Genie
A TEREX BRAND

Service and Repair Manual

Serial Number Range

Z®-60 DC
Z®-60 FE

from Z60H-2548
from Z60M-1000
from Z60D-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. 1307785GT
Rev C
June 2024

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
E-mail: awp.techpub@terex.com

Find a Manual for this Model

Go to https://www.genielift.com

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

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Second Edition, Third Printing

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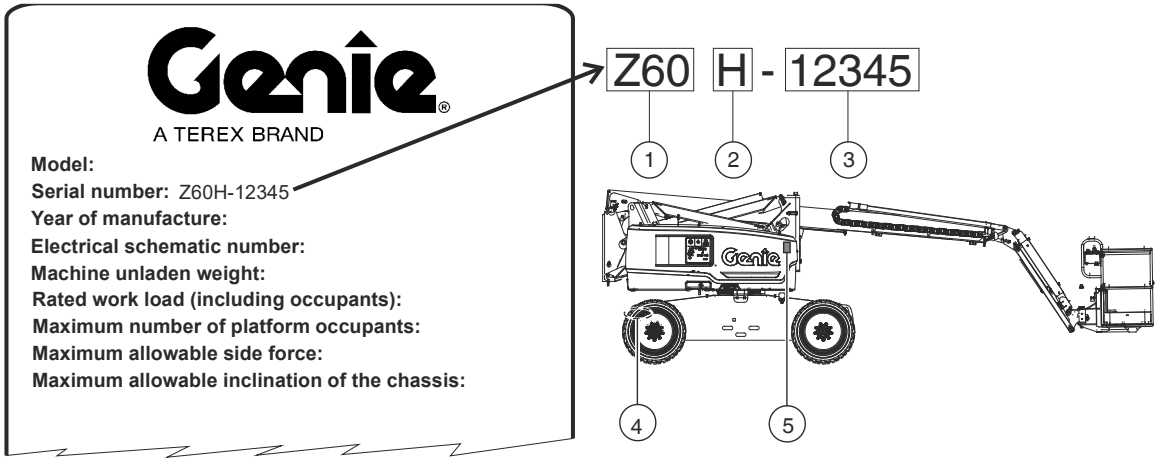
Revision History

Revision	Date	Section	Procedure / Page / Description
A	9/2021		Initial Release
B	8/2022	Repair	11-1
		Fault Codes	All Sections
		Navigation Menus	All Sections
		Schematics	Electrical schematics
C	6/2024	Specifications	Performance Specifications
			Hydraulic Component Specifications
			Kohler KDW 1404 Engine
			Machine Torque Specifications
		Repair	Calibration Process Steps
			Platform Controls
		Schematics	Electrical Component Legend
			Kohler Engine Fuse / Relay Module
			Electrical schematics

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

Introduction

Serial Number Legend



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

Safety Rules



Danger

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

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

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

Do Not Perform Maintenance Unless:

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

☑ You read, understand and obey:

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

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

Safety Rules

Personal Safety

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



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



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

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

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

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

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



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



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

Workplace Safety

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



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



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



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



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



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



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

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Specifications

Machine Specifications

Tires and Wheels	Rough terrain
Tire size (Rough terrain)	355/55D625
Tire weight, foam-filled (minimum) (Rough terrain)	426 lbs 193 kg
Tire weight, foam-filled (minimum) (Rough terrain non marking)	426 lbs 193 kg
Tire ply rating	14
Wheel lugs	9 @ 5/8 - 18
Lug nut torque, dry	240 ft-lbs 325 Nm
Lug nut torque, lubricated	180 ft-lbs 244 Nm
Overall tire diameter (Rough terrain, low profile tires)	36.9 in 93,7 cm
Fluid capacities	
Fuel tank	17 gallons 64,4 liters
Hydraulic tank	18 gallons 68 liters
Hydraulic system (including tank)	21 gallons 80 liters
Drive hubs	24 fl oz 710 cc
Turntable rotation drive hub	43 fl oz 1262 cc

Drive hub oil type: SAE 90 multipurpose hypoid gear oil API service classification GL5

Batteries

Type	Lead acid AGM	L16G-AC EV Dry cell
Group		903-L16
Quantity		8
Capacity	Trojan lead acid Fullriver AGM Trojan AGM	390 AH 415 AH 370 AH
Reserve capacity @ 25A rate	Trojan lead acid Fullriver AGM Trojan AGM	789 min 885 min 817 min
Weight	Refer to *Machine Component Weights*	

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

Specifications

Performance Specifications

Drive speed, maximum Stowed position	
2WD/4WD models Stowed	4.0 mph 6.44 km/h 40 ft / 6.8 sec 12.2 m / 6.8 sec
Elevated	0.7 mph 1.0 km/h 40 ft / 40 sec 12.2 m / 40 sec
Gradeability	See Operator's Manual
Braking distance, high range on paved surface	3 - 6 feet 0.9 - 1.8 m
Function speeds, maximum from platform controls	
Jib boom up	13 - 17 seconds
Jib boom down	13 - 17 seconds
Primary boom up (with secondary fully elevated)	36 - 44 seconds
Primary boom down (with secondary fully elevated)	36 - 44 seconds
Primary boom extend	42 - 52 seconds
Primary boom retract	34 - 42 seconds
Secondary boom up	31 - 39 seconds
Secondary boom up/down	31 - 39 seconds
Turntable rotate, per 90° Stowed	21 - 27 seconds
Turntable rotate, per 90° Not stowed	35 - 42 seconds

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

Hydraulic Oil Specifications

Hydraulic Fluid Specifications

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

Cleanliness level, minimum	ISO 15/13
Water content, maximum	250 ppm
Recommended Hydraulic Fluid	
Hydraulic oil type	Chevron Rando HD Premium
ISO Grade	32
Viscosity index, maximum	200
Optional Hydraulic Fluids	
Mineral based	Shell Tellus S2 V 32 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.

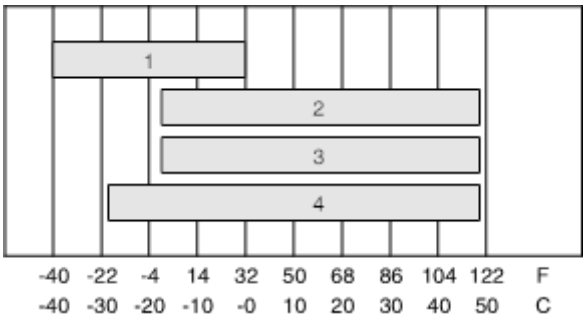
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond its maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

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 tandem gear pump
Displacement per revolution (inner pump)	.40 cu in / 6.6 cc
(outer pump)	.20 cu in / 3.3 cc
Max flow rate L/min(inner pump)	6.8 gpm / 25.74
L/min(outer pump)	3.4 gpm / 12.87
Auxiliary pump	
Type	Fixed displacement gear pump
Displacement per revolution (Bucher)	1.9 gpm 7.3 L/min
Displacement per revolution (MTE)	1.7 gpm 6.44 L/min
Function manifold	
Proportional relief valve pressure, variable	50 to 3000 psi 3.4 to 207 bar
Platform level relief valve pressure	2800 psi 193 bar
Primary boom extend relief valve pressure	1250 psi 86 bar
Oscillate reducing valve pressure	400 psi 28 bar
Platform level flow regulator	Variable 1 to 1.5 gpm 3.8 to 5.7 L/min
Hydraulic Filters	
High pressure filter:	Beta 5 ˆ 1000
Hydraulic tank return filter	Beta 10 ˆ 200

Manifold Component Specifications

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

Valve coil resistance

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

Description	Specification
Proportional solenoid relief valve, 24V DC (schematic item AA)	22 Ω
Proportional solenoid valve, 3 position 4 way, 20V DC (schematic items B, G, and S	19 Ω
Proportional solenoid valve, 3 position 4 way, 20V DC (schematic items AE, E, I, O, R, and Z)	24 Ω
Solenoid valve, 2 position 3way, 12V DC (schematic item JA)	9 Ω

Specifications

Kubota D1105-E4-GNI-1 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/ SAE 10W-40
-10 to 25° C (14° to 77° F)	SAE 10W-30/ SAE 10W-40/ SAE 15W-40
Above 25° C (77° F)	SAE 10W-30/ SAE 10W-40/ 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	75AH
Cold cranking ampere	450A
Reserve capacity @ 25A rate	70 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%

Specifications

Kohler KDW 1404 Engine

Displacement	83.72 cu in 1.372 liters
Number of cylinders	4
Bore and Stroke	2.95 x 3.05 inches 75 x 77.6 mm
Horsepower, gross intermittent	25.2 @ 3000 rpm 18.8 kW @ 3000 rpm
Firing order	1 - 3 - 4 - 2
Low idle	2150 rpm
High idle	3000 rpm
Compression ratio	22.8:1
Governor	mechanical
Valve clearance, cold	0.0059 - 0.0078 in 0.15 - 0.20 mm
Engine coolant	
Capacity	4.23 quarts 4 liters
Lubrication system	
Oil pressure	22 - 80 psi 1.5 - 5.5 bar
Oil capacity (including filter)	3.4 quarts 3.2 liters
Oil viscosity requirements	
Below -10°C (14° F)	SAE 5W-40 SAE 10W-30 SAE 10W-40
-10 to 25° C (14° to 77° F)	SAE 5W-40 SAE 15W-40
Above 25° C (77° F)	SAE 5W-40 SAE 15W-40
Unit ships with 5W-40. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Manual for your engine.	

Injection system	
Injection pump	Bosch PDM
Injection timing	11° BTDC
Injection pump pressure, maximum	2030 - 2248 psi 140 - 155 bar
Fuel requirement	
For fuel requirements, refer to the engine Operator Manual for your engine.	
Starter motor	
Cranking speed	250 - 300 rpm
Current draw, normal load	200A
Battery	
Type	12V DC
Group	70
Quantity	1
Ampere hour	54AH
Cold cranking ampere	530A
Reserve capacity @ 25A rate	86 minutes
Alternator	
Alternator output	45A, 12V DC
Fan belt deflection	0.4 - 0.6 inches 10 - 15 mm

Specifications

Machine Torque Specifications

Platform Rotator	
1-8 center bolt, GR 5	
Lubricated	480 ft-lbs 650 Nm
Dry	640 ft-lbs 867 Nm
3/8 -16 bolts, GR 8	
Lubricated	33 ft-lbs 45 Nm
Dry	44 ft-lbs 60 Nm
Turntable rotate assembly	
Rotate bearing mounting bolts, lubricated	160 ft-lbs 217 Nm
Rotate drive hub mounting bolts, lubricated	80 ft-lbs 108.4 Nm
Drive motors and hubs	
Drive hub mounting bolts, dry	93 ft-lbs 126 Nm
Drive motor leads square nuts (requires 12 point socket)	9 ft lbs 12 Nm
Hydraulic tank return filter	
from serial number: Z60M-1645	
Mounting bolts, dry	13 ft-lbs 18 Nm

Machine Component Weights

Tire and wheel assembly	429 lbs 195 kg
Drive motor and hub	160 lbs 73 kg
Engine assembly	724 lbs 328 kg
Primary boom	1277 lbs 579 kg
Primary boom lift cylinder	283 lbs 128 kg
Primary boom extend cylinder	234 lbs 106 kg
Secondary boom linkage	3017 lbs 1368 kg
Secondary boom lift cylinder	180 lbs 82 kg
Jib boom assembly	247lbs 112kg
Jib boom cylinder	47 lbs 22 kg
Oscillate cylinder	50 lbs 23 kg
6 ft / 1.8 m platform	275 lbs 125 kg
8 ft / 2.4 m platform	315 lbs 143 kg
Battery box assembly with counterweight (without batteries)	612 lbs 278 kg
Battery 6volt (wet)	106 lbs 48 kg
Battery 6 volt (maintenance free)	123 lbs 56 kg

Specifications

Hydraulic Hose and Fitting Torque Specifications

Your machine is equipped with Parker Seal-Lokπ 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-Lokπ 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

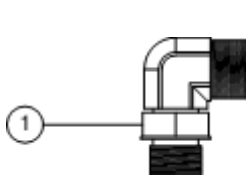
(swivel nut or hose connection)

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

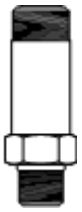
(tube fitting - installed into Aluminum)
(all types)

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

Specifications

Torque Procedure

Seal-Lok™ fittings

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

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

2 Lubricate the O-ring before installation.

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

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

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

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

JIC 37° fittings

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

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

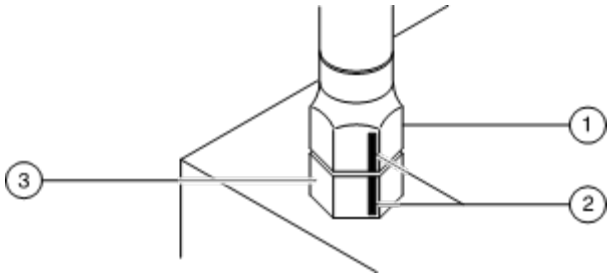


Illustration 1

1 hex nut
2 reference mark
3 body hex fitting

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

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

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

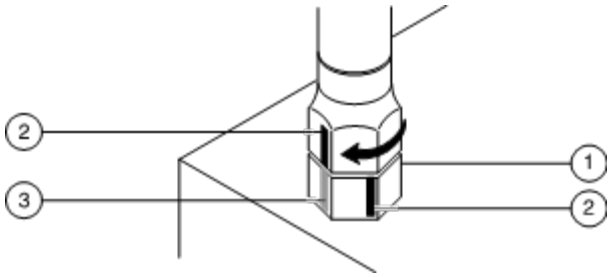


Illustration 2

1 body hex fitting
2 reference mark
3 second mark

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

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

Repair Procedures



Observe and Obey:

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

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

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

Before Repairs Start:

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

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

☑ Use only Genie approved replacement parts.

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

Machine Configuration:

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

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

Repair Procedures

About This Section

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

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

Symbols Legend



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

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

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

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

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

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

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

Repair Procedures

Calibration Process Steps

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.

1 **Calibrate the pressure relief valve:** Refer to Repair Procedures, *How to Adjust the Proportional Relief Valve and Hydraulic Pressure Sensor.*

Note: Perform this procedure prior to calibrating other hydraulic functions.

2 **Calibrate the universal tilt sensor:** Refer to Repair Procedures*, How to Calibrate Universal Tilt Sensor.*

3 **Calibrate the platform overload:** Refer to Repair Procedures, *How to Perform a Full Load Platform Calibration*.

4 **Calibrate the primary and secondary angle sensors:** Refer to Repair Procedures, *How to Calibrate Booms Angle Sensors.*

5 **Calibrate the steer angle sensor:** Refer to Repair Procedures, *How to Calibrate the Steer Angle Sensor*.

6 **Verify pump efficiency calibration:** Refer to Repair Procedures, *How to Check the Function Pump Calibration*.

7 **Set hydraulic valve thresholds** for turntable rotate, primary up/down, secondary up/down, primary extend/retract, jib up/down, and platform rotate: Refer to Repair Procedures, *How to Adjust the Joystick Threshold Setting*.

8 **Set low flow hydraulic valves** for jib up/down and platform rotate: Refer to Repair Procedures, *How to Adjust the Maximum Speed Setting (Hydraulic Functions)*.

9 **Set high flow hydraulic valves** for primary up/down, secondary up/down, primary extend/retract and turntable rotate: Refer to Repair Procedures, *How to Adjust the Maximum Speed Setting (Hydraulic Functions)*.

10 **Clear the fault history:** Refer to Repair Procedure, *How to Clear Fault History*.

How to Reset System Defaults from Ground Controls

It is required to perform the calibration process if defaults have been reset. Refer to *Calibration Process Steps*.

1 Turn the machine on at the ground controls and immediately move and hold both the function enable and auxiliary enable toggle switches for 5 seconds.

⊙ Result: The LCD screen will display "**PASSWORD**".

2 Momentarily activate the extend / retract toggle switch in the following sequence to enter the password.

<left><left><right><left>

⊙ Result: An audible alarm sounds for 1 second. Defaults have been reset.

⊠ Result: There is no audible alarm. Repeat this procedure.

Note: The password must be entered within 5 seconds.

How to Reset General Parameter Defaults from Platform Controls

General parameters do not include calibration parameters. Machine calibration is not required.

Note: Refer to Navigation Menus, *Settings Navigation Menu.*

1 Turn the key switch to platform controls.

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

3 Do not press down the foot switch.

4 Do not start the engine (if equipped).

5 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

6 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

7 Navigate to **RESET GENERAL PARAMETERS** and press <**enter**>.

8 Press <**+**> to select **YES**.

9 Press <**enter**> to save the change.

10 Navigate to **EXECUTE PARAMETER RESET** and press <**enter**>.

11 Press <**+**> to select **YES**.

12 Press <**enter**> to save the change.

⊙ Result: An audible alarm sounds for 1 second. Defaults have been reset.

Repair Procedures

How to Reset Calibration Defaults from Platform Controls

It is required to perform the calibration process if defaults have been reset. Refer to *Calibration Process Steps*.

Note: Refer to Navigation Menus, *Settings Navigation Menu.*

1 Turn the key switch to platform controls.

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

3 Do not press down the foot switch.

4 Do not start the engine (if equipped).

5 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

6 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

7 Navigate to **RESET CALIBRATION** and press <**enter**>.

8 Press <**+**> to select **YES**.

9 Press <**enter**> to save the change.

10 Navigate to **EXECUTE PARAMETER RESET** and press <**enter**>.

11 Press <**+**> to select **YES**.

12 Press <**enter**> to save the change.

⊙ Result: An audible alarm sounds for 1 second. Defaults have been reset.

How to Reset All Parameter Defaults from Platform Controls

It is required to perform the calibration process if defaults have been reset. Refer to *Calibration Process Steps*.

Note: Refer to Navigation Menus, *Settings Navigation Menu.*

1 Turn the key switch to platform controls.

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

3 Do not press down the foot switch.

4 Do not start the engine (if equipped).

5 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

6 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

7 Navigate to **RESET ALL PARAMETERS** and press <**enter**>.

8 Press <**+**> to select **YES**.

9 Press <**enter**> to save the change.

10 Navigate to **EXECUTE PARAMETER RESET** and press <**enter**>.

11 Press <**+**> to select **YES**.

12 Press <**enter**> to save the change.

⊙ Result: An audible alarm sounds for 1 second. Defaults have been reset.

1-1
Platform Controls

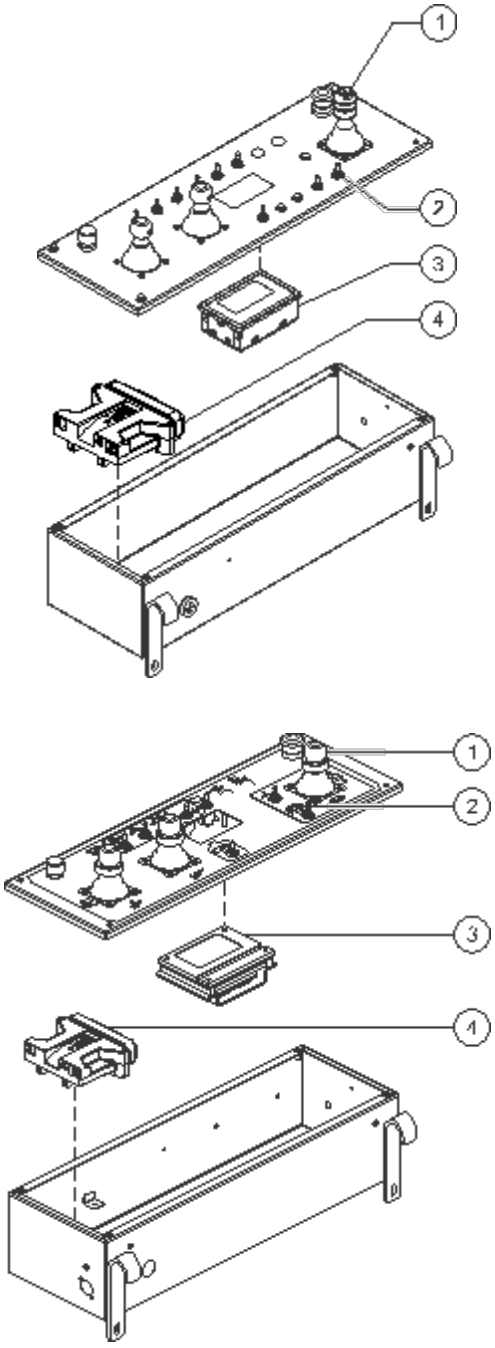
The platform control box contains two control modules; The VCON is a LCD screen mounted between the secondary boom and drive joysticks. The PCON (platform controller) inside the platform control box communicates with the VCON and controllers located on the turntable of the machine.

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
- Battery SOC (State of Charge)
- Select options
- View function speed setting
- Fuel level (FE models)
- Operating mode (DC / FE)
- Software part number and version
- Aid in the calibration process

Note: Platform control box may vary per machine.



1 drive joystick with steer left/right rocker switch
2 drive enable toggle switch
3 VCON (diagnostic display)
4 PCON (platform control module)

Platform Controls

How to Adjust the Joystick Threshold Setting

The threshold setting is the minimum output current at which a function proportional valve can open and allow the function to operate. There are two types threshold currents to adjust:

Joystick controlled functions - Primary Up/Down, Secondary Up/Down and Turntable Rotate.
Switch controlled functions - Primary Extend/Retract, Platform Rotate, Jib Up/Down and Jib 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 Turn the key switch to platform controls. Do not start the engine (if equipped).

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

5 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

⊙ Result: The display will show FAULTS.

6 Momentarily activate steer in the right direction until SETTINGS is shown on the display.

7 Momentarily activate the drive enable toggle switch in the right direction until VALVE AND SENSOR SETTINGS is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction until CALIBRATE TILT SENSOR is shown on the display.

9 Momentarily activate steer in the right direction until VALVE THRESHOLD CURRENT is shown on the display.

Joystick Controlled Functions:

10 Press down on the foot switch and slowly deflect the joystick to be adjusted until the valve is operating at the desired threshold current.

⊙ Result: The display will indicate the threshold current parameter in milliamps while operating the function.

11 While operating the function and the function is barely moving, momentarily activate the drive enable toggle switch in the right direction to save the desired value.

⊙ Result: The alarm will sound indicating the setting has been saved. Release the foot switch. Continue to the next threshold current adjustment.

Switch Controlled Functions:

12 Perform steps 1 through 9 to enter the sub menu THRESHOLD CURRENT on the display.

13 Momentarily activate the speed select toggle switch in either direction until the bar graph is at about 50% on the display.

14 Press down on the foot switch and select the toggle switch controlled boom function to be adjusted.

⊙ Result: The display will indicate the parameter in milliamps while operating the function.

15 Momentarily activate the speed select switch in either direction while operating the function (foot switch depressed) to achieve the desired threshold value. Do not release the foot switch.

16 Momentarily activate the drive enable toggle switch in the right direction to save the value.

⊙ Result: The alarm will sound indicating the setting has been saved. Release the foot switch. Continue to the next threshold current adjustment.

To exit programming mode:

17 Move and hold the drive enable toggle in the left position until the display returns to SYSTEM READY mode.

How to Adjust the Maximum Speed Setting (Hydraulic Functions)

There are three types of speed settings to adjust:
High Flow Functions: Primary Up/Down Primary Extend/Retract, Secondary Up/Down and Turntable rotate.
Low flow Functions: Jib Up/Down, Jib rotate, and Platform rotate.
Other Functions: Steering is set by a fixed flow regulating valve (non adjustable), Platform level (adjusted by a needle valve located on the function manifold) and Hydraulic Valve Ramps. Refer to *How to Adjust Ramp Rate Setting.*

Note: Refer to Specifications, *Performance Specifications,* for each boom function speed. Check function pump calibration before adjusting the maximum speed setting. Refer to Repair Procedures, *How to Check Function Pump Calibration*.

1 Turn the key switch to platform controls.

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

5 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

⊠ Result: The display will show FAULTS.

6 Momentarily activate steer in the right direction until SETTINGS is shown on the display.

7 Momentarily activate the drive enable toggle switch in the right direction until VALVE AND SENSOR SETTINGS is shown on the display.

Platform Controls

8 Momentarily activate the drive enable toggle switch in the right direction until CALIBRATE TILT SENSOR is shown on the display.

9 Momentarily activate steer in the right direction until VALVE MAXIMUM CURRENT is shown on the display.

10 Momentarily activate the drive enable switch to enter the sub menu VALVE MAXIMUM CURRENT.

High Flow Functions:

The function speeds are fixed by the flow rate supplied by the hydraulic pump. Excess flow is rarely produced resulting in little or no oil going over relief.

11 Momentarily activate and release the high flow boom function in one direction.

⊙ Result: The display shows the name, direction and current value in milliamps for the function being moved. Example: “PRI_UP_MAX 590.”

12 Momentarily activate steer right five times to increase the mA value.

13 Activate the boom function again by pressing the foot switch and moving the function switch (or joystick to full speed) in the same direction. Momentarily active steer left once every three seconds to decrease the maximum mA value where pressure rises by about 300 PSI / 21 bar.

14 Release the foot switch and momentarily activate steer in the right direction one time to increase the value by 10 milliamps. Repeat releasing the foot switch and momentarily activating steer right until the function moves with no valve throttling and no audible alarm for the primary up/down, secondary up/down and primary boom extend and retract.

15 Momentarily activate steer in the right direction two times to increase the value by 20 milliamps for the turntable function setting.

16 Momentarily activate the drive enable toggle switch in the right direction to save the value.

⊙ Result: The alarm will sound indicating the setting has been saved. Continue to the next desired high flow function adjustment.

To exit programming mode:

17 Move and hold the drive enable toggle in the left position until the display returns to SYSTEM READY mode.

Low Flow Functions:

Hydraulic flow from the pump is fixed, and the function speed is controlled by the hydraulic directional control valve. Hydraulic flow will always exceed the flow allowed by the controlling valve and the excess flow will always be sent over the relief valve and back to tank. Function speed is set by changing control current (mA) and is confirmed by timing the function travel time with a stop watch. Refer to Specifications, *Performance Specifications* for each boom function speed.

18 Perform steps 1 through 10 to enter the sub menu VALVE MAXIMUM CURRENT on the display.

19 Momentarily active a low flow boom function in one direction.

⊙ Result: The display shows the name of the function, direction and current value in milliamps for the function being moved. Example: “JIB_UP_MAX 590.”

20 Activate the boom function again by pressing the foot switch and moving the function switch in the same direction. Using a stop watch, record the full motion function and compare this time to the performance specification.

21 While performing the function, activate steer in either direction to reach the desired speed.

Note: Activating steer right decreases the time it takes to perform the low flow boom function. Activating steer left increases the time it takes to perform the low flow boom function.

22 Momentarily activate the drive enable toggle switch in the right direction to save the value.

⊙ Result: The alarm will sound indicating the setting has been saved. Continue to the next low flow function adjustment.

To exit programming mode:

23 Move and hold the drive enable toggle in the left position until the display returns to SYSTEM READY 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 Turn the key switch to platform controls. Do not start the engine (if equipped).

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

5 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

⊙ Result: The display will show FAULTS.

6 Momentarily activate steer in the right direction until SETTINGS is shown on the display.

Platform Controls

7 Momentarily activate the drive enable toggle switch in the right direction until VALVE AND SENSOR SETTINGS is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction until CALIBRATE TILT SENSOR is shown on the display.

9 Momentarily activate steer in the right direction to choose either RAMP UP TIME or RAMP DOWN TIME sub menus.

10 Momentarily activate the drive enable toggle switch in the right direction to enter the desired ramp time calibration sub menu.

11 Momentarily activate the boom function to be adjusted.

⊙ Result: The display shows the name of the function, direction, and time value in milliseconds. Example "PRI_UP_VALVE 2500" (2500 milliseconds / 2.5 seconds of ramp time).

Note: At this step, the function can be tested and ramp times can be measured. Release the foot switch prior to making a parameter adjustment.

12 Momentarily active steer to change the ramp up or ramp down value. Each activation will change the value by 50 milliseconds. Refer to the Ramp Rate chart for factory settings.

13 Momentarily activate the drive enable toggle switch in the right direction to save the value.

⊙ Result: 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
Secondary boom up/down	
ramp accelerate (up)	1.5 second
ramp decelerate (down)	0.5 second
Turntable rotate	
ramp accelerate (up)	1.85 seconds
ramp decelerate (down)	1.25 seconds
Extend/Retract	
ramp accelerate (up)	2 seconds
ramp decelerate (down)	0.4 second
Jib up/down	
ramp accelerate (up)	1 second
ramp decelerate (down)	0.4 second
Platform rotate	
ramp accelerate (up)	0.3 second
ramp decelerate (down)	0.75 second
Propel	
ramp accelerate (up)	5 seconds
ramp decelerate (down)	3 seconds

1-2
How to Calibrate Booms Angle Sensors

Boom angle sensors are installed on the primary and secondary boom sections. They are used to detect whether the boom sections are stowed or not stowed. A two point calibration procedure captures the signal with the cylinder fully extended and fully retracted to an angle measurement that is scaled to degrees within the program. If either angle sensor is in the uncalibrated state, drive speed is limited to out-of-stowed speed.

Note: Start this procedure with the boom in a stowed position. Position the machine in a suitable location with sufficient vertical space. Refer to Navigation Menus, *Settings Menu*.

Note: The one point calibration is optional. It allows 2 MPH / 3.2 Km/h of travel in the stowed position if the machine needs to be immediately moved.

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

2 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

3 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

⊙ Result: The display will show FAULTS.

4 Momentarily activate steer in the right direction until SETTINGS is shown on the display.

5 Momentarily activate the drive enable toggle switch in the right direction until VALVE AND SENSOR SETTINGS is shown on the display.

6 Momentarily activate the drive enable toggle switch in the right direction until CALIBRATE TILT SENSOR is shown on the display.

7 Momentarily activate steer in the right direction until BOOM ANGLE CALIBRATE is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction to enter the BOOM ANGLE CALIBRATE screen.

9 Momentarily activate the drive enable toggle switch in the right direction to enter the sub-menu.

⊙ Result: The screen will display PRI SNSR MVXXXX, SEC SNSR MVXXXX. A flashing value indicates the mV (millivolt) value is within expected range.

10 Momentarily activate the drive enable toggle switch in the right direction to store the millivolt value.

⊙ Result: An alarm will sound for one second and the screen will display CALIBRATED.

11 Calibrate the boom elevated positions, fully raise the primary and secondary booms. Repeat steps 9 and 10 to store the millivolt value.

⊙ Result: An alarm will sound for two seconds and the screen will display CALIBRATED indicating both the primary and secondary angle sensors have been calibrated successfully.

To exit programming mode:

12 Move and hold the drive enable toggle in the left position until the display returns to SYSTEM READY mode.

Platform Controls

1-3 How to Clear Fault History

There are 1 - 16 fault codes shown in the fault history menu 1 being the most recent displayed. It may be necessary to clear the fault history in order to acquire the most recent fault codes. It is also good practice to clear fault history after performing any calibration procedure.

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

1 Turn the key switch to platform controls. Do not start the engine (if equipped).

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

5 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

⊙ Result: The display will show FAULTS.

6 Momentarily activate the drive enable toggle switch in the right direction until ACTIVE FAULTS is shown on the display.

7 Momentarily activate steer in the right direction until FAULT HISTORY is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction to activate the clear fault history function

⊙ Result: The display will read ENABLE at the bottom.

9 Momentarily activate steer in the right direction to change NO to YES on the display.

10 Momentarily activate the drive enable toggle switch to except the change.

⊙ Result: The alarm will sound indicating the fault history has been cleared.

2-1
Platform Leveling Cylinder

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

How to Remove the Platform Leveling Cylinder

Note: Before cylinder removal is considered, bleed the leveling cylinder to be sure there is no air in the closed loop.

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

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

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

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

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

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

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

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

6 Remove the external snap rings from the slave cylinder barrel-end pivot pin. Do not remove the pin.

7 Place a block under the slave cylinder for support. Protect the cylinder rod from damage.

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

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

NOTICE Component damage hazard. The leveling cylinder rod may become damaged if it is allowed to fall if not properly supported by the lifting device.

9 Use a soft metal drift and drive the barrel-end pin out.

10 Carefully pull the cylinder out of the primary boom.

How to Bleed the Platform Leveling Cylinder

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

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

Platform Components

2-2 Platform Rotator

How to Remove the Platform Rotator

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

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

1 Remove the platform and platform support.

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

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

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

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

How to Bleed the Platform Rotator

Note: This procedure will require two people. Do not start the engine. Use auxiliary power for this procedure.

1 Move the function enable toggle switch to either side and activate the platform rotate toggle switch to the right then the left through two platform rotation cycles, then hold the switch to the right position until the platform is fully rotated to the right.

2 Place a suitable container underneath the platform rotator.

3 Open the top bleed screw on the rotator, but do not remove it.

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

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

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

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

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

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

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

7 Clean up any hydraulic oil that may have spilled.

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

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.

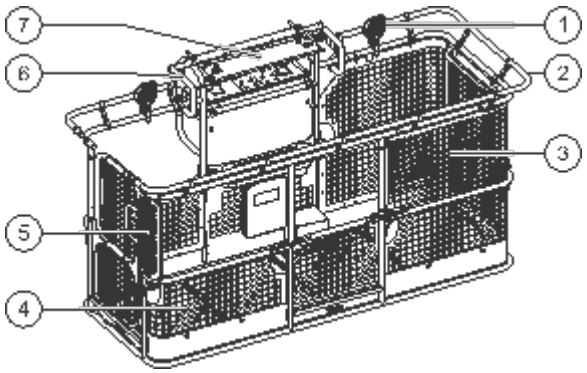
1 Fully retract and lower the boom. Level the platform.

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 Turn the key switch to ground controls and pull out the red Emergency Stop button. Within 5 seconds, activate the secondary boom up toggle switch 3 times.

Note: Do not activate function enable.

⊙ Result: The hour meter displays **CALIBRAT MODE**.

4 Activate and hold secondary down for 3 - 4 seconds.

⊙ Result: Hour meter displays **ZEROLOAD CAL OK**. Calibration is saved.

⊠ Result: Hour meter displays **ZEROLOAD OUT OF RANGE**. Calibration has not been saved. Adjust the load cell and repeat this procedure.

How to Perform a Full Load Platform Calibration

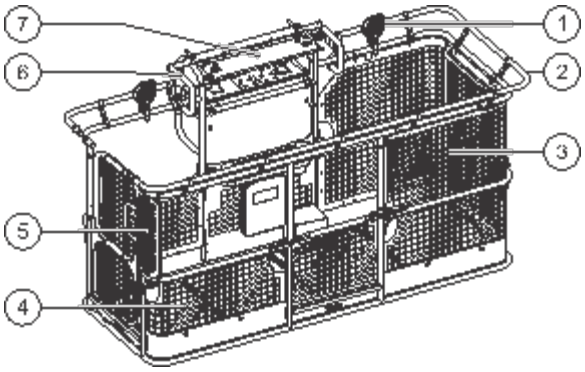
Note: Perform this procedure on a firm, level surface with the machine in the stowed position.

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

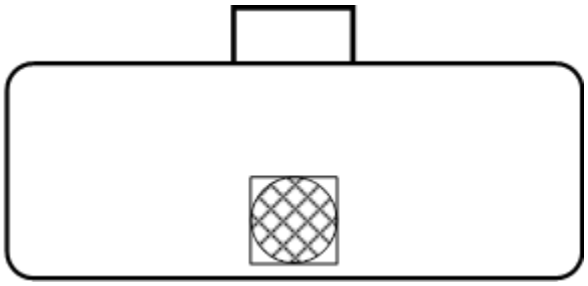
Platform Components

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

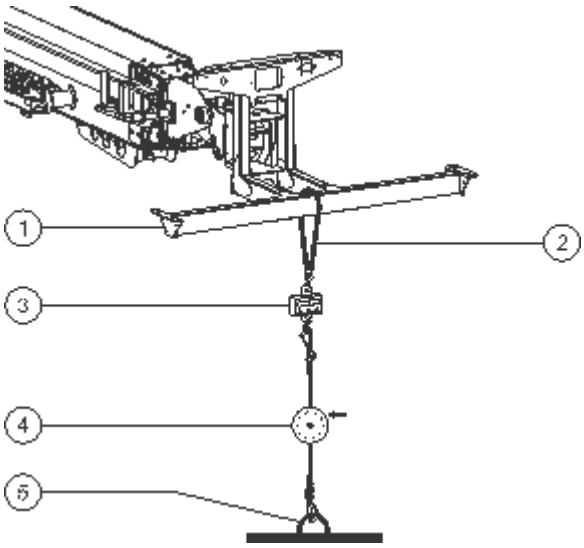
4 Place a test weight on the platform floor using a suitable lifting device. Place the weight near the center entry point of the platform, as far away from the operator controls as possible.

Weight = 500 lbs / 227 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 Activate and hold secondary boom up for 3 - 4 seconds.

⊙ Result: Hour meter displays **MAXRATED LOAD CAL OK**. Calibration is saved.

⊠ Result: Hour meter displays **MAXRATED LOAD OUT OF RANGE**. 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.

Platform Components

Confirm calibration:

7 Start the engine from the ground controls.

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

⊙ Result: The alarm sounds. The engine turns off. The platform overload indicator light or 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 indicator light or LCD symbol flash and the alarm sounds.

9 Test all machine functions from the ground controls.

⊙ Result: Engine does not start. 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

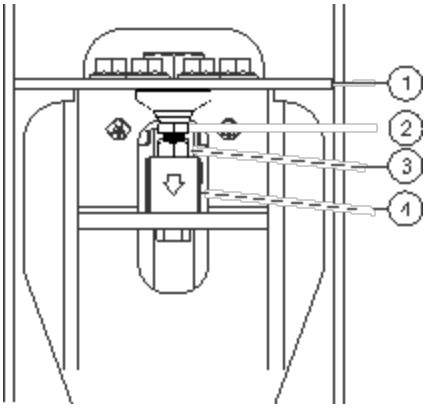
Note: The preload adjustment should only be performed after the load cell sensor has been replaced.

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.*

How to Reset Overload Recovery Faults (if equipped)

The message OVERLOAD RECOVERY will be displayed when a platform overload recovery occurs under auxiliary power. The message will persist until the reset overload recovery procedure is performed. Refer to Navigation Menus, *Faults Menu.*

1 Turn the key switch to platform controls.

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

5 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

⊙ Result: The display will show FAULTS.

6 Momentarily activate the drive enable toggle switch in the right direction until ACTIVE FAULTS is shown on the display.

7 Activate steer in the right direction until RESET OVERLOAD RECOVERY is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction to lock the menu OVERLOAD RECOVERY RESET.

9 Enter the reset code by momentarily activating steer right three times then steer left one time.

⊙ Result: A one second pulse alarm will sound indicating the reset procedure has been saved.

Jib Boom Components

3-1
Jib Boom

How to Remove the Jib Boom

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

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

1 Remove the platform.

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

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

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

4 Remove the platform support.

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

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

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

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

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

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

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

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

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

13 Use a soft metal drift to remove the pin and let the cylinder hang down.

⚠WARNING Crushing hazard. The jib boom could fall when the barrel-end pivot pin is removed if not properly supported by the lifting device.

14 Remove the pin retaining fastener from the jib boom pivot pin. Use a soft metal drift to remove the pin, then remove the jib boom.

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

3-2
Jib Boom Lift Cylinder

How to Remove the Jib Boom Lift Cylinder

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

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

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

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

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

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

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

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

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

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

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

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

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

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

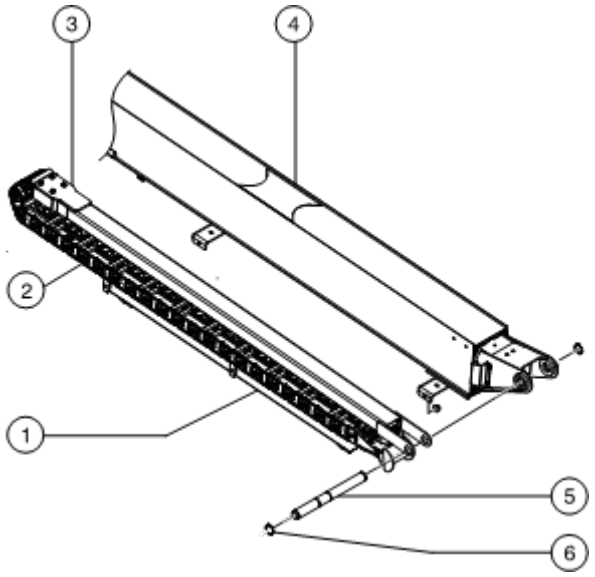
Primary Boom Components

4-1
Cable Track

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

How to Remove the Cable Track

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



1 cable track tray
2 cable track
3 cable track pull tube
4 primary boom
5 pin
6 snap ring

1 Tag and disconnect the wire connectors from the bottom of the platform control box.

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

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

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

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

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

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

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

7 Remove the retaining fasteners securing the cable track pull tube.

8 Pull the cable track back from the pull tube.

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

10 Pull the hoses and cables out of the cable track pull tube.

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

12 Remove the retaining fasteners that attach the cable track to the cable track tray.

13 Remove the cable track from the machine.

Primary Boom Components

How to Repair the Cable Track

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

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

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

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

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

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

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

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

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

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

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

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

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

4-2 Primary Boom

How to Remove the Primary Boom

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

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

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

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

3 Raise the primary boom to the horizontal position.

4 Raise the secondary boom until the primary lift cylinder rod end pivot pin is above the upper secondary arm.

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

Primary Boom Components

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

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

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

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

8 Tag, disconnect and plug the hoses under the pivot end of the boom at the hose unions.

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

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

⚠WARNING Crushing hazard. The boom lift cylinder and primary boom will fall if not properly supported.

11 Place a support block across the upper secondary arm and lower the lift cylinder on it.

12 Remove the lower cable and hose tray located under the primary boom and set it on a supporting device.

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

14 Remove the primary boom pivot pin with a soft metal drift, then carefully remove the primary boom from the machine and place it on a structure capable of supporting it.

⚠WARNING Crushing hazard. The primary boom could become unbalanced and fall when removed from the machine if not properly attached to the suitable lifting device.

How to Disassemble the Primary Boom

Complete disassembly of the boom is only necessary if the outer or inner boom tube must be replaced. The extension cylinder can be removed without completely disassembling the boom. Refer to Repair Procedure, *How to Remove the Primary Boom Extension Cylinder*.

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

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

3 At the pivot end of the primary boom, remove the two side wear pads from the extension tube.

4 At the platform end of the primary boom, remove the upper and lower wear pad plates.

5 Support and slide the extension tube out of the boom tube.

⚠WARNING Crushing hazard. The primary boom extension tube could become unbalanced and fall when removed from the primary boom tube if not properly supported.

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

4-3
Primary Boom Lift Cylinder

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

How to Remove the Primary Boom Lift Cylinder

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

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 primary boom to a horizontal position.

2 Raise the secondary boom until the upper secondary arm is above the compression arms.

3 Place a block across both compression arms. Lower the secondary boom until it just rest on the block. Do not rest the entire weight of the boom on the block.

4 Attach a 5 ton / 5000 kg overhead crane to the primary boom for support.

5 Raise the primary boom with the overhead crane slightly to take the pressure off the primary boom lift cylinder pivot pins.

6 Support the rod end and the barrel end of the primary boom lift cylinder with a second overhead crane or similar lifting device.

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

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

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

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

9 Place a support block across the upper arm under the primary boom lift cylinder.

10 Lower the rod end of the lift cylinder onto the block. Protect the cylinder rod from damage.

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

11 Remove the primary boom lift cylinder barrel-end pivot pin snap rings.

12 Use a soft metal drift to remove the pin. Carefully remove the primary 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.

Primary Boom Components

4-4
Primary Boom Extension Cylinder

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

How to Remove the Primary Boom Extension Cylinder

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

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

1 Retract the primary boom. Raise the primary boom to a horizontal position.

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

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

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

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

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

6 Lift the extend cylinder block from the saddle. Support and slide the extension cylinder out of the primary boom.

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

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

NOTICE Component damage hazard. Hoses and cables can be damaged if the primary boom extension cylinder is dragged across them.

Note: Note the length of the cylinder after removal. The cylinder must be at the same length for installation.

4-5
Platform Leveling Master Cylinder

The master cylinder acts as a pump for the slave cylinder. It's part of the closed circuit hydraulic loop that keeps the platform level through the entire range of boom motion. The master cylinder is located at the base of the primary boom.

How to Remove the Platform Leveling Master Cylinder

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

1 Raise the secondary boom until both the rod-end and barrel-end pivot pins on the master cylinder are accessible.

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

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

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

4 Attach overhead supporting device to the master cylinder.

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

6 Use a soft metal drift to remove the pin.

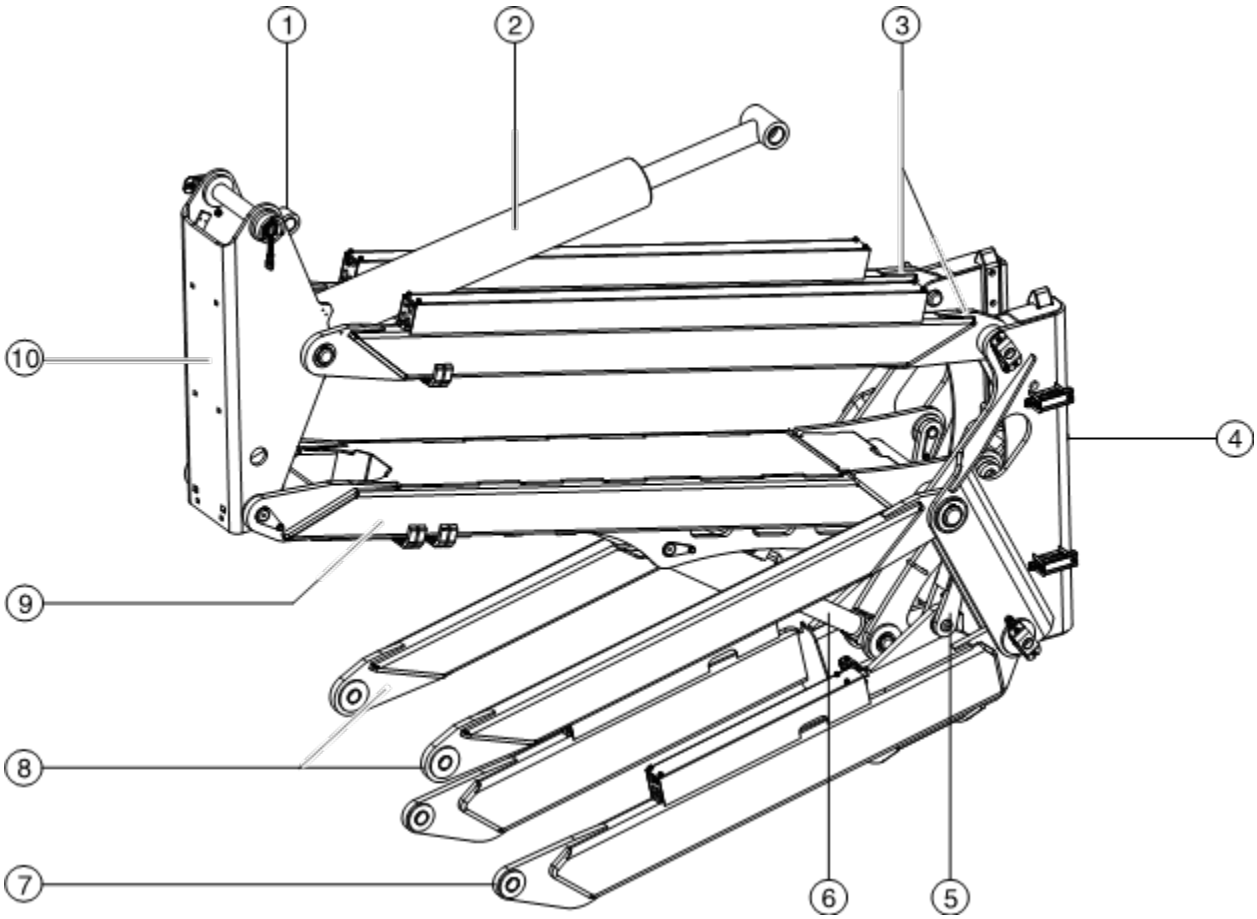
7 Remove the retaining fastener from the rod-end pivot pin.

8 Use a soft metal drift to remove the pin.

9 Remove the master cylinder from the machine.

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

Secondary Boom Components



Secondary Boom components

1 master cylinder
2 primary boom lift cylinder
3 upper compression arms
4 mid-pivot
5 timing link
6 secondary boom lift cylinder
7 lower compression arm
8 lower tension arms
9 upper tension arm
10 upper pivot

Secondary Boom Components

5-1
Secondary Boom Lift Cylinder

There is one secondary boom lift cylinder incorporated in the structure of the secondary boom assembly. This cylinder requires hydraulic pressure to extend and retract. The secondary boom lift cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

How to Remove the Secondary 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 secondary boom until the rod end pivot pins of the secondary lift cylinder clear the lower tension arms.

2 Attach a lifting strap from an overhead supporting device (5 ton / 5000 kg) to the pivot end of the primary boom for support. Do not apply lifting pressure.

⚠DANGER Crushing hazard. The boom assembly can fall if not properly supported by the overhead crane.

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

3 Remove the pin retaining fasteners securing the barrel-end pivot pins of the secondary boom lift cylinder. Do not remove the pins.

4 Attach a strap from an overhead supporting device to the center of the secondary boom lift cylinder for support. Do not apply lifting pressure.

⚠WARNING Crushing hazard. The secondary boom lift cylinder could become unbalanced and fall when removed from the machine if not properly attached to the suitable lifting device.

5 Use a slide hammer to remove the pivot pins.

6 Use auxiliary power to retract the cylinder.

Secondary Boom Components

7 Tag, disconnect and plug the hydraulic hoses from the secondary 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.

8 Lower the cylinder onto the lower compression arm.

9 Remove the pin retaining fastener securing the rod-end pivot pin of the secondary boom lift cylinder. Remove the pivot pin securing the lift cylinder.

10 Lift and move the cylinder towards the center of the machine enough to lower it down through the lower compression arm. Pull the cylinder towards the platform and remove it from the machine.

⚠WARNING Crushing hazard. The secondary boom lift cylinder could become unbalanced and fall when removed from the machine if not properly attached to the suitable lifting device.

NOTICE Component damage hazard. When removing a secondary boom lift cylinder from the machine, be careful not to damage the counterbalance valve at the barrel end of the cylinder.

6-1
RPM Adjustment

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

Hydraulic Pumps

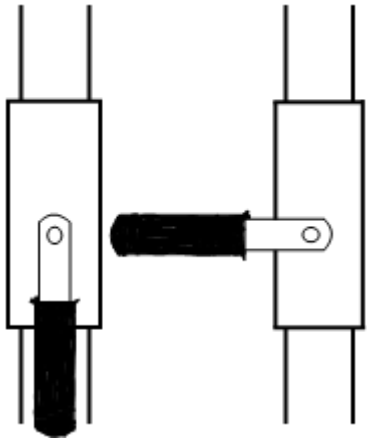
7-1 Function Pump

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 hydraulic tank valve at the hydraulic tank. Close the valve.

NOTICE Component Damage hazard.Do not perform any functions with hydraulic tank shut off valve closed. Remove the key switch and tag the machine to inform personnel of the condition.



Open Closed

1

2 Tag, disconnect and plug 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 hydraulic tank valve and prime the pump after installation.

How to Check the Function Pump Calibration

Pump efficiency is calibrated automatically but must be verified after a new pump installation and to confirm the pump is in good operating condition before performing any boom speed calibrations. Refer to Repair Procedures, *Calibration Process Steps.* This procedure determines the number of revolutions that are required to create a determined amount of flow for both the large and small gear pumps. This can also aid in diagnosing if a pump is failing.

Note: Start this procedure with the secondary boom in the stowed position and primary boom at or above horizontal. Position the machine in a suitable location with sufficient vertical space. Refer to Navigation Menus, *Settings Menu.*

Note: Primary and secondary angle sensors must be functional and calibrated. Refer to Repair Procedures, *How to Calibrate Booms Angle Sensors.*

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

Note: If the unit is equipped with the engine option, set the machine to DC mode.

2 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

3 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

4 Momentarily activate steer in the right direction until SETTINGS is shown on the display.

5 Momentarily activate the drive enable toggle switch in the right direction until you see the VALVE AND SENSOR SETTINGS screen.

6 Momentarily activate the drive enable toggle switch in the right direction until CALIBRATE TILT SENSOR is shown on the display.

7 Continue to momentarily active the steer in the right direction until LARGE & SMALL PUMP EFFICIENCY is shown on the display.

8 Momentarily activate the drive enable toggle switch to enter LARGE & SMALL PUMP EFFICIENCY menu.

9 Perform the secondary boom up function.

⊙ Result: A one second pulse alarm will sound indicating a successful large pump efficiency calibration. The display will indicate pump efficiency in %.

10 Raise the secondary boom to the halfway position.

11 Perform the secondary boom down function.

⊙ Result: A one second pulse alarm will sound indicating a successful small pump efficiency calibration. The display will indicate pump efficiency in %.

To exit programming mode:

12 Move and hold the drive enable toggle in the left position until the display returns to SYSTEM READY mode.

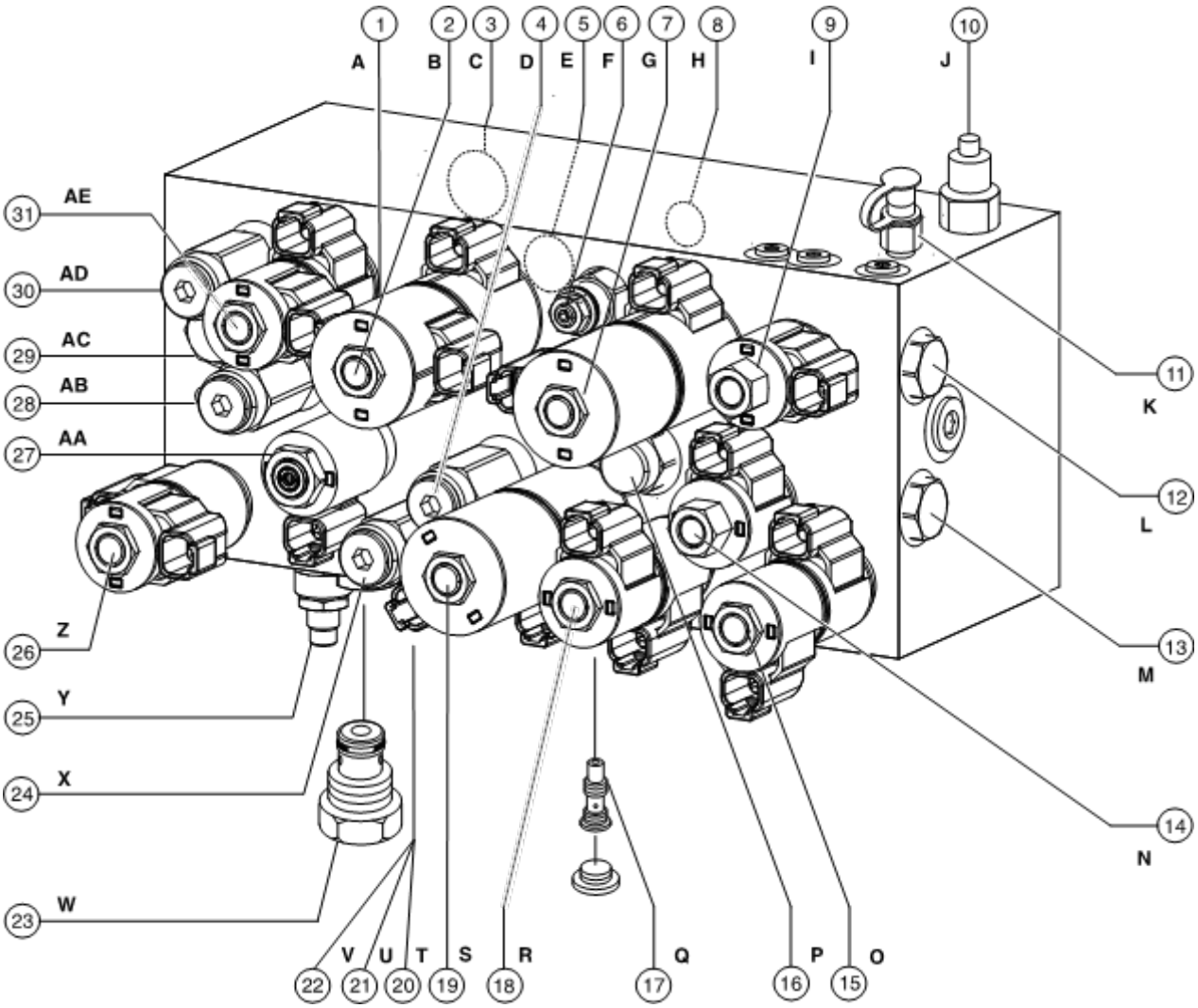
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8-1
Function Manifold Components

The function manifold is mounted to the turntable next to the ground controls.

Index No.	Description	Schematic Item	Function	Torque
1	Flow control valve, pressure compensated	A	Oscillate circuit	33-37 ft lbs / 45-50 Nm
2	Solenoid valve, 3 position 4 way	B	Primary boom extend/retract circuit	24-26 ft lbs / 32-35 Nm
3	Check valve	C	Platform rotate left/right	18-20 ft lbs / 25-27 Nm
4	Relief valve, 1250 psi / 86 bar	D	Primary boom extend	19-21 ft lbs / 26-29 Nm
5	Shuttle valve	E	Primary boom extend/retract circuit	20 ft lbs / 27 Nm
6	Counterbalance valve, 1000 psi, 69 bar, 4.5:1 ratio	F	Primary boom retract	30-35 ft lbs / 41-47 Nm
7	Solenoid valve, 3 position 4 way	G	Secondary boom extend/retract	30-35 ft lbs / 41-47 Nm
8	Shuttle valve	H	Pilots primary boom retract counterbalance valve	4-5 ft lbs / 5-7 Nm
9	Solenoid valve, 2 position 2 way (normally open)	I	P2 circuit	19-21 ft lbs / 26-29 Nm
10	Pressure transducer	J	Monitors pressure	18-20 ft lbs / 25-27 Nm
11	Diagnostic port, (TP1)	K	Testing	
12	Check valve	L	Check to P2 circuit	18-20 ft lbs / 25-27 Nm
13	Check valve	M	Check to P1 circuit	18-20 ft lbs / 25-27 Nm
14	Solenoid valve, 2 position 2 way (normally open)	N	P1 circuit	19-21 ft lbs / 26-29 Nm
15	Solenoid valve, 3 position 4 way	O	Steer left/right	18-20 ft lbs / 25-27 Nm
16	Compensator valve, 150 psi	P	Turntable rotate left/right	33-37 ft lbs / 45-50 Nm
17	Shuttle valve	Q	Turntable rotate left/right	4-5 ft lbs / 5-7 Nm
18	Solenoid valve, 3 position 4 way	R	Turntable rotate left/right	18-20 ft lbs / 25-27 Nm

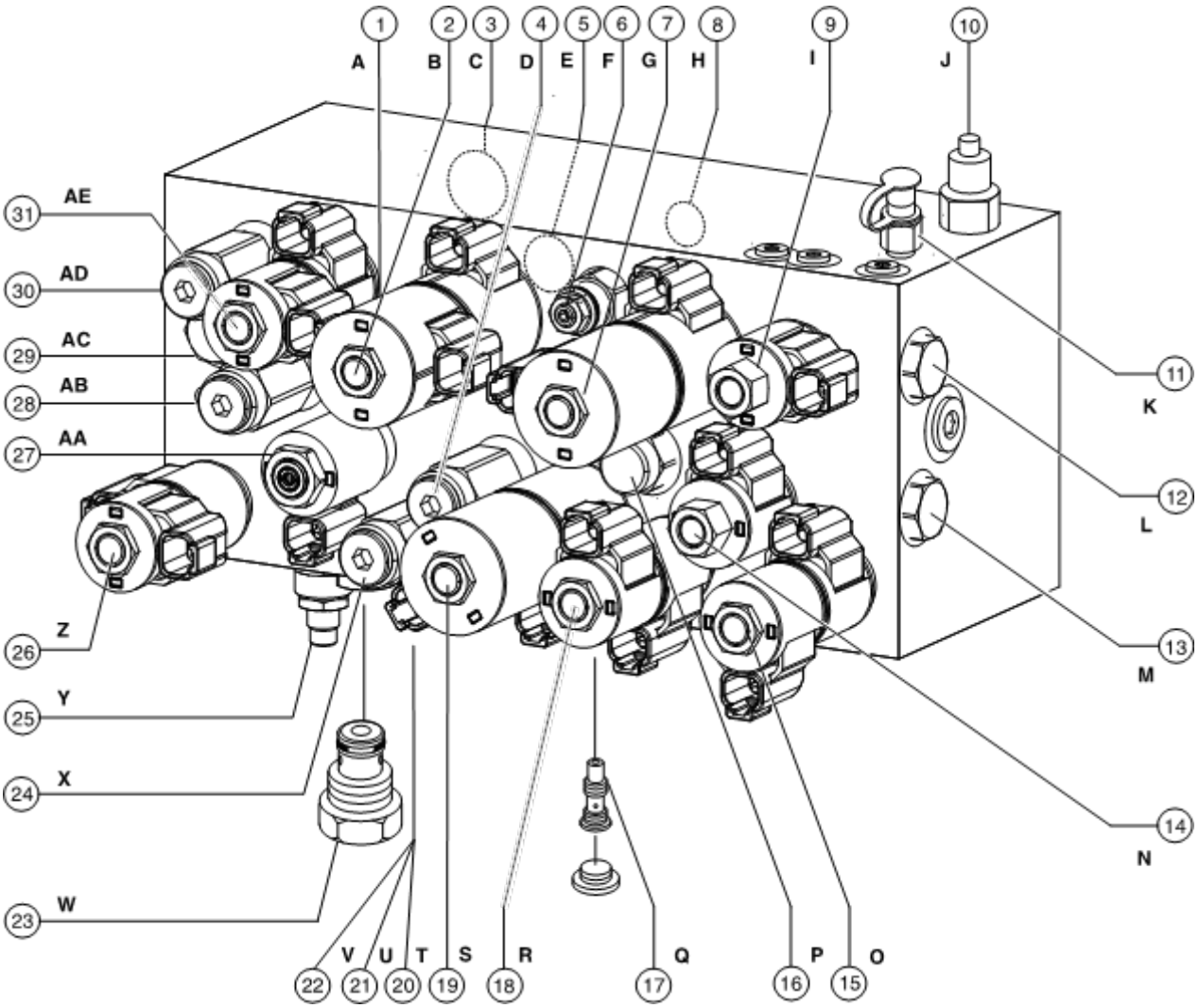
Manifolds


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Function Manifold Components, continued

Index No.	Description	Schematic Item	Function	Torque
19	Solenoid valve, 3 position 4 way	S	Primary boom up/down	18-20 ft lbs / 25-27 Nm
20	Diagnostic port, (TP2)	T	Testing	
21	Diagnostic port, (TP3)	U	Testing	
22	Diagnostic port, (TP4)	V	Testing	
23	Check valve	W	Tank return circuit	18-20 ft lbs / 25-27 Nm
24	Pressure reducing valve	X	Oscillate circuit	25 ft lbs / 40 Nm
25	Needle valve	Y	Platform level up/down	20 ft lbs /27 Nm
26	Solenoid valve, 3 position 4 way	Z	Platform level up/down	18-20 ft lbs / 25-27 Nm
27	Solenoid operated proportional valve	AA	Boom functions	18-20 ft lbs / 25-27 Nm
28	Relief valve, 2800 PSI / 193 bar	AB	Platform level up circuit	19-21 ft lbs / 25-27 Nm
29	Check valve, dual pilot operated	AC	Platform level up/down	20 ft lbs / 27 Nm
30	Relief valve, 2800 PSI / 193 bar	AD	Platform level down circuit	19-21 ft lbs / 25-27 Nm
31	Solenoid valve, 3 position 4 way	AE	Platform rotate left/right	18-20 ft lbs / 25-27 Nm

Manifolds


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8-2
Valve Adjustments - Function Manifold

How to Adjust the Proportional Relief Valve and Hydraulic Pressure Sensor

Note: Perform this procedure with the machine 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 To enter the pressure sensor calibration mode, momentarily activate the ground control function enable switch three times within 5 seconds of pulling the red Emergency Stop button at the ground controls.

⊙ The pump motor activates and a green light will begin flashing on the TCON controller.

Note: The procedure will time out if any step is not completed within 90 seconds or terminate if the function enable switch is activated.

4 Simultaneously activate the platform level toggle switch until the pressure gauge reads 1000 PSI / 69 bar. The platform level toggle up increases pressure, platform level down decreases pressure.

5 Simultaneously activate the platform rotate toggle switch to store the value.

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

6 Simultaneously activate the platform level toggle switch until the pressure gauge reads 3000 PSI / 207 bar. The platform level toggle up increases pressure, platform level down decreases pressure.

7 Simultaneously activate the platform rotate toggle switch to save the value.

⊙ Result: The control system will automatically continue to the next procedure, calibrate and save for the remaining values: 2500 PSI / 172 bar, 2000 PSI / 138 bar, and 500 PSI / 34 bar. A one second pulse alarm will indicate the calibration procedure is complete.

8 Remove the pressure gauge.

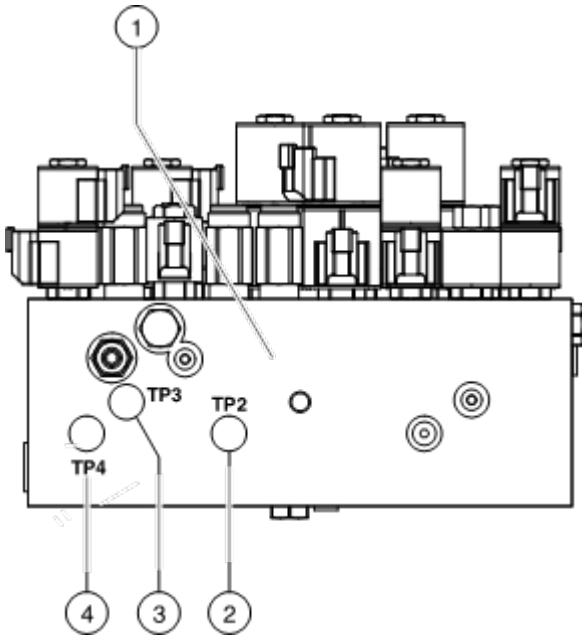
Manifolds

How to Adjust the Platform Level Relief Valves

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

Platform Level Up

1 Connect a 0 to 5000 PSI / 0 to 350 bar pressure gauge to test port 3 on the bottom of the function manifold.



1 function manifold bottom
2 test port 2
3 test port 3
4 test port 4

2 Raise the jib to the horizontal position.

3 Locate and remove the solenoid operated proportional valve coil. Refer to Repair Procedures, *Function Manifold Components*.

4 Press and hold the function enable button. Activate and hold the platform level up switch with the platform fully elevated.

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

6 Locate and remove the cap from the platform level up relief valve. Refer to Repair Procedures, *Function Manifold Components.*

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

8 Repeat this procedure beginning with step 3 to confirm the relief valve pressure.

9 Reinstall the proportional valve coil.

10 Remove the pressure gauge.

Platform Level Down

11 Connect a 0 to 5000 PSI / 0 to 350 bar pressure gauge to test port 4 on the bottom of the function manifold.

12 Raise the jib to the horizontal position.

13 Locate and remove the solenoid operated proportional valve coil. Refer to Repair Procedures, *Function Manifold Components*.

14 Press and hold the function enable button. Activate and hold the platform level down switch with the platform fully lowered.

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

16 Locate and remove the cap from the platform level down relief valve. Refer to Repair Procedures, *Function Manifold Components*.

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

18 Repeat this procedure beginning with step 11 to confirm the relief valve pressure.

19 Reinstall the proportional valve coil.

20 Remove the pressure gauge.

How to Adjust the Primary Boom Extend Relief Valve

Note: Perform this procedure with the machine 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 Raise the primary boom to a horizontal position.

3 Locate and remove the solenoid operated proportional valve coil. Refer to Repair Procedures, *Function Manifold Components*.

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

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

6 Locate and remove the cap from the primary boom extend relief valve. Refer to Repair Procedures, *Function Manifold Components.*

7 Remove the pressure gauge.

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

9 Repeat this procedure beginning with step 4 to confirm the relief valve pressure.

10 Reinstall the proportional valve coil.

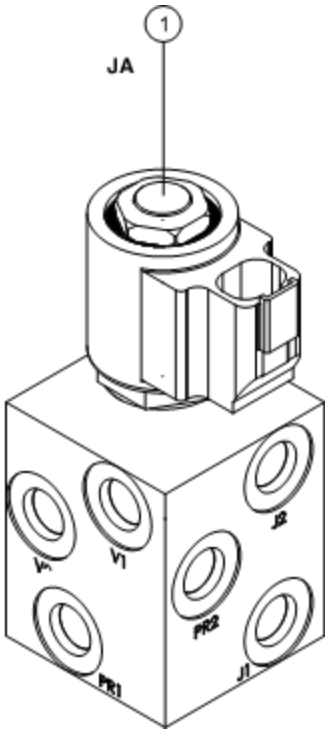
11 Remove the pressure gauge.

Manifolds

8-3
Jib Boom / Platform Rotate Manifold Components

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

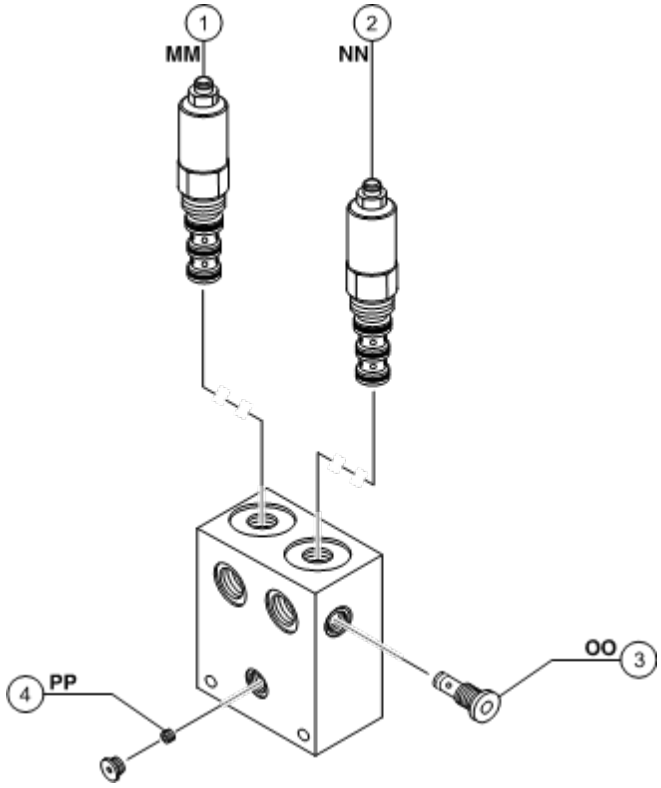
Index No.	Description	Schematic Item	Function	Torque
1	Solenoid Valve, 2 position 3 way	JA	Platform rotate/jib boom select	8-10 ft-lbs / 11-14 Nm



8-4
Turntable Rotation Manifold Components

The turntable rotation manifold is mounted to the turntable rotation motor located in the center of the turntable.

Index No.	Description	Schematic Item	Function
1	Counterbalance valve	MM	Turntable rotate right
2	Counterbalance valve	NN	Turntable rotate left
3	Shuttle valve	OO	Brake circuit
4	Orifice	PP	Brake circuit

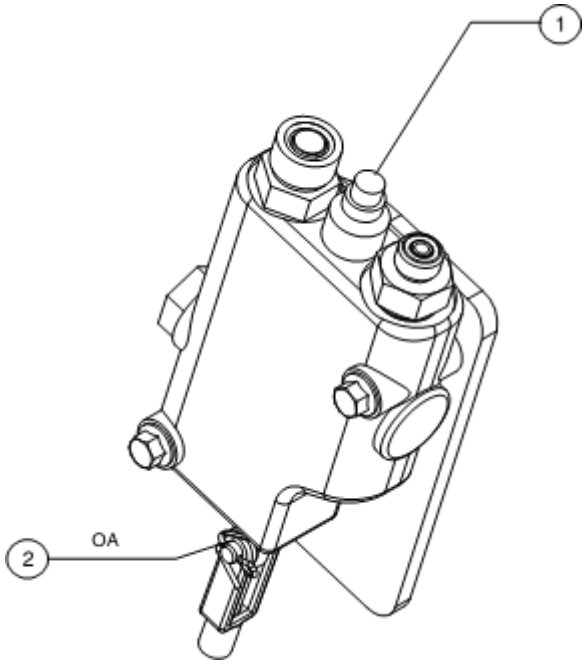


Manifolds

8-5
Oscillate Directional Valve Manifold Components

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

Index No.	Description	Schematic Item	Function	Torque
1	Cap		Breather	20-25 ft-lbs / 27-33 Nm
2	Spool valve	OA	Directional control	



8-6 How to Set Up the Oscillate Directional Valve Linkage

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

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

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

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

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

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

3 Locate and remove the ball joint retaining fastener from the bracket.

4 To level the chassis, perform any boom function and push up or pull down the threaded rod until the machine is completely level.

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

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

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

8 Check and make sure the drive chassis is completely level.

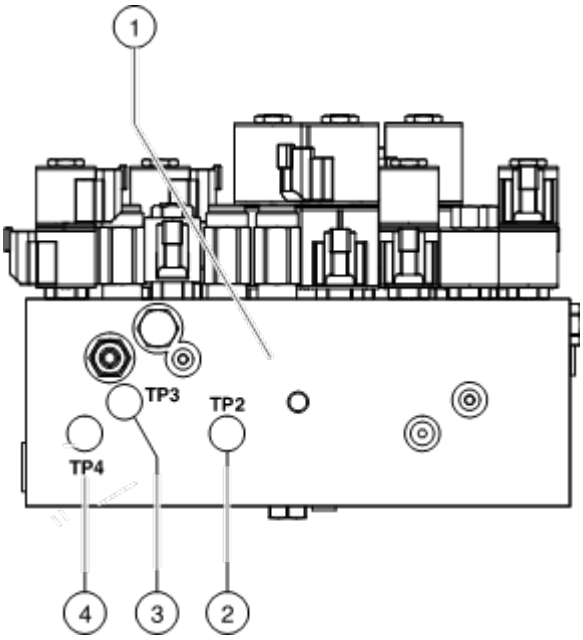
9 Measure the distance between the drive chassis and non-steer axle on both sides (from inside of the drive chassis.

Note: If the distance is not equal and the adjustment to the linkage was completed with ground and drive chassis level, repeat steps 4 thru 9 or consult Genie Product Support.

How to Adjust the Oscillate Relief Valve

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

1 Connect a 0 to 2000 psi / 0 to 150 bar pressure gauge to test port 2 located on the bottom of the function manifold.



1 function manifold bottom
2 test port 2
3 test port 3
4 test port 4

2 Disconnect the harness from the solenoid operated proportional relief valve (AA). Refer to Repair Procedures, *Function Manifold Components*.

3 While activating a boom function, observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Component Specifications.*

Manifolds

4 Locate and remove the cap from the oscillate reducing valve located on the function manifold (X). Refer to Repair Procedures, *Function Manifold Components.*

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

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

6 Repeat this procedure beginning with step 3 to confirm the reducing valve pressure.

7 Remove the pressure gauge.

8-7 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. Refer to Specifications, *Manifold Component Specifications* for valve coil specifications.

How to Test a Coil Diode

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

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

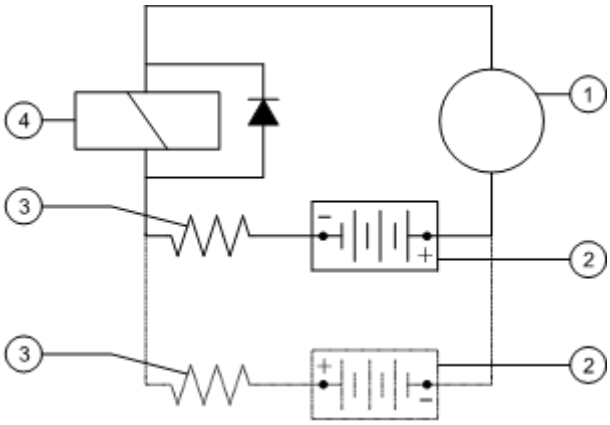
1 Test the coil for resistance. Refer to Repair Procedure, *How to Test a Coil*.

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

Resistor 10Ω

Genie part number 27287

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



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

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

3 Set a multimeter to read DC current.

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

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

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

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

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

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

Turntable Rotation Components

9-1
Turntable Rotation Assembly

How to Remove a Turntable Rotation Assembly

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

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

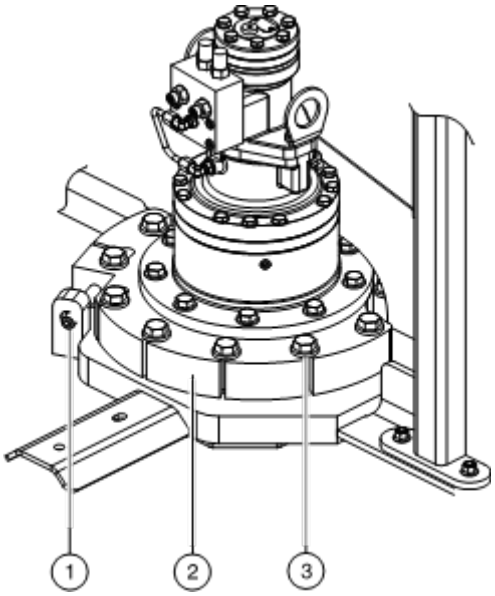
1 Secure the turntable from rotating with the turntable rotation lock pin.

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

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

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

3 Loosen the backlash pivot plate and adjustment bolts.



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

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

Turntable Rotation Components

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

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

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

When installing the drive hub assembly:

6 Install the drive hub. Torque the back lash pivot plate to specification. Refer to Specifications, *Machine Torque Specifications*.

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

How to Adjust the Turntable Rotation Gear Backlash

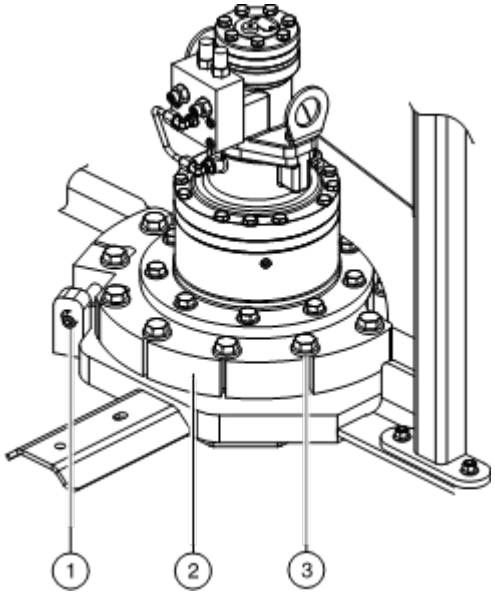
The turntable rotation drive hub is mounted on an adjustable plate that controls the gap between the rotation motor pinion gear and the turntable bearing ring gear.

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

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

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

2 Loosen the backlash pivot plate mounting fasteners.



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

Turntable Rotation Components

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

4 Loosen the lock nut on the adjustment bolt.

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

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

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

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

9-2 How to Replace the Universal Tilt Sensor (UTS)

This machine has a dual axis angle-sensing device called the Universal Tilt Sensor (UTS). It is mounted on the turntable to monitor and communicate ground angle relative to gravity via CAN bus. Should the turntable be tilted at the *Allowable Tilt Angle* or greater an alarm will sound at both the turntable and the platform. If not calibrated, the machine will only drive in the stowed configuration in turtle mode.

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

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

2 Tag and disconnect the harness from the tilt sensor.

Note: Record the X and Y axis orientation of the tilt sensor.

3 Remove the fasteners securing the tilt sensor to the turntable.

4 Secure the new tilt sensor using the existing fasteners removed in step 3. Tighten the fasteners.

5 Calibrate the tilt sensor. Refer to Repair Procedure, *How to Calibrate the Universal Tilt Sensor*.

How to Calibrate the Universal Tilt Sensor (UTS)

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

Note: The unit must be on a surface that is within 1 degree of level.

Note: Refer to Navigation Menus, *Settings Menu*.

1 Turn the key switch to platform control and pull out the red Emergency Stop button to the on position at both the ground and platform controls.

2 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

3 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

⊙ Result: The display will show FAULTS.

4 Momentarily activate steer in the right direction until SETTINGS is shown on the display.

5 Momentarily activate the drive enable toggle switch in the right direction until VALVE AND SENSOR SETTINGS is shown on the display.

6 Momentarily activate the drive enable toggle switch in the right direction until CALIBRATE TILT SENSOR is shown on the display.

7 Momentarily activate the drive enable toggle switch in the right direction to enter the TILT SENSOR CALIBRATE screen.

8 Momentarily activate the drive enable toggle switch to save the X and Y axis values.

⊙ Result: An audible alarm will sound for one second indicating a successful calibration.

To exit programming mode:

9 Move and hold the drive enable toggle in the left position until the display returns to SYSTEM READY mode.

Axle Components

10-1 Oscillating Axle Cylinders

The oscillating axle cylinders extend and retract between the drive chassis and the oscillating axle. The cylinders are equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure. The valves are not adjustable.

How to Remove an Oscillating Axle Cylinder

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

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

1 Rotate the turntable until the boom is between the steer tires or tracks.

2 Tag, disconnect and plug the oscillating axle cylinder hydraulic hoses. Cap the fittings on the oscillate cylinder.

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

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

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

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

6 Remove the oscillate cylinder from the machine.

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

10-2
How to Remove the Steer Cylinder

1 Adjust the steer tires so they are in a straight driving position.

2 Turn the key switch to the off position.

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

4 Remove the drive chassis cover at the steer end of the machine.

5 Remove the cable clamp securing the steer sensor cable to the chassis.

6 Tag and disconnect the steer sensor harness from the main harness.

7 Tag, disconnect and plug the hydraulic hoses from the steer 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.

8 Remove the rue ring and clevis pin from each end of the cylinder.

9 Remove the cylinder from the machine.

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

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

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

4 Move and hold the drive enable toggle switch in the right direction while holding steer in the right direction.

5 When the display leaves **SYSTEM READY** mode, release the drive enable toggle switch and the steer joystick.

⊙ Result: The display will show FAULTS.

6 Momentarily activate steer in the right direction until SETTINGS is shown on the display.

7 Momentarily activate the steer right direction until you see the DRIVE SETTINGS screen.

8 Momentarily activate the drive enable toggle switch in the right direction until you see the STEER SENSOR CAL screen.

9 Momentarily activate the drive enable toggle switch in the right direction.

⊙ Result: The display will show steer sensor value in mV and ENABLE will appear at the bottom of the screen.

Axle Components

10 Momentarily activate the drive enable toggle switch in the right direction to save calibrate steer center.

⊙ Result: The alarm will sound and the mV value flashes to indicate the setting has been saved.

To exit programming mode:

11 Move and hold the drive enable toggle in the left position until the display returns to SYSTEM READY mode.

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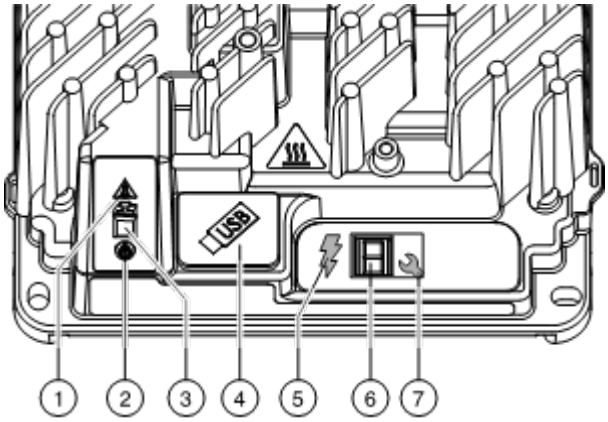
Battery Charger

11-1 Battery Charger

The charger contains selectable charging profiles stored in its internal memory to charge batteries. These profiles are specific to each battery type. The charging profile must be programmed to match the specific battery type on the machine.

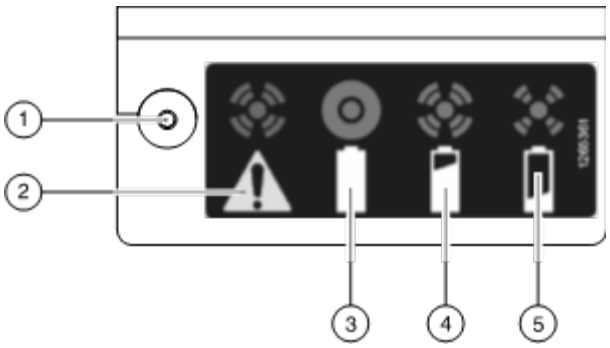
Charge profiles are stored in the internal memory when the battery type is selected using the machine software option settings.

When replacing the batteries with other brands or types not listed in the options settings, battery type **CUSTOM** must be selected.



Charger status indicators

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
7 Charger button



Remote charger status indicators

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

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

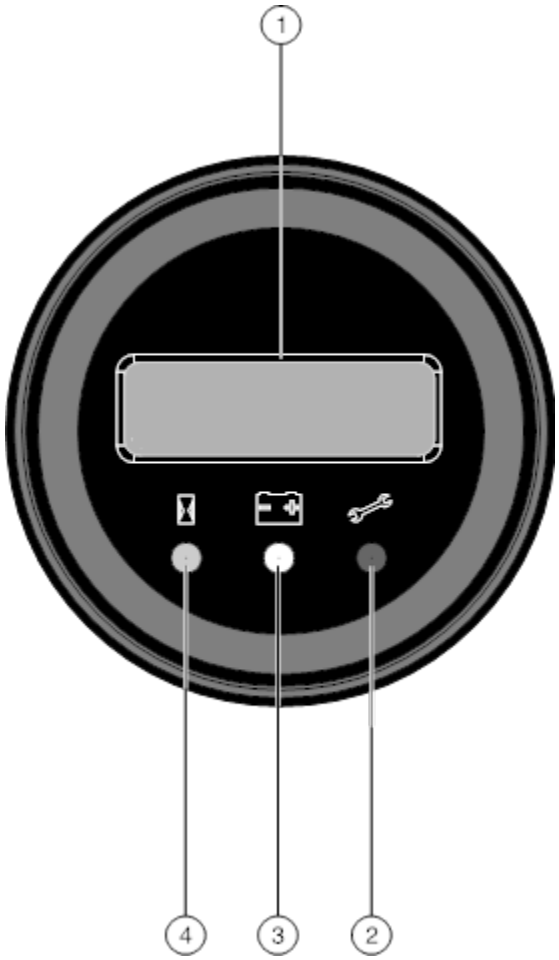
Fault Codes Ground Controls

Standard Genie fault codes shall be displayed and the red LED will illuminate when any faults are present. If more than one fault code is present, the codes shall be displayed in succession with each code displayed for 4 seconds. Once all active fault codes have been displayed the screen will pause for 4 seconds and then repeat the list of active fault codes. Use the *Control Systems Fault Codes* chart to aid in troubleshooting the machine by pinpointing the area or component affected.

Ground Display Smart Hour Meter

The smart hour meter will display unit hours and battery state of charge (SOC) whenever no faults are present on the system. The value will cycle between unit hours and battery SOC every 5 seconds. When the engine is running (if equipped), the display will cycle hours, SOC, and RPM.

Both Engine Hours and DC Function Enable Hours will be tracked. DC Function enable hours will be displayed on the smart hour meter by default. Engine Hours will be displayed if the hybrid mode select switch is held for three (3) seconds. Engine Hours will continue to display as long as the hybrid mode select switch is held.



1 LCD screen (8 character display)
2 Red LED below the wrench icon illuminates when system faults are displayed
3 Yellow LED below the battery icon illuminates when battery state of charge is displayed.
4 Green LED below the hourglass icon illuminates when unit hours are displayed.

Control System Fault Codes

How to Retrieve Control System Fault Codes from the Platform Controls

At least one fault code is present when the alarm at the platform controls produces one short beep every 30 seconds. Refer to Navigation Menus, *Faults Menu*.

To access active faults list:

1 Turn the key switch to platform control.

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction and hold steer in the right direction.

5 When the display leaves SYSTEM READY mode, release the drive enable toggle switch and steer.

⊙ Result: The display will show FAULTS.

6 Momentarily activate the drive enable toggle switch in the right direction until ACTIVE FAULTS is shown on the display.

7 Momentarily activate the drive enable toggle switch in the right direction to access the active fault codes.

8 Activate steer in the right direction to scroll through the fault codes. Fault codes will be listed in order 1 through 16.

To access component faults list:

1 Turn the key switch to platform control.

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction and hold steer in the right direction.

5 When the display leaves SYSTEM READY mode, release the drive enable toggle switch and steer.

⊙ Result: The display will show FAULTS.

6 Momentarily activate the drive enable toggle switch in the right direction until COMPONENT FAULTS is shown on the display.

7 Momentarily activate the drive enable toggle switch in the right direction to access the active fault codes.

8 Activate steer in the right direction to scroll through the fault codes. Fault codes will be listed in order 1 through 16.

Control System Fault Codes

To access fault history list:

1 Turn the key switch to platform control.

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction and hold steer in the right direction.

5 When the display leaves SYSTEM READY mode, release the drive enable toggle switch and steer.

⊙ Result: The display will show FAULTS.

6 Momentarily activate the drive enable toggle switch in the right direction until ACTIVE FAULTS is shown on the display.

7 Activate the steer rocker switch in the right direction until FAULT HISTORY is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction to access the fault history list codes.

9 Activate the steer rocker switch in the right direction to scroll through the fault codes. Fault codes will be listed in order 1 through 16.

10 Refer to the *Control System Fault Codes* chart to aid in troubleshooting the machine by pinpointing the area or component affected

To clear fault history:

1 Turn the key switch to platform control.

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

3 Do not press down the foot switch.

4 Move and hold the drive enable toggle switch in the right direction and hold steer in the right direction.

5 When the display leaves SYSTEM READY mode, release the drive enable toggle switch and steer.

⊙ Result: The display will show FAULTS.

6 Momentarily activate the drive enable toggle switch in the right direction until ACTIVE FAULTS is shown on the display.

7 Activate steer in the right direction until CLEAR FAULTS HISTORY is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction to enter CLEAR FAULTS HISTORY.

⊙ Result: CLEAR FAULT HISTORY? NO will appear on the display.

9 Momentarily activate drive enable right to enter menu.

⊙ Result: Enable will appear at the bottom of the display.

10 Activate steer in the right direction to change the display from NO to YES.

11 Activate the drive enable toggle switch in the right direction to accept the change.

⊙ Result: The alarm will sound for one second. All fault history listings and counters will be cleared.

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
15	**FOOT SWITCH**	21	Fault	Stuck ON (on @ power up)	Platform controlled functions disabled	Release foot switch and recycle power Verify: (when activated) • 24V supply on C11-1 (P22PWR WH) • 24V on C11-2, PCON C46-6 GY (C56FTS RD) when pressed, 0V when not pressed
		28	Timeout	ON for > Timeout Ti me (default is 2 min)		
16	**SPEED ADJUSTMEN T TOGGLE SWITCH**	27	Active at startup	Stuck ON (on @ power up)	Toggle Switch functi ons operate at 50% s peed	Verify: · 24V supply on toggle switch center (RD C134PWR) · 24V on pos 3, C48-11 VCON (C194DEC WH/BK) when pressing down on the switch · 24V on C48-10 (C194INC WH/RD) when pressing up on the switch (B- otherwise)
18	**PROPORTION AL RELIEF VALVE**	21	Fault	Open or short circuit	Warning: Will cause poor operating efficiency	Verify no open/short circuit across C28-2 RRDCON, C1-6, C3-3 (V191PCE WH/RD)
19	**AUX PUMP TOGGLE SWITCH**	27	Active at startup	Stuck ON (on @ power up)	AUX functions disab led	Verify: (when activated) · 24V created by AUX toggle switch TS1 at platform or ground controls(they are wired in parallel) · 24V at C35-11 to RRDCON C28-33 (C27AUX RD) to 24V when switch is activated · 24V across AUX Relay CR3-86 & CR3-85 (DC units only)
21	**PRIMARY UP/DOWN JOYSTICK**	11	Shorted to Supply	5V	Primary Boom disabled	Verify: · 5V at JC7-2 (P162PJW OR) · B- at JC7-1 (JSGND BR) · 500 to 4500 mV at JC7-3 & PCON C46-11 (C195STC BL/WH) through joystick motion
		16	Value at 0 V	0V		
		17	Not Calibrate d	Not between 2000 & 3000 mV at startup		
22	**PRIMARY UP VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across PCON C20-5 BK & B- (V01PBU RD)
		26	Value too low	Short or Ohms <5		

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
23	**PRIMARY DOWN VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across PCON C20-6 BK & B- (V02PBD RD/BK)
		26	Value too low	Short or Ohms < 5		
24	**PRIMARY BOOM ANGLE SENSOR**	11	Shorted to Supply	>4850 mV	Act as if in Out of Stowed position · elevated drive speed · no elevated drive due to tilt drive cutout on CE units Note: Driving at 2 MPH is allowed if primary and secondary angle sensors are calibrated and the mV value is close to the calibrated, stowed value	Verify: · 5V from C27-5 to C12-C (P109PWR GR/WH) · B- at Pin C12-A · Signal Output approximately 1000 - 4000 mV across range of motion at LRDCON C27-16 C123 PBS RD/BK) · Cycle Power with problem corrected to clear fault To Calibrate: · Stowed mV must be between 2600 & 3400 mV · Elevated mV must be between 400 & 1200 mV
		16	Value at 0 V	0V		
		17	Not Calibrated	Calibration Not Completed		
		19	Out of Range	Reported angle sensor value out outside normal range more than 3 degrees		
26	**PRIMARY EXTEND VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across TCON C20-3 BK & B- (V07PBE BK)
		26	Value too low	Short or Ohms < 5		
27	**PRIMARY RETRACT VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across TCON C20-4 BK & B- (V08PBR BK/WH)
		26	Value too low	Short or Ohms < 5		
31	**SECONDARY UP/DOWN JOYSTICK**	11	Shorted to Supply	5V	Secondary Boom disabled	Verify: · 5V at JC1-2 (P162JW OR) · B- at JC1-1 (JSGND BR) · 500 to 4500 mV at JC1-3 & VCON C48-6 (C161 SB WH/BK) through joystick motion
		16	Value at 0 V	0V		
		17	Not Calibrated	Not between 2000 & 3000 mV at startup		
32	**SECONDARY UP VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across TCON C20-7 BK & B- (V10SBU BL)
		26	Value too low	Short or Ohms < 5		

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
33	**SECONDARY DOWN VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across TCON C20-8 BK & B- (V11SBD BL/BK)
		26	Value too low	Short or Ohms < 5		
36	**JIB UP/PLATFORM ROTATE LEFT VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across PCON C47-4 BK or C9-17 or C6-3 & B- (V17PRL GR) · Can occur during platform rotate L uses the same valve with selector
		26	Value too low	Short or Ohms < 5		
37	**JIB DOWN/PLATFORM ROTATE RIGHT VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across PCON C47-5 BK or C9-18 or C6-4 & B- (V17PRR GR/BK) · Can occur during platform rotate R uses the same valve with selector
		26	Value too low	Short or Ohms < 5		
40	**JIB SELECT VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across PCON C47-3 BK or C10-1 & B- (C19JSV GR/WH)
		26	Value too low	Short or Ohms < 5		
41	**TURNTABLE JOYSTICK**	11	Shorted to Supply	5V	Turntable rotate functions disabled	Verify: · 5V at JC7-2 (P162PJW OR) · B- at JC7-1 (JSGND BR) · 500 to 4500 mV at JC7-4 & PCON C46-12 (C165TRS WH/RD) through joystick motion
		16	Value at 0 V	0V		
		17	Not Calibrated	Not between 2000 & 3000 mV at startup		
42	**TURNTABLE CW VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across TCON C20-9 TCON BK & B- (V04TRL WH)
		26	Value too low	Short or Ohms < 5		
43	**TURNTABLE CCW VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across TCON C20-10 BK & B- (V05TRR WH/BK)
		26	Value too low	Short or Ohms < 5		
44	**DRIVE ENABLE TOGGLE SWITCH**	27	Active at startup	Stuck ON (on @ power up)	Drive disabled	· Verify 5V VCON C48-4 (C66DRE BL) when switch is pressed right and 2.5V when pressed left
48	**SMALL PUMP ENABLE VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across PCON C47-7 BK or C9-14 or C6-2 & B- (V242HGP WH/BK)
		26	Value too low	Short or Ohms < 5		

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
49	**LARGE PUMP ENABLE VALVE**	25	Value too high	Open Circuit or Ohms > 60	Associated Function disabled	· Check Ohms · Verify no open/short circuit across PCON C47-6 BK or C9-13 or C6-1 & B- (V241HGP OR/RD)
		26	Value too low	Short or Ohms < 5		
51	**DRIVE JOYSTICK**	11	Shorted to Supply	5V	Drive disabled	Verify: · 5V at JC3-2 (P162JW OR) · B- at JC3-1 (JSGND BR) · 500 to 4500 mV at JC3-4 & PCON C47-2 (C160JPL WH/RD) through joystick motion
		16	Value at 0 V	0V		
		17	Not Calibrated	Not between 2000 & 3000 mV at startup		
56	**TELEMATICS DEVICE**	13	Not Detected	Genie Telematics Device not detected when option is enabled	Only basic telematics functionality	Verify: · CAN bus wiring · Telematics device is functioning
61	**STEER JOYSTICK**	11	Shorted to Supply	5V	Steer function disabled	Verify: · 5V at JC3-2 (P162JW OR) · B- at JC3-1 (JSGND BR) · 500 to 4500 mV at JC3-3 (JC3-5 for dual axis joystick) & PCON C46-11 (C159STC BL/WH) through joystick motion Note: 1500 to 3500 mV for rocker style joystick at JC3-5
		16	Value at 0 V	0V		
		17	Not Calibrated	Not between 2000 & 3000 mV at startup		
64	**HYDRAULIC PRESSURE SENSOR**	11	Shorted to Supply	12V	Warning: Calibration affected which can lead to poor operating efficiency	Verify: · 12V (P198SEN RD) on Pin A · Signal (C245PSR GR) at C34-17 ECON (Approx. 1000 mV at 0 psi, 1800 mV at 1000 psi & 3400 mV at 3000 psi) · B- (SENGND BK) at Pin C
		16	Value at 0 V	0V		
		17	Not Calibrated	Calibration not completed		

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
66	**SECONDARY BOOM ANGLE SENSOR**	11	Shorted to Supply	5V	Act as if in Out of Stowed position · elevated drive speed · no elevated drive due to tilt drive cutout on CE units Note: Driving at 2 MPH is allowed if primary and secondary angle sensors are calibrated and the mV value is close to the calibrated, stowed value	Verify: · 5V from TCON C19-8 thru C3-15 to sensor C15-C · B- from C19-9 thru C3-16 to C15-A · Signal Output approximately 1000 - 4000 mV across range of motion at TCON C19-10 GY thru C58-5 from C15-B (C124 SBS RD/WH) · Cycle Power with problem corrected to clear fault To Calibrate: Stowed mV must be between 3600 & 4400 mV Elevated mV must be between 600 & 1400 mV
		16	Value at 0 V	0V		
		17	Not Calibrated	Calibration not completed		
		19	Out of Range	Reported angle sensor value out outside normal range more than 3 degrees		
68	**FUNCTION ENABLE TOGGLE SWITCH** (Ground controls)	27	Active at startup	Stuck ON (on @ power up)	Ground controlled functions disabled	Verify: no open/short circuit across C3-14 or C20-2 (C47FE WH/BK) to either 24V or B-
71	**ESTOP RELAY**	21	Fault	Relay Contact Stuck · Platform Estop detected when Key Switch is in Ground Position or · Platform Estop not detected when key switch is in platform position	Platform functions disabled	Verify: · Relay is in operable condition · LRDCON C27-22 detects Platform Estop when ON (passes thru C4-4 & C9-4) (P23PWR WH) · Key switch ground position detected at LRDCON C27-14 (C174PWR WH)

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
72	**LIFT GUARD CONTACT ALARM SWITCH**	14	Cross check fault	NO/NC switch contacts not connected correctly or welded	Platform functions disabled	Verify: *When switch is not activated: · -0V on N.O. switch output and at C247LS OR/BK · -26V on N.C. switch output and at C247LS OR/BK *When switch is activated: · Reverse readings
76	**PLATFORM LOAD**	13	No Response	No CAN signal from load cell	Elevated drive, primary up, secondary up and extend disabled	· Verify CAN connection at the load cell
		14	Cross check fault	Cross check between controllers failed		· Check load cell mounting · Repeat calibration · Replace load cell
		15	Value too low	Negative load detected while boom up activated		· Check load cell mounting · Repeat calibration
		17	Not Calibrated	Load cell not calibrated or only zero load calibrated	No calibration Partial calibration	· Perform full calibration
		21	Internal Fault	Vishay VPG internal error status	Elevated drive, primary up, secondary 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, secondary up and extend disabled	· Check load cell mounting · Repeat calibration · Replace load cell

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
77	**VCON LCD DISPLAY** (Platform controls)	13	No Response	No CAN communication	All functions disabled from platform controls All functions allowed from ground controls	Verify: · 24V supply on C48-1 · B- at C48-2 · 60 Ohm resistance across CAN+/- C49-1 and C49-2
78	**PCON CONTROLLER** (Platform controls)	13	No Response	No CAN communication	All functions disabled	Verify: · 24V supply on C47-11, C47-12, and C46-2 · B- at C46-1 · 60 Ohm resistance across CAN +/- C46-3 and C46-4
		29	Software Version Mismatch	Wrong software version		
79	**ROUND LCD DISPLAY** (Ground controls)	13	No Response	No CAN communication	Warning	Verify: · 24V supply on C61-5 · B- at C61-8 · 60 Ohm resistance across CAN+/- C61-1 and C62-2

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
82	**LOAD SENSE RECOVERY**	21	Fault	Overload was tripped and AUX was used to lower the platform while overloaded	All functions disabled	Enter LCD menu at Platform, Navigate to RESET OVERLOAD RECOVERY (<Enter>,<+>, <+>, <+>) Enter reset pass code:<+>, <+>, <+>, <->
83	**TELEMATICS REMOTE SHUTDOWN**	20	Warning	Unit shut down via remote telematics command	All functions disabled or drive speed reduced or lift speed reduced	Contact machine owner to have functionality restored
84	**LEVEL SENSOR**	13	No Response	No CAN communication	· 2WD or 4WD limited to 2.5 MPH (ANSI)3 · 2WD or 4WD Elevated Drive disabled (CE) · Tilt Alarm ON (Sensor or calibration fault latches, loss of CAN does not)	Verify: · 24V supply on C21-1 · B- at C1-2 · 60 Ohm resistance across CAN +/- C21-3 and C21-4
		17	Not Calibrated	Calibration not completed		Calibrate Level Sensor
		21	Fault	Internal Fault		Replace Sensor
89	**FUEL LEVEL SENSOR**	11	Shorted to Supply	Signal > 4975 mV	Display fault code only	Verify: · 24V supply on pin A of sensor · B1 on pin C · 1700 - 4500 mV on pin B
		16	Value at 0 V	Signal < 150 mV		

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
95	**ENGINE RPM**	23	Value too high	Engine Speed higher than setting	Hybrid Mode disabled	Verify: · Proper operation engine hi RPM solenoid · Proper engine RPM setting: -Normal/Low 2150 RPM (208 Hz) -High 3000 RPM (290 Hz)
		24	Value too low	Engine Speed lower than setting		Verify: · Over temperature switch is not activating Relay CR64 by providing a ground path to the relay coil {unplug oil pressure switch for this test} (C108SEL WH/BK) · Oil Pressure Switch contacts open to B- after engine start (C108SEL WH/BK) · Relay CR64 is operable. Output of relay CR64-87 is connected to C27-4 LRDCON through C35-1 (R108SEL WH/BK)
96	**LOW OIL PRESSURE OR ENGINE OVERTEMP**	19	Value out of range	Either the over temperature or low oil pressure switch provided a ground to relay CR64 to shut down the engine. A time delay of 5 seconds gives the oil pressure time to build after the engine is started.		
97	**MOTOR BRAKING FAULT**	21	Fault	Drive motors do not slow during braking	Electric brakes set	Verify: · Proper operation and calibration of the UTS level sensor · Motor & motor controller phase leads and main power connections

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
100	**PLATFORM LEVEL UP VALVE**	25	Value too high	Open circuit or >60 ohms	Associated Function Disabled	Verify: · no open circuit between controller & B- (V14PLU OR)
		26	Value too low	Short circuit or <5 ohms		Verify: · no short circuit between controller & B- (V14PLU OR)
101	**PLATFORM LEVEL DOWN VALVE**	25	Value too high	Open circuit or >60 ohms	Associated Function Disabled	Verify: · no open circuit between controller & B- (V14PLD OR/BK)
		26	Value too low	Short circuit or <5 ohms		Verify: · no short circuit between controller & B- (V14PLD OR/BK)
104	**STEER ANGLE SENSOR**	11	Shorted to Supply	12V	High Speed Drive disabled	Verify: · 12V supply Pin A & RRDCON C28-25 (P198SEN RD) in relation to C28-7 RRDCON (Sensor Ground) · 500-4500mV through steer motion at PIN B & C28-24 (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	0V		
		17	Not Calibrated	Calibration not completed		

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
131	**BATTERY VOLTAGE**	23	Value too high	Battery voltage too high	Charging disabled, brake set, main contactor open, no drive	· Check battery voltage · Check battery condition · Check battery size · Check cable connections Self clearing when condition has been corrected.
		24	Value too low	Battery voltage too low		· Check battery voltage · Check battery condition · Check battery size · Check cable connections · Charge batteries Self clearing when condition has been corrected.
135	**WALL POWERED CHARGER**	08	Component fault	Fault without a specific Genie fault code occurred	Refer to Charger Faults	
		13	No Response (detected by TCON, not reported by charger)	No CAN signal from charger	Display fault	Verify: · 24V on (+) terminal · Ground on (-) terminal · 60 ohms across +/- with power off · Charger is connected to the machine
		28	Charger timeout	Battery pack not reaching required voltage within time limit Charger output reduced due to high temperatures Battery condition Deep discharge Battery connections Heavy loads		· Operate at lower ambient temperature · Check DC connections · Replace batteries Self clearing when condition has been corrected.
		29	Software version mismatch	Charger hardware does not support the new software version trying to be programmed Existing software is left running		· Install correct software

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
136	**PUMP / GENERATOR MOTOR CONTROLLER**	08	Component fault	Fault without a specific Genie fault code occurred	Refer too Pump Controller fault codes	
		13	No Response	No CAN signal communication	Hydraulic functions disabled	Verify: · 48V on pin 1 (R45GEN GR/WH) · 60 ohms across +/- with power off
137	**LEFT FRONT MOTOR CONTROLLER**	08	Component fault	Fault without a specific Genie fault code occurred	Refer too Drive Controller Faults	
		13	No Response	See left front motor controller	Drive disabled	
138	**RIGHT FRONT MOTOR CONTROLLER**	08	Component fault	Fault without a specific Genie fault code occurred	Refer too Drive Controller Faults	
		13	No Response	See left front motor controller	Drive disabled	
139	**LEFT REAR MOTOR CONTROLLER**	08	Component fault	Fault without a specific Genie fault code occurred	Refer too Drive Controller Faults	
		13	No Response	See left front motor controller	Drive disabled	
140	**RIGHT REAR MOTOR CONTROLLER**	08	Component fault	Fault without a specific Genie fault code occurred	Refer too Drive Controller Faults	
		13	No Response	See left front motor controller	Drive disabled	

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
160	**STEER LEFT VALVE**	21	Fault	Open or short circuit	Associated Function disabled	Verify: · No open/short circuit between controller and B- (V37SCC BL/BK)
161	**STEER RIGHT VALVE**	21	Fault	Open or short circuit	Associated Function disabled	Verify: · no open/short circuit between controller and B- (V36SCW BL)
189	**LIFT PUMP 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 functions	· Check encoder wiring · Confirm motor rotates freely
		25	Value too high	Motor phase is open Bad crimps or faulty wiring	Main contactor open	· Check motor power (U,V,W) cables · Check power cable connections · Check motor phase to phase resistance
190	**RIGHT REAR DRIVE MOTOR**	21	Fault	Stalled motor Motor encoder failure Bad crimps or faulty wiring Problems with power supply for the motor encoder	Brake set Main contactor open No drive functions	· Verify brakes release · Check encoder wiring · Confirm motor rotates freely
		25	Value too high	Motor phase is open Bad crimps or faulty wiring	Brake set Main contactor open No drive of failed motor Reduced drive speed	· Check motor power (U,V,W) cables · Check power cable connections

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
191	**LEFT REAR DRIVE MOTOR**	21	Fault	Stalled motor Motor encoder failure Bad crimps or faulty wiring Problems with power supply for the motor encoder	Brake set Main contactor open No drive functions	• Verify brakes release • Check encoder wiring • Confirm motor rotates freely
		25	Value too high	Motor phase is open Bad crimps or faulty wiring	Brake set Main contactor open No drive of failed motor Reduced drive speed	· Check motor power (U,V,W) cables · Check power cable connections
192	**RIGHT FRONT DRIVE MOTOR**	21	Fault	Stalled motor Motor encoder failure Bad crimps or faulty wiring Problems with power supply for the motor encoder	Brake set Main contactor open No drive functions	• Verify brakes release · Check encoder wiring · Confirm motor rotates freely
		25	Value too high	Motor phase is open Bad crimps or faulty wiring	Brake set Main contactor open No drive of failed motor Reduced drive speed	· Check motor power (U,V,W) cables · Check power cable connections
193	**LEFT FRONT DRIVE MOTOR**	21	Fault	Stalled motor Motor encoder failure Bad crimps or faulty wiring Problems with power supply for the motor encoder	Brake set Main contactor open No drive functions	• Verify brakes release · Check encoder wiring · Confirm motor rotates freely
		25	Value too high	Motor phase is open Bad crimps or faulty wiring	Brake set Main contactor open No drive of failed motor Reduced drive speed	· Check motor power (U,V,W) cables · Check power cable connections

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
194	**RIGHT REAR BRAKE COIL**	21	Fault	Brake motor coil failure Open or short circuit	Reduced drive speed Affected wheel locked	• Check brake coil • Check wiring (C32BRK WH/BK & P181RET OR)
195	**LEFT REAR BRAKE COIL**	21	Fault	Brake motor coil failure Open or short circuit	Reduced drive speed Affected wheel locked	• Check brake coil • Check wiring (C32BRK WH/BK & P181RET OR)
196	**RIGHT FRONT BRAKE COIL**	21	Fault	Brake motor coil failure Open or short circuit	Reduced drive speed Affected wheel locked	• Check brake coil • Check wiring (C32BRK WH/BK & P181RET OR)
197	**LEFT FRONT BRAKE COIL**	21	Fault	Brake motor coil failure Open or short circuit	Reduced drive speed Affected wheel locked	• Check brake coil • Check wiring (C32BRK WH/BK & P181RET OR)
198	**RIGHT REAR SPEED SENSOR**	21	Fault	Motor Sin/Cos encoder feedback signal fault	Reduced drive speed Affected wheel locked	• Check motor encoder Sin/Cos • Check wiring (D185SEN WH, D186SEN BL, P109PWR, P110RET BK)
199	**LEFT REAR SPEED SENSOR**	21	Fault	Motor Sin/Cos encoder feedback signal fault	Reduced drive speed Affected wheel locked	• Check motor encoder Sin/Cos • Check wiring (D185SEN WH, D186SEN BL, P109PWR, P110RET BK)
200	**RIGHT FRONT SPEED SENSOR**	21	Fault	Motor Sin/Cos encoder feedback signal fault	Reduced drive speed Affected wheel locked	• Check motor encoder Sin/Cos • Check wiring (D185SEN WH, D186SEN BL, P109PWR, P110RET BK)
201	**LEFT FRONT SPEED SENSOR**	21	Fault	Motor Sin/Cos encoder feedback signal fault	Reduced drive speed Affected wheel locked	• Check motor encoder Sin/Cos • Check wiring (D185SEN WH, D186SEN BL, P109PWR, P110RET BK)

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
204	**MAIN BATTERY (CHARGER)**	21	Fault	Voltage detected but the charger is unable to charge the battery Battery could not be trickle charged up to the minimum voltage		• Check for shorted battery cells • Check for damaged battery cells • Check DC connections • Replace batteries Self clearing when condition has been corrected.
205	**DRIVE POWER CONTACTOR**	21	Fault	Main contactor does not close correctly	No drive functions	• Check main contactor wiring • Check main contactor for damage • Check main contactor contacts
		27	Active at startup	Main contactor is found closed at power ON (welded contactor)	No drive functions	• Check main contactor wiring • Check main contactor for damage • Check main contactor contacts
233	**BATTERY TEMPERATURE (CHARGER)**	19	Out of Range	Battery temperature too high Battery temperature too low Battery temperature sensor error	Charging disabled	• Check temperature sensor • Check wiring • Reset charger Self clearing when condition has been corrected.
		21	Fault	Battery temperature sensor is required by charge profile	Charging disabled	• Verify sensor is connected correctly • Check power at charger pin 5 (WH/RD) and B- on pin 14 • Verify charge profile selected does not require temperature compensation
	BATTERY TEMPERATURE (SYSTEM)	23	Value too high	Battery temperature >120 deg F during hybrid charge	Terminates hybrid charge	• Repower with battery temperature issue corrected
253	**CAPACITOR CHARGE**	21	Fault	Precharge failed to charge the capacitor bank from the external precharge resistor	Shut down motor, main contactor, EM brake, throttle Full brake	• Check key switch (KSI) wiring on all AC motor controllers (R181PWR OR) • Check for power drain on B+ cable Refer to components faults to determine if motor controller is reporting issue

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
254	**BATTERY CHARGE VOLTAGE**	23	Value too high	Battery voltage too high as detected by algorithm		• Check battery voltage and cable connections. Self clearing when condition has been corrected.
		24	Value too low	Battery voltage too low as detected by algorithm		• Check battery voltage and cable connections. Self clearing when condition has been corrected.
255	**RIGHT REAR DRIVE MOTOR TEMPERATURE**	20	Warning	Motor temperature exceeded warning temperature limit of 248° F / 120° C	Reduced drive speed	• Allow motor to cool down • Check gearbox and motor for damage
		21	Fault	Motor temperature exceeded maximum rated temperature limit of 293° F / 145° C	No drive functions	• Allow motor to cool down • Check gearbox and motor for damage • Check temperature sensor wiring
256	**LEFT REAR DRIVE MOTOR TEMPERATURE**	20	Warning	Motor temperature exceeded warning temperature limit of 248° F / 120° C	Reduced drive speed	• Allow motor to cool down • Check gearbox and motor for damage
		21	Fault	Motor temperature exceeded maximum rated temperature limit of 293° F / 145° C	No drive functions	• Allow motor to cool down • Check gearbox and motor for damage • Check temperature sensor wiring
257	**RIGHT FRONT DRIVE MOTOR TEMPERATURE**	20	Warning	Motor temperature exceeded warning temperature limit of 248° F / 120° C	Reduced drive speed	• Allow motor to cool down • Check gearbox and motor for damage
		21	Fault	Motor temperature exceeded maximum rated temperature limit of 293° F / 145° C	No drive functions	• Allow motor to cool down • Check gearbox and motor for damage • Check temperature sensor wiring

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
258	**LEFT FRONT DRIVE MOTOR TEMPERATURE**	20	Warning	Motor temperature exceeded warning temperature limit of 248° F / 120° C	Reduced drive speed	• Check battery voltage and cable connections. Self clearing when condition has been corrected.
		21	Fault	Motor temperature exceeded maximum rated temperature limit of 293° F / 145° C	No drive functions	• Check battery voltage and cable connections. Self clearing when condition has been corrected.
259	**RIGHT REAR DRIVE CONTROLLER TEMPERATURE**	20	Warning	Motor controller temperature exceeded or is below the warning temperature limit	Reduced drive speed	• Allow motor controller to cool down • Move unit to warmer location
		23	Value too high	Motor controller temperature exceeded the maximum temperature limit 205° F / 95° C	No drive functions	• Allow motor controller to cool down • Check mechanical connection to heat dissipation plate • Check for component damage • Verify brakes release
		24	Value too low	Motor controller temperature below the minimum temperature limit -40° F / -40° C	No drive functions	• Move unit to warmer location
260	**LEFT REAR DRIVE CONTROLLER TEMPERATURE**	20	Warning	Motor controller temperature exceeded or is below the warning temperature limit	Reduced drive speed	• Allow motor controller to cool down • Move unit to warmer location
		23	Value too high	Motor controller temperature exceeded the maximum temperature limit 205° F / 95° C	No drive functions	• Allow motor controller to cool down • Check mechanical connection to heat dissipation plate • Check for component damage • Verify brakes release
		24	Value too low	Motor controller temperature below the minimum temperature limit -40° F / -40° C	No drive functions	• Move unit to warmer location

Control System Fault Codes

Error Source		Error Type				
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	Reduced drive speed	• Allow motor controller to cool down • Move unit to warmer location
		23	Value too high	Motor controller temperature exceeded the maximum temperature limit 205° F / 95° C	No drive functions	• Allow motor controller to cool down • Check mechanical connection to heat dissipation plate • Check for component damage • Verify brakes release
		24	Value too low	Motor controller temperature below the minimum temperature limit -40° F / -40° C	No drive functions	• Move unit to warmer location
262	**LEFT FRONT DRIVE CONTROLLER TEMPERATURE**	20	Warning	Motor controller temperature exceeded or is below the warning temperature limit	Reduced drive speed	• Allow motor controller to cool down • Move unit to warmer location
		23	Value too high	Motor controller temperature exceeded the maximum temperature limit 205° F / 95° C	No drive functions	• Allow motor controller to cool down • Check mechanical connection to heat dissipation plate • Check for component damage • Verify brakes release
		24	Value too low	Motor controller temperature below the minimum temperature limit -40° F / -40° C	No drive functions	• Move unit to warmer location
264	**AMP HOUR RETURN**	23	Value too high	Battery condition Battery pack deep discharge. Battery connections Excessive loads on battery while charging	Warning battery may be defective	• Check DC connections • Disconnect parasitic loads • Replace batteries Self clearing when condition has been corrected.

Control System Fault Codes

Control System Fault Codes

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
265	**CHARGER USB**	21	Fault	Issue inserting or removing USB flash drive		• Remove and re-insert USB Flash Drive If issue persist, disconnect AC power and battery for 30 seconds and retry
		21	Fault	USB hardware overcurrent protection has been tripped		• Remove and re-insert USB Flash Drive If issue persist, use different USB flash drive
266	**CHARGE PROFILE**	21	Fault	Selected charge profile is incompatible with charger software	Charging disabled	• Update charger software • Select different charge profile
		31	Invalid setup	Charge profile not selected		• Select charge profile
267	**CHARGER AC VOLTAGE**	23	Value too high	AC voltage is too high. >270 VAC	Charging disabled	• Connect charger to an AC source that provides stable AC between 85 - 270 VAC / 45 - 65 Hz Self clearing when condition has been corrected.
		24	Value too low	AC source is unstable. Undersized generator and/or undersized input cables		
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

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
270	**PUMP POWER CONTACTOR**	21	Fault	Main contactor does not close correctly	Shut down motor, main contactor, EM brake, 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	Shut down EM brake Drive disabled	• Replace contactor
271	**PUMP MOTOR TEMPERATURE**	21	Fault	Motor temperature exceeded maximum rated temperature limit of 293° F / 145° C	No drive functions	• Allow motor to cool down • Check temperature sensor wiring • Check for component damage
		23	Value too high	Motor temperature exceeded warning temperature limit of 248° F / 120° C	Limited pump speed	• Allow motor to cool down • Check for component damage
272	**PUMP CONTROLLER TEMPERATURE**	23	Value too high	Motor controller temperature exceeded the maximum temperature limit 205° F / 95° C	No drive functions	• Allow motor controller to cool down • Check mechanical connection to heat dissipation plate • Check for component damage • Confirm pump rotates freely
		24	Value too low	Motor controller temperature below the minimum temperature limit -40° F / -40° C		• Move unit to warmer location
273	**LIFT PUMP MOTOR SPEED SENSOR**	21	Fault	Motor encoder failure Bad crimps or faulty wiring Refer to Monitor menu Motor: Motor RPM	Shut down EM brake Drive disabled	• Check motor encoder Sin/Cos • Check wiring (D185SEN WH, D186SEN BL, P109PWR. P110RET BK)

Charger Fault Codes

Battery 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.

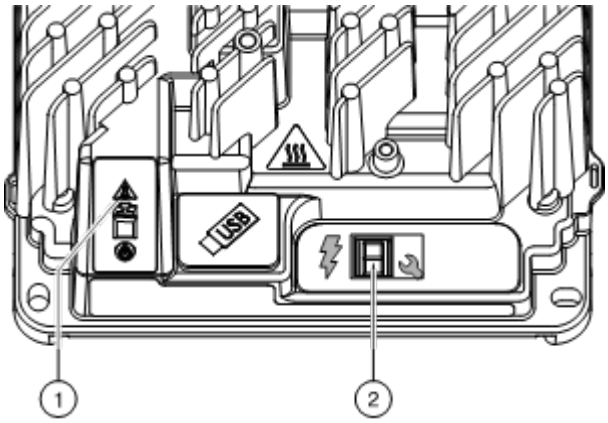
 Flashing green - USB interface is active.

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

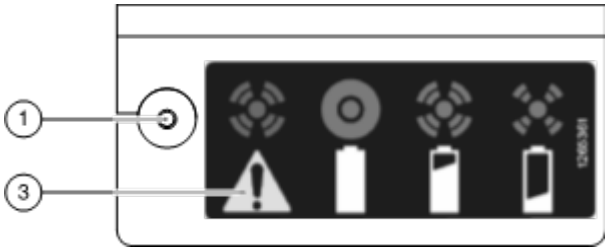
Codes are displayed as F, E or P and followed by three numbers and a period (example: E-0-0-4). The charger can display multiple codes.

If the batteries are changed from one type to another, (example: flooded lead acid to AGM), the charger profile must be programmed. Refer to Repair Procedure, *Programming the Charger Profile*.

Charger Fault Codes



Charger status indicators



Remote charger status indicators

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

Charger Fault Codes

Charger Fault Code	Genie Fault ID	Genie Fault Type	Description	Possible Causes	**Solution**
F-0-0-1	135	8	DC-DC failure: LLC excessive leakage fault.	Internal charger fault.	Disconnect AC input and battery pack for 30 seconds. If fault does not clear, replace charger.
F-0-0-2	135	8	PFC failure: PFC excessive leakage fault.		
F-0-0-3	135	8	PFC taken too long to boost.		
F-0-0-4	135	8	Charger unable to calibrate current offset.		
F-0-0-5	135	8	Output relay voltage too high when closed.		

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	Battery voltage too high to charge.	Check battery voltage and cable connections. Self clearing when condition has been corrected.
E-0-0-2	131	24	Low battery voltage detected prior to starting charge cycle	Battery voltage too low to charge.	Check battery voltage and cable connections. Check battery 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.	Charge output reduced due to high temperature. Charge at lower temperature. Check battery condition. Replace damaged battery. Check battery connections. Battery pack deep discharge. Disconnect battery pack for 30 seconds to clear fault when condition has been corrected.
E-0-0-4	204	21	Defective battery	Battery pack could not be trickle charged up to the minimum voltage.	Check battery condition. Replace damaged battery. Check battery connections. Disconnect battery pack for 30 seconds to clear fault when condition has been corrected.
E-0-0-7	264	23	Amp hour limit exceeded	Safety limit exceeded.	Check battery condition. Replace damaged battery. Check battery connections. Battery pack deep discharge. High parasitic loads on battery pack while charging. Disconnect parasitic loads. Disconnect battery pack for 30 seconds to clear fault when condition has been corrected.

Charger Error Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-0-8	233	19	Battery temperature out of range	Battery temperature sensor.	Check temperature sensor and electrical connections. Rest charger. Disconnect AC power for 30 seconds. Self clearing when condition has been corrected.
E-0-1-1	135	8	Charger disabled by external command	Battery pack not being charged..	Power outage. AC power disconnected before charging complete.
E-0-1-2	135	8	Reverse polarity	Battery connected incorrectly.	Check battery connections. Self clearing when condition has been corrected.
E-0-1-3	204	21	Battery does not take current	Battery voltage is detected, but charger is unable to charge the battery pack..	Incorrect profile for battery type. Installed from a different machine with different battery type. Disconnect battery pack for 30 seconds to clear fault when condition has been corrected.
E-0-1-6	135	8	Software update failed	Software update failed.	Confirm USB Flash Drive is formatted with correct software. If software update continues to fail, contact Genie Product support.
E-0-1-7	265	21	USB error	USB not connected correctly.	Remove and re-insert USB Flash Drive Disconnect AC input and battery pack for 30 seconds.
E-0-1-8	135	8	Slot CRC error	Software update failed.	Confirm USB Flash Drive is formatted with correct software. If software update continues to fail, contact Genie Product support.
E-0-1-9	135	29	Hardware does not support software	Charger hardware does not support software version being programmed.	Confirm USB Flash Drive is formatted with correct software. If software update continues to fail, contact Genie Product support.
E-0-2-0	266	31	No algorithm selected	Charger profile not programmed.	Program the charger for the proper battery profile.

Charger Fault Codes

Charger Error Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	Condition	Possible Causes
E-0-2-1	254	23	High battery voltage detected while charging	Battery voltage too high as detected by charger profile.	Check battery voltage and cable connections. Confirm charger profile is programmed for correct battery type. Self clearing when condition has been corrected.
E-0-2-2	254	24	Low battery voltage detected while charging	Battery voltage too low as detected by charger profile.	Check battery voltage and cable connections. Confirm charger profile is programmed for correct battery type. Self clearing when condition has been corrected.
E-0-2-3	267	23	High AC voltage	AC voltage greater than 270 VAC.	Connect to a stable AC source between 85 - 270 VAC / 45 - 65 Hz. Self clearing when condition has been corrected.
E-0-2-4	135	8	Failure to initialize	Charger failed to turn on correctly.	Disconnect AC input and battery pack for 30 seconds. Contact Genie Product Support.
E-0-2-5	267	24	Low AC voltage oscillation	AC voltage unstable.	Connect to a stable AC source between 85 - 270 VAC / 45 - 65 Hz. Using an undersized generator. Self clearing when condition has been corrected.
E-0-2-6	135	8	Script failure	Software update failed.	Confirm USB Flash Drive is formatted with correct software. If software update continues to fail, contact Genie Product support.
E-0-2-7	265	21	USB over current fault	USB over current protection has been tripped.	Remove and re-insert USB Flash Drive Use different USB Flash drive.
E-0-2-8	266	21	Charge profile incompatibility	Selected charger profile is not compatible with charger software.	Update charger software. Confirm charger profile is programmed for correctly. Updating current firmware and error occurs, contact Genie Product Support.

Charger Error Codes

Charger Error Code	Genie Fault ID	Genie Fault Type	Description	**Condition**	Possible Causes
E-0-2-9	135	18	CAN Bus error	CAN Bus network error.	Check CAN Bus connections. CAN modules not functioning correctly. Termination resistance is ~60 ohms.
E-0-3-0	135	8	COMM battery module error	CAN Bus battery module error.	CAN Buss battery module not functioning correctly.
E-0-3-1	135	8	Vref for ADC measurements triggered alarm	Internal charger error.	Disconnect AC input and battery pack for 30 seconds. Contact Genie Product Support.
E-0-3-2	135	13	CAN Bus heartbeat error	CAN Bus heartbeat error.	CAN Bus devices not functioning correctly.
E-0-3-6	233	21	Battery temperature sensor charge profile	Battery temperature sensor is required by charger profile but is not installed.	Check battery temperature sensor connections. Check charger profile and confirm battery temperature sensor is installed.
E-0-3-7	135	8	CAN Open Error	CAN Open reprogramming failed.	Download CAN Open software. Reprogram charger using USB Flash Drive.
E-0-3-8	268	21	Stalled cooling fan	Fan obstructed.	Inspect fan for damage Clear blockage.

Pump Control Fault Codes

Pump Controller Fault Handling

The pump controller is located on the engine side of the machine and mounted to the battery compartment.

The pump controller can detect faults or error conditions. Faults can also be detected by the machine control system and PCON display.

Diagnostics information can be obtained by observing the fault code ID issued by the flashing status LED's.

The controller status LED's produce flash code ID's displaying all the currently set faults in a repeating cycle. Each code ID consists of two digits.

The red LED flashes once to indicate that the first digit of the code ID will follow; the yellow LED then flashes the appropriate number of times for the first digit.

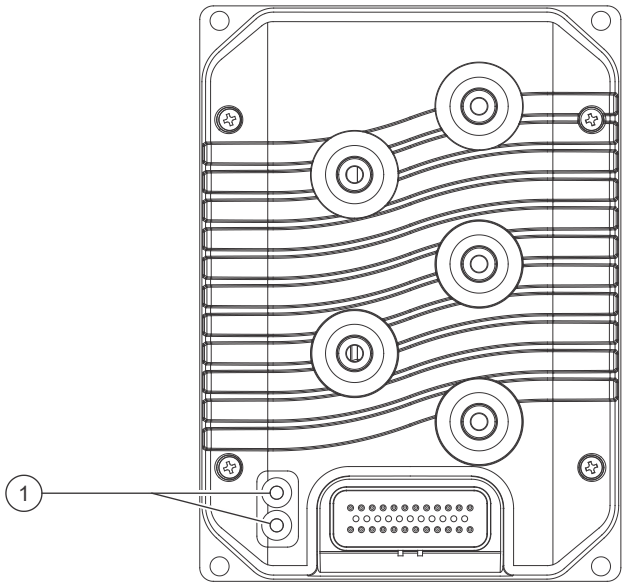
The red LED flashes twice to indicate that the second digit of the code ID will follow; the yellow LED flashes the appropriate number of times for the second digit.

Example:

The controller LED's will display this repeating pattern:

Fault Code	Name
23	B+ Undervoltage Cutback

Red	Yellow	Red	Yellow
✱	✲✲	✱✱	✲✲✲
first digit	2 flashes	second digit	3 flashes



1 status LED

Pump Control Fault Codes

LED Display Format:

The LEDs have five different display modes, indicating the type of information they are providing.

Display	Status
Neither LED illuminated	• Controller is not powered on. • Faulty battery. • Replace controller.
Yellow LED flashing	• Controller is operating normally.
Red and yellow LED's on solid	• Controller is in flash program mode.
Red LED on solid	• Internal hardware fault detected by the Supervisor or Primary microprocessor. • Missing or corrupt software. Interrupting a software download may cause corruption of the software. Cycle the key switch to clear. Reload software or replace controller if necessary.
Alternating red and yellow flash pattern	• Active fault.

When a fault is detected and no wiring or component failure can be found, cycle the key switch off and back on to see if the fault clears.

- If the fault does not clear, turn the key switch to the off position and push in the red Emergency Stop button. Disconnect the 35 pin connector from the controller. Check the connector for corrosion or damage, clean it if necessary, and reconnect it to the controller.

Pump Control Fault Codes

Flash Pattern	Name	Cause	Effect	Solution
1-2	Controller Overcurrent	1. External short of phase U,V, or W motor connections 2. Motor parameters are miss-tuned 3. Controller defective 4. Speed encoder noise problems	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Phase current exceeded the current measurement limit Clear: Cycle KSI.
1-3	Current Sensor Fault	1. Leakage to vehicle frame from phase U, V, or W (short in motor stator) 2. Controller defective	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Controller current sensors have invalid offset reading Clear: Cycle KSI.
1-4	Precharge Failed	1. See Monitor menu » Battery: Capacitor Voltage 2. Open circuit in external precharge relay, external precharge resistor, or associated wiring 3. External load on capacitor bank (B+ connection terminal) that prevents the capacitor bank from charging	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Precharge failed to charge the capacitor bank from the external precharge resistor Clear: Cycle Interlock input or use VCL function Enable_Precharge()
1-5	Controller Severe Undertemp	1. See Monitor menu » Controller: Temperature 2. Controller is operating in an extreme environment	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Heatsink temperature below -40°C Clear: Bring heatsink temperature above -40°C, and cycle interlock or KSI
1-6	Controller Severe Overtemp	1. See Monitor menu » Controller: Temperature 2. Controller is operating in an extreme environment 3. Excessive load on vehicle 4. Improper mounting of controller	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake.	Set: Heatsink temperature above +95°C Clear: Bring heatsink temperature below +95°C, and cycle interlock or KSI
1-7	Severe B+ Undervoltage	1. Battery parameters are misadjusted 2. Non-controller system drain on battery 3. Battery resistance too high 4. Battery disconnected while driving 5. See Monitor menu » Battery: Capacitor Voltage 6. Blown B+ fuse or main contactor did not close	Reduced drive torque	Set: Capacitor bank voltage dropped below the Severe Undervoltage limit with FET bridge enabled Clear: Bring capacitor voltage above Severe Undervoltage limit

Pump Control Fault Codes

Flash Pattern	Name	Cause	Effect	Solution
1-8	Severe B+ Overvoltage	1. See Monitor menu » Battery: Capacitor Voltage 2. Battery parameters are misadjusted 3. Battery resistance too high for given regen current 4. Battery disconnected while regen braking	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Capacitor bank voltage exceeded the Severe Overvoltage limit with FET bridge enabled Clear: Bring capacitor voltage below Severe Overvoltage limit, and then cycle KSI
2-2	Controller Overtemp Cutback	1. See Monitor menu » Controller: Temperature 2. Controller is performance-limited at this temperature 3. Controller is operating in an extreme environment 4. Excessive load on vehicle 5. Improper mounting of controller	Reduced drive and brake torque	Set: Heatsink temperature exceeded 85°C Clear: Bring heatsink temperature below 85°C
2-3	B+ Undervoltage Cutback	1. Normal operation. Fault indicates the batteries need recharging. Controller is performance limited at this voltage 2. Battery parameters are misadjusted 3. Non-controller system drain on battery 4. Battery resistance too high 5. Battery disconnected while driving 6. See Monitor menu » Battery: Capacitor Voltage 7. Blown B+ fuse or main contactor did not close	Reduced drive torque	Set: Capacitor bank voltage dropped below the Undervoltage limit with the FET bridge enabled Clear: Bring capacitor voltage above the Undervoltage limit
2-5	+5V Supply Failure	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 5. See Monitor menu » Battery: Capacitor Voltage	None	Set: +5V supply (pin 26) outside the 5 V±10% range Clear: Bring voltage within range
2-6	Digital Out 6 Open/Short	External load impedance on Digital Output 6 driver (pin 19) is too low	Digital Output 6 driver will not turn on	Set: Digital Output 6 (pin 19) current exceeded 1 Amp Clear: Remedy the overcurrent cause and cycle power
2-7	Digital Out 7 Open/Short	External load impedance on Digital Output 7 driver (pin 20) is too low	Digital Output 7 driver will not turn on	Set: Digital Output 7 (pin 20) current exceeded 1 Amp Clear: Remedy the overcurrent cause and cycle power

Pump Control Fault Codes

Flash Pattern	Name	Cause	Effect	Solution
2-8	Motor Temp Hot Cutback	1. Motor temperature is at or above the programmed Temperature Hot setting, and the current is being cut back 2. Motor Temperature Control Menu parameters are miss-tuned 3. See Monitor menu » Motor: Temperature and » Inputs: Analog2 4. If the application doesn't use a motor thermistor, Temp Compensation and Temp Cutback should be programmed Off	Reduced drive torque	Set: Motor temperature is at or above the Temperature Hot parameter setting Clear: Bring the motor temperature within range
2-9	Motor Temp Sensor Fault	1. Motor thermistor is not connected properly 2. If the application doesn't use a motor thermistor, Motor Temp Sensor Enable should be programmed Off 3. See Monitor menu » Motor: Temperature and » Inputs: Analog2	MaxSpeed reduced (LOS, Limited Operating Strategy), and motor temperature cutback disabled	Set: Motor thermistor input (pin 8) is at the voltage rail (0 V or 10 V) Clear: Bring the motor thermistor input voltage within range
3-1	Main Open/Short	1. Open or short on driver load 2. Dirty connector pin 3. Bad crimps or faulty wiring	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Main contactor driver (pin 6) is either open or shorted. This fault can be set only when Main Enable = On Clear: Correct open or short, and cycle driver
3-2	EMBrake Open/Short (Start Relay)	1. Open or short on driver load 2. Dirty connector pins 3. Bad crimps or faulty wiring	ShutdownEMBrake; ShutdownThrottle; FullBrake Will drag tire with the bad brake	Set: Electromagnetic brake driver (pin 5) is either open or shorted. This fault can be set only when EM Brake Type >0 Clear: Correct open or short, and cycle driver
3-3	Coil3 Driver Open/Short (Ignition Relay)	1. Open or short on driver load 2. Dirty connector pins 3. Bad crimps or faulty wiring	ShutdownDriver3	Set: Driver 3 (pin 4) is either open or shorted Clear: Correct open or short, and cycle driver
3-4	Coil4 Driver Open/Short (High RPM Solenoid)	1. Open or short on driver load 2. Dirty connector pins 3. Bad crimps or faulty wiring	ShutdownDriver4	Set: Driver 4 (pin 3) is either open or shorted Clear: Correct open or short, and cycle driver

Pump Control Fault Codes

Flash Pattern	Name	Cause	Effect	Solution
3-5	Proportional Driver Open/Short (Proportional Relief Valve)	1. Open or short on driver load 2. Dirty connector pins 3. Bad crimps or faulty wiring	ShutdownPD	Set: Proportional driver (pin 2) is either open or shorted Clear: Correct open or short, and cycle driver
3-6	Encoder Fault	1. Motor encoder failure 2. Bad crimps or faulty wiring 3. See Monitor menu » Motor: Motor RPM	ShutdownEMBrake; Motor disabled	Set: Motor encoder phase failure detected Clear: Either cycle KSI, or if parameter LOS Upon Encoder Fault= On and Interlock has been cycled, then the Encoder Fault is cleared and Encoder LOS fault (code 93) is set, allowing limited motor control
3-7	Motor Open	1. Motor phase is open 2. Bad crimps or faulty wiring	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Motor phase U, V, or W detected open Clear: Cycle KSI
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 precharge resistor) is providing a current to the capacitor bank (B+ connection terminal)	ShutdownEMBrake; Motor disabled	Set: Motor encoder phase failure detected Clear: Cycle Power to KSI
3-9	Main Contactor Did Not Close	1. Main contactor did not close 2. Main contactor tips are oxidized, burned, or not making good contact 3. External load on capacitor bank (B+ connection terminal) that prevents capacitor bank from charging 4. Blown B+ fuse	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Just prior to the main contactor closing, the capacitor bank voltage (B+ connection terminal) was loaded for a short time and the voltage did not discharge Clear: Cycle KSI Power
4-6	EEPROM Failure	Failure to write to EEPROM memory. This can be caused by EEPROM memory writes initiated by VCL, by the CAN bus, by adjusting parameters with the programmer, or by loading new software into the controller	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1,2,3 &4; ShutdownPD; FullBrake	Set: Controller operating system tried to write to EEPROM memory and failed Clear: Download the correct software (OS) and matching parameter default settings into the controller and cycle KSI
4-9	Parameter Change Fault	This is a safety fault caused by a change in certain parameter settings so that the vehicle will not operate until KSI is cycled. For example, if a user changes the Throttle Type this fault will appear and require cycling KSI before the vehicle can operate	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Adjustment of a parameter setting that requires cycling of KSI Clear: Cycle Power to KSI

Pump Control Fault Codes

Flash Pattern	Name	Cause	Effect	Solution
6-8	VCL Runtime Error	1. VCL code encountered a runtime VCL error 2. See Monitor menu » Controller: VCL Error Module and VCL Error. This error can then be compared to the runtime VCL module ID and error code definitions found in the specific OS system information file	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1,2,3 &4; ShutdownPD; FullBrake	Set: Runtime VCL code error condition Clear: Edit VCL application software to fix this error condition; flash the new compiled software and matching parameter defaults; cycle KSI
7-1	OS General	Internal controller fault	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1; ShutdownDriver2; ShutdownDriver3; ShutdownDriver4; ShutdownPD; FullBrake	Set: Internal controller fault detected Clear: Cycle Power to KSI.
7-2	PDO Timeout	Time between CAN PDO messages received exceeded the PDO Timeout Period	ShutdownThrottle; CAN NMT State set to Pre-operational	Set: Time between CAN PDO messages received exceeded the PDO Timeout Period Clear: Cycle KSI or receive CAN NMT message
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 5. See Monitor menu » Motor: Motor RPM	ShutdownEMBrake; Motor disabled; Control Mode changed to LOS (Limited Operating Strategy)	Set: No motor encoder movement detected Clear: Cycle Power to KSI
7-7	Supervisor Fault	1. The Supervisor has detected a mismatch in redundant readings 2. Internal damage to Supervisor microprocessor 3. Switch inputs allowed to be within upper and lower thresholds for over 100 milliseconds	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1,2,3 &4; ShutdownPD; FullBrake	Set: Mismatched redundant readings; damaged Supervisor; illegal switch inputs Clear: Check for noise or voltage drift in all switch inputs; check connections; cycle KSI

Pump Control Fault Codes

Flash Pattern	Name	Cause	Effect	Solution
7-8	Supervisor In-compatible	The main OS is not compatible with the Supervisor OS	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1,2,3 &4; ShutdownPD; FullBrake	Set: Incompatible software Clear: Load properly matched OS code or update the Supervisor code; cycle KSI
8-2	Bad Calibration	Internal controller fault	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Internal controller fault detection Clear: Cycle Power to KSI
8-3	Driver Supply Fault	Internal controller fault in the voltage supply for the driver circuits	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Internal controller fault detection Clear: Cycle Power to KSI
8-4	Following Error Fault	1.vThe Following Error Limit has been exceeded for the Following Error Time 2. Incorrect or overly restrictive Following Error Limit and Following Error Time parameter settings 3. Motor or drive train rotation obstruction or degradation	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: The Following Error Limit has been exceeded for the Following Error Time Clear: Cycle Power to KSI
8-8	Encoder Pulse Count Fault	Encoder Steps parameter does not match the actual motor encoder	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1,2,3 &4; ShutdownPD; FullBrake	Set: Motor lost IFO control and accelerated without throttle command Clear: Ensure the Encoder Steps parameter matches the actual encoder; Cycle Power to KSI

Pump Control Fault Codes

Flash Pattern	Name	Cause	Effect	Solution
8-9	Motor Type Fault	The Motor_Type parameter value is out of range	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Cycle Power
9-1	VCL/OS Mismatch	The VCL software in the controller does not match the OS software in the controller	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1,2,3 &4; ShutdownPD; FullBrake	Set: VCL & OS software do not match; when KSI cycles, a check is made to verify that they match & a fault occurs when they don't Clear: Download the correct VCL and OS software into the controller
9-2	EM Brake Failed to Set (no brake on pump motor)	1. Vehicle movement sensed after the EM Brake has been commanded to set 2. EM Brake will not hold the motor from rotating	ShutdownEMBrake; ShutdownThrottle Position Hold is engaged when Interlock = On	Set: After the EM Brake was commanded to set & time has elapsed to allow the brake to fully engage, vehicle movement sensed Clear: Activate the Interlock
9-8	Illegal Model Number	1. Model_Number variable contains illegal value 2. Software and hardware do not match 3. Controller defective	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Set: Illegal Model_Number variable; when KSI cycles, a check is made to confirm a legal Model_ Number, and a fault is issued if one is not found Clear: Download appropriate software for controller model
9-9	Parameter Mismatch	1. Dual drive enabled on one controller 2. Incorrect position feedback type chosen for motor technology in use 3. Dual drive is enabled in torque mode	ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake	Clear: Adjust parameters to appropriate values and cycle KSI

Drive Control Fault Codes

Drive Controller Fault Handling

The drive controllers are located on the ground controls side of the machine and mounted to the bulkhead.

The drive controller can detect faults or error conditions. Faults can also be detected by the machine control system and PCON display. The fault displayed is the four digit CAN Object.

The faults list is in the numerical flash code order. The fault's name and CAN Object are listed, including the fault type.

Cause, Effect and Solution are also listed. Effect is "what the controller will do" when the fault is active.

Diagnostics information can be obtained by observing the flash pattern issued by the status LED.

The controller status LED produces flash code ID's displaying all the currently set faults in a repeating cycle. Each code ID consists of two digits.

The LED flashes red indicating the first digit of the code ID.

The LED flashes yellow indicating the second digit of the code ID.

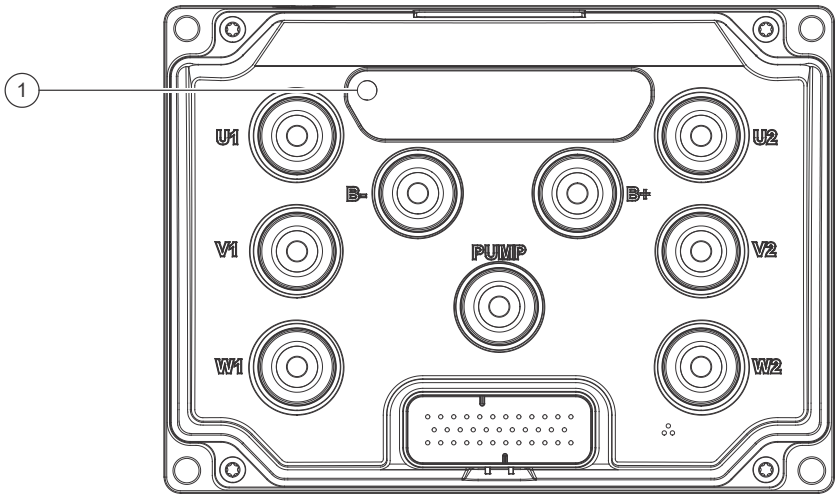
Example:

The controller's LED will display this repeating pattern:

Note: The CAN Object is displayed at the PCON.

CAN Object	Fault Code	Name
2121	23	Undervoltage Cutback

Red	Yellow
✱✱ 2 flashes	✲✲✲ 3 flashes



1 status LED

Drive Control Fault Codes

LED Display Format:

The LED has six different display modes, indicating the type of information it is providing.

Display	Status
LED not illuminated	• Controller is not powered on. • Faulty battery. • Replace controller.
Yellow LED flashing	• Controller is operating normally.
Yellow LED on solid	• Controller is in flash program mode.
Alternating red and yellow flash pattern	• Active fault.
Red LED on solid	• Internal hardware fault detected by the Supervisor or Primary microprocessor. • Missing or corrupt software. Interrupting a software download may cause corruption of the software. Cycle the key switch to clear. Reload software or replace controller if necessary.
Red LED flashing	• Non-production device profile software.

When a fault is detected and no wiring or component failure can be found, cycle the key switch off and back on to see if the fault clears.

If the fault does not clear, turn the key switch to the off position and push in the red Emergency Stop button. Disconnect the 35 pin connector from the controller. Check the connector for corrosion or damage, clean it if necessary, and reconnect it to the controller.

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2510	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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Reset Controller
2832	1-3	Current Sensor Fault	1. Leakage to vehicle frame from phase U, V, or W (short in motor stator) 2. Controller defective	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Controller current sensors have invalid offset reading Clear: Reset Controller
2223	1-4	Precharge Failed 1 = Abort 2 = Energy Limit Exceeded 3 = Time Limit Exceeded	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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: The precharge failed to charge the capacitor bank Clear: Cycle Interlock or Reset Controller
2141	1-5	Controller Severe Undertemp	Controller is operating in an extreme environment See Programmer » System Monitor menu » Controller » Controller Temperature	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Heatsink temperature below –40°C (–40°F) Clear: Bring the heatsink temperature above –40°C (–40°F) and then Reset Controller
2142	1-6	Controller Severe Overtemp	Controller is operating in an extreme environment. Excessive load on vehicle Improper mounting of controller See Programmer » System Monitor menu » Controller » Controller Temperature	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Heatsink temperature above +95°C Clear: Bring heatsink temperature below +95°C, and then Reset Controller

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2120	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 mis-adjusted See Programmer » Monitor menu » Controller » Capacitor Voltage	No drive torque. Fault Action: ShutdownPump ShutdownMotor Dual Drive This Motor: TrimDisable Other Motor: TrimDisable	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
2122	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	Fault Action: ShutdownAll	Set: When below Brownout Voltage for 2 seconds Clear: Bring KSI voltage above Brownout Voltage
2130	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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	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
2132	1-8	Severe KSI Overvoltage	Battery-voltage applied to KSI (pin 1) exceeds the Severe Overvoltage limit See Programmer » Monitor menu » Battery » Keyswitch Voltage	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: KSI voltage exceeded the Severe Overvoltage limit Clear: Bring KSI voltage below the Severe Overvoltage limit, and then Reset Controller
2133	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	ShutdownInterlock ShutdownEMBrake	Set: Motor rpm has exceeded the Max Speed Limit setting for the Max Speed Time Limit setting's duration Clear: Reset Controller

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2134	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. Mis-adjusted Travel Control Supervision parameters See: Programmer » Application Setup » Travel Control Supervision menu	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: The motor frequency and/or and phase-current are above their Travel Control Supervision settings when in the stopped state Clear: Reset Controller
2109	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	ShutdownAll;	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
210A	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	ShutdownAll;	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
2110	1-13	Reset Rejected	1. NMT Reset Rejected 2. Reset_Controller () Rejected	Shutdown Interlock; Shutrdown Throttlel;	Clear: Reset Controller
2140	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	Reduced drive torque Reduced regen-braking torque. Fault Action: None, unless a fault action is programmed in VCL	Set: Controller's Heatsink temperature exceeded 85°C Clear: Bring heatsink temperature below 85°C

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2121	2-3	Undervoltage Cutback	1. Batteries need recharging. Controller is performance limited at this voltage 2. Battery parameters are mis-adjusted. 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	Reduced drive torque Reduced regen braking torque Fault Action: None, unless a fault action is programmed in VCL	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
2131	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 mis-adjusted 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	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	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
2531	2-5	Ext 5V Supply Failure Ext_5V_Supply_Failure_Active 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.	Disables the 5V Supply Fault Action: None, unless a fault action is programmed in VCL.	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

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2532	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	Disables the 12V Supply Fault Action: None, unless a fault action is programmed in VCL	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
2151	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 mis-adjusted See Programmer » AC Motor Setup » Temperature Sensor	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	Set: Motor temperature is at or above the Temperature Hot parameter setting Clear: Bring the motor temperature within range
2150	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 mis-adjusted See Programmer » System Monitor menu » AC Motor » Temperature	Motor temperature cutback disabled Fault Action: None, unless a fault action is programmed in VCL	Set: Motor thermistor input (pin 9) is at the voltage rail Clear: Bring the motor thermistor input voltage within range
2222	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)	Open or short on driver load Dirty connector pins at controller or contactor coil Bad connector crimps or faulty wiring	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	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

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2320	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	ShutdownEMBrake ShutdownThrottle FullBrake	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
2232	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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	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
2230	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	ShutdownEMBrake ShutdownThrottle ShutdownMotor	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
2240	3-7	Motor Open Fault	Motor phase is open Bad crimps or faulty wiring	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Motor phase U, V, or W detected open Clear: Reset Controller.

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2220	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)	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	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
2221	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 mis-tuned 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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: With the main contactor commanded closed, the capacitor bank voltage (B+ connection terminal) did not charge to B+ Clear: Reset Controller
2103	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)	Fault Action: None Yet, the motor will not operate until the motor configuration and/or commissioning tests are complete	Set: Default for both ACIM and PMAC motors Clear: Run the appropriate motor commissioning sequences

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2102	3-11	Motor Misalignment Error	Motor offset has shifted so controller is producing torque in an uncommanded direction	Shudown Vehicle;	Clear: Reset Controller
2830	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	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift	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
2211	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	ShutdownThrottle	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
2460	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	ShutdownThrottle ShutdownEMBrake Dual Drive Same, both motors	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

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2813	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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Adjustment of a parameter setting that requires cycling of KSI Clear: Reset Controller
2710	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	Drive Inhibited	Set: Serious fault on 1 or more drive controllers Clear: Re-power with problem corrected
2711	5-2	User 2 Fault Internal CAN communication error	1. CAN wiring 2. Damaged Controller	Drive Inhibited	Set: Loss of communication between left and right motor control sections Clear: Repower with CAN wiring problem corrected or replace controller
2712	5-3	User 3 Fault Invalid Motor Type Selection	Incompatible motor selected	See User 1 fault (above)	Set: Invalid Motor Type Selection Clear: Select valid Motor Type
2713	5-4	User 4 Fault Front to Back CAN bus fault	1. CAN wiring 2. Damaged Controller	See User 1 fault (above)	Set: Loss of communication between front and rear motor controllers Clear: Repower with CAN wiring problem corrected or replace controller
2820	6-8	VCL Run Time Error	Runtime errors are defined using the VCL Error Module and VCL Error See the System Information file: Curtis Software Suiteп » 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	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift	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

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2831	7-1	Internal Controller Fault	1. Physical damage from external sources/events 2. Hardware damage	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift	Clear: Reset Controller
2541	7-2	PDO Timeout	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	ShutdownThrottle	Set: Time between CAN PDO messages received exceeded the PDO Timeout Period Clear: Receive CAN NMT message, or Reset Controller
2231	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	ShutdownEMBrake ShutdownThrottle ShutdownMotor Control Mode changed to LOS (Limited Operating Strategy)	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
2550	7-6	Insulation Resistance Too Low	1. Component/PCB failure within controller 2. Moisture ingress	No Action (warning)	Clear: Reset Controller
2840	7-7	Supervision Fault	Internal controller fault	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift	Set: Internal controller failure Clear: Reset Controller

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2841	7-9	Supervision Input Check	Internal controller fault	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift	Set: Damaged Controller Clear: Reset Controller
2542	8-2	PDO Mapping Error	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	PDO message disabled Fault Action: None, unless a fault action is programmed in VCL	Set: Incorrect PDO map detected Clear: Reset Controller
2835	8-3	Internal Hardware Fault	Internal controller fault detected	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Internal controller fault detected Clear: Reset Controller
2850	8-7	Motor Characterization Error	Motor characterization failed during characterization process. The fault type indicates the cause	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Motor characterization failed during the motor characterization process Clear: Reset Controller
2234	8-8	Encoder Pulse Error	Encoder Steps parameter does not match the actual motor encoder Verify parameter settings: AC Motor Setup » Quadrature Encoder » Encoder Steps	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Detected wrong setting of the Encoder Steps parameter Clear: Ensure the Encoder Steps parameter matches the actual encoder Reset Controller

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2811	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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Parameter detected outside of limits Clear: Bring parameter within its limits
2815	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	Controller does not fully startup (without error)	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
2321	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	Position Hold is engaged when Interlock = ON Fault Action: None, unless a fault action is programmed in VCL	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)
2233	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	LOS Mode Fault Action: None, unless a fault action is programmed in VCL	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

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2520	9-5	Pump Overcurrent	1. External short of pump motor 2. Controller defective	Shutdown Pump	Clear: Reset Controller
2450	9-6	Pump Battery Discharge Indicator (BDI)	1. The BDI is below the Lift_BDI_Lockout setting 2. BDI parameters are mistuned	ShutdownPump	Set: Pump activated when the BDI Percentage is below the Lift Battery lockout setting Clear: Charge battery
2833	9-7	Pump Hardware Error Fault Type(s): 1 = Duty cycle not update with the update timeframe 2 = Mismatch of the Commanded pump dutycycle vs. output	1. External short of the pump motor 2. Controller defective	Shutdown Pump	Clear: Reset Controller
2812	9-8	Parameter Mismatch	Invalid Configuration of parameters	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift	Clear: Fix parameter mismatch and reset the controller
2332	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	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	ShutdownMotor ShutdownEMBrake ShutdownMainContactor	Set: During an interlock braking event, the motor speed exceeded the limit set by the Interlock Braking Supervision parameters Clear: Reset Controller

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2160	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	ShutdownDriver1	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
2161	10-2	Driver 2 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver2	See Driver 1 Fault
2162	10-3	Driver 3 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver3	See Driver 1 Fault
2163	10-4	Driver 4 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver4	See Driver 1 Fault
2164	10-5	Driver 5 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver5	See Driver 1 Fault
2165	10-6	Driver 6 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver6	See Driver 1 Fault
2166	10-7	Driver 7 Fault Fault Type(s): See Driver 1 Fault	See Driver 1 Fault	ShutdownDriver7	See Driver 1 Fault

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2632	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	Fault Action: None, unless a fault action is programmed in VCL	Set: Driver assignment conflict (i.e., duplicate items assigned to the same driver) Clear: Resolve the conflicted driver assignment, then Reset Controller
2169	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	ShutdownAll: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle ShutdownInterlock ShutdownDriver1 to 7 ShutdownPD FullBrake ShutdownPump ShutdownCoilSupply ShutdownVehicle ShutdownLower ShutdownLift	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
2620	11-1	Analog 1 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	Fault Action: None, unless a fault action is programmed in VCL	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
2621	11-2	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2622	11-3	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2623	11-4	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range

Drive Control Fault Codes

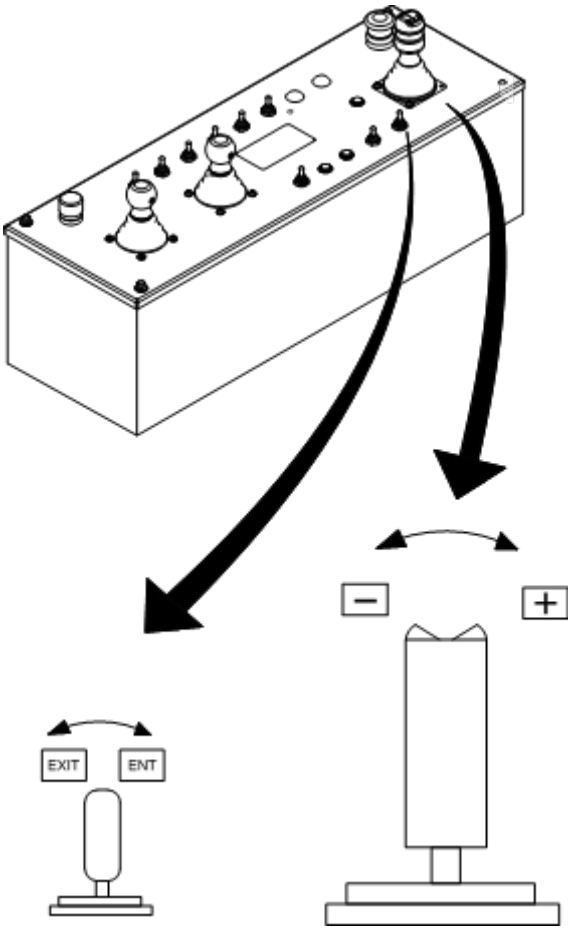
CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2624	11-5	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2625	11-6	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2626	11-7	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2627	11-8	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2628	11-9	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
262A	11-11	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2631	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	None (warning)	Clear: Resolve assignment conflict, and then Reset Controller
262B	11-13	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
262C	11-14	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2834	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	Shutdown Pump	Clear: Reset Controller

Drive Control Fault Codes

CAN Object	Flash Pattern	Description & Fault Type	Cause	Effect	Solution
2860	12-1	Branding Error	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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	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
2106	12-7	Analog 31 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range	See Analog 1 Out of Range
2108	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	ShutdownAll;	Clear: Kick_Watchdog( ). Starts and reset the specified watchdog timer
2111	12-10	Autobaud Failure on linked controller CAN port	1. Getting stuck in start manager (bootloader) 2. Internal CAN bus error	None (warning)	Clear: Reset Controller
2113	12-11	Primary State Error	Internal Controller Error	None (warning)	Clear: Reset Controller
2870	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	ShutdownVehicle: ShutdownMotor ShutdownMainContactor ShutdownEMBrake ShutdownThrottle FullBrake ShutdownPump	Set: Incorrect OS (device profile). Clear: Load the matching OS (device profile)

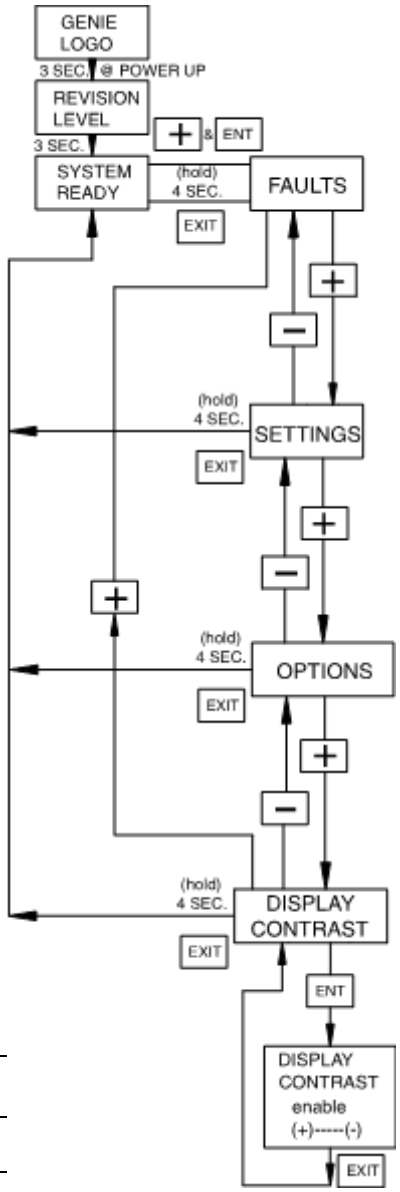
Navigation Menus

Navigation Menu - Top Menus



Drive enable switch

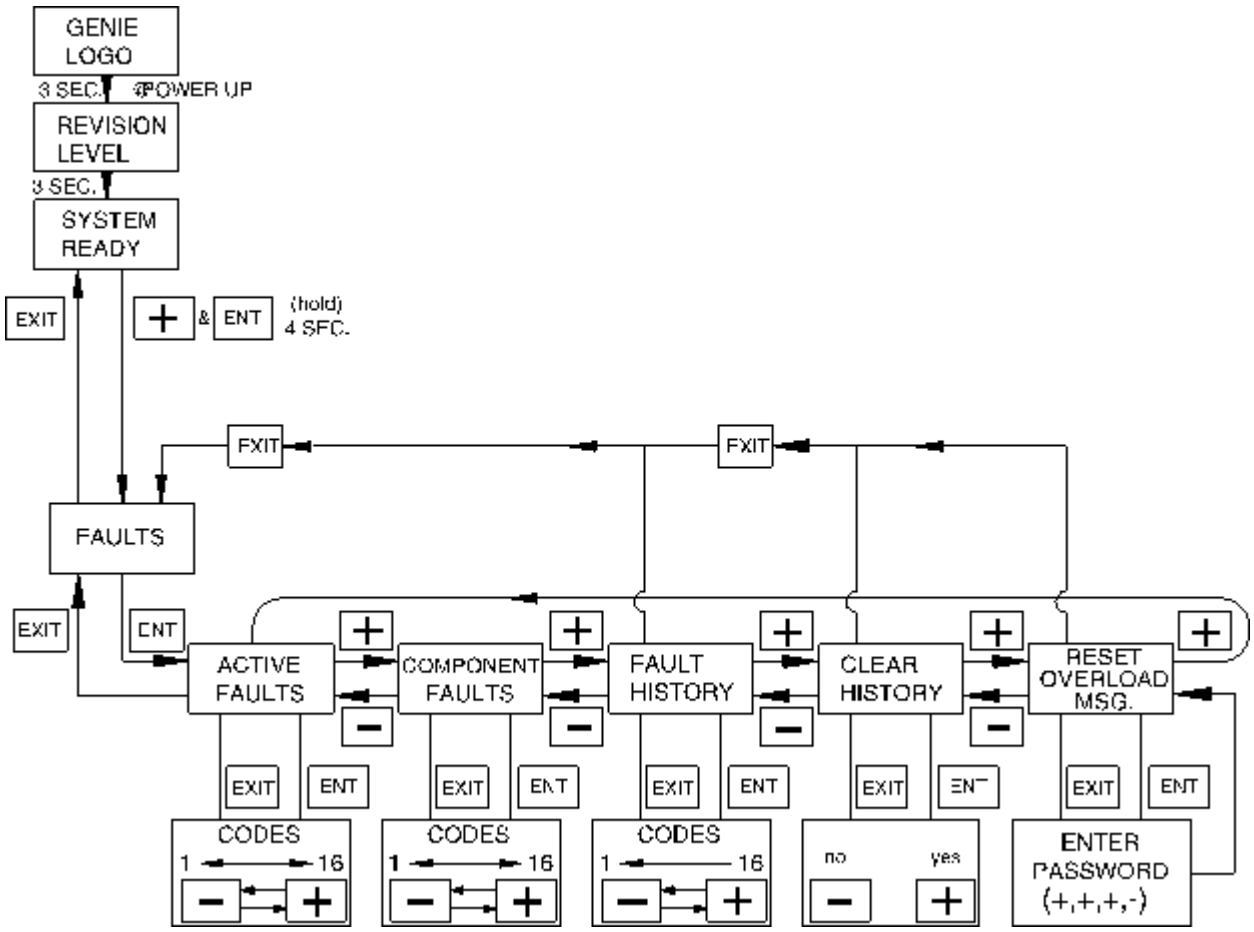
Drive Joystick



EXIT	Drive enable switch left
ENT	Drive enable switch right
−	Drive joystick left
+	Drive joystick right

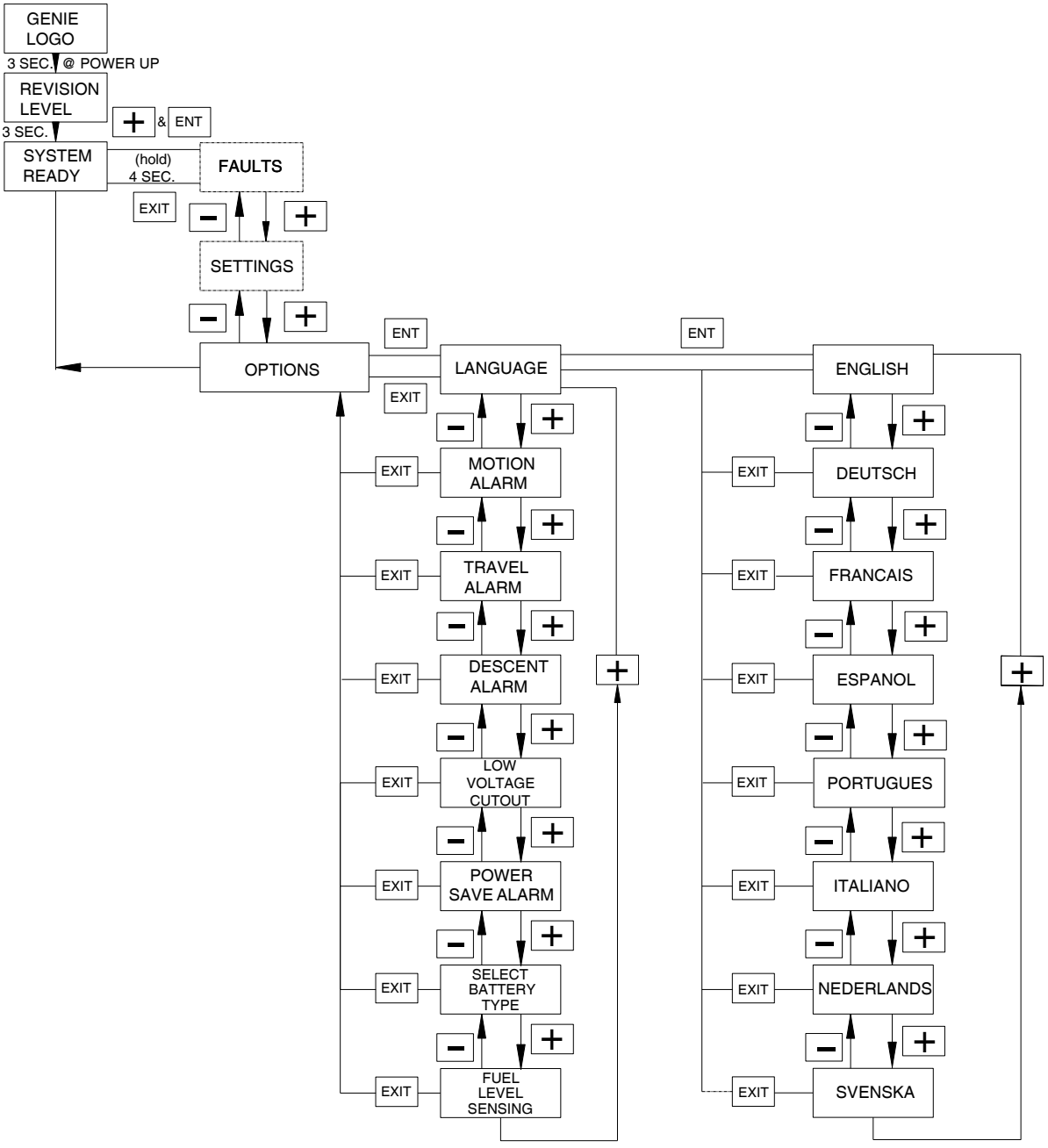
Faults Navigation Menu

Faults Navigation Menu

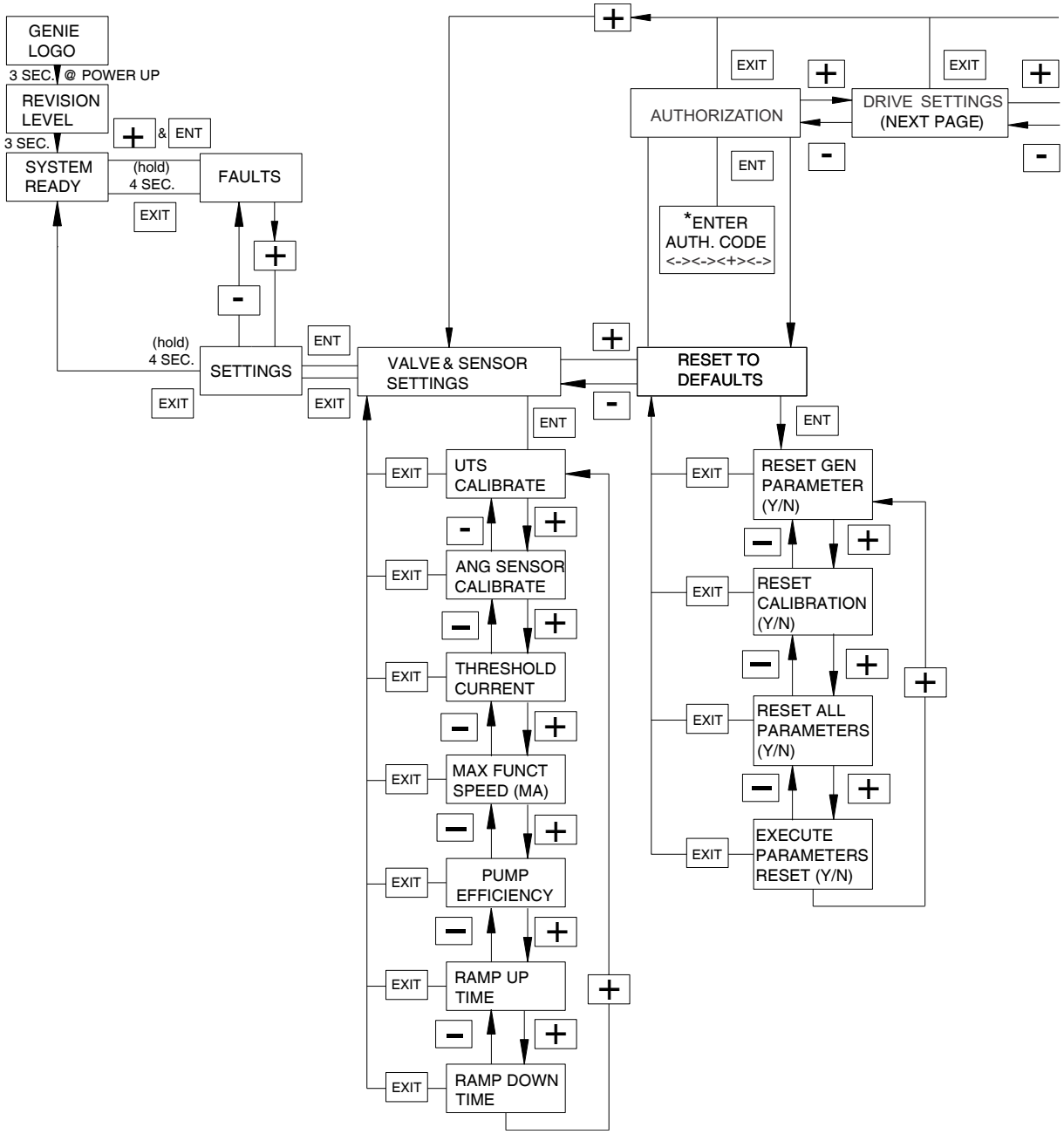


Options Navigation Menu

Options Navigation Menu

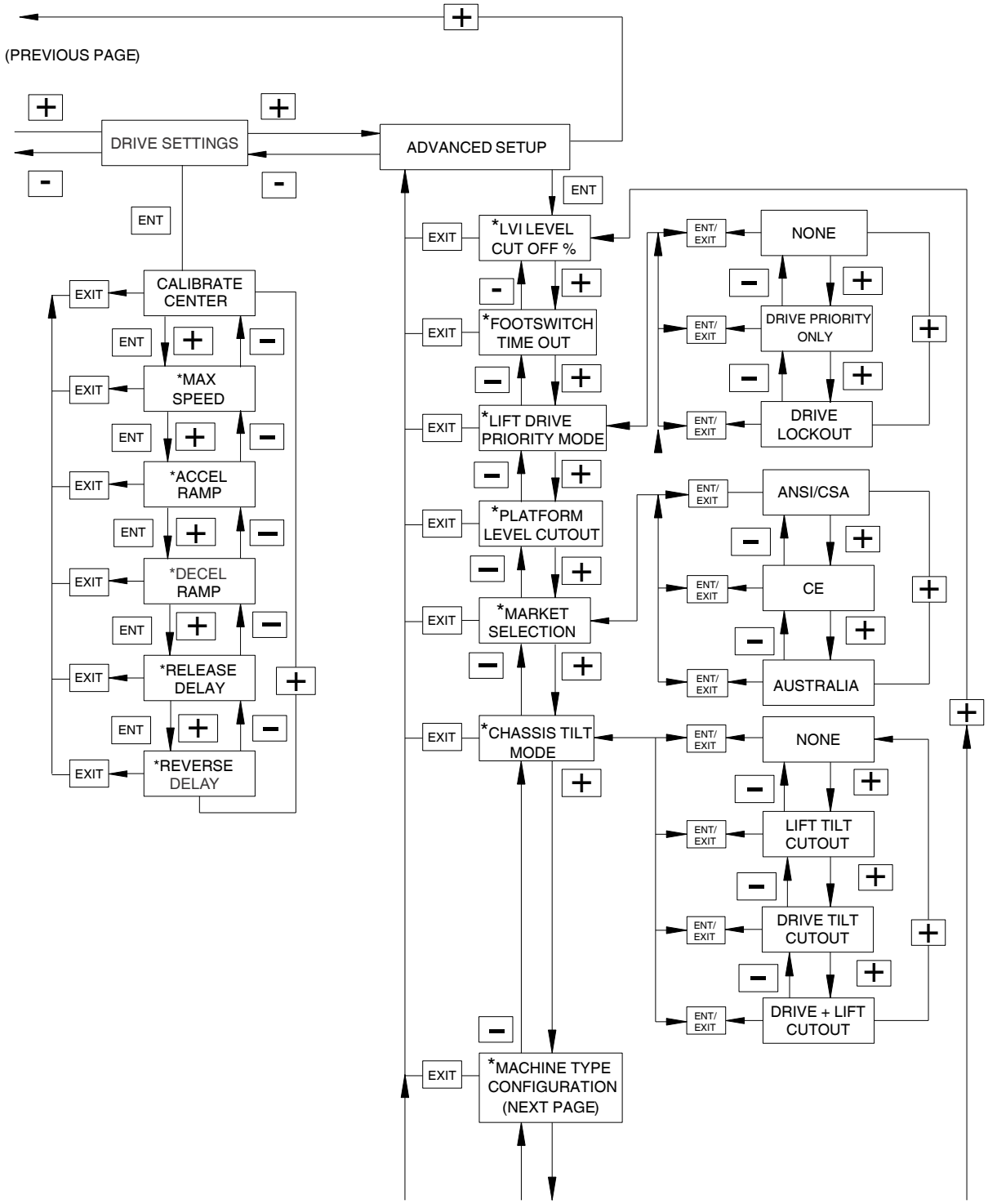


Settings Navigation Menu



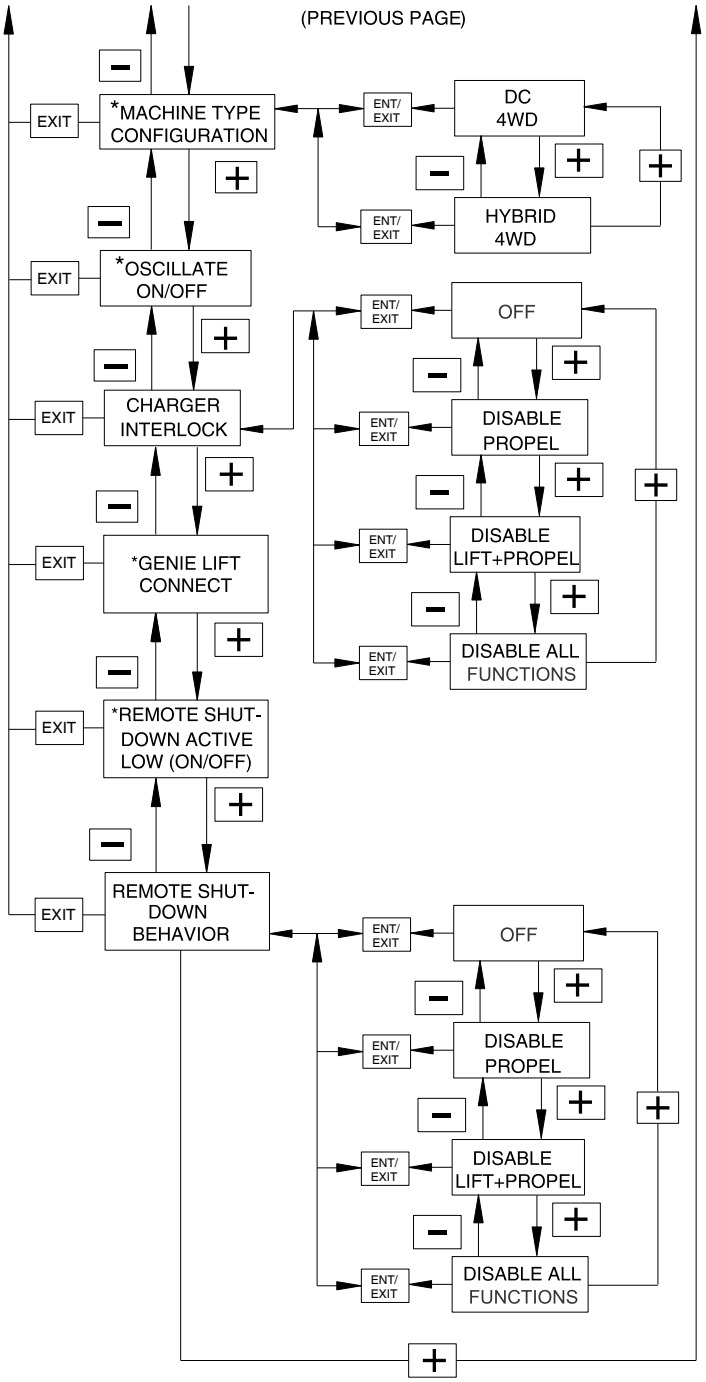
Advanced and Drive Navigation Menu

Advanced and Drive Navigation Menu



Advanced and Drive Navigation Menu

Advanced and Drive Navigation Menu (cont.)



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.

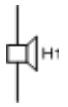
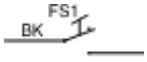
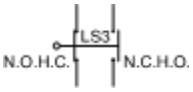
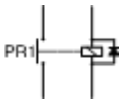
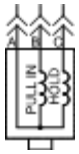
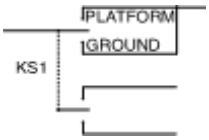
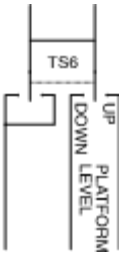
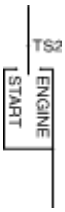
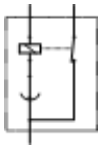
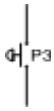
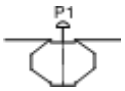
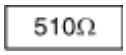
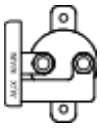
Electrical Schematics

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

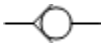
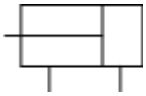
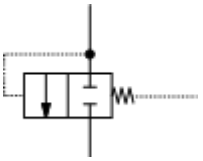
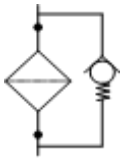
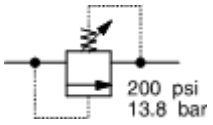
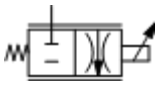
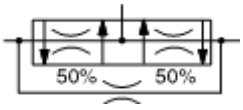
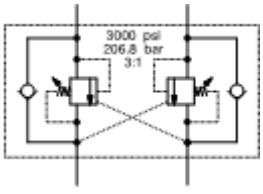
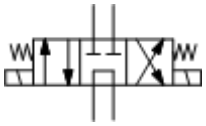
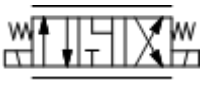
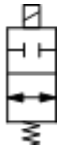
Hydraulic Schematics

⚠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

Electrical Component and Wire Color Legends

Item	Description
B	**Battery**
B1	Engine start, 12V DC
B7	Left/Right side battery packs, 48V DC
C	**Connector**
C1	GCON box to rear motor controller harness
C2	GCON box to ECON harness
C3	GCON box the turntable harness
C4	GCON box to 18/18 boom cable
C5	GCON box to 12/3 boom cable
C6	Harness jumper, 18/18 to TT harness
C7	Rear motor controller to function harness
C8	PCON box to 12/3 boom cable
C9	PCON box to 18/18 boom cable
C10	PCON box to LS1, load and prox switch
C11	PCON to foot switch
C12	Primary angle sensor
C13	LS1 Primary extend limit switch
C14	12V battery charger
C15	Secondary boom angle sensor
C16	Fuse/contactor box
C17	PCON CAN1 connect
C18	DC/DC converter
C19/C20	TCON (gry) / TCON (blk)
C21	Tilt sensor
C22	Battery charger (48V)
C23	CAN connect (PCON)
C24	Hydraulic pressure sensor
C25	DCON, Left front AC motor controller
C26	DCON, Right front AC motor controller
C27	DCON, Left rear AC motor controller
C28	DCON Right rear AC motor controller
C29	Telematics
C30	Jumper plug LR/RR motor controller to ECON
C31	Jib select hydraulic manifold
C32	Steer sensor extender
C33	Function pump motor / Generator
C34	ECON, AC motor / Generator controller
C35	DC or Engine (option)
C36	Battery status LED
C37	Drive enable limit switch
C38	Left front AC motor to front MC harness
C39	Right front AC motor to front MC harness
C40	Left rear AC motor to rear MC harness
C41	Right rear AC motor to rear MC harness
C42	Drive lights (option)
C43	Steer sensor
C44	Flashing beacon
C45	Engine speed pickup
C46/47	PCON (gray) / PCON (black)
C48/49	VCON (20 pin) / VCON (14 pin)
C50	Work light (option)
C51	Fuel shut off
C52	Left side battery box temp sensor
C53/C54	relay block 1 / relay block 2
C55	Angle sensor common harness
C56	Primary angle sensor extender
C57	DCON CAN connect (ECON end)
C58	Jumper plug ECON to function harness
C59	Electric clutch
C61	Hour meter
C63	Operational protection alarm (option)
C68	Inverter (option)
C69	Charger interlock 2
C70	12V charger

Electrical Component and Wire Color Legends

Item	Description
CB	**Circuit Breaker**
CB1	Fuel pump, 15A
CB2	Controls power, 24V DC, 15A
CB4	Charger box 12V, 10A
CB7	Engine RPM, 10A
CB9	Telematics, 5A (option)
CR	**Control Relay**
CR1	Engine start
CR2	Fuel pump
CR3	Auxiliary power relay
CR4	High idle
CR5	Horn
CR6	Ignition power (Kohler engine)
CR15	Glow plug timer (Kohler engine)
CR15a/b	Glow plugs relays
CR20	Dump load
CR62	E-stop relay
CR64	Engine faults relay
CR88	Charger relay
FB	Flashing beacon
F	**Fuse**
F1	Battery, 325A
F2/F3	Glow plugs 30A
F5	Spare 15A
F8	Charger, 40A
F11	Engine power, 25A (Kohler engine)
F18	Work lights, 7A
F21	RPM Solenoid, 25A (Kohler engine)
F22	Glow plugs, 80A (Kohler engine)
FS1	Foot switch
G	**Gauge**
G1	Battery Charge Indicator
G2	Engine oil pressure
G3	Engine coolant temp.
G4	Engine oil temp.
G6	Hour meter

Item	Description
H	**Horn or Alarm**
H2	Horn
H5	Alarm (multifunction)
JC	**Joystick**
JC1	Boom proportional joystick: secondary boom up/down
JC3	Drive/steer proportional joystick
JC7	Boom proportional joystick: primary up/down, turntable rotate
KS	**Key switch**
KS1	Key switch
L	**LED or Light**
L1	Drive enable led
L4	Platform overload led
L5	Battery mode led
L44	Hybrid mode LED
L45	Platform overload led
L48	Tilt alarm led
L53	Charger LED
LS	**Limit Switch**
LS1	Primary boom extend
LS3	Drive enable
LS18	Platform overload (AS/CE models)

Electrical Component and Wire Color Legends

Item	Description
P	**Button**
P1	Red emergency stop (ground)
P2	Red emergency stop (platform)
P3	Horn
P4	Function enable
PR	**Power Relay**
PR1	Main contactor
R	**Resistor**
R1	+5V
R2	+2.5V
S	**Sensor**
S7	Tilt sensor
S13	Steer angle sensor
S19	Secondary angle sensor
TS	**Toggle Switch**
TS1	Auxiliary pump
TS3	Hybrid mode
TS5	Function speed
TS7	Platform rotate
TS8	Jib boom up/down
TS9	Platform level
TS13	Primary boom extend/retract
TS14	Motor shift (high / low)
TS15	Drive enable
TS18	Work light (option)
TS47	Inverter (option)
TS51	Auxiliary pump
TS52	Model select
TS56	Proximity switch
TS57	Platform rotate
TS58	Jib boom up/down
TS59	Platform level up/down
TS60	Secondary boom up/down
TS61	Primary boom up/down
TS62	Turntable rotate
TS63	Primary boom extend/retract
TS69	Recovery

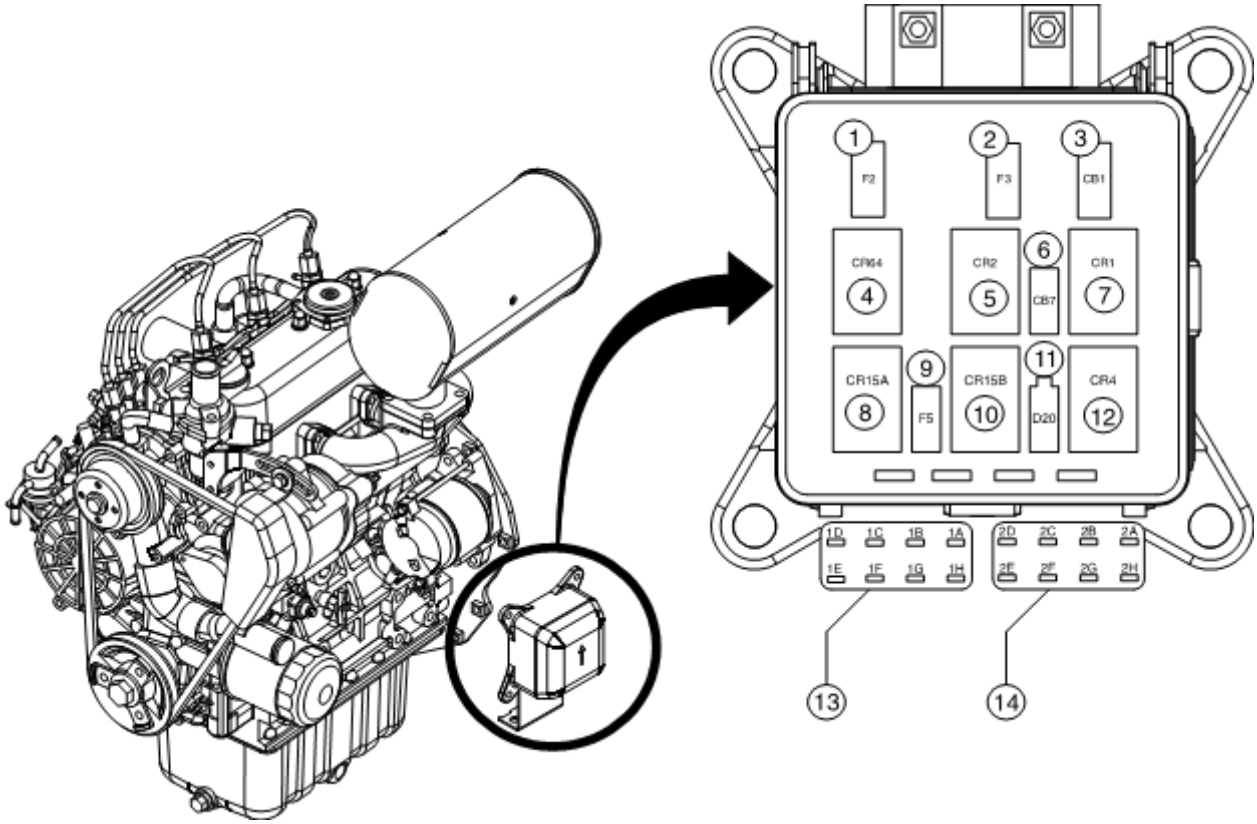
U	Module
U3A	DCON, RR, AC motor controller
U3B	DCON, LR AC motor controller
U3C	DCON, RF AC motor controller (4WD option)
U3D	DCON LF AC motor controller (4WD) option)
U4	48V charger

Wire Color Legend

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

Kubota Engine Fuse and Relay Module

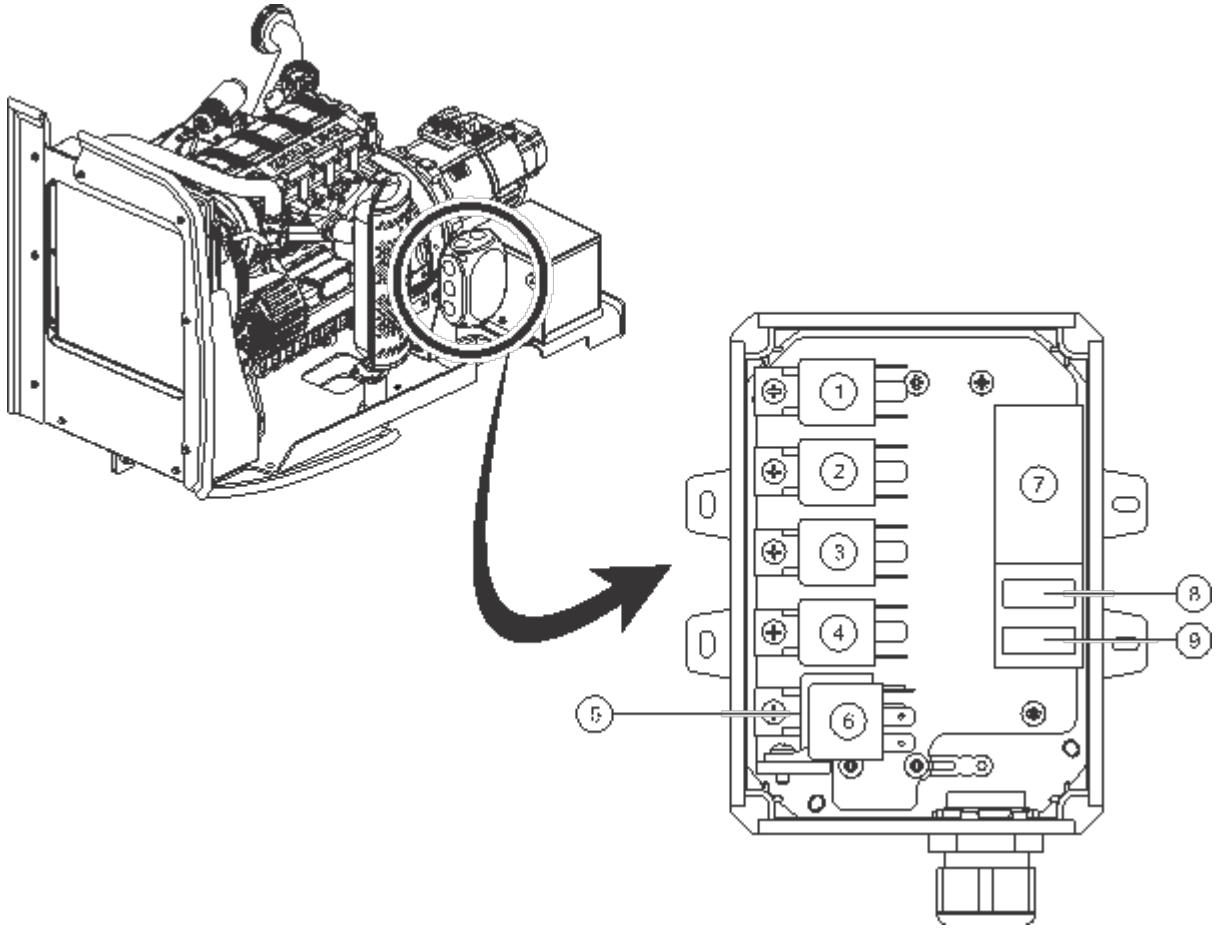
Kubota D1105-E4B



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

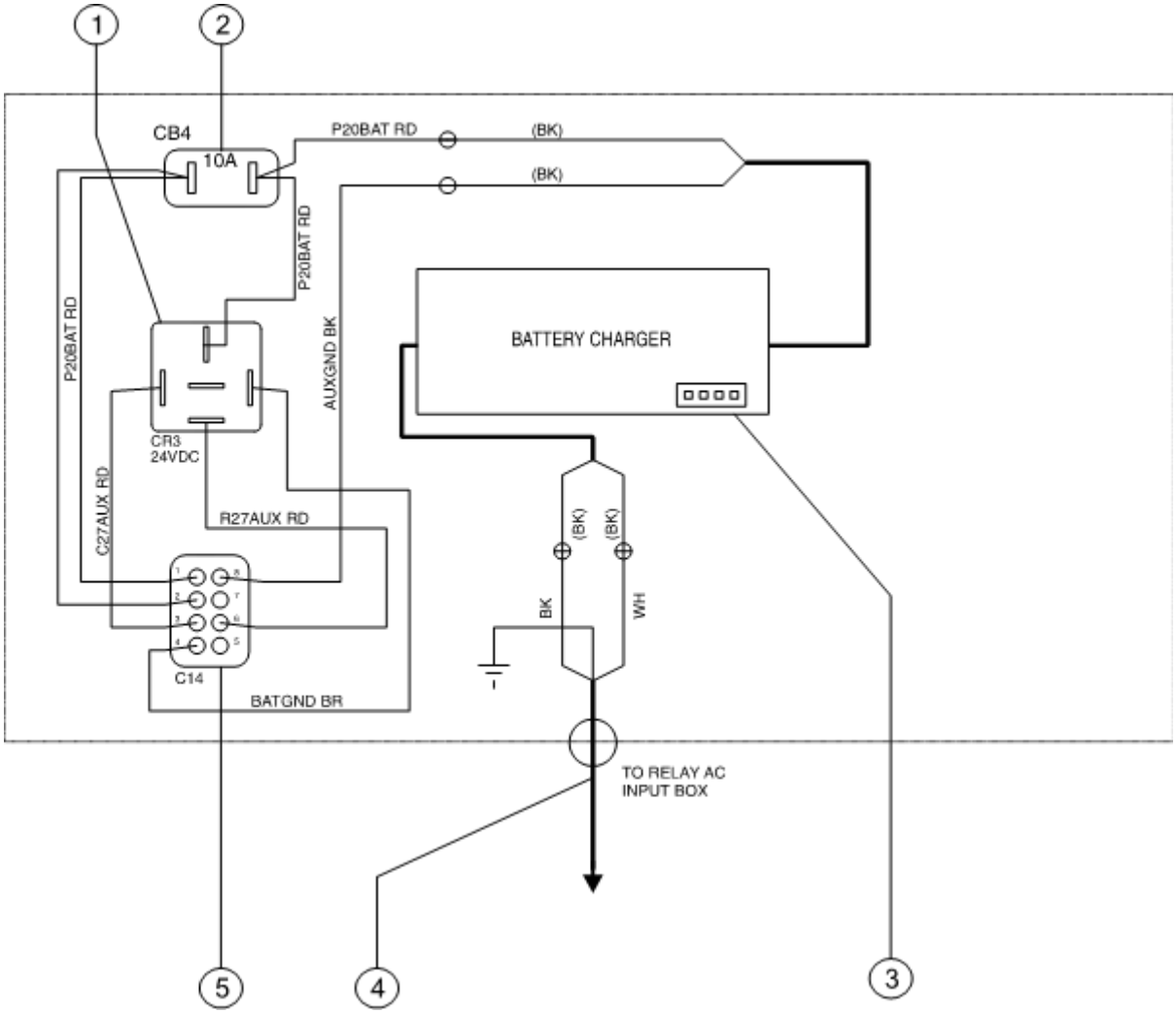
Kohler Engine Fuse and Relay Module

Kohler KDW 1404



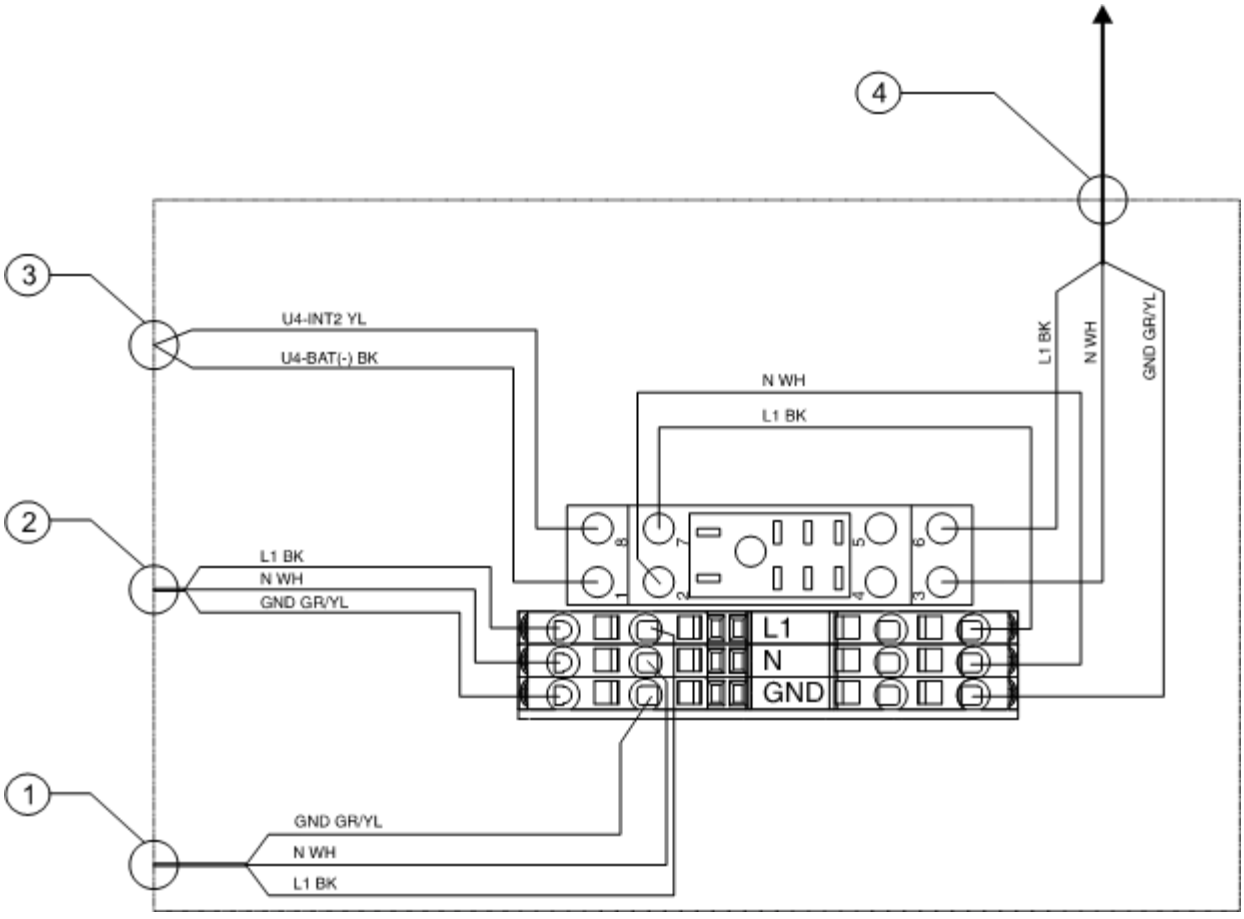
1 CR1 Engine start
2 CR4 High rpm
3 CR6 Fuel pump
4 CR15A Engine status
5 CR64 Fault alarm
6 CR15B Engine status
7 CR15 Glow plug
8 F11 20A DC supply
9 F21 20A RPM solenoid

12V DC Charger Wiring (DC Option)



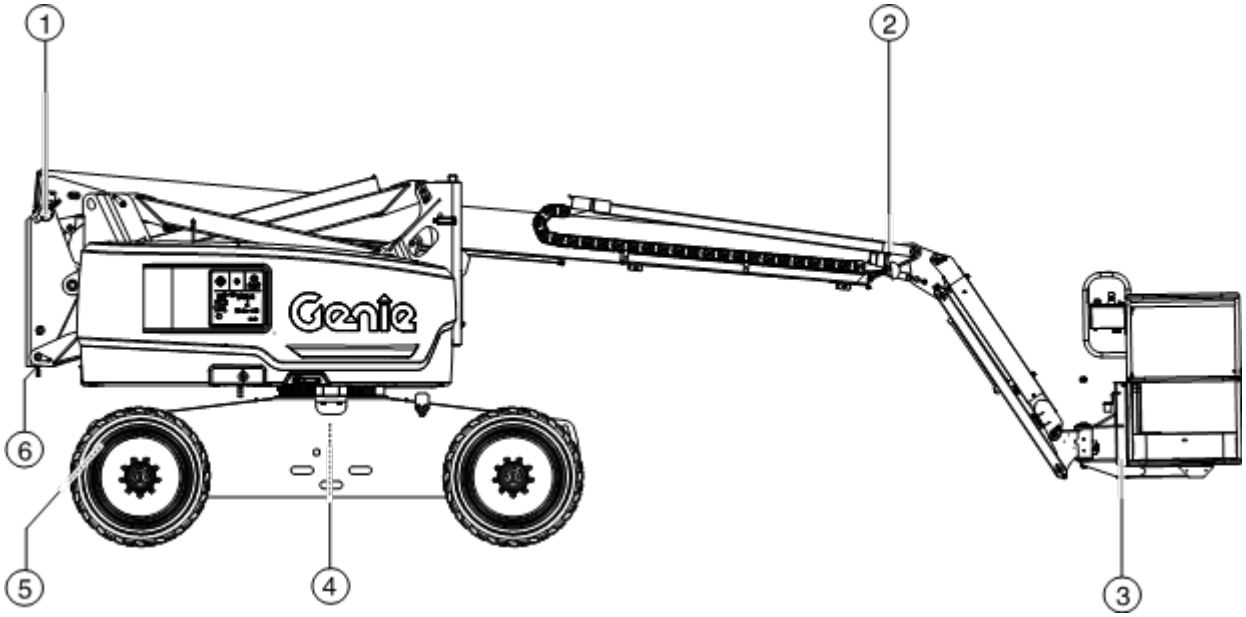
1 Control Relay 3 - 24V auxiliary
2 Circuit breaker 4 - 10A
3 Battery charger - 12V
4 To relay AC input box
5 Connector 14

AC Input Wiring (DC Option)



1 AC input wall plug
2 AC input to 48V charger
3 Charger Control IN
4 To 12V charger

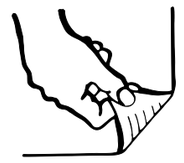
Limit Switch/Angle Sensor Legend



1 S17 Primary angle sensor
2 LS1 Boom extend limit switch
3 LS18 Platform overload
4 LS3 Drive enable
5 S13 Steer angle sensor (inside steer cylinder)
6 S19 Secondary angle sensor (outside upper-pivot)

Wiring Diagram - Options

[from Z60H-2548 to 2999]

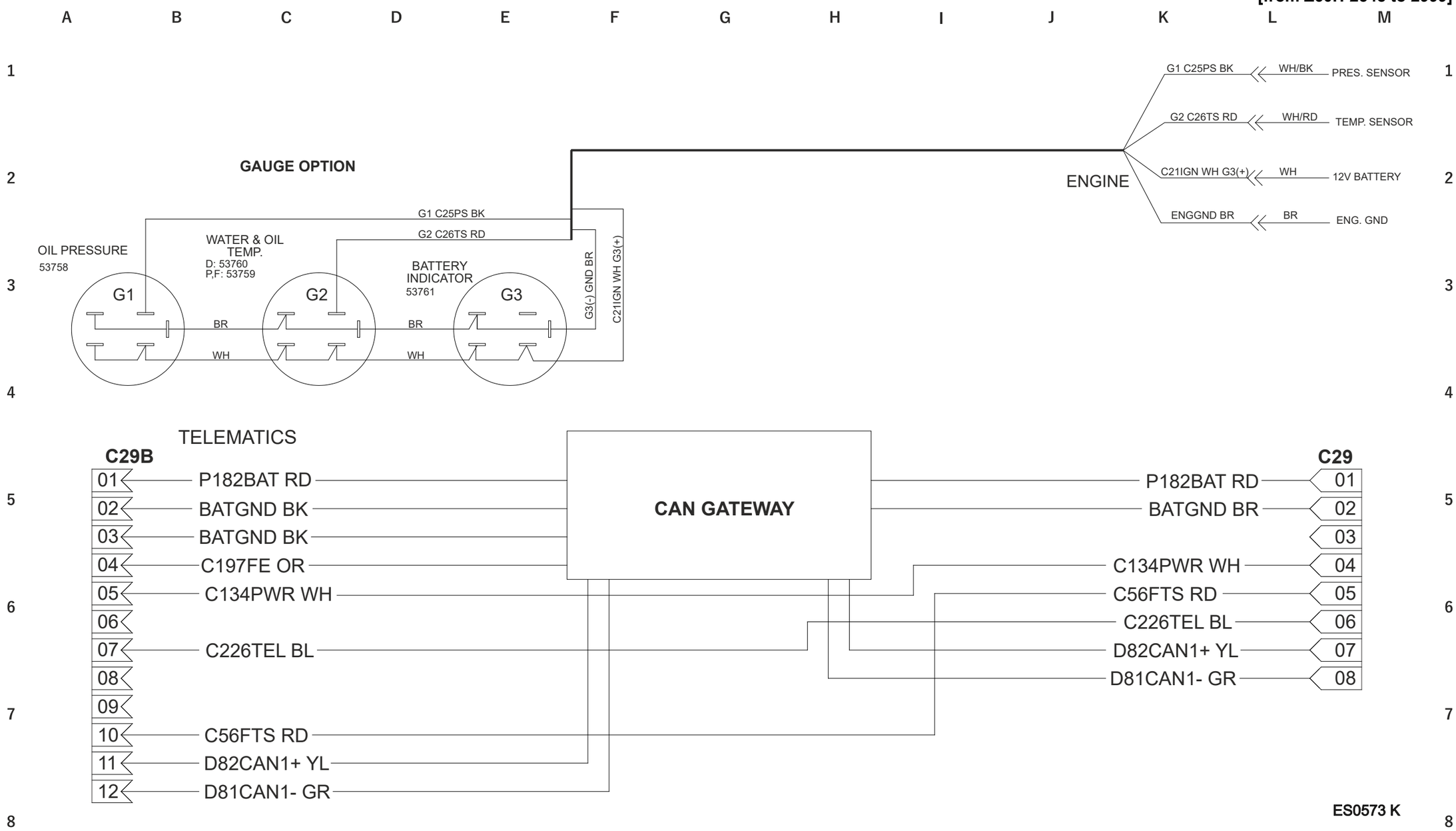


Wiring Diagram - Kubota and DC Options

[from Z60H-2548 to 2999]

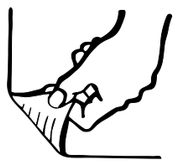
ES0573 K

Wiring Diagram, Options
[from Z60H-2548 to 2999]



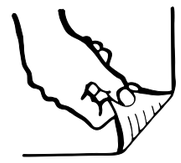
Wiring Diagram - Options

[from Z60H-2548 to 2999]



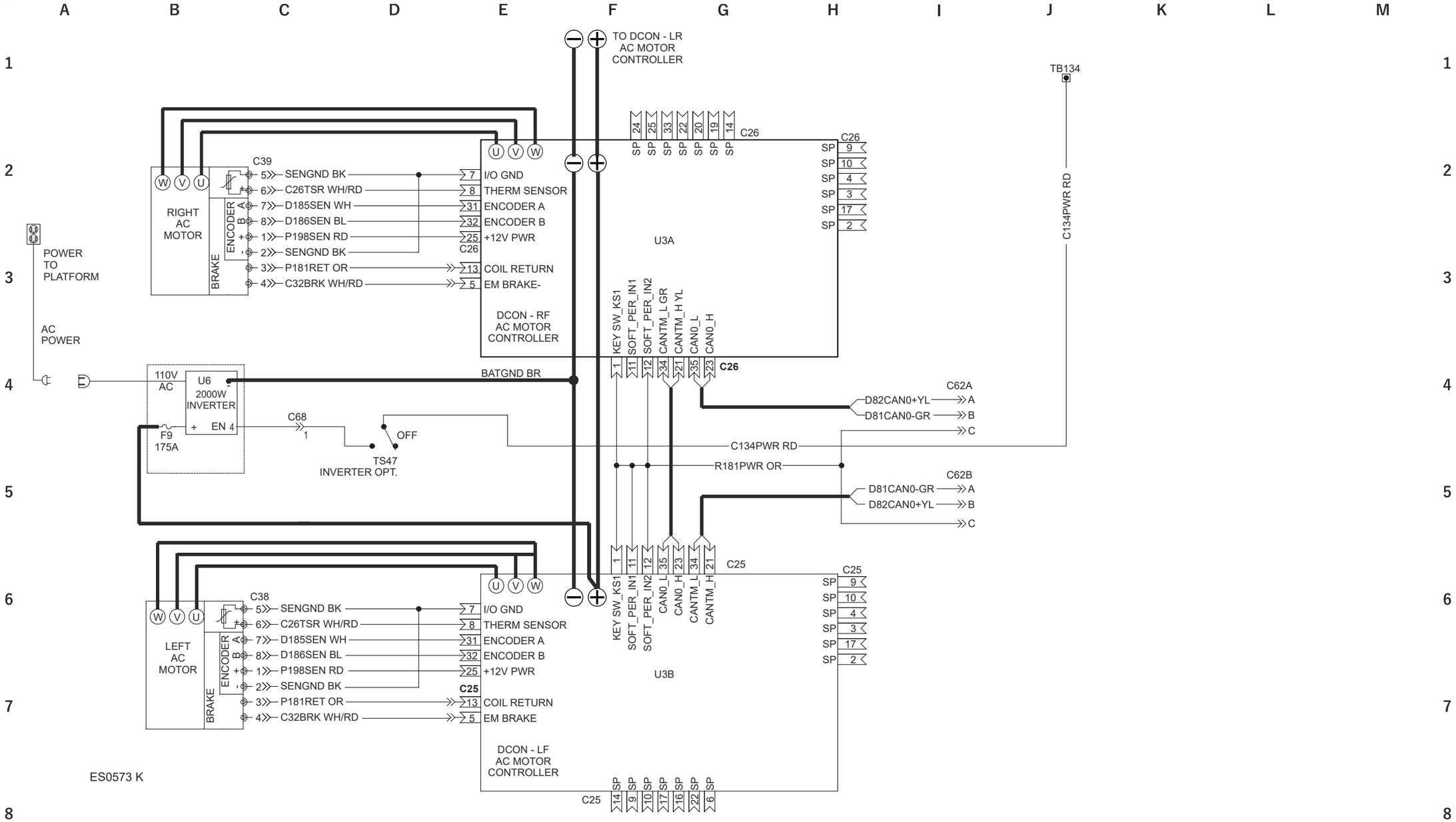
Electrical Schematic - Options, 4WD

[from Z60H-2548 to 2999]



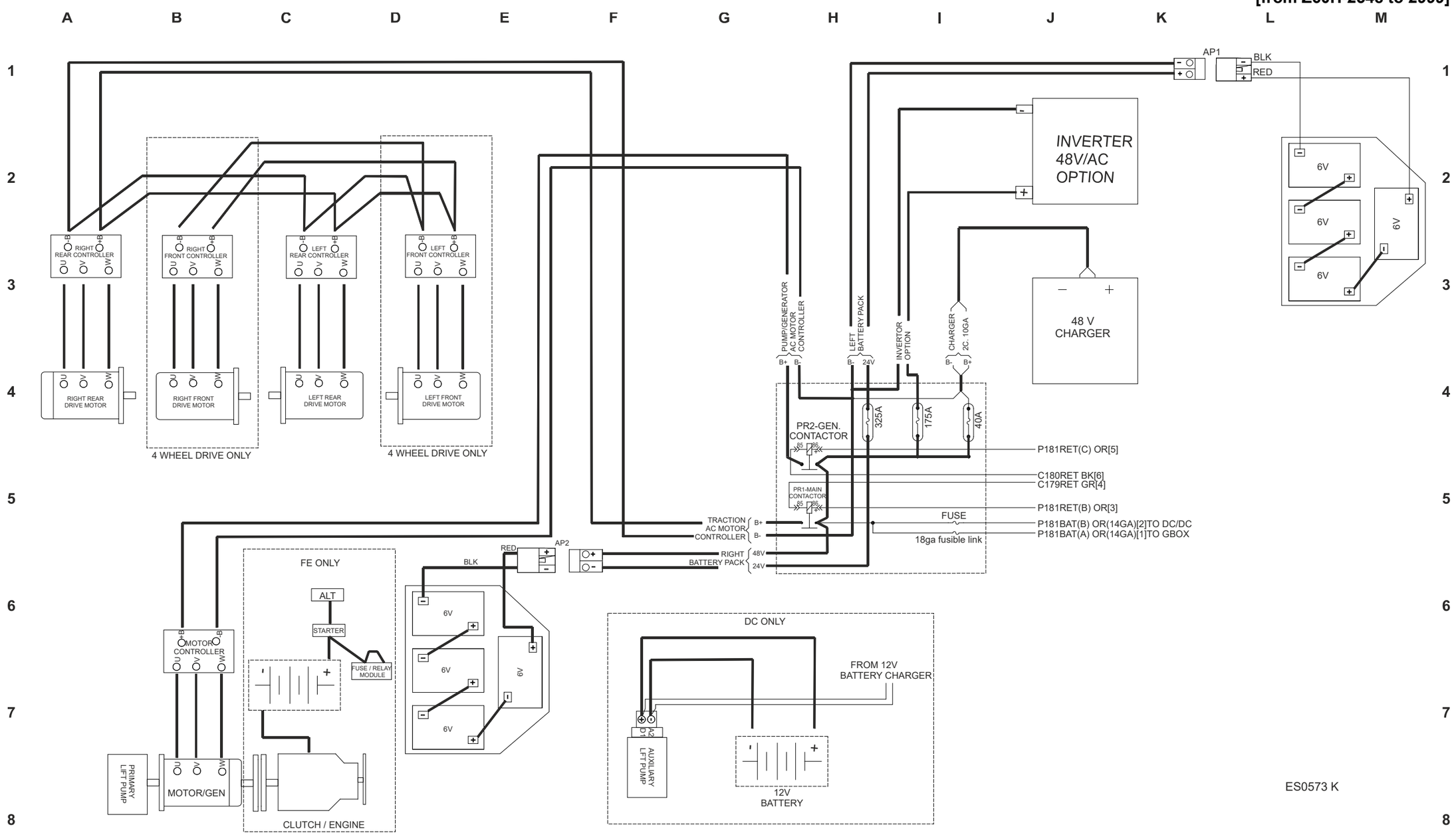
Electrical Schematic - Options, 4WD

[from Z60H-2548 to 2999]



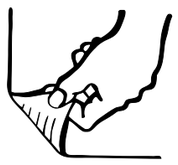
Power Cable Wiring Diagram

[from Z60H-2548 to 2999]

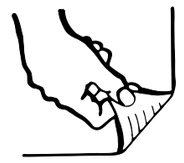


Power Cable Wiring Diagram

[from Z60H-2548 to 2999]

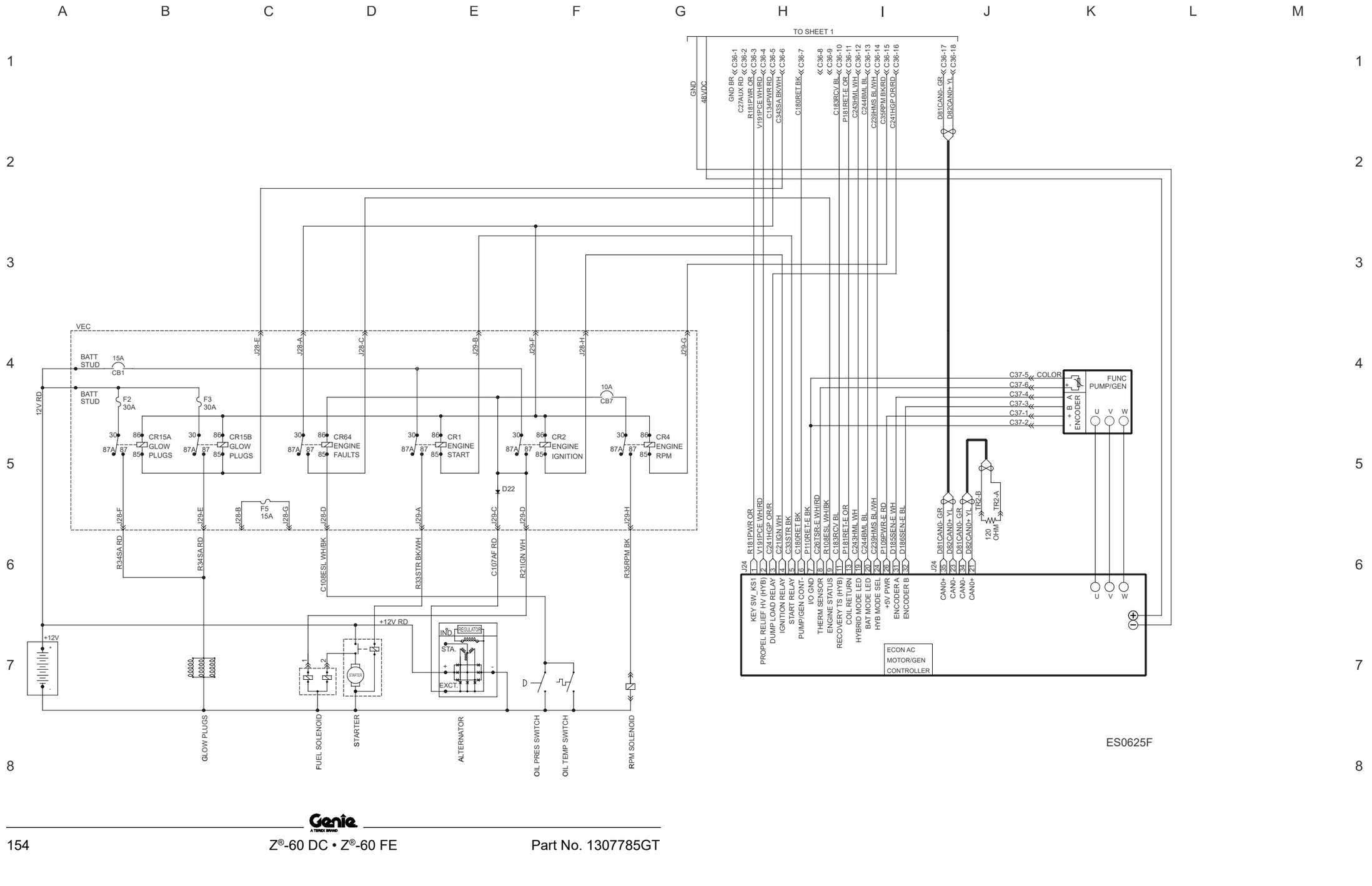


Wiring Diagram - Kubota Engine FE Models
[from Z60H-3000, Z60M-1000, Z60D-101]



Wiring Diagram - Kubota Engine FE Models

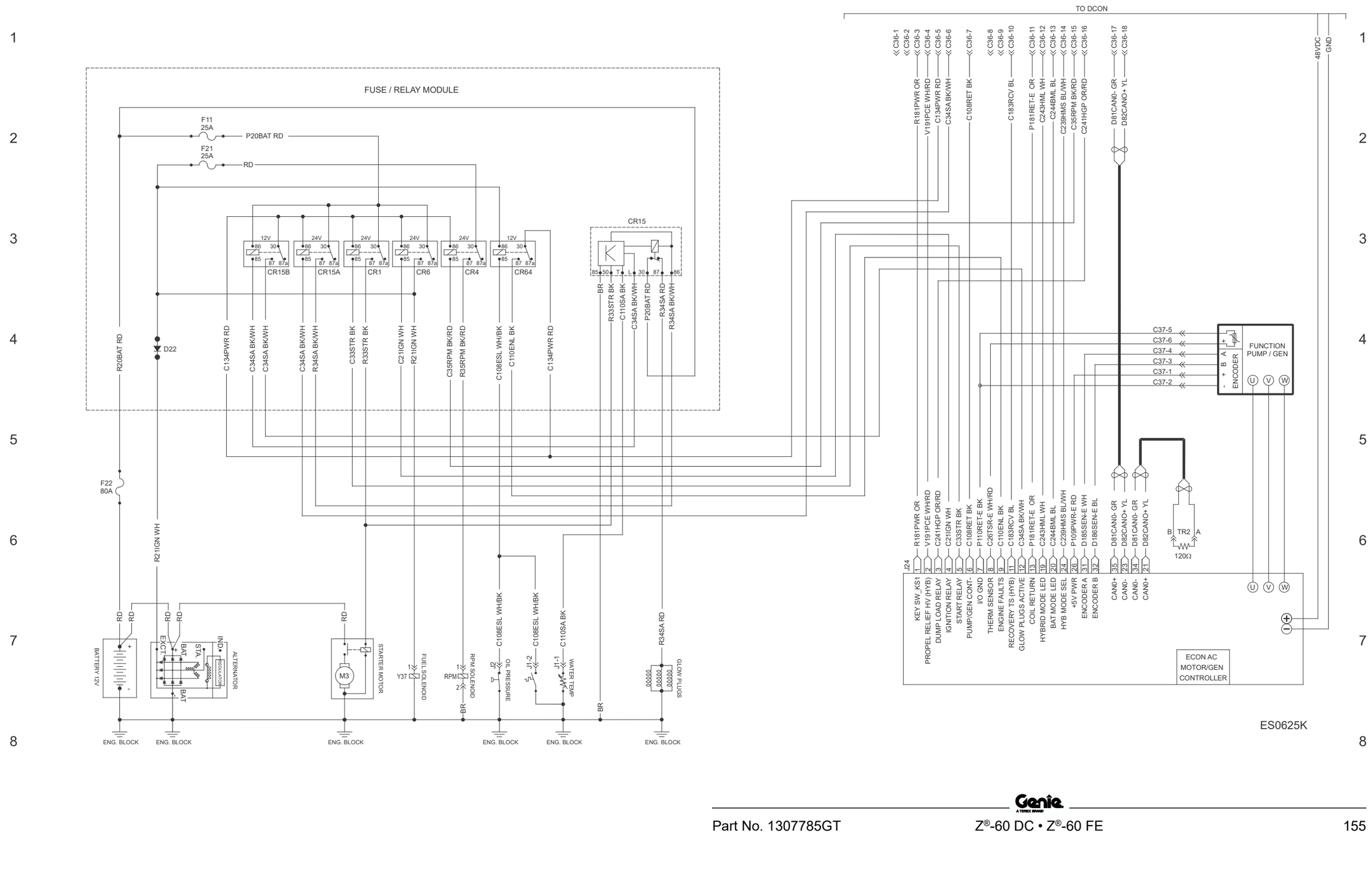
[from Z60H-3000, Z60M-1000, Z60D-101]



ES0625F

Wiring Diagram - Kohler Engine FE Models

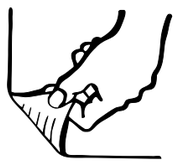
[from Z60M-1200, Z60D-126]



ES0625K

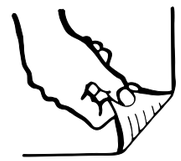
Wiring Diagram - Kohler Engine FE Models

[from Z60M-1200, Z60D-126]



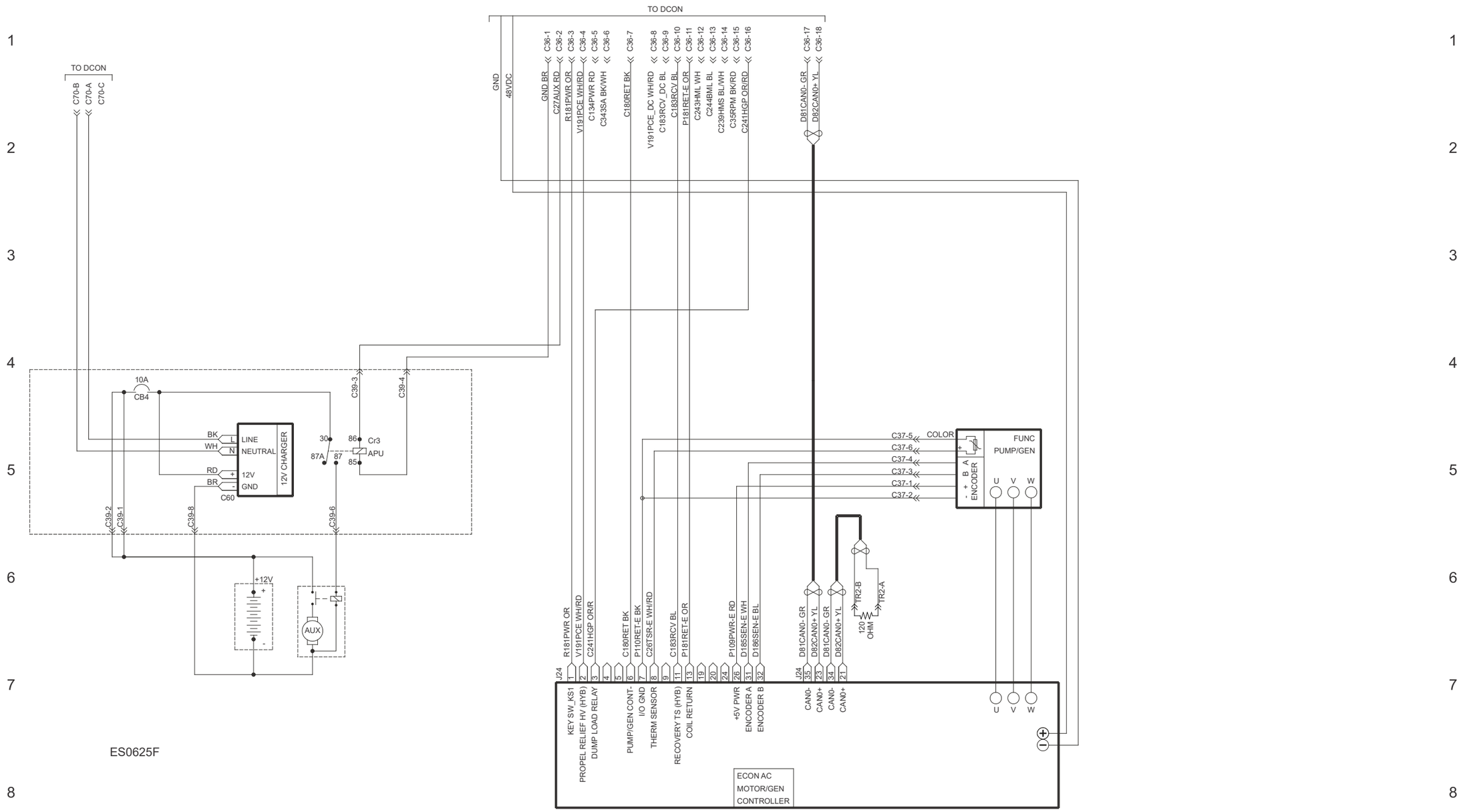
Wiring Diagram - DC Models

[from Z60H-3000, Z60M-1000, Z60D-101]



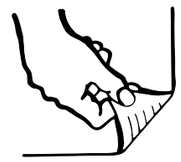
Wiring Diagram - DC Models

[from Z60H-3000, Z60M-1000, Z60D-101]



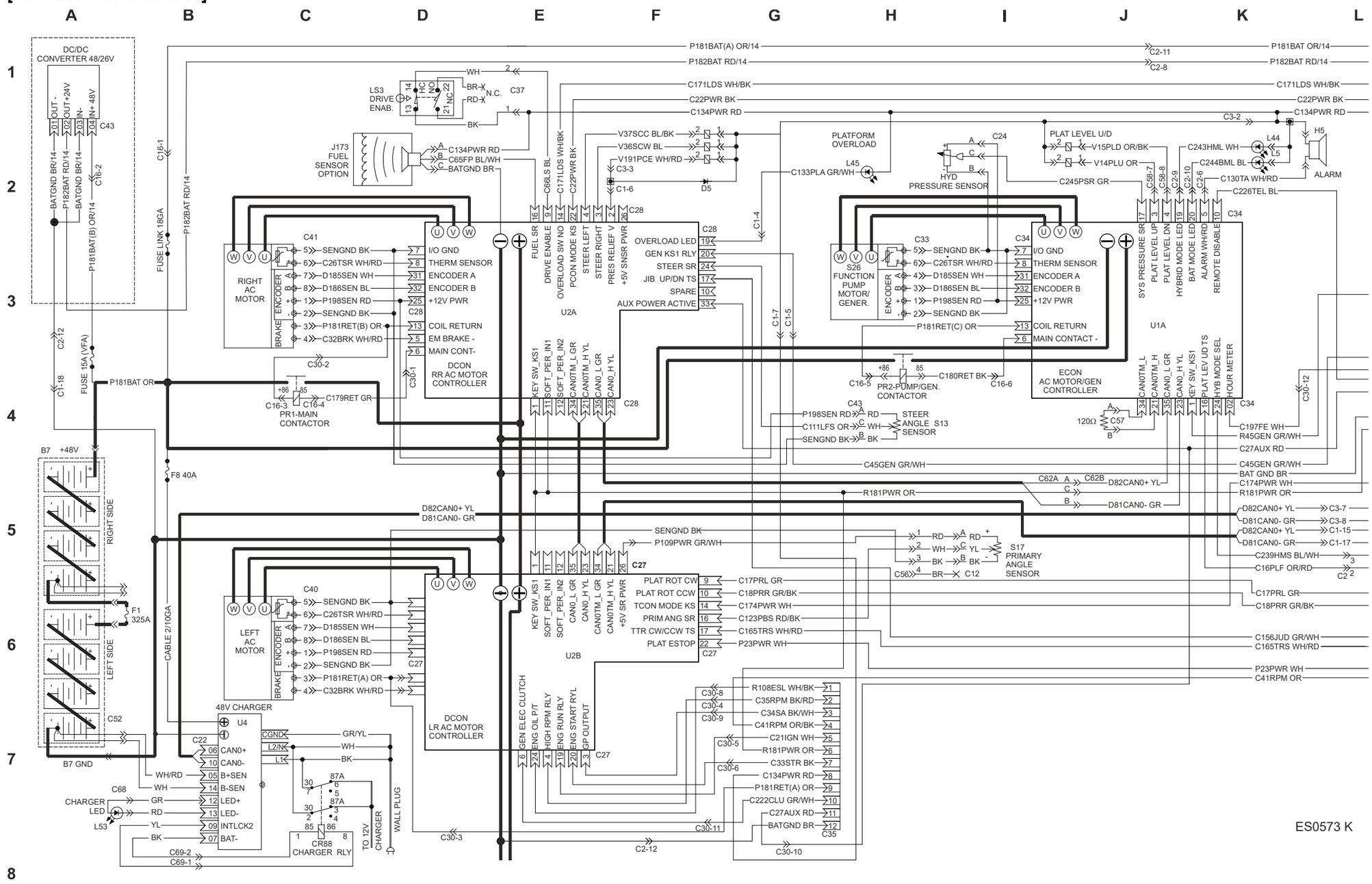
ES0625F

Electrical Schematic
[from Z60H-2548 to 2999]

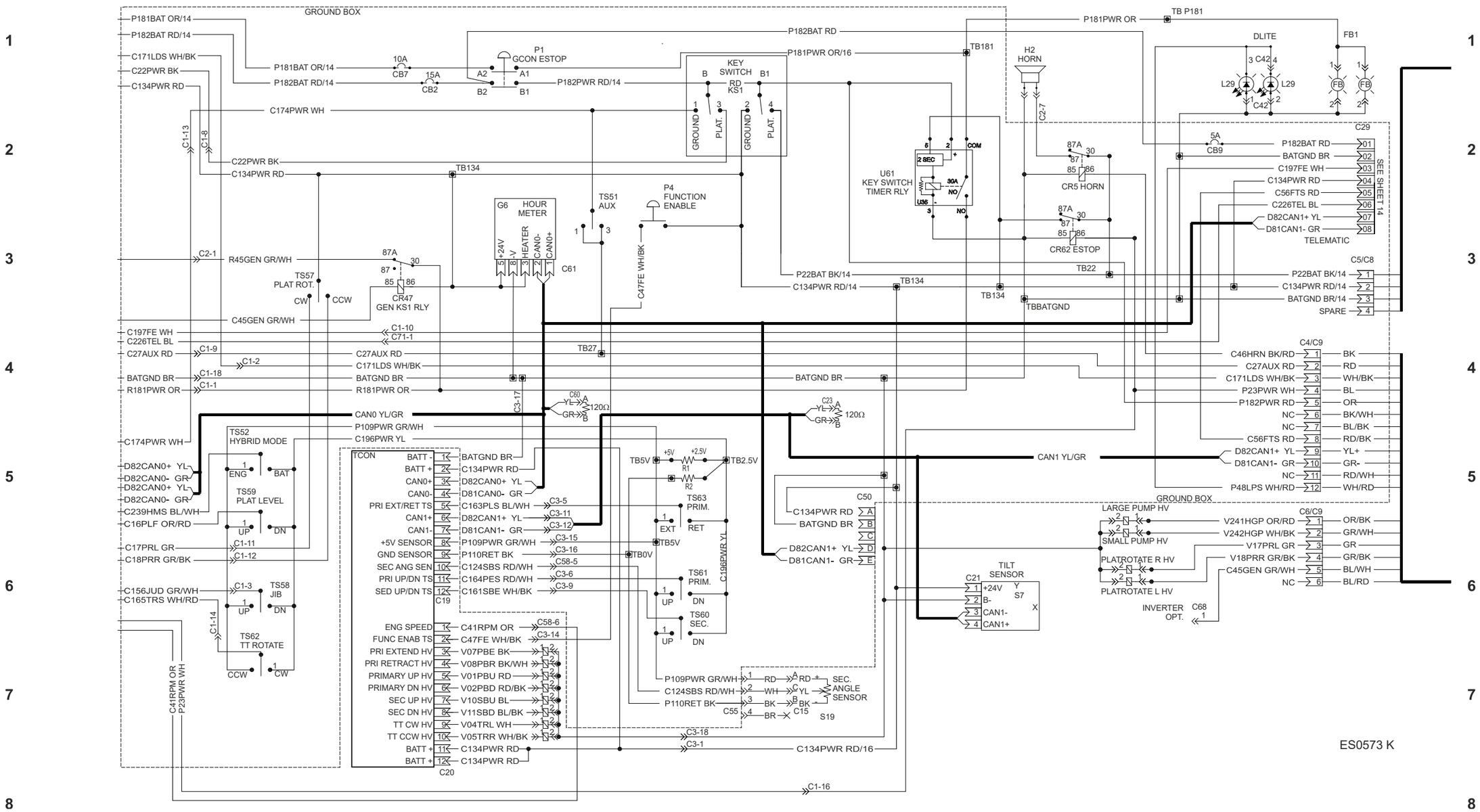


Electrical Schematic

[from Z60H-2548 to 2999]

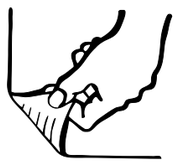


Electrical Schematic
[from Z60H-2548 to 2999]

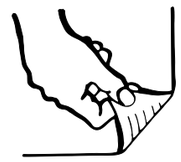


Electrical Schematic

[from Z60H-2548 to 2999]

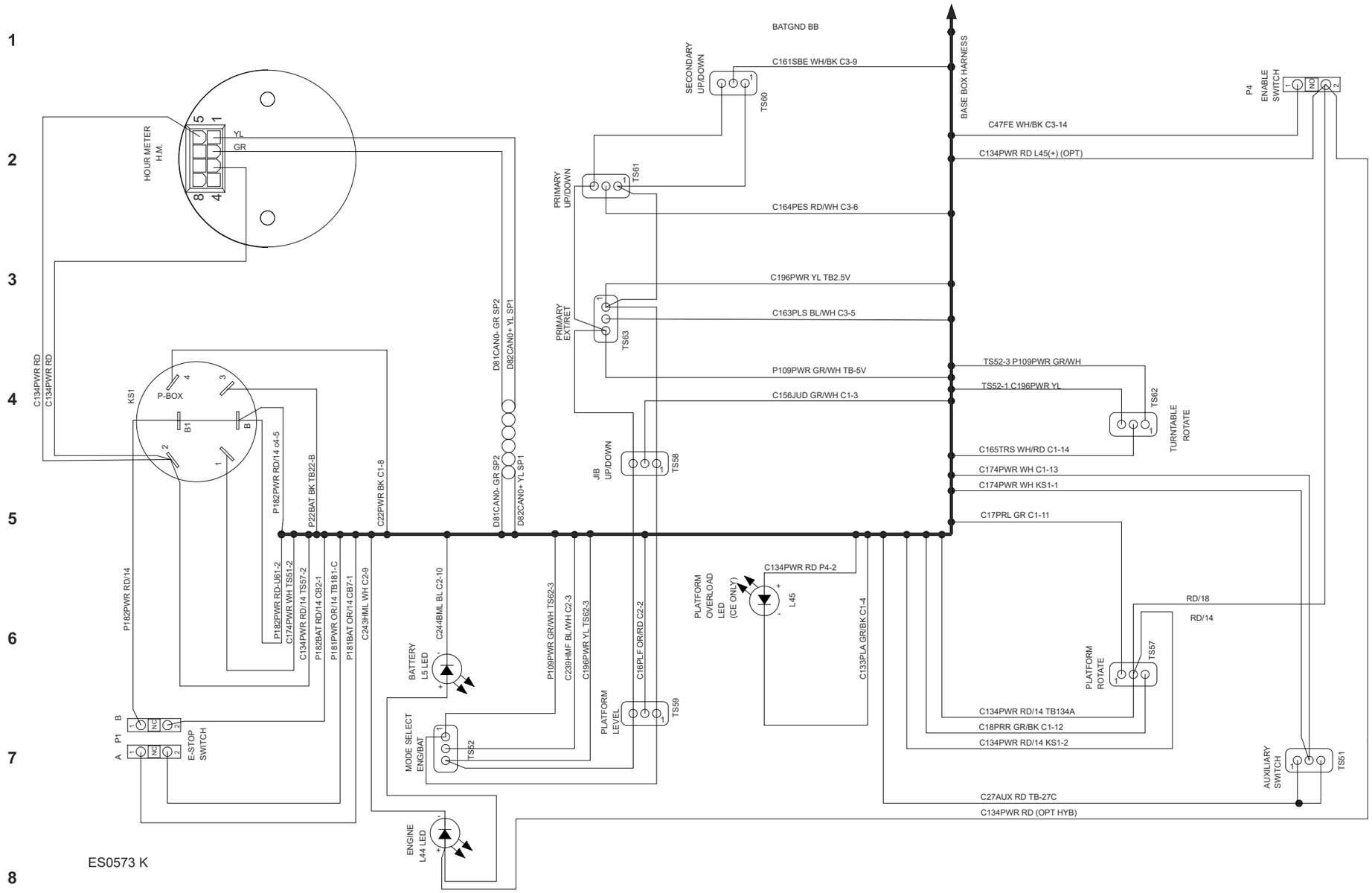


Ground Control Box Wiring Diagram
[from Z60H-2548 to 2999]



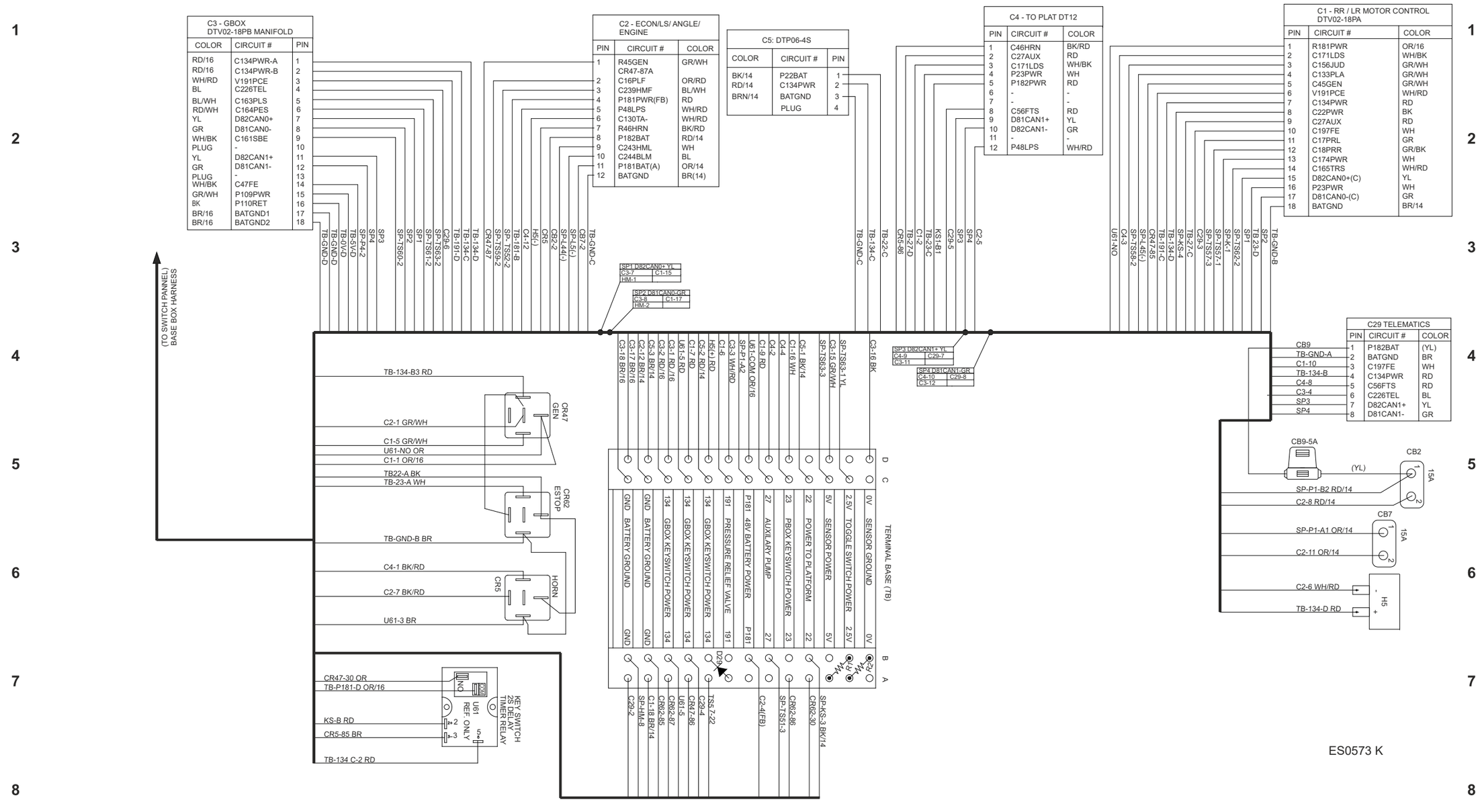
Ground Control Box Wiring Diagram

[from Z60H-2548 to 2999]



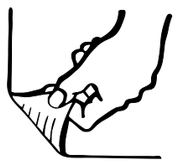
Ground Control Box Wiring Diagram

[from Z60H-2548 to 2999]

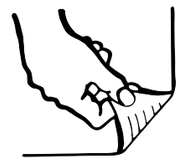


Ground Control Box Wiring Diagram

[from Z60H-2548 to 2999]

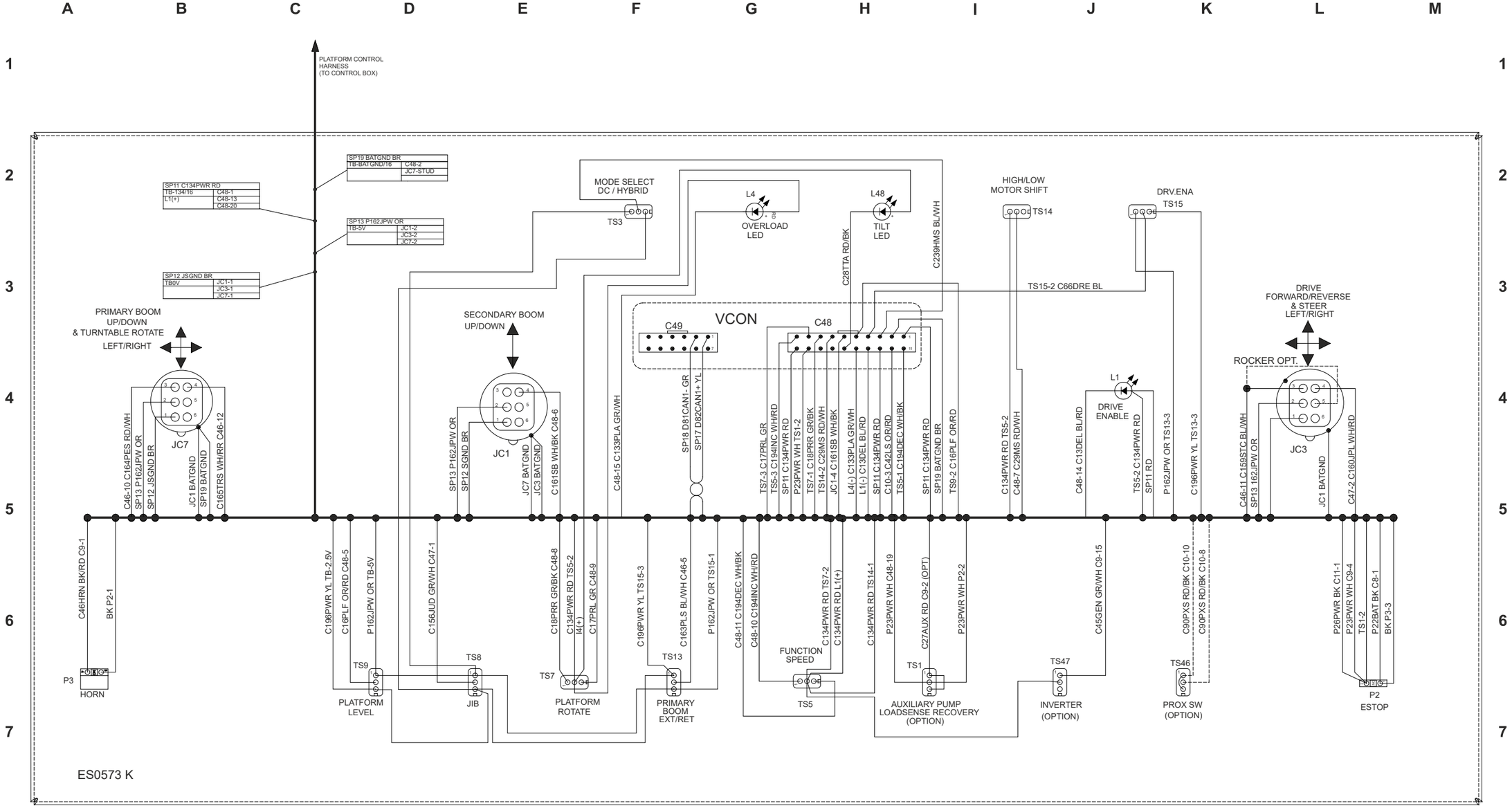


Platform Control Box Wiring Diagram
[from Z60H-2548 to 2999]



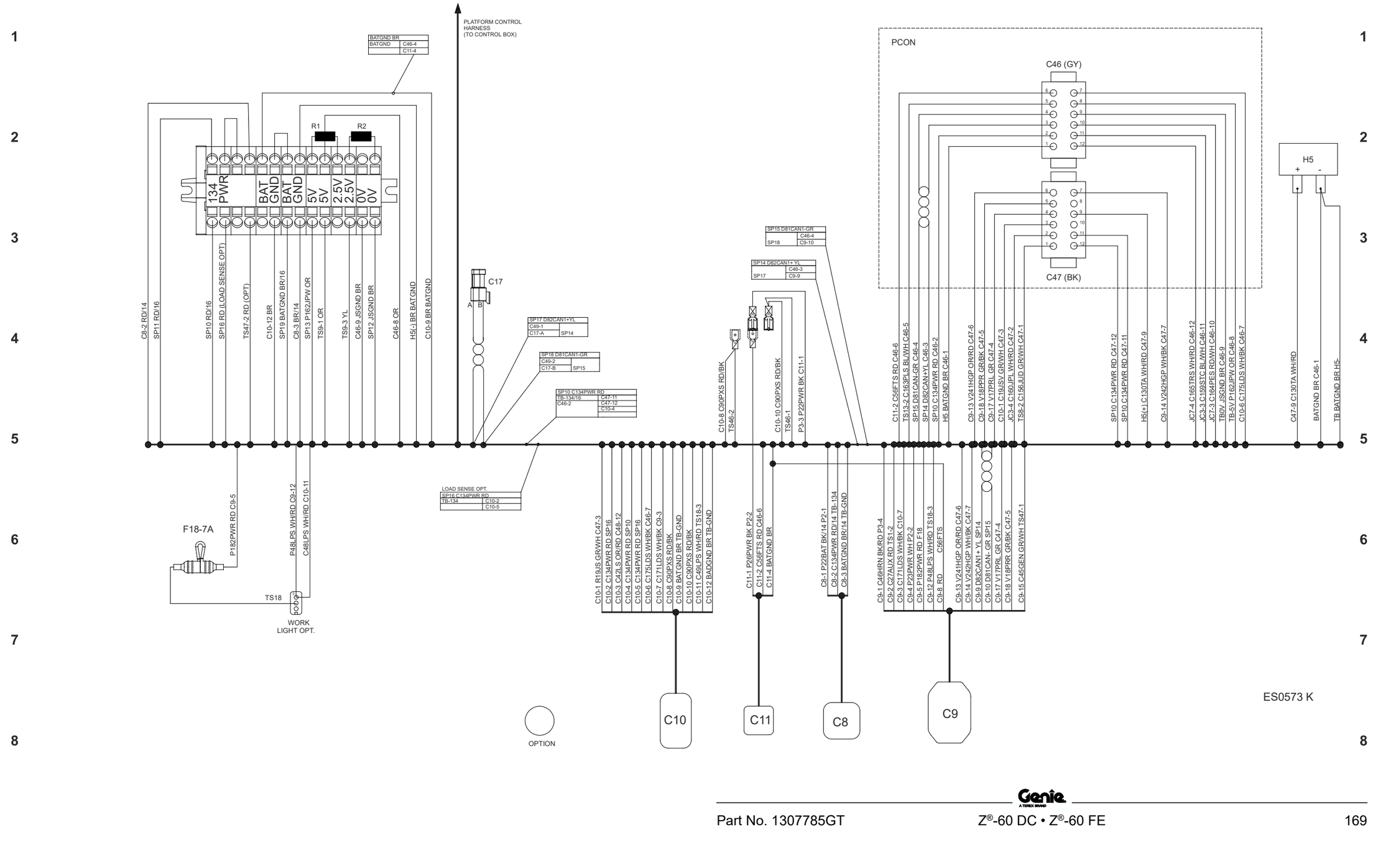
Platform Control Box Wiring Diagram

[from Z60H-2548 to 2999]



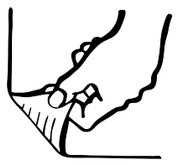
Platform Control Box Wiring Diagram

[from Z60H-2548 to 2999]



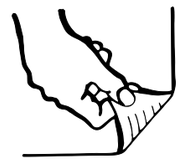
Platform Control Box Wiring Diagram

[from Z60H-2548 to 2999]



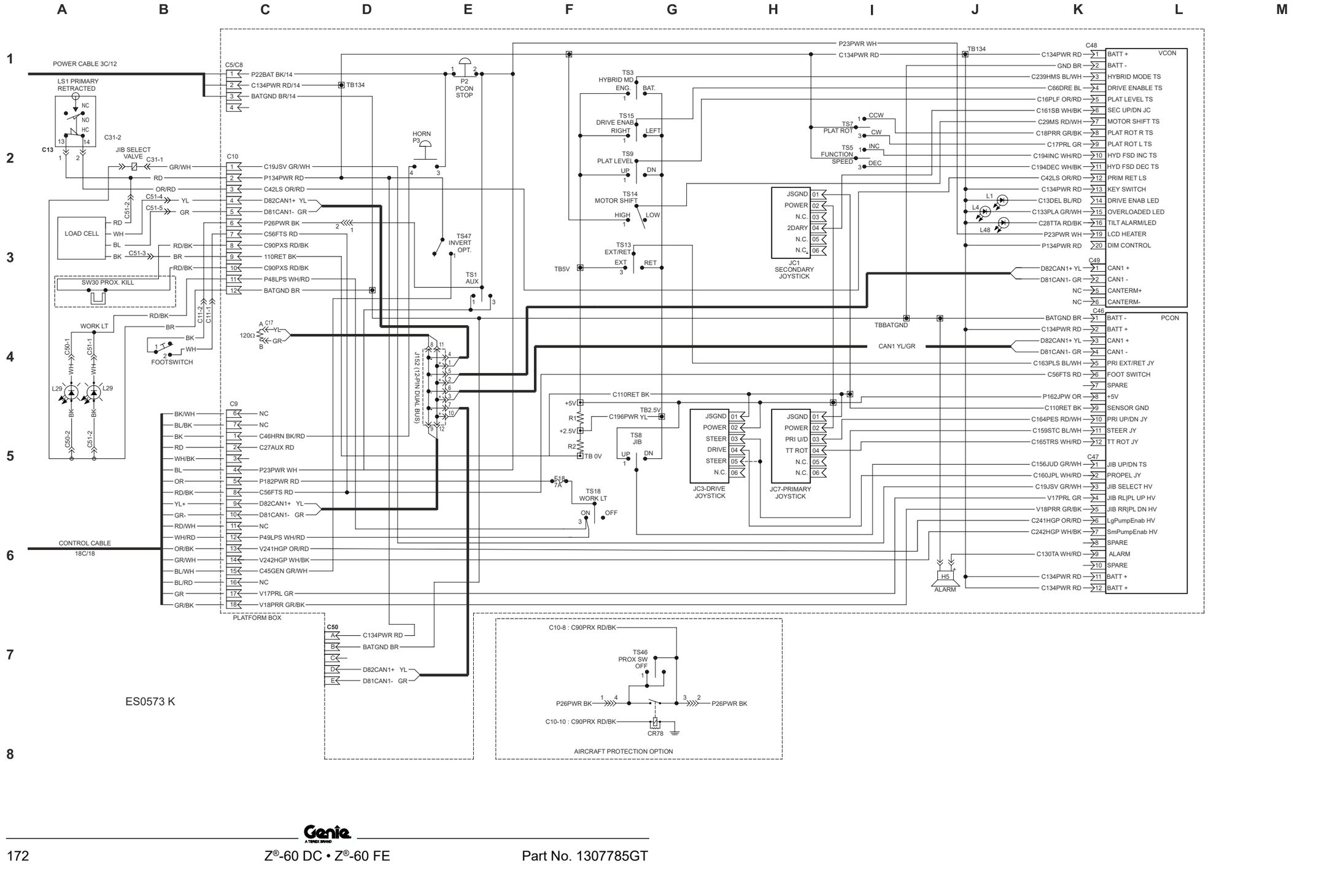
Electrical Schematic, PCON

[from Z60H-2548 to 2999]



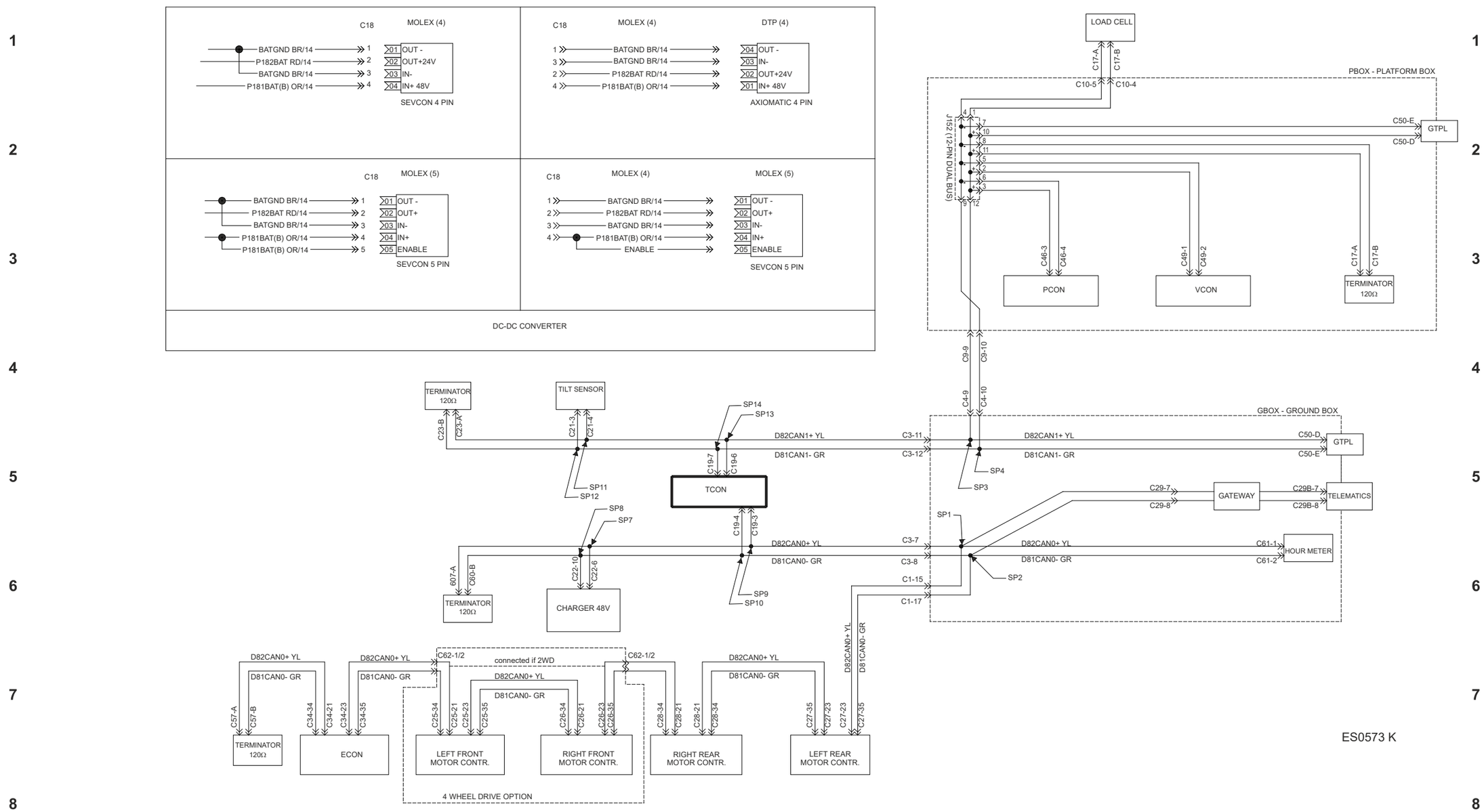
Electrical Schematic, PCON

[from Z60H-2548 to 2999]



Wiring Diagram, CAN BUS

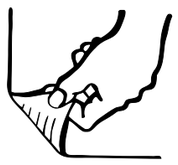
[from Z60H-2548 to 2999]



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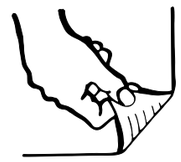
Wiring Diagram, CAN BUS

[from Z60H-2548 to 2999]



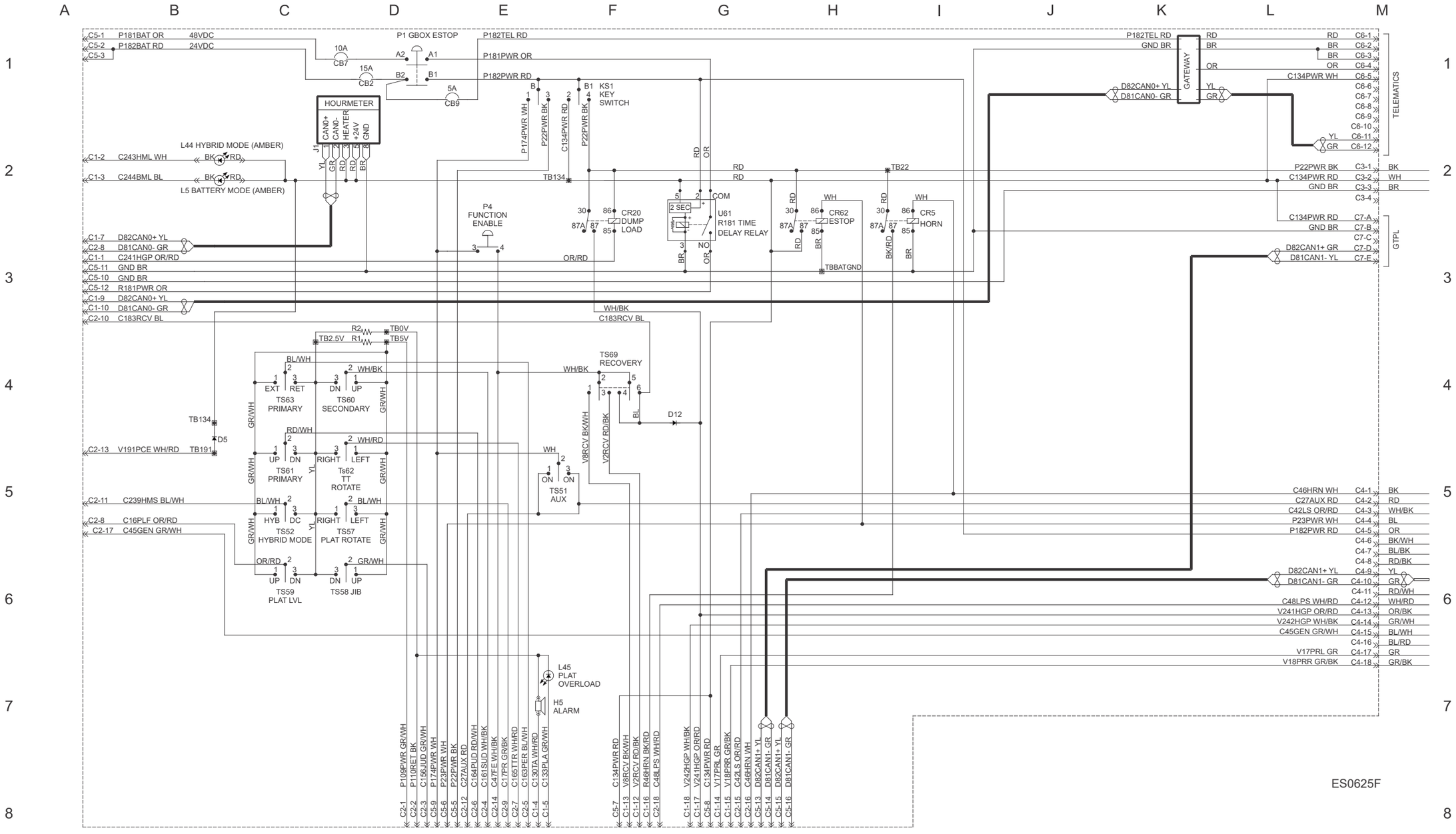
Electrical Schematic, DCON

[from Z60H-3000 to 3505, Z60M-1000 to 1999, Z60D-101 to 125]



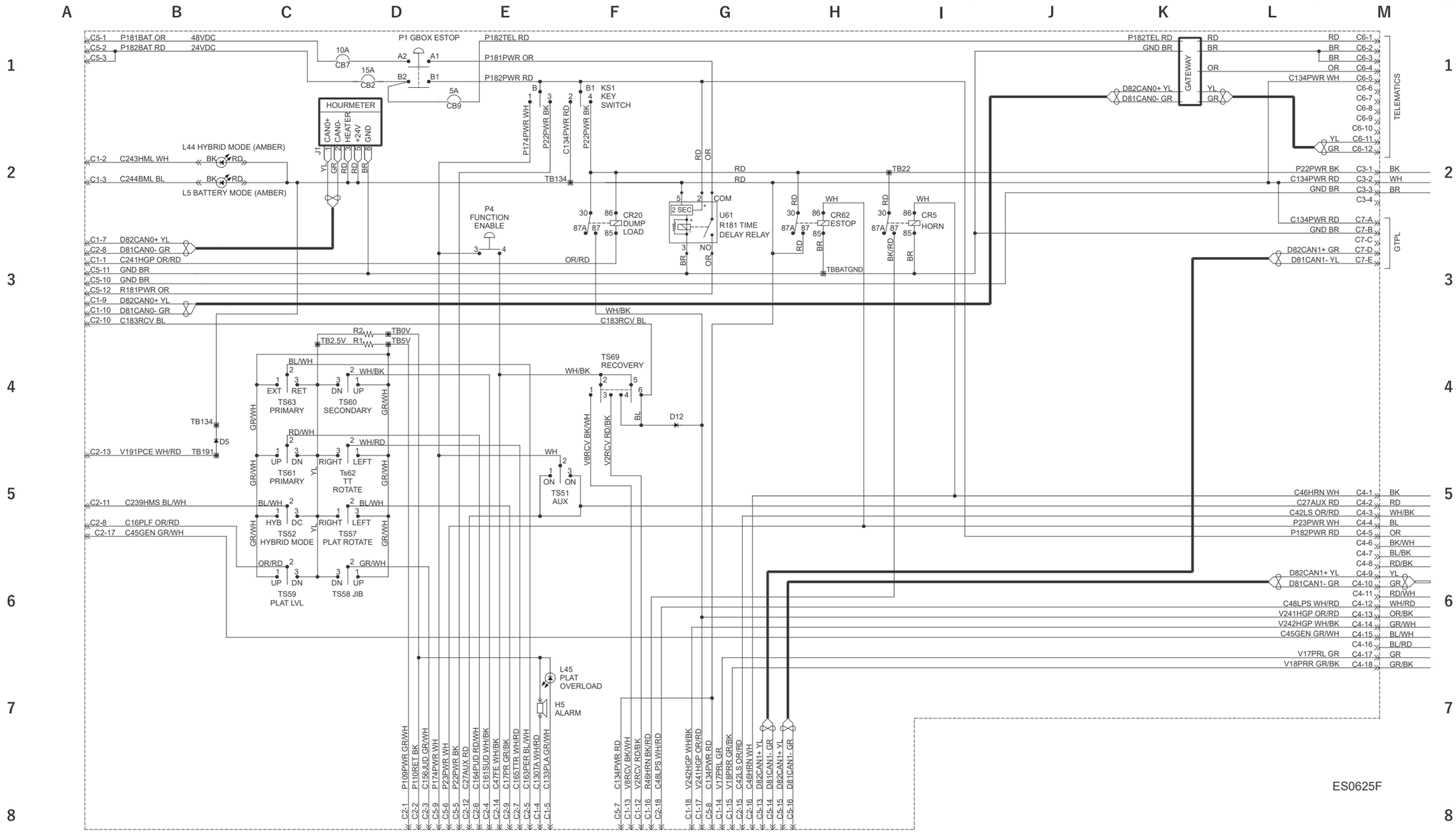
Electrical Schematic, DCON

[from Z60H-3000 to 3505, Z60M-1000 to 1199, Z60D-101 to 125]



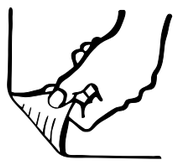
Electrical Schematic, GCON

[from Z60H-3000 to 3505, Z60M-1000 to 1199, Z60D-101 to 125]



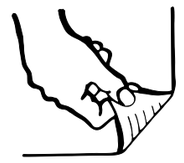
Electrical Schematic, GCON

[from Z60H-3000 to 3505, Z60M-1000 to 1199, Z60D-101 to 125]



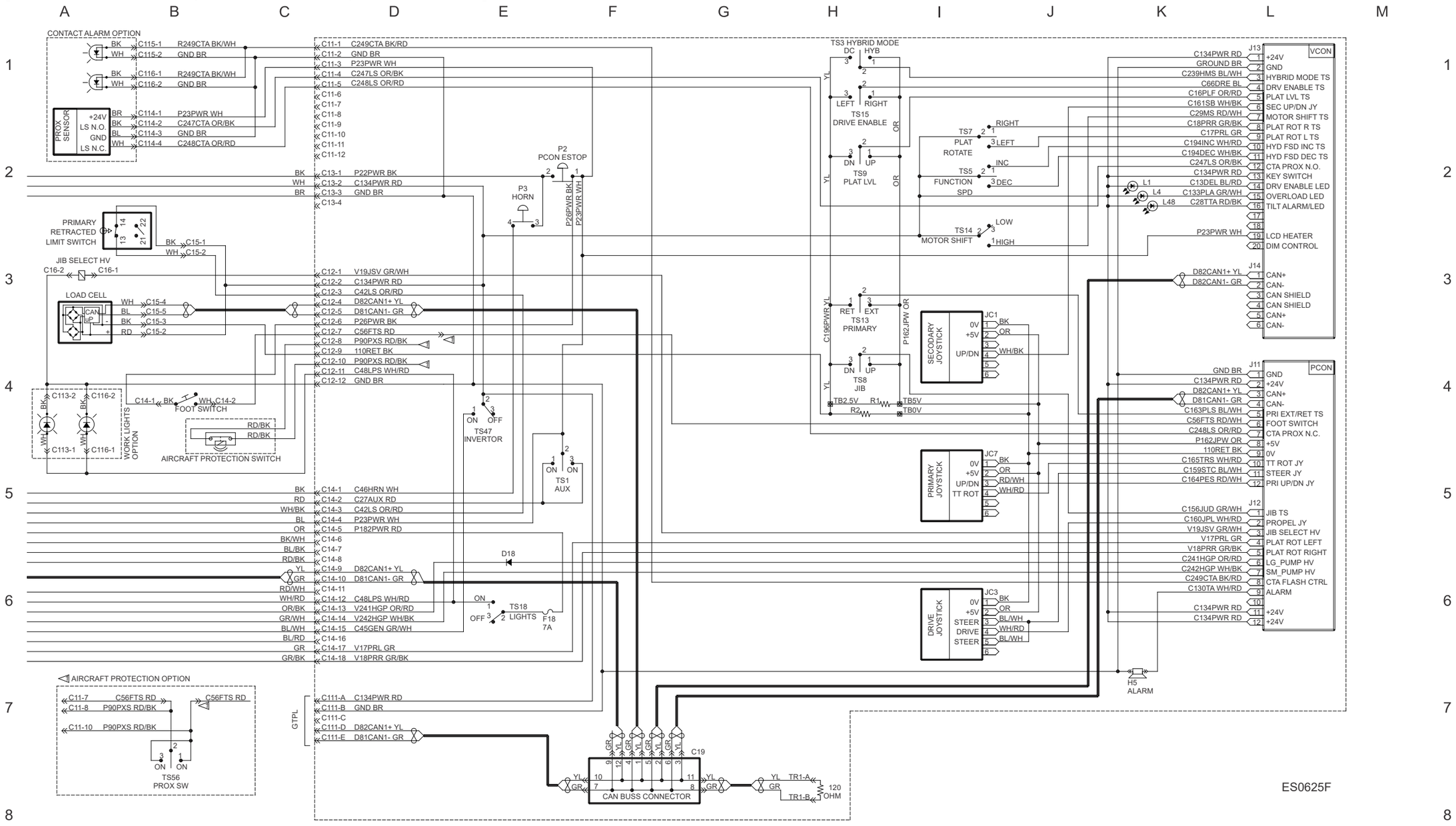
Electrical Schematic, PCON

[from Z60H-3000 to 3505, Z60M-1000 to 1199, Z60D-101 to 125]



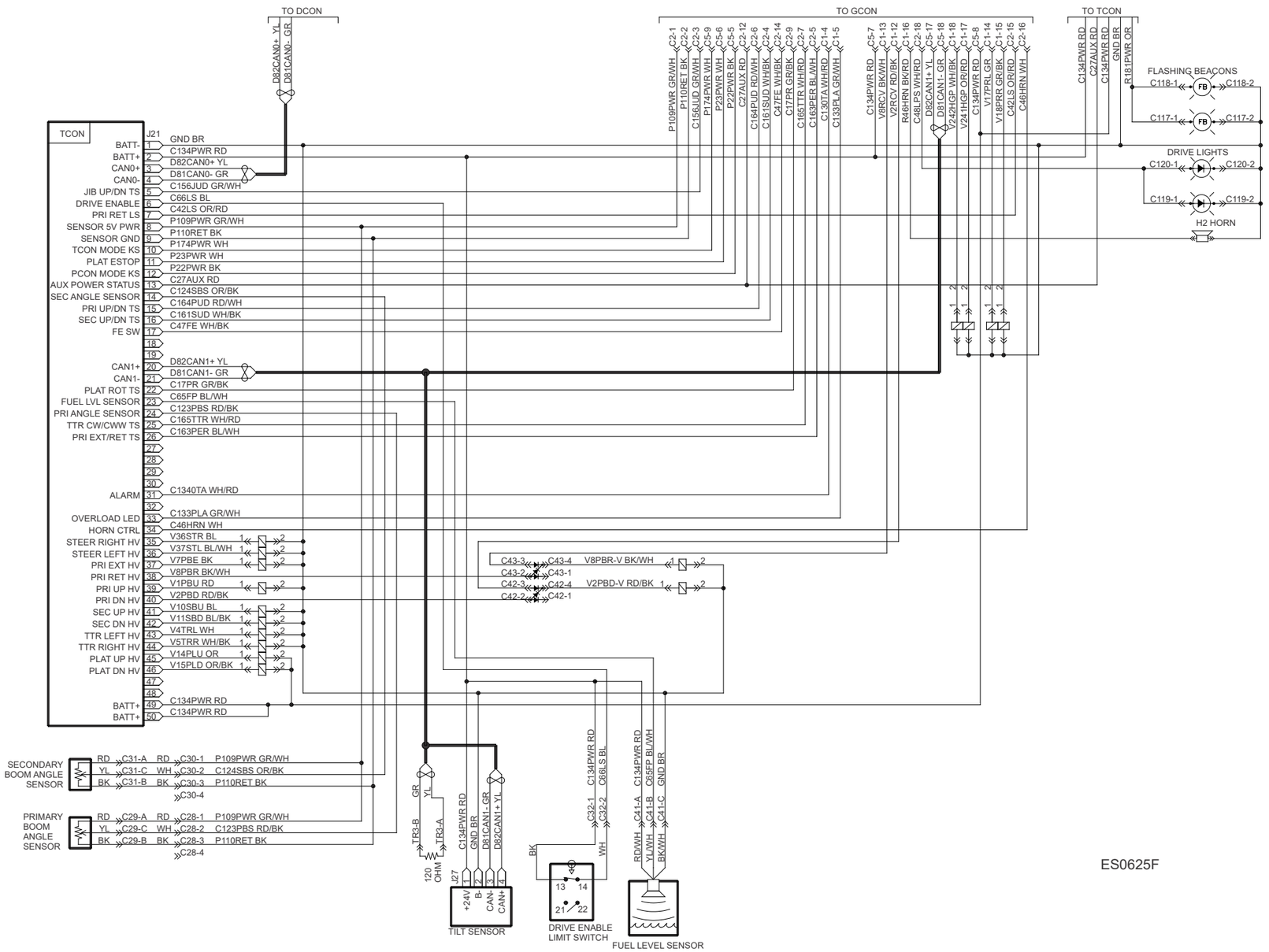
Electrical Schematic, PCON

[from Z60H-3000 to 3505, Z60M-1000 to 1199, Z60D-101 to 125]



Electrical Schematic, TCON

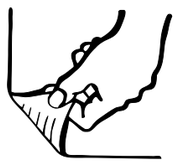
[from Z60H-3000 to 3505, Z60M-1000 to 1199, Z60D-101 to 125]



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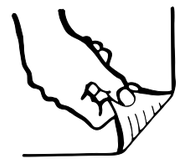
Electrical Schematic, TCON

[from Z60H-3000 to 3505, Z60M-1000 to 1199, Z60D-101 to 125]



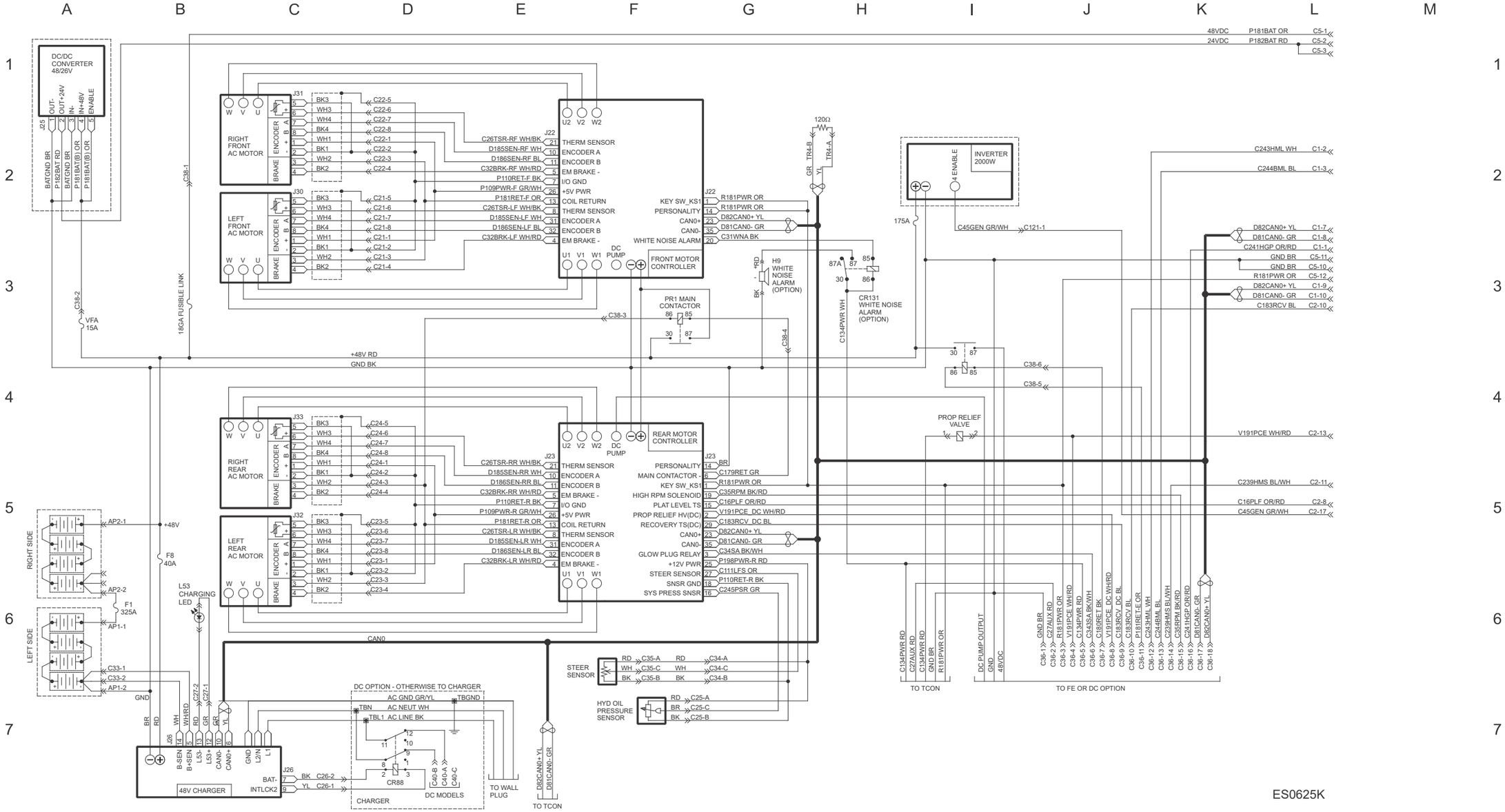
Electrical Schematic, DCON

[from Z60H-3506, Z60M-1200, Z60D-126]



Electrical Schematic, DCON

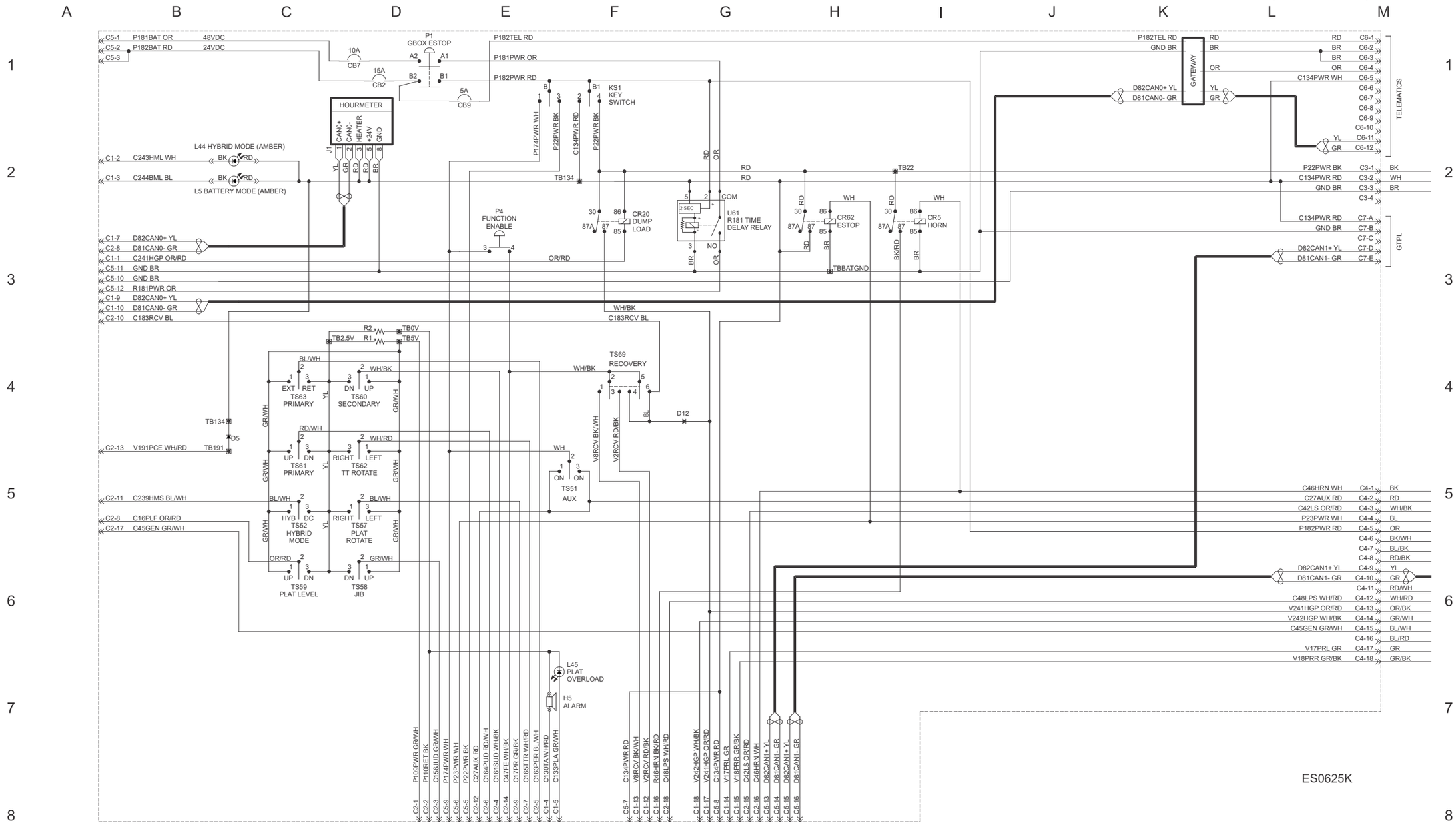
[from Z60H-3506, Z60M-1200, Z60D-126]



ES0625K

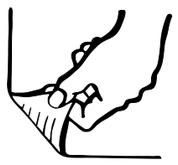
Electrical Schematic, GCON

[from Z60H-3506, Z60M-1200, Z60D-126]



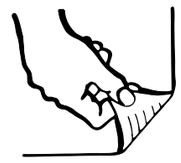
Electrical Schematic, GCON

[from Z60H-3506, Z60M-1200, Z60D-126]



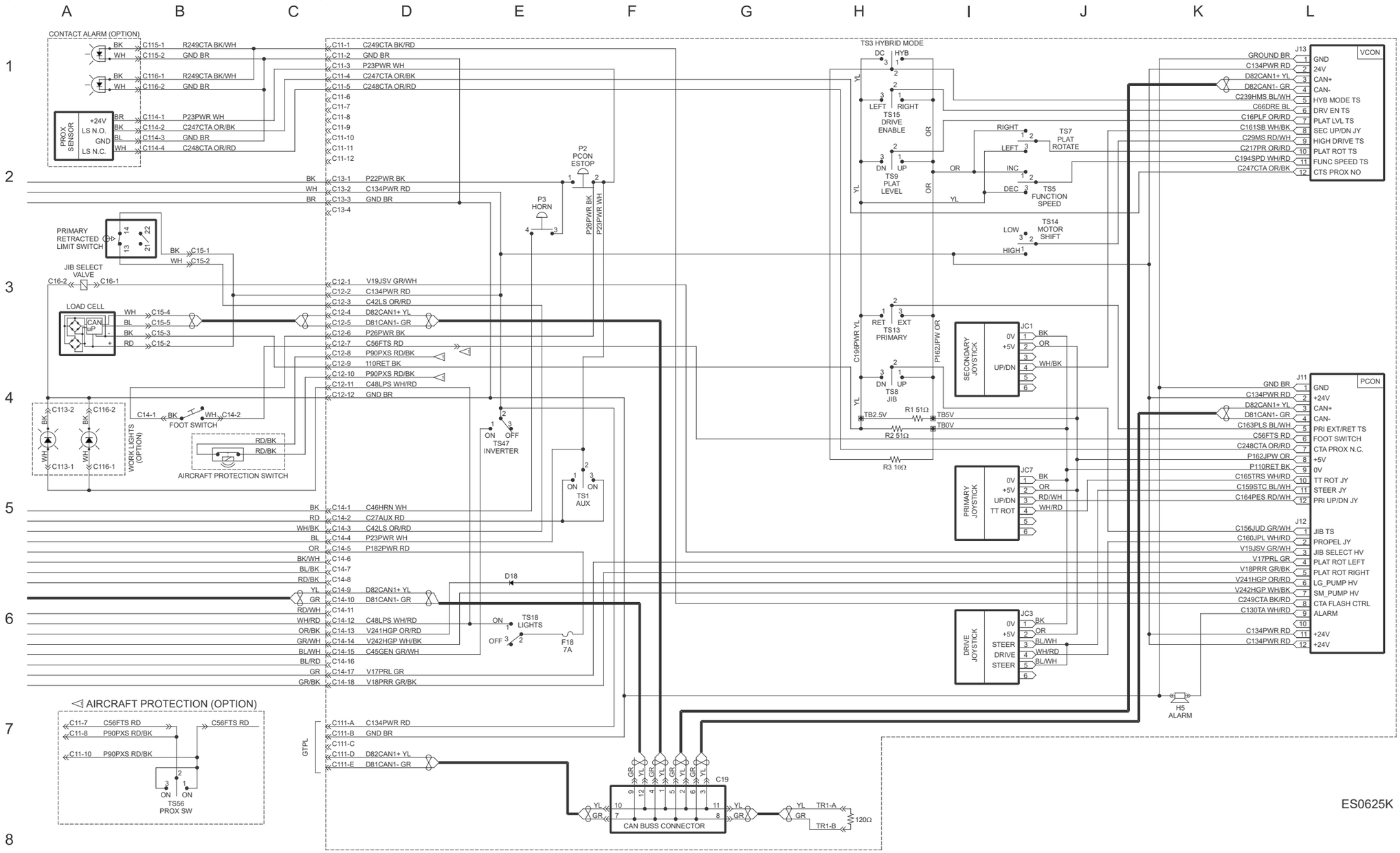
Electrical Schematic, PCON

[from Z60H-3506, Z60M-1200, Z60D-126]



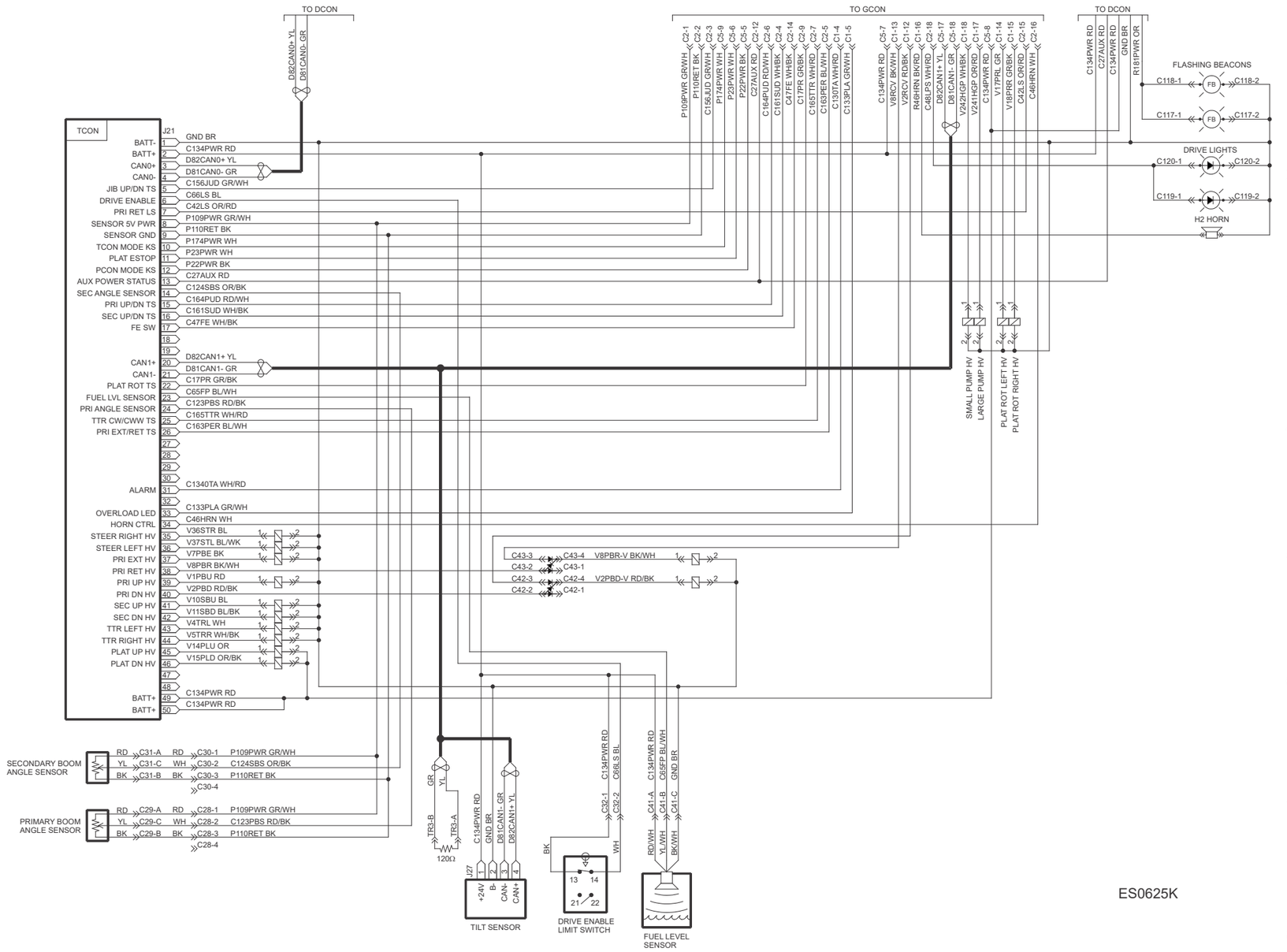
Electrical Schematic, PCON

[from Z60H-3506, Z60M-1200, Z60D-126]



Electrical Schematic, TCON

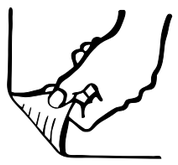
[from Z60H-3506, Z60M-1200, Z60D-126]



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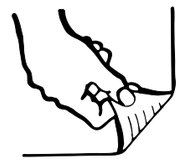
Electrical Schematic, TCON

[from Z60H-3506, Z60M-1200, Z60D-126]



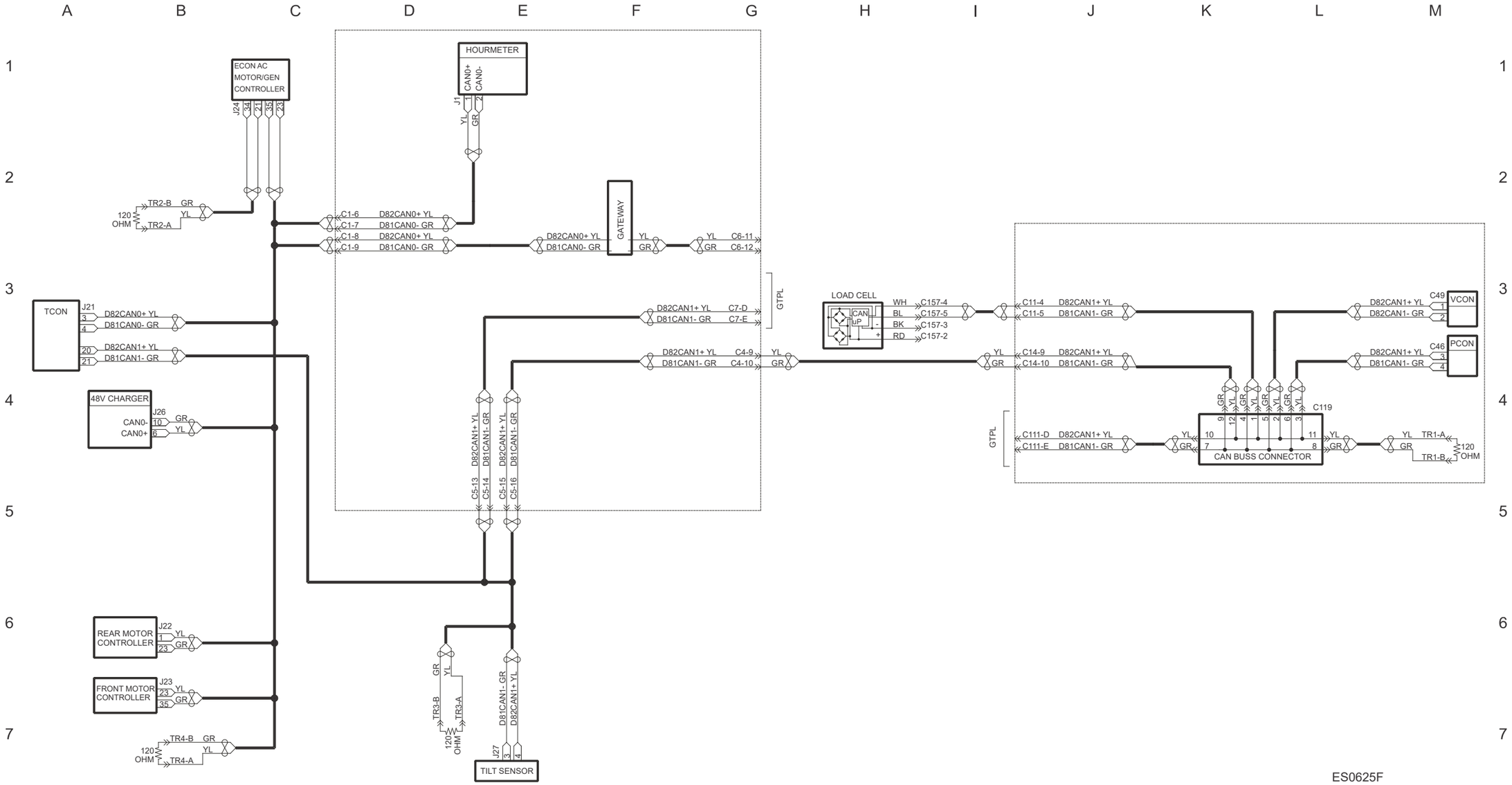
Wiring Diagram, CAN BUS

[from Z60H-3000, Z60M-1000, Z60D-101]



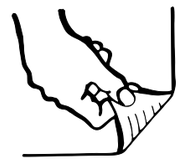
Wiring Diagram, CAN BUS

[from Z60H-3000, Z60M-1000, Z60D-101]



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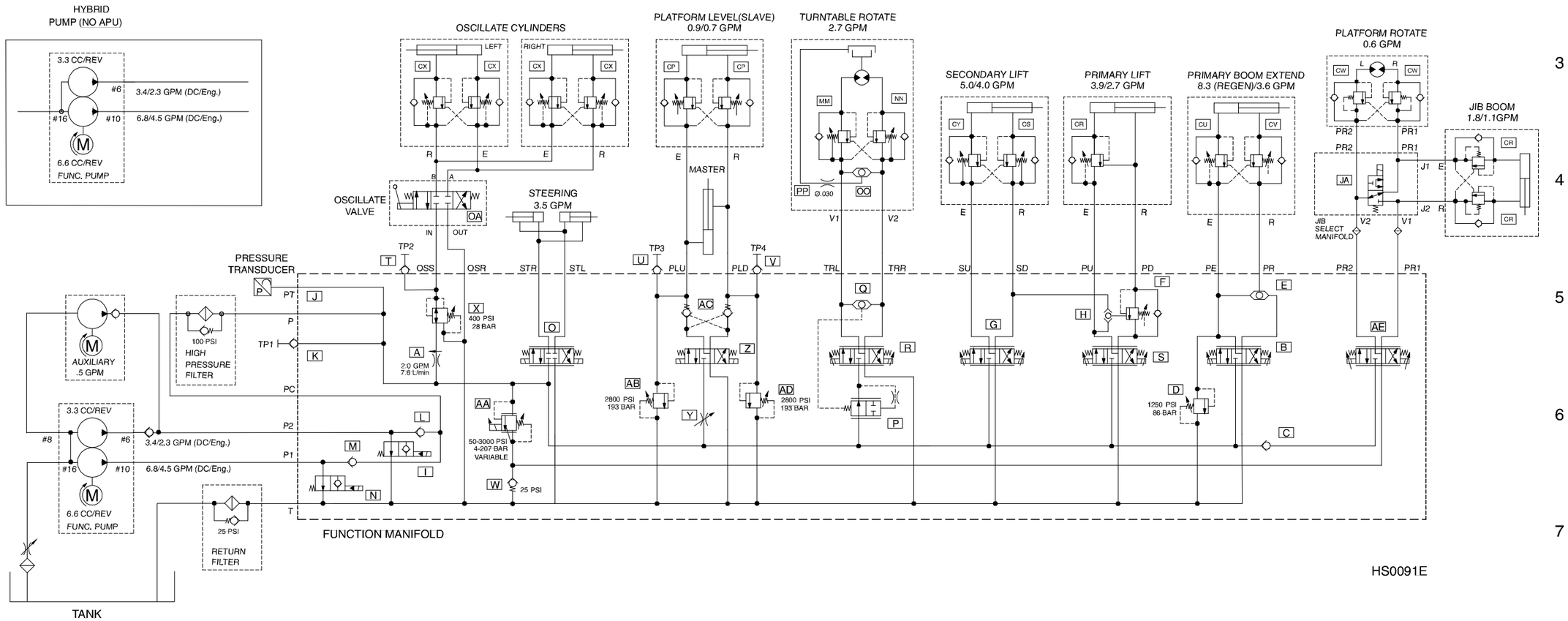
Hydraulic Schematic



Hydraulic Schematic

COUNTERBALANCE VALVES

VALVE	RATIO	PSI / BAR
CP	4.5:1	3500 PSI / 241 BAR
MM NN CS	3:1	1000 PSI / 69 BAR
CR CW	3:1	3000 PSI / 207 BAR
CU	3:1	3500 PSI / 241 BAR
F	4.5:1	1000 PSI / 69 BAR
CX	10:1	3000 PSI / 207 BAR
CY	1.5:1	3000 PSI / 207 BAR
CV	4.5:1	1500 PSI / 103 BAR



HS0091E

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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