Manual.

| Dana 213 Axle Maintenance and Repair Manual | |
|---|---|
| Genie part number | 115026 |

## A-11
## Perform Axle Maintenance

Axle specifications requires that this procedure be performed every 200 hours of operation.

Required maintenance procedures and additional axle information is available in the Dana 213 Axle Maintenance and Repair Manual.

| Dana 213 Axle Maintenance and Repair Manual | |
|---|---|
| Genie part number | 115026 |

## B-1 Inspect the Batteries

Genie requires that this procedure be performed every 250 hours or quarterly, whichever comes first.

Genie requires that this procedure be performed every 250 hours or quarterly, whichever comes first.

Proper battery condition is essential to good engine performance and operational safety. Improper fluid levels or damaged cables and connections can result in engine component damage and hazardous conditions.

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

**⚠WARNING** Bodily injury hazard. Batteries contain acid. Avoid spilling or contacting battery acid. Neutralize battery acid spills with baking soda and water.

1 Put on protective clothing and eye wear.

2 Remove the cover from the auxiliary power unit batteries located at the ground controls side of the machine.

Note: Perform the remaining steps on the auxiliary power unit batteries and the engine starting battery.

3 Be sure that the battery cable connections are free of corrosion.

Note: Adding terminal protectors and a corrosion preventative sealant will help eliminate corrosion on the battery terminals and cables.

4 Be sure that the battery retainers and cable connections are tight.

5 Be sure that the battery separator wire connections are tight.

6 Fully charge the battery(s) and allow the battery(s) to rest at least 6 hours.

7 Remove the battery vent caps and check the specific gravity of each battery cell with a hydrometer. Note the results.

8 Check the ambient air temperature and adjust the specific gravity reading for each cell as follows:

- Add 0.004 to the reading of each cell for every 10° / 5.5° C above 80° F / 26.7° C.
- Subtract 0.004 from the reading of each cell for every 10° / 5.5° C below 80° F / 26.7° C.

⊙ Result: All battery cells display an adjusted specific gravity of 1.277 or higher. The battery is fully charged. Proceed to step 12.

☒ Result: One or more battery cells display a specific gravity of 1.217 or below. Proceed to step 9.

9 Perform an equalizing charge OR fully charge the battery(s) and allow the battery(s) to rest at least 6 hours.

# Checklist B Procedures

10 Remove the battery vent caps and check the specific gravity of each battery cell with a hydrometer. Note the results.

11 Check the ambient air temperature and adjust the specific gravity reading for each cell as follows:

- Add 0.004 to the reading of each cell for every 10° / 5.5° C above 80° F / 26.7° C.
- Subtract 0.004 from the reading of each cell for every 10° / 5.5° C below 80° F / 26.7° C.

⊙ Result: All battery cells display a specific gravity of 1.277 or greater. The battery is fully charged. Proceed to step 12.

⊠ Result: The difference in specific gravity readings between cells is greater than 0.1 OR the specific gravity of one or more cells is less than 1.177. Replace the battery.

12 Check the battery acid level. If needed, replenish with distilled water to 1/8 inch / 3 mm below the bottom of the battery fill tube. Do not overfill.

13 Install the vent caps and neutralize any electrolyte that may have spilled.

## B-2
## Inspect the Electrical Wiring

Genie requires that this procedure be performed every 250 hours or quarterly, whichever comes first.

Maintaining electrical wiring in good condition is essential to safe operation and good machine performance. Failure to find and replace burnt, chafed, corroded or pinched wires could result in unsafe operating conditions and may cause component damage.

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

1 Inspect the following areas for burnt, chafed, corroded and loose wires:

- Inside of the operator's compartment
- Underside of the chassis
- Inside engine compartment

2 Inspect for a lite, even coating of dielectric grease in the following locations:

- All harness connectors

Note: Do not apply excessive amounts of dielectric grease to harness connectors, pins or sockets.

Note: Do not apply dielectric grease to a engine ECU/ECM or engine harness connectors.

3 Start the engine and raise the boom so there is enough room to access and remove all the covers attached to the chassis.

4 Attach a lifting strap from an overhead crane to the boom. Support the boom. Do not apply any lifting pressure.

5 Remove all engine covers, hydraulic tank covers and chassis covers.

**⚠ DANGER** Crushing hazard. Death or serious injury could result if the boom should unexpectedly fall while working underneath the boom. Do not stand or work beneath a boom that is not properly supported.

6 Inspect the following areas for burnt, chafed, corroded, pinched and loose wires:

- Engine
- Transmission
- Manifolds
- Chassis

7 Inspect for a lite, even coating of dielectric grease in all connections between the engine, transmission and the operator's compartment.

Note: Do not apply excessive amounts of dielectric grease to harness connectors, pins or sockets.

Note: Do not apply dielectric grease to a engine ECU/ECM or engine harness connectors.

8 Install all covers removed in step 5.

9 Remove the lifting strap from the overhead crane.

10 Start the engine and lower the boom to the stowed position. Turn the machine off.

## B-3
## Check the Exhaust System

Genie requires that this procedure be performed every 250 hours or quarterly, whichever comes first.

Maintaining the exhaust system is essential to good engine performance and service life. Running the engine with a damaged or leaking exhaust system can cause component damage and unsafe operating conditions.

**⚠ WARNING** Bodily injury hazard. Do not inspect while the engine is running. Remove the key to secure from operation.

**⚠ CAUTION** Bodily injury hazard. Beware of hot engine components. Contact with hot engine components may cause severe burns.

1 Open the engine access cover.

2 Be sure that all fasteners are tight.

3 Inspect all welds for cracks.

4 Inspect for exhaust leaks; i.e., carbon buildup around seams and joints.

5 Close the engine access cover.

# Checklist B Procedures

## B-4
## Inspect the Engine Air Filter

Genie requires that this procedure be performed every 250 hours or quarterly, whichever comes first.

Perform this procedure more often if dusty conditions exist.

Maintaining the engine air filter in good condition is essential to good engine performance and service life. Failure to perform this procedure can lead to poor engine performance and component damage.

Note: Perform this procedure with the engine off.

1 Release the latches on the front cover of the air cleaner assembly. Remove the cover.

2 Gently twist and pull out the external or primary filter element.

3 Remove the inner or secondary filter element.

4 Clean the inside of the canister and the gasket with a damp cloth.

5 Inspect the primary and secondary air filter elements. If needed, blow from the inside out using low pressure dry compressed air, or carefully tap out dust.

6 Install the secondary filter element first, then install the primary filter element.

7 Install the front cover onto the air cleaner assembly and secure the latches.

## B-5
## Inspect the Tires, Wheels and Lug Nut Torque

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Maintaining the tires and wheels, including proper wheel fastener torque, is essential to safe operation and good performance. Tire and/or wheel failure could result in a machine tip-over. Component damage may also result if problems are not discovered and repaired in a timely fashion.

**⚠WARNING** Bodily injury hazard. An over-inflated tire can explode and could cause death or serious injury.

**⚠WARNING** Tip-over hazard. Do not use temporary flat tire repair products.

1 Check all tire treads and sidewalls for cuts, cracks, punctures and unusual wear.

2 Check each wheel for damage, bends and cracked welds.

3 Check each lug nut for proper torque. Refer to Specifications, *Machine Specifications*.

4 Check the air pressure in each tire. Refer to Specifications, *Machine Specifications*.

# Checklist B Procedures

## B-6
## Perform Hydraulic Oil Analysis

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Replacement or testing of the hydraulic oil is essential for good machine performance and service life. Dirty oil and a clogged suction strainer may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require oil changes to be performed more often. For hydraulic oil specifications, Refer to Specifications, *Hydraulic Specifications*.

Note: Before replacing the hydraulic oil, the oil may be tested by an oil distributor for specific levels of contamination to verify that changing the oil is necessary. If the hydraulic oil is not replaced at the two year inspection, test the oil quarterly. Replace the oil when it fails the test. Refer to Maintenance Procedure, *Test or Replace the Hydraulic Oil*.

## B-7
## Inspect the Fuel and Hydraulic Tank Cap Venting Systems

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Perform this procedure more often if dusty conditions exist.

Free-breathing fuel and hydraulic tank caps are essential for good machine performance and service life. A dirty or clogged tank cap may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the caps be inspected more often.

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

Note: Perform this procedure with the engine off.

1 Remove the fuel filler cap from the tank.

2 Check for proper venting.

⊙ Result: Air passes through the fuel tank cap. Proceed to step 4.

⊠ Result: If air does not pass through the cap, clean or replace the cap. Proceed to step 3.

Note: When checking for positive tank cap venting, air should pass freely through the cap.

# Checklist B Procedures

3 Using a mild solvent, carefully wash the cap venting system. Dry using low pressure compressed air. Repeat this procedure beginning with step 2.

4 Install the fuel tank cap onto the fuel tank.

5 Remove the breather cap from the hydraulic tank.

6 Check for proper venting. The cap is pressurized to 3 psi.

⊙ Result: Air passes through the breather cap. Proceed to step 8.

⊠ Result: If air does not pass through the cap, clean or replace the cap. Proceed to step 7.

Note: When checking for positive tank cap venting, air should pass freely through the cap.

7 Using a mild solvent, carefully wash the cap venting system. Dry using low pressure compressed air. Repeat this procedure beginning with step 6.

8 Install the breather cap onto the hydraulic tank.

## B-8
## Check the Boom Wear Pads

Genie specifications require that this procedure be performed every 250 hours of operation.

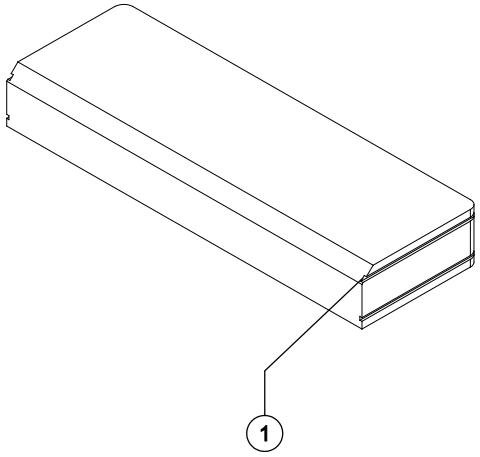
1 Extend the boom until the wear pads are accessible.

Note: It may be necessary to remove the wear pad retainer plates to expose the wear pads.

2 Inspect the end of each upper wear pad.

⊙ Result: The wear pad grooves are visible on the end of the wear pad.

⊠ Result: The grooves on the end of the wear pad are no longer visible. Replace both wear pads. Refer to the Repair Procedure, *How to Replace the Boom Wear Pads*.




1 wear pad groove

3 Repeat the procedure for the lower wear pads.

4 Measure each side wear pad.

⊙ Result: The measurement is within specification.

⊠ Result: The measurement is less than specification. Replace all side wear pads. Refer to the Repair Procedure, *How to Replace the Boom Wear Pads*.

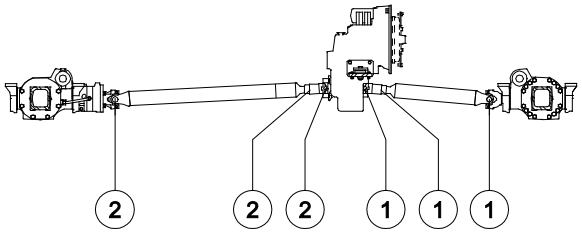
| Boom Wear Pad Specifications | |
|---|---|
| Side wear pad thickness, minimum | 3/8 inch<br>9.5 mm |

## B-9
## Lubricate the Driveshaft

Genie requires that this procedure be performed every 250 hours or quarterly, whichever comes first.

Greasing the specified locations is essential for good machine performance and service life. Operating the machine with little or no grease may cause the machine to perform poorly and continued use may cause component damage.

1 Using a grease gun, thoroughly grease the driveshafts at each of the locations indicated in the illustration.




1 rear driveshaft
2 front driveshaft

| Grease Specifications |
|---|
| Chevron Ultra-duty grease, EP NLGI 2 (lithium based) or equivalent |

# Checklist B Procedures

## B-10
## Perform Engine Maintenance - John Deere Models

Engine specifications require that this procedure be performed every 250 hours.

- Engine oil and filter - change

Required maintenance procedures and additional engine information is available in the John Deere 4045HF485 Operator's Manual.

| **John Deere 4045HF485 Operator's Manual** | |
|---|---|
| Genie part number | 123703 |

## C-1
## Inspect and Lubricate the Sequencing Chains

Genie specifications require that this procedure be performed every 500 hours or semi-annually, whichever comes first. In extremely dusty or hostile environments, it may be necessary to lubricate the chains more often.

Maintaining the sequencing chains in good condition is essential to safe operation and good machine performance. Failure to detect damage to the chains could result in a hazardous operating condition.

Environments in which Genie Telehandlers operate can vary widely from outdoor moisture and temperature extremes, to mildly corrosive or highly corrosive industrial atmospheres, in addition to abrasive exposures such as sand and grit.

In addition, dynamic shock loading can impose abnormal loads above the endurance limit of the chains. Examples of dynamic shock loading are:

- High velocity movement of load, followed by sudden abrupt stops.
- Carrying loads in suspension over irregular surfaces and rough terrain.
- Attempting to "inch" loads which are beyond the rated capacity of the vehicle.

The load cycles and environmental conditions make it impossible to predict chain life. It is therefore necessary to conduct regular inspections.

1 Park the machine on a firm level surface, level the boom and engage the parking brake.

2 Fully extend the boom.

3 Inspect the chains for the following conditions:

- Elongation
- BL666 chain - Measure 16 pitches of the extend chain for machines using BL666 chain.

Note: For identification, this chain typically measures 3/4 inch between pin centers when new.

Note: Both the extend and retract chains should be measured.

Note: Measurement should be taken in the area where the chain articulates most frequently over the sheaves.

⊙ Result: The distance measures 12.36 inches / 313mm or less. The chain is within specifications. Continue with inspection.

☒ Result: If the distance is greater than 12.36 inches / 313mm, the machine shall be removed from service until the chain is replaced.

# Checklist C Procedures

Note: The boom chain's normal life expectancy can be expressed as a maximum percent of elongation of 3%.

- **Edge wear**:

  Check the chain for wear on the link plate edges caused by running back and forth over the sheave. The maximum reduction of material should not exceed 5%.

- **Cracked plates**:

  Check link side plates for any cracks. These are generally a sign of chain fatigue.

- **Turning pins**:

  Check the pins. The position of the riveting must be parallel with the top and bottom of the side plate.

If any of these conditions are discovered during the inspection, the chain must be replaced.

After inspection and before being returned to service, the chains must be lubricated with a quality chain lubricant.

Note: Do not use grease to lubricate chains.

The chain plates should be brushed with a wire brush prior to lubrication to clear the space between the plates.

The lubricant must penetrate the chain joint to prevent wear. Applying lubricant to the external surfaces will prevent rust, but the chains should be articulated to make sure the lubricant penetrates to the working surfaces between the pins and links.

Lubricant may be applied with a brush, sprayed or poured on, but the chain should be well flooded with lubricant and the boom should be extended and retracted to insure that the lubricant penetrates to the working surfaces. All excess lubricant should be wiped away from the external surfaces.

Note: Do not use solvents to remove excess lubricant.

## C-2
## Perform Engine Maintenance - John Deere Models

Engine specifications require that this procedure be performed every 500 hours or annually, whichever comes first.

Required maintenance procedures and additional engine information is available in the John Deere 4045HF485 Operator's Manual.

| **John Deere 4045HF485 Operator's Manual** | |
|---|---|
| Genie part number | 123703 |

# Checklist C Procedures

## C-3
## Perform Axle Maintenance

Axle specifications require that this procedure be performed after 500 hours of operation.

Required maintenance procedures and additional axle information is available in the Dana 213 Axle Maintenance and Repair Manual.

| **Dana 213 Axle Maintenance and Repair Manual** | |
|---|---|
| Genie part number | 115026 |

## C-4
## Perform Transmission Maintenance - Dana Models

Transmission specifications require that this procedure be performed every 500 hours or semi-annually, whichever comes first.

Required maintenance procedures and additional transmission information is available in the Dana T20000 Maintenance Manual.

| **Dana T20000 Service Manual** | |
|---|---|
| Genie part number | 115025 |

# Checklist C Procedures

## C-5
## Perform Engine Maintenance - Perkins Models

Engine specifications require that this procedure be performed every 500 hours.

**1104 Engine**

- V-belts - inspect/adjust/replace

Required maintenance procedures and additional engine information is available in the Perkins 1104 Operation and Maintenance Manual OR the, Perkins 1204 Operation and Maintenance Manual.

| **Perkins 1104 Operation and Maintenance Manual** | |
|---|---|
| Genie part number | 117765 |

## C-6
## Perform Engine Maintenance - Perkins Models

Engine specifications require that this procedure be performed every 500 hours or annually.

**1104 Engine**

- Engine oil and filter - change

API CH-4 or API CI-4 approved oil

- Fuel system primary filter (water separator) element - replace
- Fuel system secondary filter - replace
- Hoses and clamps - inspect/replace
- Radiator - clean

Required maintenance procedures and additional engine information is available in the Perkins 1104 Operation and Maintenance Manual.

| **Perkins 1104 Operation and Maintenance Manual** | |
|---|---|
| Genie part number | 117765 |

## C-7
## Adjust the Boom Sequencing Chains

Genie specifications require that this procedure be performed every 500 hours or six months, whichever comes first.

1 Raise the boom to the horizontal position.

2 Extend the boom fully, then retract the boom approximately 1 inch / 25 mm.

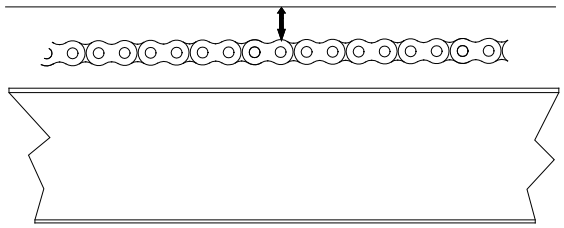
3 Tie a string line on each end of the chain, being sure to pull the string taut.

4 At the midpoint of the string, measure the distance between the string and the chain surface corresponding to the surface the string line is attached to.

⊙ Result: The distance is 0.25 to 0.5 inch / 6.35 to 12.7 mm. No adjustment to the chain is necessary. Proceed to step 8.

⊠ Result: The distance is less than a 0.25 inch / 6.35 mm OR is greater than 0.5 inch / 12.7 mm. The chain requires adjustment. Proceed to step 5.

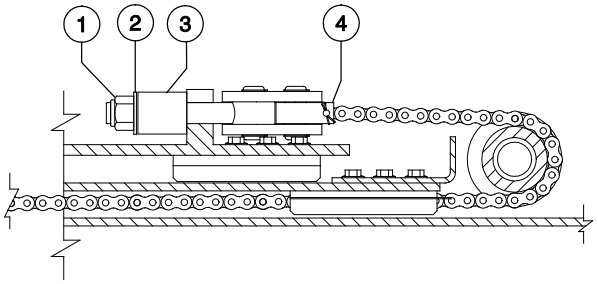
5 Working at the fork end of the large boom tube, locate the adjustable chain anchor on the top of the boom section.



6 Place an adjustable wrench across the flat part of the chain, just ahead of the chain anchor. Tighten the wrench onto the chain.

7 Using a 1 7/16 inch wrench, adjust the nut as required to tighten or loosen the chain. Repeat this procedure beginning with step 4 until the gap is between 0.25 to 0.5 inch / 6.35 to 12.7 mm.

Note: If the adjusting bolt runs out of threads before the chain tension is correct, the chain has stretched too far and the chain must be replaced.




1 nut
2 washer
3 spacer
4 chain anchor

8 Fully retract the boom.

9 Measure the gap between the washer and the spacer. The gap should be between 0.125 to 0.25 inch / 3.2 mm to 6.35 mm.

# Checklist C Procedures

## C-8
## Perform Axle Maintenance

Axle specifications require that this procedure be performed every 700 hours of operation.

Required maintenance procedures and additional axle information is available in the Dana 213 Axle Maintenance and Repair Manual.

| **Dana 213 Axle Maintenance and Repair Manual** | |
|---|---|
| Genie part number | 115026 |

## C-9
## Perform Axle Maintenance

Axle specifications require that this procedure be performed every 800 hours of operation.

Required maintenance procedures and additional axle information is available in the Dana 213 Axle Maintenance and Repair Manual.

| **Dana 213 Axle Maintenance and Repair Manual** | |
|---|---|
| Genie part number | 115026 |

# Checklist D Procedures

## D-1
## Inspect the Forks

Genie specifications require that this procedure be performed every 1000 hours or annually, whichever comes first OR whenever permanent deformation of the forks is suspected.

Maintaining the lifting forks in good condition is essential to safe operation and good machine performance. Failure to detect damage to the forks could result in a hazardous operating condition.

1 Thoroughly clean the lifting forks.

2 Inspect the forks for the following:

- Surface cracks
- Straightness of the blade and shank
- Fork angle at 90 ± 3 degrees
- Relative height of fork tips shall not differ more than 3% of blade length

| Fork | 3% of blade length |
|---|---|
| 48" forks | 1.44 in |
| 60" forks | 1.8 in |
| 72" forks | 2.16 in |

- Excessive wear to the forks, fork mount or legible markings

☒ Result: If any of the above criteria are not met, the fork shall be removed from service until it is repaired or replaced.


1 shank
2 blade

## D-2
## Perform Transmission Maintenance - Dana Models

Transmission specifications require that this procedure be performed every 1000 hours or annually, whichever comes first.

Required maintenance procedures and additional transmission information is available in the Dana T20000 Maintenance Manual.

| Dana T20000 Service Manual | |
|---|---|
| Genie part number | 115025 |

# Checklist D Procedures

## D-3
## Replace Hydraulic Tank Return Filter Element

Genie specifications require that this procedure be performed every 1000 hours or annually, whichever comes first.

Perform this procedure more often if dusty conditions exist.

Replacement of the hydraulic filters is essential for good machine performance and service life. A dirty or clogged filter may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the filter be replaced more often.

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

Note: Perform this procedure with the engine off.

1 Start the engine. Raise the boom to allow access to the hydraulic tank.

2 Remove the fasteners securing the rear access cover and slide back.

3 Release the pressure in the oil reservoir by loosening the filler/breather cap.

4 Unscrew the return filter.

5 Install the new filter element.

6 Tighten the filler/breather cap.

7 Record the hours the filter element was replaced and keep with your maintenance records.

8 Start the engine.

9 Inspect the filter assembly to be sure that there are no leaks.

10 Clean up any oil that may have spilled during the installation procedure.

11 Re-install the rear access cover.

## D-4
## Perform Axle Maintenance

Axle specifications require that this procedure be performed every 1000 hours of operation.

Required maintenance procedures and additional axle information is available in the Dana 213 Axle Maintenance and Repair Manual.

| **Dana 213 Axle Maintenance and Repair Manual** | |
|---|---|
| Genie part number | 115026 |

## D-5
## Perform Engine Maintenance - Perkins Models

Engine specifications require that this procedure be performed every 1000 hours.

**1104 Engine**

- Engine valve lash - inspect/adjust

Required maintenance procedures and additional engine information is available in the Perkins 1104 Operation and Maintenance Manual.

| **Perkins 1104 Operation and Maintenance Manual** | |
|---|---|
| Genie part number | 117765 |

# Checklist E Procedures

## E-1
## Test or Replace the Hydraulic Oil

Genie specifications require that this procedure be performed every 2000 hours or every two years, whichever comes first.

Perform this procedure more often if dusty conditions exist.

Replacement or testing of the hydraulic oil is essential for good machine performance and service life. Dirty oil and a clogged suction strainer or hydraulic filters may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require oil changes to be performed more frequently.

Note: Before replacing the hydraulic oil, the oil may be tested by an oil distributor for specific levels of contamination to verify that changing the oil is necessary. If the hydraulic oil is not replaced at the two year inspection, test the oil quarterly. Replace the oil when it fails the test.

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

1 Lower the boom to the stowed position.

2 Remove oil cap from top of hydraulic tank.

3 Using an approved hand-operated pump, drain the hydraulic tank into a suitable container. Refer to Specifications, *Hydraulic Specifications*.

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

4 Remove the drain plug from the rear of the tank.

5 Rinse out the inside of the tank using a mild solvent.

6 Install the drain plug and securely tighten. Do not over tighten.

7 Fill the tank with hydraulic oil until the fluid level is in the center of the sight glass at the rear of the tank.

8 Clean up any oil that may have spilled.

# Checklist E Procedures

## E-2
## Perform Engine Maintenance - John Deere Models

Engine specifications require that this procedure be performed every 2000 hours.

Required maintenance procedures and additional engine information is available in the John Deere 4045HF485 Operator's Manual.

| John Deere 4045HF485 Operator's Manual | |
|---|---|
| Genie part number | 123703 |

## E-3
## Perform Engine Maintenance - Perkins Models

Engine specifications require that this procedure be performed every 2000 hours.

**1104 Engine**

- Aftercooler core - inspect
- Alternator - inspect
- Engine mounts - inspect
- Starting Motor - inspect
- Turbocharger - inspect
- Water pump - inspect

Required maintenance procedures and additional engine information is available in the Perkins 1104 Operation and Maintenance Manual.

| Perkins 1104 Operation and Maintenance Manual | |
|---|---|
| Genie part number | 117765 |

# Checklist E Procedures

## E-4
## Perform Engine Maintenance - Perkins Models

Engine specifications require that this procedure be performed every 3000 hours.

**1104 Engine**

- Alternator Belt - Inspect/Adjust/Replace
- Fuel Injector - test/change

Required maintenance procedures and additional engine information is available in the Perkins 1104 Operation and Maintenance Manual.

| **Perkins 1104 Operation and Maintenance Manual** | |
|---|---|
| Genie part number | 117765 |

## E-5
## Perform Engine Maintenance - John Deere Models

Engine specifications require that this procedure be performed every 4500 hours or 60 months, whichever comes first.

Required maintenance procedures and additional engine information is available in the John Deere 4045HF485 Operator's Manual.

| **John Deere 4045HF485 Operator's Manual** | |
|---|---|
| Genie part number | 123703 |

## E-6
## Perform Engine Maintenance - Perkins Models

Engine specifications require that this procedure be performed every 12,000 hours or every three years, whichever comes first.

**1104 Engines**

- Cooling System Coolant (Extended life coolant) - change

Required maintenance procedures and additional engine information is available in the Perkins 1104 Operation and Maintenance Manual.

| **Perkins 1104 Operation and Maintenance Manual** | |
|---|---|
| Genie part number | 117765 |

# Repair Procedures

## Observe and Obey:

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

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

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

## Before Repairs Start:

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

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

☑ Use only Genie approved replacement parts.

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

## Machine Configuration:

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

- Machine parked on a firm, level surface
- Boom in the stowed position
- Key switch in the off position with the key removed
- Wheels chocked

## About This Section

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

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

### Symbols Legend

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

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

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

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

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

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

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

# Boom Components

## 1-1 Boom Proximity Switch

The boom angle switch is a proximity switch. This switch functions by sensing a change in the electromagnetic field of the switch, due to the introduction of metal into the field. A proximity switch is, simply, a metal detector.

The switch generates an electromagnetic field at the face of the switch. This field senses when steel has been moved close to the switch as well as when the steel has been moved away, which is how the switch contacts open and close.

These switches are of a fail-safe design. Should the switch or the switch wire circuit be faulty, the machine will not function outside its designed range of use.

The boom proximity switch is a component of the drive circuit and the chassis sway circuit. Both the drive and the chassis sway functions are disabled when the boom is raised to 60° or higher.

### How to Test a Proximity Switch

1 Remove the switch from the machine. Do not disconnect the switch wire harness from the machine.

2 Start the engine.

3 Move the switch away from any ferrous or metallic object

⊙ Result: The light of the limit switch assembly is not illuminated.

4 Move the switch close to any ferrous or metallic object

⊙ Result: The light of the proximity switch assembly turns on. The switch is functioning correctly.

# Boom Components

## How to Adjust the Boom Angle Proximity Switch

The boom angle proximity switch is attached to a mounting bracket, located between the boom and the chassis directly beneath the boom pivot pin. The switch location is adjustable.

1 Start the engine.

2 Raise the boom to 60°. Confirm with a digital level.

3 Working at the pivot end of the boom, locate the boom angle proximity switch. Loosen the fasteners, securing the proximity switch assembly to the chassis, just enough to allow the bracket to move.

4 Move the proximity switch assembly until the light of the proximity switch turns on, then move the proximity switch assembly until the light of the proximity switch just turns off.

5 Securely tighten the fasteners. Do not over tighten.

6 Lower the machine to 55°.

⊙ Result: The light of the proximity switch assembly is illuminated.

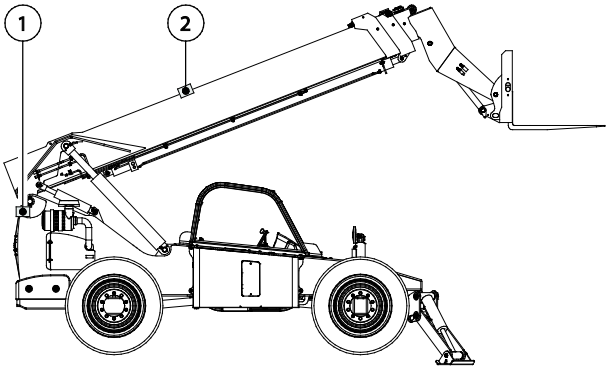
7 Raise the boom to 60°. Confirm with a digital level.

⊙ Result: The light of the proximity switch assembly is not illuminated. The proximity switch is properly calibrated.

⊠ Result: The light of the proximity switch assembly is illuminated. The proximity switch is not calibrated correctly. Repeat this procedure beginning with step 4.

## How to Adjust the Boom Extend Proximity Switch

The boom extend proximity switch assembly, used only on the GTH-1056, is secured to the top surface of the number 0 boom tube at the center of the boom. The proximity switch assembly is fixed in position and is not adjustable.




1 boom angle proximity switch
2 boom extend proximity switch (GTH-1056)

# Boom Components

## 1-2 Boom

### How to Replace the Boom Wear Pads

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

2 Remove the wear pad mounting fasteners and remove the wear pads from the boom.

3 Lubricate the wear surface of the new pads. Refer to Maintenance Procedure in the appropriate Service or Maintenance Manual for your machine, *Lubricate the Boom*.

Note: Do not lubricate the side wear pads.

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

### How to Remove the Lifting Fork Frame

1 With the boom in the stowed position, attach a lifting strap from an overhead crane to the top of the lifting fork frame at the front of the boom. Support the frame. Do not apply any lifting pressure.

2 Working from the rear of the frame, lift the spring-assisted handle of the lock securing the lower fork frame lock pin to the fork frame mount. Use a soft metal drift to remove the pin.

3 Using the overhead crane, lift and remove the fork frame from the boom.

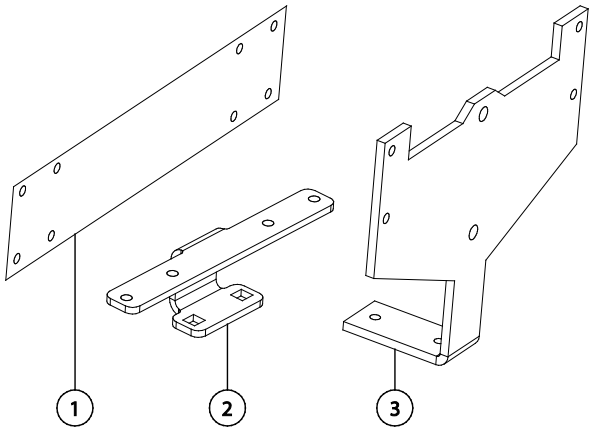
**⚠ CAUTION** Crushing hazard. The fork frame could fall if not properly supported when the lock pin is removed from the machine.

## How to Remove the Cable Bridge Assembly , GTH-1056

Inside the four-section boom of the GTH-1056, a cable bridge is used to route hydraulic lines through the boom assembly to the fork level cylinder and auxiliary connections (if equipped). The three-section boom on the GTH-1048 does not require the use of a cable bridge.

1 Remove the inspection cover at the pivot end of the boom.

2 Working at the pivot end of the boom, remove the fasteners securing the cable bridge rear mount bracket to the boom assembly. Remove the bracket from the boom.




1 cable bridge mount bracket
2 cable track mount bracket
3 cable bridge slider

3 Working at the pivot end of the boom, tag, disconnect and plug the hydraulic hoses at the hard lines of the cable bridge. Cap the fittings.

4 Working at the pivot end of the boom, remove the fasteners securing the hose roller assembly to boom tube number 1. Remove the hose roller assembly from the boom.

5 Working at the fork end of the boom, remove the fasteners securing the cable track mount bracket to boom tube number 3.

6 Working at the fork end of the boom, remove the fasteners securing the cable bridge slider to the cable bridge. Remove the slider from the boom.

Note: Pay attention to how the hoses are routed before removing the slider from the boom.

Note: During reassembly, it may be helpful to use tape to secure the bolts to the cable bridge when installing the cable bridge slider.

7 Working at the fork end of the boom, securely attach the loose end of the cable track to the cable bridge using a cable tie or similar device.

8 Working at the pivot end of the boom, carefully remove the cable bridge from the boom.

# Boom Components

## How to Replace the Retraction Chain

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

1 Start the engine and allow the engine to idle.

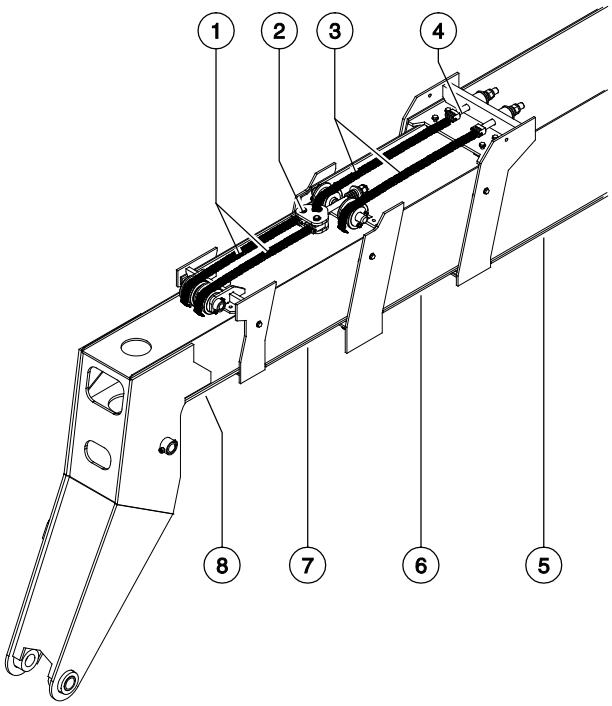
2 Raise the boom to a horizontal position.

3 Fully retract the boom.

4 Extend the boom approximately 1 inch / 2.5 cm.

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

6 **GTH-1056**: Working at the fork end of the boom, loosen the fasteners securing the dual-chain tensioner to the top of boom tube number 1. After noting the orientation and assembly order of the components, remove the fasteners and pull the tensioner free of the boom.



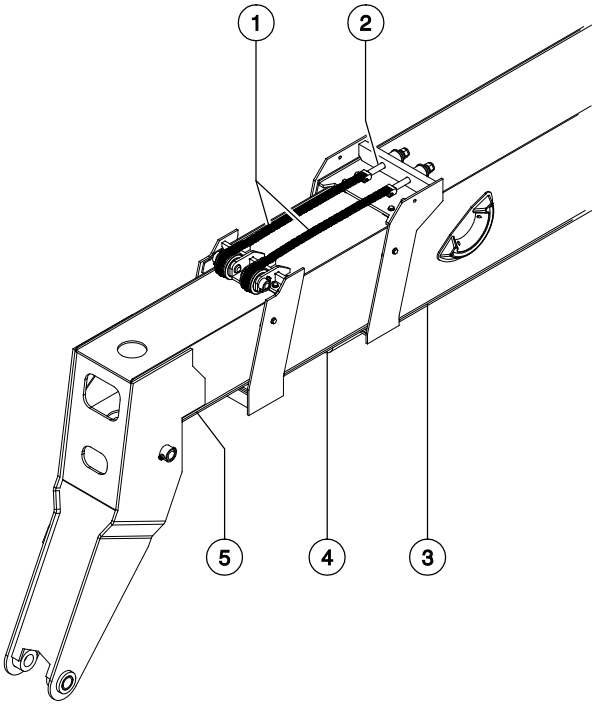

GTH-1056

1 tube 3 extension chains
2 dual-chain tensioner
3 tube 2 extension chains
4 single-chain tensioner
5 boom tube number 0
6 boom tube number 1
7 boom tube number 2
8 boom tube number 3

7 **GTH-1056**: Working at the fork end of the boom, loosen evenly the fasteners securing the single-chain tensioners to the top of boom tube number 0. After noting the orientation and assembly order of the components, remove the fasteners and pull the tensioners free of the boom.

# Boom Components

8 **GTH-1048**: Working at the fork end of the boom, loosen the fasteners securing the single-chain tensioners to the top of boom tube number 1. After noting the orientation and assembly order of the components, remove the fasteners and pull the tensioners free of the boom.



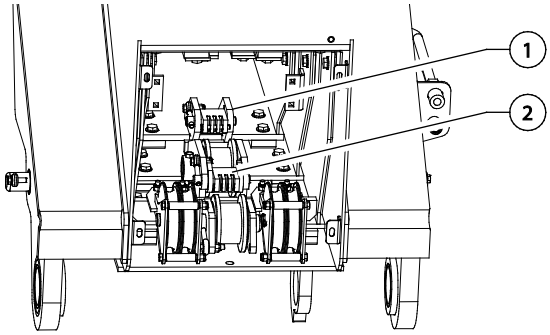

GTH-1048

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

9 Remove the inspection cover from the pivot end of the boom.

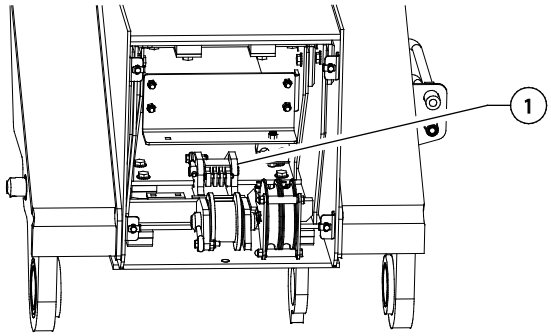
10 **GTH-1056**: Locate the two chain anchors of the boom retraction chains where they attach to the chain anchor mount at the lower side of boom tube 2 and 3.

**GTH-1048**: Locate the chain anchor of the boom retraction chain where it attaches to the chain anchor mount at the lower side of boom tube 3.




GTH-1056

1 chain anchor - boom tube number 3
2 chain anchor - boom tube number 2




GTH-1048

3 chain anchor

11 Select a chain anchor. Remove the fasteners securing the chain anchor pivot pin to the anchor mount of the boom tube. Remove the pivot pin and pull the chain anchor free of the mount.

# Boom Components

12 Using a strap from an overhead crane, support the extend cylinder. Do not apply any lifting pressure

13 Working at the fork end of the boom, remove the fasteners securing the boom extend cylinder pivot pin to the boom.

14 Use a soft metal drift to remove the pivot pin. Lower the cylinder just enough for access to the chain anchor bolts.

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

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

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

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

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

19 Working at the pivot end of the boom, install the chain anchor into the chain anchor mount. Secure the chain anchor to the mount using the pivot pin and fasteners removed in step 11. Securely tighten the fasteners. Do not over tighten.

20 Working at the pivot end of the boom, route the chain over the roller and install the chain onto the boom assembly using the pivot pin removed in step 11. Securely tighten the fasteners. Do not over tighten.

21 **GTH-1056**: Repeat this procedure, beginning with step 11, for the remaining chain anchor.

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

23 **GTH-1056**: Working at the fork end of boom tube number 1, install the dual-chain tensioner into the tensioner mount. Install the mounting components, removed in step 6, and securely tighten the fasteners.

24 **GTH-1056**: Install the chain tensioners into the tensioner mount at the fork end of boom tube number 0. Install the mounting components, removed in step 7. Evenly tighten the chain tensioners to the top of the boom tube until they are securely tightened.

25 **GTH-1048**: Install the chain tensioners into the tensioner mount at the fork end of boom tube number 1. Install the mounting components, removed in step 8. Evenly tighten the chain tensioners to the top of the boom tube until they are securely tightened.

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

**NOTICE**

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

## How to Replace the Extension Chains

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

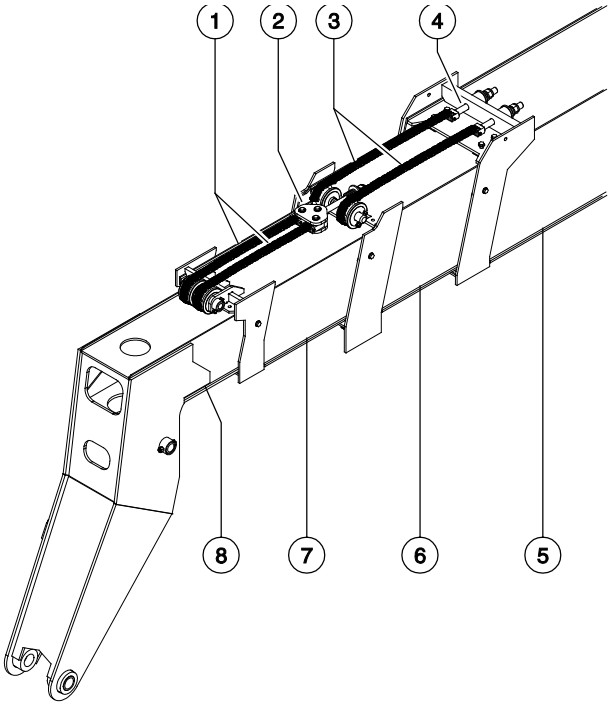
1 Start the engine and allow the engine to idle.

2 Raise the boom to a horizontal position.

3 Fully retract the boom.

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

5 **GTH-1056**: Working at the fork end of the boom, loosen the fasteners securing the dual-chain tensioner to the top of boom tube number 1. After noting the orientation and assembly order of the components, remove the fasteners and pull the tensioner free of the boom.



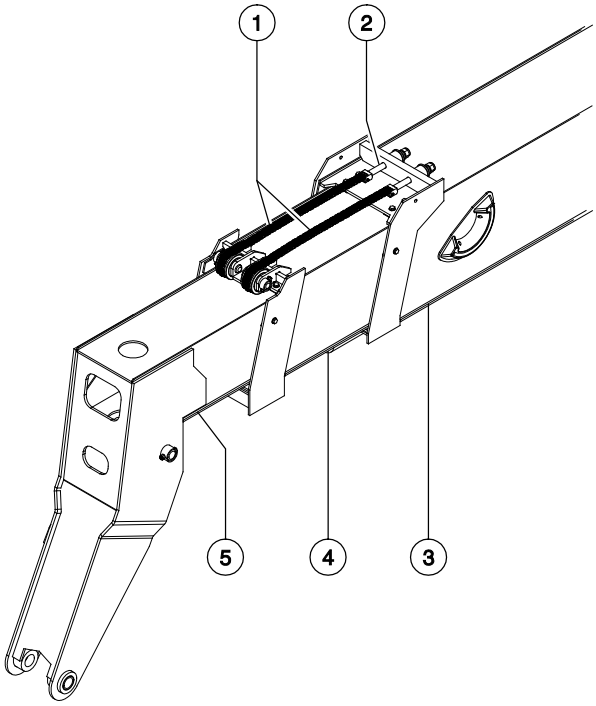

GTH-1056

1 tube 3 extension chains
2 dual-chain tensioner
3 tube 2 extension chains
4 single-chain tensioner
5 boom tube number 0
6 boom tube number 1
7 boom tube number 2
8 boom tube number 3

6 **GTH-1056**: Working at the fork end of the boom, loosen evenly the fasteners securing the single-chain tensioners to the top of boom tube number 0. After noting the orientation and assembly order of the components, remove the fasteners and pull the tensioners free of the boom.

# Boom Components

7 **GTH-1048**: Working at the fork end of the boom, loosen the fasteners securing the single-chain tensioners to the top of boom tube number 1. After noting the orientation and assembly order of the components, remove the fasteners and pull the tensioners free of the boom.




GTH-1048

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

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

9 Repeat this procedure, beginning with step 8, for the other chains.

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

11 **GTH-1056**: Remove the inspection cover from the pivot end of the boom and locate the chain anchors of the extension chains at the top of boom tubes 2 and 3.

**GTH-1048**: Remove the inspection cover from the pivot end of the boom and locate the chain anchors of the extension chains at the top of boom tube 3.

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

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

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

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

15 Install the chain anchor, pin and clip onto the new chain.

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

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

18 Working at the pivot end of the boom and using the fasteners removed in step 12, install the chain anchor onto the boom tube. Securely tighten the fasteners. Do not over tighten.

19 Remove the rope from the chain and install the chain into the chain anchor of the tensioner assembly. Secure the chain to the chain anchor using the pin and clip removed in step 8.

20 Repeat this procedure, beginning with step 10, for the other chains.

21 Install the inspection cover, removed in step 8, onto the boom. Install and securely tighten the fasteners. Do not over tighten.

22 **GTH-1056**: Working at the fork end of boom tube number 1, install the dual-chain tensioner into the tensioner mount. Install the mounting components, removed in step 5, and securely tighten the fasteners.

23 **GTH-1056**: Install the chain tensioners into the tensioner mount at the fork end of boom tube number 0. Install the mounting components, removed in step 6. Evenly tighten the chain tensioners to the top of the boom tube until they are securely tightened.

24 **GTH-1048**: Install the chain tensioners into the tensioner mount at the fork end of boom tube number 1. Install the mounting components, removed in step 7. Evenly tighten the chain tensioners to the top of the boom tube until they are securely tightened.

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

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

## How to Remove the Boom

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

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

1 Remove the lifting fork and frame. Refer to Repair Procedure, *How to Remove the Lifting Fork Frame.*

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

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

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

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

# Boom Components

6 Lower the fork level cylinder onto the chassis.

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

7 Repeat this procedure beginning with step 3 for the other fork level cylinder.

8 Select a lift cylinder. Tag, disconnect and plug the hydraulic hoses at the lift cylinder manifold. Cap the fittings on the cylinder manifold.

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

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

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

12 Repeat this procedure beginning with step 8 for the other lift cylinder.

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

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

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

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

16 Use a soft metal drift to remove the boom pivot pin.

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

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

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

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

## How to Disassemble the Boom - GTH-1048

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

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

1 Remove the extension cylinder. Refer to Repair Procedure, *How to Remove the Extension Cylinder*.

2 *Remove the b*oom. Refer to Repair Procedure, *How to Remove the Boom*.

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

4 Using a lifting strap from an overhead crane, support the lift cylinder. Do not apply any lifting pressure.

5 Use a soft metal drift to remove the lift cylinder rod-end pivot pin. Remove the cylinder from the boom.

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

6 Repeat this procedure beginning with step 3 for the other lift cylinder.

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

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

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

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

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

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

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

12 Use a soft metal drift to remove the pivot pin. Remove the cylinder from the boom.

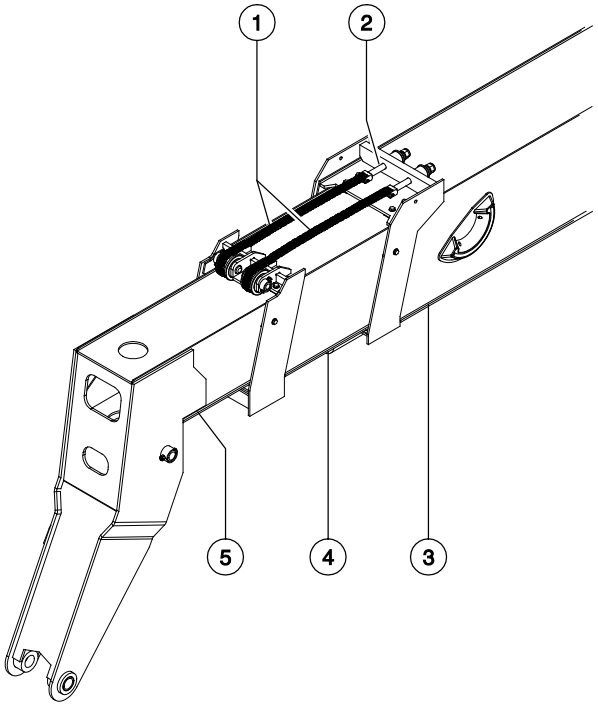
**⚠WARNING** Crushing hazard. The cylinder could fall if not properly supported when the pivot pin is removed from the machine.

13 Remove the inspection cover at the pivot end of the boom.

# Boom Components

14 Remove the hose keepers from the hose roller assembly.

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




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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## How to Disassemble the Boom - GTH1056

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

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

1 Remove the extension cylinder. Refer to Repair Procedure, *How to Remove the Extension Cylinder*.

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

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

4 Using a lifting strap from an overhead crane, support the lift cylinder. Do not apply any lifting pressure.

5 Use a soft metal drift to remove the lift cylinder rod-end pivot pin. Remove the cylinder from the boom.

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

6 Repeat this procedure beginning with step 3 for the other lift cylinder.

# Boom Components

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

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

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

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

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

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

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

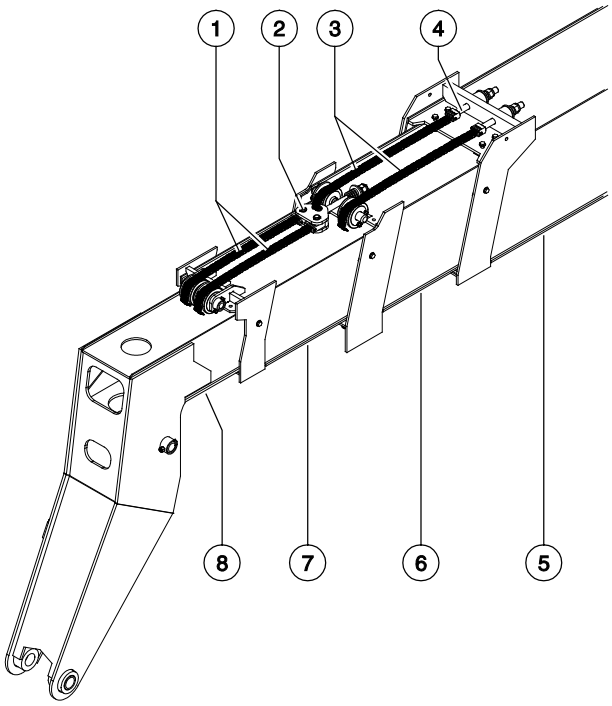
12 Use a soft metal drift to remove the pivot pin. Remove the cylinder from the machine.

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

13 Remove the inspection cover at the pivot end of the boom.

14 Working at the pivot end of the boom, remove the hose keepers from the hose roller assembly.

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




1 tube 3 extension chains
2 dual-chain tensioner
3 tube 2 extension chains
4 single-chain tensioner
5 boom tube number 0
6 boom tube number 1
7 boom tube number 2
8 boom tube number 3

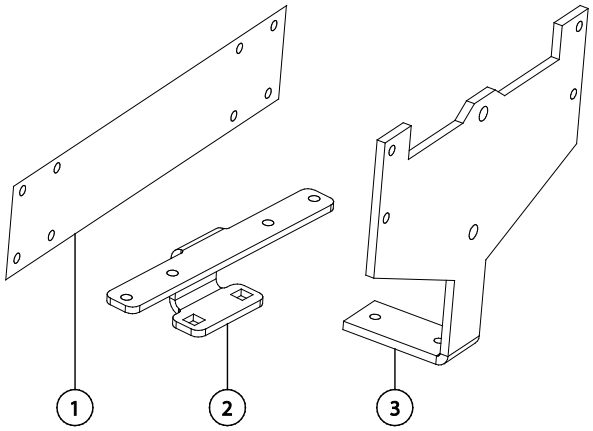
15 Working at the pivot end of the boom, remove the fasteners securing the cable bridge rear mount bracket to the boom assembly. Remove the bracket from the boom.

16 Working at the pivot end of the boom, tag, disconnect and plug the hydraulic hoses at the hard lines of the cable bridge. Cap the fittings.

# Boom Components

17 Working at the pivot end of the boom, remove the fasteners securing the hose roller assembly to boom tube number 1. Remove the hose roller assembly from the boom.

18 Working at the fork end of the boom, remove the fasteners securing the cable track mount bracket to boom tube number 3.




1 cable bridge mount bracket
2 cable track mount bracket
3 cable bridge slider

19 Working at the fork end of the boom, remove the fasteners securing the cable bridge slider to the cable bridge. Remove the slider from the boom.

Note: Pay attention to how the hoses are routed before removing the slider from the boom.

Note: During reassembly, it may be helpful to use tape to secure the bolts to the cable bridge when installing the cable bridge slider.

20 Working at the fork end of the boom, securely attach the loose end of the cable track to the cable bridge using a cable tie or similar device.

21 Working at the pivot end of the boom, carefully remove the cable bridge from the boom.

22 Working at the fork end of the boom, remove the fasteners securing the dual-chain tensioner to the top of boom tube number 1.

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

24 Working at the pivot end of the boom, remove the fasteners securing the retraction chain block pivot pin to boom tube number 3. Remove the pivot pin.

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

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

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

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

27 Working at the fork end of the boom, loosen evenly, then remove, the fasteners securing the chain tensioners to the top of boom tube number 0.

28 Working at the fork end of the boom, remove the fasteners securing the extension chain rollers to the top of boom tube number 1. Remove the chain rollers from the boom.

29 Working at the pivot end of the boom, remove the fasteners securing the retraction chain block pivot pin to boom tube number 2. Remove the pivot pin.

# Boom Components

30 Working at the pivot end of the boom, remove the fasteners securing the chain roller to boom tube number 2. Remove the chain roller from the boom.

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

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

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

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

33 Working at the pivot end of the boom, remove the fasteners securing the chain roller to boom tube number 1. Remove the chain roller from the boom.

34 Working at the fork end of the boom, remove the wear pads from boom tube number 0.

35 Support and slide boom tube number 1 out of boom tube number 0. Place boom tube number 1 on a structure capable of supporting it.

**⚠WARNING** Crushing hazard. Boom tube number 1 could become unbalanced and fall when removed from the boom tube number 0 if not properly supported and attached to the overhead crane.

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

## 1-3 Boom Lift Cylinder

### How to Remove the Lift Cylinder

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

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

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

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

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

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

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

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

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

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

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

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

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

# 1-4 Boom Extension Cylinder

## How to Remove the Extension Cylinder

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

1 Raise the boom to a horizontal position.

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

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

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

3 Attach a lifting strap from an overhead crane to the center point of the boom extension cylinder. Support the cylinder. Do not apply any lifting pressure.

# Boom Components

4 Remove the extension cylinder support loop from the underside of the boom.

Note: The extension cylinder support loop is located at the fork end of the boom.

5 Remove the fasteners securing the extension cylinder pivot pins to the boom.

6 Use a soft metal drift to remove both pivot pins. Remove the cylinder from the machine.

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

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

## 1-5 Fork Level Cylinder

### How to Remove the Fork Level Cylinder

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

1 Remove the lifting fork frame. Refer to Repair Procedure, *How to Remove the Lifting Fork Frame*.

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

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

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

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

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

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

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

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

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

# 1-6 Hydraulic Hoses

## How to Replace the Fork Level and/or Auxiliary Cylinder Hoses, GTH-1048

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

1 Fully retract the boom.

2 Fully lower the tips of the lifting forks.

3 Remove the covers from the pivot end of the boom.

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

5 Tag, disconnect and plug the fork level cylinder supply hoses at the cylinder manifold. Cap the fittings.

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

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

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

# Boom Components

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

8 Working at the pivot end of the boom, select one of the hoses. Pull the hose out of the boom.

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

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

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

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

12 Install both ends of the hose assembly onto the correct connection points. Torque to specification. Refer to Specifications.

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

14 Remove the lifting strap from the fork frame.

15 Install the cover onto the rear of the boom. Install and securely tighten the retaining fasteners.

## How to Replace the Fork Level and/or Auxiliary Cylinder Hoses, GTH-1056

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.*

**Replace the lower hoses**:

1 Fully retract the boom.

2 Fully lower the tips of the lifting forks.

3 Remove the covers from the pivot end of the boom.

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

5 Working at the pivot end of the boom, remove the fasteners securing the cable bridge rear mount bracket to the boom assembly. Remove the bracket from the boom.

6 Tag, disconnect and plug the hydraulic hoses at the hard lines of the cable bridge. Cap the fittings.

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

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

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

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

9 Working at the pivot end of the boom, select one of the hoses. Pull the hose out of the boom.

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

10 Remove the rope from the hose. Discard the hose.

11 Securely install a section of rope onto the correct end of the new hose assembly.

12 Install the new hose assembly into the boom by routing the hose under the roller at the pivot end of the boom. Using the rope, carefully pull the hose through the boom until the end is accessible.

13 Install both ends of the hose assembly onto the correct connection points. Torque to specification. Refer to Specifications.

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

15 Install the cable bridge rear mount bracket onto the cable bridge and the boom assembly. Securely tighten the fasteners. Do not over tighten.

16 Remove the lifting strap from the fork frame.

17 Install the cover onto the rear of the boom. Install and securely tighten the retaining fasteners.

**Replace the upper hoses**:

1 Fully retract the boom.

2 Fully lower the tips of the lifting forks.

3 Remove the covers from the pivot end of the boom.

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

5 Working at the pivot end of the boom, remove the fasteners securing the cable bridge rear mount bracket to the boom assembly. Remove the bracket from the boom.

6 Tag, disconnect and plug the hydraulic hoses at the hard lines of the cable bridge. Cap the fittings.

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

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

7 Return the cable bridge to its original position.

8 Working at the fork end of the boom, tag, disconnect and plug the fork level cylinder hoses at the cylinder manifolds. Cap the fittings.

9 **Models with auxiliary function**: Working at the fork end of the boom, tag, disconnect and plug the auxiliary hoses at the fittings. Cap the fittings.

# Boom Components

10 Working at the fork end of the boom, remove the fasteners securing the cable bridge slider to the cable bridge. Remove the slider from the boom.

Note: Pay attention to how the hoses are routed before removing the slider from the boom.

Note: During reassembly, it may be helpful to use tape to secure the bolts to the cable bridge when installing the cable bridge slider.

11 Remove the fasteners securing the cable track to the cable track mount bracket.

12 Remove the fasteners securing the cable track mount bracket to the cable bridge. Remove the bracket from the boom.

13 Carefully pull the cable track through the opening at the front of boom until the hose connections are accessible.

14 Tag, disconnect and plug the affected hoses. Cap the fitting. Remove the hose from the cable track.

15 Install the new hose assembly and torque to specification. Refer to Specifications.

16 Install the cable bridge and cable track into the boom.

17 Install the cable track mount bracket and cable bridge slider. Securely tighten all fasteners. Do not over tighten.

18 Working at the pivot end of the boom, install the hydraulic hoses onto the hard lines of the cable bridge and torque to specification. Refer to Specifications.

19 Install the cable bridge mount bracket onto the cable bridge and the boom assembly. Securely tighten all fasteners. Do not over tighten.

20 Install the cover onto the rear of the boom. Install and securely tighten the retaining fasteners.

# 2-1 Operator's Compartment

## How to Remove the Operator's Compartment

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

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

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

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

1 Open the access door above the hydraulic tank.

2 Disconnect the battery from the machine.

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

3 Locate the secondary function manifold under the manifold inspection cover. Tag, disconnect and plug the hydraulic hoses at ports BP and BT of the secondary function manifold. Cap the fittings. Refer to *Secondary Function Manifold Components*.

4 Locate the brake manifold under the manifold inspection cover. Tag, disconnect and plug the hydraulic hose at the underside of the brake manifold. Cap the fitting. Refer to *Brake Manifold Components*.

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

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

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

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

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

9 Tag, disconnect and plug the hydraulic hose at port JP of the secondary function manifold. Cap the fitting.

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

10 Tag, disconnect and plug the hydraulic hoses at ports J1, J2, J3 and J4 of the primary function manifold. Cap the fittings.

# Operator's Compartment

11 **Models with dual joystick**: Tag, disconnect and plug the hydraulic hoses at ports JT2, JT4, JS3 and JS1 of the primary function manifold. Cap the fittings.

12 Remove the fasteners securing the joystick mount to the operator's compartment. Remove the joystick assembly.

13 **Models with single joystick**: With the base of the joystick above the top of the hydraulic tank, tag disconnect and plug the hydraulic hose at port T of the joystick. Cap the fitting.

Note: Removing the hydraulic hose from port T of the joystick with the joystick below the hydraulic oil level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not disconnect the hose from the joystick if the joystick is below the hydraulic oil level in the hydraulic tank.

14 **Models with dual joystick**: Locate the tee fitting which joins together the hydraulic hoses from port T of both joysticks to the tank return hydraulic hose.

15 **Models with dual joystick**: With the tee fitting above the top of the hydraulic tank, tag, disconnect and plug the tank return hydraulic hose from the tee fitting. Cap the fitting.

Note: Removing the hydraulic hose from the tee fitting with the tee fitting below the hydraulic oil level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not disconnect the hose from the tee fitting if the tee fitting is below the hydraulic oil level in the hydraulic tank.

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

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

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

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

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

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

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

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

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

| Bolt torque specification | |
|---|---|
| Operator's cab mounting bolts | 750 ft-lbs<br>1017 Nm |

# 2-2 Machine Controls

## How to Remove the Steering Column

1 Disconnect the battery from the machine.

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

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

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

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

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

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

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

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

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

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

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

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

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

## How to Remove the Steering Wheel

1 Open the access door above the hydraulic tank.

2 Disconnect the battery from the machine.

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

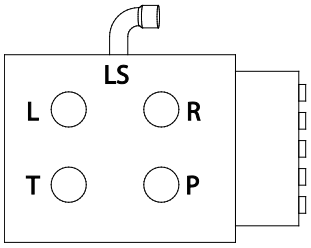
3 Remove the horn button from the steering wheel. Remove the nut securing the steering wheel to the column and remove the steering wheel.

# Operator's Compartment

## How to Remove the Steer Orbitral

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

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




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

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

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

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

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

## How to Remove the Joystick - Models with Single Joystick

1 Disconnect the battery from the machine.

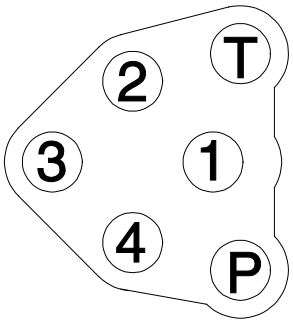
**⚠WARNING** Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

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

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

4 Tag, disconnect and plug the hoses from ports 1, 2, 3, 4, P and T of the joystick. Cap the fittings.

Note: Removing the hydraulic hose from port T of the joystick with the joystick below the hydraulic oil level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not disconnect the hose from the port if the joystick is below the hydraulic oil level in the hydraulic tank.




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

# Operator's Compartment

## How to Remove the Joystick - Models with Dual Joysticks

1 Disconnect the battery from the machine.

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

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

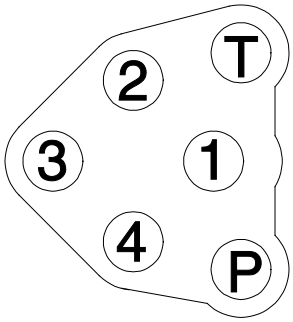
3 Tag and disconnect the joystick wire harness from the machine.

4 Tag, disconnect and plug the hoses from ports 1, 2, 3, 4 and P of the joystick. Cap the fittings.

5 Locate the tee fitting which joins together the hydraulic hoses from port T of both joysticks to the tank return hydraulic hose.

6 With the tee fitting above the top of the hydraulic tank, tag, disconnect and plug the tank return hydraulic hose from the tee fitting. Cap the fitting.

Note: Removing the hydraulic hose from port T of the joystick with the joystick below the hydraulic oil level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not disconnect the hose from the port if the joystick is below the hydraulic oil level in the hydraulic tank.




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

## How to Remove the Brake Pedal Assembly

1 Disconnect the battery from the machine.

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

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

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

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

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

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

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

# Operator's Compartment

## How to Remove the Gauge Cluster Assembly

1 Disconnect the battery from the machine.

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

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

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

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

## How to Remove the Gauge Cluster Assembly

1 Disconnect the battery from the machine.

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

2 Reach under the dashboard and gently loosen and remove the locknut securing the diagnostic display to the dashboard. Gently push the diagnostic display through the opening in the dashboard.

3 Tag and disconnect the wire harness from the diagnostic display. Remove the diagnostic display from the machine.

# 3-1
# Fuel and Hydraulic Tanks

## How to Remove the Fuel and Hydraulic Tank Assembly

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

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

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

1 Disconnect the battery from the machine.

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

2 Remove the battery from the machine.

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

4 Remove the filler cap from the hydraulic tank.

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

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

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

7 Remove the filler cap from the fuel tank.

8 Using an approved hand-operated pump, drain the fuel tank into a container of suitable capacity. Refer to Specifications, *Machine Specifications*.

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

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

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

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

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

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

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

# Engines

## 4-1
## Engines

### How to Repair the John Deere 4045T Engine

Repair procedures and additional engine information is available in the John Deere 4045HF485 Operator's Manual, John Deere 4045T Workshop Manual, John Deere 4045T Alternator Manual and the John Deere 4045T Fuel Systems Manual.

| **John Deere 4045HF485 Operator's Manual** | |
|---|---|
| Genie part number | 123703 |
| **John Deere 4045T Workshop Manual** | |
| Genie part number | 108443 |
| **John Deere 4045T Alternator Manual** | |
| Genie part number | 108502 |
| **John Deere 4045T Fuel Systems Manual** | |
| Genie part number | 108503 |

### How to Repair the Perkins 1104D-E44TA Engine

Repair procedures and additional engine information is available in the Perkins 1100 Operation and Maintenance Manual and the Perkins 1104 Service Manual and the Perkins 1100 Troubleshooting Manual.

| **Perkins 1100 Operation and Maintenance Manual** | |
|---|---|
| Genie part number | 123702 |
| **Perkins 1104 Service Manual** | |
| Genie part number | 117764 |
| **Perkins 1100 Troubleshooting Manual** | |
| Genie part number | 123583 |

### How to Remove the Engine

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.*

**All Models:**

1 Open the access door above the hydraulic tank.

2 Disconnect the battery from the machine.

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

3 Remove the fasteners securing the engine access cover from the rear of the machine. Remove the cover from the machine.

4 **Perkins models**: Open the engine access cover at the tank side of the machine. Locate the fuel supply line where it is attached to the fuel filter/water separator.

Tag, disconnect and plug the fuel supply hose at the fuel filter/water separator. Cap the fitting.

Locate the fuel return hose connection just above the fuel filter/water separator.

Tag, disconnect and plug the fuel return hose at the fuel filter/water separator. Cap the fitting.

5 **John Deere models**: Open the engine access cover at the tank side of the machine. Locate the fuel supply line where it is attached to the fuel filter/water separator.

Tag, disconnect and plug the fuel supply hose at the fuel filter/water separator. Cap the fitting.

Open the engine access cover at the operator's compartment side of the machine. Locate the fuel return hose at the fuel pump.

Tag, disconnect and plug the fuel return hose at the fuel pump. Cap the fitting.

**All Models:**

6 Open the transmission access cover at the top of the machine. Locate the transmission cooler.

7 Tag, disconnect and plug the coolant hoses at the transmission cooler. Cap the fittings.

8 Tag and disconnect the engine wire harnesses near the operator's compartment.

9 Remove the air cleaner from the machine. Remove all intake and exhaust components which would interfere with the removal of the engine from the chassis.

10 Remove the fasteners securing the driveshaft to the transmission. Secure the bearing caps onto the universal joint of the driveshaft.

Note: Using adhesive tape to secure the caps to the universal joint may be helpful.

11 Remove the fasteners securing the engine tray to the chassis.

12 Support and secure the engine tray to a forklift of adequate capacity.

13 Remove the engine tray from the machine.

# 4-2
# Engine Fault Codes

## How to Retrieve Engine Fault Codes

When the engine Electronic Control Module (ECM) detects an abnormal operating condition, a fault code is immediately stored in the ECM memory. At the same time, a colored warning lamp is illuminated and the fault code is shown on the engine diagnostic display, is located on the dashboard in the operator's compartment.

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

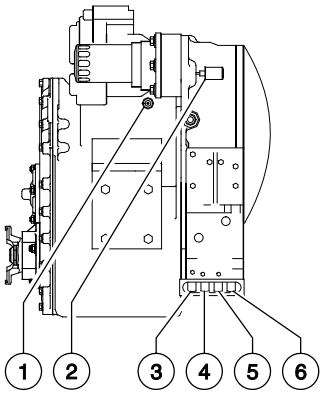
# Transmission

## 5-1 Transmission

## How to Repair the Transmission

Repair procedures and additional transmission information is available in the Dana T12000 Transmission Maintenance and Repair Manual and the Dana T20000 Maintenance Manual.

| **Dana T12000 Service Manual** | |
|---|---|
| Genie part number | 97489 |
| **Dana T20000 Service Manual** | |
| Genie part number | 115025 |




Dana T20000 transmission

1 transmission temperature sender (located opposite side of trans)
2 transmission pressure sender
3 transmission shift coil 'F' (drive forward function) (blue wire)
4 transmission shift coil 'R' (drive reverse function) (brown wire)
5 transmission shift coil '2' (gear reduction) (green wire)
6 transmission shift coil '1' (gear reduction) (yellow wire)

Note: refer to electrical schematic for additional transmission shift coil information.

## How to Remove the Transmission

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 access door above the hydraulic tank.

2 Disconnect the battery from the machine.

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

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

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

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

5 Tag, disconnect and plug the transmission oil cooler lines at the cooler. Cap the fittings.

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

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

6 Tag, disconnect and plug the hydraulic pump high pressure line at the function manifold. Cap the fitting.

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

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

7 Tag, disconnect and plug the hydraulic pump supply line at the pump. Cap the orifice on the pump.

8 Remove the fasteners securing the transmission mounting flange to the chassis.

9 Tag and disconnect the driveshafts from the transmission.

Note: To avoid damage to the driveshaft universal joints, secure the driveshafts to the chassis.

10 Tag and disconnect the wiring harness from the transmission.

11 Attach a lifting strap from an overhead crane to the center point of the transmission.

12 Remove the fasteners securing the transmission mounting flange to the chassis. Remove the transmission from the machine.

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

# Hydraulic Pump

## 6-1
## Hydraulic Pump

### How to Test the Function Pump

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

1 Tag, disconnect and plug the high pressure hydraulic hose from the primary function manifold. Cap the fitting on the main valve.

**⚠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.

Note: The high pressure hose is the smaller of the two hoses.

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the high pressure hose disconnected in step 1.

3 Hold the manual fuel shut-off lever on the engine in the closed position.

4 Observe the pressure gauge while cranking the engine in one second intervals.

⊙ Result: If the pressure gauge reads 3190 psi / 220 bar, immediately stop. The pump is good.

☒ Result: If the pressure fails to reach 3190 psi / 220 bar, the pump needs to be adjusted OR or the pump or pump coupling is faulty and will need to be serviced or replaced.

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

5 Remove the pressure gauge and install the high pressure hose onto the pump. Torque to specification. Refer to Specifications, *Hydraulic Hose and Fitting Torque Specifications*.

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

## How to Remove the Function Pump

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

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

Note: Perform this procedure with the engine off and cool.

1 Open the access door above the hydraulic tank.

2 Disconnect the battery from the machine.

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

3 Tag and disconnect the wire harness from the pump.

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

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

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

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

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

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

7 Tag and disconnect the transmission cooler hoses at the transmission cooler. Cap the fittings.

**⚠CAUTION** Burn hazard. Contact with hot engine components may cause severe burns.

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

# Hydraulic Pump

## How to Install the Function Pump

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

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

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

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

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

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

7 Securely install the wire harness onto the pump.

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

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

10 Start the engine and inspect for leaks.

11 Turn the machine off.

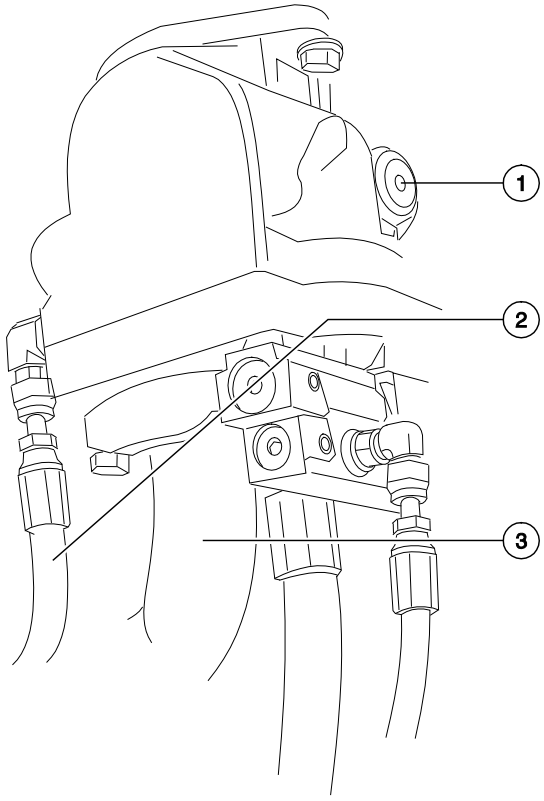
12 Adjust the pump pressure. Refer to Repair Procedures, *How to Adjust the Function Pump Standby Pressure* and *How to Adjust the Function Pump Pressure Pressure Compensator*.

## How to Prime the Function Pump

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

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

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




1 case drain filler plug
2 case drain hose
3 hydraulic supply line (from tank)

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

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

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

## How to Adjust the Function Pump Standby Pressure

1 Connect a 0 to 1000 psi / 0 to 100 bar pressure gauge to test port 'TP' on the primary function manifold. Refer to *Primary Function Manifold Components.*

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

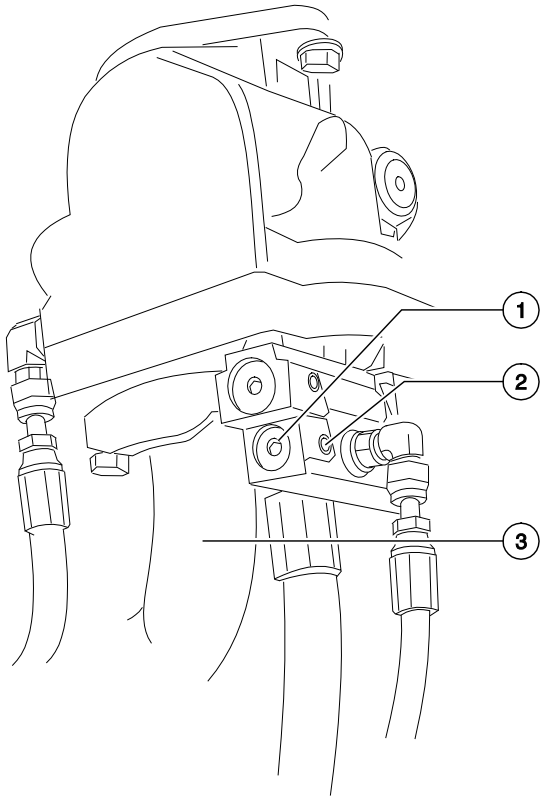
3 Observe the pressure reading on the pressure gauge.

⊙ Result: The pressure gauge reads 450 ±25 psi / 31 ±1.7 bar. The pump is functioning correctly. Proceed to step 6.

☒ Result: The pressure gauge fails to read 450 ±25 psi / 31 ±1.7 bar. The pressure setting needs to be adjusted. Proceed to step 4.

# Hydraulic Pump

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




1 standby pressure adjustment screw
2 set screw
3 hydraulic supply line (from tank)

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

6 Turn the engine off and remove the pressure gauge.

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

## How to Adjust the Function Pump Standby Pressure

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

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to test port 'TP' on the primary function manifold. Refer to *Primary Function Manifold Components*.

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

3 Fully retract the boom.

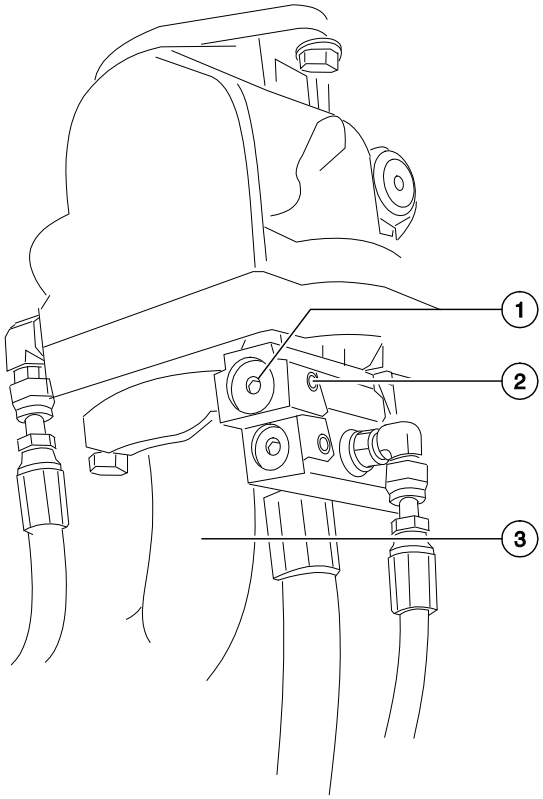
4 Continue to activate the boom retract function and observe the pressure reading on the pressure gauge.

⊙ Result: The pressure gauge reads 3190±50 psi / 220±3.4 bar. The pump is functioning correctly. Proceed to step 7.

⊠ Result: The pressure gauge fails to read 3190±50 psi / 220±3.4 bar. The pressure setting needs to be adjusted. Proceed to step 5.

# Hydraulic Pump

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




1 pressure compensator adjustment screw
2 set screw
3 hydraulic supply line (from tank)

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

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

7 Turn the engine off and remove the pressure gauge.

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

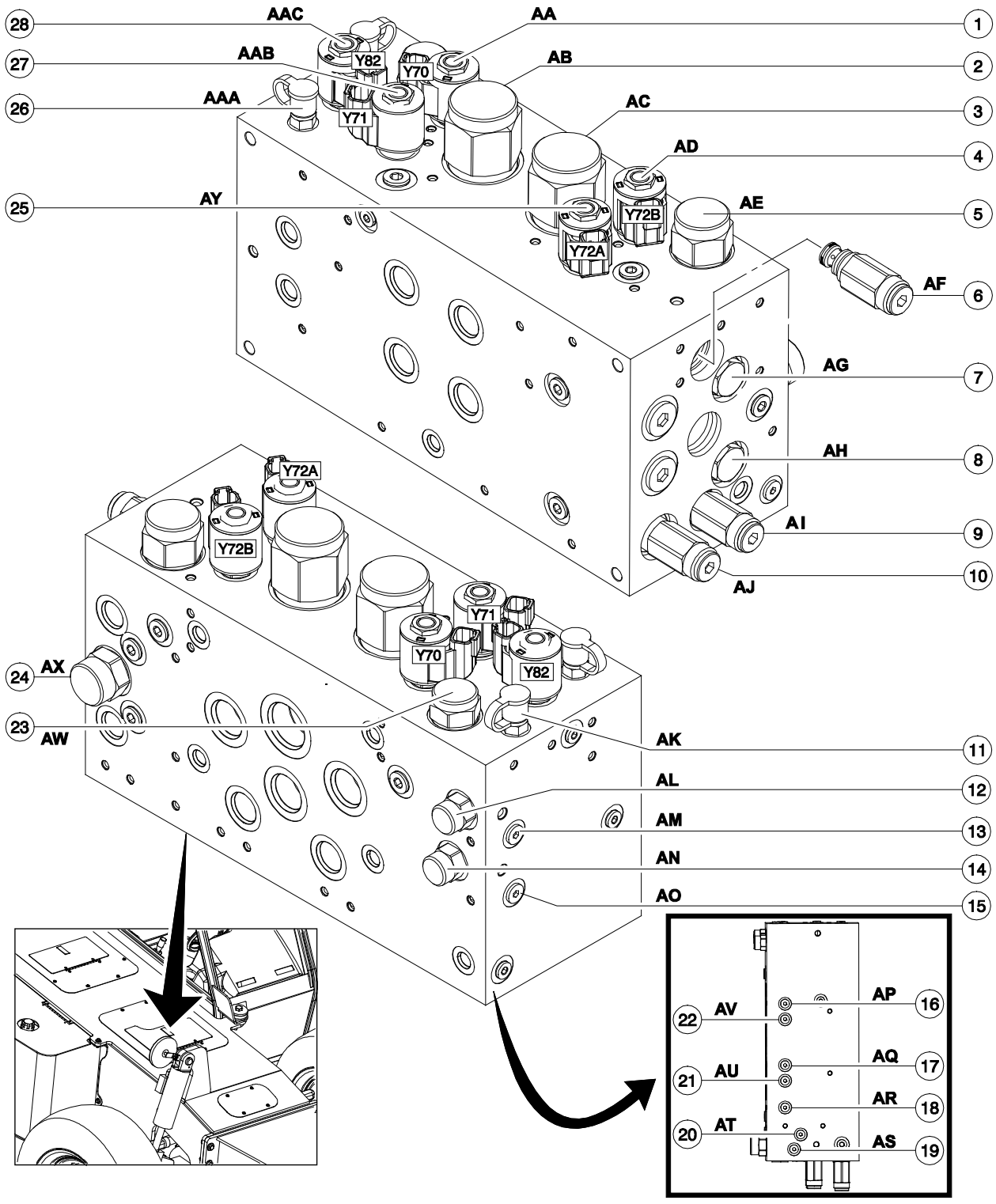
# Manifolds

## 7-1
## Primary Function Manifold Components - Models with Single Joystick

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

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Solenoid valve, 2 position 4 way | AA | Function select -boom extend and sway left | 20 ft-lbs / 27 Nm |
| 2 | Directional valve, 3 position 4 way, pilot operated | AB | Boom extend/retract | 65-75 ft-lbs / 88-101 Nm |
| 3 | Directional valve, 3 position 4 way, pilot operated | AC | Boom up/down | 65-75 ft-lbs / 88-101 Nm |
| 4 | Solenoid valve, 2 position 4 way | AD | Function select -boom down and fork tilt down | 20 ft-lbs / 27 Nm |
| 5 | Directional valve, 3 position 4 way, pilot operated | AE | Fork tilt up/down | 46-54 ft-lbs / 61-72 Nm |
| 6 | Relief valve, 3500 psi / 241 bar | AF | Fork tilt up relief | 20 ft-lbs / 27 Nm |
| 7 | Check valve, pilot operated 100 psi / 6.9 bar | AG | Fork tilt down circuit | 25 ft-lbs / 34 Nm |
| 8 | Check valve, pilot operated 100 psi / 6.9 bar | AH | Fork tilt up circuit | 25 ft-lbs / 34 Nm |
| 9 | Relief valve, 3500 psi / 241 bar | AI | Fork tilt down relief | 20 ft-lbs / 27 Nm |
| 10 | Relief valve, 3500 psi / 241 bar | AJ | System relief | 25 ft-lbs / 34 Nm |
| 11 | Diagnostic nipple | AK | Test port 'LS' | |
| 12 | Flow regulator valve, 0.1 gpm / 0.4 L/min | AL | Load sense drain circuit | 20 ft-lbs / 27 Nm |
| 13 | Check valve, 5 psi / 0.3 bar | AM | Sway right circuit | 12-14 ft-lbs / 16-19 Nm |
| 14 | Priority flow regulator valve, 2 gpm / 7.6 L/min | AN | Sway left/right circuit | 20 ft-lbs / 27 Nm |
| 15 | Check valve, 5 psi / 0.3 bar | AO | Sway left circuit | 12-14 ft-lbs / 16-19 Nm |

# Manifolds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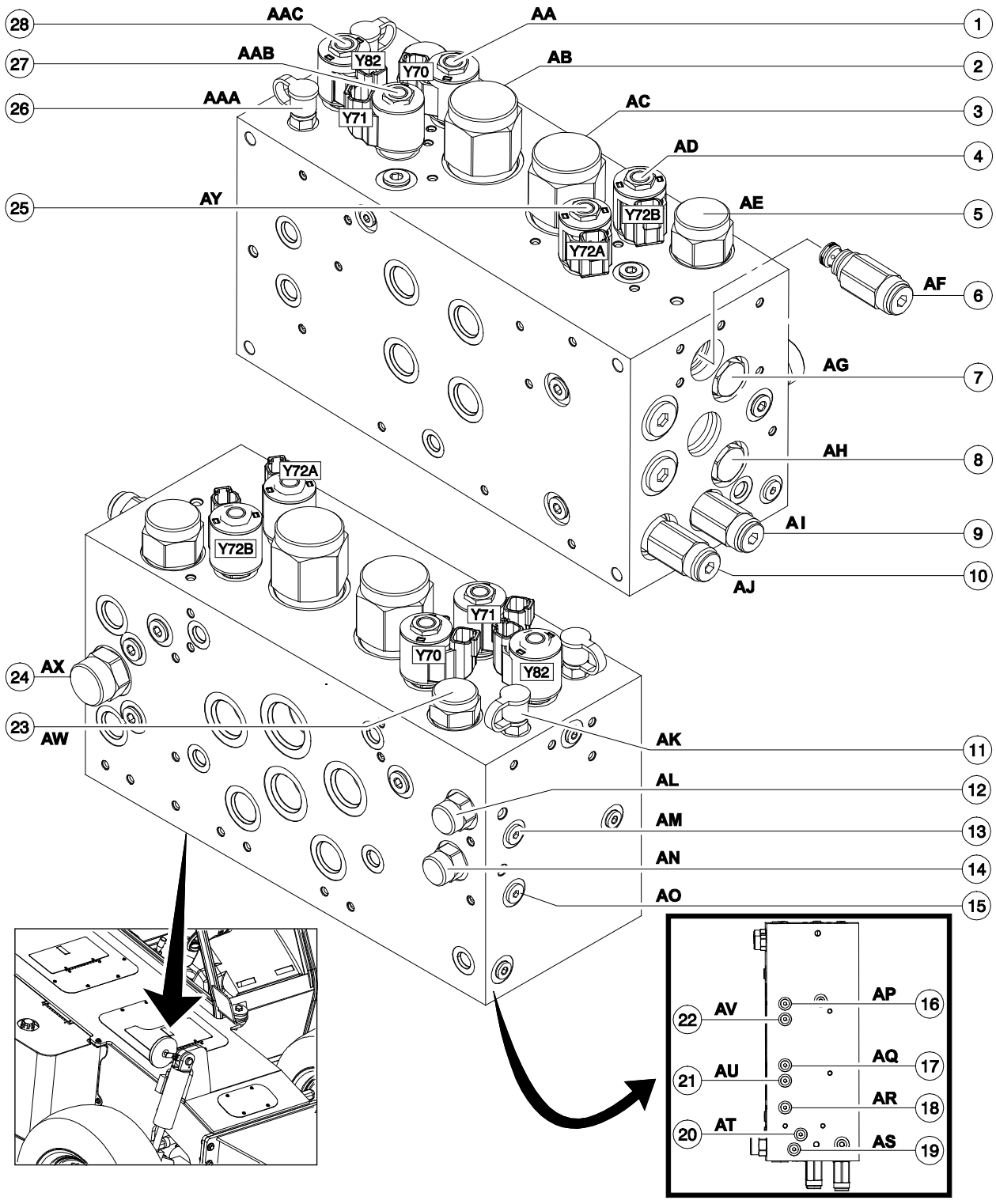
# Manifolds

## Primary Function Manifold Components - Models with Single Joystick

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

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 16 | Check valve, 5 psi / 0.3 bar | AP | Boom extend circuit | 12-14 ft-lbs / 16-19 Nm |
| 17 | Check valve, 5 psi / 0.3 bar | AQ | Boom down circuit | 12-14 ft-lbs / 16-19 Nm |
| 18 | Check valve, 5 psi / 0.3 bar | AR | Fork tilt up circuit | 12-14 ft-lbs / 16-19 Nm |
| 19 | Check valve, 5 psi / 0.3 bar | AS | Steer left/right circuit | 12-14 ft-lbs / 16-19 Nm |
| 20 | Check valve, 5 psi / 0.3 bar | AT | Fork tilt down circuit | 12-14 ft-lbs / 16-19 Nm |
| 21 | Check valve, 5 psi / 0.3 bar | AU | Boom up circuit | 12-14 ft-lbs / 16-19 Nm |
| 22 | Check valve, 5 psi / 0.3 bar | AV | Boom retract circuit | 12-14 ft-lbs / 16-19 Nm |
| 23 | Directional valve, 3 position 4 way, pilot operated | AW | Sway left/right | 33-37 ft-lbs / 45-50 Nm |
| 24 | Flow regulator valve, 14 gpm / 53 L/min | AX | Fork tilt up/down circuit | 20 ft-lbs / 27 Nm |
| 25 | Solenoid valve, 2 position 4 way | AY | Function select -boom up and fork tilt up | 20 ft-lbs / 27 Nm |
| 26 | Diagnostic nipple | AAA | Test port 'TP' | |
| 27 | Solenoid valve, 2 position 4 way | AAB | Function select -boom extend and sway right | 20 ft-lbs / 27 Nm |
| 28 | Solenoid valve, 2 position 2 way | AAC | Function select - sway left/right | 20 ft-lbs / 27 Nm |

# Manifolds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AV
22

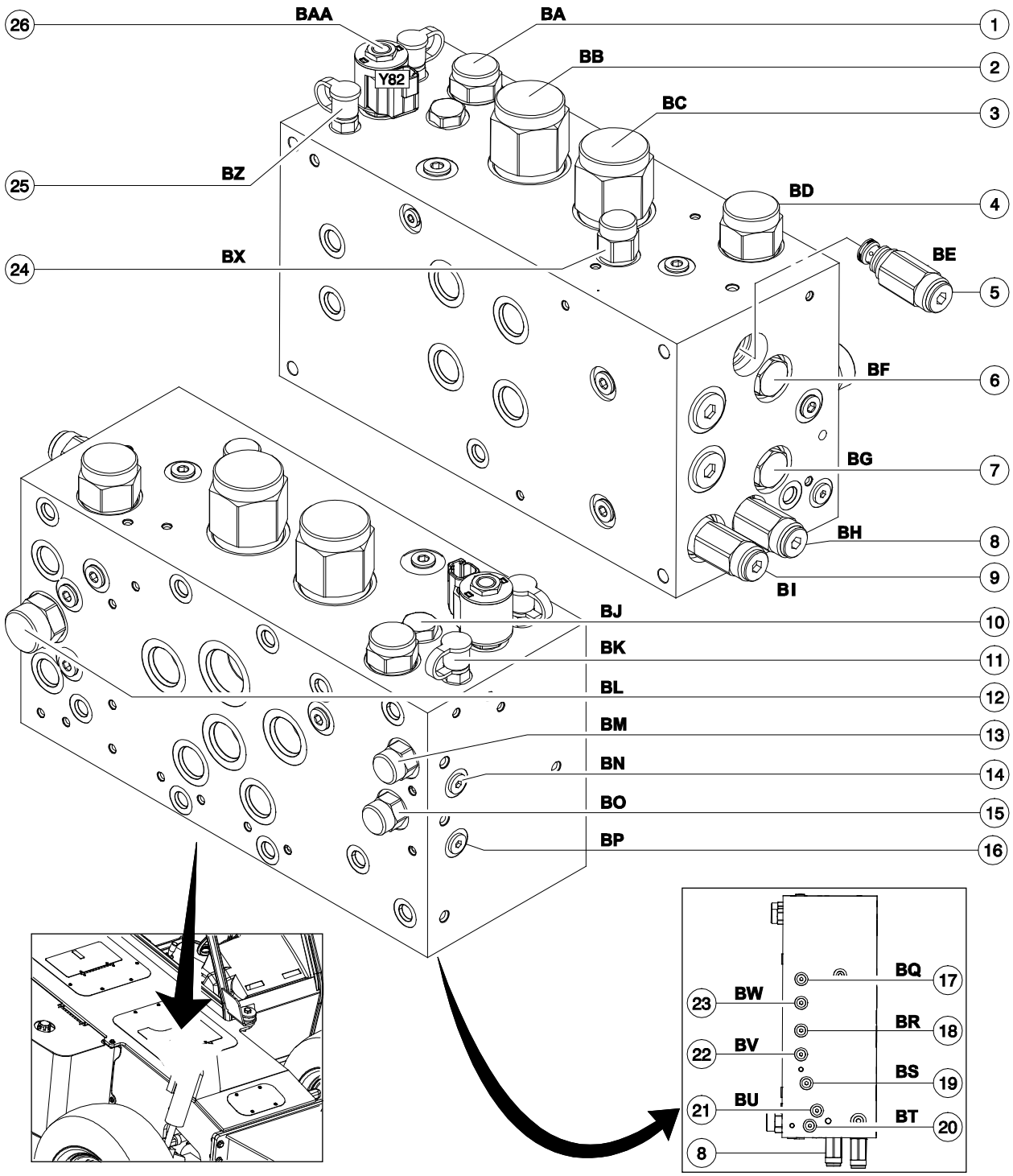
# Manifolds

## 7-2
## Primary Function Manifold Components - Models with Dual Joysticks

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

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Directional valve, 3 position 4 way, pilot operated | BA | Sway left/right | 33-37 ft-lbs / 45-50 Nm |
| 2 | Directional valve, 3 position 4 way, pilot operated | BB | Boom extend/retract | 65-75 ft-lbs / 88-101 Nm |
| 3 | Directional valve, 3 position 4 way, pilot operated | BC | Boom up/down | 65-75 ft-lbs / 88-101 Nm |
| 4 | Directional valve, 3 position 4 way, pilot operated | BD | Fork tilt up/down | 46-54 ft-lbs / 61-72 Nm |
| 5 | Relief valve, 3500 psi / 241 bar | BE | Fork tilt up relief | 20 ft-lbs / 27 Nm |
| 6 | Check valve, pilot operated 100 psi / 6.9 bar | BF | Fork tilt down circuit | 25 ft-lbs / 34 Nm |
| 7 | Check valve, pilot operated 100 psi / 6.9 bar | BG | Fork tilt up circuit | 25 ft-lbs / 34 Nm |
| 8 | Relief valve, 3500 psi / 241 bar | BH | Fork tilt down relief | 20 ft-lbs / 27 Nm |
| 9 | Relief valve, 3500 psi / 241 bar | BI | System relief | 25 ft-lbs / 34 Nm |
| 10 | Shuttle valve | BJ | Function select - sway left/right | 20 ft-lbs / 27 Nm |
| 11 | Diagnostic nipple | BK | Test port 'LS' | x |
| 12 | Flow regulator valve, 14 gpm / 53 L/min | BL | Fork tilt up/down circuit | 20 ft-lbs / 27 Nm |
| 13 | Flow regulator valve, 0.1 gpm / 0.4 L/min | BM | Pilot pressure drain circuit | 20 ft-lbs / 27 Nm |
| 14 | Check valve, 5 psi / 0.3 bar | BN | Sway left circuit | 12-14 ft-lbs / 16-19 Nm |
| 15 | Priority flow regulator valve, 2 gpm / 7.6 L/min | BO | Sway left/right circuit | 20 ft-lbs / 27 Nm |

# Manifolds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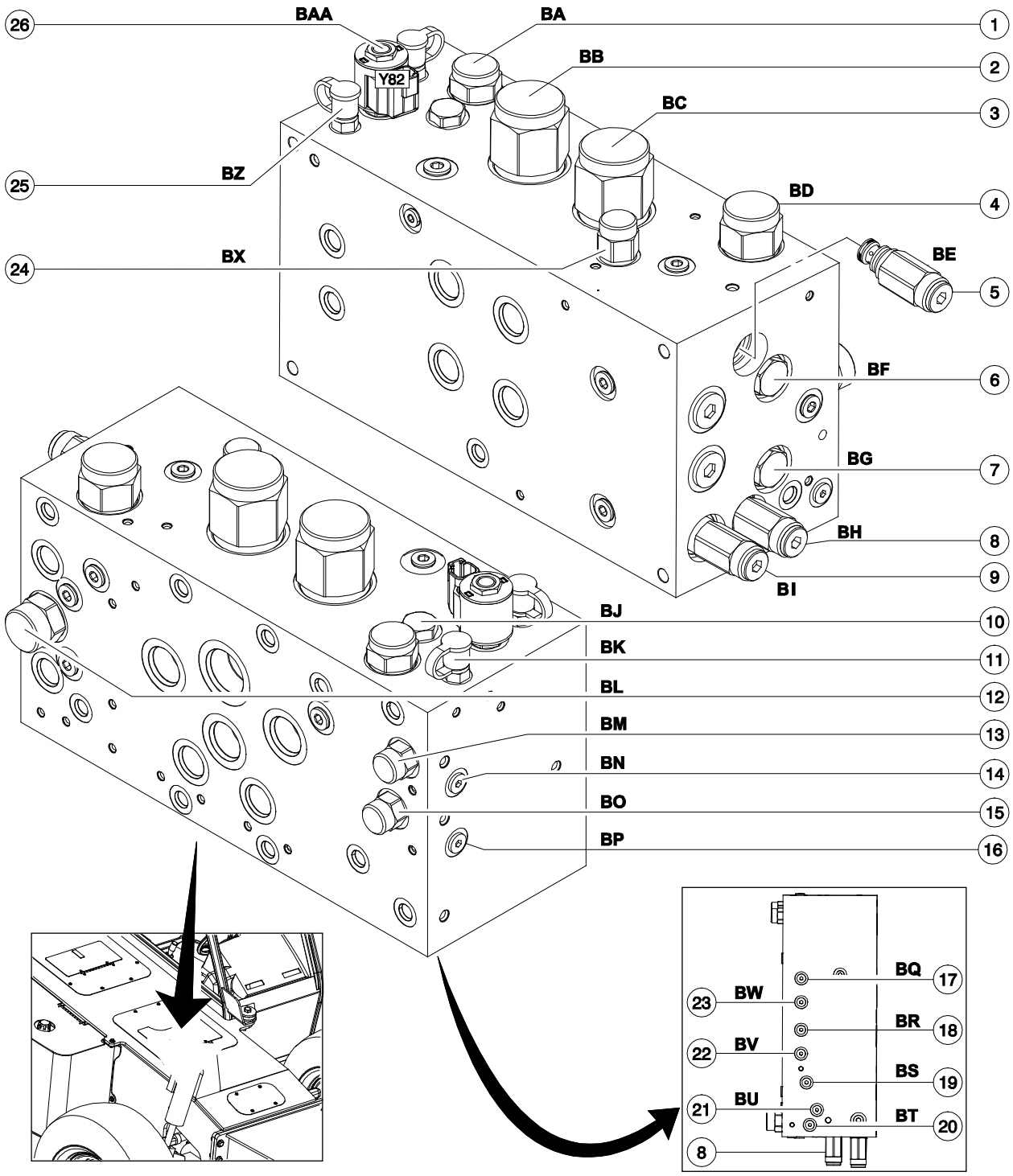
# Manifolds

## 7-2
## Primary Function Manifold Components - Models with Dual Joysticks

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

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 16 | Check valve, 5 psi / 0.3 bar | BP | Sway right circuit | 12-14 ft-lbs / 16-19 Nm |
| 17 | Check valve, 5 psi / 0.3 bar | BQ | Boom extend circuit | 12-14 ft-lbs / 16-19 Nm |
| 18 | Check valve, 5 psi / 0.3 bar | BR | Boom down circuit | 12-14 ft-lbs / 16-19 Nm |
| 19 | Check valve, 5 psi / 0.3 bar | BS | Fork tilt down circuit | 12-14 ft-lbs / 16-19 Nm |
| 20 | Check valve, 5 psi / 0.3 bar | BT | Steer left/right circuit | 12-14 ft-lbs / 16-19 Nm |
| 21 | Check valve, 5 psi / 0.3 bar | BU | Fork tilt up circuit | 12-14 ft-lbs / 16-19 Nm |
| 22 | Check valve, 5 psi / 0.3 bar | BV | Boom up circuit | 12-14 ft-lbs / 16-19 Nm |
| 23 | Check valve, 5 psi / 0.3 bar | BW | Boom retract circuit | 12-14 ft-lbs / 16-19 Nm |
| 24 | Directional valve, 2 position 2 way, pilot operated | BX | Fork tilt circuit | 25 ft-lbs / 34 Nm |
| 25 | Diagnostic nipple | BZ | Test port 'TP' | |
| 26 | Solenoid valve, 2 position 2 way | BAA | Function select - sway left/right | 20 ft-lbs / 27 Nm |

# Manifolds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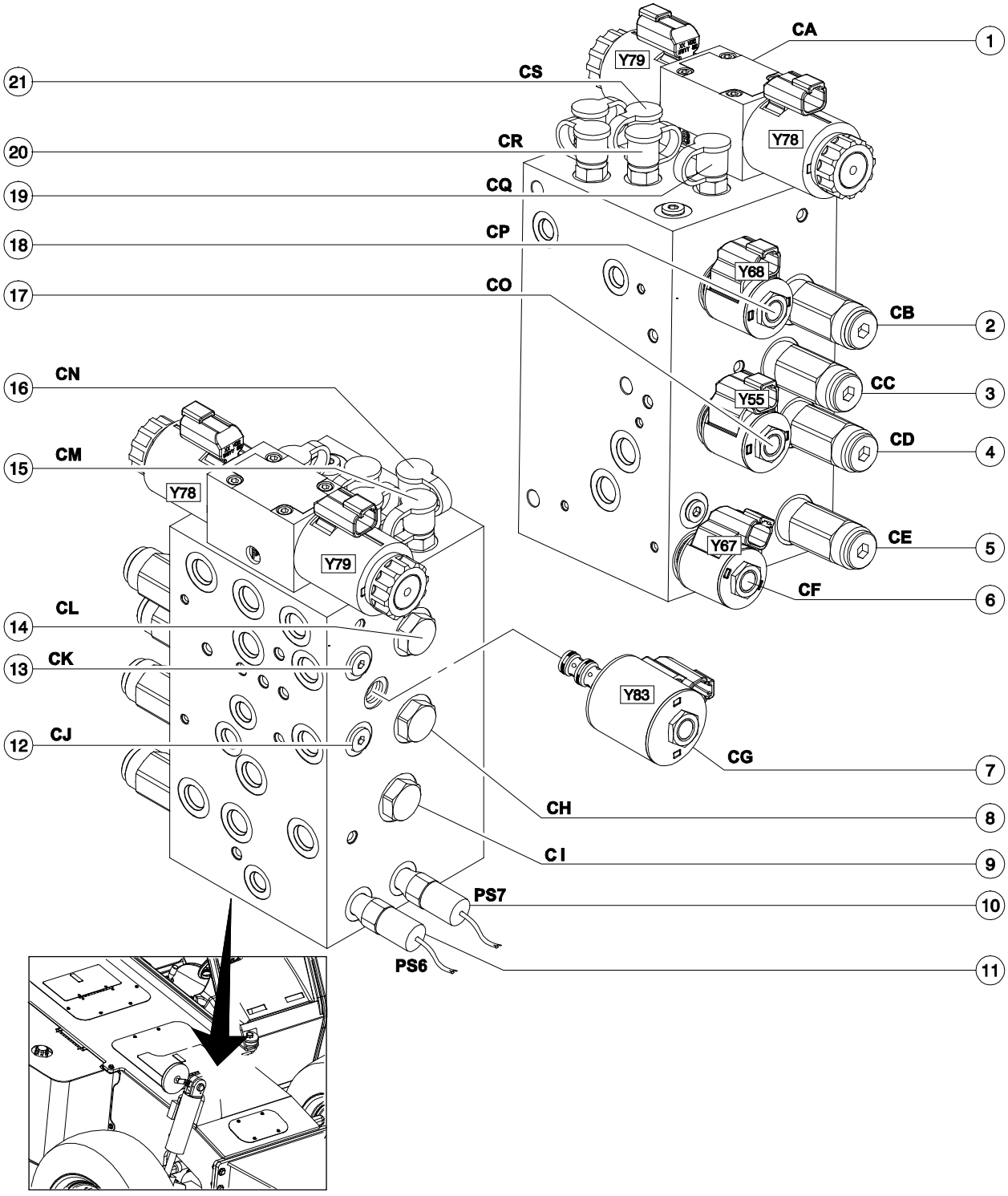
# Manifolds

## 7-3
## Secondary Function Manifold Components

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

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | DO3 valve, 3 position 4 way | CA | Steer left/right | 60 in-lbs / 6.8 Nm |
| 2 | Pressure reducing/relief valve, 50 psi / 3.4 bar | CB | Rear lock-up circuit | 25-27 ft-lbs / 34-37 Nm |
| 3 | Pressure reducing/relief valve, 400 psi / 27.5 bar | CC | Differential lock-up circuit | 25-27 ft-lbs / 34-37 Nm |
| 4 | Pressure reducing/relief valve, 2500 psi / 172 bar | CD | Steer circuit | 25-27 ft-lbs / 34-37 Nm |
| 5 | Pressure reducing/relief valve, 400 psi / 27.5 bar | CE | Drive brake circuit | 25-27 ft-lbs / 34-37 Nm |
| 6 | Solenoid valve, 2 position 3 way | CF | Parking brake select | 20 ft-lbs / 27 Nm |
| 7 | Solenoid valve, 2 position 4 way | CG | Rear axle fast oscillate select | 25 ft-lbs / 34 Nm |
| 8 | Check valve, 4 psi / 0.3 bar | CH | Rear lock-up extend circuit | 20 ft-lbs / 27 Nm |
| 9 | Check valve, 25 psi / 1.7 bar | CI | Drive brake circuit | 20 ft-lbs / 27 Nm |
| 10 | Pressure switch, 350 psi / 24 bar | PS7 | Low brake pressure | 11 ft-lbs / 14.9 Nm |
| 11 | Pressure switch, 250 psi / 17.2 bar | PS6 | Parking brake pressure | 11 ft-lbs / 14.9 Nm |
| 12 | Orifice, 0.059 in / 1.5 mm | CJ | Rear lock-up extend circuit | |
| 13 | Orifice, 0.051 in / 1.3 mm | CK | Rear lock-up retract circuit | |
| 14 | Check valve, 4 psi / 0.3 bar | CL | Rear lock-up retract circuit | 20 ft-lbs / 27 Nm |
| 15 | Diagnostic nipple | CM | Test port 'TB' | |
| 16 | Diagnostic nipple | CN | Test port 'TPB' | |
| 17 | Solenoid valve, 2 position 3 way | CO | Rear axle oscillate enable select | 20 ft-lbs / 27 Nm |
| 18 | Solenoid valve, 2 position 3 way | CP | Differential lock-up select | 20 ft-lbs / 27 Nm |
| 19 | Diagnostic nipple | CQ | Test port 'TJ' | |
| 20 | Diagnostic nipple | CR | Test port 'TS' | |
| 21 | Diagnostic nipple | CS | Test port 'TR' | |

# Manifolds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CN
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CF
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CL
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CK
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Y83
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CJ
CG
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CH
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CI
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PS7
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PS6
11

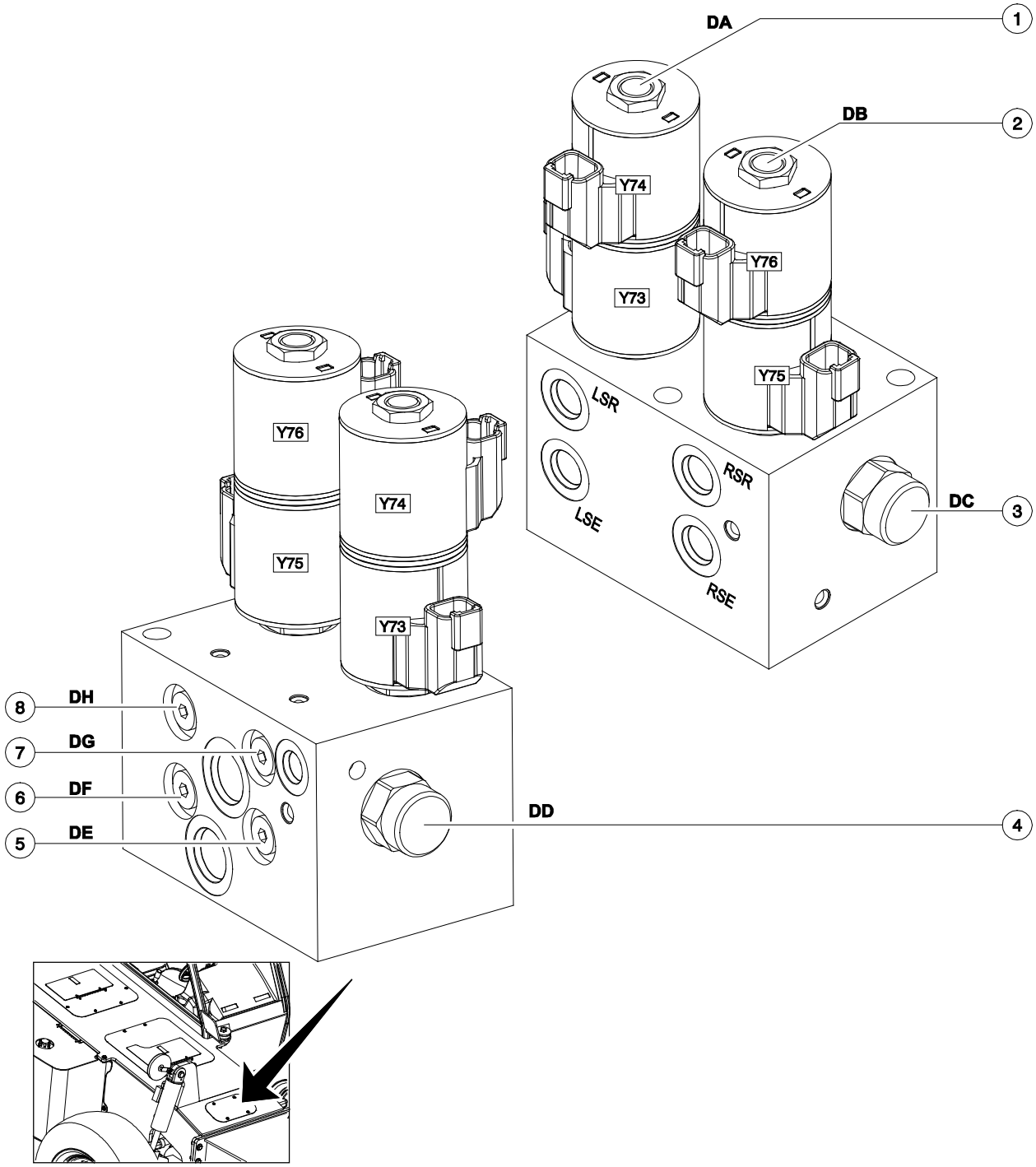
# Manifolds

## 7-4
## Outrigger Manifold Components

The outrigger manifold is located under the outrigger inspection cover.

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Solenoid valve, 3 position 4 way | DA | Left outrigger extend/retract | 25 ft-lbs / 34 Nm |
| 2 | Solenoid valve, 3 position 4 way | DB | Right outrigger extend/retract | 25 ft-lbs / 34 Nm |
| 3 | Flow regulator valve, 6 gpm / 22.7 L/min | DC | Right outrigger circuit | 25 ft-lbs / 34 Nm |
| 4 | Flow regulator valve, 6 gpm / 22.7 L/min | DD | Left outrigger circuit | 25 ft-lbs / 34 Nm |
| 5 | Check valve, 5 psi / 0.3 bar | DE | Left outrigger extend circuit | 12-14 ft-lbs / 16-19 Nm |
| 6 | Check valve, 5 psi / 0.3 bar | DF | Right outrigger extend circuit | 12-14 ft-lbs / 16-19 Nm |
| 7 | Check valve, 5 psi / 0.3 bar | DG | Left outrigger retract circuit | 12-14 ft-lbs / 16-19 Nm |
| 8 | Check valve, 5 psi / 0.3 bar | DH | Right outrigger retract circuit | 12-14 ft-lbs / 16-19 Nm |

# Manifolds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Y74
Y75
Y73
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DH
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DG
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DF
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DD
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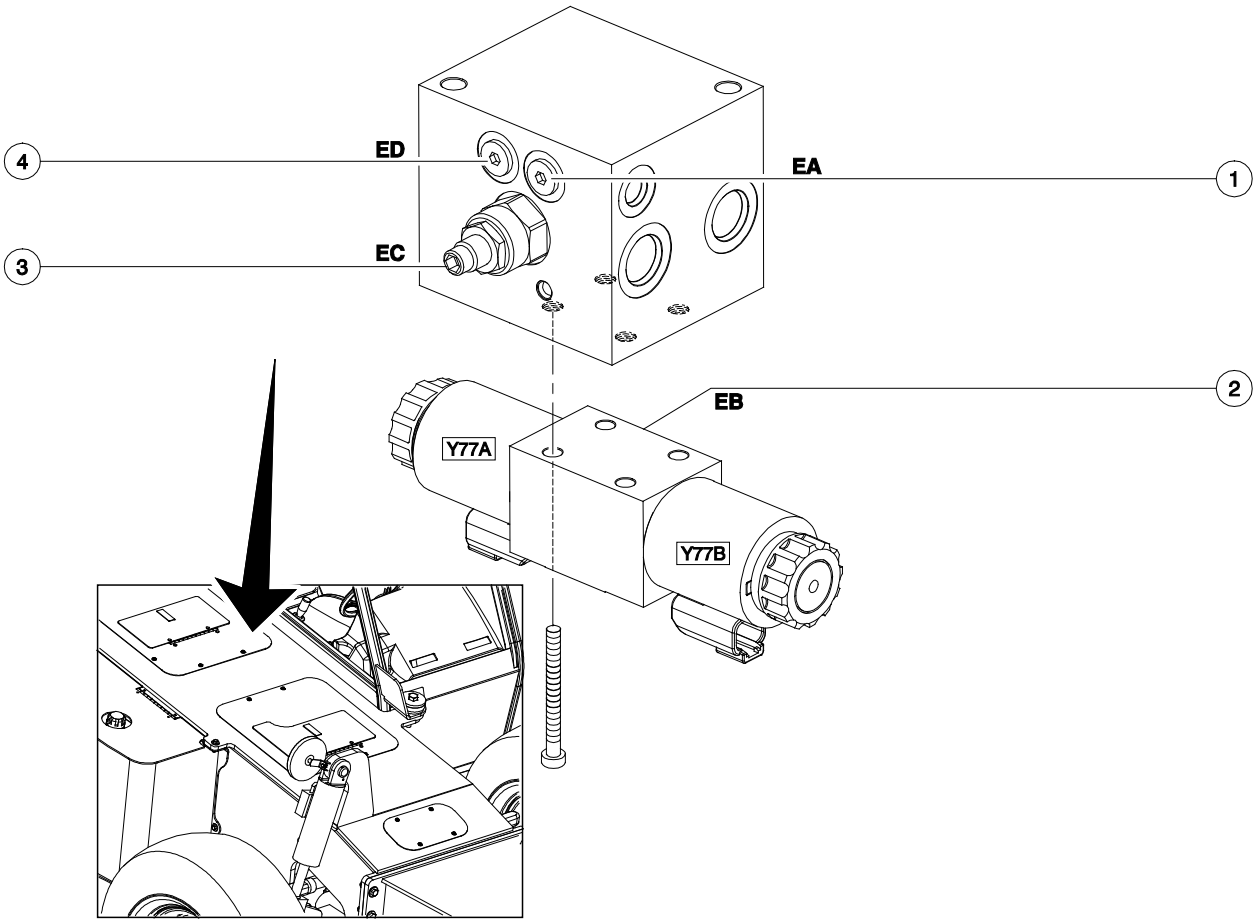
# Manifolds

## 7-5
## Auxiliary Manifold Components (option)

The auxiliary manifold is located under the transmission inspection cover.

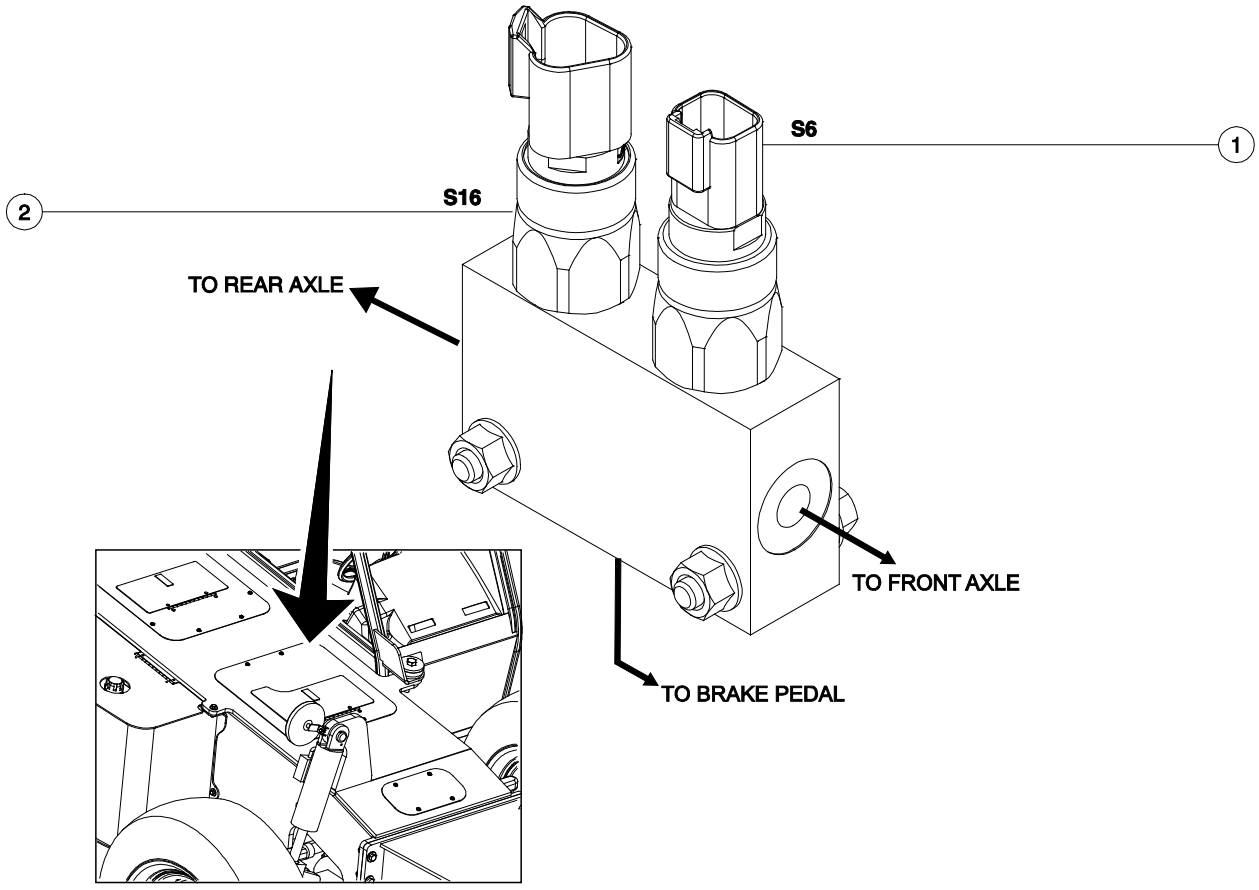
| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Check valve, 5 psi / 0.3 bar | EA | Auxiliary 'A1' circuit | 12-14 ft-lbs / 16-19 Nm |
| 2 | DO3 valve, 3 position 4 way | EB | Auxiliary function enable | 60 in-lbs / 6.8 Nm |
| 3 | Flow regulator valve | EC | Function speed control | 25 ft-lbs / 34 Nm |
| 4 | Check valve, 5 psi / 0.3 bar | ED | Auxiliary 'A2' circuit | 12-14 ft-lbs / 16-19 Nm |



## 7-6
## Brake Manifold Components

The brake manifold is located under the manifold inspection cover.

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Pressure switch, 450 psi / 31 bar | PS4 | Clutch cut-off pressure | 11 ft-lbs / 14.9 Nm |
| 2 | Pressure switch, 50 psi / 3.4 bar | PS5 | Brake light pressure (option) | 11 ft-lbs / 14.9 Nm |

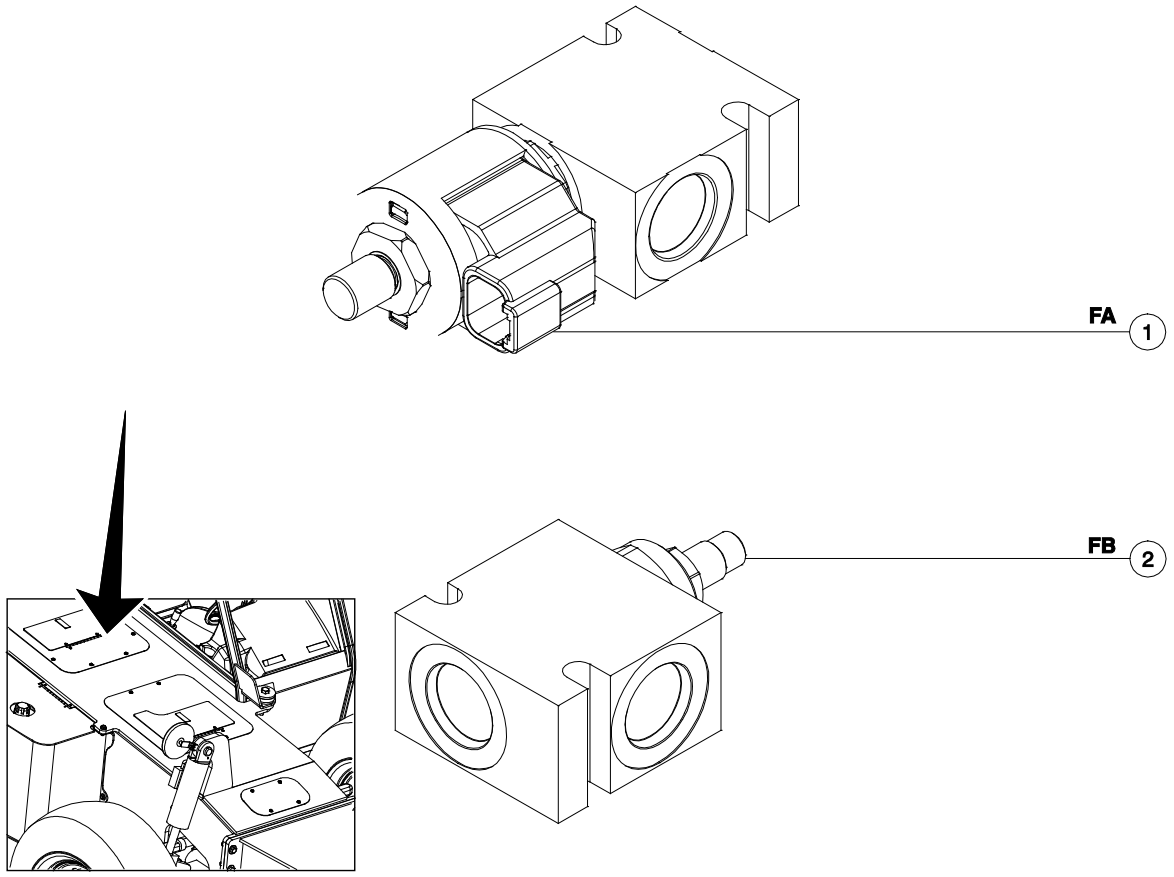


# Manifolds

## 7-7
## AC Hydraulic Manifold Components

The AC Hydraulic manifolds are located under the manifold inspection cover.

| Index No. | Description | Schematic Item | Function | Torque |
|---|---|---|---|---|
| 1 | Solenoid valve, 2 position 2 way | FA | Controls motor | 20 ft-lbs / 27.1 Nm |
| 2 | Flow control valve, 3 gpm/ 11.3 lpm | FB | Regulates flow | 33-37 ft-lbs / 45-50 Nm |



# 7-8
# Valve Adjustments - Secondary Function Manifold

## How to Set the Steer System Pressure

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

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

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

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

⊙ Result: The pressure gauge reads 450 ±25 psi / 31 ±1.7 bar. The pump is functioning correctly.

⊠ Result: The pressure gauge fails to read 450 ±25 psi / 31 ±1.7 bar. The pressure setting needs to be adjusted. Refer to Repair Procedure, *How to Adjust the Function Pump Pressure*.

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

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

5 Install a 0 to 3500 psi / 0 to 250 bar pressure gauge into test port 'TS' at the top of the secondary function manifold. Refer to *Secondary Function Manifold Components*.

6 Start the engine. Allow the engine to idle.

7 Fully turn and hold the steering wheel in the left direction and allow the wheels to fully turn to the left. Continue holding the steering while observing the pressure reading on the pressure gauge.

⊙ Result: The pressure gauge reads 2500 psi / 172 bar. The pressure setting is correct. Proceed to step 12.

⊠ Result: The pressure gauge fails to read 2500 psi / 172 bar. The pressure setting needs to be adjusted. Proceed to step 8.

8 Turn the machine off. Hold the steer pressure reducing/relief valve with a wrench and remove the cap.

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

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

10 Install the relief valve cap.

11 Repeat this procedure beginning with step 6.

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

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

# Manifolds

## How to Set the Parking Brake System Pressure

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

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

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

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

⊙ Result: The pressure gauge reads 450 ±25 psi / 31 ±1.7 bar. The pump is functioning correctly.

⊠ Result: The pressure gauge fails to read 450 ±25 psi / 31 ±1.7 bar. The pressure setting needs to be adjusted. Refer to Repair Procedure, *How to Adjust the Function Pump Pressure*.

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

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

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

6 Start the engine. Allow the engine to idle.

⊙ Result: The pressure gauge reads 400 psi / 27.5 bar. The pressure setting is correct. Proceed to step 11.

⊠ Result: The pressure gauge fails to read 400 psi / 27.5 bar. The pressure setting needs to be adjusted. Proceed to step 7.

7 Turn the machine off. Hold the brake pressure reducing/relief valve with a wrench and remove the cap.

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

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

9 Install the relief valve cap.

10 Repeat this procedure beginning with step 6.

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

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

## How to Set the Differential Lock/Joystick System Pressure

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

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

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

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

⊙ Result: The pressure gauge reads 450 ±25 psi / 31 ±1.7 bar. The pump is functioning correctly.

⊠ Result: The pressure gauge fails to read 450 ±25 psi / 31 ±1.7 bar. The pressure setting needs to be adjusted. Refer to Repair Procedure, *How to Adjust the Function Pump Pressure*.

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

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

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

6 Start the engine. Allow the engine to idle.

⊙ Result: The pressure gauge reads 400 psi / 27.5 bar. The pressure setting is correct. Proceed to step 11.

⊠ Result: The pressure gauge fails to read 400 psi / 27.5 bar. The pressure setting needs to be adjusted. Proceed to step 7.

7 Turn the machine off. Hold the differential lock/joystick pressure reducing/relief valve with a wrench and remove the cap.

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

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

9 Install the relief valve cap.

10 Repeat this procedure beginning with step 6.

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

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

# Manifolds

## How to Set the Rear Lock-up System Pressure

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

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

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

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

⊙ Result: The pressure gauge reads 450 ±25 psi / 31 ±1.7 bar. The pump is functioning correctly.

⊠ Result: The pressure gauge fails to read 450 ±25 psi / 31 ±1.7 bar. The pressure setting needs to be adjusted. Refer to Repair Procedure, *How to Adjust the Function Pump Pressure*.

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

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

5 Install a 0 to 500 psi / 0 to 50 bar pressure gauge into test port 'TR' at the top of the secondary function manifold, Refer to Secondary Function Manifold Components.

6 Start the engine. Allow the engine to idle.

⊙ Result: The pressure gauge reads 50 psi / 3.4 bar. The pressure setting is correct. Proceed to step 11.

⊠ Result: The pressure gauge fails to read 50 psi / 3.4 bar. The pressure setting needs to be adjusted. Proceed to step 7.

7 Turn the machine off. Hold the rear lockup pressure reducing/relief valve with a wrench and remove the cap.

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

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

9 Install the relief valve cap.

10 Repeat this procedure beginning with step 6.

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

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

# 7-9 Valve Coils

## How to Test a Coil

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

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

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

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

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

2 Test the coil resistance.

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

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

## Valve Coil Resistance Specification

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

**Valve Coil Resistance Specification**

| Description | Specification |
|---|---|
| Solenoid valve, 2 position 4 way 12V DC with diode (schematic items AA, AD, AY, AAB and BAA) | 8.9Ω |
| Solenoid valve, 2 position 2 way 12V DC with diode (schematic items AAC and EA) | 8.9Ω |
| DO3 valve, 3 position 4 way 12V DC with diode (schematic items CA and EB) | 5.6Ω |
| Solenoid valve, 2 position 2 way 12V DC with diode (schematic items FA) | 8.8Ω |
| Solenoid valve, 2 position 3 way 12V DC with diode (schematic items CF, CO and CP) | 8.9Ω |
| Solenoid valve, 2 position 4 way 12V DC with diode (schematic items CG ) | 7.3Ω |
| Solenoid valve, 3 position 4 way 12V DC with diode (schematic items DA and DB) | 7.3Ω |

# Manifolds

## How to Test a Coil Diode

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

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

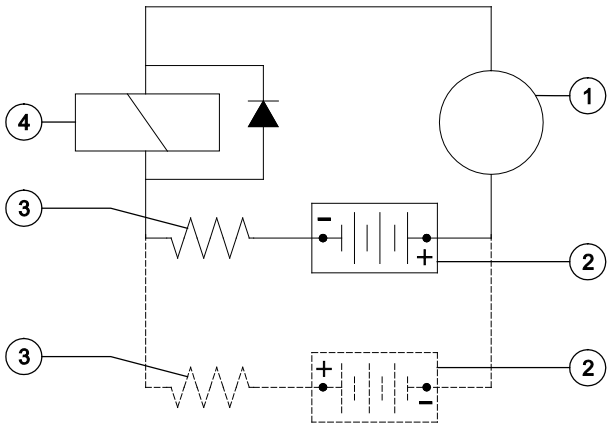
1 Test the coil for resistance. Refer to Repair Procedure, *How to Test a Coil*.

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

**Resistor 10Ω**

Genie part number 27287

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




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

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

3 Set a multimeter to read DC current.

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

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

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

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

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

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

# 8-1 Axles

## How to Remove the Axle

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

1 Chock the wheels.

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

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

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

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

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

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

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

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

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

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

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

| Bolt torque specification | |
|---|---|
| Axle mounting bolts | 380 ft-lbs<br>515 Nm |

## How to Repair the Axle

Repair procedures and additional axle information is available in the Dana 213 Axle Maintenance and Repair Manual.

| Dana 213 Axle Maintenance and Repair Manual | |
|---|---|
| Genie part number | 115026 |

# Outriggers

## 9-1 Outriggers

### How to Remove an Outrigger

1 Extend the outrigger until the pad just touches the ground. Do not rest the weight of the machine on the outrigger.

2 Tag, disconnect and plug the hydraulic supply hoses at the outrigger cylinder. Cap the fittings.

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

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

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

4 Remove the fasteners securing the outrigger cylinder barrel-end pivot pin to the machine.

5 Use a soft metal drift to remove the outrigger cylinder barrel-end pivot pin. Lower the cylinder onto the outrigger.

**⚠WARNING** Crushing hazard. The cylinder may become unbalanced and fall if not properly supported when the pivot pin is removed from the machine.

6 Attach a lifting strap from an overhead crane to the outrigger assembly. Support the outrigger. Do not apply any lifting pressure.

7 Remove the fasteners securing the outrigger pivot pin to the machine.

8 Use a soft metal drift to remove the pivot pin. Remove the outrigger assembly from the machine.

**⚠WARNING** Crushing hazard. The outrigger will fall if not properly supported when the pivot pin is removed from the machine.

## How to Remove an Outrigger 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 outrigger until the pad just touches the ground. Do not rest the weight of the machine on the outrigger.

2 Tag, disconnect and plug the two hydraulic supply hoses at the outrigger cylinder. Cap the fittings.

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

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

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

4 Remove the fasteners securing the outrigger cylinder barrel-end pivot pin to the chassis.

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

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

6 Raise the cylinder to a vertical position.

7 Remove the fasteners securing the outrigger cylinder rod-end pivot pin to the machine.

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

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

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# Fault Codes

## Observe and Obey:

- ☑ Troubleshooting and repair procedures shall be completed by a person trained and qualified on the repair of this machine
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.
- ☑ Unless otherwise specified, perform each procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Boom in the stowed position
  - Key switch in the off position with the key removed
  - Wheels chocked

## Before Troubleshooting:

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

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

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

# Diagnostic Display

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

**Models to Serial Number GTH1012-16291**

The fault code is displayed on the engine diagnostic display which is located on the dashboard in the operator's compartment. This backlit LCD display allows the operator to view these fault codes, a description of the code and corrective action needed. When not being used to display fault codes, the display shows the many readouts of engine functions in both English and metric units.

Located at the upper corners of the diagnostic display are amber and red indicator lights. Depending on the severity of a detected engine fault, one of these lights will illuminate indicating an active engine fault:

Amber - **WARNING**

An amber colored light signals an abnormal engine condition which should be corrected as soon as possible.

Red - **STOP ENGINE**

A red colored light indicates an engine condition exists which requires the operator to shut down the engine as soon as possible. The ECM will, in some cases, automatically shut down the engine when the red light is displayed.

**Access the Active Fault Codes:**

**NOTICE** Component damage hazard. Ignoring active fault codes may result in engine damage.

1 During normal operation, engine parameters are visible in the diagnostic display. When an engine fault is detected, the engine parameters on display are immediately replaced with a WARNING message. Also on display are the SPN and FMI codes which are combined to show an engine fault code.

2 If the word "Next" appears at the bottom of the display, this indicates that additional active fault codes exist. Use the arrow keys to scroll to the next code.

3 Press the "Enter" key to acknowledge the active code and return to the engine parameter display.

**Access the Stored Fault Codes:**

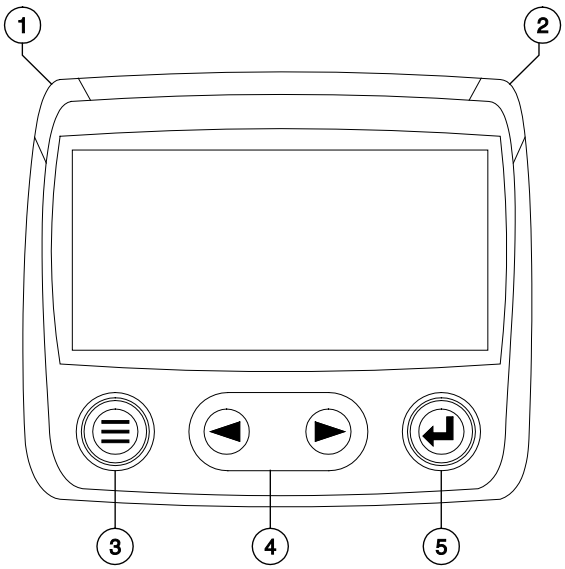
1 Turn the key switch to the on position. Do not start the engine.

2 Press the "Menu" key. Use the "Arrow" keys to scroll to "Stored Codes."

3 Press the "Enter" key to view the stored code.

4 If the word "Next" appears at the bottom of the screen, there are additional codes being stored. Use the "Arrow" key to scroll to the next stored code.

5 Press the "Menu" key to return to the main menu.




Diagnostic display (to Serial Number GTH1012-16291)

1 amber warning light
2 red stop engine light
3 menu key
4 arrow/scroll keys
5 enter key

# Diagnostic Display

**Models from Serial Number GTH1012-16292**

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

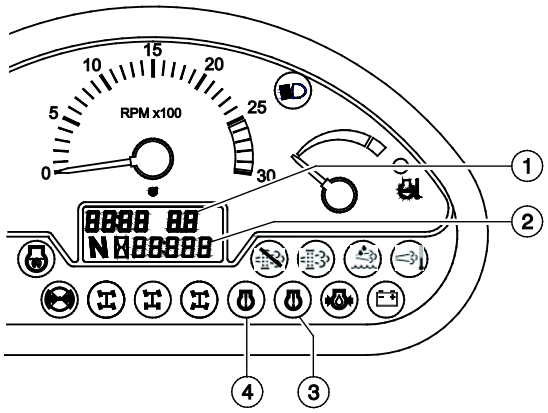
The gauge cluster also includes two warning lights.

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

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

**Active Fault Codes**

Active Fault Codes will be displayed on the gauge cluster whenever a fault is detected. If multiple fault codes are detected, the fault codes will scroll on the display.




1 FMI Code
2 SPN Code
3 amber warning light
4 red stop engine light

**All Models**

**Active Codes vs Stored Codes**

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

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

Note: Additional hardware will be necessary to access stored codes on machines from serial number GTH1012-16292.

**Decoding Fault Codes**

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

# John Deere 4045HF485 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description | Corrective Action |
|---|---|---|---|
| 000028 | 3 | Throttle #3 Voltage Out of Range High | Check Sensor and Wiring |
| | 4 | Throttle #3 Voltage Out of Range Low | Check Sensor and Wiring |
| | 14 | Throttle #3 Voltage Out of Range | Contact Servicing Dealer |
| 000029 | 3 | Throttle #2 Voltage Out of Range High | Check Sensor and Wiring |
| | 4 | Throttle #2 Voltage Out of Range Low | Check Sensor and Wiring |
| | 14 | Throttle #2 Voltage Out of Range | Contact Servicing Dealer |
| 000091 | 3 | Throttle Voltage Out of Range High | Check Switch and Wiring |
| | 4 | Throttle Voltage Out of Range Low | Check Switch and Wiring |
| | 14 | Throttle Voltage Out of Range | Check Sensor and Wiring |
| 00094 | 3 | Fuel Pressure Voltage Out of Range High | Check Sensor and Wiring |
| | 4 | Fuel Pressure Voltage Out of Range Low | Check Sensor and Wiring |
| 000097 | 3 | Water in Fuel Voltage Out of Range High | Check Sensor and Wiring |
| | 4 | Water in Fuel Voltage Out of Range Low | Check Sensor and Wiring |
| | 16 | Water in Fuel Detected | Stop and Drain Water Separator |
| 000100 | 1 | Engine Oil Pressure Low-Most Severe | Check Oil Level |
| | 3 | Engine Oil Pressure Voltage Out of Range High | Check Sensor and Wiring |
| | 4 | Engine Oil Pressure Voltage Out of Range Low | Check Sensor and Wiring |
| | 18 | Engine Oil Pressure Low-Moderately Severe | Check Oil Level |
| | 31 | Oil Pressure Detected with Zero Engine Speed | Contact Servicing Dealer |
| 000102 | 2 | Manifold Air Pressure Sensor In-Range Failure | Contact Servicing Dealer |
| | 3 | Manifold Air Pressure Voltage Out of Range High | Contact Servicing Dealer |
| | 4 | Manifold Air Pressure Voltage Out of Range Low | Contact Servicing Dealer |
| 000103 | 0 | Turbocharger Speed High -Most Severe | Contact Servicing Dealer |
| | 2 | Turbocharger Speed Data Incorrect | Contact Servicing Dealer |
| | 5 | Turbocharger Harness Open Circuit | Contact Servicing Dealer |
| | 6 | Turbocharger Harness Shorted To Ground | Contact Servicing Dealer |
| | 8 | Turbocharger Speed Signal In-Range Failure | Contact Servicing Dealer |
| | 31 | Turbocharger Speed Signal Missing | Contact Servicing Dealer |

# John Deere 4045HF485 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description | Corrective Action |
|---|---|---|---|
| 000105 | 0 | Exhaust Gas Recirculation Air Temperature High - Most Severe | Check Air Cleaner, Aftercooler, or Room Temperature |
| | 3 | Exhaust Gas Recirculation Air Temperature Input Voltage Out of Range High | Check Sensor and Wiring |
| | 4 | Exhaust Gas Recirculation Air Temperature Input Voltage Out of Range Low | Check Sensor and Wiring |
| | 15 | Exhaust Gas Recirculation Air Temperature High - LeastSevere | Check Air Cleaner, Aftercooler, or Room Temperature |
| | 16 | Exhaust Gas Recirculation Air Temperature High-Moderately Severe | Check Air Cleaner, Aftercooler, or Room Temperature |
| 000108 | 2 | Barometric Air Pressure Sensor Signal Invalid | Contact Servicing Dealer |
| | 31 | Barometric Air Pressure Sensor Signal Invalid | Contact Servicing Dealer |
| 000110 | 0 | Engine Coolant Temperature High-Most Severe | Check Cooling System, Reduce Power |
| | 3 | Engine Coolant Temperature Input Voltage Out of Range - High | Check Sensor and Wiring |
| | 4 | Engine Coolant Temperature Input Voltage Out of Range - Low | Check Sensor and Wiring |
| | 15 | Engine Coolant Temperature High-Least Severe | Check Cooling System, Reduce Power |
| | 16 | Engine Coolant Temperature High - Moderately Severe | Check Cooling System, Reduce Power |
| | 17 | Engine Coolant Temperature Low-Least Severe | Check Cooling System |
| 000111 | 1 | Coolant Level Low | Check Operator's Manual |
| 000157 | 3 | Fuel Rail Pressure Voltage Out of Range High | Contact Servicing Dealer |
| | 4 | Fuel Rail Pressure Voltage Out of Range Low | Contact Servicing Dealer |
| | 10 | Fuel Rail Pressure Drops Too Fast | Contact Servicing Dealer |
| | 17 | Fuel Rail Pressure Not Developed | Contact Servicing Dealer |
| 000158 | 17 | Keyswitch Circuit Problem | Contact Servicing Dealer |
| 000174 | 0 | Fuel Temperature High-Most Severe | Add Fuel or Switch Fuel Tanks |
| | 3 | Fuel Temperature Voltage Out of Range High | Check Sensor and Wiring |
| | 4 | Fuel Temperature Voltage Out of Range Low | Check Senor and Wiring |
| | 16 | Fuel Temperature High-Moderately Severe | Add Fuel or Switch Fuel Tanks |
| 000189 | 0 | Engine Speed Derate | Check Fault Codes or Contact Servicing Dealer |

# John Deere 4045HF485 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description | Corrective Action |
|---|---|---|---|
| 000190 | 0 | Engine Speed High-Most Severe | Reduce Engine Speed |
| | 16 | Engine Speed High-Moderately Severe | Reduce Engine Speed |
| 000412 | 0 | Exhaust Gas Recirculation Temperature Input Voltage High-Most Severe | Contact Servicing Dealer |
| | 3 | Exhaust Gas Recirculation Temperature Voltage Out of Range High | Contact Servicing Dealer |
| | 4 | Exhaust Gas Recirculation Temperature Voltage Out of Range Low | Contact Servicing Dealer |
| | 16 | Exhaust Gas Recirculation Temperature Moderately Severe | Contact Servicing Dealer |
| 000611 | 3 | Electronic Injector Wiring Shorted to Power Source | Check Wiring |
| | 4 | Electronic Injector Wiring Shorted to Ground | Check Wiring |
| 000620 | 3 | 5V Sensor Supply Voltage Out of Range High | Check Wiring |
| | 4 | 5V Sensor Supply Voltage Out of Range Low | Check Wiring |
| 000627 | 1 | Electronic Injector Supply Voltage Low | Check Battery Voltage and Wiring |
| | 16 | ECU Power Supply Voltage High | Contact Servicing Dealer |
| | 18 | ECU Power Supply Voltage Low | Contact Servicing Dealer |
| 000628 | 12 | ECU Programming Error | Contact Servicing Dealer |
| 000629 | 12 | ECU Programming Error | Contact Servicing Dealer |
| | 13 | ECU Error | Contact Service Dealer |
| 000636 | 2 | Engine Position Sensor Noise | Check Sensor and Wiring |
| | 5 | Engine Position Sensor Current Low or Open Circuit | Contact Servicing Dealer |
| | 6 | Engine Position Sensor Current High or Grounded Circuit | Contact Servicing Dealer |
| | 8 | Engine Position Sensor Input Missing | Check Sensor and Wiring |
| | 10 | Engine Position Sensor Pattern Error | Check Sensor and Wiring |
| 000637 | 2 | Timing (Crank) Position Sensor Noise | Check Sensor and Wiring |
| | 5 | Timing (Crank) Position Sensor Current Low or Open Circuit | Contact Servicing Dealer |
| | 6 | Timing (Crank) Position Sensor Current High or Grounded Circuit | Contact Servicing Dealer |
| | 7 | Crank/Camshaft Position Out of Sync | Check Sensor and Wiring |
| | 8 | Crank Position Input Missing | Check Sensor and Wiring |
| | 10 | Crank Position Input Pattern Error | Check Sensor and Wiring |

# John Deere 4045HF485 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description | Corrective Action |
|---|---|---|---|
| 000640 | 31 | External Engine Protection Signal Not Recognized | Engine External Protection Unknown. Check Installation |
| 000641 | 4 | Turbocharger Actuator Disabled | Contact Servicing Dealer |
| | 5 | Turbocharger Actuator Current Low or Open Circuit | Contact Servicing Dealer |
| | 12 | Turbocharger Actuator Communication Error | Contact Servicing Dealer |
| | 13 | Turbocharger Learn Error | Contact Servicing Dealer |
| | 16 | Turbocharger Temperature High-Moderately Severe | Contact Servicing Dealer |
| 000651 | 02 | Cylinder #1 Injector Part Number Not Recognized | Contact Servicing Dealer |
| | 05 | Cylinder #1 Electronic Injector Circuit Open | Check Injector Wiring or Injector Solenoid |
| | 06 | Cylinder #1 Electronic Injector Circuit Shorted | Check Injector Wiring or Injector Solenoid |
| | 07 | Cylinder #1 Electronic Injector Fuel Flow Low | Injector Failed or Flow Limiter Closed |
| | 13 | Cylinder #1 Injector QR Code String Error | Contact Servicing Dealer |
| 000652 | 02 | Cylinder #2 Injector Part Number Not Recognized | Contact Servicing Dealer |
| | 05 | Cylinder #2 Electronic Injector Circuit Open | Check Injector Wiring or Injector Solenoid |
| | 06 | Cylinder #2 Electronic Injector Circuit Shorted | Check Injector Wiring or Injector Solenoid |
| | 07 | Cylinder #2 Electronic Injector Fuel Flow Low | Injector Failed or Flow Limiter Closed |
| | 13 | Cylinder #2 Injector QR Code String Error | Contact Servicing Dealer |
| 000653 | 02 | Cylinder #3 Injector Part Number Not Recognized | Contact Servicing Dealer |
| | 05 | Cylinder #3 Electronic Injector Circuit Open | Check Injector Wiring or Injector Solenoid |
| | 06 | Cylinder #3 Electronic Injector Circuit Shorted | Check Injector Wiring or Injector Solenoid |
| | 07 | Cylinder #3 Electronic Injector Fuel Flow Low | Injector Failed or Flow Limiter Closed |
| | 13 | Cylinder #3 Injector QR Code String Error | Contact Servicing Dealer |
| 000654 | 02 | Cylinder #4 Injector Part Number Not Recognized | Contact Servicing Dealer |
| | 05 | Cylinder #4 Electronic Injector Circuit Open | Check Injector Wiring or Injector Solenoid |
| | 06 | Cylinder #4 Electronic Injector Circuit Shorted | Check Injector Wiring or Injector Solenoid |
| | 07 | Cylinder #4 Electronic Injector Fuel Flow Low | Injector Failed or Flow Limiter Closed |
| | 13 | Cylinder #4 Injector QR Code String Error | Contact Servicing Dealer |
| 000655 | 02 | Cylinder #5 Injector Part Number Not Recognized | Contact Servicing Dealer |
| | 05 | Cylinder #5 Electronic Injector Circuit Open | Check Injector Wiring or Injector Solenoid |
| | 06 | Cylinder #5 Electronic Injector Circuit Shorted | Check Injector Wiring or Injector Solenoid |
| | 07 | Cylinder #5 Electronic Injector Fuel Flow Low | Injector Failed or Flow Limiter Closed |
| | 13 | Cylinder #5 Injector QR Code String Error | Contact Servicing Dealer |

# John Deere 4045HF485 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description | Corrective Action |
|---|---|---|---|
| 000656 | 02 | Cylinder #6 Injector Part Number Not Recognized | Contact Servicing Dealer |
| | 05 | Cylinder #6 Electronic Injector Circuit Open | Check Injector Wiring or Injector Solenoid |
| | 06 | Cylinder #6 Electronic Injector Circuit Shorted | Check Injector Wiring or Injector Solenoid |
| | 07 | Cylinder #6 Electronic Injector Fuel Flow Low | Injector Failed or Flow Limiter Closed |
| | 13 | Cylinder #6 Injector QR Code String Error | Contact Servicing Dealer |
| 000676 | 03 | Glow Plug Relay Voltage High | Check Relay and Wiring |
| | 04 | Glow Plug Relay Voltage Low | Check Relay and Wiring |
| 000898 | 09 | Vehicle Speed or Torque Message Invalid | Contact Servicing Dealer |
| 000970 | 31 | Auxiliary Engine Shutdown Signal | Non Engine Fault. Check Other Shutdown Devices |
| 000971 | 31 | Auxiliary Engine Derate Signal | Non Engine Fault. Check Other Shutdown Devices |
| 001079 | 03 | Sensor Supply Voltage 3 Out of Range High | Check Wiring |
| | 04 | Sensor Supply Voltage 3 Out of Range Low | Check Wiring |
| 001080 | 03 | Fuel Rail Pressure Sensor Supply Voltage 2 Out of Range High | Check Wiring |
| | 04 | Fuel Rail Pressure Sensor Supply Voltage 2 Out of Range Low | Check Wiring |
| 001109 | 31 | Engine Protection System Approaching Shutdown | Check Fault Codes |
| 001110 | 31 | Engine Protection System Shutdown Engine | Check Fault Codes |
| 001136 | 00 | ECU Temperature High - Most Severe | Contact Servicing Dealer |
| | 16 | ECU Temperature High - Moderately Severe | Contact Servicing Dealer |
| 001172 | 03 | Turbo Compressor Inlet Temperature Input Voltage Out of Range High | Contact Servicing Dealer |
| | 04 | Turbo Compressor Inlet Temperature Input Voltage Out of Range Low | Contact Servicing Dealer |
| | 16 | Turbo Compressor Inlet Temperature High - Moderately Severe | Contact Servicing Dealer |
| 001180 | 00 | Turbo Turbine Inlet Temperature High-Most Severe | Contact Servicing Dealer |
| | 16 | Turbo Turbine Inlet Temperature High - Moderately Severe | Contact Servicing Dealer |

# John Deere 4045HF485 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description | Corrective Action |
|---|---|---|---|
| 001209 | 02 | Exhaust Pressure Incorrect | Contact Servicing Dealer |
| | 03 | Exhaust Pressure Sensor Voltage Out of Range High | Contact Servicing Dealer |
| | 04 | Exhaust Pressure Sensor Voltage Out of Range Low | Contact Servicing Dealer |
| 001347 | 03 | Fuel Pump Pressurizing Assembly #1 Sensor Voltage High | Contact Servicing Dealer |
| | 05 | Fuel Pump Pressurizing Assembly #1 Sensor Circuit Open, Shorted to Ground, or Overloaded | Check Pump Wiring |
| | 07 | Fuel Pump Assembly #1 Rail Pressure Contro Mismatch | Check Fuel Filter and Lines |
| 001569 | 31 | Engine Protection Derate | Check Fault Codes |
| 002630 | 00 | Exhaust Gas Recirculation Fresh Air Temperature High-Most Severe | Contact Servicing Dealer |
| | 03 | Exhaust Gas Recirculation Fresh Air Temperature Voltage Out of Range High | Contact Servicing Dealer |
| | 04 | Exhaust Gas Recirculation Fresh Air Temperature Voltage Out of Range Low | Contact Servicing Dealer |
| | 15 | Exhaust Gas Recirculation Fresh Air Temperature High-Least Severe | Contact Servicing Dealer |
| | 16 | Exhaust Gas Recirculation Fresh Air Temperature High-Moderately Severe | Contact Servicing Dealer |
| 002659 | 02 | Exhaust Gas Recirculation Flow/Temperature Mismatch | Contact Servicing Dealer |
| | 15 | Exhaust Gas Recirculation Flow Rate Above Normal | Contact Servicing Dealer |
| | 17 | Exhaust Gas Recirculation Flow Rate Below Normal | Contact Servicing Dealer |
| 002790 | 16 | Turbocharger Compressor Outlet Temperature High - Most Severe | Contact Servicing Dealer |

# John Deere 4045HF485 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description | Corrective Action |
|---|---|---|---|
| 002791 | 02 | Exhaust Gas Recirculation Valve Sensor Voltage Mismatch | Contact Servicing Dealer |
| | 03 | Exhaust Gas Recirculation Valve Sensor Voltage Out of Range High | Contact Servicing Dealer |
| | 04 | Exhaust Gas Recirculation Valve Sensor Voltage Out of Range Low | Contact Servicing Dealer |
| | 05 | Exhaust Gas Recirculation Valve Current Low or Open Circuit | Contact Servicing Dealer |
| | 06 | Exhaust Gas Recirculation Valve Current High or Grounded Circuit | Contact Servicing Dealer |
| | 07 | Exhaust Gas Recirculation Valve Not Responding or Out of Adjustment | Contact Servicing Dealer |
| | 13 | Exhaust Gas Recirculation Valve Out of Calibration | Contact Servicing Dealer |
| | 14 | Exhaust Gas Recirculation Valve Off | Contact Servicing Dealer |
| | 31 | Exhaust Gas Recirculation Valve Position Error | Contact Servicing Dealer |
| 002795 | 07 | Turbocharger Actuator Not Responding or Out Of Adjustment | Contact Servicing Dealer |
| | 12 | Turbocharger Actuator Bad Intelligent Device Or Component | Contact Servicing Dealer |
| 523222 | 03 | Sensor Supply Voltage #5 Out of Range High | Contact Servicing Dealer |
| | 04 | Sensor Supply Voltage #5 Out of Range Low | Contact Servicing Dealer |
| 523229 | 03 | Sensor Supply Voltage #4 Out of Range High | Contact Servicing Dealer |
| | 04 | Sensor Supply Voltage #4 Out of Range Low | Contact Servicing Dealer |

# Perkins 1104 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description |
|---|---|---|
| 91 | 2 | Incorrect throttle switch inputs |
| | 3 | Throttle position sensor: voltage above normal or shorted high |
| | 4 | Throttle position sensor: voltage below normal or shorted low |
| | 8 | Throttle position sensor: abnormal frequency, pulse width or period |
| 100 | 3 | Engine oil pressure sensor: voltage above normal or shorted high |
| | 4 | Engine oil pressure sensor :voltage below normal or shorted low |
| 102 | 3 | Boost pressure sensor voltage: voltage above normal or shorted high |
| | 4 | Boost pressure sensor voltage: voltage below normal or shorted low |
| | 10 | No 5V to sender |
| 105 | 3 | Intake manifold temperature sensor: temperature above normal or shorted high |
| | 4 | Intake manifold temperature sensor: temperature below normal or shorted low |
| 105 | 3 | Intake manifold air temperature open/short to battery positive (+) |
| | 4 | Intake manifold air temperature short to ground |
| 110 | 3 | Engine coolant temperature open/short to battery positive (+) |
| | 4 | Engine coolant temperature short to ground |
| 157 | 3 | Fuel rail pressure open/short to battery positive (+) |
| | 4 | Fuel rail pressure short to ground |
| 168 | 0 | System voltage high |
| | 1 | System voltage low |
| | 2 | ECM battery power intermittent/erratic |
| 172 | 3 | Air inlet temperature voltage high |
| | 4 | Air inlet temperature voltage low |
| 174 | 2 | Fuel temperature sensor: data erratic/intermittent or incorrect |
| 190 | 8 | Engine speed signal abnormal |
| | 15 | Engine speed: overspeed WARNING |
| 190 | 0 | Engine overspeed |
| 626 | 5 | Ether start aid current low |
| | 6 | Ether start aid current high |
| 630 | 2 | System parameters incorrect |
| 631 | 2 | Personality module mismatch |
| 637 | 11 | Engine timing calibration invalid |
| 637 | 139 | Engine timing calibration required |
| 639 | 9 | J1939 data link communications |
| | 12 | J1939 data link malfunction |
| 651 | 2 | Cylinder #1 injector data incorrect |
| | 5 | Cylinder #1 injector open circuit |
| | 6 | Cylinder #1 injector short |
| | 7 | Cylinder #1 injector not responding |
| 652 | 2 | Cylinder #2 injector data incorrect |
| | 5 | Cylinder #2 injector open circuit |
| | 6 | Cylinder #2 injector short |
| | 7 | Cylinder #2 injector not responding |

# Perkins 1104 Engine Fault Codes

SPN = Suspect Parameter Number
FMI = Failure Mode Identifier

| SPN | FMI | Description |
|---|---|---|
| 653 | 2 | Cylinder #3 injector data incorrect |
| | 5 | Cylinder #3 injector open circuit |
| | 6 | Cylinder #3 injector short |
| | 7 | Cylinder #3 injector not responding |
| 654 | 2 | Cylinder #4 injector data incorrect |
| | 5 | Cylinder #4 injector open circuit |
| | 6 | Cylinder #4 injector short |
| | 7 | Cylinder #4 injector not responding |
| 678 | 3 | 8V DC supply short to battery positive (+) |
| | 4 | 8V DC supply shorted to ground |
| 723 | 8 | Secondary engine speed signal abnormal |
| 1188 | 5 | Turbo wastegate drive current low |
| 1196 | 9 | Machine security system module non-communication |
| 1347 | 5 | Fuel rail pump output current low |
| | 6 | Fuel rail pump output current high |
| | 7 | Fuel rail pressure valve solenoid not responding |
| 2882 | 2 | Mode selector switch: data erratic/intermittent or incorrect |
| 3509 | 3 | 5V DC power supply sensor short to battery positive (+) |
| | 4 | 5V DC power supply sensor short to ground |

| **Perkins 1100 Troubleshooting Manual** | |
|---|---|
| Genie part number | 123583 |

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# Schematics

## Observe and Obey:

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

## Before Troubleshooting:

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

## About This Section

There are two groups of schematics in this section.

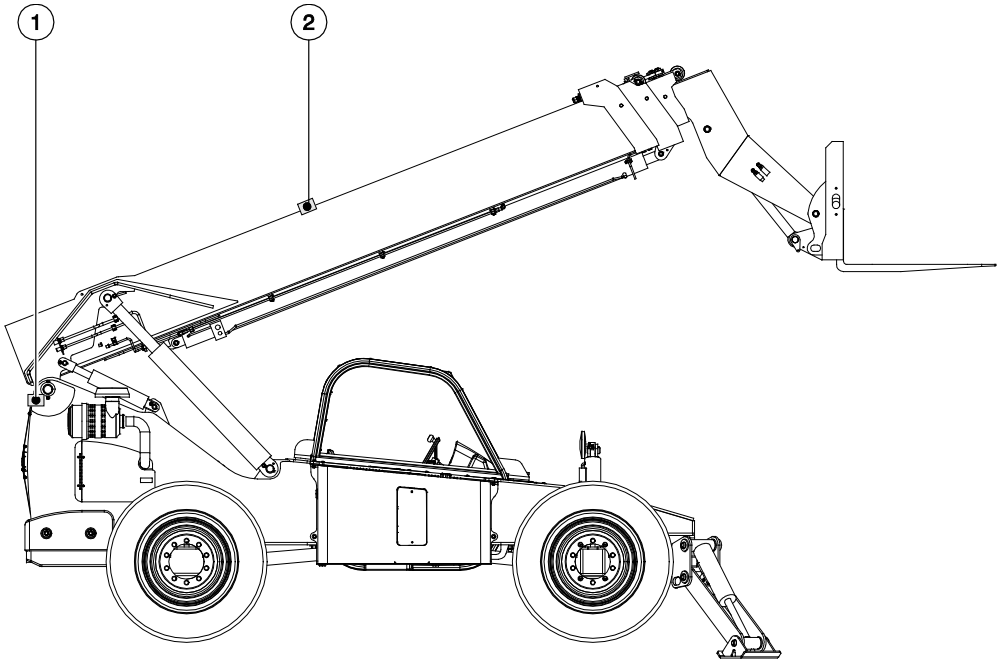
### Electrical Schematics

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

### Hydraulic Schematics

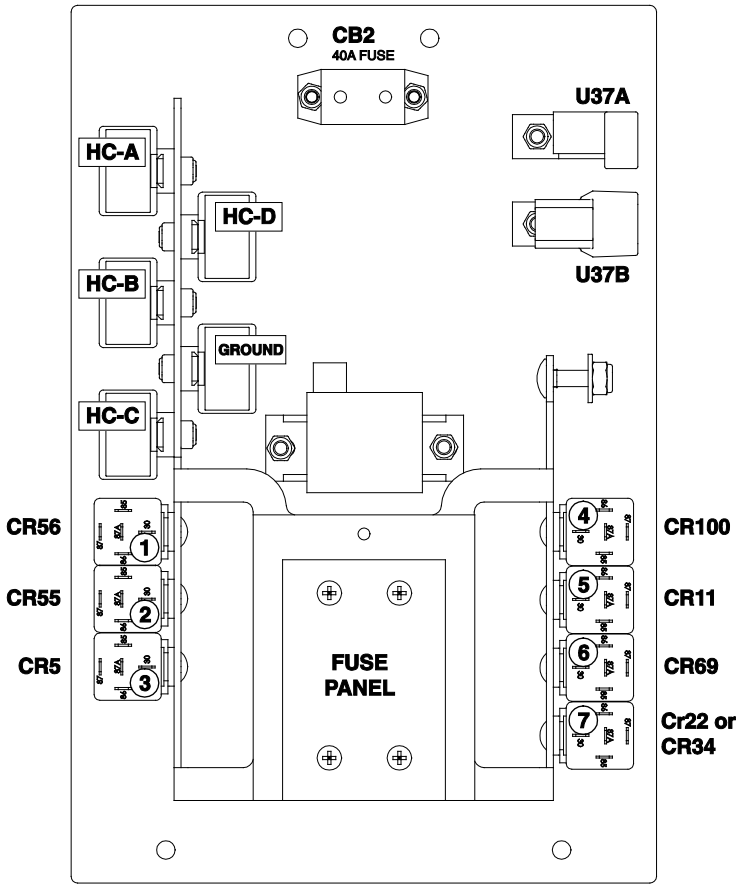
**⚠WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

# Proximity Switch Legend

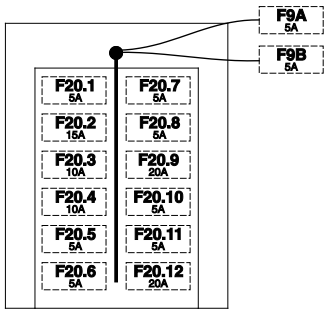



1 Boom Angle Proximity Switch PX2 (under boom pivot pin)
2 Boom Extend Proximity Switch PX1 (under plate at top of boom tube, GTH-1056 only)

# Fuse Panel Layout




**FUSE PANEL**




F20.9, F20.10, F20.11 and F20.11 are for machine options, refer to electrical schematics.

**PCB Board Fuse Panel located in the Cab**

# Electrical Component Legend

| Item | Description |
|---|---|
| **B1** | **Battery** |
| **CB2** | **Circuit Breaker, 40A** |
| **C5** | **Capacitor, 4700mf** |
| **CR** | **Control relay** |
| CR5 | Horn |
| CR11 | Boom up |
| CR55 | Drive reverse |
| CR56 | Drive forward |
| CR69 | Boom extend |
| CR88 | Power |
| CR89 | Parking brake |
| CR100 | Sway enable |
| **D1** | **Alternator** |
| **F** | **Fuse** |
| F6 | 20A, Power to controls |
| F19 | 10A, ECM power |
| F20 | Fuse block |
| **FS2** | **Throttle pedal** |
| **G** | **Gauge** |
| G3 | Engine coolant temperature |
| G6 | Hourmeter |
| G8 | Diagnostic display |
| G11 | Fuel level |
| G12 | Tachometer |
| **H** | **Horn** |
| H2 | Auto-style horn |
| H5 | Multifunction alarm |
| **KS1** | **Key switch** |

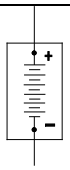
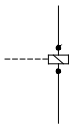
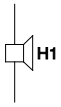
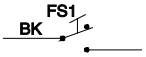
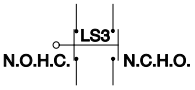
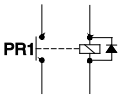
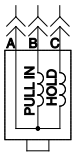
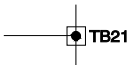
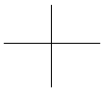
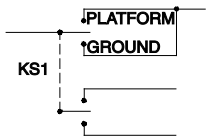
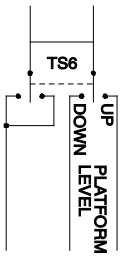
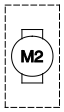
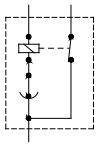
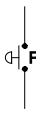
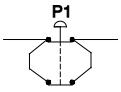
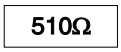
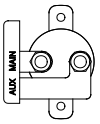
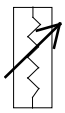
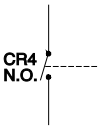
| Item | Description |
|---|---|
| **L** | **Light** |
| L7 | Low battery |
| L42 | Engine oil pressure |
| L61 | Back up light |
| L63 | Low brake pressure |
| L64 | Parking brake on |
| L71 | Transmission oil pressure |
| L72 | Transmission temperature |
| L73 | Low fuel level |
| L74 | 4-wheel steer select |
| L75 | Crab steer select |
| L76 | 2-wheel steer select |
| **M** | **Motor** |
| M3 | Engine starter |
| M9 | Heater fan motor |
| M10 | Windshield wiper motor |
| M11 | Cab circulation fan motor |
| M12 | Windshield washer motor |
| **PS** | **Pressure switch** |
| PS4 | Service brake |
| PS6 | Parking brake |
| PS7 | Low brake pressure |
| PS8 | Sway |
| **PX** | **Proximity switch** |
| PX1 | Boom extend |
| PX2 | Boom angle |
| **S** | **Sensor** |
| S1 | Engine coolant temperature |
| S2 | Engine oil pressure |
| S11 | Transmission oil temperature |
| S12 | Transmission oil pressure |
| S13 | Fuel level |

# Wire Color Legend

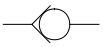
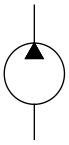
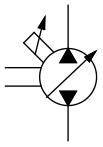
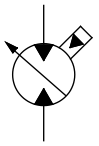
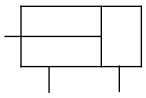
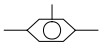
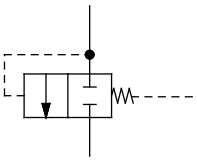
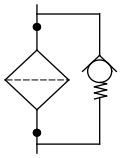
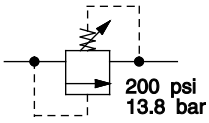
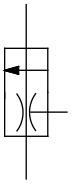
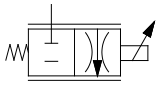
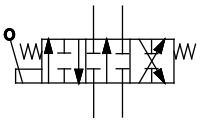
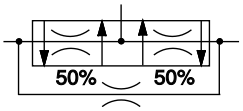
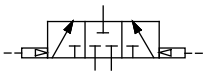
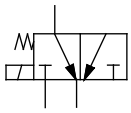
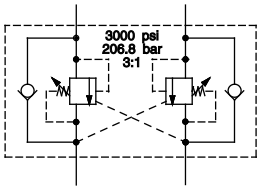
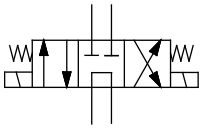
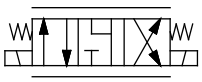
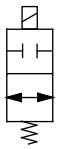
| Item | Description |
|---|---|
| **SW** | **Switch** |
| SW23 | Transmission control |
| SW24 | Parking brake |
| SW34 | Sway enable |
| SW35 | Auxiliary control |
| SW39 | Right outrigger |
| SW40 | Left outrigger |
| SW42 | Tilt enable |
| SW43 | Steer select |
| SW44 | Horn |
| SW77 | Differential lock |
| **U** | **Electrical component** |
| U31 | Engine ECM |
| U37 | Diode |
| **Y** | **Valve coil** |
| Y5 | Transmission reverse |
| Y6 | Transmission forward |
| Y55 | Rear axle oscillate enable |
| Y67 | Parking brake release |
| Y68 | Differential lock |
| Y70 | Sway left enable |
| Y71 | Sway right enable |
| Y72 | Tilt |
| Y73 | Right outrigger extend |
| Y74 | Right outrigger retract |
| Y75 | Left outrigger extend |
| Y76 | Left outrigger retract |
| Y77 | Auxiliary |
| Y78 | 4-wheel steer select |
| Y79 | Crab steer select |
| Y80 | Transmission "D" |
| Y81 | Transmission "E" |
| Y82 | Sway enable |
| Y83 | Rear axle oscillate fast |

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

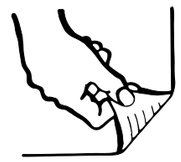
# Electrical Symbol Legend

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

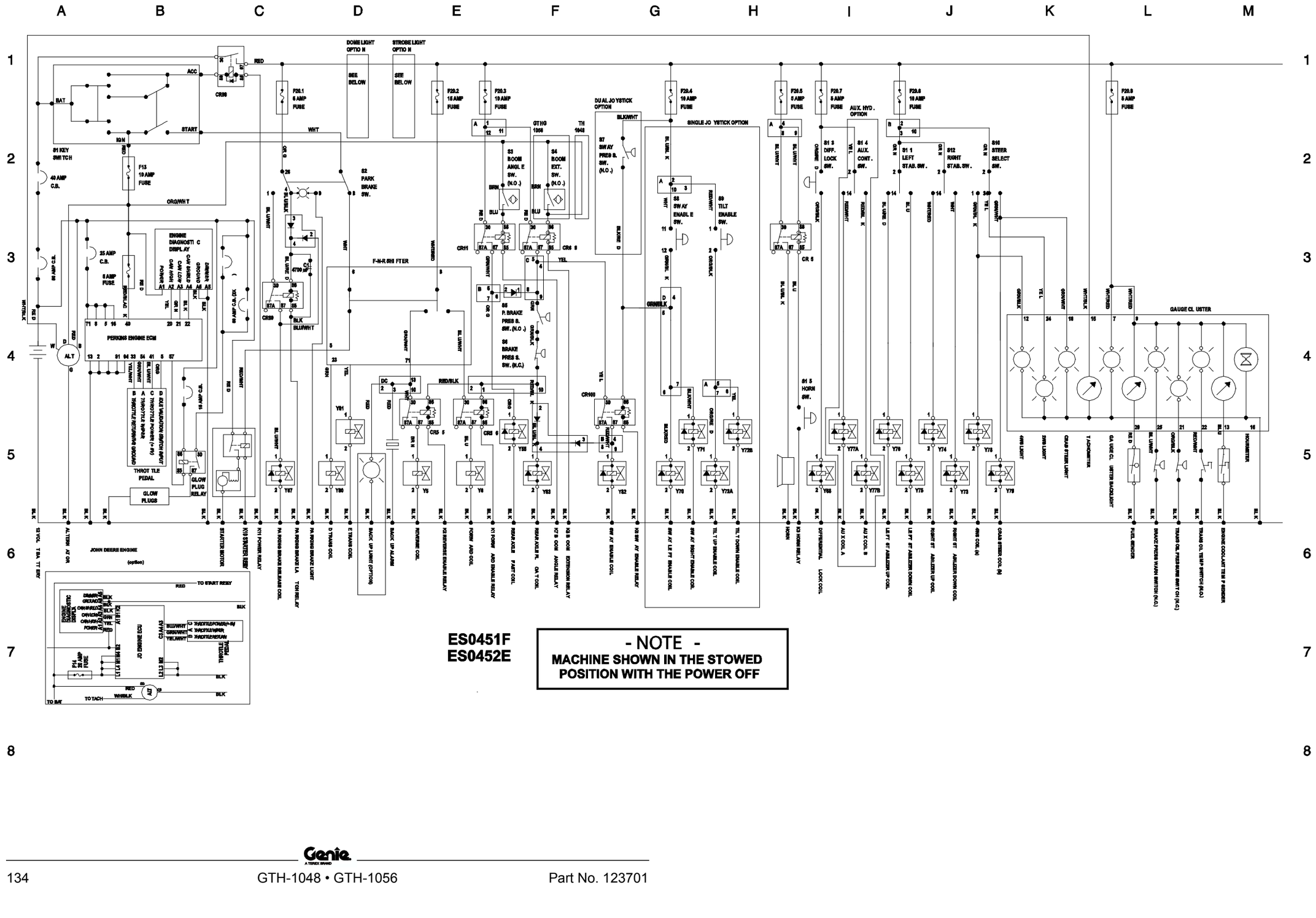
# Hydraulic Symbols Legend

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

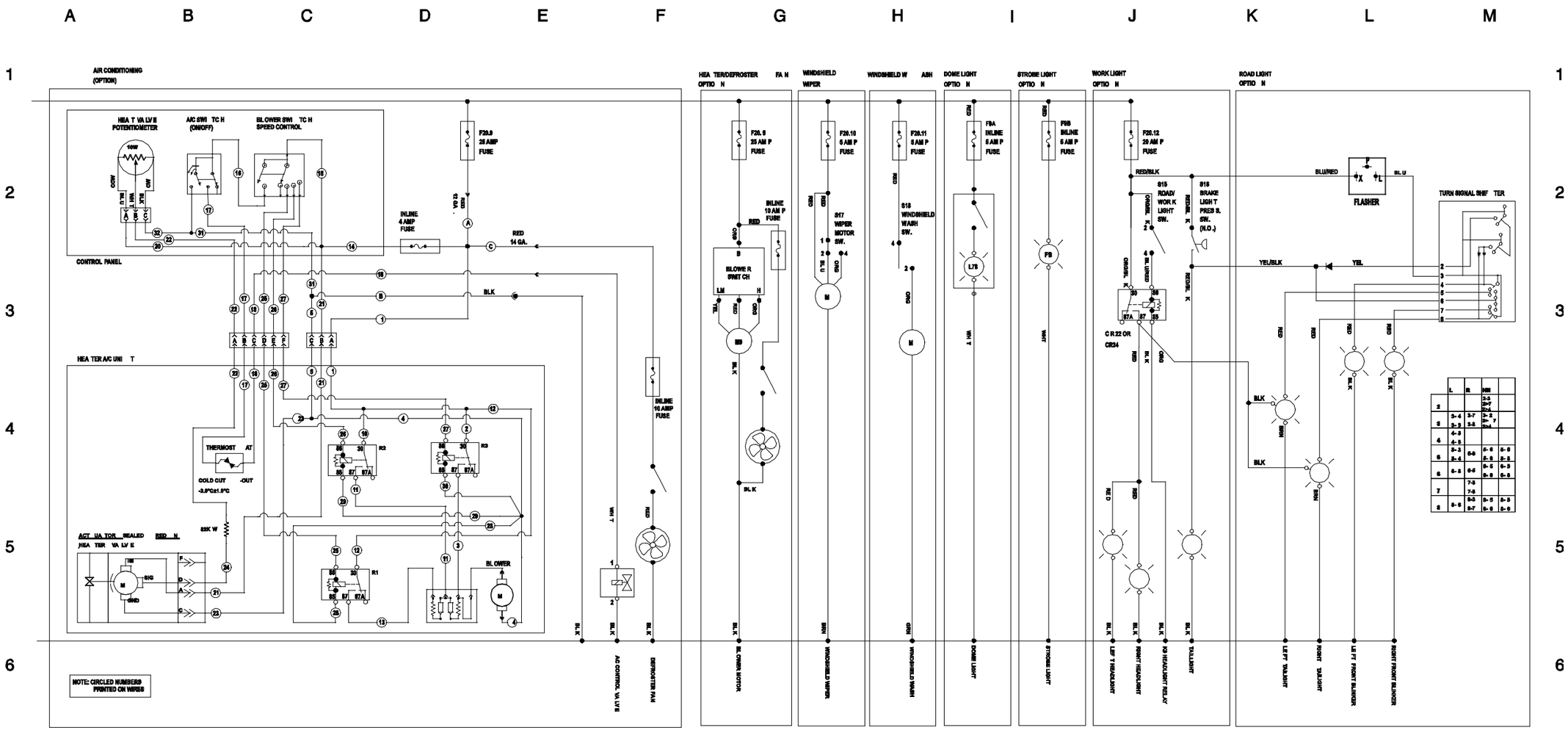
# Electrical Schematic



## Electrical Schematic



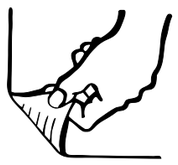
# Electrical Schematic



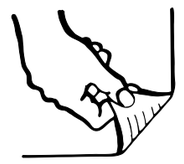

- NOTE -
**MACHINE SHOWN IN THE STOWED POSITION WITH THE POWER OFF**

ES0451F
ES0452E

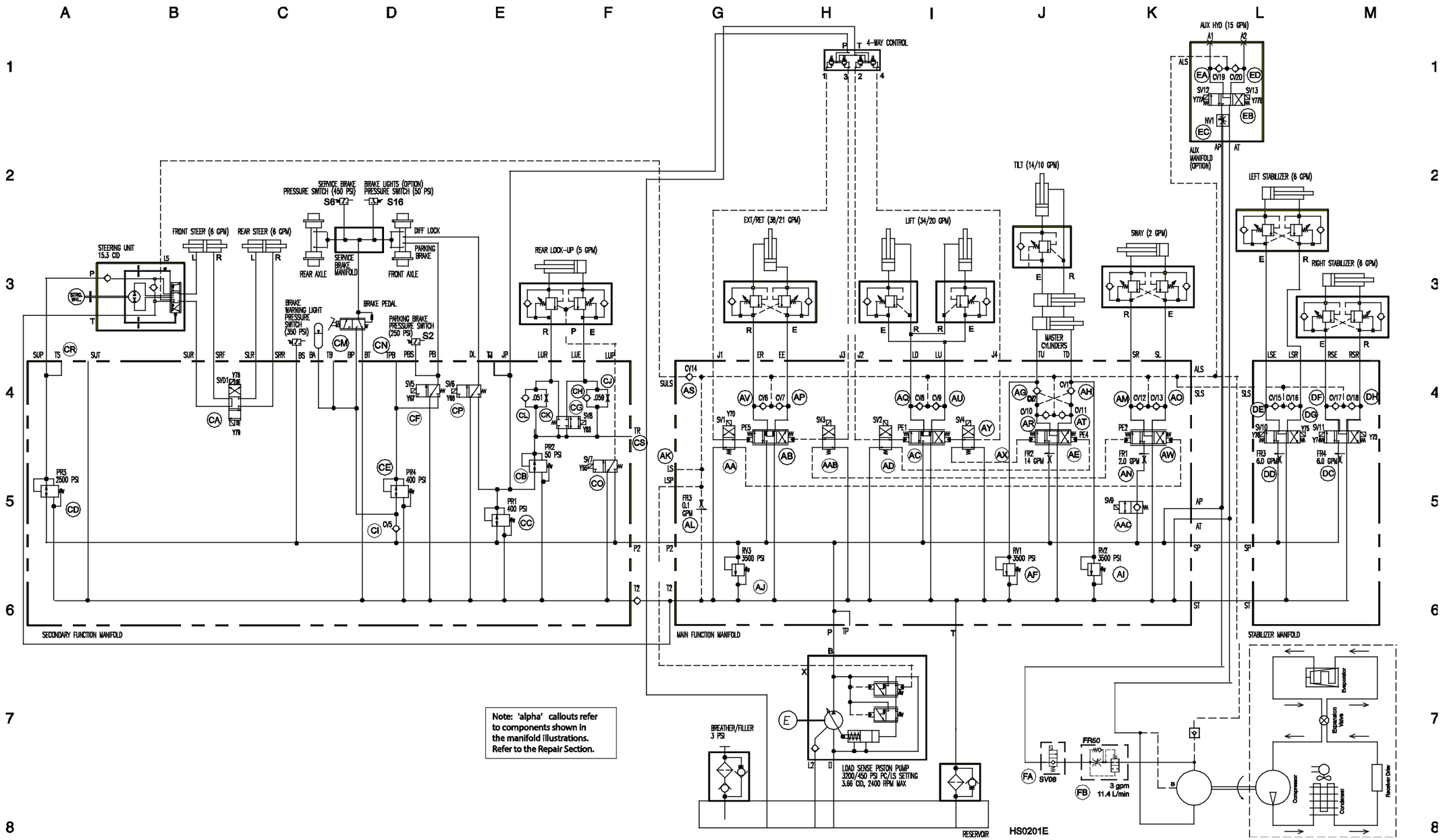
## Electrical Schematic



# Hydraulic Schematic - Models with Single Joystick



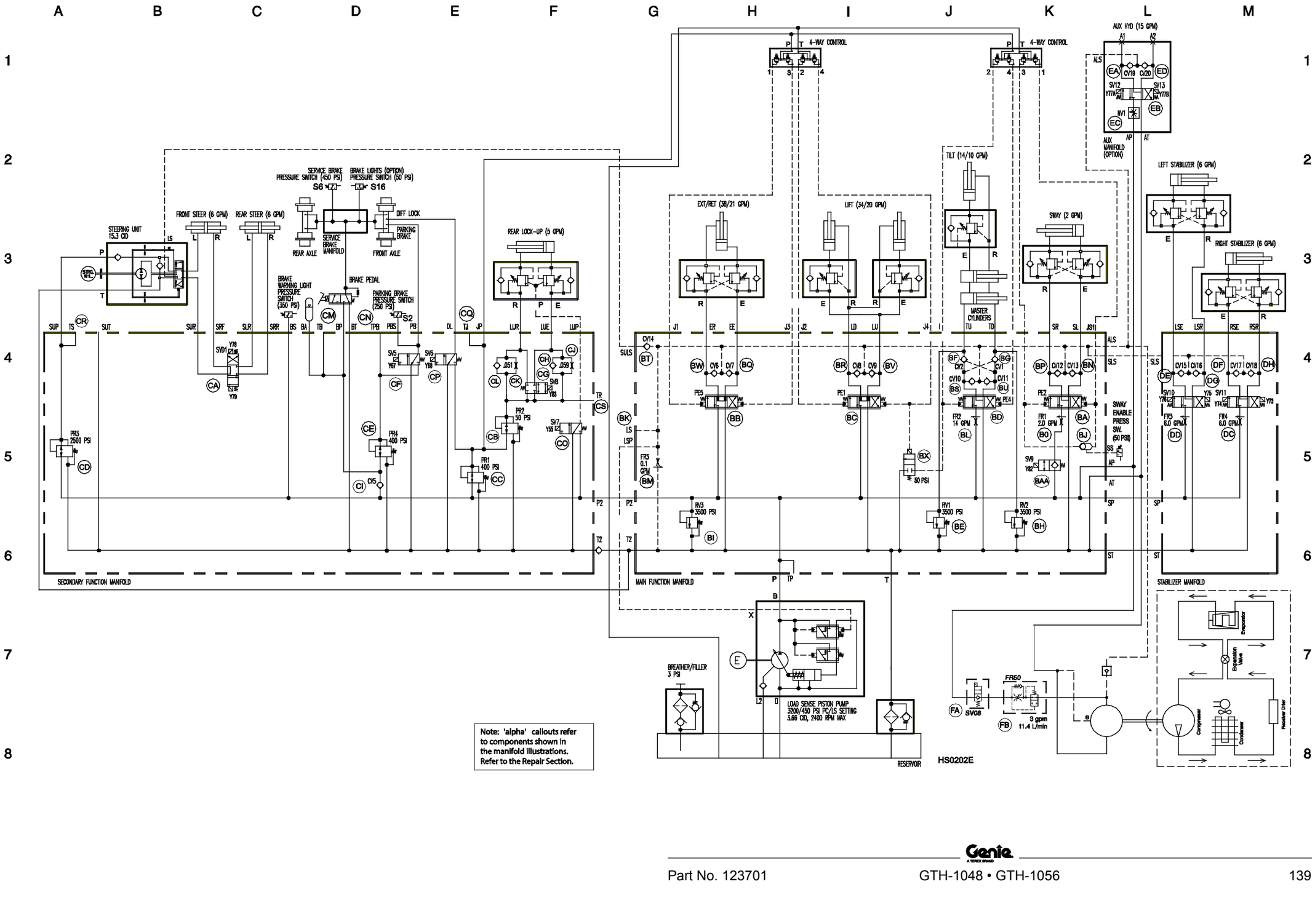
## Hydraulic Schematic - Models with Single Joystick




Note: 'alpha' callouts refer to components shown in the manifold illustrations. Refer to the Repair Section.

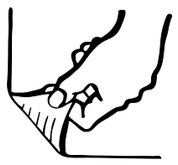
HS0201E

# Hydraulic Schematic - Models with Dual Joystick




Note: 'alpha' callouts refer to components shown in the manifold illustrations. Refer to the Repair Section.

# Hydraulic Schematic - Models with Dual Joystick



California Proposition 65

**Warning**

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

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