Genie
A TEREX BRAND

Service and Repair Manual

Serial Number Range

S®-85 XC™ FE
S®-85 XC™ E

from S85XCEH-101
from S85XCED-101

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

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

Original Instructions
Part No. 1337498GT
Rev A
November 2025

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 Classification

Group B/Type 3 as defined by ISO 16368

Machine Design Life

Unrestricted with proper operation, inspection and scheduled maintenance.

Technical Publications

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

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

Contact Us:

Internet: www.genielift.com
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Find a Manual for this Model

Go to http://www.genielift.com
https://www.genielift.com/en/support/manuals

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

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First Edition, First Printing

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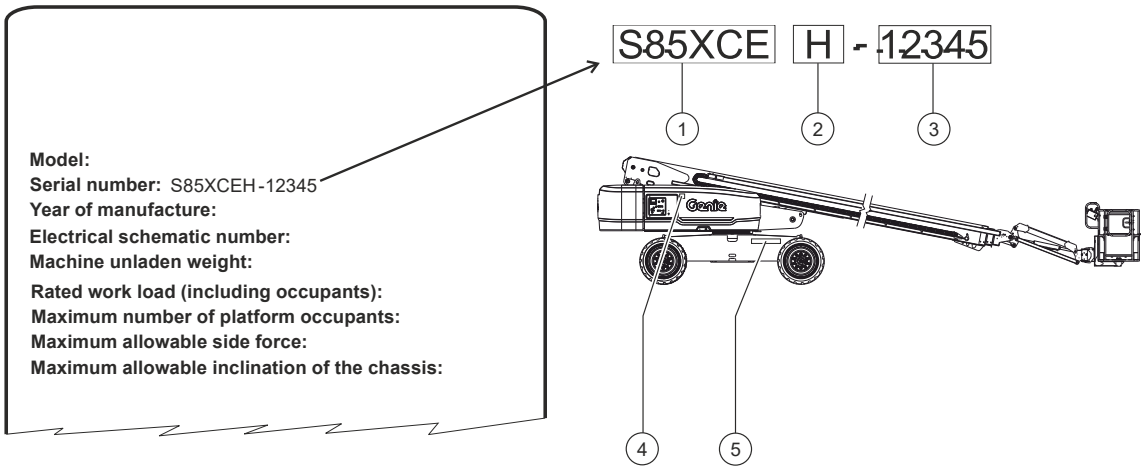
Revision History

Revision	Date	Section	Procedure / Page / Description
A	11/2025		Initial Release

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

Introduction

Serial Number Legend



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

Safety Rules

Danger

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

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

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

Do Not Perform Maintenance Unless:

- ☑ You are trained and qualified to perform maintenance on this machine.
- ☑ You read, understand and obey:
  - manufacturer's instructions and safety rules
  - employer's safety rules and worksite regulations
  - applicable governmental regulations
- ☑ You have the appropriate tools, lifting equipment and a suitable workshop.

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 Rough Terrain and Non-Marking	
Tire size	18-710 XT
Tire ply rating	16 ply
Overall tire diameter	40.75 in 103.5 cm
Tire pressure	foam filled at 60 PSI
Wheel diameter	28 in 71 cm
Wheel width	15 in 38 cm
Tire weight, new foam filled (minimum)	575 lbs 261 kg
Lug nut torque	
Wheel lugs	10 x M22 - 1.5
Lug nut torque, dry / Lubricated	450 ft-lbs 610 Nm

Fluid capacities	
Fuel tank	17 gallons 64 liters
Hydraulic tank	28 gallons 106 liters
Hydraulic system (including tank)	61 gallons 230 liters
Turntable rotation drive hub	43 fl oz 1272 cc
Drive hubs	84.5 fl oz 2500 cc
Drive hub oil type: SAE 90 multipurpose hypoid gear oil API service classification GL5	

Specifications

Performance Specifications

Drive speed, maximum	
Stowed position	40 ft / 9.1 sec 12.2 m / 9.1 sec
Raised or extended	40 ft / 54 sec 12.2 m / 54 sec
Braking distance, maximum	
High range on paved surface	32 in / 0.81 m
Gradeability	Refer to Operator's Manual
Boom function speeds, maximum from platform controls	
Jib boom up	13 - 17 sec
Jib boom down	13 - 17 sec
Primary boom up	79 - 87 sec
Primary boom down	100 - 108 sec
Primary boom extend	60 - 66 sec
Primary boom retract	64 - 70 sec
Turntable rotate stowed, (360°)	95 - 103 sec
Turntable rotate raised or extended, (360°)	210 - 250 sec
Platform rotate, 160°	10 - 14 sec
Platform level (10° range of motion)	3 - 5 sec

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

Hydraulic Oil Specifications

Hydraulic Fluid Specifications	
Genie specifications require hydraulic oils which are designed to give maximum protection to hydraulic systems, have the ability to perform over a wide temperature range, and the viscosity index should exceed 140. They should provide excellent antiwear, oxidation prevention, corrosion inhibition, seal conditioning, and foam and aeration suppression properties.	
Cleanliness level, minimum	ISO 15/13
Water content, maximum	250 ppm
Recommended Hydraulic Fluid	
Hydraulic oil type	Chevron Rando HD Premium
ISO Grade	32
Viscosity index, maximum	200
Optional Hydraulic Fluids	
Mineral based	Shell Tellus S2 V 32 Shell Tellus S2 V 46 Shell Tellus S4 VX 32 Shell Donax TG (Dexron III) Chevron 5606A
Biodegradable	Petro Canada Environ MV 46
Fire resistant	UCON Hydrolube HP-5046

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

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

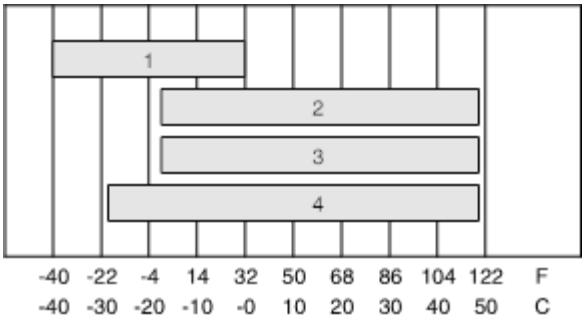
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond its maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

NOTICE

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

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

Hydraulic Fluid Temperature Range



Ambient air temperature

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

Chevron Rando HD Premium Oil MV Fluid Properties

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

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

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

Specifications

Chevron 5606A Hydraulic Oil Fluid Properties

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

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

NOTICE

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

Petro-Canada Environ MV 46 Fluid Properties

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

Shell Tellus S4 VX Fluid Properties

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

UCON Hydrolube HP-5046 Fluid Properties

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

Specifications

Hydraulic Component Specifications

Function Pump	
Type: 2 section fixed displacement gear pump	
Displacement per revolution inner pump	0.42 cu in 7 cc
Displacement per revolution outer pump	0.12 cu in 2 cc
Flow rate @ 4000 rpm inner pump	7.4 gpm 28 L/min
Flow rate @ 4000 rpm outer pump	2.1 gpm 8 L/min
Pressure, maximum	3200 psi 220 bar
Type: fixed displacement gear pump	
Displacement per revolution	0.9 cu in 15 cc
Flow rate @ 2000 rpm	7.93 gpm 30 L/min
Pressure, maximum	4061 psi 280 bar

Function manifold	
System relief valve pressure, maximum	102 - 3626 psi 7 - 250 bar
Primary boom extend relief pressure	2400 psi 165 bar
Oscillate relief	
Oscillate relief valve pressure	950 psi 65.5 bar
Hydraulic Filters	
High pressure filter:	Beta 5(C) ≥1000
High pressure filter bypass pressure	102 psi 7 bar

Manifold Component Specifications

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

Specifications

Kubota D1105-E4-GNI-4 Engine

Displacement	68.53 cu in 1.123 liters
Number of cylinders	3
Bore and Stroke	3.07 x 3.09 inches 78 x 78.4 mm
Horsepower, gross intermittent	24.8 @ 3000 rpm 18.5 kW @ 3000 rpm
Combustion system	Indirect injection
Firing order	1 - 2 - 3
Low idle	2150 rpm 208 Hz
High idle	3000 rpm 500 Hz
Compression ratio	24:1
Compression pressure	412 - 469 psi 28.4 - 32.3 bar
Governor	mechanical
Valve clearance, cold	0.0057 - 0.0072 in 0.145 - 0.185 mm

Lubrication system	
Oil pressure	28 - 64 psi 1.9 - 4.4 bar
Oil capacity (including filter)	5.4 quarts 5.1 liters
Oil viscosity requirements	
Below -10°C (14° F)	SAE 10W-30
-10 to 25° C (14° to 77° F)	SAE 10W-30 SAE 15W-40
Above 25° C (77° F)	SAE 30/ SAE 10W-30/ SAE 15W-40

Unit ships with 15W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine.

Engine coolant	
Capacity	3.3 quarts 3.1 liters

Fuel injection system	
Injection pump make	Bosch MD
Injection pump pressure, maximum	1991 psi 137 bar
Injection timing	18° BTDC

Fuel requirement

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

Starter motor	
Cranking speed	200 - 300 RPM
Current draw, normal load	155A

Battery	
Type	12V DC
Group	70
Quantity	1
Ampere hour	55AH
Cold cranking ampere	500A
Reserve capacity @ 25A rate	80 minutes
Alternator output	40A @ 12V DC
Fan belt deflection	1/4 - 3/8 inches 7 - 9 mm
Electric clutch	1.6A @ 48 V DC 29.22 Ω +/- 5%
Clutch fastener torque LOCTITE® 243™ threadlocker	28 ft-lbs / 38 Nm

Specifications

Machine Torque Specifications

Platform Rotator	
1-8 center bolt, GR 5, dull gray, lubricated	483 ft-lbs 655 Nm
1/2-13 bolts, GR 8, dull gray, LOCTITE® 243™ threadlocker	85 ft-lbs 115 Nm
Turntable rotate assembly	
Rotate bearing mounting bolts, lubricated	192 ft-lbs 260 Nm
Rotate drive hub mounting bolts, lubricated	93 ft-lbs 126 Nm
Backlash plate mounting bolts, lubricated	317 ft-lbs 430 Nm
Drive motors and hubs	
Drive hub mounting bolts, lubricated (for DANA and ZHUCHI drives)	93 ft-lbs 126 Nm
Function Pump	
Pump mounting bolts, (FE Models) LOCTITE® 243™ threadlocker	45 ft lbs 61 Nm
Pump mounting bolts, (E models - 7+2cc and 15 cc) LOCTITE® 243™ threadlocker	68 ft lbs 92 Nm

Engine vibration isolators

Compressed height	0.44 - 0.56 in 11 - 14 mm

Machine Component Weights

Primary boom assembly (does not include jib assembly)	5210 lbs 2364 kg
Turntable assembly (does not include boom, jib or engine)	4441 lbs 2015 kg
Counterweight	14120 lbs 6404 kg
Drive chassis assembly (does not include tire options)	8400 lbs 3811 kg
Tire and wheel assembly RT foam filled.	575 lbs 261 kg
Tire and wheel assembly High flotation.	300 lbs 136 kg
Drive motor and hub	274 lbs 125 kg
Engine assembly, max.	486 lbs 221 kg
Primary boom lift cylinder	1170 lbs 530 kg
Primary boom extend cylinder (includes cables and sheaves)	938 lbs 426 kg
Jib boom assembly (does not include platform)	369 lbs 168 kg
Jib boom cylinder	62 lbs 28 kg
Oscillate cylinder	75 lbs 34 kg
Platform, 6 ft / 1,8 m	275 lbs 125 kg
Platform, 8 ft / 2,4 m	315 lbs 143 kg
Battery	535 lbs 243 kg

Specifications

Hydraulic Hose and Fitting Torque Specifications

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

Seal-Lok™ Fittings

(hose end - ORFS)

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

JIC 37° Fittings

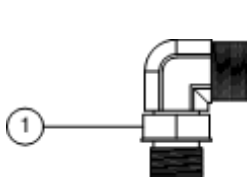
(swivel nut or hose connection)

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

SAE O-ring Boss Port

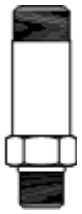
(tube fitting - installed into Aluminum)
(all types)

SAE Dash Size	Torque
-4	14 ft-lbs / 19 Nm
-6	23 ft-lbs / 31.2 Nm
-8	36 ft-lbs / 49 Nm
-10	62 ft-lbs / 84 Nm
-12	84 ft-lbs / 114 Nm
-16	125 ft-lbs / 169.5 Nm
-20	151 ft-lbs / 204.7 Nm
-24	184 ft-lbs / 249.5 Nm



Adjustable Fitting

1 jam nut



Non-adjustable fitting

SAE O-ring Boss Port

(tube fitting - installed into Steel)

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

Torque Procedure

Seal-Lok™ fittings

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

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

2 Lubricate the O-ring before installation.

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

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

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

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

JIC 37° fittings

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

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

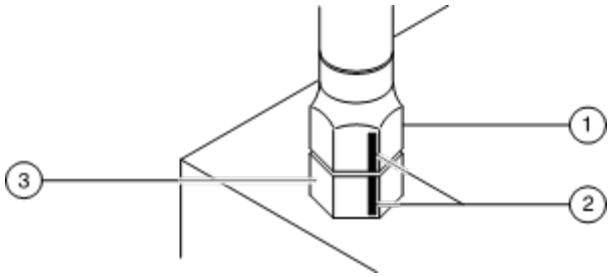


Illustration 1

1 hex nut
2 reference mark
3 body hex fitting

Specifications

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

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

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

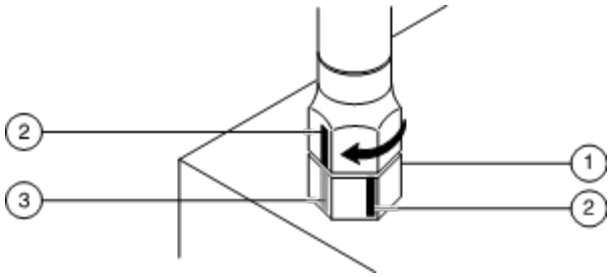


Illustration 2

1 body hex fitting
2 reference mark
3 second mark

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

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

Repair Procedures



Observe and Obey:

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

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

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

Before Repairs Start:

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

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

☑ Use only Genie approved replacement parts.

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

Machine Configuration:

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

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

Repair Procedures

About This Section

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

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

Symbols Legend



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

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

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

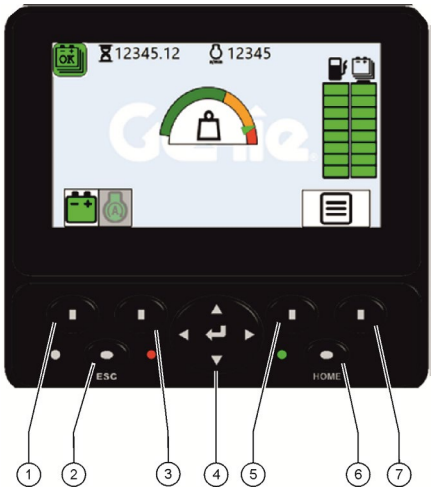
⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.

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

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

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

1-1
How to Enter Service Mode



Control System Display

1 Number 1
2 Escape
3 Number 2
4 Navigation button (left, right, up, down)
5 Number 3
6 Home
7 Number 4

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

1 Turn the key switch to ground controls.

2 Push in the red Emergency Stop button OFF.

3 Press and hold buttons number 2 and 3 located below the display screen.

4 Keep holding buttons 2 and 3, Pull out the red Emergency Stop button to ON.

Note: The password entry screen appears when you complete all the steps above.

5 Use the navigation buttons to enter the password **3 - 3 - 2 - 4**.

Note: Press the left or right navigation button to select the digit to change. The selected digit is highlighted in color. Press the up button to increase the digit by 1 unit. Press the down button to decrease the digit by 1 unit.

6 Press button number 4 (OK), to enter Service Mode page.

7 When the Service Mode menu page loads, the unlocked symbol displays in the top-right corner of the display. This symbol confirms that Service Mode is active.

8 Use the navigation buttons to move through the menu and select either Settings or Calibrations.

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

9 During parameter changes, the machine function will be disabled.

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

10 To exit Service Mode, press the ESC button.

Note: If there has been no input for 10 minutes while in Service Mode, the Service Mode will be exited.

Control System

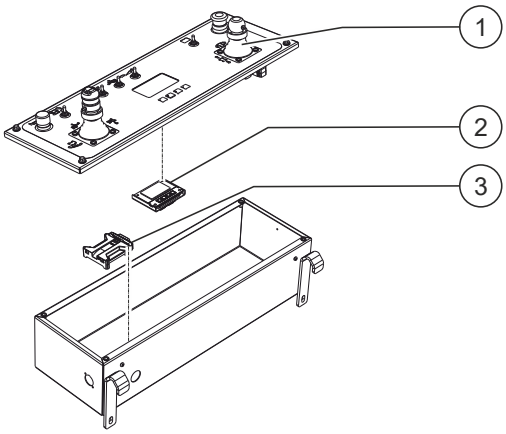
1-2 Platform Controls

The platform control box contains two control modules; The VCON is a LCD screen mounted between the boom and drive joysticks. The PCON (platform controller) inside the platform control box communicates with the VCON and controllers located on the turntable of the machine.

The joystick controllers at the platform controls utilize Hall Effect technology and require no calibration. Automatic calibration of center voltage occurs on power up if the signal value is in the valid range. Each joystick controller should operate smoothly and provide proportional speed control over its entire range of motion. The remaining boom functions operate by on/off toggle switches. Except for platform level, the speed of these functions are controlled by a function speed control switch.

The platform controls VCON can be utilized to perform a number of tasks:

- Read active and stored faults
- View battery SOC (State of Charge)
- Select options
- Activate drive enable
- Activate optional equipment
- View function speed setting
- View fuel level (FE models)
- View and change operating mode (E / FE)
- View software part number and version
- Aid in the calibration process



1 Drive joystick with steer left/right
2 VCON (diagnostic display)
3 PCON (platform control module)

How to Calibrate Valve Thresholds

The threshold setting is the minimum output current at which a function proportional valve can open and allow the function to operate. The controller sets the threshold automatically for most functions. You must calibrate the threshold manually for the functions listed below.

Functions to calibrate - Jib Up/Down, Platform Rotate and Turntable Rotate.

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

Note: Perform this procedure with the boom in the stowed position. Refer to Navigation Menus, *Settings Menu*.

1 Enter Service Mode. Refer to *How to Enter Service Mode.*

2 Select Menu and navigate to valve Threshold Calibration

Menu -> Calibrations -> Valve Threshold Calibration.

3 Press and hold the Function Enable button, then activate the required function. The function name will appear on the screen.

4 Use the Up arrow and the Down arrow on the screen to change the minimum threshold value. Increase the mA (milliamps) value to make the function faster. Decrease the mA (milliamps) value to make the function slower.

5 Operate the function and gradually reduce the threshold value until the function is barely moving.

6 When you find the correct value, press OK to save the setting.

7 Repeat steps 3 to 7 for each function that requires calibration.

8 Press the ESC button until you exit the Service Mode.

How to Calibrate the Valve Maximum Control Signal

The system calibrates specific hydraulic functions automatically. You must manually calibrate the Jib Up/Down, Platform Rotate, Primary Extend/Retract and Turntable Rotate functions. Valve calibration is important for efficient operation while maintaining the ability to operate multiple functions simultaneously.

You can adjust only the speeds of flow surplus functions in this setting. To adjust the speeds of other functions, use the master function speed setting.

Flow starved: Jib Up/Down, Turntable Rotate, Primary Extend/Retract

Flow surplus: Platform rotate.

Flow Starved Function:

Note: Do not use the valve maximum current setting to adjust function times. This calibration makes sure the valve stays fully open during operation. A fully open valve prevents throttling. Throttling causes low-pressure functions to take flow from high-pressure functions. Throttling also creates extra heat and reduces battery life.

1 Enter Service Mode. Refer to *How to Enter Service Mode*.

2 Select Menu and navigate to Valve Maximum Control Signal Calibration.

Menu -> Calibrations -> Valve Maximum Control Signal Calibration.

3 Press and hold the Function Enable button, then activate the required function. The function name will appear on the screen.

4 If you select the wrong function, press the ESC button. Then select the correct function.

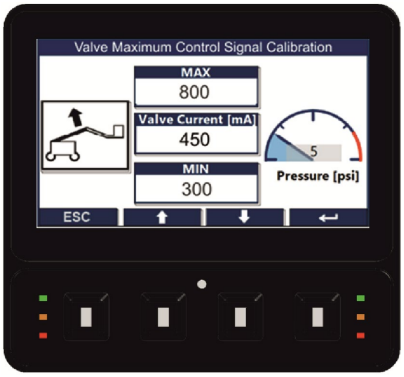
5 The screen displays the name of the function and a dial for hydraulic pressure.

Control System

6 Activate and hold the function for a few seconds.

7 Watch the pressure gauge and find the point before the gauge quickly increases to a high value.

8 Use the Up arrow or Down arrow on the screen to change the mA value during calibration.



9 Continue to activate the function. Stop the function, adjust the mA value, and activate the function again

10 Change the mA value in small steps until the function moves smoothly and the pressure gauge stays stable just below the surge point.

11 When you reach this point, increase the mA value by 1 click.

12 When the desired value is set, press OK to save the setting.

13 Press the ESC button until you exit the Service Mode.

Flow Surplus Function:

Note: You control the maximum speed using the valve maximum current setting.

1 Enter Service Mode. Refer to *How to Enter Service Mode*.

2 Select Menu and navigate to Valve Maximum Control Signal Calibration.

Menu -> Calibrations -> Valve Maximum Control Signal Calibration.

3 Press and hold the Function Enable button, then activate the required function. The function name will appear on the screen.

4 If you select the wrong function, press the ESC button. Then select the correct function.

5 The screen displays the name of the function and a dial for hydraulic pressure.

6 Operate the selected function for a few seconds to observe its movement. If the function moves too slowly, increase the control signal (mA) to make it faster. If the function moves too quickly, decrease the control signal (mA) to make it slower.

7 When the desired value is set, press OK to save the setting.

8 Press the ESC button until you exit the Service Mode.

How to Adjust the Ramp Rate Setting

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

Ramp Up Time: The amount of time it takes to accelerate to speed.
Ramp Down Time: The amount of time it takes to decelerate to a stop.

Note: Perform this procedure with the boom in the stowed position. Refer to Navigation Menus, *Settings Menu*.

1 Enter Service Mode. Refer to *How to Enter Service Mode*.

2 Select Menu and navigate to Speeds and Acceleration time.

Menu -> Calibrations -> Speeds and Acceleration time.

3 Using the arrow keys select the function to edit and press OK to select it.

4 The screen shows the current Ramp Rate setting in milliseconds and the minimum and maximum permitted values.

5 Use the Up Arrow or Down Arrow on the screen to set the Ramp Rate to the desired value.

- Increase the value to make the function operate faster.
- Decrease the value to make the function operate slower.

6 When the desired value is set, press OK to save the setting.

7 Press the ESC button until you exit the Service Mode.

Note: The alarm will sound indicating the setting has been saved. Continue to the next desired Ramp time adjustment.

Ramp Rate (factory settings)	
Primary boom up/down	
ramp accelerate (up)	2 seconds
ramp decelerate (down)	0.6 second
Turntable rotate	
ramp accelerate (up)	1.5 seconds
ramp decelerate (down)	1.25 seconds
Extend/Retract	
ramp accelerate (up)	2 seconds
ramp decelerate (down)	0.4 seconds
Jib up/down	
ramp accelerate (up)	2 seconds
ramp decelerate (down)	0.4 second
Platform rotate	
ramp accelerate (up)	0.75 second
ramp decelerate (down)	0.3 second
Propel	
ramp accelerate (up)	5 seconds
ramp decelerate (down)	3 seconds
Platform level	
ramp accelerate (up)	1 second
ramp decelerate (down)	0.4 second

Control System

1-3 Full Machine Calibration

It is required to perform the calibration process if system defaults have been reset or if new software has been installed. Any deviation in the order of these steps could result in improper machine function and fault codes to display.

How to Fully Calibrate the Machine

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

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

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

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

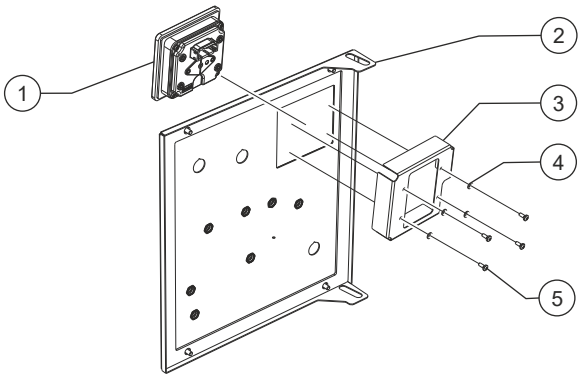
Full machine calibration must be completed in the following sequence:

- Turntable level sensor. Refer to Repair Procedure, *How to Calibrate the Turntable Level Sensor*.
- Load cell sensor. Refer to Repair Procedure, *How to Calibrate the Load Cell Sensor.*
- Calibrate the pressure relief valve. Refer to Repair Procedures, *How to Adjust the Proportional Relief Valve and Hydraulic Pressure Sensor.*
- Primary boom angle sensor. Refer to Repair Procedure, *How to Calibrate the Primary Boom Angle Sensor*.
- Primary boom length sensor. Refer to Repair Procedure, *How to Calibrate the Primary Boom Length Sensor*.
- Platform angle sensor. Refer to Repair Procedure, *How to Calibrate the Platform angle Sensor*.
- Set hydraulic valve thresholds. For jib up/down and platform rotate: Refer to Repair Procedures, *How to Adjust the Joystick Threshold Setting*.
- Set low flow hydraulic valves. For primary extend and turntable rotate: Refer to Repair Procedures, *How to Calibrate the Valve Maximum Control Signal.*
- Set high flow hydraulic valves. For jib up/down and platform rotate: Refer to Repair Procedures, *How to Calibrate the Valve Maximum Control Signal*.
- Calibrate the steer angle sensor. Refer to Repair Procedures, *How to Calibrate the Steer Angle Sensor*.

1-4
How to Replace the Display Controller (DISCON) Module

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

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



1 DISCON
2 Ground box lid
3 Mounting Bracket
4 Flat washers
5 Screws

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

4 Remove the DM430 mounting bracket from the back by loosening the M4 PHPM screws and washers.

Note the orientation of the cables for reassembly.

5 Remove the DISCON unit from the ground control box lid by pulling it outward, opposite the direction of the mounting hardware. Clean the lid surface thoroughly to remove any dirt, oil, or contaminants.

Note the lanyard attachment point for reassembly.

6 Install the new DISCON unit onto the ground box lid. From the opposite side, position the mounting bracket in place. Secure the DISCON using new M4 PHPM screws and washers.

7 Evenly tighten the screws evenly to ensure a stable and uniform fit.

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

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

Platform Components

2-1
Platform Leveling Cylinder

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

How to Remove the Platform Leveling Cylinder

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

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

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

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

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

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

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

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

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

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

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

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

2-2 Platform Rotator

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

How to Remove the Platform Rotator

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

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

1 Remove the retaining fasteners securing the platform assembly to the platform rotator. Remove the platform assembly and set aside.

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

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

3 Support the jib boom leveling arms with an overhead supporting device. Do not apply any lifting pressure.

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

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

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

6 Use a soft metal drift to remove both pins and remove the platform rotator from the machine.

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

Note: When installing the platform rotator fasteners, torque the fasteners to specifications. Refer to Specifications, *Machine Torque Specifications*.

Platform Components

How to Bleed the Platform Rotator

1 From the ground controls, fully rotate the platform to the right and then the left. Continue holding platform rotate in each direction for approximately 10 seconds.

2 Repeat this procedure until the air has been bled out of the platform rotator.

Note: Verify by pushing and pulling the platform side to side by hand. There should be minimal movement.

2-3 Platform Overload System

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

How to Perform a Zero Load Platform Calibration

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

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

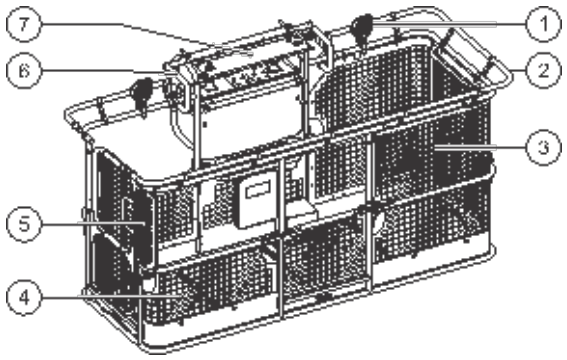
1 Fully retract and lower the boom. Level the platform.

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

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

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

Platform Components



Integrated Options and Accessories

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

3 Enter Service Mode. Refer to *How to Enter Service Mode.*

4 Select Menu and navigate to Platform Load Sense Calibration

Menu -> Calibrations -> Platform Load Sense Calibration.

5 Follow the instructions shown on the screen. Press button 4 or OK to calibrate the zero point for the load cell. If full load calibration is not required, exit the screen.

⊙ Result: The load cell zero point is now calibrated. If full load calibration was completed earlier, the same value is saved. If full load calibration was not completed, the system saves a conservative default value.

⊙ Result: Screen displays **Load Sensor calibration completed**. Calibration is saved.

⊠ Result: Screen displays **Load Sensor calibration failed**. Calibration has not been saved. Adjust the load cell and repeat this procedure.

How to Perform a Full Load Platform Calibration

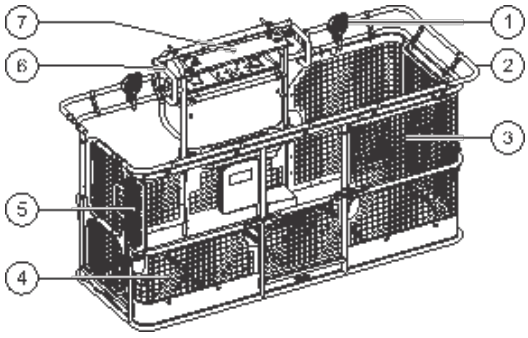
Note: Perform this procedure on a firm, level surface with the machine in the stowed position.

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

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

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

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



Integrated Options and Accessories

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

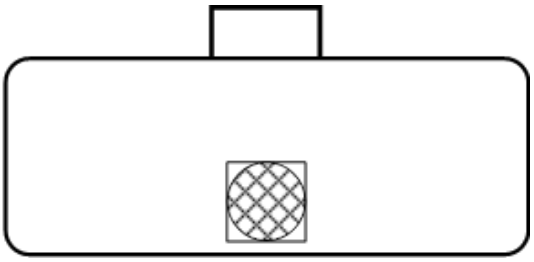
3 Perform a zero load calibration. Refer to *How to Perform a Zero Load Calibration*.

Platform Components

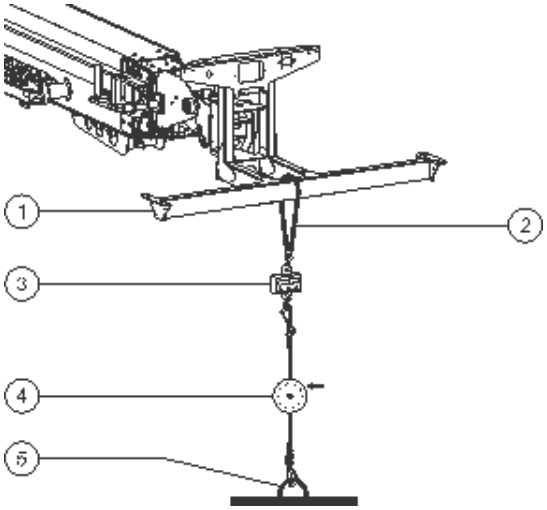
4 Place a test weight on the platform floor using a suitable lifting device. Place the weight near the center entry point of the platform, as far away from the operator controls as possible.

Weight = 660 lbs / 300 kg

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



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



Platform hidden from illustration for clarity

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

5 Press OK on screen to save values.

⊙ Result: Screen displays **Load sensor calibration completed**. Calibration is saved.

⊠ Result: Screen displays **Load sensor calibration failed**. Calibration has not been saved. Adjust the load cell and repeat this procedure.

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

Confirm calibration:

7 Start the machine using the ground controls.

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

⊙ Result: The alarm sounds. LCD symbol flashes at the platform controls and *Platform Overload* is displayed on the LCD screen at the ground controls.

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

9 Test all machine functions from the ground controls.

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

10 Remove the weight or rated load from the platform.

How to Replace the Load Cell Sensor

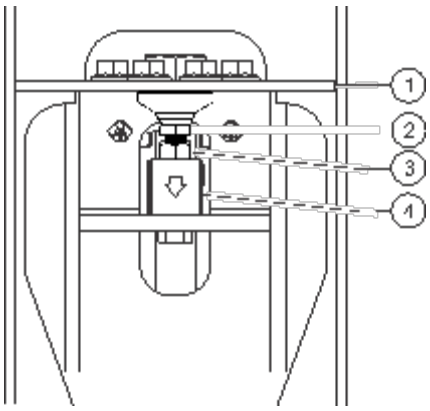
Note: The preload adjustment should only be performed after the load cell sensor has been replaced.

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

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

3 Tag and disconnect the load cell sensor harness.

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



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

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

Install the new Load Cell Sensor

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

Note: Verify the arrow on the load cell is in the downward position.

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

Set the Load Cell Sensor Preload

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

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

10 Attach the load cell sensor harness.

11 Install the plastic instruction holder.

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

Platform Components

2-5 Platform angle sensor

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

How to Calibrate the Platform Angle Sensor

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

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

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

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

1 Raise the primary boom to a horizontal position.

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

3 Select Menu and navigate to Platform Angle Sensor Calibration

   Menu > Calibrations > Platform Angle Sensor Calibration

4 When prompted, press and hold the function enable button and the platform down button.

Note: The machine will then display this message: "Press the platform button down until the platform reaches the mechanical stop."

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

5 Press OK on the display.

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

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

7 Press OK on the display.

8 Exit Service Mode.

3-1
Jib Boom

How to Remove the Jib Boom

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

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

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

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

2 Tag and disconnect the electrical connector from the platform load sense cell.

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

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

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

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

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

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

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

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

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

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

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

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

Jib Boom Components

3-2
Jib Boom Lift Cylinder

How to Remove the Jib Boom Lift Cylinder

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4-1 Cable Track

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

How to Remove the Cable Track

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

1 Open the platform control box.

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

3 Loosen the squeeze connector and remove the foot switch cable from the control box.

4 Disconnect the wire connectors from the bottom of the platform control box.

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

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

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

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

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

8 Tag, disconnect and plug the wiring from the platform manifold.

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

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

10 From the ground controls, raise the boom to a horizontal position.

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

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

12 Remove the cable track guide fasteners from the cable track guides at the platform end of the boom. Remove the cable track guides from the boom.

13 Remove the cable clamp from the pivot end of the boom.

Boom Components

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

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

15 Attach a lifting strap from an overhead lifting device to the cable track.

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

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

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

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

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

How to Repair the Cable Track

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

Note: A cable track repair kit is available through Genie Service Parts. Check the parts manual for your serial number range to identify the correct kit part number. The kit includes a 4-link section of cable track.

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

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

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

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

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

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

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

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

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

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

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

4-2 Boom

How to Shim the Boom

1 Measure each wear pad.

Boom wear pad specifications	
Boom number one	**Minimum**
Bottom wear pads (extension end of boom)	0.50 inch 12.7 mm
Top and side wear pads (extension end of boom)	0.625 inch 15.9 mm
Boom number two	
Top and side wear pads (extension end of boom)	0.75 inch 19.1 mm
Bottom wear pads (extension end of boom)	0.50 inch 12.7 mm
Bottom wear pads (pivot end of boom)	0.75 inch 19.1 mm
Top and side wear pads (pivot end of boom)	0.5 inch 12.7 mm
Boom number three	
Top, bottom and side wear pads (pivot end of boom)	0.50 inch 12.7 mm

Note: Replace the pad if thickness is less than minimum specification. If thickness is more than minimum specification, perform the following procedure.

2 Extend the boom until the wear pads are accessible.

3 Loosen the wear pad mounting fasteners.

4 Install the new shims under the wear pad to obtain zero clearance and zero drag.

5 Tighten the mounting fasteners.

6 Extend and retract the boom through an entire cycle. Check for tight spots that could cause binding or scraping.

Note: Always maintain squareness between the outer and inner boom tubes.

How to Remove the Boom

⚠ DANGER Tip-over hazard. This procedure requires the removal of the turntable counterweight. Failure to remove the counterweight before removing the boom assembly will result in the machine tipping over. Do not remove the boom without first removing the counterweight.

⚠ DANGER Tip-over hazard. When installing the boom onto the machine, the boom assembly must be first installed prior to the installation of the counterweight. If the counterweight is installed before the boom assembly, the machine will tip over resulting in death or serious injury.

⚠ DANGER Tip-over hazard. The turntable counterweight is essential for machine stability. Failure to install the counterweight after installing the boom assembly will compromise machine stability resulting in the machine tipping over. Death or serious injury will result.

⚠ 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.

Boom Components

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

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

3 Raise the boom until the short and long link arm to boom pivot pins are above the turntable covers.

4 Place a block of wood measuring 4 x 4 x 60 inches / 10 x 10 x 152 cm under the long link arm, across the turntable covers.

5 Slowly lower the boom until the long link arm contacts the wood block. Do not rest the entire weight of the boom on the block. Turn the machine off.

NOTICE Component damage hazard. The turntable covers can become damaged if the weight of the boom is allowed to rest on the block.

6 Place wood blocks between the short link arm and the turntable weldment for support..

7 Securely attach shackles and lifting straps or chains with a minimum rating of 7.5 tons / 7000 kg to the lifting points on the top of the turntable counterweight. Attach the lifting straps or chains to a 7.5 ton / 7000 kg overhead lifting device.

Note: A spreader bar and other hardware may be needed to safely remove the counterweight.

8 Slowly operate the overhead lifting device to apply tension to the lifting straps. Do not attempt to lift the machine.

9 Locate and remove the counterweight retaining fastener at the center of the counterweight. Carefully lift the counterweight upwards and remove the counterweight from the machine. Set the counterweight on the ground. Do not leave the counterweight suspended above the ground.

⚠ DANGER Crushing hazard. The turntable counterweight will fall if not properly supported by the overhead lifting device resulting in death or serious injury. Keep personnel away from the area when removing the counterweight.

10 Remove the end cover from the pivot end of the primary boom.

11 Remove the limit switch mounting fasteners from the limit switch on the bottom of the primary boom at the counterweight end. Do not disconnect the wiring. Remove the limit switch.

12 Disconnect the electrical connector from the string potentiometer.

13 Disconnect the electrical connector from the primary boom angle sensor.

Note: The primary boom angle sensor is located on the pivot pin on the engine side of the boom.

14 Remove the primary boom angle sensor bracket mounting fasteners and remove the primary boom angle sensor from the primary boom. Do not remove the angle sensor from the bracket.

Note: When the primary boom is installed, the primary boom angle sensor will need to be calibrated. Refer to Repair Procedure, *How to Calibrate the Primary Boom Angle Sensor*.

Boom Components

15 Remove the hose and cable guide fasteners at the primary boom pivot pin. Remove the hose and cable guide.

16 Attach lifting straps from a 5 ton / 5000 kg overhead lifting device to each end of the boom. Support the boom. Do not apply any lifting pressure.

17 Support and secure the rod end of the boom lift cylinder to a second overhead lifting device.

18 Remove the lift cylinder rod-end pivot pin retaining fasteners. Use a soft metal drift to remove the pin.

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

19 Using auxiliary power, activate the boom down function so the cylinder will retract. Retract the cylinder just enough until the rod end of the cylinder will clear the mounting bracket on the boom. Turn the machine off.

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

20 Using the overhead lifting device, carefully lower the boom lift cylinder and allow it to rest on the boom rest pad. Protect the cylinder rod from damage.

21 Remove the boom end cover retaining fasteners and remove the cover.

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

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

23 Tag and disconnect the electrical connector for the cable break limit switch.

24 Tag and disconnect all boom wire harness electrical connectors located at the pivot end of the boom.

25 Tag, disconnect and plug the hydraulic hoses from the bulkhead fittings at the pivot end of the boom. Cap the bulkhead fittings.

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

26 Remove the external snap rings from both boom pivot pins at the short and long link arms. Do not remove the pins.

Boom Components

27 Using the overhead crane, adjust the boom as necessary to relieve pressure from the pivot pins.

28 Use a soft metal drift to remove each boom pivot pin. Carefully remove the boom assembly from the machine and place it on a structure capable of supporting it.

⚠WARNING Crushing hazard. The boom could fall if not properly supported by the overhead lifting device when each boom pivot pin is removed.

⚠CAUTION Crushing hazard. The long and short link arms may fall if not properly supported when the boom pivot pins are removed.

4-3 Boom Lift Cylinder

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

How to Remove the Boom Lift Cylinder

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

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

1 Raise the boom to a horizontal position.

2 Attach a 5 ton / 5000 kg overhead supporting device to the boom at the platform end for support. Do not lift the boom.

3 Support and secure both ends of the boom lift cylinder to a second overhead lifting device.

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

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

5 Using auxiliary power, activate the boom down function so the cylinder will retract. Retract the cylinder just enough until the rod end of the cylinder will clear the mounting bracket on the boom. Turn the machine off.

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

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

7 Remove the pin retaining fasteners from the boom lift cylinder barrel-end pivot pins. Do not remove the pins.

8 Use a slide hammer to remove the barrel-end pivot pins.

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

9 Move the boom lift cylinder towards the counterweight end of the machine. Rotate the boom lift cylinder until the barrel-end pivot pin bores will clear the boom linkage.

10 Carefully remove the boom lift cylinder from the machine.

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

4-4
Boom Extension Cylinder

The boom extension cylinder is located inside the boom assembly and incorporates cables and pulleys that are responsible for extending the number 3 boom tube. The primary boom extension cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

How to Remove the Boom Extension Cylinder

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

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

Note: Perform this procedure with the boom fully retracted.

1 Raise the boom to a horizontal position.

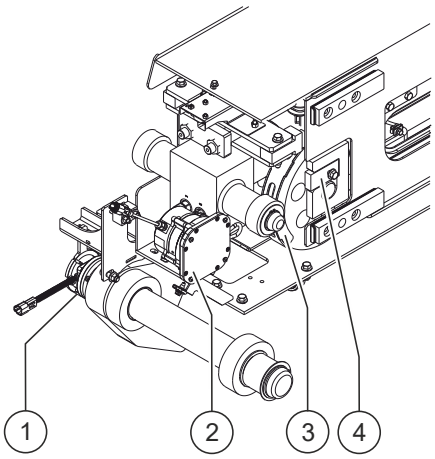
2 Remove the boom end cover retaining fasteners and remove the cover.

3 Remove the access covers from both sides of the boom at the pivot end.

4 Remove the mounting plates and the string potentiometer.

Boom Components

5 Fully loosen the lock nuts on the extend cables. Do not remove the nuts.



1 boom angle sensor
2 string potentiometer
3 cable guard
4 cable guard retaining plate

6 Loosen the retract cable nut at the platform end of the boom. Pull the cable rod from the support and let it hang down.

7 Remove the cable guard fasteners and remove the cable guard.

8 Locate the retaining plates that secure the retract cables to the inside of the number 3 boom tube.

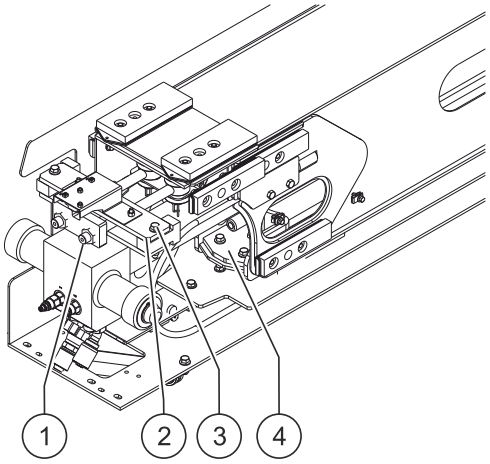
9 Remove the cable retaining plates and pull the retract cables off of the pulleys. Lay the cables flat and out of the way.

10 Remove the fasteners from the retaining blocks from the extension cylinder saddle. Remove the blocks.

Note: Access the fasteners through the access hole in the outer boom tube at the pivot end.

11 Disconnect the wire connector to the extend cable break proximity sensor.

12 Remove the retaining fasteners that secure the extend cable mounting plates to the inside of the number 1 boom tube.



1 extend cable lock nuts
2 extend cable mounting plate
3 extend cable mounting plate fastener
4 extend cable bracket

13 Pull back on the extend cable mounting plate until it clears the blocks welded to the inside of the number 1 boom tube.

Boom Components

14 Lift up the extend cable mounting plate and push the extend cables towards the platform to create slack in the cables. Rest the cable and bracket assembly on top of the extend cylinder.

15 Locate the lower extend cable bracket on the bottom of the number 3 boom tube.

16 Remove the lower extend cable bracket mounting fasteners and pull back on the bracket to release it from the number 3 boom tube.

17 While pushing the lower extend cable bracket towards the platform, pull the extend cable mounting plate towards the pivot end of the boom.

18 Secure the extend cable bracket and cables to the cylinder to prevent them from falling off when removing the cylinder.

19 Remove the external snap rings from the extension cylinder pin at the pivot end of the boom.

20 Use a soft metal drift to remove the pin.

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

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

22 Attach a lifting strap from a 5 ton / 5000 kg overhead crane to the lug at the rod end of the boom extension cylinder.

23 Lift the boom extension cylinder with the crane until it clears the cylinder saddle inside the number 2 boom tube.

24 Carefully support and slide the extension cylinder out of the boom.

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

NOTICE Component damage hazard. Be careful not to damage the cable break limit switch.

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

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

Boom Components

4-5
Boom Extend and Retract Cables

How to Adjust the Boom Extend/Retract Cables

The boom extend/retract cables are responsible for the extension and retraction of the number 3 boom tube. Proper adjustment of the boom extend/retract cables and related components on a regular basis is essential to good machine performance and safe machine operation. The boom extend and retract functions should operate smoothly and be free of hesitation, jerking and unusual noise.

Note: Perform this procedure with the boom in a horizontal position.

1 Raise the boom to a horizontal position.

2 Fully retract the boom.

3 Remove the boom end cover retaining fasteners and remove the cover.

4 Inspect the threaded ends of the boom extend cables. The threads must be clean and in good condition with no damaged threads.

5 Locate the retract cable adjustment nut on the bottom of the number 1 boom tube at the platform end of the boom. Loosen the nut, but do not remove the nut.

6 Locate the extend cable adjustment nuts on the counterweight end of boom tube #1. Refer to Illustration 1. Loosen the nylock nuts and jam nuts on the cable tension equalizer bracket. Do not remove the nuts.

7 Adjust the extend cable adjustment nut to obtain 6 3/8 inches/16.2 cm to 6 1/2 inches/16.5 cm between the platform end of boom tube #2 and boom tube #3. Refer to illustration 2. There should be approximately 1/2 inch of exposed threads on the adjustment bolts. Refer to Illustration 1.

Note: If the cables have been replaced, be sure the adjustment nuts have been replaced. Do not re-use the existing nuts.

8 Extend the boom until there is approximately 3 feet / 1 m of travel left. Do not fully extend the boom.

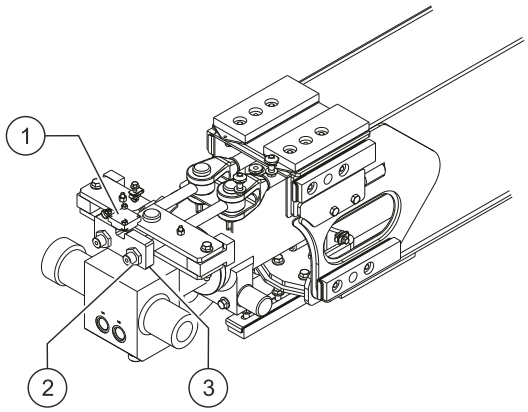


Illustration 1

1 cable break limit switch
2 extend cable adjustment nut
3 extend cable pivot plate

9 Locate the retract cable adjustment nut on the bottom of the number 1 boom tube at the platform end of the boom.

10 Using a dial type torque wrench, torque the retract cable adjustment nut to 32-36 ft lbs / 43-49 Nm using gentle and steady torque.

11 Retract and extend the boom approximately 3 feet / 1 m two times and stop during the extension cycle. This will create slack in the retract cables.

Note: Be sure to not fully extend the boom. Stop when there is approximately 3 feet / 1 m of travel left.

12 Repeat steps 12 and 13 two to three times.

13 Fully extend the boom then retract the boom approximately 12 inches / 30 cm.

14 At the pivot end of the boom, visually inspect the boom extend cables for even cable droop or sag.

Note: If the boom extend cables are uneven, tighten the boom extend cable adjustment nut at the pivot end of the boom for the appropriate cable.

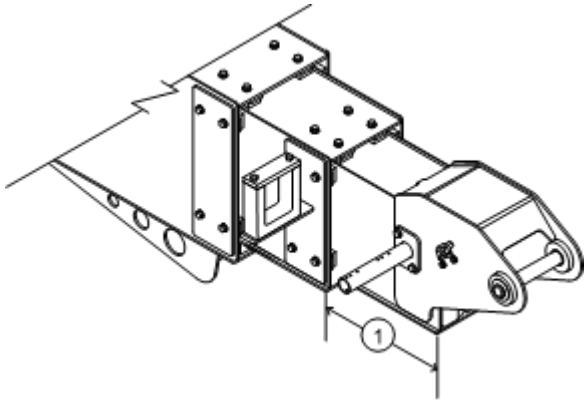


Illustration 2

1 6.375 inches / 16.2 cm

15 Visually inspect the cable break proximity switch to ensure that the notch in the middle of the pivot plate is centered with respect to the proximity switch, and verify that the LED indicator on the proximity switch is ON.

Note: If the boom extend cables are adjusted to have even tension, the pivot plate notch should be centered below the proximity switch.

16 Install the boom end cover at the pivot end of the boom.

17 Fully retract and lower the boom to the stowed position.

Boom Components

How to Replace the Boom Extend/Retract Cables

Note: The cable pulleys must also be replaced when replacing the cables.

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

Boom extend cables:

2 Remove the cables from the lower boom extend cable bracket that attaches to the number 3 boom tube.

3 Remove the rue rings and clevis pins from the boom extend cables located near the extend cable break proximity sensor.

4 Remove the external snap rings from the boom extend cable pulley pivot pin. Use a soft metal drift to remove the pin.

Note: When driving the pivot pin out, be sure to drive it from the shaped end of the pin.

5 Remove the pulley and boom extend cables from the extension cylinder assembly. Discard the old cables and pulleys.

6 Route the new boom extend cables through the boom extend pulley bracket.

7 Install the new boom extend cable pulley, pivot pin and snap rings.

Note: Be sure the boom extend cables are routed through the grooves of the pulley and the upper wear pad on the extension cylinder.

8 Install the boom extend cable clevis pins and rue rings to the pivot plate near the cable break proximity sensor.

9 Install the boom extend cables to the lower extend cable bracket that mounts to the number 3 boom tube.

Boom retract cables:

10 Remove the rue rings and clevis pins from the boom retract cables at the platform end of the boom.

11 Attach the cable pulling tool or a rope to one of the boom retract cables at the pivot end of the boom.

Note: A cable pulling tool is available through Genie Service Parts Department (Genie part no. 94510)

12 At the platform end of the boom, pull on the boom retract cable that has the rope attached to it.

13 Pull the old cable completely out of the boom tube. Remove the rope. Discard the old boom retract cable.

14 Securely attach the rope to the same end of the new boom retract cable.

15 At the pivot end of the boom, carefully pull the rope with the new retract cable attached.

16 Pull the new cable towards the pivot end of the boom until the end of the cable is at the end of the boom tube. Remove the rope.

17 Repeat steps 14 through 19 for the other boom retract cable.

18 At the platform end of the boom, install the retract cables, clevis pins and rue rings to the adjustment plate.

19 Remove and discard the old boom retract pulleys from the pivot end of the boom extension cylinder.

20 Install the new boom retract pulleys to the pivot end of the boom extension cylinder.

21 Install the boom extension cylinder assembly into the boom.

Note: Before lowering the extension cylinder into the saddles of the number 1 boom tube, wrap the boom retract cables around the pulleys.

22 Adjust the boom extend/retract cables. Refer to Repair Procedure, *How to Adjust the Boom Extend/Retract Cables*.

4-6 Primary Boom Angle Sensor

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

How to Calibrate the Primary Boom Angle Sensor

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

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

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

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

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

3 Press the Menu button below the display then go to Calibrations screen.

4 Navigate to the Boom Angle Sensor calibration screen.

5 Select and start the calibration procedure.

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

Boom Components

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

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

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

10 The calibration is now complete.

11 Exit the Service Mode.

4-7 Boom Length Sensor

How to Calibrate the Primary Boom Length Sensor

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

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

1 Fully retract the boom. Ensure the boom angle is above 50°.

2 Make sure the pitch and roll angles are less than 3°.

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

4 Press the Menu button below the display then go to Calibrations screen.

5 Navigate to the Boom Length Sensor calibration screen.

6 Select and start the calibration procedure.

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

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

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

10 The calibration is complete.

11 Exit the Service Mode.

5-1
RPM Adjustment

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

5-2
Flex Plate

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

Type "B" flex plates combines the pump coupler, as part of the flex plate, which is installed onto the engine flywheel.



Type "B"
(flexplate with coupler combined)

Hydraulic Pump

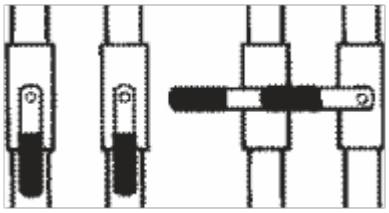
6-1 Function Pump

How to Remove the Function Pump

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

1 Locate the two hydraulic tank valves at the hydraulic tank. Close the valves.

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



open closed

2 Tag, disconnect and plug the function pump hydraulic hoses. Cap the fittings on the pump.

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

3 Support the pump with a suitable lifting device.

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

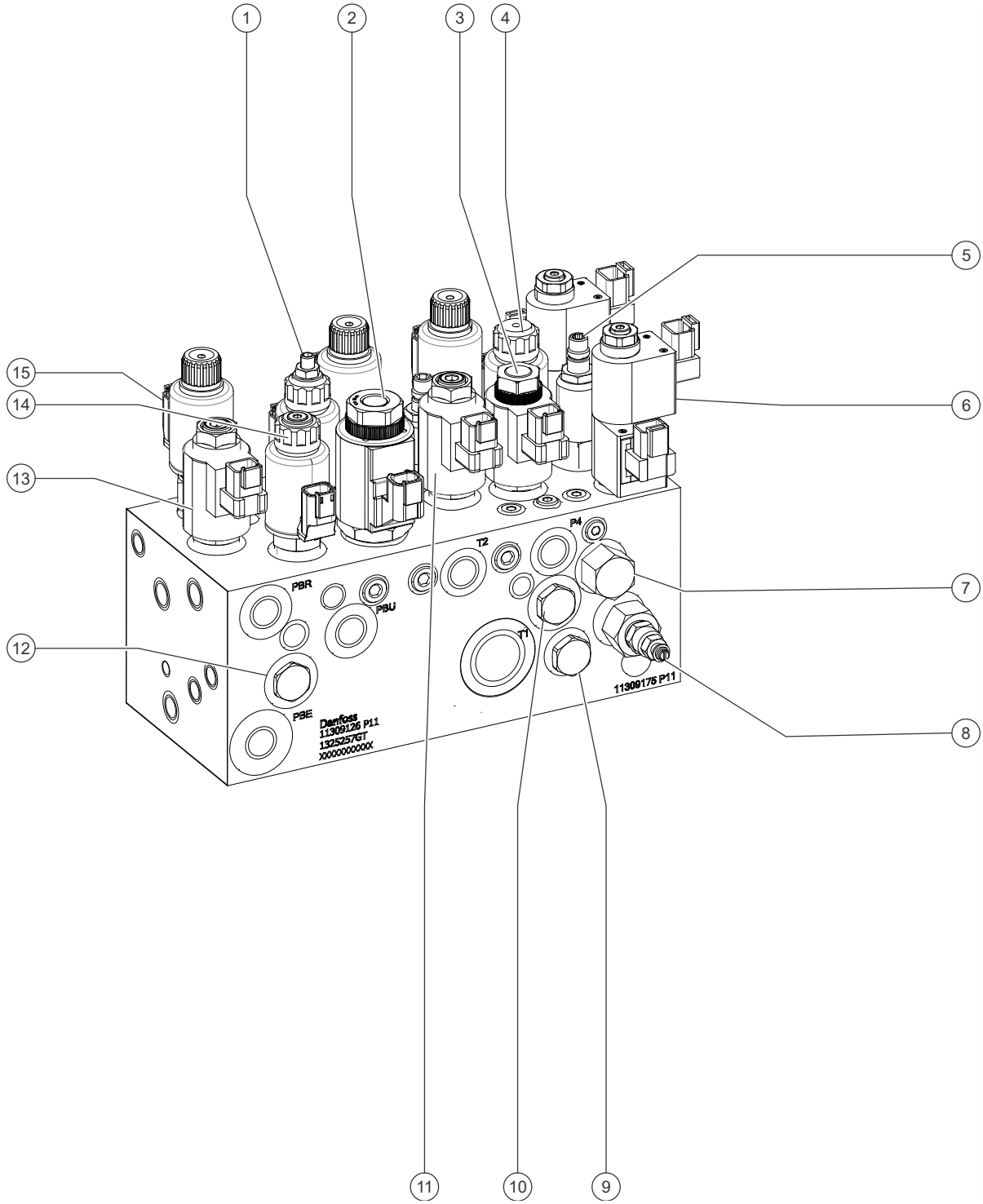
NOTICE Component damage hazard. Be sure to open the two hydraulic tank valves and prime the pump after installing the pump.

7-1
Function Manifold Components, View 1

The function manifold assembly is located on the ground control box side of the machine.

Index No.	Description	Schematic Item	Function	Torque
1	Proportional valve	SR	Boom up	55-60 ft-lbs / 74-81 Nm
2	Solenoid valve, 2 position 2 way	Aux 1	Cross over value	47-52 ft-lbs / 65-70 Nm
3	Solenoid valve, 2 position 2 way	Aux 2	Cross over value	33-37 ft-lbs / 45-50 Nm
4	Proportional valve		Turntable rotate proportional	20-25 ft-lbs / 27-34 Nm
5	Sequential valve	PS1	Oscillate supply	30-35 ft-lbs / 41-47 Nm
6	Solenoid valve, 3 position 4 way	SP3	Turntable rotate directional	26-30 ft-lbs / 35-40 Nm
7	Differential sensing valve		Differential sensing/Turntable rotate	30-35 ft-lbs / 41-47 Nm
8	Pressure reducing valve	PR1	Oscillate pressure control	33-37 ft-lbs / 45-50 Nm
9	Check valve		Back flow / check function pump	20-25 ft-lbs / 27-34 Nm
10	Check valve		Platform manifold supply	20-25 ft-lbs / 27-34 Nm
11	Solenoid Valve, NO, Poppet	SP	Boom extend	33-37 ft-lbs / 45-50 Nm
12	Check valve		Back flow / check function pump	20-25 ft-lbs / 27-34 Nm
13	Solenoid Valve, NO, Poppet	SQ	Boom retract	33-37 ft-lbs / 45-50 Nm
14	Proportional solenoid valve	SR	Extend proportional	33-37 ft-lbs / 45-50 Nm
15	Relief valve		P2 Pressure increasing valve	32-37 ft-lbs / 44-50 Nm

Manifolds

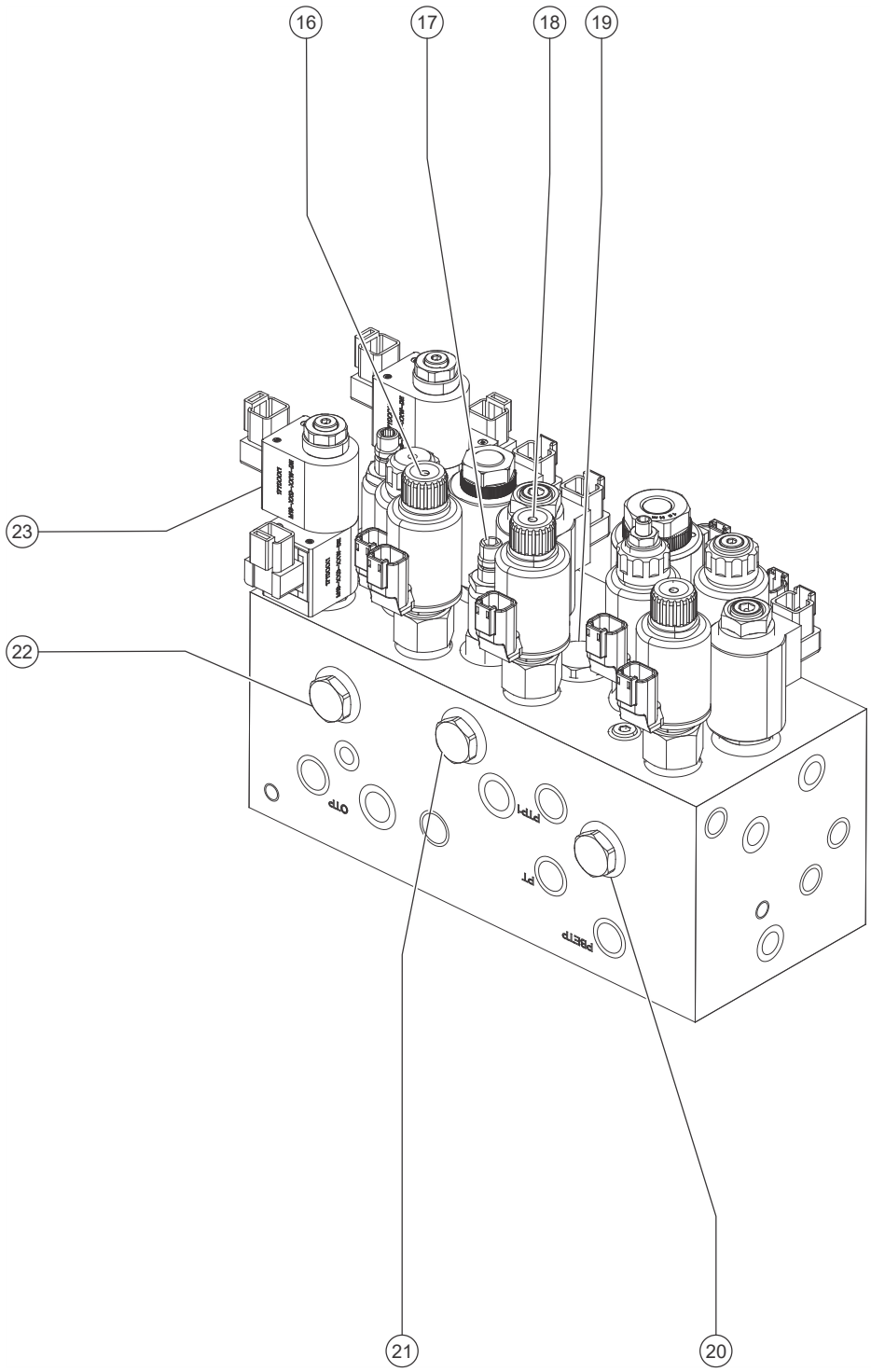

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P4
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11309175 P11

Function Manifold Components, View 2

The function manifold assembly is located on the hydraulic tank side of the machine.

Index No.	Description	Schematic Item	Function	Torque
16	Relief valve		P1 Pressure increasing valve	32-37 ft-lbs / 44-50 Nm
17	Relief valve 2400psi	SO	Boom extend relief	20-25 ft-lbs / 27-34 Nm
18	Relief valve		P3 Pressure increasing valve	32-37 ft-lbs / 44-50 Nm
19	Check valve		Back flow / check function pump	30-35 ft-lbs / 41-47 Nm
20	Differential sensing valve	SS	Boom extend	30-35 ft-lbs / 41-47 Nm
21	Check valve, 30psi	ST	Return check valve	20-25 ft-lbs / 27-34 Nm
22	Flow regulator valve	SM	Steering flow control	20-25 ft-lbs / 27-34 Nm
23	Solenoid valve, 3 position 4 way	SL	Steering directional	26-30 ft-lbs / 35-40 Nm

Manifolds



7-2 Valve Adjustments - Function Manifold

How to Adjust the Proportional Relief Valve, Hydraulic Pressure Sensor and Oscillate Pressure Reducing Valve

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

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to test port #1 (TP1) on the function manifold.

2 Turn the key switch to Ground control. Pull out the platform red Emergency Stop button to the on position and pull out the ground control red Emergency stop button to the on position.

3 Enter Service Mode. Refer to *How to Enter Service Mode.*

4 Select Menu and navigate to Proportional Relief Calibration

Menu -> Calibrations -> Proportional Relief Calibration.

5 Press Button 4 to start the calibration

⊙ The pump motor activates and a green light flashes on the TCON controller. The ground display shows the current calibration steps along the entire procedure.

Note: The procedure will time out if any step is not completed within 120 seconds or terminate if the function enable switch is activated.

6 Use Button 2 or Button 3 to adjust the pressure. Press Button 2 to increase or press Button 3 to decrease the relief pressure until the pressure gauge reads 1000 psi / 69 bar.

7 Press the Enter Button, which is Button 4 to store the value.

⊙ Result: The control system will continue to the next calibration procedure value - (3000 psi / 207 bar).

8 Use Button 2 or Button 3 to adjust the pressure. Press Button 2 to increase or press Button 3 to decrease the relief pressure until the pressure gauge reads 3000 psi / 207 bar.

9 Press the Enter button, which is Button 4 to store the value.

⊙ Result: The control system will automatically continue through the procedure and it automatically sweeps the following calibration values: 2500 PSI / 172 bar, 2000 PSI / 138 bar, and 600 psi / 41 bar.

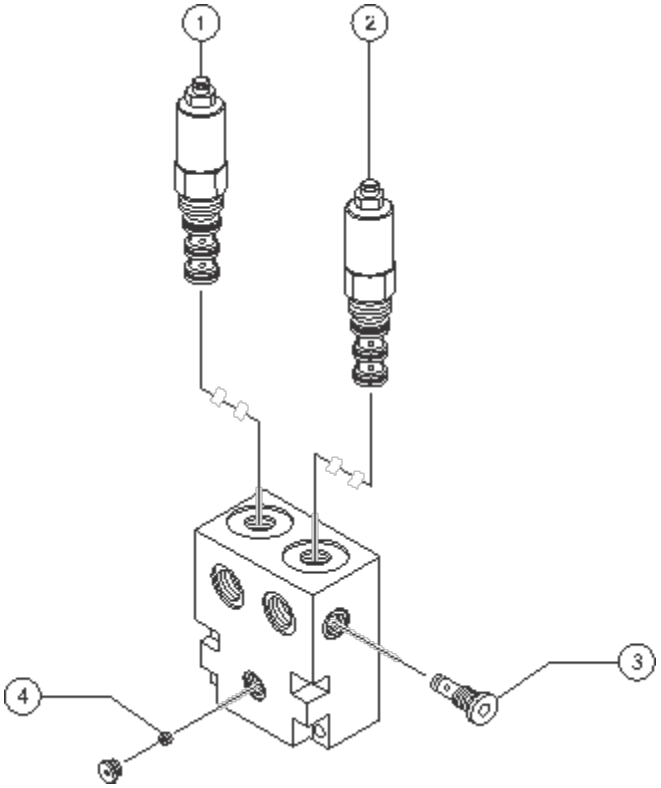
Note: Wait until the display shows 'Calibration Complete'. It means that pressure relief valves 1, 2, and 3 are calibrated.

Repair Procedures

7-3
Turntable Rotation Manifold Components

The turntable rotation manifold is mounted to the turntable rotation motor at the ground control side of the machine.

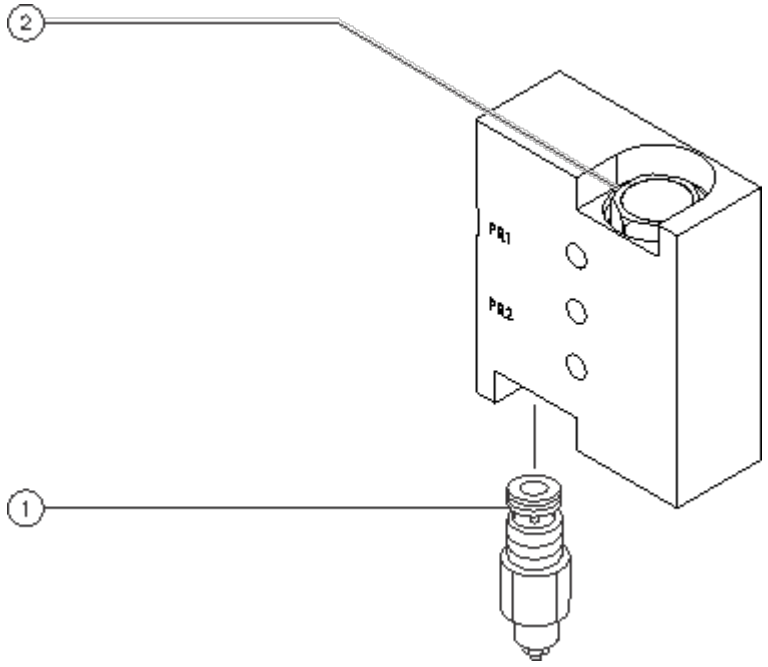
Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve, 1000 psi / 69 bar	RA	Turntable rotate left	25-30 ft-lbs / 34-41 Nm
2	Counterbalance valve, 1000 psi / 69 bar	RB	Turntable rotate right	25-30 ft-lbs / 34-41 Nm
3	Shuttle valve, 2 position 3 way	RD	Turntable rotation brake release	8-10 ft-lbs / 10-15 Nm
4	Orifice, 0.030 inch / 0.8 mm	RC	Turntable rotate brake circuit	



7-4
Platform Rotate Manifold Components

The platform rotate manifold is mounted on the platform rotator.

Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve, 3300 psi / 227 bar	PA	Platform rotate right	37-44 ft-lbs / 50-60 Nm
2	Counterbalance valve, 3300 psi / 227 bar	PB	Platform rotate left	37-44 ft-lbs / 50-60 Nm

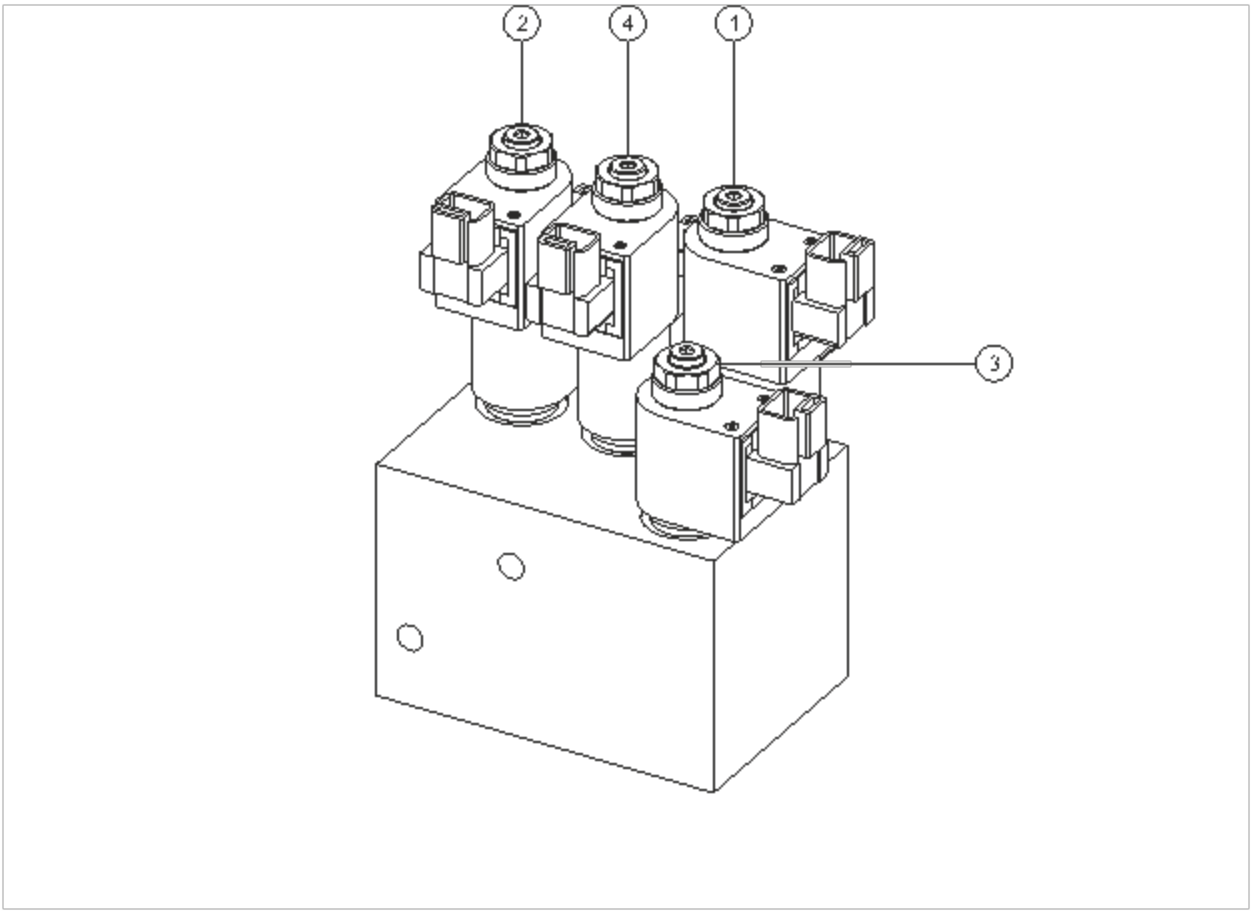


Repair Procedures

7-5
Platform Manifold Components

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

Index No.	Description	Schematic Item	Function	Torque
1	Proportional solenoid valve, 3 position 4 way	A	Platform level up/down	17-20 ft-lbs / 24-28 Nm
2	Proportional solenoid valve, 3 position 4 way	B	Platform rotate left/right	26-30 ft-lbs / 35-40 Nm
3	Proportional solenoid valve, 3 position 4 way	C	Jib boom up/down	17-20 ft-lbs / 24-28 Nm
4	Solenoid valve, 2 position 2 way, N.O.	D	Platform level circuit	19-21 ft-lbs / 26-28 Nm



7-6 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	
proportional relief valve	15.5Ω
Proportional solenoid valve (schematic items SR)	15.5Ω
2 position, 2 way solenoid valve (schematic item aux1)	17Ω
2 position, 2 way solenoid valve (schematic item aux2)	28Ω
Normally open solenoid valve with poppet (schematic item SP and SQ)	28Ω
3 positions 4 way solenoid valve (schematic item SL and SP3)	36Ω

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.

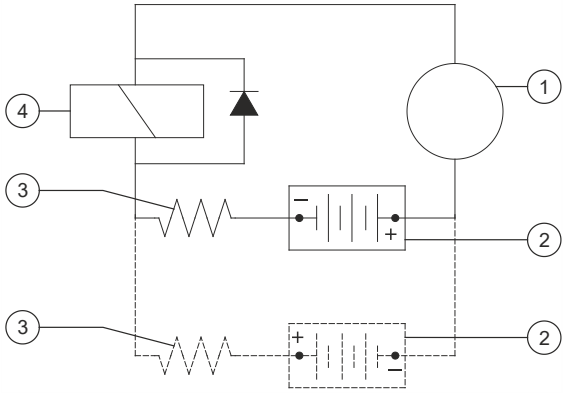
1 Test the coil for resistance. Refer to Repair Procedure, *How to Test a Coil*.

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 Fuel Tank

How to Remove the Fuel Tank

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

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

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

1 Turn the manual fuel shutoff valve to the closed position (if equipped).

2 Remove the fuel filler cap from the tank.

3 Using an approved hand-operated pump, drain the fuel tank into a suitable container. 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 diesel fuel.

4 Tag, disconnect, drain and plug the supply and return fuel hoses. Cap the fittings on the fuel tank.

5 Remove the fuel tank retaining fasteners.

6 Remove the fuel tank from the machine.

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

NOTICE Component damage hazard. When installing the plastic fuel tank, do not overtighten the retaining fasteners.

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

Fuel and Hydraulic Tanks

8-2 Hydraulic Tank

The primary functions of the hydraulic tank are to cool, clean and de-aerate the hydraulic fluid during operation. The tank utilizes internal suction strainers for the pump supply hoses.

How to Remove the Hydraulic Tank

NOTICE

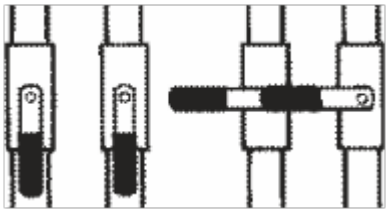
Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system and cause severe component damage. Dealer service is recommended.

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

1 Close the two hydraulic tank valves located at the hydraulic tank (if equipped).

NOTICE

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



open closed

2 Remove the drain plug from the hydraulic tank and completely drain the tank into a container of suitable capacity. Refer to Specifications, *Machine Specifications*.

3 Tag, disconnect and plug the two suction hoses that are attached to the hydraulic tank.

4 Tag and disconnect and plug the hose from the return filter. Cap the fitting on the return filter housing.

5 Support the hydraulic tank with 2 lifting straps. Place one lifting strap at each end of the tank and attach the lifting straps to an overhead crane.

6 Remove the four fasteners securing the tank to the chassis bulkhead.

7 Remove the hydraulic tank from the machine.

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

8 Remove the suction strainers from the tank and clean them using a mild solvent.

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

10 Install the suction strainers using pipe thread sealant on the threads.

11 Install the drain plug using pipe thread sealant on the threads.

12 Install the hydraulic tank onto the machine.

13 Install the two suction hoses.

14 Fill the tank with hydraulic oil until the level is within the top 2 inches / 5 cm of the sight gauge. Do not overfill.

15 Clean up any oil that may have spilled.

16 Open the hydraulic tank shutoff valves (if equipped).

NOTICE Component damage hazard. Be sure to open the two hydraulic tank shutoff valves (if equipped) and prime the pump after installing the hydraulic tank.

Note: Always use pipe thread sealant when installing the drain plug and strainers.

Turntable Rotation Components

9-1
Turntable Rotation Drive Hub Assembly

How to Remove the Turntable Rotation Drive Hub Assembly

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

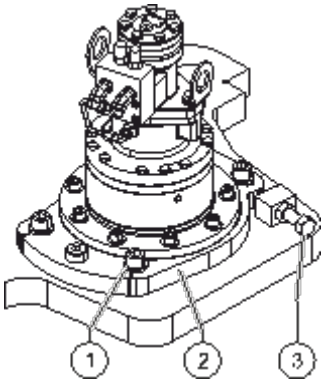
1 Secure the turntable from rotating with the turntable rotation lock pin.

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

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

3 Loosen the backlash pivot plate and adjustment bolts.

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



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

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

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

When installing the drive hub assembly:

6 Install the drive hub. Apply removable thread locking compound to fastener threads. Torque the backlash pivot plate mounting fasteners to specification. Refer to Specifications, *Machine Torque Specifications*.

7 Install the brake and then the motor onto the drive hub. Apply removable thread locking compound to fastener threads. Torque the motor/brake mounting fasteners to specification. Refer to Specifications, *Machine Torque Specifications*.

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

How to Remove the Turntable Rotation Hydraulic Motor

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

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

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

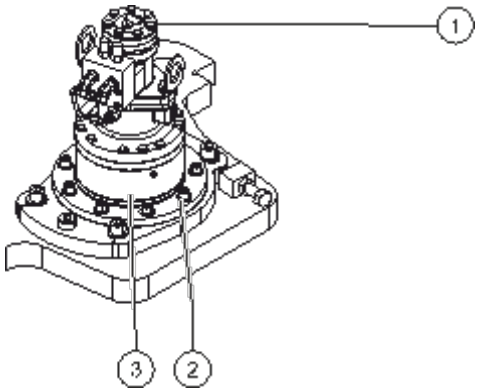
⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

3 Remove the hydraulic tube that connects from the counterbalance manifold to the brake. Cap the fittings on the brake and manifold.

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

4 Remove the motor/brake mounting fasteners. Carefully remove the motor from the brake.

5 Clean up any oil that may have spilled.



1 motor
2 drive hub mounting bolts
3 drive hub with brake

Turntable Rotation Components

How to Adjust the Turntable Rotation Gear Backlash

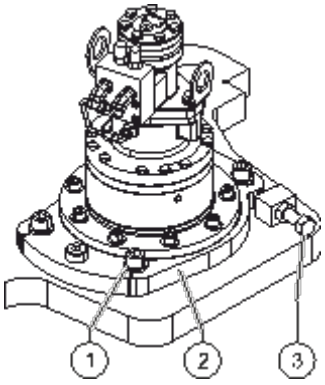
The turntable rotation drive hub is mounted on an adjustable plate that controls the gap between the rotation motor pinion gear and the turntable bearing ring gear.

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

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

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

2 Loosen the backlash pivot plate mounting fasteners.



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

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

4 Loosen the lock nut on the adjustment bolt.

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

6 Turn the adjustment bolt one half turn counterclockwise. Tighten the lock nut on the adjustment bolt.

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

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

How to Calibrate the Turntable Tilt Sensor

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

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

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

2 Press the Button 4 below the display and navigate to the Calibrations menu.

3 Navigate to the Chassis Tilt Sensor calibration screen.

4 Select and start the calibration procedure.

5 If the machine is not level or the engine is running, the procedure will stop. A message will say to level the chassis or switch to DC mode. Move the machine to a level surface and stop the engine before you start the procedure.

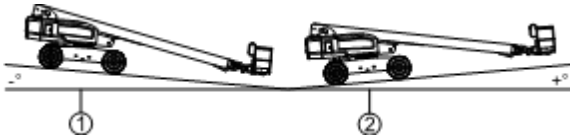
6 The first calibration is machine pitch. This is the pitch of the machine from the platform end to the counterweight end of the machine.



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

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

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



Turntable Pitch

1 uphill
2 downhill

Turntable Rotation Components

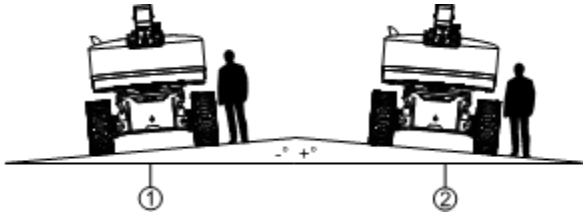
10 The next calibration of the machine is the machine roll. This is the angle of the machine from side to side.



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

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

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



Turntable Roll

1 uphill
2 downhill

14 The calibration is now complete.

15 Exit the Service Mode.

10-1
Yoke and Drive Hub

How to Remove the Yoke and Drive Hub Assembly

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

1 Remove the pin retaining fasteners from both the steer cylinder and the tie rod pivot pins. Remove the pins.

2 Loosen the wheel lug nuts. Do not remove them.

3 Block the non-steer wheels, and center a lifting jack of ample capacity under the steer axle.

4 Raise the machine approximately 6 inches / 15 cm and place blocks under the chassis for support.

5 Remove the lug nuts. Remove the tire and wheel assembly.

6 Tag and disconnect the traction control cable harnesses and the motor controller cables.

7 Remove the steer angle sensor from the upper yoke pivot pin.

8 Support and secure the drive hub assembly with an overhead lifting device.

9 Remove the drive hub mounting fasteners.

⚠WARNING Crushing hazard. The drive hub assembly can fall if it is not supported and secured to the lifting device. Make sure the drive hub assembly is stable before you remove the mounting fasteners.

10 Slide the drive hub assembly out of the yoke. Remove the drive hub assembly from the machine.

11 Support and secure the yoke with an overhead lifting device.

12 Remove the upper and lower pin retaining plates and fasteners from the yoke. Use soft metal drifts to push the upper and lower pivot pins out of the yoke and axle.

⚠WARNING Crushing hazard. The yoke assembly can fall if it is not supported and secured to the lifting device. Make sure the yoke assembly is stable before you remove the pivot pins.

Note: Replace the thrust washer when installing the yoke and drive hub assembly onto the axle.

Axle Components

How to Calibrate the Steer Angle Sensor

Note: Perform this procedure on a firm, level surface with the machine in the stowed position. Refer to Navigation Menus, *Settings Menu*.

1 Turn the key switch to platform controls.

2 Enter Service Mode. Refer to *How to Enter Service Mode.*

3 Select Menu and navigate to Steer Angle Sensor

Menu -> Calibrations -> Steer Angle Sensor.

4 Adjust the steer wheels so they are pointing straight ahead, in line with the non-steer wheels. Release the foot switch.

5 Push OK or button 4 to save.

⊙ Result: The alarm will sound to indicate the setting has been saved.

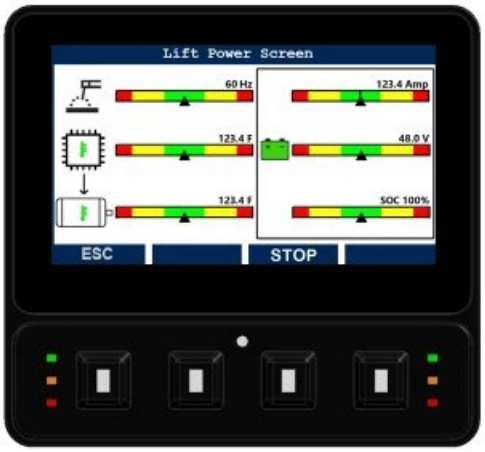
To exit programming mode:

6 After you calibrate the steer sensor, push OK or ESC to exit. You can now operate the machine. The system will automatically exit Service Mode when you cycle the power.

11-1 Generator

How to Check the Generator Frequency

The generator uses an electric motor with RPM control. The system adjusts the motor speed to keep the output frequency within the specified range. Use the display menu to access the generator screen and monitor output frequency, motor temperature, and battery current.



To manually check the generator frequency and voltage, follow the procedure in this section.

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

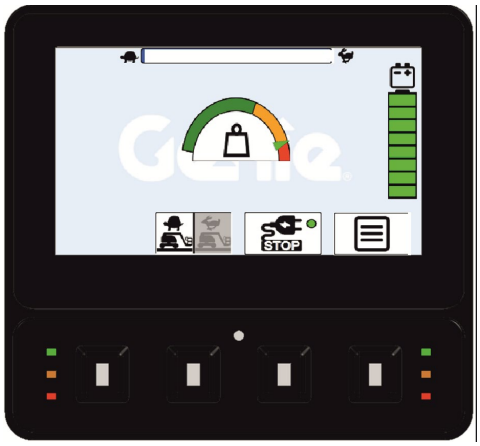
Note: Perform this procedure with the machine on a firm, level surface.

Note: This procedure will require a digital multimeter (DMM) with a frequency counter.

1 Set the multimeter to measure frequency and 110 volts AC. Connect the test lead to the 110 volts AC socket.

2 Start the generator by pressing the button 3 under the VCON on the platform control panel.

3 When the generator is ON, the Lift Power icon on the VCON shows a green LED. The green LED means the system is active.



Generator ON

4 Use the multimeter to measure the voltage and the frequency. Use the values in the table below.

ANSI	12 kW Generator	120+/- 6V	60+/- 1 Hz
AUS	7.5 kW Generator	230+/- 12V	50+/- 1 Hz

5 To stop the generator, press button 3. The Lift Power icon on the VCON does not show a LED. The missing LED means the system is OFF.



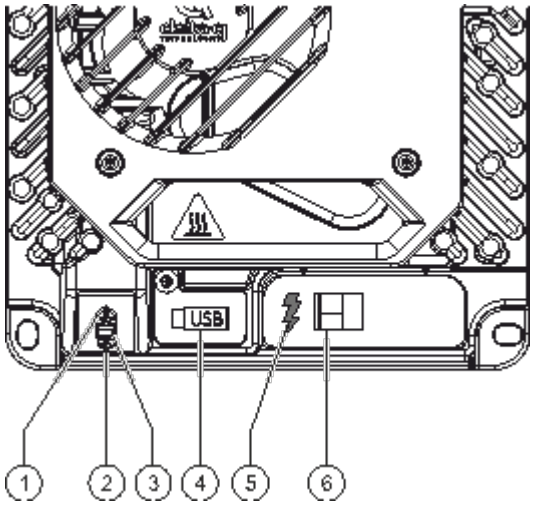
Generator OFF

Battery Charger

12-1 Battery Charger

The machine is equipped with either a 1.2 kW battery charger or a 3.3 kW battery charger. Both chargers connect to a standard wall power source. Make sure the power source matches the local electrical supply. The charger charges the main lithium battery.

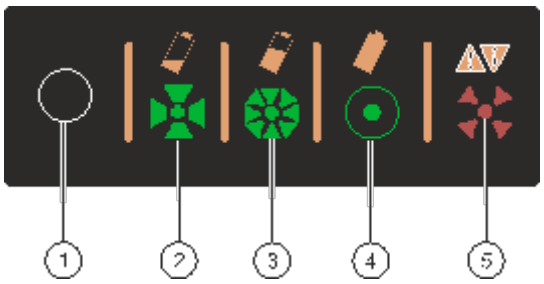
1.2 kW Charger



Charger Status Indicator

1 Error / Fault / USB indicator
2 AC power indicator
3 Battery charging indicator
4 USB port
5 Charging output indicator
6 Charger profile / Error display

3.3 kW Charger



Remote charger status indicators

1 Error / Fault / USB indicator
2 Charging, low state of charge
3 Charging, high state of charge
4 Charge complete
5 Error / Fault

Fault Codes



Observe and Obey:

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

Before Troubleshooting:

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

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

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

Control System Fault Codes

Control System

How to Retrieve Control System Fault Codes

The machine control system contains three different types of fault codes

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

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

Component Faults: These faults come from third-party systems that are integrated into the machine. These faults are reported through the CAN bus and show the status or problems detected by the component's own control system.

Some component faults can also cause active faults. Some faults are informational. Informational faults do not stop machine operation. Some faults require you to replace the component. Use the device-specific fault code tables to find and diagnose component faults.

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
6	Key switch	21	Fault	Key switch Contact(s) Stuck or mechanical damage to key switch	All functions disabled	*Keyswitch in operable condition *Controller detects Keyswitch is ON (P106PWR WH/BK) *Controller detects Keyswitch in Platform Mode (P22PWR BK) *Controller detects Keyswitch in Ground Mode (P174PWR WH)
15	Foot switch	27	Active at startup	Stuck on at power up	Platform functions disabled	* Release foot switch and cycle power. * 24V at foot switch (P26PWR BK). * 24V at PCON pin 10 when pressed (C56FTS RD). Verify 0V when not pressed.
		28	Timeout	ON for > Timeout Time (default is 2 min in ANSI and CE, 10s in AUS)		* Release foot switch.
16	Speed adjustment toggle switch	27	Active at startup	Stuck on at power up	Toggle switch functions operate at 50% of normal speed	* 5V at pin 1 of toggle switch (P109PWR GR/WH). * 2.5V at pin 3 of toggle switch (C196PWR YL). * 5V at pin J13-11 when it rabbit mode (C194SPD WH/RD). * 2.5V at pin J13-11 when in turtle mode (C194SPD WH/RD).
17	Auxiliary contactor fault	25	Resistance too high	Contactor not suppling power	Auxiliary pump controller function disabled Auxiliary battery charging function disabled	* AUX battery fuse is good. * AUX relay output fuse is good. * AUX relay is functioning. * 24V at TCON pin J2-19 with toggle switch activated (V27AUX RD/WH). * 24V across relay terminals 85 and 86 with toggle switch activated.
		27	Active at startup	Welded contacts		* AUX relay is functioning. * Contacts not welded.
18	Proportional relief 1 coil	25	Resistance too high	Open circuit of ohms > 175% of nominal	Fault condition Recover using Auxiliary power	* Check resistance. * Check for open/short circuit between controller and B- (V242HGP WH/BK).
		26	Resistance too low	Short or Resistance <5% of nominal		
19	Auxiliary enable toggle switch	27	Active at startup	Stuck on at power up	Auxiliary functions disabled	* 24V at the auxiliary toggle switch. * 24V at the controller when the toggle switch is activated (C27AUX RD). * 24V across the auxiliary relay CR3 terminals 86 and 85 (electric models).

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
20	Primary boom extend/retract joystick	11	Shorted to supply	>5V at neutral	Associated function disabled	* 5V supply from PCON pin 8 to joystick pin 2 (P109PWR GR/WH). * B- from PCON pin 9 to joystick pin 1 (P110RET BK). * Output of 1.5-3.5V across range of motion from joystick pin 5 to PCON pin 14 (C163PLS BL/WH). *Cycle Power with problem corrected to clear fault
		16	Value at 0 V	0V at neutral		
		17	Not calibrated	Not between 2-3V at startup		
21	Pri Boom Up / Down Joystick	11	Shorted to supply	>5V at neutral	Associated function disabled	* 5V supply from PCON pin 8 to joystick pin 2 (P109PWR GR/WH). * B- from PCON pin 9 to joystick pin 1 (P110RET BK). * Output of 0.5-4.5V across range of motion from joystick pin 3 to PCON pin 17 (C164PES RD/WH).
		16	Value at 0 V	0V at neutral		
		17	Not calibrated	Not between 2-3V at startup		
22	Primary boom up coil	21	Valve status fault	Overload. Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (155Ω). * Check for open/short circuit between controller and B- (V01PBU RD).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		
23	Primary boom down coil	21	Valve status fault	Overload. Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (155Ω)). * Check for open/short circuit between controller and B- (V02PBD RD/BK).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
24	Primary boom angle	08	Component fault	Output mode error	When Primary < 10 deg Switch [LSB3AS] is OFF disabled functions are: *Primary Boom Extend *Primary Boom Up *Turntable Rotate CW *Turntable Rotate CCW *Drive Functions *Platform Level When Primary < 10 deg Switch [LSB3AS] is ON disabled functions are: *Primary Boom Extend *Primary Boom Up Recovery Sequence: *Until the primary boom is fully retracted Primary Boom Down shall be inhibited. Also Inhibited: Block Primary Up if Off Level (Off Level Restriction) Pump 3 calibration	* Check magnet and sensor. * Check gap between magnet and sensor (0.118 - 0.315 in / 3 - 8 mm) * Replace magnet and sensor.
		13	Not detected	Power supply to the output too low.		* 26V from TCON pin J2-9 to angle sensor pin 1 (P198PWR RD). * B- at angle sensor pin 2. * With the sensor unplugged, check resistance across pins 3 and 4 (60Ω). * Replace magnet and sensor.
		14	Cross check fault	The two internal sensing channels inside the angle sensor have registered an angle difference >3°		* Check boom angle sensor mount, ensure all fasteners are tightened to spec. * Calibrate angle sensor. * Replace magnet and sensor.
		17	Not calibrated	Sensor has been replaced and requires calibration. Sensor and magnet not replaced as a matched set		* Perform boom angle calibration process and verify fault is no longer active.
		19	Out of range	Limit switch LSB3AS indicates stowed, but angle not within 2% of value. Angle is >2% of calibration range. Limit switch LSB3AS indicates stowed and angle sensor indicates value >10° or <7°.		* With the boom stowed, 26V at TCON pin J2-12 (C68LS BL). * With the boom above 12°, 0V at TCON pin J2-12 (C68LS BL). * Check limit switch LSB3AS for damage. * Check bearings in rotary base housing. * Calibrate angle sensor.
		22	Value not changing	Boom angle within 10-90% of range, but reported angle not changing		* Check boom angle sensor mount, ensure all fasteners are tightened to spec.
		30	Calibration mismatch	Calibration values in TCON and PCON don't match		* Calibrate angle sensor.

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
25	Cable tension	21	Fault	Boom cable tension limit switch LSB2S indicates that the tension is loose on the boom cables	Boom up and extend functions will not operate	* Return boom to stowed position as quickly as possible. * Verify both boom cables are properly tensioned and that LSB2S is properly centered in the bracket. * Verify LSB2S operates properly (C59CNK, BL/WH, TCON J2-25). Signal should normally be 12V. If cable tension is loose, signal should be 0V.
26	Primary boom extend coil	21	Valve status fault	Overload. Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V07PBE BK).
27	Primary boom retract coil	21	Valve status fault	Overload. Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V08PBR BK/WH).
35	Ground Control Station Buttons	27	Active at startup	Button are engaged when not pressed	Hybrid Mode disabled. Only the associated with the stuck button is disabled.	Replace Ground Controls Display
36	Jib up coil	21	Fault	Overload. Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V17PRL GR). * Can occur during platform rotate left. Uses same valve with selector.
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
37	Jib down coil	21	Fault	Overload. Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V18PRR GR/BK). * Can occur during platform rotate right. Uses same valve with selector.
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		
41	Turntable rotate joystick	11	Shorted to supply	>5V at neutral	Associated function disabled	* 5V supply from PCON pin 8 to joystick pin 2 (P109PWR GR/WH). * B- from PCON pin 9 to joystick pin 1 (P110RET BK). * Output of 0.5-4.5V across range of motion from joystick pin 4 to PCON pin 17 (C165TRS WH/RD).
		16	Value at 0 V	0V at neutral		
		17	Not calibrated	Not between 2-3V at startup		
42	Turntable rotate CW coil	21	Valve status fault	Open or shorted. Overload. Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V04TRL WH).
43	Turntable Rotate CCW Coil	21	Valve status fault	Open or shorted. Overload. Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V05TRR WH/BK).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
44	Drive enable toggle switch	27	Active at startup	Stuck on at power up	Drive disabled	* 5V at controller when toggle switch activated in the right position. * 2.5V at controller when toggle switch activated in the left position. (C66DRE BL)
46	Platform Rotate CW Coil	21	Fault	Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V17PRL GR).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		
47	Platform rotate CCW coil	21	Fault	Output mode error. Power supply to the output too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V18PRR GR/BK).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		
51	Drive joystick	11	Shorted to supply	>5V at neutral	Associated function disabled	* 5V supply from PCON pin 8 to joystick pin 2 (P109PWR GR/WH). * B- from PCON pin 9 to joystick pin 1 (JSGND BR). * Output of 0.5-4.5V across range of motion from joystick pin 4 to PCON pin 19 (C160JPL WH/RD).
		16	Value at 0 V	0V at neutral		
		17	Not calibrated	Not between 2-3V at startup		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
61	Steer joystick	11	Shorted to supply	>5V at neutral	Associated function disabled	* 5V supply from PCON pin 8 to joystick pin 2 (P109PWR GR/WH). * B- from PCON pin 9 to joystick pin 1 (JSGND BR). Dual axis joystick option: * Output of 0.5-4.5V across range of motion from joystick pin 3 to PCON pin 16 (C159STC BL/WH). Rocker switch joystick option: * Output of 1.5-3.5V across range of motion from joystick pin 5 to PCON pin 16 (C159STC BL/WH).
		16	Value at 0 V	0V at neutral		
		17	Not calibrated	Not between 2-3V at startup		
64	Hydraulic pressure sensor	11	Shorted to supply	12V shorted to B-	Warning: Calibration affected which can lead to poor operating efficiency	* 12V at sensor pin A (P198SEN RD). * Signal input at TCON pin J2-4 (C245PSR GR). *B- (SENGND BK) at pin C ~1.0V at 0 psi/bar. ~1.8V at 1000 psi / 69 bar. ~3.4V at 3000 psi / 207 bar.
		16	Value at 0 V	Open circuit, 0V		
		17	Not calibrated	Calibration not completed		
68	Function enable toggle switch	27	Active at startup	Stuck on at power up	Ground controlled functions disabled	* Check for open/short to either 12V or B- at toggle switch and TCON pin J1-28 (C45FE WH/BK).
		28	Time out	ON for > Timeout Time (default is 2 min in ANSI and CE, 10s in AUS)	Ground controlled functions disabled	Release Function Enable Switch
71	Emergency Stop relay	21	Fault	Relay contact stuck. Platform Estop detected when in ground mode. Platform Estop not detected when in platform mode.	Platform functions disabled	* Check Estop relay (CR62). * Signal input at PCON pin J11-34 with platform Estop on (P23PWR WH). * Signal input at TCON pin J2-19 with key switch in ground position (P174PWR WH).
72	Lift guard contact alarm switch	14	Cross check fault	NO/NC contacts not connected correctly or welded shut	Lift and Drive functions disabled	* Verify with proximity switch connected: 0V on N.O. proximity switch output and at VCON pin J13-9 (C247CTA OR/BK). 26V on N.C. proximity switch output and at PCON pin J11-11 (C248CTA OR/RD). * With proximity switch disconnected: Voltages are reversed.

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
76	Platform load sensor	13	Not detected	Loss of CAN Bus signal from load cell	Elevated drive, primary up and extend disabled	* Check CAN Bus connection to load cell.
		14	Cross check fault	Crosscheck failed between controllers		* Check load cell installation. * Perform calibration procedure. * Replace load cell.
		15	Value too low	Negative load detected while boom up activated		* Check load cell installation. * Perform calibration procedure.
		17	Not calibrated	Load cell not calibrated or only zero load calibrated	Not calibrated. Partial calibration.	* Perform calibration procedure.
		21	Internal fault	Vishay VPG internal error status	Elevated drive, primary up and extend disabled	* Replace load cell.
		23	Value too high	Overload condition detected	All functions disabled	*Remove excess weight from platform.
		31	Invalid setup	Zero/Full load gain outside limits	Elevated drive, primary up and extend disabled	* Verify calibration weight. * Check load cell installation. * Perform calibration procedure. * Replace load cell.
77	Platform display (VCON)	13	Not detected	No CAN communication	The following functions are not available: -Drive Enable, High Drive Speed (low speed forced) & Function Speed toggle switch. -Overload, Drive Enable and Tilt Alarm icons	* 24V supply to VCON pin 2 (C134PWR RD). * B- at VCON pin 1. * 60Ω across VCON pins 3 and 4 with power off.
		29	Software version mismatch	Incorrect software version	All functions disabled	* Install correct version of software. (TCON and VCON software must match)

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
78	Platform controller (PCON)	13	Not detected	No CAN communication	All functions disabled	* 24V supply to PCON pin 2 (C134PWR RD). * B- at PCON pin 1. * 60Ω across PCON pins 3 and 4 with power off.
		29	Software version mismatch	Incorrect software version		* Install correct version of software. (TCON and PCON software must match)
79	Ground display (DISCON)	13	Not detected	No CAN communication	Warning	* 24V supply to DISCON pin 2 (C134PWR RD). * B- at DISCON pin 8. * 60Ω resistance across CAN +/- Pins 1 and 2 (with power OFF)
		29	Software version mismatch	Incorrect software version	All functions disabled	* Install correct version of software. (TCON and DISCON software must match)
80	Turntable controller (TCON)	21	Fault	NV memory checksum or NV memory access issue	Machine functions disabled.	• Replace DISCON
82	Load sense recovery	21	Fault	Platform overloaded and auxiliary used to lower platform	Warning	
83	Disabled by owner	20	Warning	Unit shut down via remote telematics command	Engine start disabled or drive and lift functions reduced	* Contact machine owner to re-enable machine functions.
84	Chassis angle (Primary)	13	Not detected	No CAN communication	Limited to 2 MPH. Elevated Drive disabled. Boom not allowed to leave stowed position. Tilt alarm on.	* 24V supply to level sensor pin 1 (P85PWR GR). * B- at level sensor pin 2. * 60Ω across level sensor pins 3 and 4 with power off.
		14	Cross check fault	Crosscheck between operational and safety channels failed		* Check level sensor installation. * Perform calibration procedure * Replace level sensor.
		17	Not calibrated	Calibration not completed		* Perform calibration procedure
		21	Fault	Internal fault		* Replace level sensor.

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
85	Chassis angle safety (Secondary)	13	Not detected	No CAN communication	Limited to 2 MPH. Elevated Drive disabled. Boom not allowed to leave stowed position. Tilt alarm on.	* 24V supply to level sensor pin 1 (P198PWR RD). * B- at level sensor pin 2. * 60Ω across level sensor pins 3 and 4 with power off.
		17	Not calibrated	Calibration not completed		* Perform calibration procedure
		21	Fault	Internal fault		* Replace level sensor.
89	Fuel level	12	Value too high	Signal >4.975V	Display fault code only	* 24V supply to fuel sensor pin A (C134PWR RD). * B- at fuel sensor pin C. * 1.7-4.5V at fuel sensor pin B.
		16	Value at 0 V	Signal <1.5V		
92	Turntable rotate flow coil	21	Fault	Output mode error. Power supply to the output stage is too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~17Ω). * Check for open/short circuit between controller and B- (V06TRF WH/RD).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
94	Primary boom length	13	Not detected	No CAN communication	Machine limited to recovery functions Disabled functions out of stowed: * Boom extend / up * Turntable rotate * Drive / steer Disabled functions stowed: * Boom extend / up Recovery sequence: * Fully retract boom * Fully lower boom	* 26V from TCON pin J2-9 to length sensor pin 1 (P198PWR RD). * B- at angle sensor pin 2. * 60Ω across length sensor pins 3 and 4 with power off.
		14	Cross check fault	The two internal sensing channels inside the length sensor report a length that differs by >3 in / 7.6 cm		* Check length sensor installation. * Perform calibration procedure. * Replace sensor.
		17	Not calibrated	Calibration not completed		* Perform calibration procedure
		19	Out of range	Boom length >2% outside of calibration range		* 26V to TCON pin J2-11 from retracted limit switch LSB1RS pin 2 with boom fully retracted (C24LS OR/RD). * 0V to TCON pin J2-11 from retracted limit switch LSB1RS pin 2 with boom extended ~10 in / 25.4 cm (C24LS OR/RD). * Check limit switch LSB1RS installation. * Perform calibration procedure
		22	Value not changing	Reported length within 10-90% of mechanical range during boom extend/retract but reported length is not changing		* Check boom length sensor installation.
		30	Calibration mismatch	Calibration values in TCON and PCON don't match		* Perform calibration procedure.
95	Engine RPM	23	Too high	Engine speed >2350 rpm for 15 seconds	Hybrid mode disabled	* Check high rpm solenoid. * Check rpm setting. Low rpm - 2150 / 208Hz High rpm - 3000 / 290 Hz
		24	Too low	Engine speed <2015 rpm for 15 seconds		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
96	Low oil pressure or engine overtemp	19	Out of range	Over temperature or low oil pressure switch provided a ground to relay CR64 to shut down the engine	Engine shutdown	* Unplug oil pressure switch and verify temperature switch is not activating relay CR64 by starting the engine (C108SEL WH/BK). * Unplug temperature switch and verify oil pressure switch is not activating relay CR64 by starting the engine (C108SEL WH/BK).
97	Drive motor speed	21	Fault	Drive motors do not slow during braking	Electric brakes set	* Check operation and calibration of the UTS level sensor. * Check motor & motor controller phase leads and main power connections.
98	Platform level angle	08	Component fault	ADC failure or saturation (Electrical failure or field too strong). Analogue gain below trimmed threshold (Field too weak). Magnetic field too weak. Magnetic field too strong. Analogue gain above trimmed threshold (Field too strong). Analogue chain rough offset compensation: Clipping. Device supply Vdd >7V	Machine limited to recovery functions Disabled functions out of stowed: * Boom extend / up * Turntable rotate * Drive / steer Disabled functions stowed: * Boom extend / up Recovery sequence: * Fully retract boom * Fully lower boom	* Check magnet and sensor. * Check gap between magnet and sensor (0.118 - 0.315 in / 3 - 8 mm). * Replace magnet and sensor.
		10	Envelope exceeded	Platform angle error from the setpoint exceeds 10°		* Operate platform level up or down using auxiliary power to reset the error or power the machine off and back on.
		13	Not detected	No CAN communication		* 26V from PCON pin J11-33 to angle sensor pin 2 (P87PWR RD). * B- at angle sensor pin 1. * With the sensor unplugged, check resistance across pins 3 and 4 (60Ω).

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
98	Platform level angle	14	Cross check fault	Two internal sensing channels inside the angle sensor report an angle that differs by >3°	Machine limited to recovery functions Disabled functions out of stowed: * Boom extend / up * Turntable rotate * Drive / steer	* Check platform level angle sensor mount, ensure all fasteners are tightened to spec. * Calibrate angle sensor. * Replace magnet and sensor.
		17	Not calibrated	Calibration not completed	Disabled functions stowed: * Boom extend / up Recovery sequence: * Fully retract boom * Fully lower boom	* Perform platform level angle calibration process and verify fault is no longer active.
		19	Out of range	Reported angle >2% outside of calibration range		* Check bearings in rotary base housing. * Check platform level angle sensor mount, ensure all fasteners are tightened to spec. * Calibrate angle sensor.
		22	Value not changing	Platform angle within 10-90% of range, but reported angle not changing		
		30	Calibration mismatch	Calibration values in TCON and PCON don't match		* Calibrate angle sensor.
99	Primary boom extend/retract flow coil	21	Fault	Output mode error. Power supply to the output stage is too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~17Ω). * Check for open/short circuit between controller and B- (V109PEF BK/RD).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		
100	Platform level up coil	21	Fault	Output mode error. Power supply to the output stage is too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29Ω). * Check for open/short circuit between controller and B- (V14PLU OR).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
101	Platform level down coil	21	Fault	Output mode error. Power supply to the output stage is too low. Analog diagnostic error.	Associated function disabled	* Check Ohms (~29W). * Check for open/short circuit between controller and B- (V14PLD OR/BK).
		25	Resistance too high	Open circuit or Ohms >175% of nominal		
		26	Resistance too low	Short circuit or Ohms <50% of nominal		
104	Front steer angle	11	Shorted to supply	12V shorted to B-	High speed drive function will not operate.	*12V supply Pin A and controller (P198SEN RD) in relation to Sensor Ground (P110RET BK) *0.5-4.5V through steer motion at PIN B and controller (C111LFS OR) and has no open/short circuit to either pin A or pin C *When wheels are straight, signal must be between 2200 & 3400 mV
		16	Value at 0 V	Open circuit, 0V		
		17	Not calibrated	Calibration not completed		
116	Model configuration	20	Warning	Incorrect option parameter	Warning diagnostic code	* Using the Options page in the Service Tool, verify all parameters are in the correct range. * Alternate procedure: Using the ground display, navigate through all the option parameters menu and look for the warning icon over the value.
		31	Invalid setup	Incorrect model parameter	All functions disabled	* Update machine configuration parameters.
130	Battery current	23	Too high	Battery Voltage too high.	Machine disabled. Battery contactor open.	* Check power and ground cables. * Check battery state of charge, temperature and state of health.
131	Battery voltage	23	Too high	Battery voltage too high	Charging disabled. EM brake set. Main contactor open. No drive.	* Check the battery voltage and cable connections. * Check battery size & condition. (This error will automatically clear once the condition has been corrected)
		24	Too low	Battery voltage too low		* Recharge the battery pack. * Check the battery voltage and cable connections. * Check battery size & condition. (This error will automatically clear once the condition has been corrected)

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
135	Wall powered charger	08	Component fault	Fault without a specific Genie fault code occurred	See Charger Fault List. Component Faults are likely uncommon or not repairable.	* See charger fault list.
		13	Not detected	No CAN communication	Display fault, but battery BDI% value will be less accurate	* 24V supply on (+) Terminal. * B- on (-) Terminal. * 60Ω resistance across CAN +/- with power off. * Verify charger is plugged into the machine.
		28	Charge timeout	Charge Timeout caused by battery pack not reaching required voltage within safe time limit. Possible causes: Charger output reduced due to high temperatures. Poor battery health. Very deeply discharged battery. Poorly connected battery. Extra loads.	Battery does not fully charge	* Operate at lower ambient temperature. * Replace battery pack. * Check DC connections. (This error will automatically clear once the charger is reset by cycling DC)
		29	Software version mismatch	The charger hardware does not support the new software version trying to be programmed. Existing software is left running.	Charging disabled	* Install correct charger software.
136	Pump motor controller 1	08	Component fault	Fault without a specific Genie fault code occurred	See pump controller fault list. Component Faults are likely uncommon or not repairable.	See component fault list.
		13	Not detected	No CAN communication	Hydraulic functions disabled	* 48V on pin 1 (R45GEN GR/WH). * 60Ω resistance across CAN +/- with power off.

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
137	Left front AC drive controller	08	Component fault	Fault without a specific Genie fault code occurred	See Drive Controller Fault List Component Faults are likely uncommon or not field repairable.	See Component Fault List
		13	Not detected	No CAN communication (System only communicates with left/master AC Drive Controllers)	Drive disabled	*Confirm 60Ω CAN H to CAN L with power OFF *48V on Pin1 *48V on Pin 14 of Front Controller (R181PWR OR)
138	Right front AC drive controller	08	Component fault	Fault without a specific Genie fault code occurred	See Drive Controller Fault List Component Faults are likely uncommon or not field repairable.	See Component Fault List
		13	Not detected	See LF Motor Controller	Drive disabled	See LF Motor Controller
139	Left rear AC drive controller	08	Component fault	Fault without a specific Genie fault code occurred	See Drive Controller Fault List Component Faults are likely uncommon or not field repairable.	See Component Fault List
		13	Not detected	See LF Motor Controller	Drive disabled	See LF Motor Controller
140	Right rear AC drive controller	08	Component fault	Fault without a specific Genie fault code occurred	See Drive Controller Fault List Component Faults are likely uncommon or not field repairable.	See Component Fault List
		13	Not detected	See LF Motor Controller	Drive disabled	See LF Motor Controller
142	Primary boom maximum angle safety (PBMAS)	10	Envelope exceeded	Boom angle has reached the safety envelope	All functions disabled except for corrective direction using AUX (LOWER)	Move boom inside operational envelope
143	Primary boom maximum length safety (PBMLS)	10	Envelope exceeded	Boom length has reached the safety envelope	All functions disabled except for corrective direction using AUX (RETRACT)	Move boom inside operational envelope

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
148	Sensor Power P85PWR	21	Fault	Overload, Too Low, Diagnostic Error	Loss of limit switch and sensor signals Machine disabled	*Voltage at TCON J2-39 *24V at TCON J0-2
149	Sensor Power P109PWR	09	Shorted to 0V	<1V	Loss of toggle switch signals Machine disabled	*Voltage at TCON J1-8 *24V at TCON J0-2
		11	Shorted to Supply Voltage	>10V	Potential loss of sensor signals Machine disabled	
		23	Value too high	>5.25V	Potential loss of toggle switch signals Machine disabled	
		24	Value too low	<4.75V	Potential loss of toggle switch signals Machine disabled	
152	Primary Down On/Off Valve	21	Valve status fault	Open or Shorted (digital outputs only) Power supply to the output stage is too low (all output types)	Associated function disabled	*Check Ω *Verify no open/short circuit between controller and B- (V168PBH BL/RD)
189	Lift Pump Motor 1	25	Resistance Too High	Motor phase is open. Bad crimps or faulty wiring.	Main Contactor Open.	*Check motor power (UVW) cables. *Confirm motor power cable connections. *Check motor phase to phase resistance.
190	RR Drive Motor	25	Resistance Too High	Motor phase is open. Bad crimps or faulty wiring.	EM brake set. Main Contactor Open. No Drive of failed motor. Reduces machine drive speed.	*Check motor power (UVW) cables. *Confirm motor power cable connections.
191	LR Drive Motor	25	Resistance Too High	Motor phase is open. Bad crimps or faulty wiring.	EM brake set. Main Contactor Open. No Drive of failed motor. Reduces machine drive speed.	Check motor power (UVW) cables. Confirm motor power cable connections.

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
192	RF Drive Motor	25	Resistance Too High	Motor phase is open. Bad crimps or faulty wiring.	EM brake set. Main Contactor Open. No Drive of failed motor. Reduces machine drive speed.	*Check motor power (UVW) cables. *Confirm motor power cable connections.
193	LF Drive Motor	25	Resistance Too High	Motor phase is open. Bad crimps or faulty wiring.	EM brake set. Main Contactor Open. No Drive of failed motor. Reduces machine drive speed.	*Check motor power (UVW) cables. *Confirm motor power cable connections.
194	RR Brake Coil	21	Fault	Brake Motor Coil Failure (shorted, open circuit)	Reduced Speed Drive, Wheel affected locked	Check Drive Motor Brake Coil and wiring. (C32BRK WH/BK & P181RET OR)
195	LR Brake Coil	21	Fault	Brake Motor Coil Failure (shorted, open circuit)	Reduced Speed Drive, Wheel affected locked	Check Drive Motor Brake Coil and wiring. (C32BRK WH/BK & P181RET OR)
196	RF Brake Coil	21	Fault	Brake Motor Coil Failure (shorted, open circuit)	Reduced Speed Drive, Wheel affected locked	Check Drive Motor Brake Coil and wiring. (C32BRK WH/BK & P181RET OR)
197	LF Brake Coil	21	Fault	Brake Motor Coil Failure (shorted, open circuit)	Reduced Speed Drive, Wheel affected locked	Check Drive Motor Brake Coil and wiring. (C32BRK WH/BK & P181RET OR)
198	RR Speed Sensor	21	Fault	Motor Sin/Cos Encoder feedback signal fault Stalled motor. Motor encoder failure. Bad crimps or faulty wiring. Problems with power supply for the motor encoder.	Reduced Speed Drive, Wheel affected locked -or- EM brake set. Main Contactor Open. No Drive of failed motor. Reduces machine drive speed.	Check Motor Encoder (Sin/Cos) & Wiring. (D185SEN WH, D186SEN BL, P109PWR and P110RET BK)
199	LR Speed Sensor	21	Fault	Motor Sin/Cos Encoder feedback signal fault Stalled motor. Motor encoder failure. Bad crimps or faulty wiring. Problems with power supply for the motor encoder.	Reduced Speed Drive, Wheel affected locked -or- EM brake set. Main Contactor Open. No Drive of failed motor. Reduces machine drive speed.	Check Motor Encoder (Sin/Cos) and Wiring. (D185SEN WH, D186SEN BL, P109PWR and P110RET BK)

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
200	RF Speed Sensor	21	Fault	Motor Sin/Cos Encoder feedback signal fault Stalled motor. Motor encoder failure. Bad crimps or faulty wiring. Problems with power supply for the motor encoder.	Reduced Speed Drive, Wheel affected locked -or- EM brake set. Main Contactor Open. No Drive of failed motor. Reduces machine drive speed.	Check Motor Encoder (Sin/Cos) & Wiring. (D185SEN WH, D186SEN BL, P109PWR and P110RET BK)
201	LF Speed Sensor	21	Fault	Motor Sin/Cos Encoder feedback signal fault Stalled motor. Motor encoder failure. Bad crimps or faulty wiring. Problems with power supply for the motor encoder.	Reduced Speed Drive, Wheel affected locked -or- EM brake set. Main Contactor Open. No Drive of failed motor. Reduces machine drive speed.	Check Motor Encoder (Sin/Cos) & Wiring. (D185SEN WH, D186SEN BL, P109PWR and P110RET BK)
204	Main Battery	21	Fault	Voltage detected but the charger is unable to charge the battery. Can be due to a electrical device connected between the charger & battery, which creates voltage but not current. Battery could not be trickle charged up to the minimum voltage	Battery will not charge	*Check for shorted or damaged cells *Replace battery pack *Check DC connections (This error will automatically clear once the charger is reset)

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
205	Drive Power Contactor	21	Fault	Main contactor does not close correctly	No Drive on any wheeldrive	Check Main Contactor wiring and condition of the contactor and its contacts.
		27	Active ON at Start Up	Main contactor is found closed at power ON (welded contactor)	No Drive on any wheeldrive	Check Main Contactor wiring and condition of the contactor and its contacts.
233	Battery Temperature	21	Fault	Pb Batteries only: Battery temperature sensor is required by charge profile (battery temperature compensated algorithm) but it is not installed. Reported by Charger.	Charging Disabled	*Confirm sensor is connected correctly. Power on Charger pin 5 (WH/RD) and B- on Charger pin 14. *Check if the charge profile installed does not require temperature compensation.
		19	Out of Range	Battery temperature sensor error. Reported by Charger or BMS.	Charging Disabled	*Check temperature sensor and connections *Reset charger (This error will automatically clear once the condition has been corrected.)
		23	Too High	Battery Temperature (TCON Check) > 120 °F (49 °C) Lead Acid or AGM Battery > 140 °F (60 °C) Lithium Battery -or- Reported by the BMS: >50 °C= warning >60 °C = limit Amps >65 °C = fault	Terminates Hybrid Charge Opens Battery Contactor if beyond warning level (if equipped)	Repower with battery temperature issue corrected.
		24	Too Low	Reported by the BMS: Charge: <0C = fault Discharge: < -20 = warning, < -30C = fault		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
252	Battery Management System (BMS)	13	No Response	CAN wiring Issue BMS Not Powered Up	Battery Pack Contactor Opens Functions limited to AUX battery at slower speed	*Confirm 60Ω across CAN pins 11 and 12 of BMS Plug when system power is OFF. *Confirm CAN wiring *Confirm Key Switch Power on pin 6 of BMS plug (R244KSP BL/WH)
		21	Component Fault	Fault without a specific Genie fault code occurred	See BMS Fault List Component Faults are likely uncommon or not repairable.	See BMS Fault List
253	Capacitor Charge	21	Fault	Precharge failed to charge the capacitor bank from the external precharge resistor.	Shutdown Motor; Shutdown Main Contactor; Shutdown EM Brake; Shutdown Throttle; Full Brake.	*Check Key Switch(KSI) wiring on all AC motor controllers. (R181PWR OR) *Check for power drain on B+ cable See component fault screen to determine motor controller is reporting the issue
254	Battery Charge Voltage	23	Too High	Battery voltage is too high as detected by the algorithm.	Charging Process Terminated	*Check the battery voltage and cable connections (This error will automatically clear once the condition has been corrected.)
		24	Too Low	Battery voltage is too low as detected by the algorithm.	Charging Process Terminated	*Check the battery voltage and cable connections. (This error will automatically clear once the condition has been corrected.)
255	Right Rear Drive Motor Temperature	20	Warning	Motor Temperature exceeded warning temperature limit of 120 °C	Limited Speed Drive	*Allow the motors to cool down *Check for damaged gearbox or motor
		21	Fault	Motor Temperature exceeded maximum rated temperature limit 0f 145 °C	No Drive	*Allow the motors to cool down *Check temperature sensor wirings *Check for damaged gearbox or motor

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
256	Left Rear Drive Motor Temperature	20	Warning	Motor Temperature exceeded warning temperature limit of 120 C	Limited Speed Drive	*Allow the motors to cool down *Check for damaged gearbox or motor
		21	Fault	Motor Temperature exceeded maximum rated temperature limit of 145 °C	No Drive	*Allow the motors to cool down *Check temperature sensor wiring, *Check for damaged gearbox or motor
257	Right Front Drive Motor Temperature	20	Warning	Motor Temperature exceeded warning temperature limit of 120 °C	Limited Speed Drive	*Allow the motors to cool down *Check for damaged gearbox or motor
		21	Fault	Motor Temperature exceeded maximum rated temperature limit of 145 °C	No Drive	*Allow the motors to cool down *Check temperature sensor wiring *Check for damaged gearbox or motor
258	Left Front Drive Motor Temperature	20	Warning	Motor Temperature exceeded warning temperature limit of 120 deg C	Limited Speed Drive	*Allow the motors to cool down *Check for damaged gearbox or motor
		21	Fault	Motor Temperature exceeded maximum rated temperature limit of 145 °C	No Drive	*Allow the motors to cool down *Check temperature sensor wiring *Check for damaged gearbox or motor

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
259	Right Rear Drive Controller Temperature	20	Warning	Motor Controller Temperature exceeded or is below the warning temperature limit	Limited Speed Drive	*Allow the motor controller to cool down. *Move unit to a warmer location
		23	Too High	Motor Controller Temperature exceeded the maximum temperature limit (205 °F / 95 °C)	No Drive	*Allow the motor controller to cool down *Check mechanical connection to heat dissipation plate *Check for component damage Ensure brakes releasing fully
		24	Too Low	Motor Controller Temperature below the minimum temperature limit (-40 °F / -40 °C)	No Drive	Move unit to a warmer location
260	Left Rear Drive Controller Temperature	20	Warning	Motor Controller Temperature exceeded or is below the warning temperature limit	Limited Speed Drive	*Allow the motor controller to cool down. *Move unit to a warmer location
		23	Too High	Motor Controller Temperature exceeded the maximum temperature limit (205 °F / 95 °C)	No Drive	*Allow the motor controller to cool down *Check mechanical connection to heat dissipation plate *Check for component damage Ensure brakes releasing fully
		24	Too Low	Motor Controller Temperature below the minimum temperature limit (-40 °F / -40 °C)	No Drive	Move unit to a warmer location

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
261	Right Front Drive Controller Temperature	20	Warning	Motor Controller Temperature exceeded or is below the warning temperature limit	Limited Speed Drive	*Allow the motor controller to cool down. *Move unit to a warmer location
		23	Too High	Motor Controller Temperature exceeded the maximum temperature limit (205 °F / 95 °C)	No Drive	*Allow the motor controller to cool down *Check mechanical connection to heat dissipation plate *Check for component damage Ensure brakes releasing fully
		24	Too Low	Motor Controller Temperature below the minimum temperature limit (-40 °F / -40 °C)	No Drive	Move unit to a warmer location
262	Left Font Drive Controller Temperature	20	Warning	Motor Controller Temperature exceeded or is below the warning temperature limit	Limited Speed Drive	*Allow the motor controller to cool down. *Move unit to a warmer location
		23	Too High	Motor Controller Temperature exceeded the maximum temperature limit (205 °F / 95 °C)	No Drive	*Allow the motor controller to cool down *Check mechanical connection to heat dissipation plate *Check for component damage Ensure brakes releasing fully
		24	Too Low	Motor Controller Temperature below the minimum temperature limit (-40 °F / -40 °C)	No Drive	Move unit to a warmer location
264	Amp Hour Return	23	Too High	Lead Acid & AGM Batteries Only Poor battery health. Very deeply discharged battery. Poorly connected battery. High parasitic loads on battery while charging.	Warning that battery may be defective.	*Replace battery pack *Check DC connections *Disconnect parasitic loads (This error will automatically clear once the charger is reset by cycling DC.)

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
265	Charger USB	21	Fault	There has been a problem mounting or unmounting the USB Flash Drive.	Can't Load Software or Charge Profile Can't Retreive Charge History	*Remove and re-insert USB Drive *If the condition persists then remove AC and battery for minimum 30 seconds and retry charger
		21	Fault	USB hardware overcurrent protection has been tripped.	Can't Load Software or Charge Profile Can't Retreive Charge History	Remove and reinsert USB flash drive. (If condition persists, try a different USB flash drive.)
266	Charge Profile	21	Fault	The selected charging profile is incompatible with the charger software.	Charging Disabled	Update charger software or select a different charge profile.
		31	Setup Invalid	There is no active charge profile selected.	Charging Disabled	Select a charge profile.
267	Charger AC Voltage	23	Too High	AC voltage is too high. (>270V AC)	Charging Disabled	Connect charger to an AC source that provides stable AC between 85 - 270 VAC / 45-65 Hz. (This error will automatically clear once the condition has been corrected.)
		24	Too Low	AC source is unstable. Could be caused by undersized generator and/or severely undersized input cables.	Charging Disabled	Connect charger to an AC source that provides stable AC between 85 - 270 VAC / 45-65 Hz. (This error will automatically clear once the condition has been corrected.)
268	Charger Cooling Fan	21	Fault	Fan will not turn when commanded, rotor must be locked	Charge rate may be reduced in hot ambient conditions.	Inspect the fan and clear the blockage.

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
270	Pump Controller 1 Contactor	21	Fault	Main contactor does not close correctly	Shutdown Motor; Shutdown Main Contactor; Shutdown EM Brake; Shutdown Throttle; Full Brake.	*Check Main Contactor wiring *Check for component damage. Low Side Control (C197RET GR) Coil Source (P181RET OR)
		27	Active at Startup	Contacts Welded	Shutdown EM Brake; Drive disabled.	Replace Contactor
271	Pump Motor 1 Temperature	23	Too High	Motor Temperature exceeded warning temperature limit of 120 °C	Limited Pump Speed	*Allow the motors to cool down *Check for damaged motor
		21	Fault	Motor Temperature exceeded maximum rated temperature limit of 145 °C	Limited Drive Speed or possibly No Drive	*Allow the motor to cool down *Check temperature sensor wiring *Check for damaged motor
272	Pump Controller 1 Temperature	20	Warning	Motor Controller Temperature exceeded or is below the warning temperature limit	Limited Speed Drive	*Allow the motor controller to cool down. *Move unit to a warmer location
		23	Too High	Motor Controller Temperature exceeded the maximum temperature limit (205 °F / 95 °C)	No Drive	*Allow the motor controller to cool down *Check mechanical connection to heat dissipation plate *Check for component damage *Ensure pump is free to rotate
		24	Too Low	Motor Controller Temperature below the minimum temperature limit (-40 °F / -40 °C)	No Drive	Move unit to a warmer location
273	Pump Motor 1 Speed Sensor	21	Fault	1. Motor encoder failure. 2. Bad crimps or faulty wiring. 3. See Monitor menu » Motor: Motor RPM.	Shutdown EM Brake; Motor disabled.	Check Motor Encoder (Sin/Cos) & Wiring. (D185SEN WH, D186SEN BL, P109PWR and P110RET BK)

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
274	Pump Motor Controller 2	08	Component Fault	Fault without a specific Genie fault code occurred	See Pump Controller Fault List Component Faults are likely uncommon or not repairable.	See Component Fault List
		13	No Response	No CAN communication	Hydraulic Functions disabled	* Check voltage (48V) on Pin 1 (R45GEN GR/WH) *Check 60Ω CAN H to CAN L with power OFF
		31	Setup Invalid	Pump Controller is not compatible with the selected machine model	Machine Disabled	Confirm Pump Motor PN is consistent with Machine model configuration. If not, Reset All Parameter and repeat the setup procedure.
275	Pump Controller 2 Contactor	21	Fault	Main contactor does not close correctly	Shutdown Motor; Shutdown Main Contactor; Shutdown EM Brake; Shutdown Throttle; Full Brake.	*Check Main Contactor wiring *Check for component damage. Low Side Control (C197RET GR) Coil Source (P181RET OR)
		27	Active at Startup	Contacts Welded	Shutdown EM Brake; Drive disabled.	Replace Contactor
276	Pump Controller 2 Temperature	20	Warning	Motor Controller Temperature exceeded or is below the warning temperature limit	Limited Speed Operation	*Allow the motor controller to cool down. *Move unit to a warmer location
		23	Too High	Motor Controller Temperature exceeded the maximum temperature limit (205 °F / 95 °C)	No Lift Functions	*Allow the motor controller to cool down *Check mechanical connection to heat dissipation plate *Check for component damage *Ensure pump is free to rotate
		24	Too Low	Motor Controller Temperature below the minimum temperature limit (-40 °F / -40 °C)	No Lift Functions	Move unit to a warmer location

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
277	Pump Motor 2 Temperature	23	Too High	Motor Temperature exceeded warning temperature limit of 120 °C	Limited Pump Speed	*Allow the motors to cool down *Check for damaged motor
		21	Fault	Motor Temperature exceeded maximum rated temperature limit of 145 °C	No Lift Functions	*Allow the motor to cool down *Check temperature sensor wiring *Check for damaged motor
278	Pump Motor 2 Speed Sensor	21	Fault	1. Motor encoder failure. 2. Bad crimps or faulty wiring. 3. See Monitor menu » Motor: Motor RPM.	Shutdown EM Brake; Motor disabled.	Check Motor Encoder (Sin/Cos) & Wiring. (D185SEN WH, D186SEN BL, P109PWR and P110RET BK)
279	Welder Motor Controller	08	Component Fault	Fault without a specific Genie fault code occurred	See Pump Controller Fault List Component Faults are likely uncommon or not repairable.	See Component Fault List
		13	No Response	No CAN communication	Hydraulic Functions disabled	*Check voltage (48V) on Pin 1 (R45GEN GR/WH) *Confirm 60Ω CAN H to CAN L with power OFF
280	Welder Controller Contactor	21	Fault	Main contactor does not close correctly	Shutdown Motor; Shutdown Main Contactor; Shutdown EM Brake; Shutdown Throttle; Full Brake.	*Check Main Contactor wiring *Check for component damage. Low Side Control (C197RET GR) Coil Source (P181RET OR)
		27	Active at Startup	Contacts Welded	Shutdown EM Brake; Drive disabled.	Replace Contactor

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
281	Welder Controller Temperature	23	Too High	Motor Controller Temperature exceeded the maximum temperature limit (205 °F / 95 °C)	No Drive	*Allow the motor controller to cool down *Check mechanical connection to heat dissipation plate *Check for component damage *Ensure pump is free to rotate
		24	Too Low	Motor Controller Temperature below the minimum temperature limit (-40 °F / -40 °C)	No Drive	Move unit to a warmer location
282	Welder Motor Temperature	23	Too High	Motor Temperature exceeded warning temperature limit of 120 °C	Limited Pump Speed	*Allow the motors to cool down *Check for damaged motor
		21	Fault	Motor Temperature exceeded maximum rated temperature limit 0f 145 °C	No Drive	*Allow the motor to cool down *Check temperature sensor wiring *Check for damaged motor
283	Welder Motor Speed Sensor	21	Fault	1. Motor encoder failure. 2. Bad crimps or faulty wiring. 3. See Monitor menu » Motor: Motor RPM.	Shutdown EM Brake; Motor disabled.	Check Motor Encoder (Sin/Cos) & Wiring. (D185SEN WH, D186SEN BL, P109PWR and P110RET BK)
284	Proportional Relief 2 Coil	25	Resistance Too High	Open Circuit or ohms > 175% of nominal	Fault condition. Recover using AUX Power	*Check Ω *Check no open/short circuit between controller and B- (V241HGP OR/RD)
		26	Resistance Too Low	Short or Resistance < 50% of nominal		
285	Proportional Relief 3 Coil	25	Resistance Too High	Open Circuit or ohms > 175% of nominal	Fault condition. Recover using AUX Power	*Check Ω *Check no open/short circuit between controller and B- (V191HGP WH/RD)
		26	Resistance Too Low	Short or Resistance < 50% of nominal		

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
286	Lift Pump Motor 2	21	Fault	Stalled motor. Motor encoder failure. Bad crimps or faulty wiring. Problems with power supply for the motor encoder.	Main Contactor Open No Lift	*Check encoder wiring. *Confirm motor is free to rotate.
		25	Resistance Too High	Motor phase is open. Bad crimps or faulty wiring.	Main Contactor Open.	*Check motor power (UVW) cables. *Confirm motor power cable connections. *Check motor phase to phase resistance.
287	Welder Motor	21	Fault	Stalled motor. Motor encoder failure. Bad crimps or faulty wiring. Problems with power supply for the motor encoder.	Main Contactor Open No Lift	*Check encoder wiring. *Confirm motor is free to rotate.
		25	Resistance Too High	Motor phase is open. Bad crimps or faulty wiring.	Main Contactor Open.	*Check motor power (UVW) cables. *Confirm motor power cable connections. *Check motor phase to phase resistance.
288	P198 Sensor Power	9	Shorted to 0V	<1V	Loss of sensor signals Machine disabled	*Check Voltage at TCON J2-9 *Check voltage (24V) at TCON J0-2
		11	Shorted to Supply Voltage	>20V	Potential loss of sensor signals Machine disabled	
		23	Too High	>12.5V	Potential loss of sensor signals Machine disabled	
		24	Too Low	<11.5V	Potential loss of sensor signals Machine disabled	
289	TCON System Power	23	Too High	>28600mV	Potential damage to system Machine disabled	*Check Voltage at TCON J1-2 *Check 24V at TCON J0-2
		24	Too Low	<23400mV	Loss of power to control system Machine disabled	
290	PCON System Power	23	Too High	>29900mV	Potential damage to system Machine disabled	*Check Voltage at PCON J1-2 *24V at TCON J0-2
		24	Too Low	<22100mV	Loss of power to control system Machine disabled	

Control System Fault Codes

ID	Component	ID	Name	Cause	Effect	Solution
291	Platform Control Buttons	27	Active at Startup	Button Engaged when not pressed	Disable Drive Enable, High Drive Speed, Hybrid Mode, Inverter Lift Power are disabled. Only the associated with the stuck button is disabled.	Confirm platform box overlay is not damaged. Confirm proper installation of platform display. Rubber bumpers in place and mounting bolts not over-torqued.
292	Hydraulic Pump 1	17	Not Calibrated	Pump efficiency (rev/gallon) auto-calibration failed.	Warning Only	Calibrate Relief Valves Calibrate associated position sensor. Confirm correct pump is installed Replace Pump
293	Hydraulic Pump 2	17	Not Calibrated	Pump efficiency (rev/gallon) auto-calibration failed.	Warning Only	Calibrate Relief Valves Calibrate associated position sensor. Confirm correct pump is installed Replace Pump
294	Hydraulic Pump 3	17	Not Calibrated	Pump efficiency (rev/gallon) auto-calibration failed.	Warning Only	Calibrate Relief Valves Calibrate associated position sensor. Confirm correct pump is installed Replace Pump

Charger Fault Codes

Battery Charger

1. Models with 1200W charger

The charger continuously monitors internal and external conditions. Fault and Error codes are generated by the charger to indicate that an internal or external malfunction has been detected in the electrical system. The types of Diagnostic Trouble Codes that may occur are explained below.

Type "F" codes - Indicate an internal fault condition has occurred and caused charging to stop.

Type "E" codes - Indicate an external fault condition has occurred and caused charging to stop.

Type "P" code - Indicates charger programming mode is active. This will occur when the charger profile is being configured.

Type "USB" code - Indicates the USB interface is active, and the USB should not be removed. This will occur when the charger firmware is being updated.

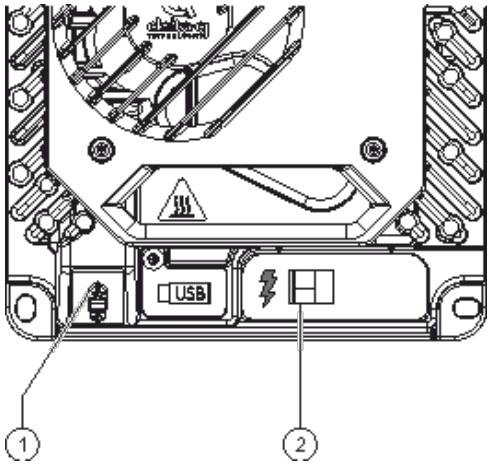
⚠ Solid red - Internal fault condition. Type "F" fault code.

⚠ Flashing amber - External fault condition. Type "E" error code.

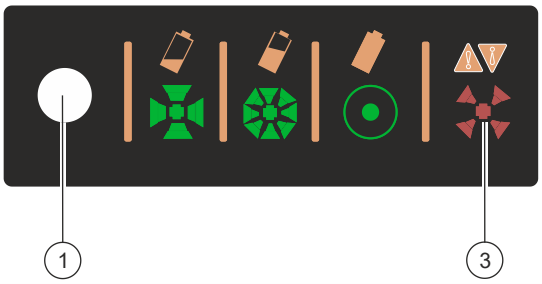
⚠ Flashing green - USB interface is active.

⚠ Solid green - Firmware update is complete. Remove USB from charger.

Codes are displayed as F, E or P and followed by three numbers and a period (example: E-0-0-4). The charger can display multiple codes.



Charger status indicators



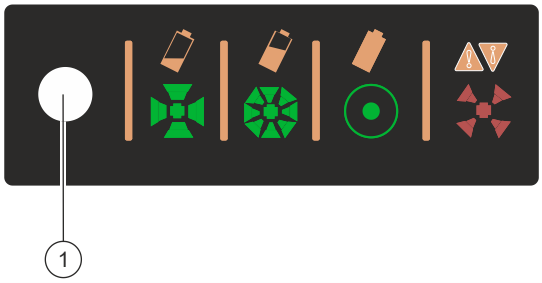
Remote charger status indicators

1 Error / Fault / USB indicator
2 Charger profile / Error display
3 Error / Fault

Charger Fault Codes

2. Models with 3.3kW Charger

The charger continuously monitors its internal and external conditions during operation. If the charger detects a malfunction in the electrical system, it generates a fault or error code. These codes help service personnel identify the type of fault. The charger sends the fault or error code to the Ground Control Display. To view the code, refer to the Ground Control Display. If the LED on the charger panel shows a solid red light, this means that a fault has occurred in the system. Refer to the image below for details about the LED indication.



1 LED Indicator

Charger Fault Codes

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Possible Causes	Solution
F-0-0-201	135	8	DC/DC Excessive Leakage	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-202	135	8	PFC Excessive Leakage	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-203	135	8	PFC Taken Too Long To Boost	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-204	135	8	Unable To Cal. Offset Current	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-205	135	8	Output Relay Volts Too High	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-206	135	8	Battery Current Sense Circuit	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-207	135	8	DC-DC Circuit Failure	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-208	135	8	Aux DC-DC Current Failed Calibration		Reset the charger to see if the fault is persistent
F-0-0-209	135	8	Internal Software Exception	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-210	135	8	Interlock Failure		Replace the VCIM as the interlock stuck
F-0-0-211	135	8	Internal Charger Circuit Supply Rail	Internal charger fault.	Remove voltage supply for minimum 30 seconds and retry. If the problem persists contact Delta-Q.
F-0-0-213	135	8	Internal DC-DC Output Short Circuit		Reset charger to see if the fault is persistent. If it is, then check if the DCDC output rectification diode is short. it may overheat or burn the charger, or short the external battery

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Possible Causes	Solution
F-0-0-214	135	8	Internal DC-DC Output Excessive Leakage		Reset charger to see if the fault is persistent. If it is, then check if the DCDC output rectification diode is short. it may overheat or burn the charger, or short the external battery
F-0-0-215	135	8	Input Primary Relay	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, contact the manufacturer of your vehicle or machine / or Delta-Q.
F-0-0-216	135	8	Internal Aux Relay Circuit Fault	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-217	135	8	Control Pilot Voltage Range Issue		Check EVSE for proper operation. Check control pilot wire for damage. Possible internal hardware fault. If persists, replace the unit.
F-0-0-218	135	8	Aux Output Fuse Circuit Failure	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-219	135	8	Aux Output Voltage Too High		Check AUX DC connected to correct voltage battery (12V or 24V). Possible internal hardware fault. If persists, replace the unit.
F-0-0-220	135	8	Internal Aux DC-DC Short Circuit	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-221	135	8	Internal Temp Senosr Fault	Internal charger fault.	Remove AC and battery for minimum 30 MINUTES and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-222	135	8	Internal Aux DC-DC Failure	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-223	135	8	PFC Circuit Issue Detected	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-224	135	8	Internal Aux DC-DC Failed To Turn On	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.
F-0-0-225	135	8	Internal Hardware Clock Fault	Internal charger fault.	Remove AC and battery for minimum 30 seconds and retry charger. If it fails again, do not continue to use the charger - replace the unit.

Charger Fault Codes

Charger Error Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-1	131	23	High Battery Voltage	High Battery voltage Error	*Check battery voltage and cable connections. *Check Battery size and Condition Self clearing when condition has been corrected.
E-0-0-2	131	24	Low Battery Voltage	Low battery voltage detected prior to starting charge cycle	Check battery voltage and cable connections. *Check Battery size and Condition Self clearing when condition has been corrected.
E-0-0-3	135	28	Charge Timeout	Charge timeout caused by battery pack not reaching required voltage within safe time limit.	*Operate at lower ambient temperature *Replace battery pack *Check DC connections Self clearing when condition has been corrected.
E-0-0-4	204	21	Battery Defective	Battery Defective	*Check for shorted or damaged cells *Replace battery pack *Check DC connections Self clearing when condition has been corrected.
E-0-0-5	266	21	Algorithm Fault	Algorithm Specific Alarm	Contact Support for details if this alarm occurs.
E-0-0-6	135	21	Battery Temp Sensor Shorted	Battery Temperature Sensor Short Circuit	Contact Support for details if this alarm occurs.
E-0-0-7	264	23	Amp Hour Return Exceeded	Ah Limit Exceeded	*Replace battery pack *Check DC connections *Disconnect parasitic loads Self clearing when condition has been corrected.
E-0-0-8	233	19	Battery Temp Out Of Range	Battery Temperature Out Of Range Error	*Check temperature sensor and connections *Reset charger Self clearing when condition has been corrected.
E-0-0-9	233	9	Battery Temp Changing Too Quick		Check loose/corrosion on output cable or bad configuration if the battery temperature sensor is used for charge control.
E-0-0-10	135	21	Charger Output Short Circuit	Charger DC Terminals In Contact With Each Other While Charging.	Check for short circuit in charging and battery cables.

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-11	135	8	Charger Disabled By Extern Command	Charger Is Disabled By External Command	
E-0-0-12	135	8	Reverse Polarity	Reverse Polarity Error	Check the battery connections. Self clearing when condition has been corrected.
E-0-0-13	204	21	Battery Does Not Take Current	Battery Does Not Take Current	Ensure the charger is properly connected to approved equipment Self clearing when condition has been corrected.
E-0-0-14	135	8	Configuration Error Number Of Cells		The charger will need to be re-flashed to the correct settings.
E-0-0-15	135	8	Configuration Error Voltage Scaling		The charger will need to be re-flashed to the correct settings.
E-0-0-16	135	8	Software Upgrade Failed	Software Upgrade Failed Error	Ensure the USB Flash Drive is properly formatted and retry the update by reinserting the USB Flash Drive into the charger.
E-0-0-17	265	21	USB Error	USB Error	*Remove and re-insert USB Drive *If the condition persists then remove AC and battery for minimum 30 seconds and retry charger
E-0-0-18	135	8	Slot CRC Error	Slot CRC Error	Ensure the USB Flash Drive is properly formatted and retry the update by reinserting the USB Flash Drive into the charger.
E-0-0-19	135	29	Hardware Does Not Support Sw Version	Hardware Build Does Not Support Software Version	Contact Product Support
E-0-0-20	266	31	No Active Algorithm Selected	No Active Algorithm Selected	Select a charge profile.
E-0-0-21	254	23	High Batt Voltage While Charging	High Battery Voltage Error Detected While Charging	Check the battery voltage and cable connections. Self clearing when condition has been corrected.
E-0-0-22	254	24	Low Batt Voltage While Charging	Low Battery Voltage Error Detected While Charging	Check the battery voltage and cable connections. Self clearing when condition has been corrected.
E-0-0-23	267	23	High AC Voltage > 270 VAC	High AC Voltage Error (>270Vac)	Connect charger to an AC source that provides stable AC between 85 - 270 VAC / 45-65 Hz. Self clearing when condition has been corrected.

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-24	135	8	Failure To Initialize	Failure To Initialize	Disconnect AC input and battery for 30 seconds before retrying.
E-0-0-25	267	24	Low AC Voltage Oscillation Error	Low AC Voltage Oscillation Error	Connect charger to an AC source that provides stable AC between 85 - 270 VAC / 45-65 Hz. Self clearing when condition has been corrected.
E-0-0-26	135	8	Script Failure	Script Failure	Ensure the USB Flash Drive is properly formatted and retry the update by reinserting the USB Flash Drive into the charger.
E-0-0-27	265	21	USB Overcurrent	USB Overcurrent Fault	Remove and reinsert USB flash drive. (If condition persists, try a different USB flash drive.)
E-0-0-28	266	21	Charge Profile Incompatibility	Charge Profile Incompatibility	Update charger software or select a different charge profile.
E-0-0-29	135	13	CAN Bus Error	CAN Bus Error	Check the physical CAN connector, electrical bus conditions & other CAN modules for correct function. For example, check termination resistance is approximately 60 ohms.
E-0-0-30	135	8	COMM Battery Module Error	COMM Battery Module Error	Check the CAN bus battery module for correct functioning.
E-0-0-31	135	8	Analog Input Vref Out Of Range	The Vref For The Adc Measurements Has Triggered An Alarm	Remove AC and battery for minimum 30 seconds & retry charger.
E-0-0-32	135	13	CAN Bus Heartbeat Error	CAN Bus Heartbeat Error	Check the networked CAN bus device(s) for correct functioning.
E-0-0-33	135	8	Configuration Error Target Voltage Too High		The charger configuration is asking for more voltage than the charger can deliver. Charger reflash is required to correct this issue.
E-0-0-34	135	8	Configuration Error Capacity Not Supported		The charger configuration is asking for voltage below 20% of the charger nominal. Charger reflash is required to correct this issue.
E-0-0-35	135	8	Configuration Error Target Voltage Too Low	Battery Temperature Sensor Error	Check if sensor is connected correctly if alarm is shown or ensure the charge profile installed does not require temperature compensation.

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-36	233	21	Batt Temperature Sensor Error	Battery Temperature Sensor Error	Check if sensor is connected correctly if alarm is shown or ensure the charge profile installed does not require temperature compensation.
E-0-0-37	135	8	CANopen Programming Failed	CANopen Reprogramming Failed	Re-try CANOpen download or re-program using the USB
E-0-0-38	268	21	Stalled Cooling Fan Motor	Stalled Cooling Fan Motor	Fan is obstructed, please inspect the fan and clear the blockage.
E-0-0-39	135	8	Button Stuck Down		Inspect for objects on or near the button or damage to the button. If alarm persists, replace charger.
E-0-0-40	135	8	Voltage Too Low		Ensure that the the fan is not stuck or drawing excess current, and that the correct fan part is installed.
E-0-0-41	135	8	Software Error		Software internal configuration error, ensure configuration settings are correct and reflash charger
E-0-0-42	135	8	Configuration Error CAN		Software internal configuration error, ensure configuration settings are correct and reflash charger
E-0-0-43	135	8	CANopen PDO CRC Mismatch		Power cycle all CAN nodes and charger. Error will clear once sequence counter updates. Reflash charger if this persists. CAN only - not shown on display
E-0-0-44	135	8	CANopen PDO Sequence Count		Power cycle all CAN nodes and charger. Error will clear once sequence counter updates. Reflash charger if this persists. CAN only - not shown on display
E-0-0-45	135	21	Charger Output Open Circuit		Charger did not see enough battery voltage. Connect the battery in order to start charging. This alarm is only displayed if configured.
E-0-0-46	135	21	CAN Invalid PDO Length		Power cycle all CAN nodes and charger. Error will clear once sequence counter updates. Reflash charger if this persists.

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-60	135	8	CAN Communication Never Received		Charger is waiting for this message to start. Check CAN cabling. Ensure nodes configured to send expected messages
E-0-0-61	135	8	CAN Battery Current Report Mismatch		The charger compares the Battery written current with its output current. Check that the right current is being sent to the charger. Check if the output cable has a parallel branch.
E-0-0-62	135	8	CAN Battery Voltage Report Mismatch		The charger compares the Battery written voltage with its output voltage. Check that the correct voltage is being sent to the charger. Check that the output cable resistance matches the charger setting. Check for other sources of voltage drop.
E-0-0-66	135	8	Battery Voltage Higher Than Configured Max		Check if the charger is connected to the right battery, or the maximum voltage configured is too low.
E-0-0-67	135	8	CAN Communication Before Messages Received		CANbus network error. Check the physical CAN connector, electrical bus conditions and other CAN modules for correct functioning. For example check termination resistance is approximately 60ohms.
E-0-0-68	135	8	Missing CAN Messages While Not Charging		Monitored messages (Heartbeat, PGN, PDO) lost while charger output off. Check the networked CANbus device(s) for correct function and messages.
E-0-0-69	135	8	Accessory Power Output Overcurrent		Accessory Power Output (APO) has too much load, please check circuits attached to Accessory Power Output (APO) for shorts or other circuit faults.
E-0-0-71	135	8	EVSE Not Powered		Check if the circuit breakers to the EVSE. If the EVSE is good, and works with other vehicles, then check the internal wiring between the Vehicle Inlet connector and the VCIM module.

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-72	135	8	EVSE Reported Fault		Consult the EVSE's trouble shooting guides
E-0-0-73	135	8	EVSE Fault		Try charging with another EVSE. Diagnostic PGN 64207 (EVCC1D1) will give further information regarding the underlying cause. Alternatively CANopen SDOs 0x2209 to 0x220F should be queried.
E-0-0-74	135	8	VCIM Proximity Open Circuit		Check the internal wiring between the VCIM module and the inlet connector. Check the internal 2K7 or 4K7 resistor built into the inlet connector.
E-0-0-75	135	8	VCIM Proximity Short Circuit		If fault clears when EVSE is unplugged then the fault lies in the EVSE's cable. If the fault persists then check the internal wiring between the VCIM and the inlet connector.
E-0-0-76	135	8	VCIM Proximity Unstable		This alarm is probably the result of connecting to an incompatible EVSE or to an EVSE with a faulty cable.
E-0-0-77	135	8	VCIM Illegal Duty Cycle		The EVSE is not operating within specified limits. Try a different EVSE
E-0-0-78	135	8	12V Supply Out Of Range		Internal VCIM error. Remove 12V supply for minimum 30 seconds and retry VCIM. If the problem persists contact Delta-Q.
E-0-0-81	135	8	External Temp Sense Out Of Range		plug overheated due to contact contamination, or over-current
E-0-0-82	135	8	External Temp Sense Open Circuit		Check for loose/corroded plug contact. sensor type
E-0-0-83	135	8	External Temp Sense Short Circuit		Check external temperature sensor external wiring then restart.
E-0-0-84	135	8	Incompatible Configuration		Verify that selected configuration items are known to selected software version.

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-87	135	8	Charger Error Monitor Triggered		Internal error has been flagged due to not generating the regular "watchdog" message. Check for low AC voltage or other abnormal conditions. If this error re appears, replace the charger.
E-0-0-88	135	8	Charger Error Monitor Not Started		Internal error has been flagged due to loss of communications internally within the charger. Check for abnormal conditions. If this error re-appears, replace the charger.
E-0-0-89	135	8	Aux DC Output Error		Lost a condition to operate the Aux DC Output. Check: Aux battery voltage between 9.7-14.5V, Traction battery voltage in range (see Design Guide). Could also be internal hardware failure causing Aux DC Output to be off when commanded on by software or key switch.
E-0-0-90	135	8	EVSE Failed To Provide Ac		Charger is communication with EVSE but it is not providing AC. Check EVSE is connected to AC power. Check cables and connections. Check EVSE hardware or try another EVSE.
E-0-0-91	135	8	EVSE Failed To Turn Off Ac		Charger is communicating with EVSE but it is not turning off AC. Check EVSE contactor for welding. Check cables and connections. If persists, try another EVSE.
E-0-0-92	135	8	Charger Reflash Error		Check the configuration file is appropriate for this charger model. Check use of the correct version of programming tool or protocol.
E-0-0-93	135	8	Aux DC Output Short Circuit		Check for wiring errors. Check for faulty or shorted battery cells. Check for too much load on Aux Output.
E-0-0-94	135	8	AC Input Voltage High Spikes		Monitor for stable AC voltage. Frequent spikes above 280VAC may damage the charger input.

Charger Fault Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-95	135	8	Safe Disconnect Alarm		Safe disconnect pin not connected but the primary contact pin connected. Ensure correct style of connector is used and the pins are installed correctly.
E-0-0-96	135	8	Charger Operation Voltage Too Low		Raise charger output voltage above 21.0VDC to reduce thermal stress to internal components.
E-0-0-97	135	8	J1772 Can Message Time Out		Monitored J1772 CAN messages from other ECU's have stopped. Check the networked CANbus device(s) for correct function.
E-0-0-104	135	8	J1772 Can Message Comm Never Received		An expected J1772 related message (i.e., with a receive timeout; e.g., RPDO or PGN) has not been received, but an EVSE is connected and otherwise charger is ready to enable AC.. Check CAN cabling. Ensure MCUs/BMS configured to send expected messages.

Pump and Drive Motor Control Fault Codes

Drive Motor Controller Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2510	0x12	1-2	Controller Overcurrent 1 = Controller Over Current Phase U 2 = Controller Over Current Phase W 3 = Controller Over Current Phase V 4 = Irms > 135% Current Limit	1. External short of phase U, V, or W motor connections. 2. Speed encoder noise problems. 3. Motor parameters are mistuned. 4. Controller defective	Reset Controller	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrakex ShutdownThrottle FullBrake ShutdownPump
0x2832	0x13	1-3	Current Sensor Fault	1. Leakage to vehicle frame from phase U, V, or W (short in motor stator). 2. Controller defective.	Set: Controller current sensors have invalid offset reading. Clear:Reset Controller	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2223	0x14	1-4	Precharge Failed 1 = Abort. 2 = Energy Limit Exceeded. 3 = Time Limit Exceeded.	1. An external load on the capacitor bank (B+ connection terminal) that prevents the capacitor bank from charging. See Programmer » System Monitor menu » Controller » Capacitor Voltage.	Set: The precharge failed to charge the capacitor bank. Clear: Cycle Interlock or Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2141	0x15	1-5	Controller Severe Undertemp	1. Controller is operating in an extreme environment. See Programmer » System Monitor menu » Controller » Controller Temperature.	Set: Heatsink temperature below –40°C (–40°F) Clear: Bring the heatsink temperature above –40°C (–40°F). and then Reset Controller	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2142	0x16	1-6	Controller Severe Overtemp	1. Controller is operating in an extreme environment. Excessive load on vehicle. Improper mounting of controller. See Programmer » System Monitor menu » Controller » Controller Temperature.	Set: Heatsink temperature above +95°C. Clear: Bring heatsink temperature below +95°C, and then Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2120	0x17	1-7	Severe B+ Undervoltage	1. Non-controller system drain on battery. 2. Battery resistance too high. 3. Battery disconnected while driving. 4. Blown B+ fuse or main contactor did not close. 5. Battery parameters are misadjusted. See Programmer » Monitor menu » Controller » Capacitor Voltage.	Set: When Main is closed and the FET Bridge is enabled, either the undervoltage drive current cut back = 0% for 64 ms or the Brownout Voltage is reached. Clear:Undervoltage drive current cut back > 0% for 100 ms and capacitor voltage > brownout voltage.	No drive torque. Fault Action: ShutdownPump ShutdownMotor Dual Drive This Motor: TrimDisable Other Motor: TrimDisable

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2122	0x17	1-7	Severe KSI Undervoltage	1. Non-controller system drain on battery/keyswitch circuit wiring. 2. Resistance in low power (KSI) circuit is too high. 3. KSI disconnected while driving. Blown fuse. See Programmer » System Monitor menu » Battery »Keyswitch Voltage.	Set: When below Brownout Voltage for 2 seconds. Clear: Bring KSI voltage above Brownout Voltage.	Fault Action: ShutdownAll
0x2130	0x18	1-8	Severe B+ Overvoltage	1. Battery parameters are misadjusted. 2. Battery resistance too high for given regen current. 3. Battery disconnected while regen braking. See Programmer » System Monitor menu » Controller» Capacitor Voltage.	Set: Capacitor bank voltage exceeded the Severe Overvoltage limit with the FET bridge enabled. Clear: Bring capacitor voltage below Severe Overvoltage limit, and then Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2132	0x18	1-8	Severe KSI Overvoltage	1. Battery-voltage applied to KSI (pin 1) exceeds the Severe Overvoltage limit. See Programmer » Monitor menu » Battery » Keyswitch Voltage.	Set: KSI voltage exceeded the Severe Overvoltage limit. Clear: Bring KSI voltage below the Severe Overvoltage limit, and then Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2133	0x19	1-9	Speed Limit Supervision	1. Motor speed detected that exceeds the limit set by the Max Speed Supervision parameter. 2. Misadjusted Max Speed Supervision parameters. See: Programmer » Application Setup » Max Speed Supervision menu.	Set: Motor rpm has exceeded the Max Speed Limit setting for the Max Speed Time Limit setting's duration. Clear:Reset Controller.	ShutdownInterlock ShutdownEMBrake
0x2134	0x1A	1-10	Travel Control Supervision	1. With the vehicle in the stopped state, the detected motor frequency and/or phase current exceeds the limit set by the Travel Control Supervision parameter. 2. Misadjusted Travel Control Supervision parameters. See: Programmer » Application Setup » Travel Control Supervision menu.	Set: The motor frequency and/or and phase-current are above their Travel Control Supervision settings when in the stopped state. Clear: Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2109	0x1B	1-11	Critical OS General Fault Program execution within the controller encountered a critical problem and could not recover from this.	(<100) Internal Fault, kindly contact your Curtis representative immediately (>100) Ill-formed or corrupted application package was loaded into controller	Set: (<100) Internal Fault (>100) CIT version is too old to fully support the FOS version Clear: (<100) Internal Fault (>100) Update CIT version, re- package the project, and re-flash the application package.	ShutdownAll
0x210A	0x1C	1-12	OS General 2 Fault Program execution within the controller encountered a serious problem and could not recover from this.	(<100) Internal Fault, kindly contact your Curtis representative immediately (>100) Ill-formed or corrupted application package was loaded into controller	Set: (<100) Internal Fault (>100) CIT version is too old to fully support the FOS version Clear: (<100) Internal Fault (>100) Update CIT version, re- package the project, and re-flash the application package.	ShutdownAll
0x2110	0x1D	1-13	Reset Rejected	1. NMT Reset Rejected 2. Reset_Controller () Rejected	Clear: Reset Controller.	Shutdown Interlock Shutdown Throttle
0x2140	0x22	2-2	Controller Overtemp Cutback	1. Controller is operating in an extreme environment. 2. Excessive load on vehicle. Improper mounting of controller which is preventing controller cooling. 3. Controller is performance-limited at this temperature. See Programmer » System Monitor menu » Controller: Temperature.	Set: Controller's Heatsink temperature exceeded 85°C. Clear: Bring heatsink temperature below 85°C.	Reduced drive torque. Reduced regen-braking torque. Fault Action: None, unless a fault action is programmed in VCL.

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2121	0x23	2-3	Undervoltage Cutback	1. Batteries need recharging. Controller is performance limited at this voltage. 2. Battery parameters are misadjusted. Non-controller system-drain on battery. 3. Battery resistance too high. 4. Battery disconnected while driving. 5. Blown B+ fuse or main contactor did not close. See Programmer » System Monitor menu » Controller» Currents » UnderVoltageCutback. See Programmer » System Monitor menu » Controller» Capacitor Voltage.	Set: Capacitor bank voltage dropped below the UnderVoltageCutback limit with the FET bridge enabled. Clear: Bring the capacitor voltage above the controller's UnderVoltageCutback limit.	Reduced drive torque. Reduced regen braking torque. Fault Action: None, unless a fault action is programmed in VCL.
0x2131	0x24	2-4	Overvoltage Cutback	1. Normal operation. Fault shows that regen braking currents elevated the battery voltage during regen braking. Controller is performance limited at this voltage. 2. Battery parameters are misadjusted. 3. Battery resistance too high for given regen current. 4. Battery disconnected while regen braking. See Programmer » System Monitor menu » Controller» Currents » OverVoltageCutback. See Programmer » System Monitor menu » Controller» Capacitor Voltage.	Set: The controller's capacitor bank voltage exceeded the OverVoltageCutback limit with the FET bridge enabled. Clear: Bring controller's capacitor voltage below the OverVoltageCutback limit.	Reduced brake torque. Note: This fault is declared only when the controller is running in regen. Fault Action: None, unless a fault action is programmed in VCL.
0x2531	0x25	2-5	Ext 5V Supply Failure Ext_5V_Supply_Failure_Active 0x2531 Fault Type(s): 1 = 5V Supply's voltage is out-of-range. 2 = 5V Supply's current is out-of-range.	External load impedance on the +5V supply is too low. See the System Monitor » Outputs menu: External_5V_Supply, Ext_5V_Current.	Set: (1) The 5V Supply is outside 5V±10%. (2) The current is outside limits defined by: Ext_5V_Supply_Min Ext_5V_Supply_Max Clear: Reset Controller, or reset using the VCL variable Ext_5V_Output_Enable.	Disables the 5V Supply. Fault Action: None, unless a fault action is programmed in VCL.

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2532	0x26	2-6	Ext 12V Supply Failure Fault Type(s): 1 = 12V Supply's voltage is out-of-range. 2 = 12V Supply's current is out-of-range.	External load impedance on the +12V supply is too low. See Programmer » System Monitor menu » Outputs: External_12V_Supply, Ext_12V_Current.	Set: (1) The 12V supply (pin 23) is outside 12V ± 15%. (2) The current is outside the limits defined by: Ext_12V_Supply_Min Ext_12V_Supply_Max Clear: Reset Controller. Or Reset using the VCL variable Ext_12V_Output_Enable.	Disables the 12V Supply. Fault Action: None, unless a fault action is programmed in VCL.
0x2151	0x28	2-8	Motor Temp Hot Cutback	1. Motor temperature is at or above the programmed Temperature Hot setting — resulting in a reduction of controller drive current. 2. The motor temperature and sensor control parameters are misadjusted. See Programmer » AC Motor Setup » Temperature Sensor.	Set: Motor temperature is at or above the Temperature Hot parameter setting. Clear: Bring the motor temperature within range.	Reduced drive torque. If the MotorBrakingThermalCutBack_Enable = On, then Regen Braking Torque is reduced. Fault Action:None, unless a fault action is programmed in VCL.
0x2150	0x29	2-9	Motor Temp Sensor	1. Motor thermistor is not connected properly. 2. Sensor polarity (between Pin 8 and Pin 18) is incorrect. 3. The motor temperature and sensor parameters are misadjusted. See Programmer » System Monitor menu » AC Motor» Temperature.	Set: Motor thermistor input (pin 9) is at the voltage rail. Clear: Bring the motor thermistor input voltage within range.	Motor temperature cutback disabled. Fault Action: None, unless a fault action is programmed in VCL.
0x2222	0x31	3-1	Main Driver Fault Type(s): 1 = Driver Short. 2 = Driver Overcurrent. 3 = Open/Short (High, should be Low). 4 = Open/Short (Low, should be High). 5 = Open Wire (at pin).	1. Open or short on driver load. Dirty connector pins at controller or contactor coil. 2. Bad connector crimps or faulty wiring.	Set: Main Contactor driver is either open or shorted. This fault can be set only when Main Enable = On. Clear: Restore/repair any external wiring or device-coil to their correct state, then Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2320	0x32	3-2	EM Brake Driver Fault Type(s): 1 = Driver Short. 2 = Driver Overcurrent. 3 = Open/Short (High, should be Low). 4 = Open/Short (Low, should be High). 5 = Open Wire (at pin).	1. Open or short on driver load. Dirty connector pins at controller or contactor coil. 2. Bad connector crimps or faulty wiring.	Set: Electromagnetic brake driver (pin 4) is either open or shorted. This fault can be set only when EM Brake Type >0. Clear: Restore/repair any external wiring or device-coil to their correct state, then Reset Controller.	ShutdownEMBrake ShutdownThrottle FullBrake
0x2232	0x36	3-6	Sin Cos Motor Feedback 1. The signals from the sensor are above the configuration by 10% or at/above the supply rails for >100ms. 2. Sensor failure.	1. Motor encoder failure. 2. Bad crimps or faulty wiring. See Programmer » System Monitor menu » Hardware Inputs: Analog 3 and	Set: Motor position/speed Sin/ Cos sensor fault. Clear: Either Reset Controller, or if parameter LOS Upon Encoder Fault = On and Interlock has been cycled, then the Encoder Fault is cleared and Encoder LOS fault (flash code 9-3) is set, allowing limited motor control.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2230	0x36	3-6	Encoder Fault Fault Type(s): 1 = Loss of regulation. 2 = Over Current trips Loss of pulses. 3 = Loss of speed signal pulses. 4 = Autocharacterization 5 = Encoder supply (voltage) fault.	1. Motor encoder failure. 2. Bad crimps or faulty wiring. See Programmer » System Monitor menu » AC Motor: Motor RPM. See Programmer » AC Motor Setup » Quadrature Encoder » Encoder fault Setup.	Set: Motor encoder phase failure detected. Clear: Either Reset Controller, or if parameter LOS Upon Encoder Fault = On and Interlock has been cycled, then the Encoder Fault is cleared and Encoder LOS fault (flash code 9-3) is set, allowing limited motor control.	ShutdownEMBrake ShutdownThrottle ShutdownMotor
0x2240	0x37	3-7	Motor Open Fault	1. Motor phase is open. Bad crimps or faulty wiring.	Set: Motor phase U, V, or W detected open. Clear:Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2220	0x38	3-8	Main Contactor Welded	1. Main contactor tips are welded closed. 2. Motor phase U or V is disconnected or open. 3. An alternate voltage path (such as an external circuit to B+) is providing a current to the capacitor bank (B+ connection terminal).	Set: Just prior to the main contactor closing, the capacitor bank voltage (B+ connection terminal) was loaded (via the motor) for a short time and the voltage did not discharge, indicating a direct-contact to the battery (i.e., Main tips are welded closed). Clear:Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2221	0x39	3-9	Main Contactor Did Not Close Fault Type(s): 1 = Main did not close when commanded 2 = Main disconnected during operation	Type 1: 1. Main contactor did not close. 2. Main contactor tips are oxidized, burned, or not making good contact. 3. An external load on the capacitor bank (B+ connection terminal) is preventing the capacitor bank from charging. 4. Blown B+ fuse. 5. Main Contactor parameters mistuned 6. Main Pull-in Voltage, 7. Main Holding Voltage. Type 2: 1. Main contactor opened during operation (while commanded closed). 2. Driver wiring to contactor's coil (e.g., pin 3 wiring) removed during operation. 3. Contactor/coil defective.	Set: With the main contactor commanded closed, the capacitor bank voltage (B+ connection terminal) did not charge to B+. Clear:Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2103	0x3A	3-10	Motor Setup Needed Fault Type(s): Hex # Bit1 – 4 Binary 0000 => bits 4 3 2 1	Motor setup is required. Please refer to fault type. Bit1: The current regulator needs to be configured. Bit2: The slip gain test needs to be run. Bit3: The base speed test needs to be run. Bit4: The automated test needs to be run (full motor commissioning).	Set: Default for both ACIM and PMAC motors. Clear: Run the appropriate motor commissioning sequences.	Fault Action: None. Yet, the motor will not operate until the motor configuration and/or commissioning tests are complete.
0x2102	0x3B	3-11	Motor Misalignment Error	Motor offset has shifted so controller is producing torque in an uncommanded direction.	Clear: Reset Controller.	Shutdown Vehicle;

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2830	0x46	4-6	NV Memory Failure Fault Type(s): 1 = Invalid checksum. 2 = NV write failed. 3 = NV read failed. 4 = NV write did not complete during power down.	1. Failure to read or write to nonvolatile (NV) memory. 2. Internal controller fault.	Set: Controller operating system tried to read or write to EEPROM memory and failed. Clear: Download the correct software and matching parameter default settings into the controller and Reset Controller.	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift
0x2211	0x47	4-7	HPD Sequencing	1. Incorrect sequence in application of Keyswitch, Interlock, Direction, or Throttle. 2. Faulty wiring, crimps, or switches at KSI, Interlock, Direction, or Throttle. 3. Moisture in above-noted digital input switches causing invalid (real) On/Off state. Verify input switch status. See Programmer » System Monitor menu » Inputs » Switch Status. Verify Throttle. See Programmer » System Monitor menu » Inputs » Throttle Command.	Set: HPD (High Pedal Disable) or SRO (Static Return to Off) sequencing fault caused by incorrect sequence of KSI, interlock, direction, and throttle inputs. Clear: Reapply inputs in correct sequence.	ShutdownThrottle
0x2460	0x47	4-7	Emergency Reverse High Pedal HPD	Emergency Reverse operation has concluded, but the throttle, forward and reverse inputs, and interlock have not been returned to neutral.	Set: At the conclusion of Emergency Reverse, the fault was set because various inputs were not returned to neutral. Clear: If EMR_Interlock = On, clear the interlock, throttle, and direction inputs. If EMR_Interlock = Off, clear the throttle and direction inputs.	ShutdownThrottle ShutdownEMBrake Dual Drive Same, both motors

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2813	0x49	4-9	Parameter Change Fault Type(s): Reports the CAN Object ID of parameter.	While the Interlock was On, a safety-based parameter was changed. Parameters with this property are marked with a [PCF] (Parameter Change Fault) in the Parameter menu listings.	Set: Adjustment of a parameter setting that requires cycling of KSI. Clear: Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2710	0x51	5-1	User 1 Fault Global Drive Shutdown	A serious fault (Genie severity = 4) has occurred on one motor controller that requires that the other motor controllers shut down also.	Set: Serious fault on 1 or more drive controllers. Clear: Repower with problem corrected.	Drive Inhibited
0x2711	0x52	5-2	User 2 Fault Internal CAN communication error	1. CAN wiring 2. Damaged Controller	Set: Loss of communication between left and right motor control sections Clear: Repower with CAN wiring problem corrected or replace controller.	Drive Inhibited
0x2712	0x53	5-3	User 3 Fault Invalid Motor Type Selection	Incompatible motor selected	Set: Invalid Motor Type Selection Clear: Select valid Motor Type.	See User 1 fault (above)
0x2713	0x54	5-4	User 4 Fault Front to Back CAN bus fault	1. CAN wiring 2. Damaged Controller	Set: Loss of communication between front and rear motor controllers Clear: Repower with CAN wiring problem corrected or replace controller.	See User 1 fault (above)
0x2820	0x68	6-8	VCL Run Time Error	1. Runtime errors are defined using the VCL Error Module and VCL Error. See the System Information file: Curtis Software Suite™ » VCL Studio » Help Using driver control commands in VCL can lead to VCL runtime errors if the VCL command and the driver assignment do not match.	Set: VCL Run Time Error detected. Clear: Edit the VCL application software to fix this error condition; flash the new compiled software and matching parameter settings; Reset Controller.	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2831	0x71	7-1	Internal Controller Fault	1. Physical damage from external sources/events. 2. Hardware damage.	Clear: Reset Controller.	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift
0x2541	0x72	7-2	PDO Timeout	1. The time between CAN PDO messages received exceeded the PDO Timeout Period as defined by the Event Timer parameter. Adjust PDO Settings. See Programmer » Application Setup » CAN Interface » PDO Setups.	Set: Time between CAN PDO messages received exceeded the PDO Timeout Period. Clear: Receive CAN NMT message, or Reset Controller.	ShutdownThrottle
0x2231	0x73	7-3	Stall Detected	1. Stalled motor. 2. Motor encoder failure. 3. Bad crimps or faulty wiring. 4. Problems with power supply for the motor encoder. See Programmer »System Monitor menu » AC Motor » Motor RPM.	Set: No motor encoder movement detected. Clear: Either Reset Controller, Or if parameter LOS Upon Encoder Fault = On and Interlock has been cycled, then the Stall Detected fault is cleared and the Encoder LOS fault (flash code 9- 3) is set, allowing limited motor control.	ShutdownEMBrake ShutdownThrottle ShutdownMotor Control Mode changed to LOS (Limited Operating Strategy).
0x2550	0x76	7-6	Insulation Resistance Too Low	1. Component/PCB failure within controller 2. Moisture ingress	Clear: Reset Controller.	No Action (warning)
0x2840	0x77	7-7	Supervision Fault	Internal controller fault.	Set: Internal controller failure Clear: Reset Controller.	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2841	0x79	7-9	Supervision Input Check	Internal controller fault.	Set: Damaged Controller. Clear: Reset Controller.	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift
0x2542	0x82	8-2	PDO Mapping Error	1. The PDO Map has too many data bytes assigned or has objects mapped that are not compatible. Adjust PDO Settings. See Programmer » Application Setup » CAN Interface » PDO Setups.	Set: Incorrect PDO map detected. Clear: Reset Controller.	PDO message disabled. Fault Action: None, unless a fault action is programmed in VCL.
0x2835	0x83	8-3	Internal Hardware Fault	Internal controller fault detected.	Set: Internal controller fault detected. Clear: Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2850	0x87	8-7	Motor Characterization Error	Motor characterization failed during characterization process. The fault type indicates the cause.	Set: Motor characterization failed during the motor characterization process. Clear: Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2234	0x88	8-8	Encoder Pulse Error	1. Encoder Steps parameter does not match the actual motor encoder. Verify parameter settings: AC Motor Setup » Quadrature Encoder » Encoder Steps.	Set: Detected wrong setting of the Encoder Steps parameter. Clear: Ensure the Encoder Steps parameter matches the actual encoder. Reset Controller.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2811	0x89	8-9	Parameter Out of Range Fault Type(s): Reports the CAN Object ID of parameter.	1. Parameter value detected outside of the limits. Use CIT or the 1313HHP to view the parameter's range and adjust the parameter's value.	Set: Parameter detected outside of limits. Clear: Bring parameter within its limits.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2815	0x91	9-1	Bad Firmware	The firmware in the controller is incorrect. 1. The CRC of the application or OS does not match. 2. The application was built with an incompatible OS version.	Set: The loaded software is not compatible with the controller hardware. Clear: Load the matching software. Verify that the controller model matches the cdev version for the project and the VCL Studio application.	Controller does not fully startup (without error).
0x2321	0x92	9-2	EM Brake Failed To Set	1. Vehicle movement sensed after the EM Brake has been commanded to set. 2. EM Brake will not hold the motor from rotating.	Set: After the EM Brake was commanded to set and time has elapsed to allow the brake to fully engage, vehicle movement has been sensed. Clear: 1. Activate the Throttle (EM Brake type 2). 2. Activate the Interlock (EM Brake type 1).	Position Hold is engaged when Interlock = On. Fault Action: None, unless a fault action is programmed in VCL.
0x2233	0x93	9-3	Encoder Limited Operating Strategy (LOS)	1. Limited Operating Strategy (LOS) control mode has been activated as a result of either an Encoder Fault (flash code 3-6) or a Stall Detected fault (flash code 7-3). 2. Motor encoder failure. 3. Bad crimps or faulty wiring. 4. Vehicle has stalled.	Set: Either the Encoder Fault (flash code 3-6) or Stall Detected (flash code 7-3) was detected. If the parameter LOS Upon Encoder Fault = On and the Interlock has been cycled, then the Encoder LOS (flash code 9-3) control mode is activated, allowing limited motor control (limp home mode). Clear: Cycle KSI or, if LOS Mode was activated by the Stall Detected fault, clear by ensuring the encoder senses the proper operation, Motor RPM = 0, and Throttle Command = 0.	LOS Mode. Fault Action: None, unless a fault action is programmed in VCL.
0x2520	0x95	9-5	Pump Overcurrent	1. External short of pump motor. 2. Controller defective.	Clear: Reset Controller.	Shutdown Pump
0x2450	0x96	9-6	Pump Battery Discharge Indicator (BDI)	1. The BDI is below the Lift_BDI_Lockout setting. 2. BDI parameters are mistuned.	Set: Pump activated when the BDI Percentage is below the Lift Battery lockout setting. Clear: Charge battery.	ShutdownPump

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2833	0x97	9-7	Pump Hardware Error Fault Type(s): 1 = Duty cycle not update with the update timeframe. 2 = Mismatch of the Commanded pump duty cycle vs. output.	1. External short of the pump motor. 2. Controller defective.	Clear: Reset Controller.	Shutdown Pump
0x2812	0x99	9-8	Parameter Mismatch	Invalid Configuration of parameters	Clear: Fix parameter mismatch and reset the controller	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift
0x2332	0x9A	9-10	Interlock Braking Supervision Fault Type(s):1 = Motor speed is outside the Interlock Brake Supervision Speed Limit. 2 = Interlock is Off and EM Brake not applied within time limit. 3 = Interlock is Off and EM Brake not applied, and the rotor position is outside the RPM-position limit.	1. During an interlock braking event, the motor speed exceeded the limit set by the Interlock Braking Supervision parameters. See Programmer » Application Setup » Interlock Braking » Supervision Enable. See Programmer » Application Setup » Interlock Braking » Interlock Braking Supervision.	Set: During an interlock braking event, the motor speed exceeded the limit set by the Interlock Braking Supervision parameters. Clear: Reset Controller.	ShutdownMotor ShutdownEMBrake ShutdownMainContactor
0x2160	0xA1	10-1	Driver 1 Fault Fault Type(s): 1 = Driver Short 2 = Driver Overcurrent 3 = Open/Short (High, should be Low) 4 = Open/Short (Low, should be High) 5 = Driver Open Requires driver checks enabled.	1. Open or short on driver load. Dirty connector pins at controller or contactor coil. 2. Bad connector crimps or faulty wiring. Driver overcurrent, as set by the Driver 1 Overcurrent parameter. See Programmer » Controller Setup » Outputs » Driver 1 » Driver 1 Overcurrent.	Set: Driver 1 is either open or shorted, or Driver 1 exceeded its overcurrent setting. Clear: Correct the open or short, and then Reset Controller.	ShutdownDriver1

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2161	0xA2	10-2	Driver 2 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver2
0x2162	0xA3	10-3	Driver 3 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver3
0x2163	0xA4	10-4	Driver 4 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver4
0x2164	0xA5	10-5	Driver 5 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver5
0x2165	0xA6	10-6	Driver 6 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver6
0x2166	0xA7	10-7	Driver 7 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver7
0x2632	0xA8	10-8	Driver Assignment Fault Type(s): 5 {X} = Driver number that cause the fault.	A Driver Output is used for two or more functions. See Programmer » Controller Setup »IO Assignments » Coil Drivers: Main Contactor Driver, EM Brake Driver, Hydraulic Contactor Driver.	Set: Driver assignment conflict (i.e., duplicate items assigned to the same driver). Clear: Resolve the conflicted driver assignment, then Reset Controller.	Fault Action: None, unless a fault action is programmed in VCL
0x2169	0xA9	10-9	Coil Supply Fault Fault Type(s): 1 = short to B- or HW fault. 2 = Coil Supply disabled due to shorted (internal) driver.* 3 = Coil Supply startup enable check failed. 4 = Coil Supply startup disable check failed. *a short must first be detected.	1. Short on driver loads. 2. Dirty connector pins at controller or device. 3. Bad connector crimps or faulty wiring. 4. Controller is defective.	Set: Short detected after the startup check has passed. A low side driver short is detected and the respective fault action fails to cut-off driver current. Coil supply startup test fails. Clear: Reset Controller.	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2620	0xB1	11-1	Analog 1/ Pin 16 Out of Range Fault Type(s): 1 = above High limit. 2 = below Low limit.	1. Analog 1 input voltage is above the parameter setting of Analog 1 High. 2. Analog 1 input voltage is below the parameter setting of Analog 1 Low. See Programmer » Controller Setup » Analog Inputs » Analog 1. See Programmer » Controller Setup » Analog Inputs » Configure » Analog 1 Low / Analog 1 High.	Set: (1) Input voltage (on pin) is above the parameter's set-point threshold. (2) Input voltage (on pin) is below the parameter's set-point threshold. Clear: Return the voltage to within the allowed range, then Reset Controller.	Fault Action: None, unless a fault action is programmed in VCL.
0x2621	0xB2	11-2	See Analog 2 / Pin 8 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x2622	0xB3	11-3	See Analog 3 / Pin 31 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x2623	0xB4	11-4	See Analog 4 / Pin 32 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x2624	0xB5	11-5	See Analog 5 / in 9 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x2625	0xB6	11-6	See Analog 6 / Pin 15 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x2626	0xB7	11-7	See Analog 7 / Pin 22 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x2627	0xB8	11-8	See Analog 8 / Pin 28 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x2628	0xB9	11-9	See Analog 9 / Pin 24 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x262A	0xBB	11-11	See Analog 14 / Pin 14 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x2631	0xBC	11-12	Analog Assignment Fault Fault Type(s): 13 X = Analog Input number that caused the fault. {X = 1-9, 14, 18-19, 31}	1. An Analog Input is used for two or more functions. 2. An Analog Input is outside the range of analog inputs. See Programmer » Controller Setup » IO Assignments » Controls.	Clear: Resolve assignment conflict, and then Reset Controller.	None (warning)
0x262B	0xBD	11-13	See Analog 18 / Pin 27 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
0x262C	0xBE	11-14	See Analog 19 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2834	0XBF	11-15	Pump Current Sensor Fault Sensor zero-current offset close to supply voltage or sensor (supply) ground.	1. External short of pump motor. 2. Controller defective.	Clear: Reset Controller.	Shutdown Pump
0x2860	0xC1	12-1	Branding Error	1. Software and hardware branding mismatch. For technical support on this fault, contact the Curtis distributor where you obtained your controller or the Curtis sales-support office in your region.	Set: Software / hardware incompatibly. Clear: As applicable: Load Branded software, or use Branded controller with the correct device profile and the correct Curtis Software Suite toolkit key.	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x2106	0xC7	12-7	Analog 31 Out of Range / Pin 26	See Analog 1 Out of Range.	See Analog 1 Out of Range.	See Analog 1 Out of Range.
0x2108	0xC9	12-9	VCL Watchdog The time interval of the VCL watchdog (WD#) exceeded the timeout value.	See the associated VCL Functions, Set_Watchdog_Timeout( ). Set_Watchdog_Fault_Action( ). Kick_Watchdog( ).The fault actions can be defined by the User/OEM in the application-specific VCL software.	Clear: Kick_Watchdog( ). Starts and reset the specified watchdog timer	ShutdownAll;
0x2111	0xCA	12-10	Autobaud Failure on linked controller CAN port	1. Getting stuck in start manager (bootloader) 2. Internal CAN bus error	Clear: Reset Controller.	None (warning)
0x2113	0xCB	12-11	Primary State Error	Internal Controller Error	Clear: Reset Controller.	None (warning)
0x2870	0xD3	13-3	Hardware Compatibility	1. The OS (device profile, .cdev file) is incompatible with the controller. 2. The loaded software (.cdev) is not compatible with the controller hardware.	Set: Incorrect OS (device profile). Clear: Load the matching OS (device profile).	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump
0x211A	0x84	8-4	Motor Bracking Impaired	1. Battery Overcharged 2. Excessive motor or controller heating 3. Misadjusted parameters	Set: OverallCutback (0x32D9) fell below Motor_Braking_ Impaired_Threshold for Motor_ Braking_Impaired_Time during regen (braking). Clear: Reset interlock.	ShutdownInterlock

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x211C	0xD6	13-6	Hazardous Movement 1. The motor speed is in the opposite direction of the speed request and the motor fails to accelerate in the correct direction for a programmed time. In the event of a change to neutral, this hazard will be detected if the motor fails to accelerate toward zero speed for a programmed time. 2. The acceleration is in the opposite direction of the difference between the operator speed request and the motor speed. The speed in the commanded direction is greater than the commanded speed by more than a parameter (Hazardous_Speed)) for a programmed time (Hazardous_Throttle_Response_Time)	mistuned Hazardous_Direction_Response_Timeparameter. (1) mistuned Hazardous_Accel parameter.(2) mistuned Hazardous_Speed_Error parameter. (2) mistuned Hazardous_Throttle_Response_Time parameter. (2)	Set: This fault detects hazardous movement when the motor is requested to be moving. The first hazard is a motor that is not able to slow down if the throttle goes to zero or the direction switch is not in the direction of travel. The second hazard is a motor that accelerates the wrong way or goes too fast. Note: This fault only occurs when the Control Mode Select is in Speed_Mode, Speed_ Mode_Express, or Servo_Mode. Clear: Reset Controller. Setting Hazardous_Direction_ Response_Time = 0 will disable these checks.	ShutdownInterlock
0x212A	0xF1	15-1	Memory Parity An internal memory error occurred. Fault Type: Indicates in which memory or peripheral the fault occurred.	An electromagnetic transient may have caused a bit to change state. Possible damage to the microcontroller may have caused a memory cell to not operate properly.	Reset Controlle.	ShutdownVehicle
0x2250	0x75	7-5	Dual Severe A severe failure has on either of the controllers setup for dual drive.	Motor open faults, encoder faults, severe under temp, B+/K	Reset both Controllers	ShutdownVehicle
0x2253	0x72	7-2	Dual PDO Timeout The time between DD CAN PDO messages received exceeded the PDO Timeout period (52ms). Fault Type(s): 1	Dual Drive CAN parameters mistuned. CAN signals between dual drive controllers are corrupted. Faulty or damaged CANbus wiring between controllers.	Reset Controller	ShutdownVehicle

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2330	0x94	9-4	EMER Rev Timeout Emergency Reverse was activated and ran until the EMR Timeout timer expired. Fault Type(s): 1	Emergency Reverse was activated and concluded because the EMR Timeout timer has expired. The emergency reverse input is stuck On	Turn the emergency reverse input (switch) to Off.	Shutdown Throttle Shutdown Embrake
0x2331	0x47	4-7	EMER REV HPD At the conclusion of Emergency Reverse, the fault was set because various inputs were not returned to neutral. Fault Type(s): 1	Emergency Reverse operation has concluded, but the throttle, forward and reverse inputs, and interlock have not been returned to neutral.	If EMR_Interlock = On, clear the interlock, throttle, and direction inputs. If EMR_Interlock = Off, clear the throttle and direction inputs.	Shutdown Throttle Shutdown Embrake
0x2333	0x9B	9-11	EMER Supervision During an EMR event, the motor speed exceeded the limit set by the Emergency Reverse Supervision parameters. Fault Type(s): 1	During an EMR event, the motor speed exceeded the limit set by the Emergency Reverse Supervision parameters. See Programmer » Application Setup » Emergency Reverse » Emergency Reverse Supervision.	Reset Controller.	ShutdownMotor ShutdownEMBrake ShutdownMainContactor
0x2871	0x68	6-8	ECC Run Time Error An embedded C application has encountered a runtime error. Fault Type(s) 0 = Hard Fault 1 = Memory Violation 2 = Bus Fault 3 = Usage Fault 4 = Stack Fault 5 = CPU Usage Fault 100 = Heap Fault 101 = Unhandled Exception 10000 (and above) ccapi exception exit All other codes are app-specific application exit code	Programming Error	Edit the ECC application software to fix this error condition; flash the new compiled software and matching parameter settings; Reset Controller	ShutdownAll

Pump and Drive Motor Control Fault Codes

CAN Object	Flash Code	Flash Pattern	Error Type	Possible Causes	Condition	Solution
0x2890	0xEE	14-14	ERU Configuration Bad configuration for EXISEL in the ERU.	Desat configuration tries to address a register that does not exist.	Correct configuration..	ShutdownVehicle
0x2891	0xEF	14-15	Desat Trip DESAT trip detected. Fault flags(s): 0x01 = U phase. 0x02 = U phase. 0x04 = V phase. 0x08 = V phase. 0x10 = W phase. 0x20 = W phase.			ShutdownVehicle

Schematics



Observe and Obey:

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

Before Troubleshooting:

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

About This Section

There are two groups of schematics in this section.

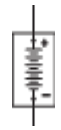
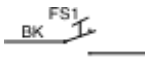
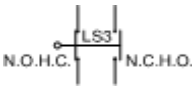
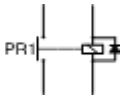
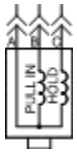
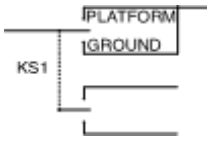
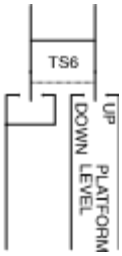
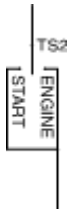
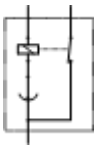
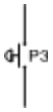
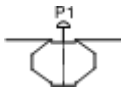
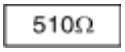
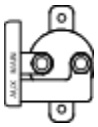
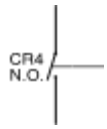
Electrical Schematics

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

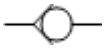
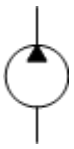
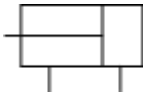
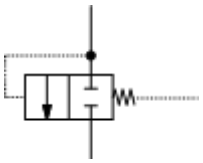
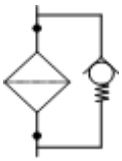
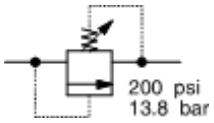
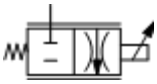
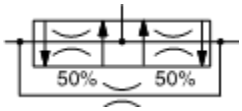
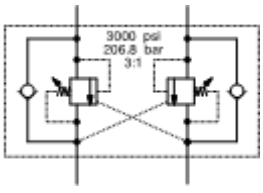
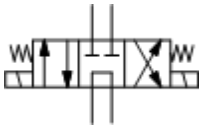
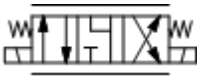
Hydraulic Schematics

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

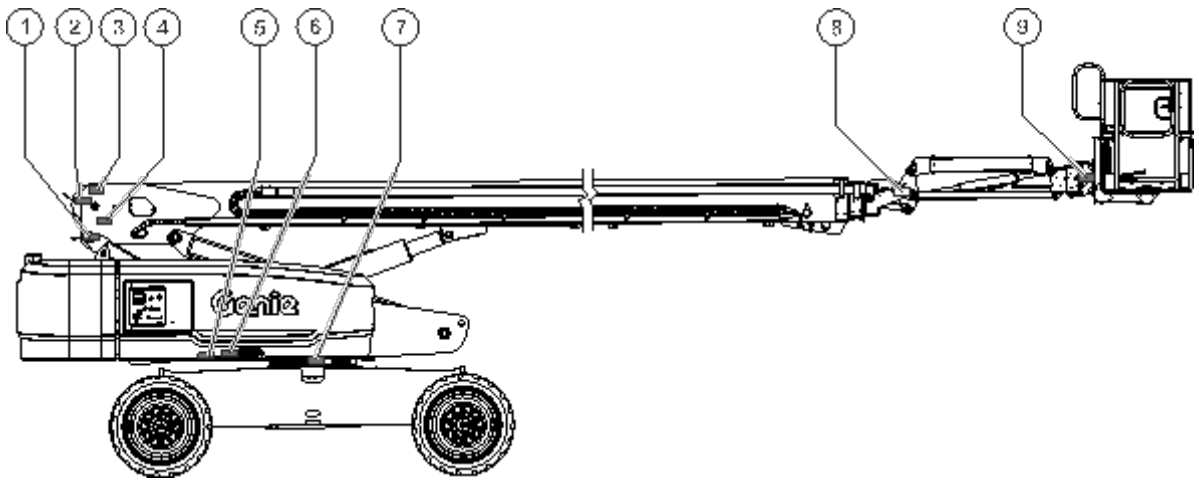
Electrical Symbol Legend

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

Hydraulic Symbols Legend

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

Limit Switch Location Legend



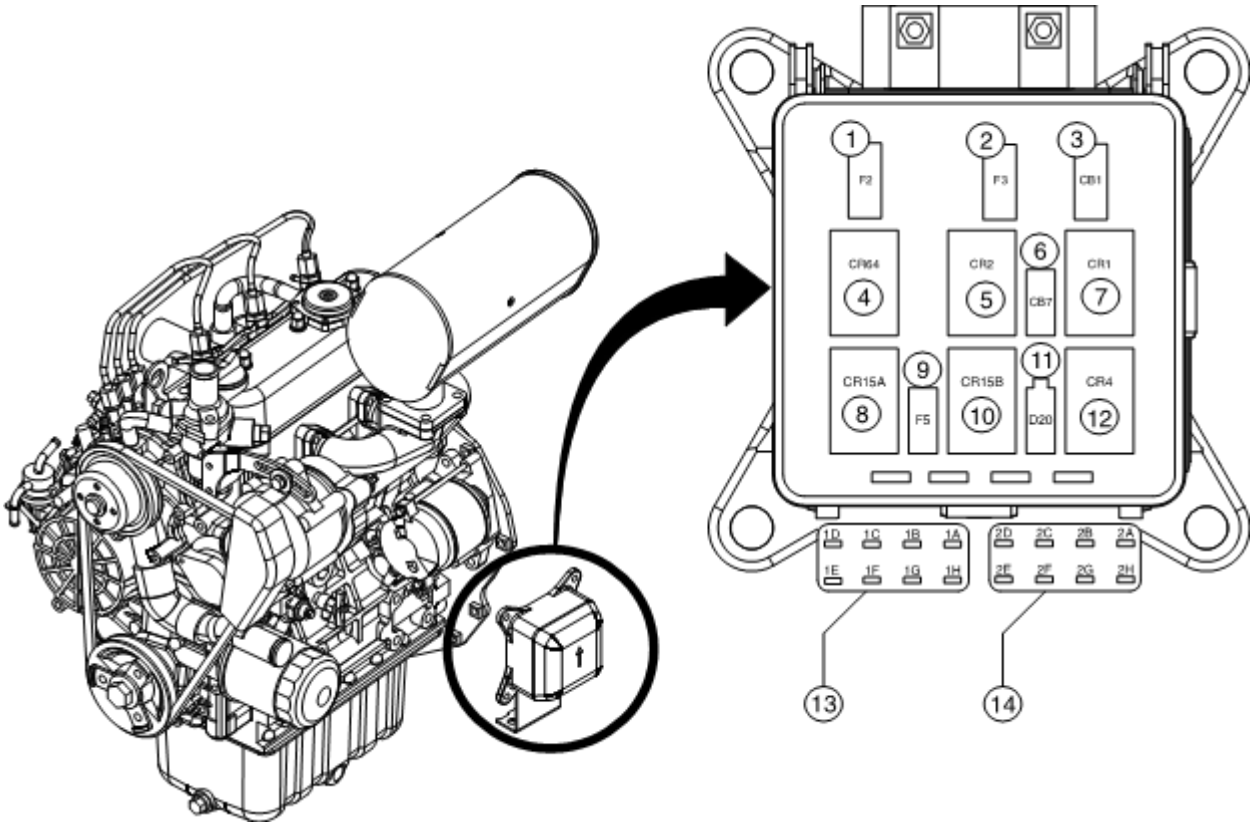
1 S17
2 S22
3 LSB2S
4 LSB1RS
5 LSB3AS
6 S8O, S8S
7 LST1O
8 S6
9 S24

Limit Switches and Sensors

S17	Boom angle sensor
S22	Boom length sensor
LSB2S	Limit Switch Cable Tension - Safety (PROX)
LSB1RS	Limit switch boom fully retracted- safety
LSB3AS	Limit Switch Boom Angle - Safety (PROX)
S8O	Universal tilt sensor - operational
S8S	Universal tilt sensor - safety
LST1O	Limit Switch Turntable (Drive Enable) - Operational (PROX)
S6	Platform level angle sensor
S24	Load cell - platform overload

Kubota Engine Fuse and Relay Module

Kubota D1105-E4B



1 Fuse 1 - 15A (spare)
2 Fuse 3 - 30A glow plug
3 Circuit breaker 1 - 15A Engine start / Fuel pump
4 Control Relay 64 Engine fault
5 Control Relay 2 Fuel pump
6 Circuit breaker 7 - 10A Engine RPM
7 Control Relay 1 Engine start
8 Control Relay 15A glow plug 1
9 Fuse 5 - 15A (spare)
10 Control Relay 15B glow plug 2
11 Diode - 6A
12 Control Relay 4 Engine RPM
13 Connector 1 Blue
14 Connector 2 Orange

Connector Pin Legend

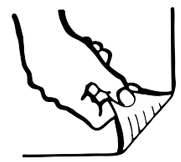
Number	Description
C0	Auxiliary controls Battery 2 way
C1	Ground controls, Brown 12 way
C2	Ground controls, Green 12 way
C3	Ground controls, Black 12 way
C4	Ground controls to boom cable, Gray 12 way
C5	Ground controls power, Gray 8 way
C6	Ground controls recovery, Black 8 way
C7	Ground GTPL, Gray 5 way
C8	Telematics ready, Gray 12 way
C9	Foot switch
C10	Main battery pack
C11	Platform options, Brown 12 way
C12	Platform manifold, Green 12 way
C13	Platform sensors, Black 12 way
C14	Platform controls to boom cable, Gray 12 way
C15	Platform load cell
C16	Primary boom sensors harness
C17	Primary boom down valves cable harness
C19	Limit switch, LSB1RS
C20	Limit switch, LST1O
C21	Limit switch, LSB3AS
C22	Limit switch, LSB2S
C24	WCON interface connector
C25	Engine interface connector
C26	Electrical swivel, 6 pin
C27	Electrical swivel, 3 pin
C28	Boom angle sensor
C29	Boom length sensor
C30	Platform level angle sensor
C31	Charger CAN
C32	ECON #1 & #2 contactors
C33	Contactor box power 6 way
C34	Platform GTPL, Gray round 5 way
C35	Steer sensor
C36	ECON pump control interface connector
C37	AC motor #1, Main function pump
C38	Contactor box control 12 way
C39	AC motor #2, Small function pump
C40	AC motor #3, Welder generator pump
C41	DC power harness to swing harness
C111	Work lights (option)
C112	Work light #1
C113	Work light #2
C114	Contact alarm, Proximity switch
C115	Contact alarm, LED #1
C116	Contact alarm, LED #2
C117	Flashing beacon #1
C118	Flashing beacon #2
C119	Drive light #1
C120	Drive light #2
C121	Inverter generator
C122	Drive light (option)
C123	Charger KSP isolation
C124	Charger, DC convertor

Connector Pin Legend

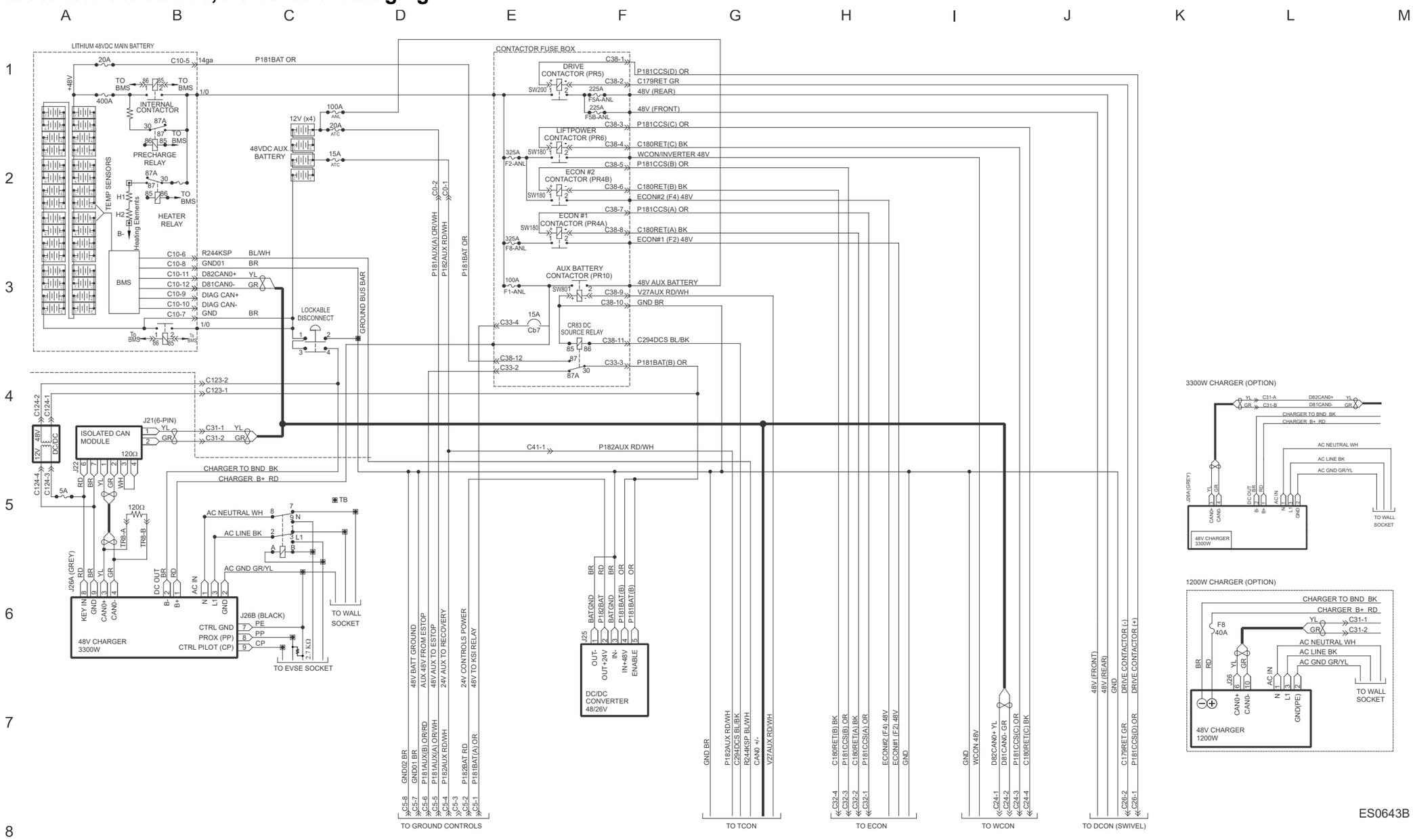
Number	Description
J0	TCON power
J1	TCON A, 50 way
J2	TCON B, 50 way
J10	Ground controls display, DISCON
J11	PCON, 50 way
J13	Platform controls display, VCON
J20	Charger CAN isolator, 6 pin
J21	Charger CAN isolator, 8 pin
J22	Front motor controller
J23	Rear motor controller
J24	Large pump controller, ECON
J25	DC/DC converter
J26	48VDC charger
J27	Primary chassis level sensor
J28	Secondary chassis level sensor
J29	Hydraulic oil pressure sensor
J30	Left front AC drive motor
J31	Right front AC drive motor
J32	Left rear AC drive motor
J33	Right rear AC drive motor
J34	Small pump controller, ECON
J35	Welder generator, WCON
J36	Engine CAN isolator, Machine side
J37	Engine CAN isolator, Engine side
JC3	Drive steer joystick connector
JC7	Primary boom joystick connector

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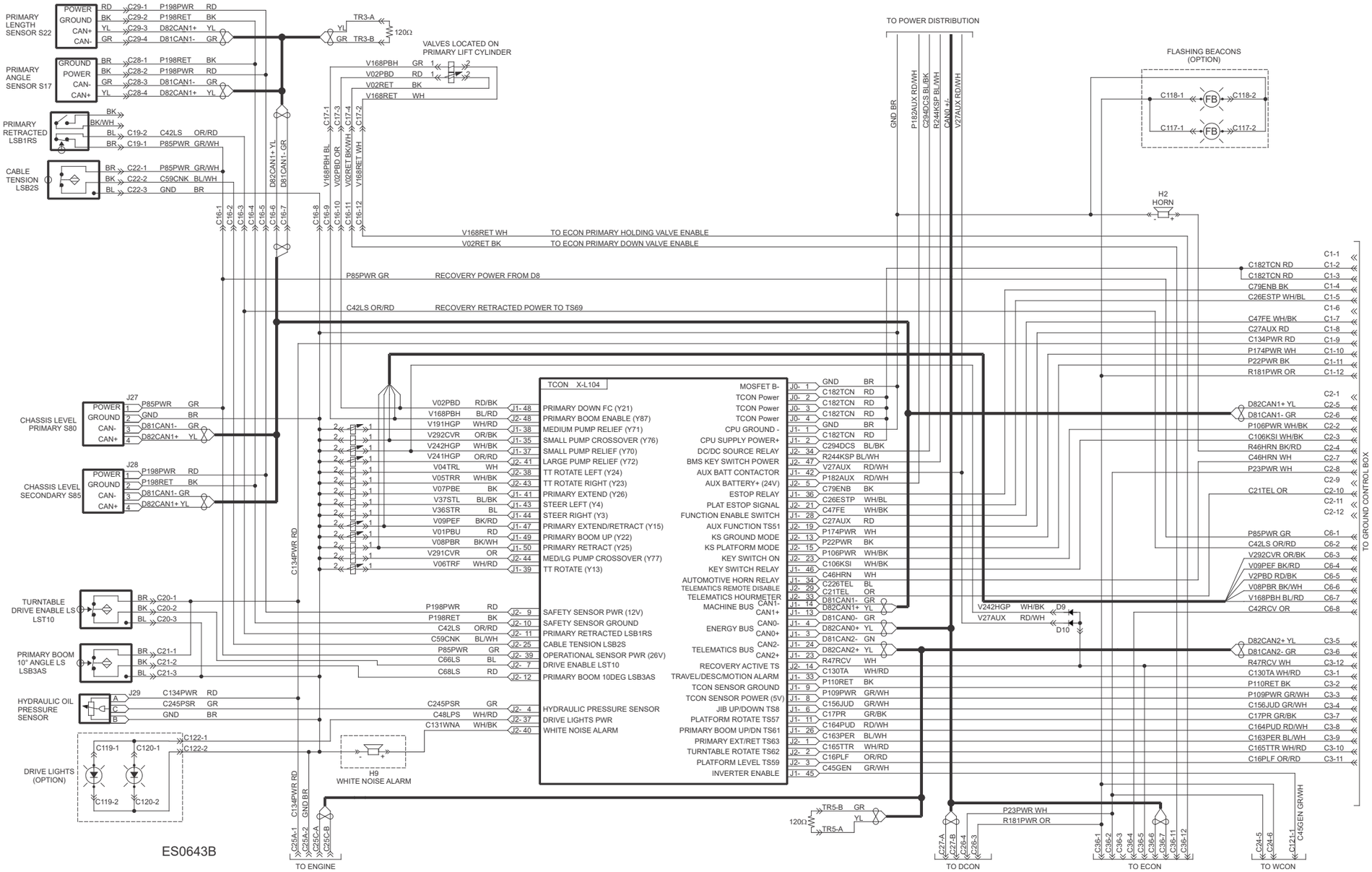
Electrical Schematic, Power and Charging



Electrical Schematic, Power and Charging



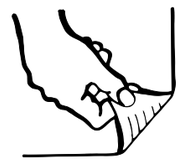
Electrical Schematic, Turntable Controller and Sensors



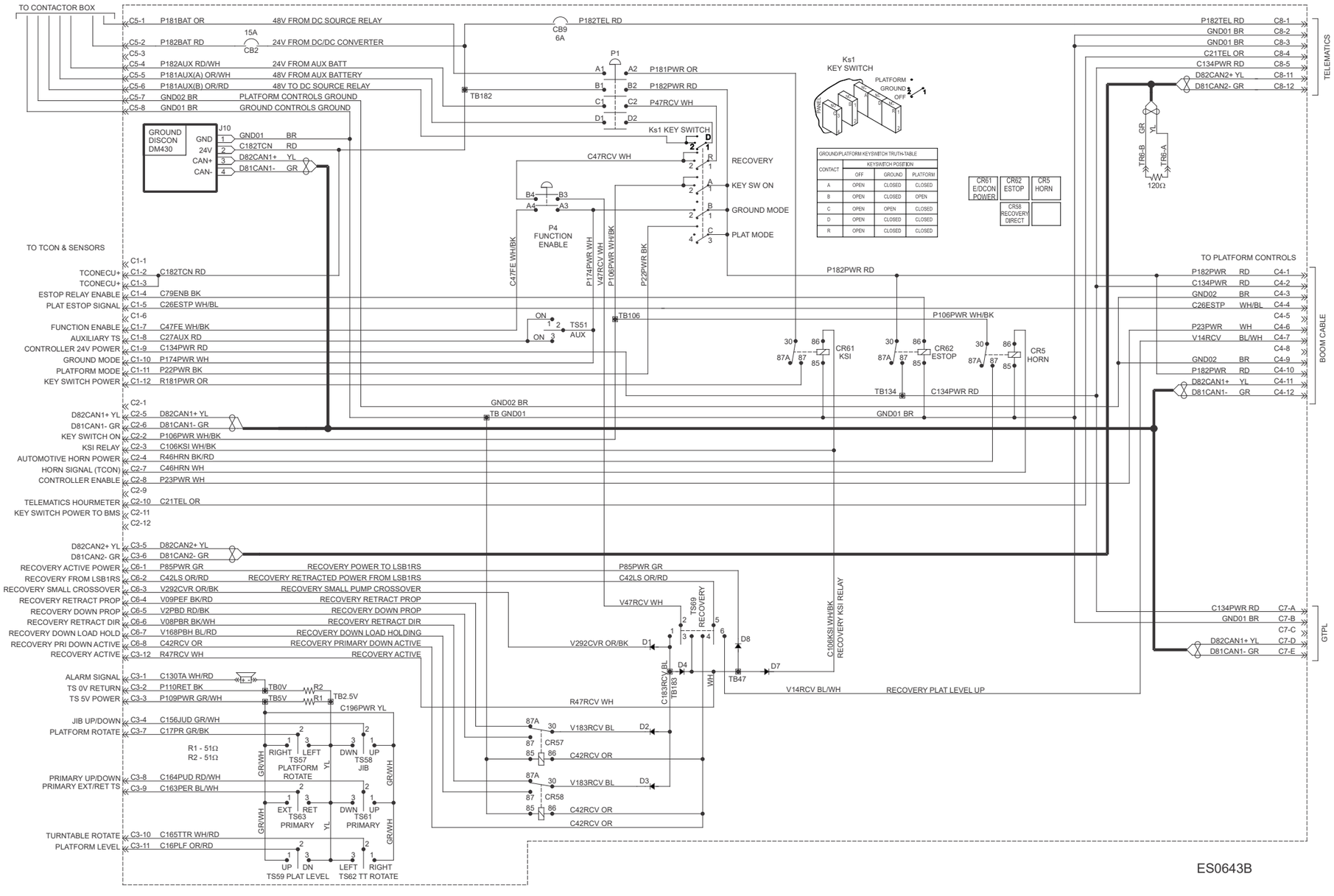
Electrical Schematic, Turntable Controller and Sensors



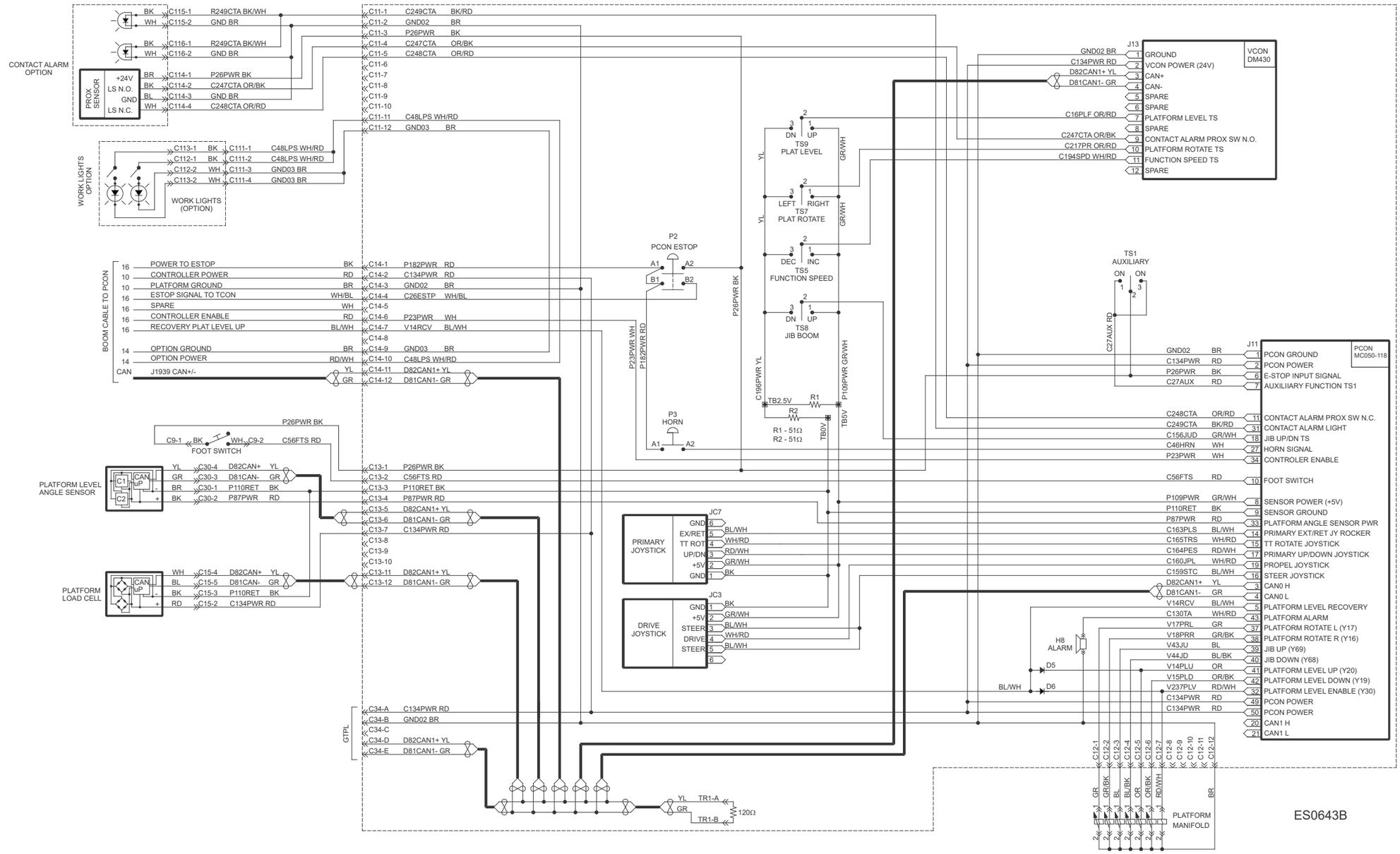
Electrical Schematic, Ground Controls



Electrical Schematic, Ground Controls

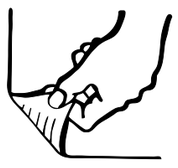


Electrical Schematic, Platform Controls

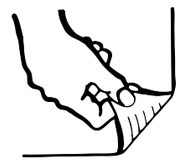


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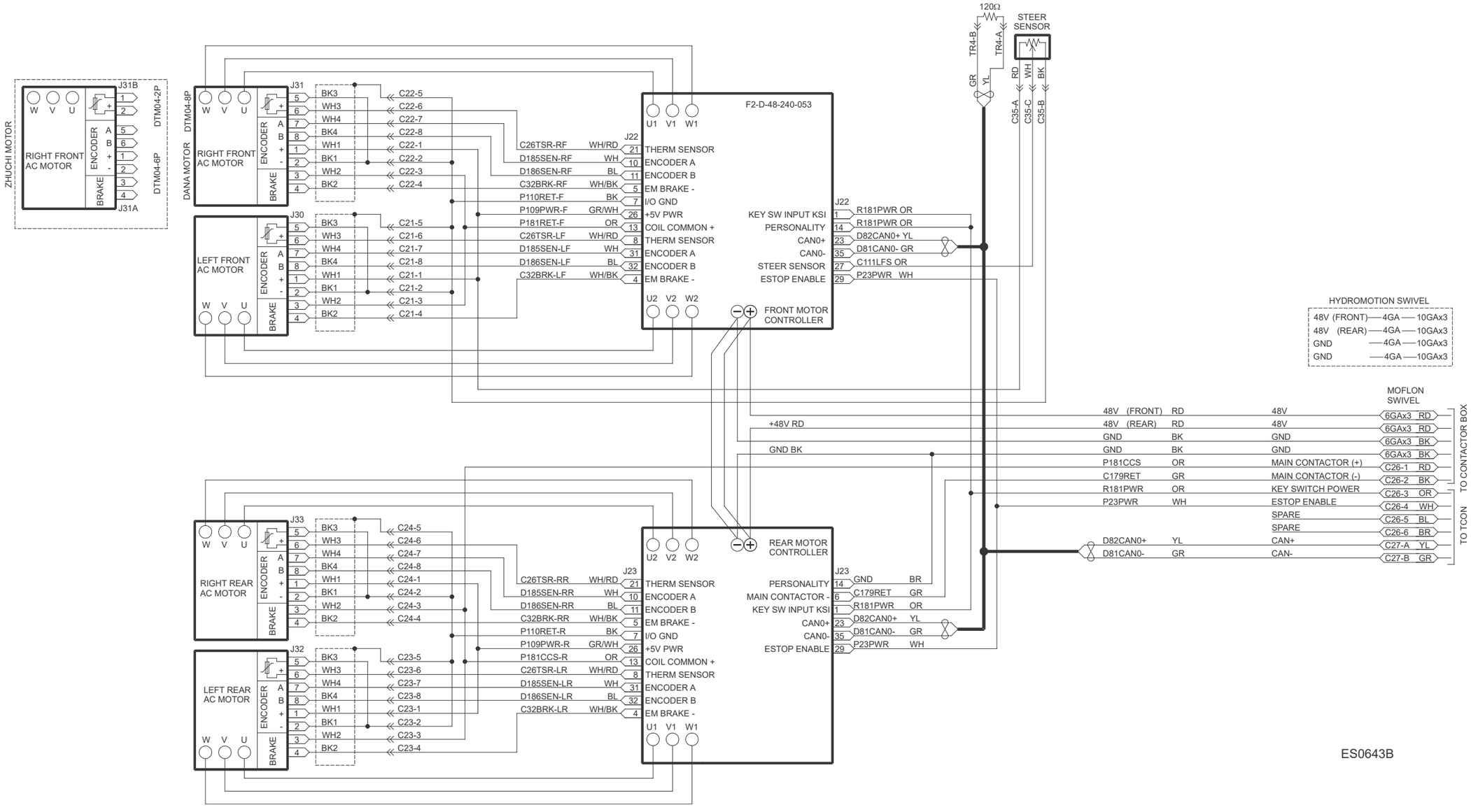
Electrical Schematic, Platform Controls



Electrical Schematic, Drive Controllers

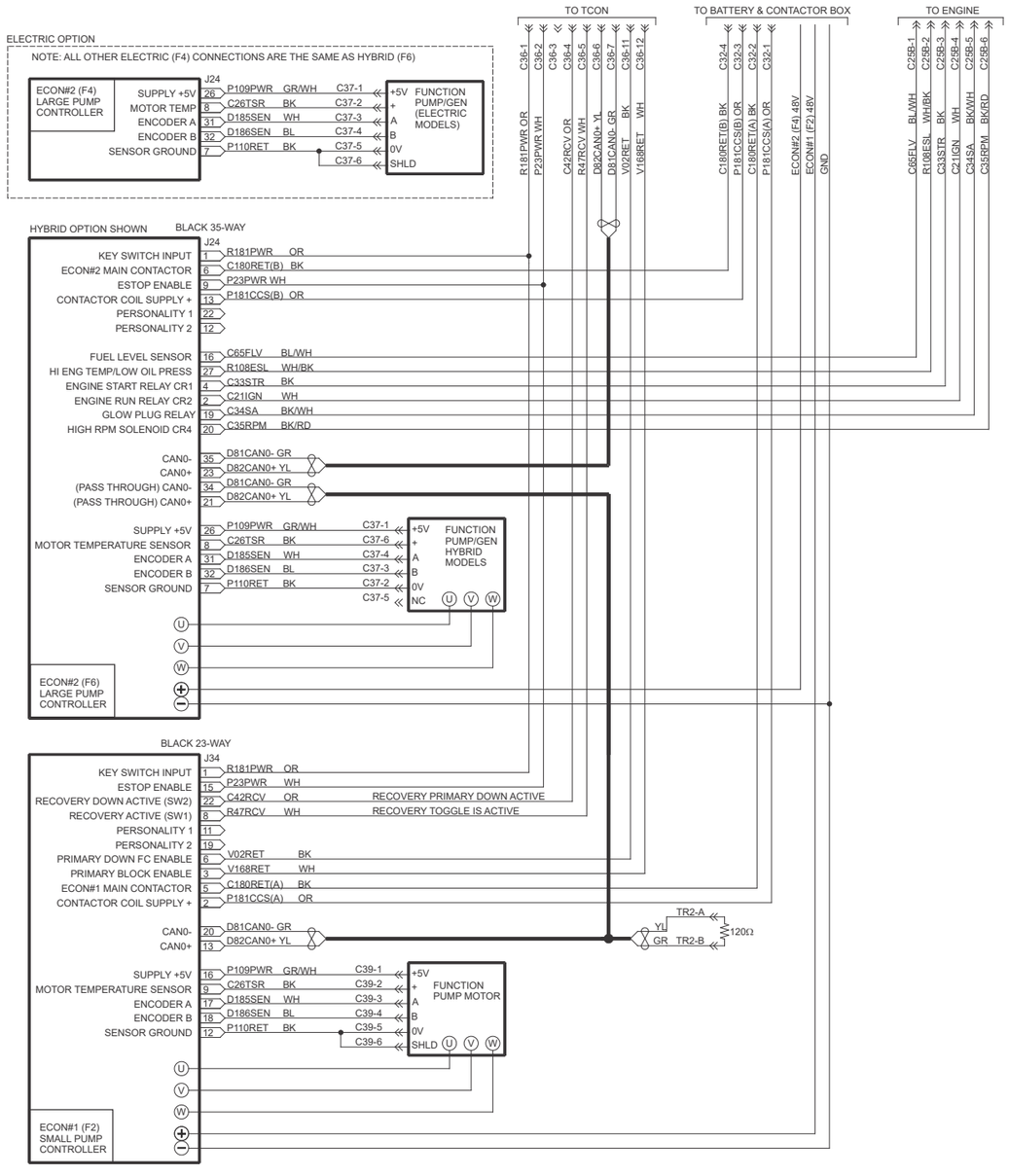


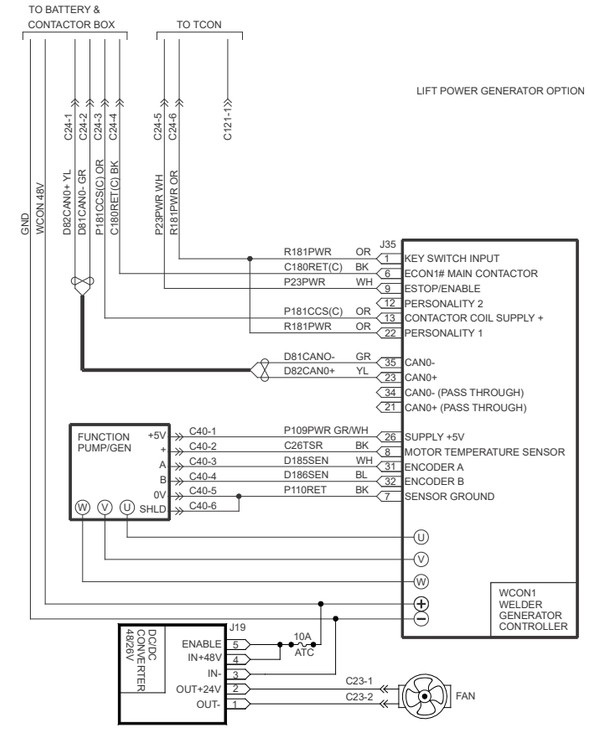
Electrical Schematic, Drive Controllers

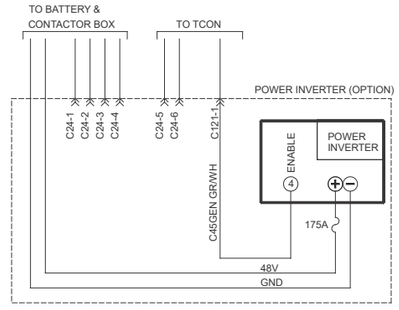


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Electrical Schematic, Pump and Generator Controllers





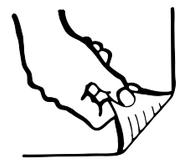


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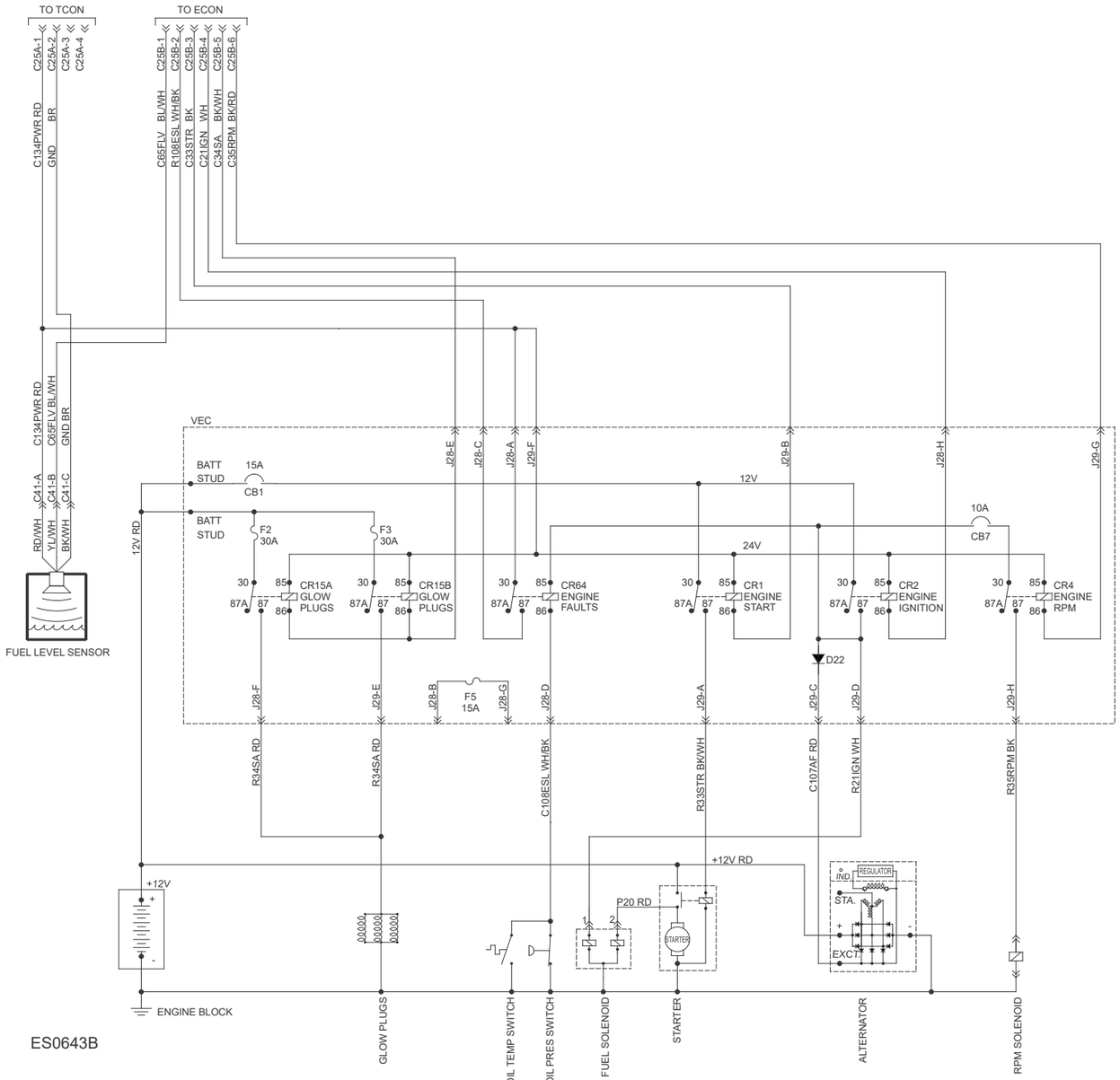
Electrical Schematic, Pump and Generator Controllers



Electrical Schematic, Kubota Engine Models

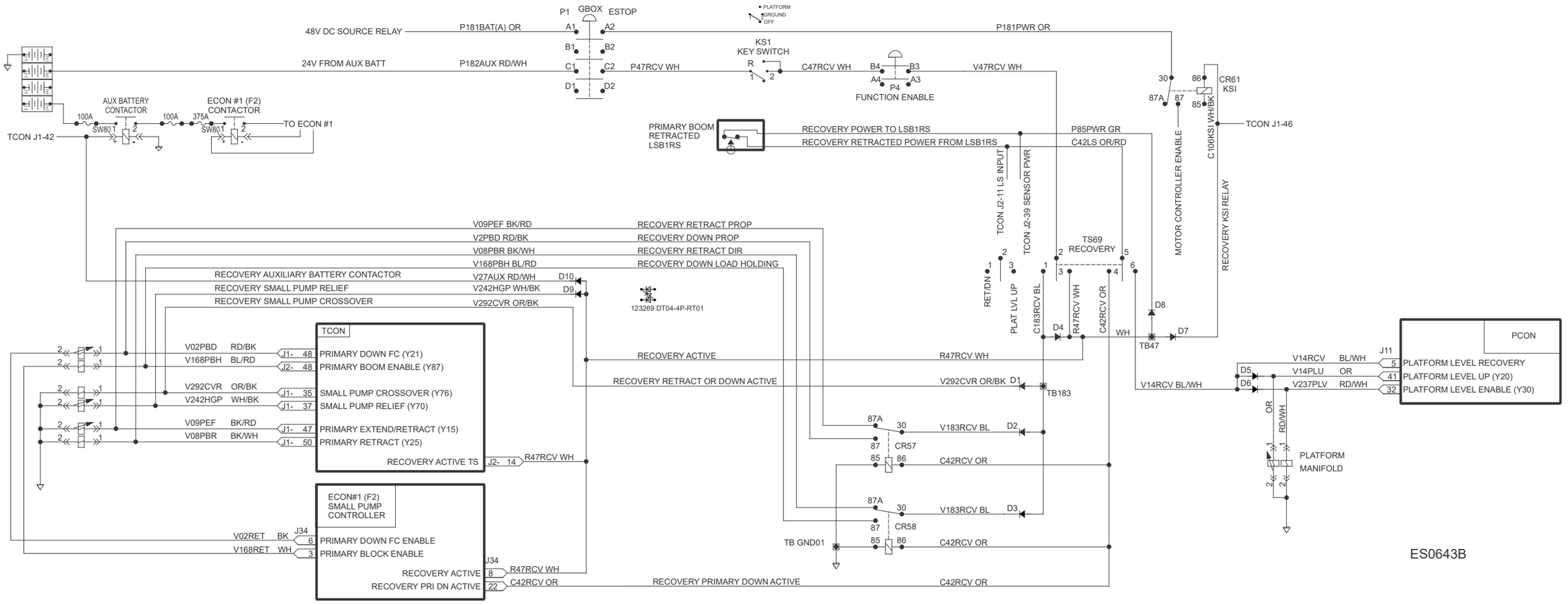


Electrical Schematic, Kubota Engine Models



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Electrical Schematic, Recovery

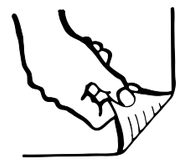


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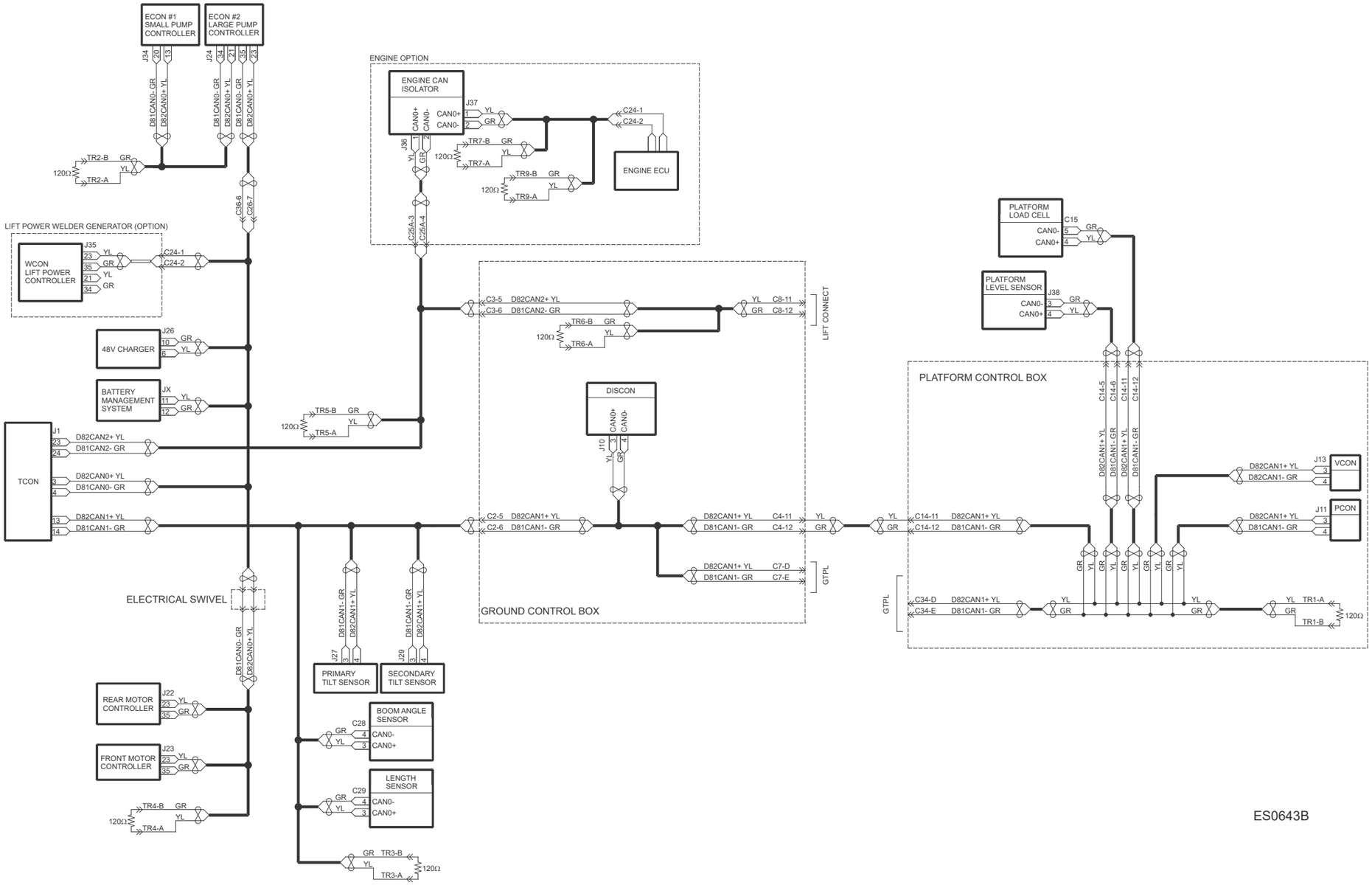
Electrical Schematic, Recovery



CAN Bus Wiring Diagram

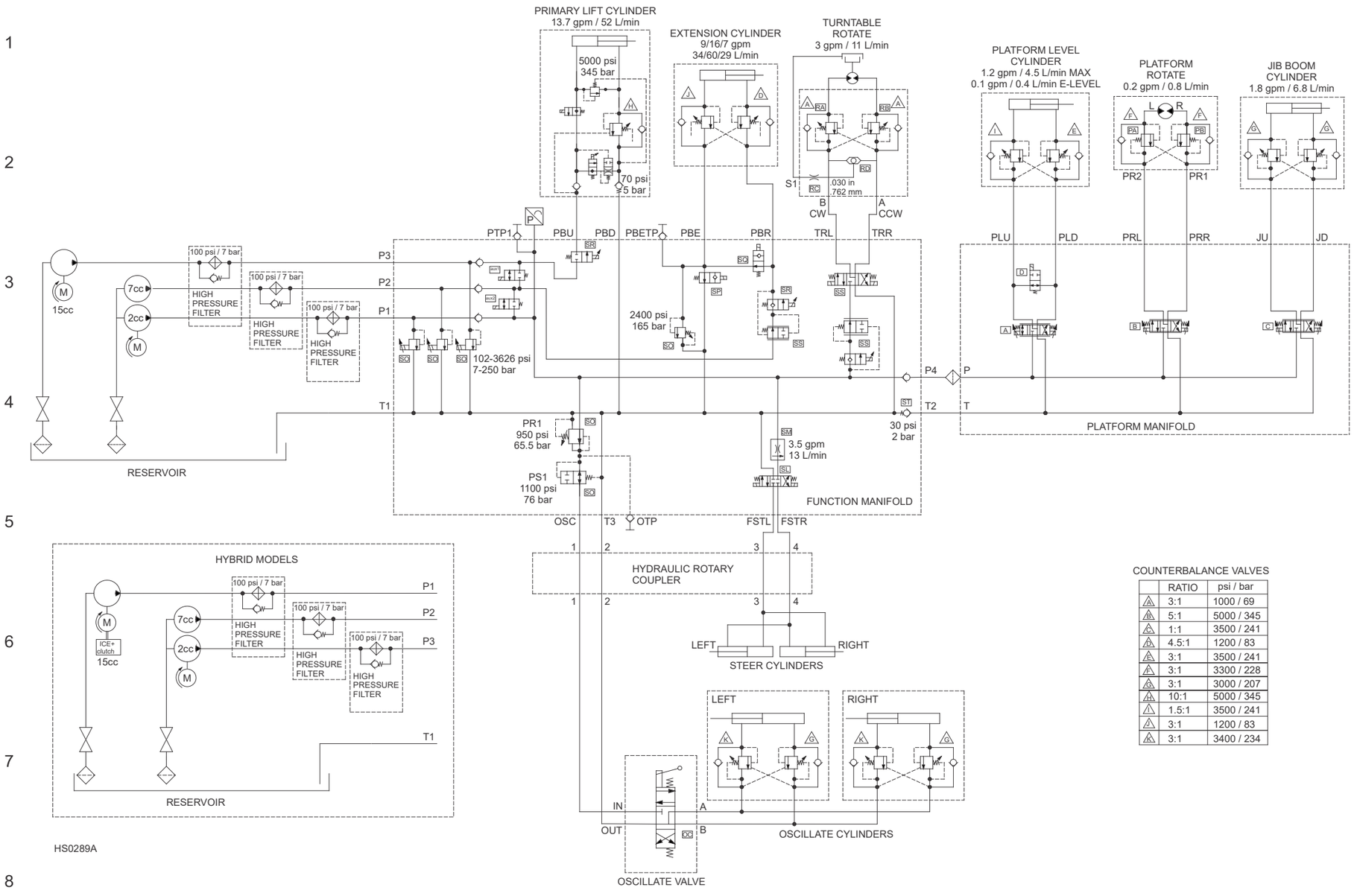


CAN Bus Wiring Diagram



ES0643B

Hydraulic Schematic



COUNTERBALANCE VALVES

	RATIO	psi / bar
A	3:1	1000 / 69
B	5:1	5000 / 345
C	1:1	3500 / 241
D	4.5:1	1200 / 83
E	3:1	3500 / 241
F	3:1	3300 / 228
G	3:1	3000 / 207
H	10:1	5000 / 345
I	1.5:1	3500 / 241
J	3:1	1200 / 83
K	3:1	3400 / 234

Hydraulic Schematic



California Proposition 65

WARNING

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

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

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

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

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