A TEREX BRAND

Service and Repair Manual

Serial Number Range

Z®-33/18
DC Power

From Z331815M-101 to Z331816M-1299

From Z3318M-1300 to Z3318M-2668

From Z3318M-2669

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

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

Part No. 1268514GT
Rev A4
January 2020

Introduction

Important

Read, understand and obey the safety rules and operating instructions in the *Genie Z-33/18 Operator's Manual* before attempting any maintenance or repair procedure.

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

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

http://www.genielift.com
e-mail: awp.techpub@terex.com

Find a Manual for this Model

Go to http://www.genielift.com

Use the links to locate Operator's, Parts or Service Manuals.

1268514GT Rev A4 January 2020

First Edition, First Printing

Revision History

Revision	Date	Section	Procedure / Page / Description
A	09/2015		Initial Release
A1	06/2016	Section 2	Specifications 2-3, 2-4
A1	06/2016	Section 3	Repair Procedure 3-37, 3-40
A1	06/2016	Section 4	Fault Codes 4-12
A1	06/2016	Section 5	Schematics 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-12
A2	09/2016	Introduction	Serial Number Legend
A3	12/2017	Section 5	Schematics 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14
A4	01/2020	Section 3	Repair Procedure 3-37
A4	01/2020	Section 4	Fault Codes 4-13,4-14, 4-15, 4-16, 4-17, 4-18, 4-19, 4-20, 4-21, 4-22, 4-23, 4-24, 4-25, 4-26
A4	01/2020	Section 5	Schematics 5-15, 5-16

REFERENCE EXAMPLES:

Section 2_Specifications, Machine Specifications
Section 3_Repair Procedure, 3-2
Section 4_Fault Codes, 4-4
Section 5_Schematics, 5-7

Electronic Version

Click on any procedure or page number highlighted in blue to view the update.

REVISION HISTORY, CONTINUED

Revision	Date	Section	Procedure / Schematic Page / Description

REFERENCE EXAMPLES:

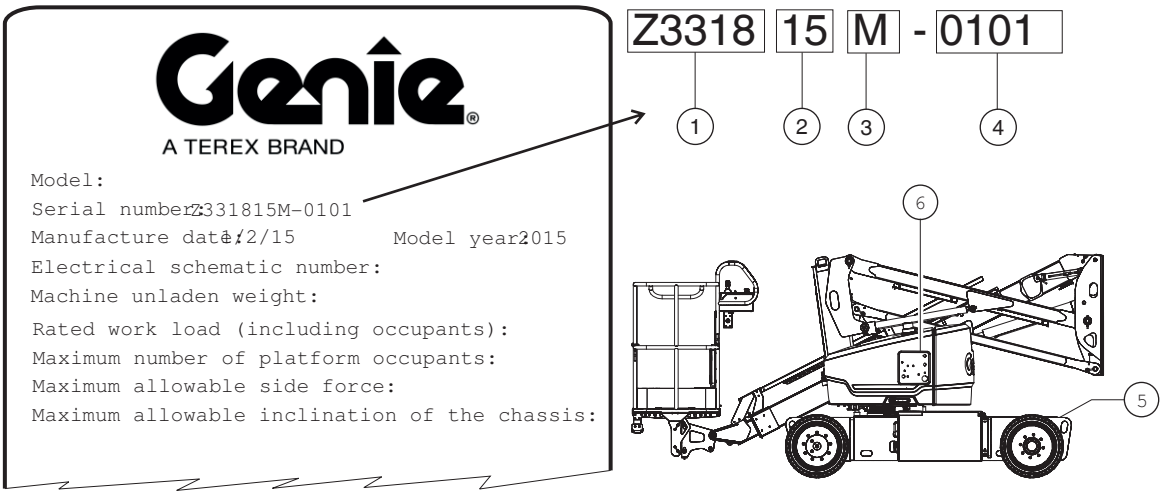
Section 2_Specifications, Machine Specifications
Section 3_Repair Procedure, 3-2
Section 4_Fault Codes, 4-4
Section 5_Schematics, 5-7

Electronic Version

Click on any procedure or page number highlighted in blue to view the update.

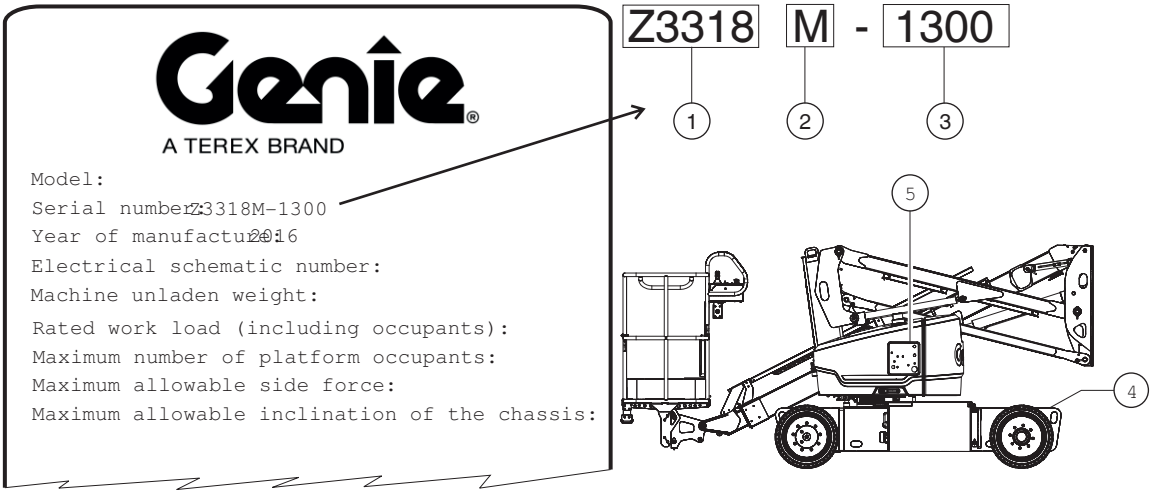
Serial Number Legend

To August 31, 2016



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

From September 1, 2016



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

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Safety Rules

Danger

Failure to obey the instructions and safety rules in this manual and the appropriate Operator's Manual on your machine will result in death or serious injury.
Many of the hazards identified in the Operator's Manual are also safety hazards when maintenance and repair procedures are performed.

Do Not Perform Maintenance Unless:

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

SAFETY RULES

Personal Safety

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

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

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

⚠DANGER Indicates an 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

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

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

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

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

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

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

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Specifications

Machine Specifications

Tires and wheels	
Tire size (solid rubber)	(22x9x17 in) 56x23x43 cm
Overall tire diameter	22 in 55,9 cm
Wheel diameter	16 in 40,6 cm
Wheel width	9 in
Wheel lugs	front 8 @ $^{5}/_{8}$ - 18 rear 9 @ $^{5}/_{8}$ - 18
Lug nut torque (lubricated) (dry)	94 ft-lbs - 127,5 Nm 125 ft-lbs - 169,5 Nm

Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.

Fluid capacities	
Hydraulic tank	6 gallons 20,8 liters
Hydraulic system (including tank)	8 gallons 28,4 liters
Drive hubs	23 fl oz 0,68 liters
Drive hub oil type	EP 80-90W gear oil API service classification GL5

Batteries	
Type	6V DC
Group size	L16GH
Quantity	8
Capacity	350 Ah
Reserve capacity @ 25A rate	750 min
Weight, each	106 lbs 48 kg

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

SPECIFICATIONS

Performance Specifications

Drive speed, stowed	3.23 mph 5,2 km/h 40 ft / 8.5 sec 12,2 m / 8,5 sec
Drive speed, boom raised or extended	0.54 mph 0,86 km/h 40 ft / 50.8 sec 12,2 m / 50,8 sec
Drive speed, boom extended and turntable out the drive enable zone	0.14 mph 0,23 km/h 40 ft / 190.6 sec 12,2 m / 190,6 sec
Braking distance, maximum on paved surface	5 to 7 ft 1,5 to 2 m
Gradeability	See Operator's Manual

Boom function speeds (from platform controls and one operator on the platform)	
Primary boom up, retracted (-43° to 71°)	36 to 40 seconds
Primary boom down, retracted (-43° to 71°)	46 to 50 seconds
Primary boom up, extended (-43° to 71°)	48 to 52 seconds
Primary boom down, extended (-43° to 71°)	55 to 59 seconds
Secondary boom up	20 to 24 seconds
Secondary boom down	20 to 24 seconds
Primary boom extend	18 to 20 seconds
Primary boom retract	18 to 20 seconds
Turntable rotate, 360°	62 to 65 seconds
Platform level (10° range of motion)	10 to 12 seconds

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Hydraulic Specifications

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

NOTICE

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

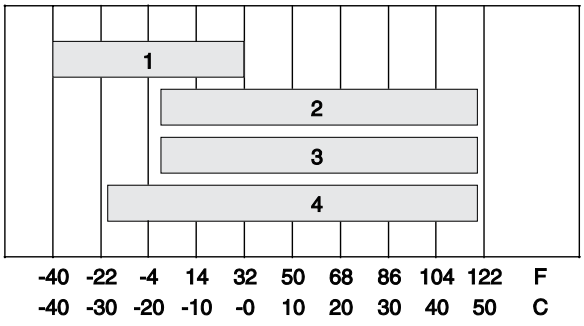
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond it's maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

NOTICE

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

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

Hydraulic Fluid Temperature Range



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

SPECIFICATIONS

Chevron Rando HD Premium Oil MV Fluid Properties

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

Chevron 5606A Hydraulic Oil Fluid Properties

ISO Grade	15
Viscosity index	300
Kinematic Viscosity cSt @ 200°F / 100°C cSt @ 104°F / 40°C cSt @ -40°F / -40°C	 5.5 15.0 510
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	154
Kinematic Viscosity cSt @ 200°F / 100°C cSt @ 104°F / 40°C	 8.0 44.4
Flash point	482°F / 250°C
Pour point	-49°F / -45°C
Maximum continuous operating temperature	180°F / 82°C

Shell Tellus S4 VX Fluid Properties

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

UNCON Hydrolube HP-5046 Fluid Properties

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

SPECIFICATIONS

Hydraulic Components Specifications

Functions Pump	
Type:	fixed displacement gear pump
Displacement	0.244 cu in 4 cc
Flow rate @ 3000 rpm	3.2 gpm 12 l/min
High pressure filter	Beta 3 ≥ 200 with 101 psi / 7 bar bypass

Function Manifold	
Proportional relief pressure, variable	50 to 3000 psi 3,4 to 207 bar
Primary boom down relief valve pressure	1885 psi 130 bar
Secondary boom down relief valve pressure	1885 psi 130 bar
Platform level flow regulator	0.6 gpm 2,27 l/min

Auxiliary pump	
Type:	fixed displacement gear pump
Displacement	0.5 gpm 1,9 l/min

Manifold Component Specifications

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

Valve Coil Resistance Specification

Description	Specification
Proportional solenoid valve, 3 position 4 way, 20V DC	24 Ω
Solenoid valve, 3 position 4 way, 20V DC	24 Ω
Proportional solenoid relief valve	22 Ω

SPECIFICATIONS

Machine Torque Specifications

Axles	
M16x2 mounting bolt, GR 8.8 (dry)	166 ft-lbs 226 Nm
M16x2 mounting bolt, GR 8.8 (lubricated)	125 ft-lbs 170 Nm
M20 x 2.5 steer link bolt, GR 8.8 (dry)	180 ft-lbs 244 Nm
M20 x 2.5 steer link bolt, GR 8.8 (lubricated)	140 ft-lbs 189 Nm
Turntable rotate assembly	
Rotate bearing mounting bolts, lubricated	173 ft-lbs 235 Nm
Rotate bearing motor/brake mounting bolts, lubricated	87 ft-lbs 110 Nm
Drive motor and hubs	
Drive hub mounting bolts, lubricated	180 ft-lbs 244 Nm
Drive motor mounting bolts, lubricated	27.9 ft-lbs 37,8 Nm

Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.

SPECIFICATIONS

Hydraulic Hose and Fitting Torque Specifications

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

Seal-Lok™ Fittings
(hose end - ORFS)

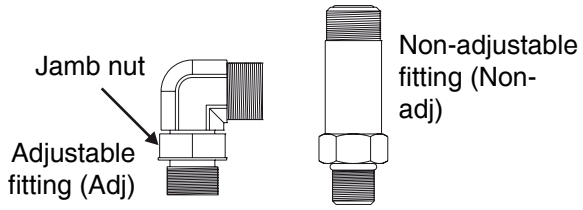
SAE Dash size	Torque
-4	10 ft-lbs / 13.6 Nm
-6	30 ft-lbs / 40.7 Nm
-8	40 ft-lbs / 54.2 Nm
-10	60 ft-lbs / 81.3 Nm
-12	85 ft-lbs / 115 Nm
-16	110 ft-lbs / 150 Nm
-20	140 ft-lbs / 190 Nm
-24	180 ft-lbs / 245 Nm

JIC 37° Fittings
(swivel nut or hose connection)

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

SAE O-ring Boss Port
(tube fitting - installed into Aluminum)
(all types)

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



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-rings used in the Parker Seal Lok™ fittings and hose ends are custom-size O-rings. They are not standard SAE 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 that the face seal O-ring 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 per given size as shown in the table.

6 Operate all machine functions and inspect the hoses and fittings and related components to confirm that 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 Make a reference mark on one of the flats of the hex nut, and continue it on to the body hex fitting with a permanent ink marker. Refer to Figure 1.

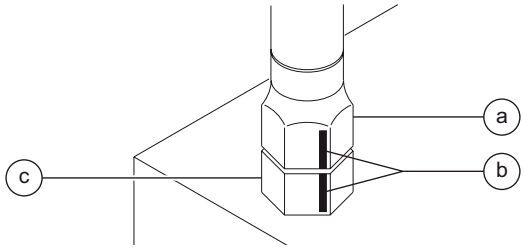


Figure 1

a hex nut
b reference mark
c 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 Figure 2.

Note: Use the JIC 37° Fittings table on the previous page to determine the correct number of flats for the proper tightening position.

Note: The marks indicate that 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.

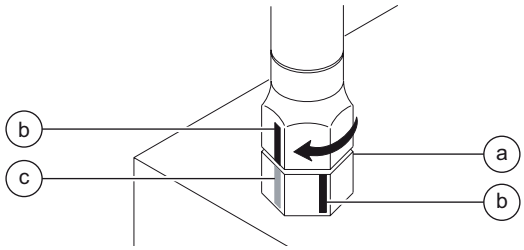


Figure 2

a body hex fitting
b reference mark
c 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 hoses and fittings and related components to confirm that there are no leaks.

SPECIFICATIONS

SAE FASTENER TORQUE CHART

•This chart is to be used as a guide only unless noted elsewhere in this manual•

SIZE	THREAD	Grade 5				Grade 8				A574 High Strength Black Oxide Bolts	
		LUBED		DRY		LUBED		DRY		LUBED	
		in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
1/4	20	80	9	100	11.3	110	12.4	140	15.8	130	14.7
	28	90	10.1	120	13.5	120	13.5	160	18	140	15.8
		LUBED		DRY		LUBED		DRY		LUBED	
		ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
5/16	18	13	17.6	17	23	18	24	25	33.9	21	28.4
	24	14	19	19	25.7	20	27.1	27	36.6	24	32.5
3/8	16	23	31.2	31	42	33	44.7	44	59.6	38	51.5
	24	26	35.2	35	47.4	37	50.1	49	66.4	43	58.3
7/16	14	37	50.1	49	66.4	50	67.8	70	94.7	61	82.7
	20	41	55.5	55	74.5	60	81.3	80	108.4	68	92.1
1/2	13	57	77.3	75	101.6	80	108.4	110	149	93	126
	20	64	86.7	85	115	90	122	120	162	105	142
9/16	12	80	108.4	110	149	120	162	150	203	130	176
	18	90	122	120	162	130	176	170	230	140	189
5/8	11	110	149	150	203	160	217	210	284	180	244
	18	130	176	170	230	180	244	240	325	200	271
3/4	10	200	271	270	366	280	379	380	515	320	433
	16	220	298	300	406	310	420	420	569	350	474
7/8	9	320	433	430	583	450	610	610	827	510	691
	14	350	474	470	637	500	678	670	908	560	759
1	8	480	650	640	867	680	922	910	1233	770	1044
	12	530	718	710	962	750	1016	990	1342	840	1139
1 1/8	7	590	800	790	1071	970	1315	1290	1749	1090	1477
	12	670	908	890	1206	1080	1464	1440	1952	1220	1654
1 1/4	7	840	1138	1120	1518	1360	1844	1820	2467	1530	2074
	12	930	1260	1240	1681	1510	2047	2010	2725	1700	2304
1 1/2	6	1460	1979	1950	2643	2370	3213	3160	4284	2670	3620
	12	1640	2223	2190	2969	2670	3620	3560	4826	3000	4067

METRIC FASTENER TORQUE CHART

•This chart is to be used as a guide only unless noted elsewhere in this manual•

Size (mm)	Class 4.6 (4.6)				Class 8.8 (8.8)				Class 10.9 (10.9)				Class 12.9 (12.9)			
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
5	16	1.8	21	2.4	41	4.63	54	6.18	58	6.63	78	8.84	68	7.75	91	10.3
6	19	3.05	36	4.07	69	7.87	93	10.5	100	11.3	132	15	116	13.2	155	17.6
7	45	5.12	60	6.83	116	13.2	155	17.6	167	18.9	223	25.2	1.95	22.1	260	29.4
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
8	5.4	7.41	7.2	9.88	14	19.1	18.8	25.5	20.1	27.3	26.9	36.5	23.6	32	31.4	42.6
10	10.8	14.7	14.4	19.6	27.9	37.8	37.2	50.5	39.9	54.1	53.2	72.2	46.7	63.3	62.3	84.4
12	18.9	25.6	25.1	34.1	48.6	66	64.9	88	69.7	94.5	92.2	125	81	110	108	147
14	30.1	40.8	40	54.3	77.4	105	103	140	110	150	147	200	129	175	172	234
16	46.9	63.6	62.5	84.8	125	170	166	226	173	235	230	313	202	274	269	365
18	64.5	87.5	86.2	117	171	233	229	311	238	323	317	430	278	377	371	503
20	91	124	121	165	243	330	325	441	337	458	450	610	394	535	525	713
22	124	169	166	225	331	450	442	600	458	622	612	830	536	727	715	970
24	157	214	210	285	420	570	562	762	583	791	778	1055	682	925	909	1233

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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.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Boom in stowed position
  - Turntable rotated with the boom between the non-steer wheels
  - Turntable secured with the turntable rotation lock
  - Key switch in the off position with the key removed
  - Wheels chocked
  - All external AC power supply disconnected from the machine

About This Section

Most of the procedures in this section should only be performed by a 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 an 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.

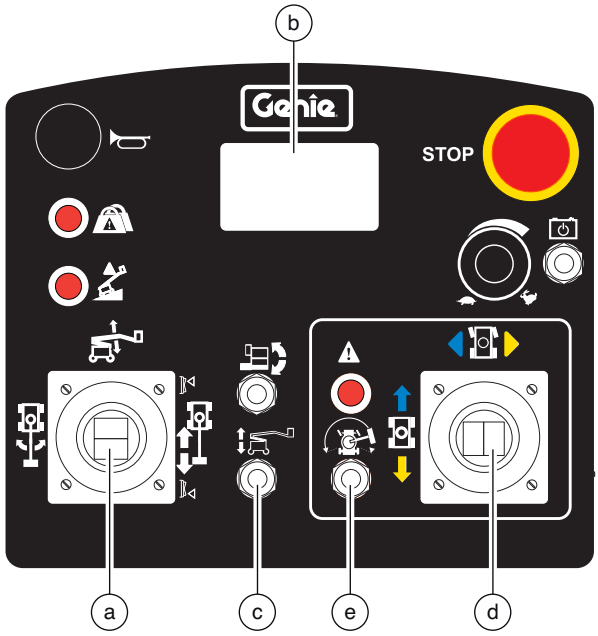
Platform Controls

The control system consists of a platform controller (PCON) located inside the platform control box, a turntable controller (TCON) located below the ground control box and two AC inverter/ motor controllers.

Input from the operator at the platform controls is communicated to the turntable controller (TCON) for processing via a CAN BUS connection. The TCON then sends an output signal to the appropriate machine function being activated.

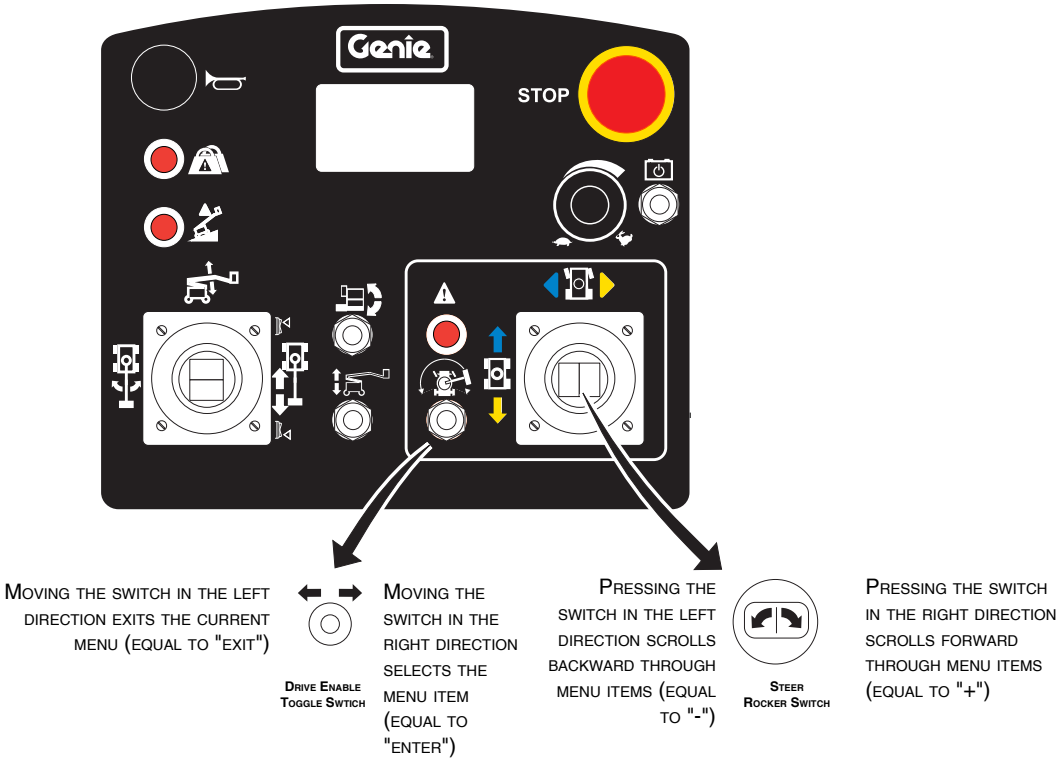
The joystick controllers utilize Hall Effect technology and require no external adjustment. The operating parameters of the joysticks are stored in memory at TCON. If a joystick controller fault occurs or if a joystick is replaced, it will need to be calibrated before that particular machine function will operate. See 1-2, How to Calibrate a Joystick.

The platform control box also contains a liquid crystal display (LCD) screen. The LCD display is able to show machine fault information, operating parameters and various other information useful to the operator and to the service technician. Various machine operating parameters can be viewed, modified or calibrated using the LCD display. Refer to Section 5, *Fault Codes* for a list of fault codes and additional information.



a primary boom up/down joystick with thumb rocker switch for boom extend/ retract
b LCD visual display (VCON)
c secondary boom up/down toggle switch
d drive joystick with thumb rocker switch for steer left/right
e drive enable toggle switch

PLATFORM CONTROLS



Important

These machines are configured for specific markets. Any attempt to modify or access any configuration settings other than those listed in the following instructions will constitute an unapproved modification and may:

1. Cause the machine to be out of compliance with the requirements of prevailing national standards and regulations.
2. Affect the performance of the machine.

Only modify the allowed configurations listed below in accordance with the following instructions.

Written approval must be obtained from Genie Industries prior to making any change to configuration settings other than those listed below. Consult Genie Service Department for additional information.

PLATFORM CONTROLS

1-1
Joysticks

How to Calibrate a Joystick

The joysticks on this machine utilize digital Hall Effect technology for proportional control. If a joystick is disconnected or replaced, its calibration is calculated by control system following an automatic procedure.

How to Adjust the Function Threshold Setting

The threshold setting of a function is the minimum output at which a function proportional valve can open and allow the function to operate.

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 while holding the steer rocker switch in the right direction.

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

⊙ Result: The display will show FAULTS.

6 Momentarily activate the steer rocker switch 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 PUMP SETTINGS is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction until THRESHOLD CURRENT is shown on the display.

9 Momentarily activate the drive enable toggle switch in the right direction to enter the threshold calibration mode.

Toggle switch controlled functions:

Begin this procedure with the rotary speed control at the plaform controls turned fully in the counterclockwise direction.

10 Press down on the foot switch and activate the function in the direction to be corrected. Slowly turn the rotary speed control in the clockwise direction just until the function begins to move. Momentarily activate the drive enable toggle switch in the right direction.

⊙ Result: The alarm should sound indicating the setting has been saved.

Joystick controlled functions:

Begin this procedure with the rotary speed control at the plaform controls turned fully in the clockwise direction.

11 Press down on the foot switch and slowly move the joystick in the direction to be corrected until the function begins to move. Momentarily activate the drive enable toggle switch in the right direction.

⊙ Result: The alarm should sound indicating the setting has been saved.

To exit programming mode:

12 Move and hold the drive enable toggle switch in the left direction until the display screen returns to SYSTEM READY.

PLATFORM CONTROLS

How to Adjust the Maximum Speed Setting

The maximum speed setting of a joystick and toggle switch controls the maximum speed of a machine function. Whenever a hydraulic cylinder, drive motor or hydraulic pump is replaced, the maximum speed setting should be adjusted to maintain optimum performance. The maximum speed settings can be changed to compensate for hydraulic pump wear and to maintain peak performance from the machine.

There are two types of max speed settings.

High flow functions: Secondary up / down and extend / retract.

Low flow functions: Primary up / down and turntable rotate.

Begin this procedure with the rotary speed control at the platform turned fully in the clockwise direction.

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 while holding the steer rocker switch in the right direction.

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

⊙ Result: The display will show FAULTS.

6 Momentarily activate the steer rocker switch 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 PUMP SETTINGS is shown on the display.

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

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

10 Momentarily activate the drive enable toggle switch in the right direction to enter VALVE MAXIMUM CURRENT calibration mode.

High flow functions:

11 Momentarily activate one of the high flow functions full stroke.

⊙ Result: The display will show the function direction and milliamps.

12 Press down on the foot switch and activate the same function in the same direction again.

⊙ Result: Alarm sounds, continue to step 15.

⊗ Result: Alarm does not sound, continue to step 13.

13 Release the footswitch. Momentarily activate the steer rocker in the left direction to decrease the value shown on the display in small increments. Continue to step 14.

14 Press down on the foot switch and activate the same function in the same direction. Repeat step 13 until the alarm sounds while function is in motion. Then release the foot switch and momentarily activate the steer rocker switch in the right direction 3 times. Continue to step 17.

15 Release the footswitch. Momentarily activate the steer rocker in the right direction to increase the value shown on the display in small increments. Continue to step 16.

16 Press down on the foot switch and activate the same function in the same direction. Repeat step 15 until the alarm no longer sounds while function is in motion. Then momentarily activate the steer rocker switch in the right direction 2 times. Continue to step 17.

17 Momentarily activate the drive enable toggle switch in the right direction to save the new setting.

⊙ Result: The alarm should sound indicating the setting has been saved.

18 Repeat steps 11 through 17 as needed for high flow functions.

Low flow functions:

19 Momentarily activate one of the low flow functions full stroke.

⊙ Result: The display will show the function, direction and milliamps.

20 Start a timer, press down on the foot switch and activate the same function in the same direction again. Record the time it takes for that function to complete a full cycle; i.e. primary up.

21 Compare the machine function time with the function times listed in Section 2, *Specifications*. Determine whether the function time needs to increase or decrease.

22 To adjust a function speed, release the foot switch. Momentarily move the steer rocker switch in the right direction to increase or momentarily in the left direction to decrease.

Each time the steer rocker switch is momentarily pressed, the time will change in 5mA to 10mA increments.

23 When function times have been achieved, activate the drive enable toggle switch to the right to save your changes.

⊙ Result: The alarm should sound indicating the setting has been saved.

24 Repeat steps 19 through 23 as needed for low flow functions.

To exit programming mode:

25 Move and hold the drive enable toggle switch in the left direction until the display screen returns to SYSTEM READY.

PLATFORM CONTROLS

How to Adjust the Function Ramp Up Time Setting

The ramp up time setting of a function controls the time at which it takes for the function to reach maximum output, when moved out of the neutral position. The ramp up time of a function can be changed to compensate for hydraulic pump wear to maintain peak performance from the machine.

Begin this procedure with the rotary speed control at the platform turned fully in the clockwise direction.

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 while holding the steer rocker switch in the right direction.

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

⊙ Result: The display will show FAULTS.

6 Momentarily activate the steer rocker switch 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 PUMP SETTINGS is shown on the display.

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

9 Momentarily activate the steer rocker switch in the right direction until RAMP UP TIME is shown on the display.

10 Momentarily activate the drive enable toggle switch in the right direction to enter RAMP UP TIME calibration mode.

11 Press down on the foot switch and momentarily activate the function to be corrected.

⊙ Result: The display will show the function, direction and the actual stored value.

12 Press down on the foot switch, start a timer and activate the same function in the same direction. Note how long it takes the function to reach maximum speed. This is the ramp up time.

13 Compare the function ramp up time with the table on the next page and determine whether the ramp up time needs to increase or decrease.

14 To adjust the ramp up time setting, release the foot switch. Momentarily move the steer rocker switch in the right direction to increase or momentarily in the left direction to decrease.

Each time the steer rocker switch is momentarily pressed, the time will change in 0.1 second increments.

Changing the ramp up time setting in one direction will also change the opposite direction.

15 When ramp time has been achieved, activate the drive enable toggle switch to the right to save your changes.

⊙ Result: The alarm should sound indicating the setting has been saved.

16 Repeat steps 11 through 13 for each machine function.

To exit programming mode:

17 Move and hold the drive enable toggle switch in the left direction until the display screen returns to SYSTEM READY.

Ramp up time (factory settings)	
Primary boom up/down	
accelerate	1 second
Secondary boom up/down	
accelerate	1 second
Turntable rotate	
accelerate	1 second
Extend/Retract	
accelerate	0,5 second

How to Adjust the Function Ramp Down Time Setting

The ramp down time setting of a function controls the time at which it takes for the function to come to a complete stop, when returned to the neutral position. The ramp down time of a function can be changed to compensate for hydraulic pump wear to maintain peak performance from the machine.

Begin this procedure with the rotary speed control at the platform turned fully in the clockwise direction.

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 while holding the steer rocker switch in the right direction.

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

⊙ Result: The display will show FAULTS.

6 Momentarily activate the steer rocker switch 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 PUMP SETTINGS is shown on the display.

PLATFORM CONTROLS

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

9 Momentarily activate the steer rocker switch in the right direction until RAMP DOWN TIME is shown on the display.

10 Momentarily activate the drive enable toggle switch in the right direction to enter RAMP DOWN TIME calibration mode.

11 Press down on the foot switch and momentarily activate the function to be corrected.

⊙ Result: The display will show the function, direction and the actual stored value.

12 Press down on the foot switch, start a timer and activate the same function in the same direction. Note how long it takes the function to reach maximum speed. This is the ramp down time.

13 Compare the function ramp down time with the table on the right and determine whether the ramp up time needs to increase or decrease.

14 To adjust the ramp down time setting, release the foot switch. Momentarily move the steer rocker switch in the right direction to increase or momentarily in the left direction to decrease.

Each time the steer rocker switch is momentarily pressed, the time will change in 0.1 second increments.

Changing the ramp up time setting in one direction will also change the opposite direction.

15 When ramp time has been achieved, activate the drive enable toggle switch to the right to save your changes.

⊙ Result: The alarm should sound indicating the setting has been saved.

16 Repeat steps 11 through 13 for each machine function.

To exit programming mode:

17 Move and hold the drive enable toggle switch in the left direction until the display screen returns to SYSTEM READY.

Ramp down time (factory settings)	
Primary boom up/down decelerate	1,5 second
Secondary boom up/down decelerate	0,65 second
Turntable rotate decelerate	0,25 second
Extend/Retract decelerate	0,5 second

How to Adjust the Max Speed Drive Settings

Adjusting the max speed setting will only affect the stowed drive speed. Elevated drive speed is not adjustable.

Begin this procedure with the machine in the stowed position.

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

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

⊙ Result: The display will show FAULTS.

5 Momentarily activate the steer rocker switch in the right direction until SETTINGS is shown on the display.

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

7 Momentarily activate the steer rocker switch in the right direction until you see the AUTHORIZATION screen.

8 Momentarily activate the drive enable toggle switch in the right direction to enter the authorization screen.

9 Using the rocker switch on the drive joystick, momentarily activate steer left, left, right, and left.

⊙ Result: The alarm will sound.

10 Momentarily activate the steer rocker switch in the right direction until you see the DRIVE SETTINGS screen.

11 Momentarily activate the drive enable toggle switch in the right direction to enter the DRIVE SETTINGS menu.

⊙ Result: The display will show ACCEL RAMP.

12 Momentarily activate the steer rocker switch in the right direction until you see the MAX SPEED screen.

13 Momentarily activate the drive enable toggle switch in the right direction to enter the MAX SPEED menu.

14 Create start and finish lines by marking two lines on the ground 40 feet / 12.2 m apart.

15 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the start and finish lines.

16 Bring the machine to maximum drive speed before reaching the start line. Begin timing when your reference point on the machine crosses the start line.

PLATFORM CONTROLS

17 Continue at full speed and note the time when the machine reference point passes over the finish line. Release the foot switch. Refer to Section 2, *Specifications*.

⊙ Result: The drive speed meets specification. Continue to step 19.

⊠ Result: The drive speed does not meet specification. Continue to step 18 to adjust the drive speed.

18 Momentarily move the steer rocker switch in the right direction to increase or momentarily in the left direction to decrease. Repeat steps 16 and 17.

Note: Adjusting this setting will affect the stowed drive speed in forward and reverse.

19 Momentarily activate the drive enable toggle switch to the right direction to save your changes.

⊙ Result: The alarm should sound indicating the setting has been saved.

To exit programming mode:

20 Move and hold the drive enable toggle switch in the left direction until the display screen returns to SYSTEM READY.

Platform Components

2-1 Platform Leveling Slave Cylinder

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

How to Remove the Platform Leveling Slave Cylinder

Before cylinder removal is considered, bleed the slave cylinder to be sure there is no air in the closed loop hydraulic circuit.

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

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

2 Raise the boom slightly and place blocks under the platform for support. Lower the boom until the platform is resting on the blocks.

3 Tag and disconnect the hydraulic hoses to the slave cylinder at the union and connect them together with a connector. Cap the fittings on the cylinder hoses.

⚠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 external snap rings from the rod-end pivot pin. Do not remove the pin.

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

6 Place a block of wood under the barrel of the slave cylinder for support.

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

⚠WARNING Crushing hazard. The platform could fall if not properly supported.

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

9 Carefully pull the cylinder with hydraulic hoses out of the boom.

⚠WARNING Crushing hazard. The slave cylinder could fall if not properly supported.

How to Bleed the Slave Cylinder

1 Raise the primary boom to a horizontal position.

2 Move the platform level toggle switch up and down - holding it in each position for at least 2 seconds - through two platform leveling cycles to remove any air that might be in the system.

PLATFORM COMPONENTS

2-2 Platform

How to Remove the Platform

1 Raise the platform up to 5 ft / 1,5 m.

2 Tag and disconnect the harness clables from the platform control box.

3 Support and secure the platform to an appropriate lifting device. Do not apply any lifting pressure.

4 Remove the fasteners securing the platform to the platform support.

5 Lift the platform up using the lifting device.

⚠WARNING Crushing hazard. The platform could fall if not properly supported.

2-3 Platform Overload System

How to Calibrate the Platform Overload System (if equipped)

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

1 Level the platform.

2 Determine the maximum platform capacity. Refer to the machine serial plate.

3 Using a suitable lifting device, place an appropriate test weight equal to that of the maximum platform capacity at the center of the platform floor.

Determine the limit switch trigger point:

4 Gently move the platform up and down by hand, so it bounces approximately 1 to 2 inches / 2,5 to 5 cm. Allow the platform to settle.

⊙ Result: **The overload indicator light and the alarm is on**. Slowly tighten the load spring adjustment nut by turning it clockwise just until the overload indicator light and alarm turns off.

The platform will need to be moved up and down and allowed to settle between adjustments.

There may be an approximate 2 second delay before the overload indicator light turns on and the alarm sounds.

⊙ Result: **The overload indicator light and alarm is off**. Slowly loosen the load spring adjustment nut by turning it counterclockwise just until the overload indicator light and alarm turn on.

There may be an approximate 2 second delay before the overload indicator light turns on and the alarm sounds.

The platform will need to be moved up and down and allowed to settle between adjustments.

Confirm the setting:

5 Turn the key switch to platform control.

6 Lift the test weight off the platform floor using a suitable lifting device.

7 Place the test weight back onto the center of the platform floor using a suitable lifting device.

⊙ Result: The alarm should be off. The platform overload indicator light should be off at both the ground and platform controls.

There may be an approximate 2 second delay before the overload indicator light and alarm turn off.

8 Add an additional 8.8 lb / 4 kg test weight to the original test weight to overload the platform.

⊙ Result: The alarm should sound. The platform overload indicator light should be flashing at both the ground and platform controls.

There may be an approximate 2 second delay before the overload indicator light turns on and the alarm sounds.

9 Test all machine functions from the platform controls.

⊙ Result: All platform control functions should not operate.

10 Turn the key switch to ground control.

11 Test all machine functions from the ground controls.
Result: All ground control functions should not operate.

If the platform overload system is not operating properly, repeat steps 1 through 4.

PLATFORM COMPONENTS

2-4
Platform Overload Recovery Message (software 1261180A and later)

If the platform controls LCD screen displays OVERLOAD RECOVERY, the emergency lowering system has been used while the platform was overloaded.

How to Clear the Platform Overload Recovery Message

Note: This message shall be cleared by a person trained and qualified on the troubleshooting and repair of this machine.

Note: Use the following chart to identify the description of each LCD screen control button used in this procedure.

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 on the foot switch.

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

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

⊙ Result: The display will show FAULTS.

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

⊙ Result: The display will show ACTIVE FAULTS.

7 Momentarily activate the steer rocker switch in the right direction until RESET OVERLOAD MSG is shown on the display.

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

⊙ Result: The display will show ENTER PASSWORD.

9 Momentarily active the steer rocker switch in the following order.
Steer right, steer right, steer right, steer left.

⊙ Result: A one second audible alarm pulse verifies the message has been reset.

⊠ Result: The alarm does not sound. Repeat this procedure starting with step 8.

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

11 Pull out the red Emergency Stop button to the on position.

⊙ OVERLOAD RECOVERY is not shown on the display.

Primary Boom Components

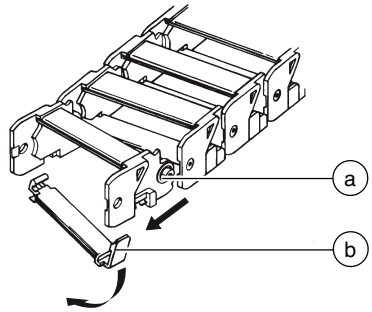
3-1 Cable Track

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 Repair the Plastic Cable Track

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

1 Use a slotted screwdriver to pry down on the lower clip.



a link separation point
b lower clip

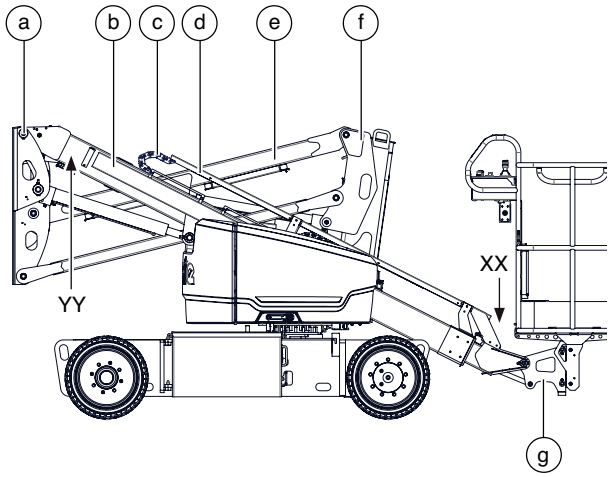
2 Repeat step 1 for each link.

3 To remove a single link, open the lower clip. Use a screwdriver to pry the link to the side.

How to Remove the Cable Track

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.
Refer to Section Two, *Hydraulic Hose and Fitting Torque Specifications*.

1 Working at the turntable, locate the two wire cables which are routed to the platform through the bottom side of the secondary boom.



a mid pivot
b cable tray
c cable track
d cable bridge
e secondary boom
f turntable
g platform mount

2 Tag and disconnect one of these wire cables from their source at the ground control box.

PRIMARY BOOM COMPONENTS

3 At the rear of the chassis, open the AC plug. Tag and disconnect the wiring from the plug. Remove the wiring from the clamp.

4 Loosen all the clamps along the turntable and secondary boom to let the two wire cables slide through.

5 Working from the mid pivot, pull the two wire cables through the turntable, secondary boom and mid pivot. Set the cables off to the side of the primary boom.

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

6 Tag and disconnect the wire harness from the platform control box.

7 Remove the cover from the AC outlet. Tag and disconnect the wiring from the outlet.

8 Pull the two harness cables through the platform mount and lay them off to the side of the primary boom.

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

9 Tag, disconnect and plug the hydraulic hoses at the platform end of the cable bridge. Cap the fittings on the hydraulic lines. Refer to 'XX' in the illustration.

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

10 Tag, disconnect and plug the hydraulic hoses at the mid pivot end of the cable tray. Cap the fittings on the hydraulic lines. Refer to 'YY' in the illustration.

11 Place blocks between the cable bridge and the primary boom. Secure them together.

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

12 Remove the fasteners securing the cable tray to the primary boom.

⚠WARNING Crushing hazard. The cable track assembly could fall if not properly supported when the fasteners are removed.

13 Loosen the three clamps along the primary boom and take the hoses and wire cables out from them.

14 Remove the pivot end cable bridge support from the primary boom.

15 Remove the fasteners securing the cable bridge to the extension boom.

16 Remove the fasteners securing the cable track to the primary boom.

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

⚠WARNING Crushing hazard. The cable track assembly could fall if not properly supported when removed from the machine.

3-2
Primary Boom

How to Shim the Primary Boom

1 Extend the boom until the wear pads are accessible.

2 Loosen the wear pad mounting fasteners.

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

4 Tighten the mounting fasteners.

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

Always maintain squareness between the outer and inner boom tubes.

How to Remove the Primary Boom

⚠WARNING Bodily injury hazard. This procedure requires specific repairskills, 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.

Perform this procedure with the boom in the stowed position.

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Remove the platform. See 2-2, *How to Remove the Platform*.

2 Remove the cable track. See 3-1, *How to Remove the Cable Track*.

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

4 Remove the pin retaining fastener from the master cylinder rod-end pivot pin. Use a soft metal drift to remove the pin. Lower the cylinder and let it hang down.

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

PRIMARY BOOM COMPONENTS

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 Raise the primary boom to a horizontal position.

7 Attach a 5 ton / 5,000 kg overhead crane to the primary boom.

8 Attach a similar lifting device to the primary boom lift cylinder, rod-end.

9 Place support blocks under the primary boom lift cylinder on the counterweight top surface.

10 Remove the pin 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 and primary boom lift cylinder could fall if not properly supported.

11 Lower the rod end of the primary boom lift cylinder onto support blocks. Protect the cylinder rod from damage.

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

13 Remove the primary boom pivot pin with a soft metal drift. 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 overhead crane.

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

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. See 3-4, *How to Remove the Primary Boom Extension Cylinder*.

1 Remove the primary boom. See 3-2, *How to Remove the Primary Boom*.

2 Place blocks under the barrel end of the primary boom extension cylinder for support.

3 Remove the pin retaining fasteners from the extension cylinder barrel-end pivot pin at the pivot end of the primary boom. Use a soft metal drift to remove the pin.

4 Remove and label the location of the wear pads from the platform end of the primary boom.

Pay careful attention to the location and amount of shims used with each wear pad.

5 Support the extension tube with an overhead crane at the platform end of the boom.

6 Support and slide the extension tube and extension cylinder assembly 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.

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

7 Remove the external snap rings from the extension cylinder rod-end pivot pin at the platform end of the extension tube. Use a soft metal drift to remove the pin.

8 Support and slide the extension cylinder out of the base end of the extension tube. Place the extension cylinder on blocks for support.

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

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

9 Remove the external snap rings from the slave cylinder barrel-end pivot pin.

10 Use a soft metal drift and drive the slave cylinder barrel-end pivot pin out.

11 Remove the slave cylinder from the primary extension boom tube.

PRIMARY BOOM COMPONENTS

3-3
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.

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Raise the primary until the lift cylinder rod-end pivot pin is above the turntable covers.

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

3 Using the overhead crane, raise the primary boom slightly to take the pressure off the primary boom lift cylinder pivot pins.

4 Support both ends of the primary boom lift cylinder with a second overhead crane or similar lifting device.

5 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.

6 Remove the pin 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.

7 Lower the rod end of the lift cylinder. Protect the cylinder rod from damage.

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

8 Remove the primary boom lift cylinder barrel end pivot pin retaining fasteners. Use a slide hammer to remove the barrel-end pivot 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.

⚠WARNING Crushing hazard. The primary boom could fall if not properly supported by the overhead crane.

3-4 Primary Boom Extension Cylinder

The extension cylinder extends and retracts the primary boom extension tube. The 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.

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Remove the platform. See 2-2, *How to Remove the Platform*.

2 Raise the primary boom to a horizontal position.

3 Completely extend the extension cylinder.

4 Support the extension tube with an overhead crane at the platform end of the boom.

5 Tag, disconnect and plug the primary boom extension cylinder hydraulic hoses, barrel-end. 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 Remove the pin retaining fasteners from the primary boom extension cylinder barrel-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.

7 Support and slide the extension tube and extension cylinder assembly 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.

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

8 Remove the external snap rings from the extension cylinder rod-end pivot pin at the platform end of the extension tube. Use a soft metal drift to remove the pin.

9 Support and slide the extension cylinder out of the base end of the extension tube. Place the extension cylinder on blocks for support.

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

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

3-5 Platform Leveling Master Cylinder

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

How to Remove the Platform Leveling Master 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.

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Before cylinder removal is considered, bleed the cylinder to be sure that there is no air in the closed loop. See 2-1, *How to Bleed the Slave Cylinder*.

1 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.

2 Attach an overhead crane or similar lifting device to the master cylinder.

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

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

4 Remove the pin retaining fastener from the rodend pivot pin.

5 Place a rod through the rod-end pivot pin and twist to remove the pin.

6 Remove the master cylinder from the machine.

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

Secondary Boom Components

4-1
Secondary Boom

How to Remove the Secondary Boom

⚠WARNING This procedure in this section 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 required.

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

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Remove the primary boom. See 3-2, *How to Remove the Primary Boom*.

Remove the mid-pivot

2 Attach a lifting strap of suitable capacity from an overhead crane to the primary lift cylinder. Raise the cylinder to an horizontal position.

3 Tag, disconnect and plug the hydraulic hoses of the primary boom lift cylinder. Cap the fittings.

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

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

4 Remove the pin retaining fasteners securing the primary lift cylinder pivot pin to the mid-pivot.

5 Using a soft metal drift, remove the primary lift cylinder pivot pin at the mid-pivot.

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

6 Attach a lifting strap of suitable capacity from an overhead crane to the mid-pivot. Do not apply any lifting pressure.

7 Tag, disconnect and plug the hydraulic hoses of the master cylinder. Cap the fittings.

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

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

8 Remove the pin retaining fasteners securing the secondary boom pivot pin to the mid-pivot.

9 Remove the pin retaining fasteners securing the secondary link pivot pin to the mid-pivot.

10 Attach a lifting strap of suitable capacity from an overhead crane to the secondary link. Do not apply any lifting pressure.

11 Using a soft metal drift, remove the secondary boom pivot pin at the mid-pivot.

⚠WARNING Crushing hazard. The mid-pivot could become unbalanced and fall if not properly supported when the pin is removed.

12 Using a soft metal drift, remove the secondary link pivot pin at the mid-pivot.

⚠WARNING Crushing hazard. The secondary link could become unbalanced and fall if not properly supported when the pin is removed.

13 Remove the mid-pivot from the machine letting the hydraulic hoses slide inside.

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

14 Remove the pin retaining fasteners securing the master cylinder pivot pin to the mid-pivot.

15 Using a soft metal drift, remove the master cylinder pivot pin at the mid-pivot.

Remove the secondary boom

16 Remove the pin retaining fasteners securing the secondary link pivot pin to the turntable.

17 Using a soft metal drift, remove the secondary link pivot pin.

⚠WARNING Crushing hazard. The secondary link could become unbalanced and fall if not properly supported when the pin is removed.

18 Remove the secondary link from the machine.

19 Attach a lifting strap of suitable capacity from an overhead crane to the secondary boom. Do not apply any lifting pressure.

20 Remove the pin retaining fasteners securing the lift cylinder pivot pin to the secondary boom.

21 Using a soft metal drift, remove the lift cylinder pivot pin from the secondary boom. Lower the cylinder.

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

22 Remove the pin retaining fasteners securing the secondary boom pivot pin to the turntable.

23 Using a soft metal drift, remove the secondary boom pivot pin.

⚠WARNING Crushing hazard. The secondary boom could become unbalanced and fall if not properly supported when the pin is removed.

SECONDARY BOOM COMPONENTS

24 Remove the secondary boom from the machine letting the hydraulic hoses slide inside.

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

4-2
Secondary Boom Lift Cylinder

The secondary boom lift cylinder raises and lowers the secondary boom. The secondary boom lift cylinder is equipped with a bi-directional solenoid valve to prevent movement in the event of a hydraulic line failure.

How to Remove the Secondary Boom Lift Cylinder

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

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

1 Attach a lifting strap of suitable capacity from an overhead crane to the mid-pivot.

2 Tag, disconnect and plug the hydraulic hoses on the 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.

3 Attach a lifting strap of suitable capacity from an overhead crane to the secondary boom lift cylinder.

4 Remove the pin retaining fasteners from the secondary boom lift cylinder rod-end and barrel-end pivot pins.

5 Using a soft metal drift, remove the secondary boom lift cylinder pins.

⚠WARNING Crushing hazard. The cylinder could fall if not properly supported when the pivot pins are removed.

6 Carefully remove the cylinder from the machine.

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

NOTICE Component damage hazard. The solenoid valve can be damaged. Use caution when removing the cylinder from the machine.

Hydraulic Pumps

5-1
Auxiliary Pump

How to Remove the Auxiliary Pump

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Open the ground controls side turntable cover.

2 Free the ground controls from the related retaining device and turn them outwards to reach the auxiliary pump.

3 Tag and disconnect the cables from the auxiliary pump.

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

4 Open the hydraulic tank side turntable cover.

5 Place a suitable container under the hydraulic tank. Refer to Section 2, *Specifications*.

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

6 Remove the drain plug from the hydraulic tank. Completely drain the hydraulic tank into a container of suitable capacity.

7 Tag, disconnect and plug the hydraulic hoses from the auxiliary pump. 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.

8 Remove the auxiliary pump mounting bolts.

9 Carefully remove the pump.

5-2
Function Pump

How to Remove the Function Pump

The function pump motor operates at various speeds, depending on the flow and pressure required for the machine function selected. A speed sensor, built into the pump motor, enables the control system to monitor and control the speed of the pump motor, which controls the flow output of the pump.

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Open the hydraulic tank side turntable cover.

2 Tag and disconnect the cables from the function pump.

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

3 Place a suitable container under the hydraulic tank. Refer to Section 2, *Specifications*.

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

4 Remove the drain plug from the hydraulic tank. Completely drain the hydraulic tank into a container of suitable capacity.

5 Tag, disconnect and plug the hydraulic hoses from the function pump. 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.

6 Remove the function pump mounting bolts.

7 Carefully remove the pump.

HYDRAULIC PUMPS

How to Calibrate the Function Pump

Calibration of the function pump is essential to good machine performance and service life. Continued use of an uncalibrated or improperly calibrated function pump could result in reduced machine performance. The function pump must be calibrated before machine functions are calibrated or before adjusting boom function speeds.

This procedure must be performed with the rotary speed controller turned to the full clockwise position.

1 Calibrate the proportional relief valve. See 6-2, *How to Calibrate the Proportional Relief Valve*.

2 Turn the key switch to platform control.

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

4 Do not press down the foot switch.

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

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

⊙ Result: The display will show FAULTS.

7 Momentarily activate the steer rocker switch in the right direction until SETTINGS is shown on the display.

8 Momentarily activate the drive enable toggle switch in the right direction to enter the SETTINGS menu.

⊙ Result: The display will show VALVE AND PUMP SETTINGS.

9 Momentarily activate the drive enable toggle switch in the right direction to enter the VALVE AND PUMP SETTINGS menu.

⊙ Result: The display will show THRESHOLD CURRENT.

10 Momentarily activate the steer rocker switch in the right direction until START PUMP GPM is shown on the display.

11 Momentarily activate the drive enable toggle switch in the right direction to begin pump calibration.

12 Press down on the foot switch. Move and hold the primary boom rocker switch in the extend direction until the boom is fully extended and an audible alarm has sounded.

⊙ Result: The alarm sounds. Continue to step 13.

⊠ Result: The alarm does not sound. Fully retract the primary boom and repeat steps 11 and 12.

To exit programming mode:

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

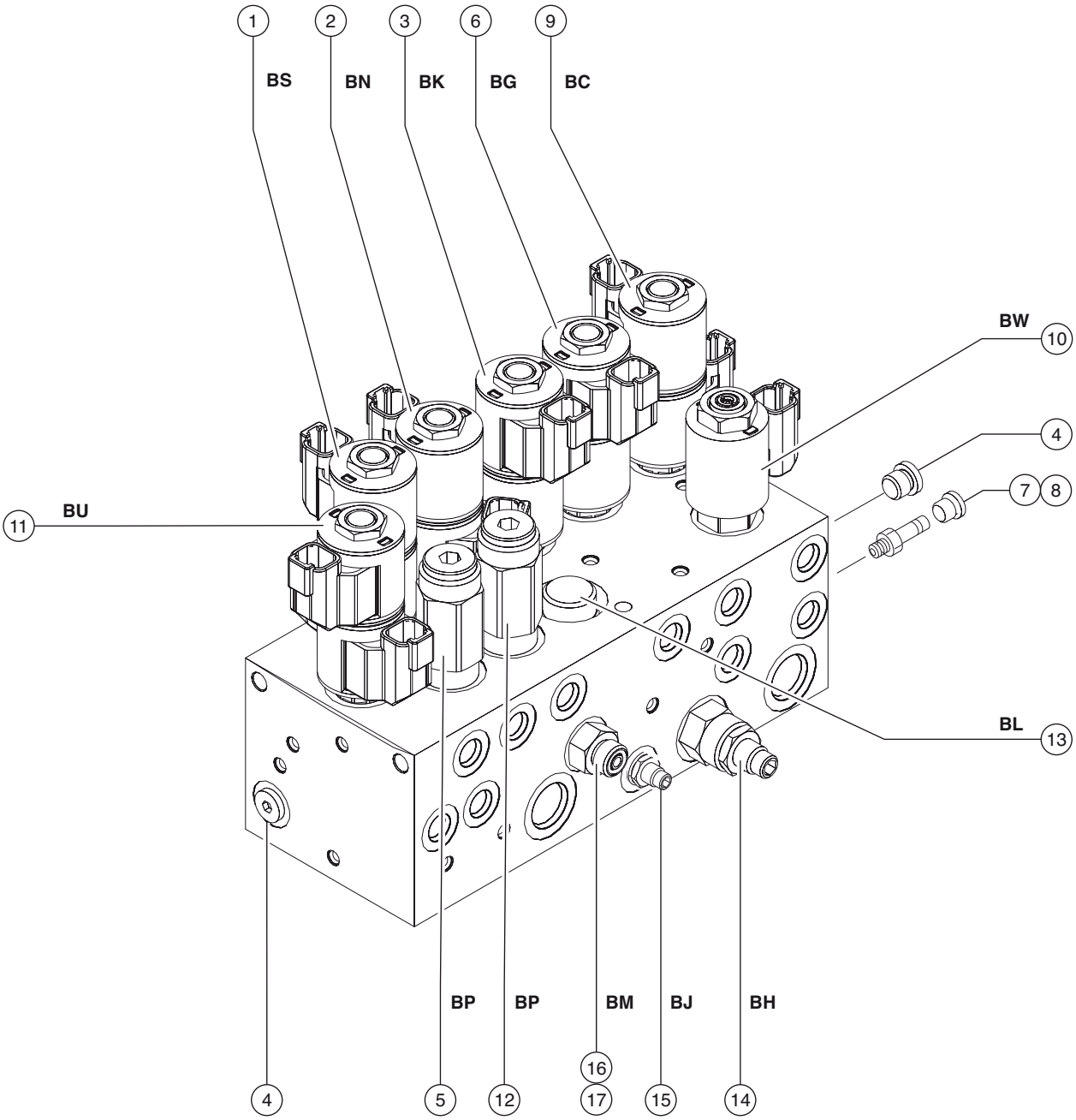
Manifolds

6-1
Function Manifold Components

The function manifold is located inside the ground controls side turntable cover.

Pos.	Description	Schematic	Function
1	VALVE, PROPORTIONAL, 3 POS, 4-WAY	BS	Primary boom up/down
2	VALVE, PROPORTIONAL, 3 POS, 4-WAY	BN	Secondary boom up/down
3	VALVE, PROPORTIONAL, 3 POS, 4 WAY	BK	Turntable rotate curcuit
4	SAE PLUG		
5	VALVE RELIEF ,130 BAR - 1885 PSI	BP	Primary boom down
6	VALVE SOLENOID, 3 POS, 4 WAY	BG	Platform level up/down
7	NIPPLE, DIAGNOSTIC, #4		
8	CAP, DIAGNOSTIC NIPPLE		
9	VALVE, PROPORTIONAL, 3 POS, 4 WAY	BC	Steer left/right
10	VALVE, PROPORTIONAL RELIEF	BW	System relief
11	VALVE, PROPORTIONAL, 3 POS, 4 WAY	BU	Primary boom extend/retract
12	VALVE RELIEF, 130 bar - 1885 PSI	BP	Secondary boom down
13	VALVE	BL	Turntable rotate curcuit
14	VALVE, NEEDLE, FINE ADJUSTMENT	BH	Platform level up/down
15	VALVE, SHUTTLE	BJ	Turntable rotate curcuit
16	FITTING		
17	ORIFICE DISC, 0.046", GREEN	BM	Secondary boom up

MANIFOLDS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6-2
Valve Adjustments - Function Manifold

How to Calibrate the Proportional Relief Valve (from s/n Z331815M-101 to Z3318M-2668)

This procedure must be performed at the ground controls.

1 Turn the key switch to the off position, and push in the red Emergency Stop button to the off position.

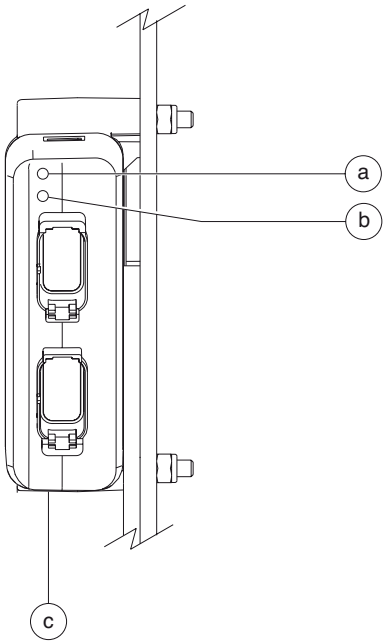
2 Connect a 0 to 3000 psi / 0 to 207 bar pressure gauge to test port TP1 on the function manifold.

3 Turn the key switch to the ground control position. Pull out the red Emergency Stop button to the on position and immediately activate the function enable toggle switch in either direction 3 times after the alarm sounds.

The function enable toggle switch must be activated within 2 seconds of the audible tone.

⊙ Result: The green LED on the TCON should change from a slow blinking light to a rapid blinking light.

⊠ Result: The green LED on the TCON does not blink rapidly. Push in the red Emergency Stop button to the off position and repeat this procedure beginning with step 3.



a green LED
b red LED
c turntable control module (TCON)

4 Move and hold the primary boom toggle switch in the extended direction.

⊙ The pressure gauge shows 1100 psi / 76 bar. Continue to step 6.

⊠ The pressure gauge does not show 1100 psi / 76 bar. Continue to step 5.

Do not activate the function enable toggle switch while making this adjustment.

MANIFOLDS

5 Move and hold the primary boom toggle switch in the extended direction. Momentarily activate the platform level toggle switch in the up direction to increase the relief pressure or in the down direction to decrease the relief pressure. Repeat this procedure beginning with step 4.

Momentarily activating the platform level toggle switch will increase or decrease the relief pressure in increments of approximately 50 psi / 3 bar.

6 Move and hold the primary boom toggle switch in the retracted direction.

⊙ Result: The pressure gauge shows 2100 psi / 124 bar. Continue to step 8.

⊠ Result: The pressure does not show 2100 psi / 124 bar. Continue to step 7.

Do not activate the function enable toggle switch while making this adjustment.

7 Move and hold the primary boom toggle switch in the retracted direction. Momentarily activate the platform level toggle switch in the up direction to increase the relief pressure or in the down direction to decrease the relief pressure. Repeat this procedure beginning with step 6.

Momentarily activating the platform level toggle switch will increase or decrease the relief pressure in increments of approximately 50 psi / 3 bar.

8 Move and hold the secondary boom toggle switch in the up direction.

⊙ Result: The pressure gauge shows 2500 psi / 172 bar. Continue to step 10.

⊠ Result: The pressure gauge does not show 2500 psi / 172 bar continue to step 9.

Do not activate the function enable toggle switch while making this adjustment.

9 Move and hold the secondary boom toggle switch in the up direction. Momentarily activate the platform level toggle switch in the up direction to increase the relief pressure or in the down direction to decrease the relief pressure. Repeat this procedure beginning with step 6.

Momentarily activating the platform level toggle switch will increase or decrease the relief pressure in increments of approximately 50 psi / 3 bar.

To exit programming mode:

10 Cycle the power (using the emergency stop pushbutton) to exit the calibration program.

How to Adjust the Proportional Relief Valve and Hydraulic Pressure Sensor (From S/N Z3318M-2669)

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

1 Connect a 0 to 3000 PSI / 0 to 207 bar pressure gauge to test port 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 (after startup beep) triple click the ground control function enable button 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. A one second pulse alarm will indicate the calibration procedure is complete.

8 Remove the pressure gauge.

MANIFOLDS

How to Adjust the Primary Boom Down Relief Valve

1 Turn the machine off. Locate the proportional relief valve (item BW) on the function manifold. Remove the coil nut and remove the coil from the valve cartridge and set aside. Do not disconnect the coil electrical connector.

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test port TP1 on the function manifold.

3 Turn the key switch to ground controls.

4 With the primary boom fully lowered, move and hold the function enable toggle switch to either side and hold the primary boom up/down toggle switch in the down direction. Observe the pressure reading on the pressure gauge. Refer to Section 2, *Specifications*.

5 Turn the machine off. Hold the primary boom down relief valve with a wrench and remove the cap (item BP).

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

⊙ Result: The relief pressure meets specification. Continue to step 7.

⊠ Result: The relief pressure does not meet specification. Repeat this procedure beginning with step 3.

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

7 Turn the machine off. Remove the pressure gauge and install the proportional relief valve coil.

How to Adjust the Secondary Boom Down Relief Valve

1 Turn the machine off. Locate the proportional relief valve (item BW) on the function manifold. Remove the coil nut and remove the coil from the valve cartridge and set aside. Do not disconnect the coil electrical connector.

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test port TP1 on the function manifold.

3 Turn the key switch to ground controls.

4 With the secondary boom fully lowered, move and hold the function enable toggle switch to either side and hold the secondary boom up/down toggle switch in the down direction. Observe the pressure reading on the pressure gauge. Refer to Section 2, *Specifications*.

5 Turn the machine off. Hold the secondary boom down relief valve with a wrench and remove the cap (item BP).

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

⊙ Result: The relief pressure meets specification. Continue to step 7.

⊠ Result: The relief pressure does not meet specification. Repeat this procedure beginning with step 3.

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

7 Turn the machine off. Remove the pressure gauge and install the proportional relief valve coil.

6-3
Valve Coils

How to Test a Coil

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

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

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

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

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

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

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

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

Valve Coil Resistance Specification

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

Description	Specification
Proportional solenoid valve, 3 position 4 way - 20V DC	24 Ω
Solenoid valve, 3 position 4 way - 20V DC	24 Ω
Proportional solenoid relief valve, 3 position 4 way - 20V DC	22 Ω

MANIFOLDS

How to Test a Coil Diode

Genie incorporates spike suppressing diodes in all of its coils. 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. See 6-3, *How to Test a Coil*.

2 Connect a 10Ω 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

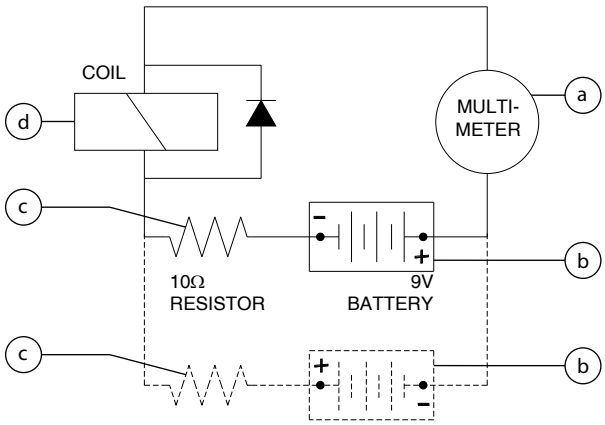
Note: The battery should read 9V DC or more when measured across the terminals.

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.

Note: If testing a single-terminal coil, connect the negative lead to the internal metallic ring at either end of the coil.



a multimeter
b 9V DC battery
c 10Ω resistor
d coil

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

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

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

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

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

Turntable Rotation Components

7-1
Turntable Rotation Assembly

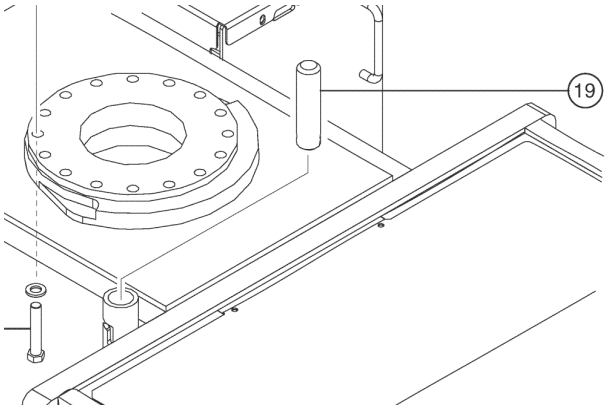
How to Remove the Turntable Rotation Assembly

When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

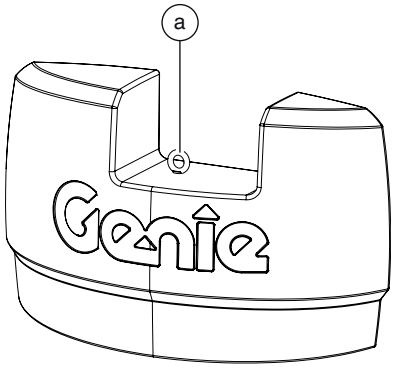
1 Raise the primary boom until the distance between the primary cylinder barrel-end pivot pin and the rod-end pivot pin is 43,85 in / 1440 mm then completely raise the secondary boom.

2 Secure the turntable from rotating with the turntable rotation lock pin "19".

⚠WARNING Crushing hazard. The machine could tip over when the turntable rotation assembly is removed if the turntable rotation lock is not in the locked position.



3 Screw a suitable eyebolt "a" in the threaded hole located on the upper side of the counterweight.



4 Remove the counterweight bottom screw to disassembly it from the swing chassis.

NOTE: At the end of the following procedure, make sure to apply an even coat of Loctite® 243™ retaining compound on the thread of the screw, before reinstalling it into the counterweight.

5 Attach a lifting strap from a suitable lifting device to the eyebolt.

6 Carefully lift up and remove the counterweight from the turntable.

7 Completely lower the secondary boom and turn the machine off.

8 Disconnect the battery backs from the machine.

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

9 Tag, disconnect and plug the hydraulic hoses from steering cylinder and unscrew the slew bearing grease hose from the slewring. 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.

TURNTABLE ROTATION COMPONENTS

10 Tag and disconnect the harness both from the control box and manifold.

11 Tag and disconnect the power cables from the main and auxiliary pumps.

12 Attach a lifting strap from an overhead crane or other suitable lifting device to the two turntable's handles and to the counterweight handle bar.

13 Remove the turntable rotation assembly mounting fasteners.

14 Carefully remove the turntable rotation assembly from the machine.

⚠WARNING Crushing hazard. The machine could tip over when the turntable rotation assembly is removed if the turntable rotation lock is not in the locked position.

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

Steer Axle Components

8-1
Hub and Bearings

How to Remove the Hub and Bearings

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

2 Block the non-steer wheels and place a lifting jack under the steer axle.

3 Raise the machine. Place blocks under the drive chassis for support.

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

5 Remove the dust cap, cotter pin and castle nut.

Always use a new cotter pin when installing a castle nut.

6 Pull the hub off the yoke spindle. The washer and outer bearing should fall loose from the hub.

7 Place the hub on a flat surface and gently pry the grease seal out of the hub. Remove the inner bearing.

When removing a bearing, always use a new inner bearing seal.

How to Install the Hub and Bearings

When replacing a wheel bearing, both the inner and outer bearings, including the pressed-in races, must be replaced.

1 Be sure that both bearings are packed with clean, fresh grease.

2 Place the large inner bearing into the rear of the hub.

3 Install a new bearing grease seal into the hub by pressing it evenly into the hub until it is flush.

Always replace the bearing grease seal when removing the hub.

4 Slide the hub onto the yoke spindle.

⚠WARNING Component damage hazard. Do not apply excessive force or damage to the lip of the seal may occur.

5 Fill the hub cavity with clean, fresh grease.

6 Place the outer bearing into the hub.

7 Install the washer and castle nut.

8 Tighten the castle nut to 150 ft-lbs / 203 Nm to seat the bearings.

Note: Rotate the hub by hand while torquing the castle nut to make sure the bearings seat properly.

9 Loosen the castle nut one full turn and then torque to 35 ft-lbs / 47 Nm.

STEER AXLE COMPONENTS

10 Install a new cotter pin. Bend the cotter pin to lock it in place.

Note: Always use a new cotter pin when installing a castle nut.

11 Install the dust cap, then the tire and wheel assembly.

12 Lower the machine and remove the blocks.

13 Torque the wheel lug nuts to specification. Refer to Section 2, *Specifications*. 9-1.

8-2
Steer Angle Sensor

How to Replace the Steer Angle Sensor

The steer angle sensor, installed on the steer yoke pivot pin, is monitored by the control system to determine steer angle. The control system uses the steer angle input, along with pre-programmed parameters, to vary the speed of each drive motor while steering to minimize tire scrub and to help minimize turning radius. Drive speed is also reduced proportionately depending on the steer angle to minimize lateral platform acceleration.

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 buttons 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 Remove the steer sensor cover retaining fasteners. Remove the steer sensor assembly from the machine.

Inspect the sensor activator pin to make sure it is not broken or twisted.

If the sensor activator pin needs to be replaced, note the mounting orientation to be sure the new one is installed correctly.

8 Install the new steer sensor assembly to the yoke pivot pin. Loosely install the cover retaining fasteners.

Be sure the sensor activator pin is engaged into the sensor.

The arrow on the steer sensor cover should point towards the front of the machine.

9 Connect the steer sensor harness to the main harness.

10 Set a voltmeter to read DC voltage. Probe the back of the electrical connector at the orange wire using the positive lead of the voltmeter. Probe the back of the electrical connector at the black wire using the negative lead of the voltmeter.

11 Turn the key switch to platform control.

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

13 Adjust the steer sensor cover so that the volt meter reads 2.5V DC.

14 Tighten steer sensor cover fasteners.

15 Install the cable clamp to secure the steer sensor cable to the drive chassis.

16 Install the drive chassis cover.

17 Calibrate the steer sensor. See 9-2 *How to Calibrate the Steer Angle Sensor*.

How to Calibrate the Steer Angle Sensor

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 Using the thumb rocker switch on the drive joystick, adjust the steer wheels so they are pointing straight ahead, in line with the nonsteer wheels. Release the foot switch.

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

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

⊙ Result: The display will show FAULTS.

6 Momentarily activate the steer rocker switch in the right direction until you see the DRIVE SETTINGS screen.

7 Momentarily activate the drive enable toggle switch in the right direction to enter the DRIVE SETTINGS menu.

⊙ Result: The display will show ACCEL RAMP.

STEER AXLE COMPONENTS

8 Momentarily activate the steer rocker switch in the right direction until you see the CALIBRATE CENTER screen.

9 Momentarily activate the drive enable toggle switch in the right direction to enter the CALIBRATE CENTER screen.

⊙ Result: The display will show OUT OF RANGE or IN RANGE according to the wheels position.

10 Momentarily activate the drive enable toggle switch in the right direction to save the setting (if steer sensor mV value is IN RANGE).

⊙ Result: The alarm should sound indicating the setting has been saved.

11 Momentarily activate the steer rocker switch in the right direction until you see the CALIBRATE RIGHT screen.

12 Adjust the steer wheels fully in the right direction.

13 Momentarily activate the drive enable toggle switch in the right direction to enter the CALIBRATE RIGHT screen.

⊙ Result: The display will show OUT OF RANGE or IN RANGE according to the wheels position.

14 Momentarily activate the drive enable toggle switch in the right direction to save the setting (if steer sensor mV value is IN RANGE).

⊙ Result: The alarm should sound indicating the setting has been saved.

15 Momentarily activate the steer rocker switch in the right direction until you see the CALIBRATE LEFT screen.

16 Adjust the steer wheels fully in the left direction.

17 Momentarily activate the drive enable toggle switch in the right direction to enter the CALIBRATE LEFT screen.

⊙ Result: The display will show OUT OF RANGE or IN RANGE according to the wheels position.

18 Momentarily activate the drive enable toggle switch in the right direction to save the setting (if steer sensor mV value is IN RANGE).

⊙ Result: The alarm should sound indicating the setting has been saved.

To exit programming mode:

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

Non-steer Axle Components

9-1
Drive Motors

How to Remove a Drive Motor

The drive motors are AC powered and are a brushless design requiring very little maintenance. They have built-in speed and temperature sensors which are monitored by the turntable controller (TCON) and the platform controller (PCON). The speed sensor is a Hall-effect type and is part of the rear motor shaft bearing. The temperature switch will shut down the drive motor if it becomes excessively hot.

1 Disconnect the battery packs from the machine.

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

2 Remove the chassis cover fasteners from the non-steer end of the chassis. Remove the cover.

3 Tag and disconnect the power cables from the drive motor.

4 Tag and disconnect the electrical connectors for the brake, speed and temperature sensors at the drive motor.

5 Remove the drive motor fasteners.

6 Support and slide the drive motor shaft out of the drive hub. Remove the drive motor from the machine.

9-2
Drive Brake

How to Remove a Drive Brake

Proper brake action is essential to safe machine operation. The machine uses drive motor regenerative braking to slow and stop the machine.
Spring applied electrically released individual wheel brakes hold the machine once it has stopped. The drive motor regenerative braking should operate smoothly, free of hesitation and jerking.

1 Block the steer wheels to prevent the machine from rolling.

2 Disconnect the battery packs from the machine.

3 Remove the chassis cover fasteners from the non-steer end of the chassis. Remove the cover.

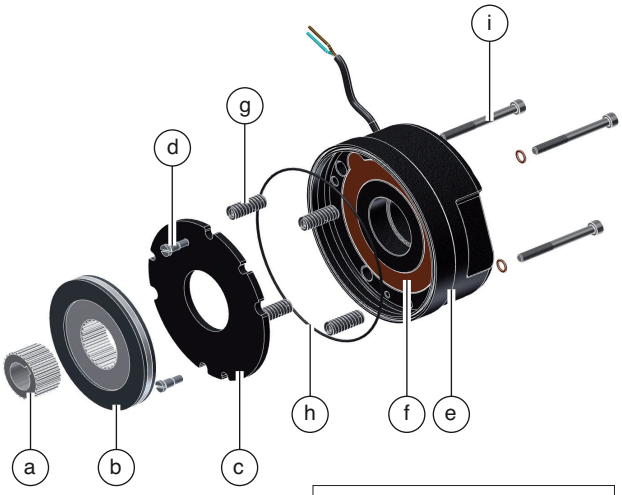
4 Tag and disconnect the electrical connector from the brake.

5 Loosen the brake mounting fasteners in an even pattern until all spring tension has been relieved. Remove the fasteners.

6 Remove the brake from the drive motor.

Some parts may fall loose from the brake assembly during removal. Refer to the following illustrations to be sure the spring pattern is correct and that the rest of the brake components are assembled properly prior to installing the brake onto the drive motor.

When installing the brake, torque the brake mounting fasteners to 7.4 ft-lbs / 10 Nm.



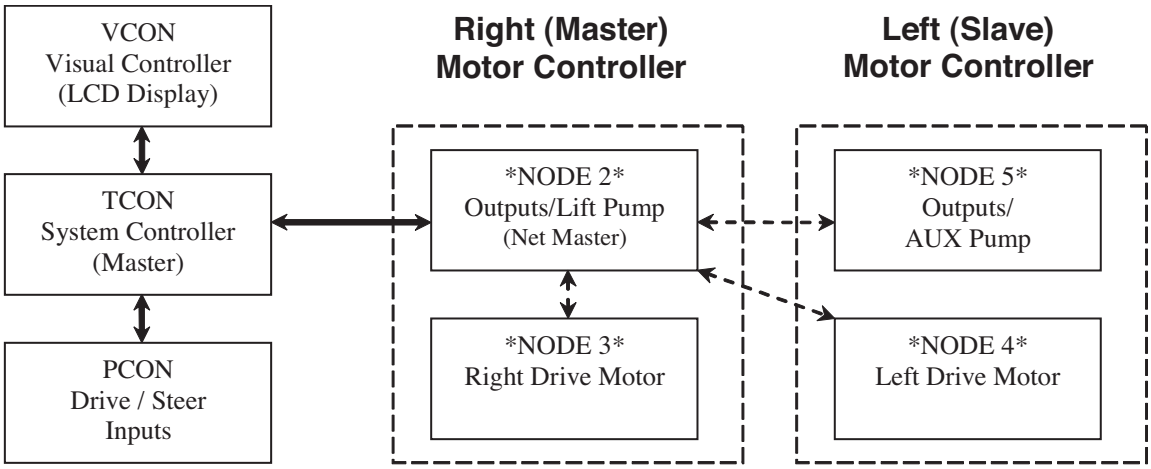
a gear
b brake disk
c brake plate
d setting screw
e brake body
f coil
g spring
h seal
i screw

Motor Controller

10-1 Motor Controllers

There are two drive motor controllers located inside the non-steer axle, one for each drive motor. When viewed from the non-steer end of the machine, the right side motor controller is the "master" and the left side motor controller is the "slave." The master motor controller controls the right drive motor and the function pump. The slave motor controller controls the left side drive motor and auxiliary power unit. The motor controllers are also AC voltage inverters which take the DC voltage from the system batteries and convert the voltage to AC power for the drive motors.
The motor controllers are in communication with the turntable controller (TCON) and the platform controller (PCON) which are able to communicate operating or fault information to the LCD display at the platform controls.

The motor controllers also control the valve outputs and machine options such as flashing beacon, travel alarm, etc.
Refer to Section 5, *Fault Codes* for a list of fault codes and additional information.
For further information or assistance, consult the Genie Industries Service Department.



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 repair procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Boom in stowed position
  - Turntable rotated with the boom between the non-steer wheels
  - Turntable secured with the turntable rotation lock
  - Key switch in the off position with the key removed
  - Wheels chocked
  - All external AC power supply disconnected from the machine

Before Troubleshooting:

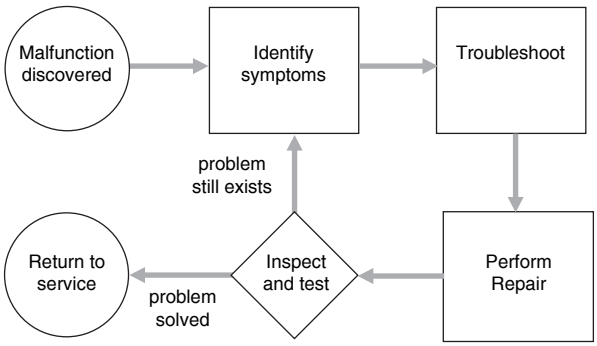
- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.
- ☑ Be aware of the following hazards and follow generally accepted safe workshop practices.

⚠DANGER Crushing hazard. When testing or replacing any hydraulic component, always support the structure and secure it from movement.

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

⚠WARNING Bodily injury hazard. 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.

General Repair Process



FAULT CODES

Control System Fault Codes

At least one fault code is present when the service icon is shown on the display.

How to Retrieve Control System Fault Codes from the Platform Controls

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 the steer rocker switch in the right direction.

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

⊙ Result: The display will show FAULTS.

To access active 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 the steer rocker switch in the right direction to scroll through the fault codes.

To access motor controller faults:

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

10 Activate the steer rocker switch in the right direction until MOTOR CONTROLLER FAULTS is shown on the display.

11 Momentarily activate the drive enable toggle switch in the right direction to access the motor controller fault codes.

12 Activate the steer rocker switch in the right direction to scroll through the fault codes.

13 Refer to the fault code table on the following pages to aid in troubleshooting the machine by pinpointing the area or component affected.

14 To exit the fault code screen, momentarily activate the drive enable toggle switch to the left direction until FAULTS is shown on the display.

To exit programming mode:

15 Push in the red Emergency Stop button at the platform controls. Wait approximately 5 seconds and then pull out the red Emergency Stop button out to the on position.

How to Retrieve Control System Fault Codes from the Ground Controls

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 Open the ground controls side turntable cover.

4 Locate the turntable control module (TCON) underneath the ground control box.

5 Visually inspect the flashing green and red LEDs on the controller.

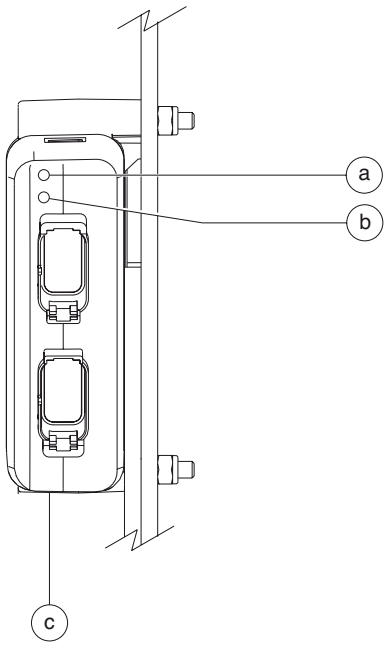
The red LED indicates the source of the error and the green LED indicates the error type.

6 **Determine the error source**: The flashing red LED, when combined with short or long pauses between the flash, tells the service technician the specific source of the error. Error source code 32, for example, would appear as three quick red flashes followed by a short pause of almost two seconds, then two more quick red flashes. Error source code 33 would appear as three quick red flashes followed by a short pause, then three more quick red flashes followed by a long pause.

7 **Determine the error type**: The flashing green LED, when combined with short or long pauses between the flash, tells the service technician the specific error type. Error type code 12, for example, would appear as one quick green flash followed by a short pause of almost two seconds, then two more quick green flashes followed by a long pause. Error type code 15 would appear as one quick green flash followed by a short pause, then five more quick green flashes followed by a long pause.

8 Use the fault code table on the following pages to aid in troubleshooting the machine by pinpointing the area or component affected.

Only control system fault codes can be retrieved from TCON. Motor controller fault codes can only be retrieved by following the procedure using the platform controls. *See How to Retrieve Control System Fault Codes from the Platform Controls*.



a green LED
b red LED
c turntable control module (TCON)

Control System Fault Code Chart (from S/N Z331815M- 101 to Z3318M-2668)

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
11	**BATTERY_PWR** Battery power screen.	12	Out of range	Main contactor open or will not close. All functions disabled.	Do not operate machine with batteries charging. Batteries overcharged, exceeds 65V DC with excessive braking. Batteries undercharged, below 11V DC with load. Replace right (master) AC motor controller.
		15	Value too low	Slow functions. Battery charge less than 10%.	Charge or replace batteries.
12	**PR5_COIL** Main contactor coil.	15	Value too low	All functions disabled.	Check for short to main contactor. Check diode on main contactor. Replace main contactor. Replace right (master) motor controller.
13	**PR5_CONTACT** Main contactor.	12	Value too high	All functions disabled.	Check for voltage at main contactor coil with machine in the on position. (24V DC on red wire. 48V DC on orange wire). Replace main contactor.
		15	Value too low	All functions disabled.	Check for voltage at main contactor coil with machine in the on position (24V DC on red wire. 48V DC on orange wire). Replace main contactor.
14	**RELIEF_VALVE**	12	Value too high	Auxiliary functions only.	Check for open at proportional relief valve. (wh/rd wire). Replace coil.
		16	Value at 0V		
15	**FOOTSWITCH**	21	Fault	All functions disabled.	Check for power into foot switch. Check for power to PCON at P1-6 with foot switch depressed.
		24	Time out	All functions disabled.	Release foot switch and press again.
16	**SPEED_DIAL** Rotary speed controller.	12	Value too high	Function speeds reduced.	Check for 5V DC (orange wire). Check output. 0-4.7V DC (wh/rd). Check input at VCON at V1-3. Replace rotary controller.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
17	**LIFT_PUMP**	12	Value too high	Auxiliary functions only.	Check for 48V DC to main function pump. Replace right (master) AC motor controller.
		15	Value too low	Auxiliary functions only.	Do not operate machine with batteries charging. Check for 48V DC to main function pump. Replace right (master) AC motor controller.
		21	Fault	Auxiliary functions only.	Allow main pump to cool down. Check for air restriction to electric motor. Check relief valve settings at main manifold.
18	**TACH_LIFTPMP** Lift pump motor encoder.	21	Fault	Auxiliary functions only.	Check 3 wire plug on encoder at pump motor. Check 5V DC (red wire). Replace motor.
19	**AUX_PUMP** Auxiliary pump.	12	Value too high	Auxiliary functions disabled.	Check fuse F1 (200A). Check for 24V DC to Aux pump. Replace Aux. pump. Replace left (slave) AC motor controller.
		15	Value too low	Auxiliary functions disabled.	Check for 24V DC to Aux pump. Replace Aux. pump. Replace left (slave) AC motor controller.
21	**PRI_UD_JYSTK** Primary up/down joystick.	11 12 15 16	Shorted high (5V) Value too high Value too low Value at 0V	Primary up/ down function disabled.	Inspect and repair joystick wiring. Replace joystick.
		17	Not calibrated	Primary up/ down function disabled.	Calibrate joystick. Replace joystick.
22	**PRI_UP_VALVE** Primary boom up valve.	12 15	Value too high Value too low	Primary up function disabled.	Check for open or short from TCON (P2-5) to the up coil. Replace coil.
23	**PRI_DN_VALVE** Primary boom down valve.	12 15	Value too high Value too low	Primary down function disabled.	Check for open or short from TCON (P2-6) to the down coil. Replace coil.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
25	**PRI_ER_JYSTK** Primary boom extend/retract joystick.	11 12 15 16	Shorted high (5V) Value too high Value too low Value at 0V	Primary extend/ retract function disabled.	Inspect and repair joystick wiring. Replace joystick.
		17	Not calibrated	Primary extend/ retract function disabled.	Calibrate joystick. Replace joystick.
26	**PRI_EX_VALVE** Primary boom extend valve.	12 15	Value too high Value too low	Primary extend function disabled.	Check for open or short from TCON (P2-3) to the extend coil.
27	**PRI_RT_VALVE** Primary boom retract valve.	12 15	Value too high Value too low	Primary retract function disabled.	Check for open or short from TCON (P2-4) to the retract coil.
32	**SEC_UP_VALVE** Secondary boom up valve.	12 15	Value too high Value too low	Secondary up function disabled.	Check for open or short from TCON (P2-7) to the secondary up coil. Replace coil.
33	**SEC_DN_ VALVE** Secondary boom down valve.	12 15	Value too high Value too low	Secondary down function disabled.	Check for open or short from TCON (P2-8) to the secondary down coil. Replace coil.
41	**TT_ROT_JYSTK** Turntable rotate joystick.	11 12 15 16	Shorted high (5V) Value too high Value too low Value at 0V	Turntable rotate functions disabled.	Inspect and repair joystick wiring. Replace joystick.
42	**TT_CW_VALVE** Turntable rotate clockwise valve.	12 15	Value too high Value too low	Turntable rotate clockwise function disabled.	Check for open or short from TCON (P2-9) to the turntable CW coil. Replace coil.
43	**TT_CCW_ VALVE** Turntable rotate counter clockwise	12 15	Value too high Value too low	Turntable rotate counterclockwise function disabled.	Check for open or short from TCON (P2-9) to the turntable CCW coil. Replace coil.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
51	**DRIVE_JYSTK** Drive joystick.	11 12 15 16	Shorted high (5V) Value too high Value too low Value at 0V	Drive function disabled.	Inspect and repair joystick wiring. Replace joystick.
		17	Not calibrated	Drive function disabled.	Calibrate joystick. Replace joystick.
52	**AC_R_MOTOR** Right side drive motor.	12	Value too high	Drive function disabled.	Do not operate machine with batteries charging. Check cable connections. Check for 33V AC across any two legs on drive motor at full stick. Replace right drive motor. Replace right (master) AC motor controller.
		15	Value too low	Drive function disabled.	Check cable connections. Check for 33V AC across any two legs on drive motor at full stick. Replace right drive motor. Replace right (master) AC motor controller.
		21	Fault	Drive function disabled.	Check wires to thermal sensor at 6 wire deutsch plug on motor. Check resistance on thermal sensor.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
53	**AC_L_MOTOR** Left side drive motor.	12	Value too high	Drive function disabled.	Do not operate machine with batteries charging. Check cable connections. Check for 33V AC across any two legs on drive motor at full stick. Replace right drive motor. Replace right (master) drive controller.
		15	Value too low	Drive function disabled.	Check cable connections. Check for 33V AC across any two legs on drive motor at full stick. Replace right drive motor. Replace right (master) AC motor controller.
		21	Fault	Drive function disabled.	Check wires to thermal sensor at 6 wire deustch plug on motor. Check resistance on thermal sensor.
54	**BRAKE_RIGHT** Right side AC motor brake.	15	Value too low	Drive function disabled.	Check for 48V DC to brake. Check for 48V DC on R-1. Replace brake. Replace right (master) AC motor controller.
55	**BRAKE_LEFT** Left side motor brake screen.	15	Value too low	Drive function disabled.	Check for 48V DC to brake. Check for 48V DC on R-1. Replace brake. Replace left (slave) AC motor controller.
56	**TACH_R_ MOTOR** Right side AC drive motor encoder.	21	Fault	Drive function disabled.	Check wiring at the 6 wire deustsch plug at the drive motor. Check for 12V DC on pins 1 and 2. Replace encoder. Replace right (master) AC motor controller.
57	**TACH_L_ MOTOR** Left side AC drive motor encoder.	21	Fault	Drive function disabled.	Check wiring at the 6 wire deutsch plug at the drive motor. Check for 12V DC on pins 1 and 2. Replace encoder. Replace left (slave) AC motor controller.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
58	**AC_R_CTRLR** Right side (Master) AC motor controller	13	No response	All functions disabled.	Check can bus circuit for open. Check can bus resistor. Isolate all other modules simultaneously. Replace right (Master) AC motor controller.
		21	Fault	All functions disabled or limited.	Cycle power off and back on. If fault persist, replace right (master) AC motor controller. See motor controller fault code chart.
59	**AC_L_CTRLR** Left side (Slave) AC motor controller.	21	Fault	All functions disabled or limited.	Cycle power off and back on. If fault persist, replace left (slave) AC motor controller. See motor controller fault code chart.
61	**STEER_JYSTK** Joystick steer.	11 12 15 16	Shorted high (5V) Value too high Value too low Value at 0V	Steering function disabled.	Repair Joystick wire connections or replace Joystick.
		17	Not calibrated	Steering function disabled.	Calibrate joystick. Replace joystick.
62	**AC_R_OUTPUT** Right side AC motor controller output.	15	Value too low	Steering and platform level functions disabled. Flashing beacon disabled (option).	Check wiring and coil for function causing fault. Fault at power up, replace right (Master) AC motor controller.
		16	Value at 0V Output shorted to B		

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
63	**STEER_ SENSOR** Steer angle sensor.	11 12 15 16	Shorted high (5V) Value too high Value too low Value at 0V	Wheel speed correction is disabled. Drive speed reduced.	Check for 5V DC (GR/WH) at steer sensor. Check for 0-5V DC (orange) output at steer sensor. Check for 0-5V DC (orange) at R-30 on right (master) AC motor controller. Replace steer sensor.
		17	Not calibrated	Wheel speed correction is disabled. Drive speed reduced.	Replace steer sensor. Re-calibrate steer sensor.
		21	Fault		Verify wiring as above. Replace right AC motor controller.
66	**AC_L_OUTPUT** Left side AC motor controller output.	15	Value too low	Hour meter, brake relay and tilt sensor alarm disabled. Platform overload alarm disabled (option).	Check wiring and coil for function causing fault. Fault at power up, replace left (slave) AC motor controller.
		16	Value at 0V Output shorted to B		
67	**DENA_SW_ PBOX** Platform control box drive enable switch.	12 19 21	Value too high Out of Range Fault	Drive Function disabled in drive disable zone.	Check for voltage output at drive enable toggle switch. (Blue) Check for voltage input at VCON at V1-4. Replace VCON.
68	**FUNC_SW_ GBOX** Ground box function enable switch.	21	Fault	Auxiliary functions only.	Check for 24V DC at function enable toggle switch. Check for 24V DC input at TCON at P2-2. Check for 24V DC input at right (Master) AC motor controller at R-32. Replace TCON. Replace right (master) AC motor controller.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
71	**ESTOP_RELAY** Emergency Stop relay.	11	Shorted High (24V)	All functions disabled.	With Red Emergency Stop pulled out at ground control, CR62 should close. Check for 24V DC on 30 and 87 of CR62. Replace relay. Replace red Emergency Stop button contacts.
76	**OVERLOAD_ SW** Platform overload switch (option).	12 21	Value too high Fault	Platform functions limited to recovery only. Primary lift pump functions at ground controls disabled. Auxiliary functions at ground control only. Extend disabled.	Do not exceed maximum platform weight. Check for 24V DC (black) input to load sensor. Check for 24V DC (red) output from load sensor. Check for 0V DC on right (master) AC motor controller on R-19. Replace load sensor.
77	**VCON_PBOX** Platform display screen.	13	No response	Platform functions disabled. Ground controls operative.	Check can bus circuit for open. Check can bus resistor. Isolate all other modules simultaneously. Replace right (master) motor controller.
78	**PCON_PBOX** Platform controller screen.	13	No response	Platform functions disabled. Ground controls operative.	Check can bus circuit for open. Check can bus resistor. Isolate all other modules simultaneously. Replace right (master) motor controller.
82	**LOAD SENSE RECOVERY**	21	Fault	System was overloaded and moved under AUX power.	N/A for reporting purposes.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
83	**DISABLED BY OWNER**	21		Lift and Drive functions disabled or slowed remotely by GTM Request from Telematics Device. Lift and Drive functions disabled remotely according to the machine configuration by Track&Trace device	contact machine owner
90	**Z33 WIRE CONNECTION**	21	Fault	Only fault code on the display. All functions are enabled	Check wire connection (AC motor controller left, pin 7)

Control System Fault Code Chart (from s/n Z3318M-2669)

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 re-power. *Check for power to PCON at C28-6 with foot switch not pressed. *Replace footswitch.
		28	Time Out	ON for > Timeout Time (default is 2 min)		
16	**Speed Adjustment Dial**	12	VALUE TO HIGH	Stuck ON (on @ power up)	All functions speeds are reduced.	Check: *5V DC (orange wire). *Output. It should be 0-4.7V DC (WH/RD wire). *Input at VCON at C35-3. *Replace rotary potentiometer (rheostat.)
17	**AUX_PUMP Auxiliary Pump**	25	RESISTANCE TOO HIGH	Pump motor output is too low, with respect to PWM applied	Auxiliary functions disabled	*Check Fuse F1 (200A) *Check for 24V DC to AUX pump. *If OK check pump winding resistance. *Replace AUX pump. *Replace Left (slave) AC controller
		26	RESISTANCE TOO LOW	Pump motor output is too high, with respect to PWM applied	Main Lift Pump and Drive Disabled	*P- Could be shorted to B- *Check for 24V DC to AUX pump. *Replace AUX pump. *Replace Left (slave) AC motor controller.
18	**Proportional Relief Valve**	16	VALUE AT 0V	Output Shorted to B-	Primary Up, Primary Extend and Secondary Up are disabled.	Verify coil shorted "VALUE AT 0 VOLTS" and all functions disabled.
		12	VALUE TOO HIGH	Coil Disconnected	Fault Code Warning Only	Make sure relief valve is plugged in. If OK, check/ replace wiring (WH/ RD wire) coil and/or hydraulic valve.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
19	**Aux Pump Toggle Switch**	27	Active at Startup	Stuck ON (on @ power up)	AUX functions disabled	Verify: (when activated) *24V created by AUX toggle switch TS1 at platform or ground controls(they are wired in parallel) *24V at C13-2 to TCON C23-17 (C27AUX RD) to 24V when switch is activated *24V across AUX Relay CR3-86 & CR3-85 (DC units only)
20	**Primary Extend/Retract Joystick Rocker**	11	Shorted to supply	5V	Primary Boom Extend/ Retract Disabled	Inspect and repair joystick: *5V at JC7-2 (P162JPW OR) *B- at JC7-1 (JSGND BR) *1050 to 3750 mV at JC7-5 & PCON C28-5 (C163PLS BL/ WH) through joystick motion. Replace joystick
		16	Sensor at Zero	0V		
		17	Not calibrated	Not between 2000 & 3000 mV at startup		
21	**Primary Up/ Down Joystick**	11	Shorted to supply	5V	Primary Boom Disabled	Inspect and repair joystick: *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	Sensor at Zero	0V		
		17	Not calibrated	Not between 2000 & 3000 mV at startup		

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
22	**Primary Up Valve**	25	Resistance Too High	Open Circuit or Ohms > 60	Associated Function disabled	*Check for open or short from TCON (C14-5) to the up coil. *Replace coil.
		26	Resistance Too Low	Short or Ohms <5		
23	**Primary Down Valve**	25	Resistance Too High	Open Circuit or Ohms > 60	Associated Function disabled	*Check for open or short from TCON (C14-6) to the down coil. *Replace coil.
		26	Resistance Too Low	Short or Ohms <5		
26	**Primary Extend Valve**	25	Resistance Too High	Open Circuit orOhms > 60	Associated Function disabled	*Check for open or short from TCON (C14-3) to the up coil. *Replace coil.
		26	Resistance Too Low	Short or Ohms <5		
27	**Primary Retract Valve**	25	Resistance Too High	Open Circuit or Ohms > 60	Associated Function disabled	*Check for open or short from TCON (C14-4) to the up coil. *Replace coil.
		26	Resistance Too Low	Short or Ohms <5		
32	**Secondary Up Valve**	25	Resistance Too High	Open Circuit or Ohms > 60	Associated Function disabled	*Check for open or short from TCON (C14-7) to the up coil. *Replace coil.
		26	Resistance Too Low	Short or Ohms <5		
33	**Secondary Down Valve**	25	Resistance Too High	Open Circuit or Ohms > 60	Associated Function disabled	*Check for open or short from TCON (C14-8) to the up coil. *Replace coil.
		26	Resistance Too Low	Short or Ohms <5		
41	**Turntable Joystick**	11	Shorted to supply	5V	Turntable Rotate Disabled	Inspect and repair joystick: *5V at JC7-2 (P162PJW OR) *B- at JC7-1 (JSGND BR) *500-4500 mV at JC7-4 & PCON C46-12 (C165TRS WH/RD) through joystick motion.
		16	Sensor at 0v	0V		
		17	Not calibrated	Not between 2000 & 3000 mV at startup		
42	**Turntable CW Valve**	25	Resistance Too High	Open Circuit or Ohms > 60	Associated Function disabled	*Check for open or short from TCON (C29-8) to the up coil. *Replace coil.
		26	Resistance Too Low	Short or Ohms <5		

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
43	**Turntable CCW Valve**	25	Resistance Too High	Open Circuit orOhms > 60	Associated Function disabled	*Check for open or short from TCON (C29-7) to the up coil. *Replace coil.
		26	Resistance 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 C35-4 (C66DRE BL) when switch is pressed right and 2.5V when pressed left.
51	**Active at Startup**	11	Shorted to supply	5V	Drive Disabled	Inspect and repair joystick: *5V at JC3-2 (P162JW OR) *B- at JC3-1 (JSGND BR), * 500-4500 mV at JC3-4 & PCON C47-2 (C160JPL WH/RD) through joystick motion
		16	Sensor at 0v	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 Disabled	Inspect and repair joystick: *5V at JC3-2 (P162JW OR) *B- at JC3-1 (JSGND BR) *500-4500 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	Sensor at 0v	0V		
		17	Not calibrated	Not between 2000 & 3000 mV at startup		

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
68	**Function Enable Toggle Switch (Ground box controls)**	27	Active at Startup	Stuck ON(on @ power up)	Ground controlled functions disabled	*Verify no open/short circuit across C14-2 (C47FE WH/BK) to either 24VDC or B-. *Check for 24VDC or B- at the Right AC Motor Controller C16-32. *Replace TCON *Replace right (master) AC motor controller
70	**Pump Electric Motor Speed**	24	TOO LOW	Generator & Engine RPM don't match by more than 100 RPM for > 2.5 seconds	Primary Up and Secondary Up are disabled	*Check 3 wire plug on lift pump motor & verify 5V *DC to pin & B- at pin C. *Check/Replace lift pump motor encoder and wiring.
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	All platform functions disabled	Verify: With Red Emergency Stop pulled out CR62 should close. *Check for 24VDC on 30 and 87 of CR62 *Replace Relay; *Replace Red Emergency Stop button contacts *Relay in operable condition *PCON C35-12 detects Platform Estop when ON[passes thru C4-4 & C9-4] (P23PWR WH)

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
76	**Load Sense**	14	Cross Check Failure	Voltage on both or none, or not 24V	All functions disabled.	Verify: *B- at C16-9, C28-7 (S132LDS BL/WH NO) (C175LDS WH/BK NC) *24V at C16-9, C28-7 (S132LDS BL/WH NO) (C175LDS WH/BK NC)
		23	Too High (Overloaded)	Too much weight in the platform detected by LS18	All functions disabled. Auxiliary functions at ground control only.	Remove weight from platform
77	**VCON LCD Display (platform controls)**	13	Not Detected	No CAN communication	Lift functions disabled	Verify: *24V supply on C35-1, C35-2, *B- at C28-1 *60 Ohm resistance across CAN+/- C34-1 and C34-2 *Replace Right (master) AC controller
78	**PCON controller (platform controls)**	13	Not Detected	No CAN communication	All functions disabled	Verify: *24V supply on C28-2, C29-11, C29-12 *B- at C28-1 *60 Ohm resistance across CAN+/- C28-3 and C28-4
		29	Sotware Version Mismatch	Wrong software version	All functions disabled	Install correct software version. Revision of TCON & PCON software must match.
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: <+>, <+>, <+>, <->

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
83	**Telematics Remote Shutdown**	21	Fault	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.
100	**Platform Level Up/Down Valve**	26	VALUE TOO LOW	Open or Shorted	Associated Function Disabled	*Verify no open/short circuit across RDCON C16-11 & B- (V14PLU OR)
		16	Shorted to B-	Open or Shorted	Associated Function Disabled	*Verify no open/short circuit across RDCON C16-11 & B- (V14PLU OR)
104	**Steer Angle Sensor**	11	Shorted to supply	5V	High Speed Drive disabled	*Check for 5V DC at steer sensor (GR/WH.) *Check for 0-5V DC output at steer sensor (orange.) *Check for 0-5V DC at right AC motor controller (C16-30.) *Replace steer sensor.
		12	VALUE TOO HIGH	4,5V		
		15	VALUE TOO LOW	0,5V		
		16	Sensor at Zero	0V		Re-calibrate steer sensor Replace steer sensor
		17	Not calibrated	Calibration Not Completed		
139	**Left Rear Drive Controller**	21	Fault	Internal fault not mapped to a specific Genie fault code has occurred	Functions disabled or limited per AC motor controller internal fault handling.	Refer to MOTOR CONTROLLER FAULT CODES screen on platform display and MOTOR CONTROLLER FAULT CODE CHART in service manual.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
140	**Right Front Drive Controller**	13	NO RESPONSE	Loss of CAN communication.	Functions are disabled	*Check CAN bus circuit for open or short. *Check CAN bus resistor. Should be 120 *Ohms from CAN High to CAN Low. *Unplug other control module 1 at a time and repower to rule out a problem at each module. *Replace Right (Master) AC Motor Controller
		21	Fault	Internal fault not mapped to a specific Genie fault code has occurred	Functions disabled or limited per AC motor controller internal fault handling.	*Refer to MOTOR CONTROLLER FAULT *CODES screen on platform display and *MOTOR CONTROLLER FAULT CODE CHART in service manual. *If fault persist replace Right AC Motor Controller
160	**Steer Left Valve**	21	Fault	Open or shorted	Associated Function Disabled	*Verify no open/short circuit across RRDCON C28-4 & B- (V37SCC BL/BK)
161	**Steer Right Valve**	21	Fault	Open or shorted	Associated Function Disabled	*Verify no open/short circuit across RRDCON C28-3 & B- (V36SCW BL)

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
189	**Lift Pump Motor**	21	FAULT	Motor Too Hot or there is an issue with the thermal switch	Lift pump disabled. Auxiliary functions only	Allow motor to cool down.Ensure proper airflow to lift pump motor.Ensure that hydraulic pressure settings are correct. If motor cools and problem remains, check temperature switch and wiring.
		25	RESISTANCE TOO HIGH	Pump motor output is too low, with respect to PWM applied	Lift pump disabled. Auxiliary functions only	Check cables going to the Lift Motor.
		26	RESISTANCT TOO LOW	Pump motor output is too high, with respect to PWM applied	Lift pump disabled. Auxiliary functions only	Check post neg is shorted to B-

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
190	**AC_R_MOTOR AC Motor Right Side**	12	VALUE TOO HIGH	Motor Windings Open or Resistance is Too High	Drive disabled. Main Lift Functions Allowed	*Do not operate machine with batteries charging. *Check for loose motor cable connections. *Check for 33V AC across 2 motor lugs when joystick fully deflected. *Replace right drive motor *Replace right AC motor controller
		15	VALUE TOO LOW	Motor Windings Shorted	Drive Disabled. Functions allowed.	*Do not operate machine with batteries charging. *Check for shorted motor cable connections. *Check for 33V AC across 2 motor lugs when joystick fully deflected. *Replace right drive motor *Replace right AC motor controller
		21	FAULT	Temperature or speed sensor failure	Drive Current Reduced to 50%	*Check wires to thermal/ speed sensor at 6 pin Deustch connector C17 on motor. *Check thermal sensor resistance.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
191	**AC_L_MOTOR AC Motor Left Side**	12	VALUE TOO HIGH	Motor Windings Open or Resistance is Too High	Drive disabled. Main Lift Functions Allowed	*Do not operate machine with batteries charging. *Check for loose motor cable connections. *Check for 33 VAC across 2 motor lugs when joystick fully deflected. *Replace right drive motor *Replace right AC motor controller
		15	VALUE TOO LOW	Motor Windings Shorted	Drive Disabled. AUX? Lift? Functions allowed.	*Do not operate machine with batteries charging. *Check for shorted motor cable connections. *Check for 33VAC across 2 motor lugs when joystick fully deflected. *Replace right drive motor *Replace right AC motor controller
		21	FAULT	Temperature or speed sensor failure	Drive Current Reduced to 50%	*Check wires to thermal/ speed sensor at *6 pin Deustch connector C24 on motor. *Check thermal sensor resistance.
194	**BRAKE_RIGHT Brake AC Motor Right Side**	26	VALUE TOO LOW	Brake Coil Shorted	Drive functions Disabled	*Check for 48V DC to brake (WH/RD) *Check for 48V DC at C16-4 (48V is brake set, 0V is released) *Replace brake *Replace Right (master) AC motor controller.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
195	**BRAKE_LEFT Brake AC Motor Left Side**	26	VALUE TOO LOW	Brake Coil Shorted	Drive functions Disabled	*Check for 48V DC to brake (WH/RD) *Check for 48V DC at C23-4 *(48V is brake set, 0V is released) *Replace brake. *Replace Right (master) AC motor controller
198	**TACH_R_ MOTOR Encoder, AC Motor Right Side**	21	FAULT	Loss of speed sensor (encoder) signal	Drive Functions disabled	*Check wiring at 6 pin deutsch connector on drive motor. *Check for 12V DC on pins 1 & 2. *Replace motor. (encoder is inside) *Replace right (master) AC motor controller.
199	**TACH_L_ MOTOR Encoder, AC Motor Left Side**	21	FAULT	Loss of speed sensor (encoder) signal	Drive Functions disabled	*Check wiring at 6 pin deutsch connector on motor. *Check for 12V DC on pins 1 & 2. *Replace motor. (encoder is inside) *Replace left (slave) AC motor controller.
202	**AC_R_CTRLR AC Motor Controller Right Side**	26	RESISTANCE TOO LOW	Coil shorted or lower than expected resistance.	Steering, Platform Level, and Flashing Beacon (option) are disabled.	*If occurs on function activation check wiring and valve coil for the function activated when fault occurs. *If fault occurs on power up, replace controller.
		9	SHORTED TO B-	Drive output (low side) is shorted connected/ shorted to B- without the output being commanded.		*Check wiring and valve coil for the function activated when fault occurs. *Look for short to B- in wire from faulted function to right AC motor controller.

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
203	**AC_L_CTRLR AC Motor Controller Left Side**	26	RESISTANCE TOO LOW	Coil shorted or lower than expected resistance.	Drive output (low side) is shorted connected/ shorted to B- without the output being commanded	*If occurs on function activation check wiring and valve coil for the function activated when fault occurs. *If fault occurs on power up, replace controller.
		9	SHORTED TO B-	Drive output (low side) is shorted connected/ shorted to B- without the output being commanded.		*Check wiring and valve coil for the function activated when fault occurs. *Look for short to B- in wire from faulted function to right AC motor controller.
204	**BATTERY_ PWR Battery Power Notes: AUX is available Drive is locked out**	19	OUT OF RANGE	Battery Voltage Too High	Main Contactor Opens (or will not close)	*Check that batteries are not being charged while attempting to operate (Voltage must be below 65V.) *Ensure that batteries are not overcharged (especially if occurs upon aggressive braking.) *Ensure that battery voltage is not too low (especially if occurs while accelerating or lifting.) If occurs on power up, and above conditions are corrected, replace Right (master) AC Motor Controller.
		24	TOO LOW	Battery Voltage Too Low or Battery Charge is less than 10%	Main Contactor Opens (or will not close). Slow Functions.	Charge or replace batteries

CONTROL SYSTEM FAULT CODE CHART

Error Source		Error Type				
ID	**Component**	**ID**	**Name**	**Cause**	**Effect**	**Solution**
205	**Drive Power Contactor**	26	VALUE TOO LOW	Coil Shorted	All functions disabled	*Check connections between right motor controller and contactor coil. *Check diode on main contactor. If OK replace contactor or right AC motor controller if contactor is OK
		12	VALUE TOO HIGH	Contacts detected closed when contactor not commanded		*Check for voltage at main contactor coil with machine in the ON position. (24V DC on red wire. 48V DC on orange wire) *Replace main contactor.
		13	VALUE TOO LOW	Contacts Stuck Open (won't close when commanded)		*Check for voltage at main contactor coil with machine in the on position. (24V DC on red wire. 48V DC on orange wire) *Replace main contactor.

Motor Controller Fault Code Chart

AC Motor controller code	Error Type	Condition	Solution
24592	W atchdog	No functions or drive.	Replace the AC motor controller.
65297	Logic failure #3	No functions or drive.	Replace the AC motor controller.
65298	Logic failure #2	No functions or drive.	Replace the AC motor controller.
8977	S TBY I HIGH	No functions or drive.	Replace the AC motor controller.
12592	Capacitor charge	No functions or drive.	Check for 48V DC on B+, using B- for ground. Replace the AC motor controller.
12833	Contactor driver	No functions or drive.	Replace the AC motor controller.
65503	Safety feedback	No functions or drive.	Replace the AC motor controller.
12835	POS AUX Shorted	No functions or drive.	Check for 48V DC on the W H/RD wire going to the right brake coil Replace the AC motor controller.
8785	Hardware coil short time out	No functions or drive.	Replace the AC motor controller.
65512	W rong set point	No functions or drive.	Replace the AC motor controller.
6513	Power MOS shorted	No functions or drive.	Replace the AC motor controller.
65515	Tiller errror	No functions or drive.	Check for 48V DC R-1, OR/RD on master motor controller. Check for 24V DC on R-29, Blue on master motor controller. Replace AC motor controller.
65517	Analog input	No functions or drive.	If problem is consistant, replace the AC controller.
65520	Hardware fault	No functions or drive.	Replace the AC motor controller.
65531	Wrong set battery	Cut out valves, function pump, propel stopped, MC opened, EB applied.	Replace the AC motor controller.
21808	EEPROM time out	Functions and drive will revert to factory default settings.	Cycle power off and back on. If the fault disappears, all valve settings will have to be readjusted. If fault is maintained, replace the AC motor controller.

MOTOR CONTROLLER FAULT CODE CHART

AC Motor controller code	Error Type	Condition	Solution
13912	High temperature	Functions and drive start to degrade and quit. One or both motor controllers have exceeded 85°C/185°F.	Let the AC motor controllers cool off. If fault persist with AC motor controllers cooled, replace faulty AC motor controller.
65516	Current gain	Functions and drive will revert to factory default settings.	Readjust the max current Setting.
16913	Thermic sensor time out	Function and drive speeds will slow down.	Replace the AC motor controller.
65512	Slip profile	No drive.	Replace the AC motor controller.
65360	Forward/Reverse	Propel is stopped (node 2 only).	Replace the right (master) AC motor controller.
65508	Plat-Gnd switch open	Node 2 only.	Replace the right (master) AC motor controller.
65521	Check up needed	Continuous normal operation (node 2 only).	Perform scheduled maintenance
24592	Watchdog	No functions or drive.	Replace the AC motor controller.
65509	Wrong zero	No functions or drive.	Replace the AC motor controller.
65510	Output mismatch	No functions or drive.	Replace the AC motor controller.
65530	Input mismatch	No functions or drive.	Replace the AC motor controller.
65511	Safety feedback	No functions or drive.	Replace the AC motor controller.
65512	Wrong setpoint	No functions or drive.	Replace the AC motor controller.
65513	Wrong config.	No functions or drive.	Replace the AC motor controller.
65532	Hardware fault	No functions or drive.	Replace the AC motor controller.
65528	Analog input	No functions or drive.	Replace the AC motor controller.
21808	EEPROM time out	No functions or drive.	Replace the AC motor controller.
9233	I=0 ever	No functions or drive.	Replace the AC motor controller.
8977	STBY I HIGH	No functions or drive.	Replace the AC motor controller.
16912	High temperature	Function pump chopper maximum current reduced proportionally to temperature increase.	Let the AC motor controllers cool off. If fault persist with AC motor controllers cooled, replace faulty AC motor controller.
65515	Hardware fault valve	No functions or drive.	Replace the AC motor controller.

MOTOR CONTROLLER FAULT CODE CHART

AC Motor controller code	Error Type	Condition	Solution
65280	Tiller mismatch	No functions or drive.	Replace the AC motor controller.
16913	Current sensor time out	No functions or drive.	Replace the AC motor controller.
21776	EEPROM warning	No functions or drive.	Replace the AC motor controller.

Drive Motor Thermal Sensor

The thermal sensor is monitored by the motor controllers to maintain optimum performance and as a thermal shutdown protection device.

Normal safe operating range is between -40°F / -40°C and 131°F / 55°C at an 85% duty cycle.

Thermal faults will occur when the temperature exceeds its threshold of 302°F / 150°C. Then drive speeds will be reduced by 50%.

Thermal shut down occurs at 392°F / 200°C.

How to Test the Thermal Sensor

1 Disconnect the battery packs from the machine.

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

2 Remove the chassis cover fasteners from the non-steer end of the chassis. Remove the cover.

3 Tag and disconnect the six pin Deutsch electrical connector for the speed and temperature sensor at the drive motor.

4 Measure the drive motor case temperature using a thermometer.

5 Measure the resistance between pins 5 and 6 on the Deutsch connector going into the motor housing. Compare value to chart on right.

Temperature °F / °C	Resistance Ohm
-40 / -40	355
-22 / -30	386
-4 / -20	419
14 / -10	455
32 / 0	493
50 / 10	533
68 /20	576
77 / 25	598
86 / 30	621
104 / 40	668
122 / 50	718
140 / 60	769
158 / 70	824
176 / 80	880
194 / 90	939
212 / 100	1000
230 / 110	1063
248 / 120	1129
266 / 130	1197
284 / 140	1268
302 / 150	1340
320 / 160	1415
338 / 170	1493
347 / 180	1572
374 / 190	1654
392 / 200	1739
410 / 210	1825
428 / 220	1914
446 / 230	2006
464 / 240	2099
482 / 250	2195
500 / 260	2293
518 / 270	2392
536 / 280	2490
554 / 290	2584
572 / 300	2668

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.

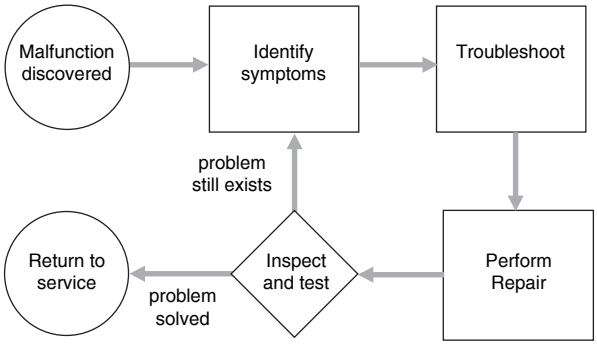
Electrical Schematics

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

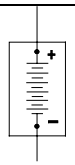
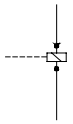
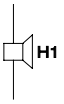
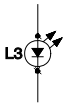
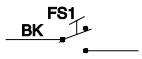
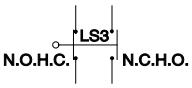
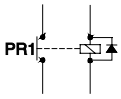
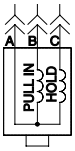
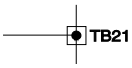
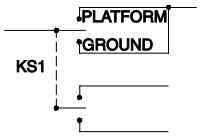
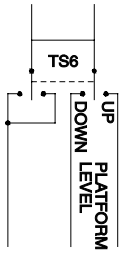
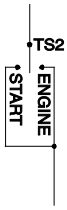
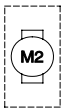
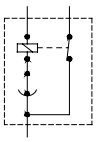
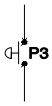
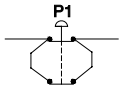
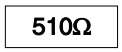
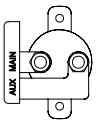
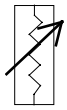
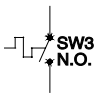
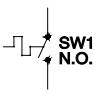
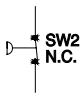
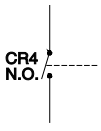
Hydraulic Schematics

⚠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.

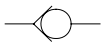
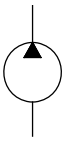
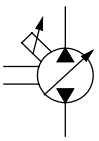
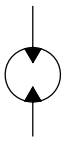
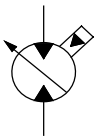
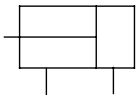
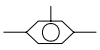
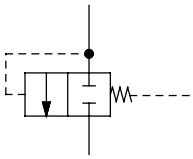
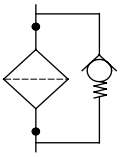
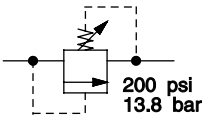
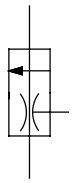
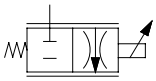
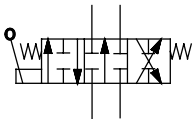
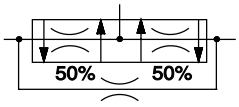
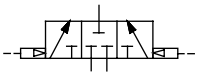
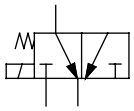
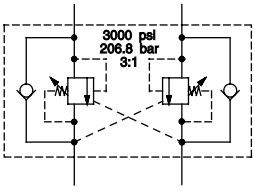
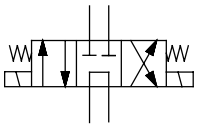
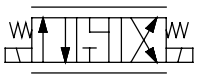
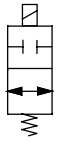
General Repair Process



Electrical Symbols Legends

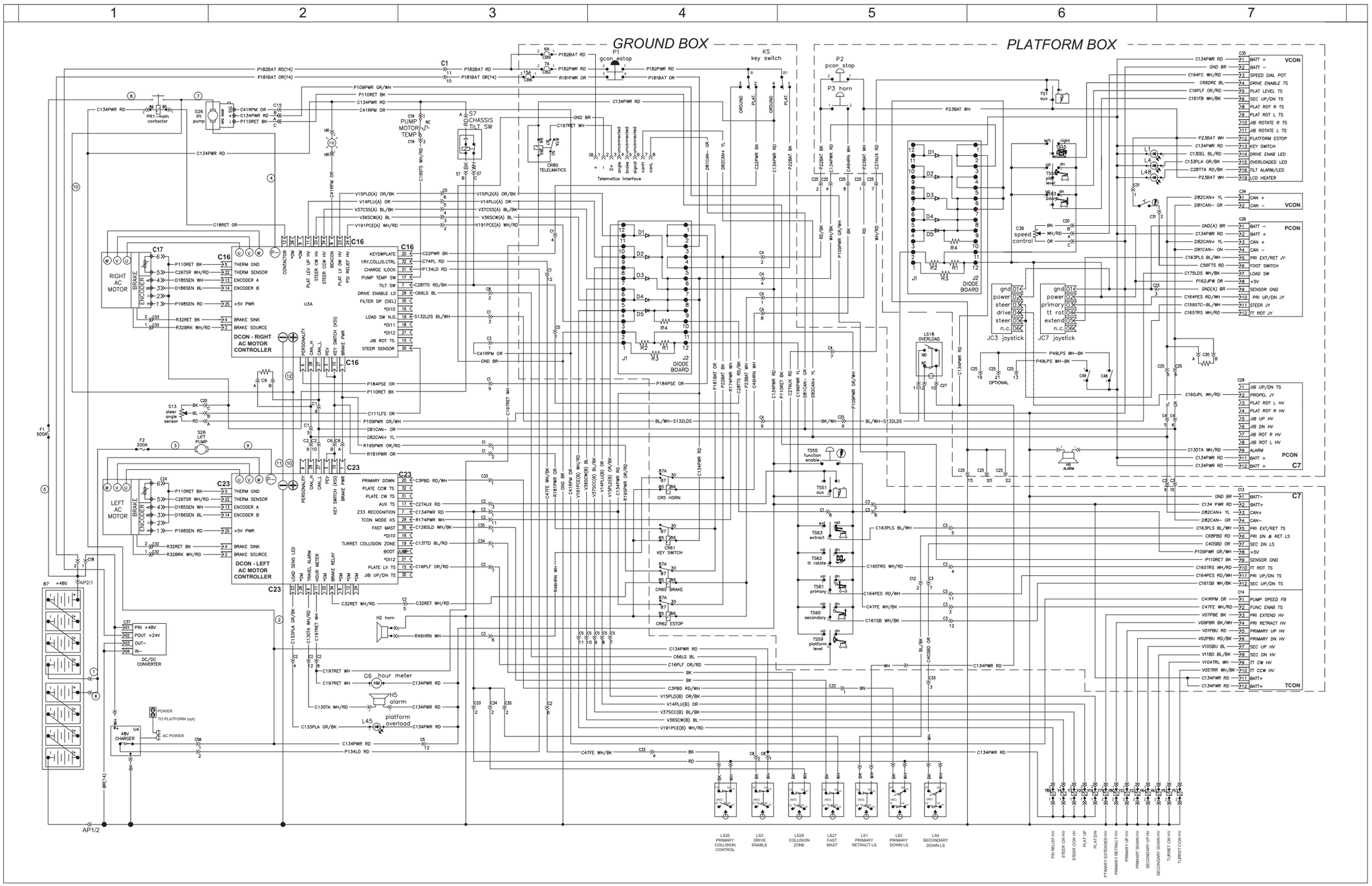
 Battery	 Coil, solenoid or relay	 Horn or alarm	 Flashing beacon	 Gauge
 Diode	 Hour meter	 LED	 Fuse with amperage	 Foot switch
 T-circuits connect	 Limit Switch	 Power relay	 Coil with suppression	 Fuel or RPM solenoid
 Connection - no terminal	 T-circuits connect at terminal	 Circuits crossing - no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

Hydraulic Symbols Legends

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

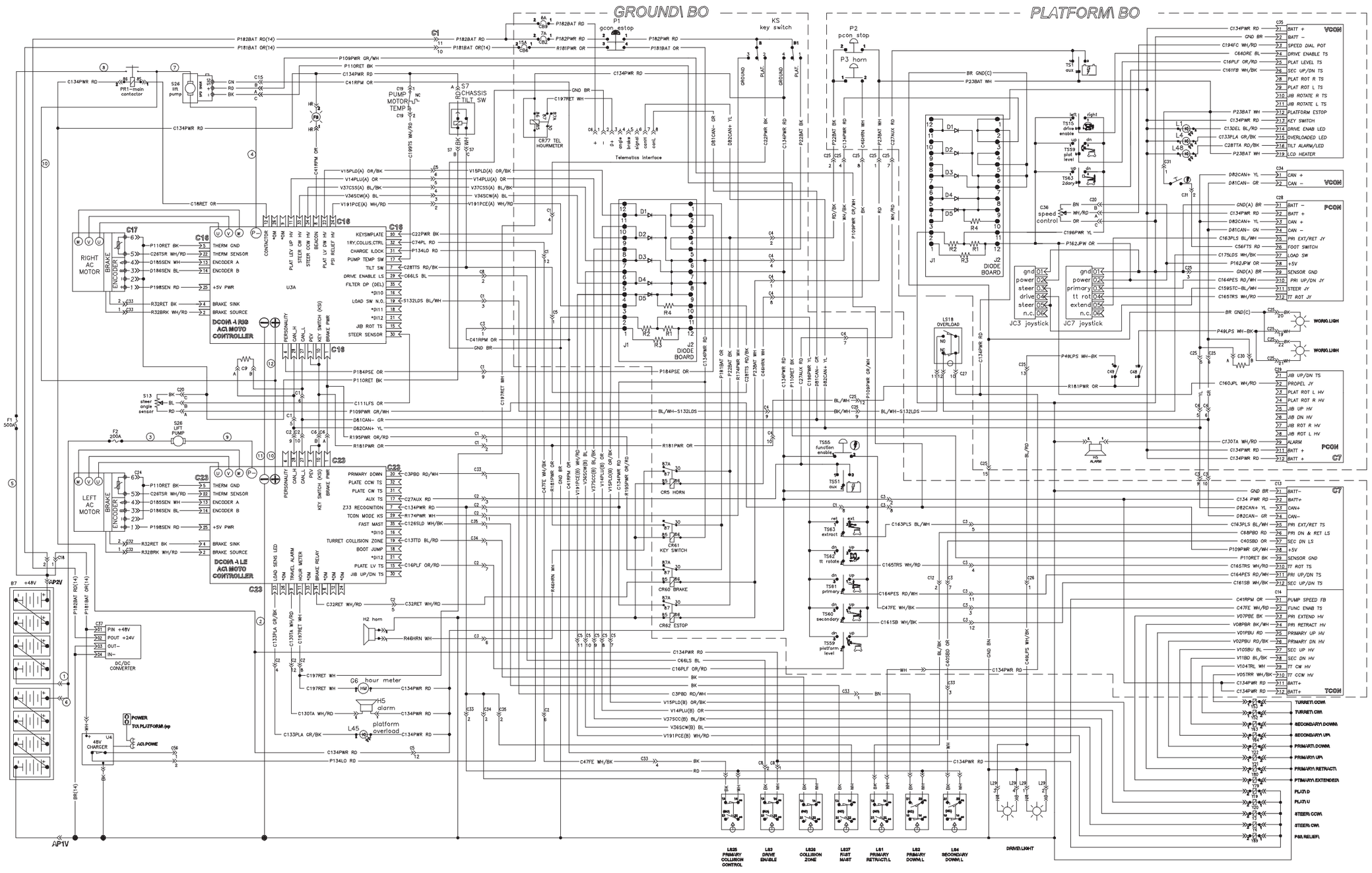
Electrical Schematic

Electrical Schematic, up to S/N Z331815M-306



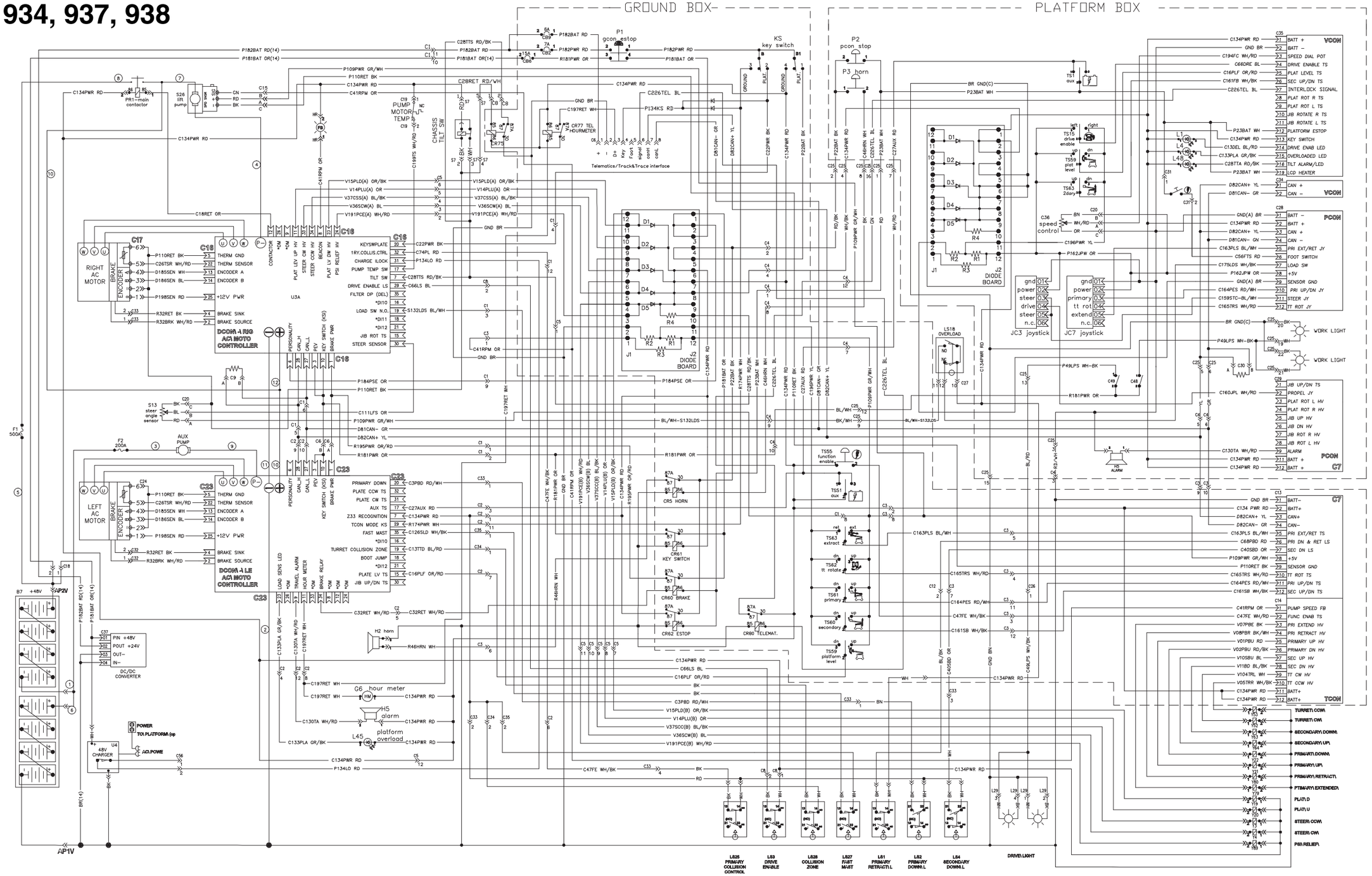
Electrical Schematic

Electrical Schematic, from S/N Z331815M-307 to S/N Z331816M-946



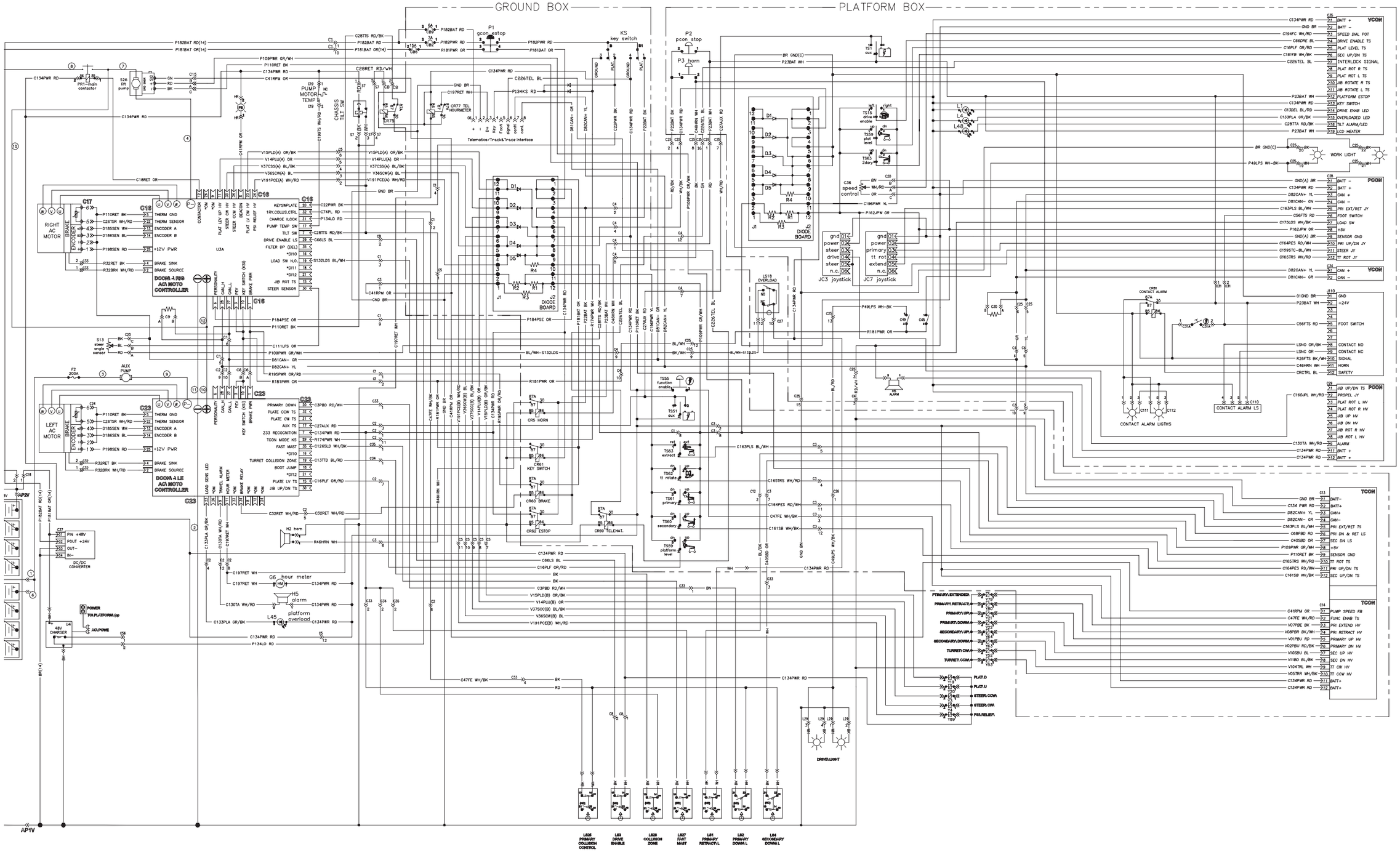
Electrical Schematic

Electrical Schematic, from S/N Z331815M-947 to S/N Z3318M-1782 and for S/N Z331815M-919, 923, 926, 929, 933, 934, 937, 938

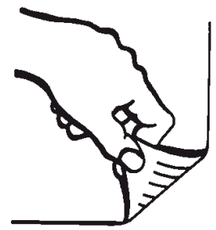


Electrical Schematic

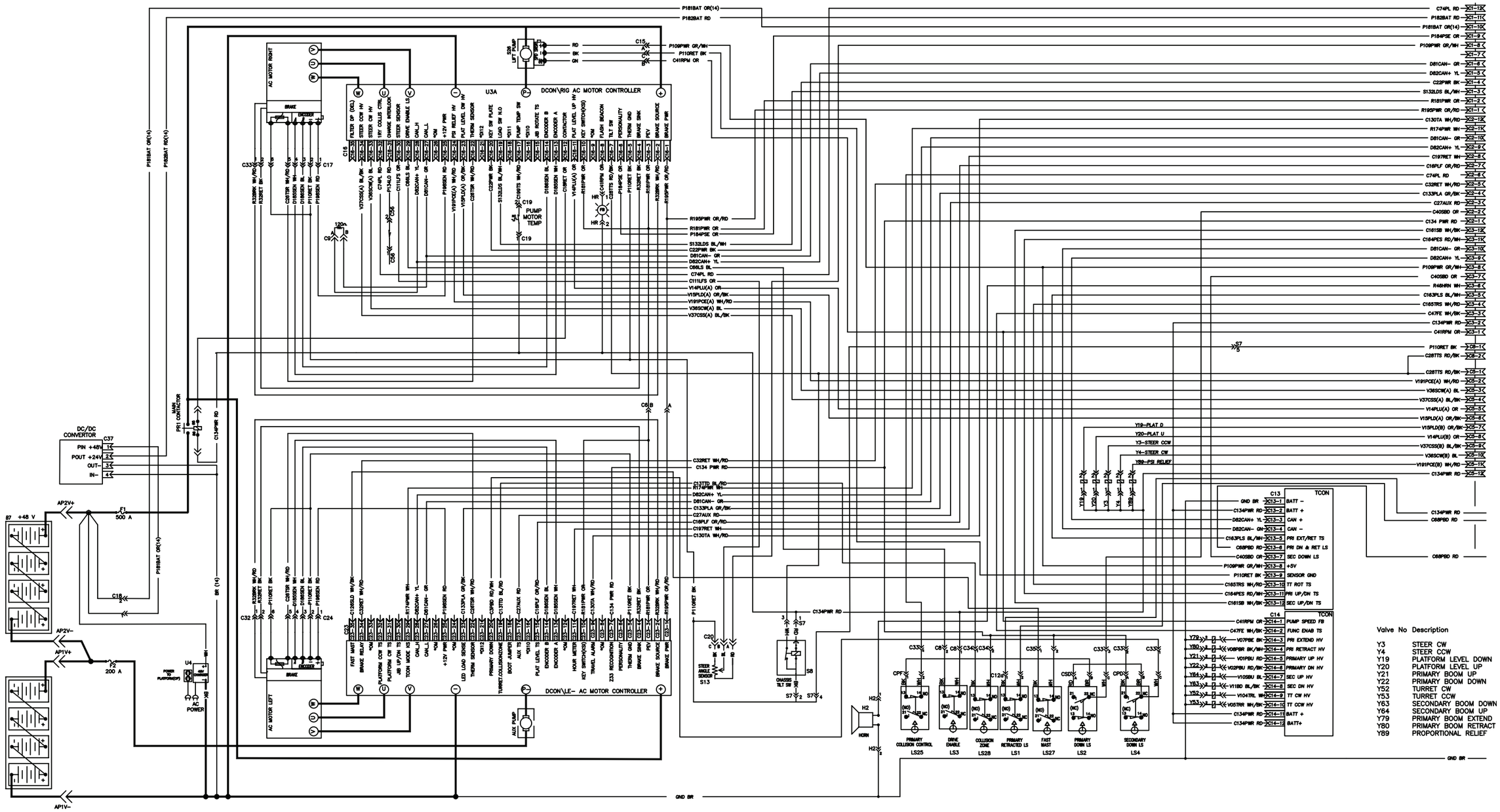
Electrical Schematic, from S/N Z3318M-1783 to Z3318M-2668



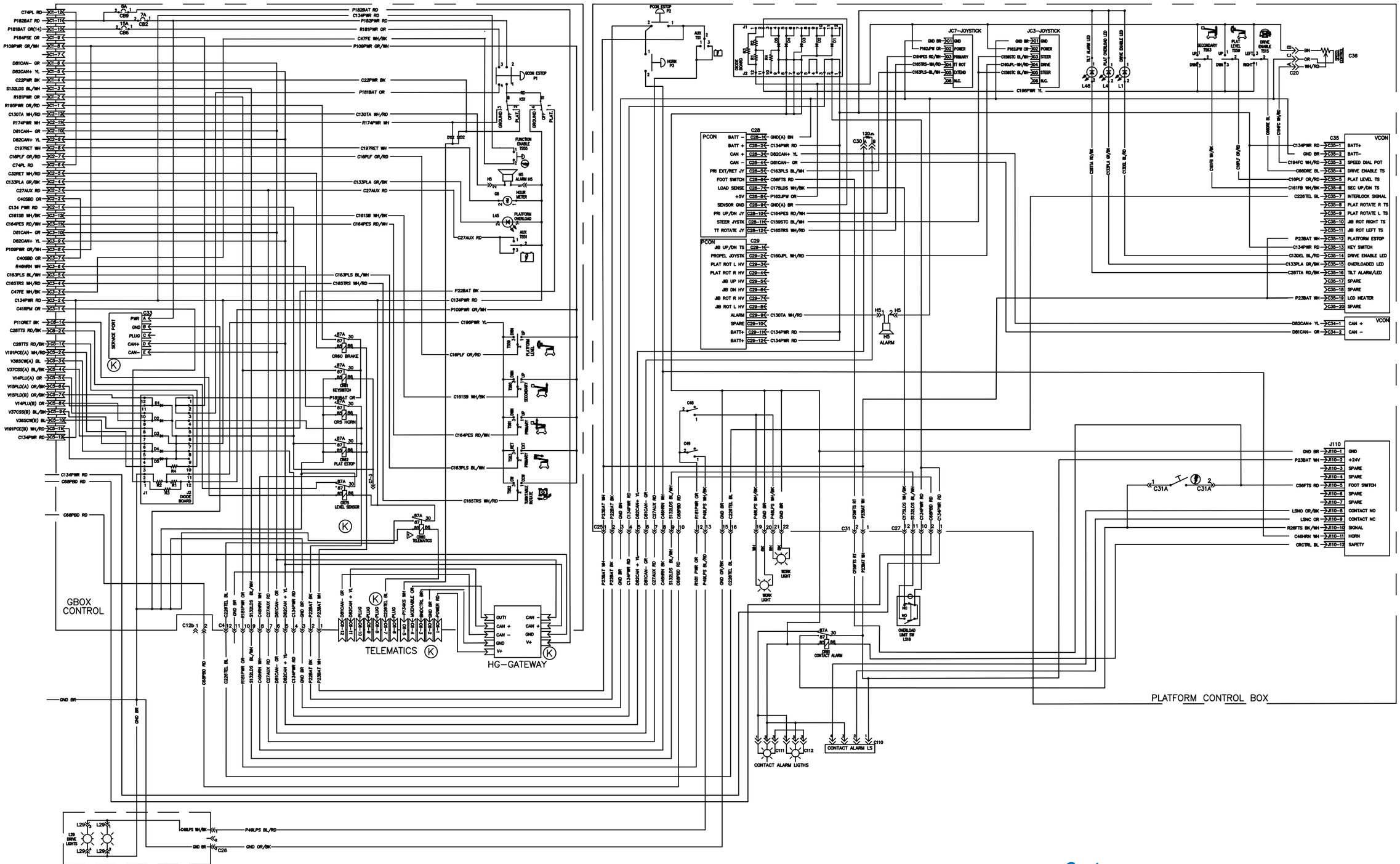
Electrical Schematic



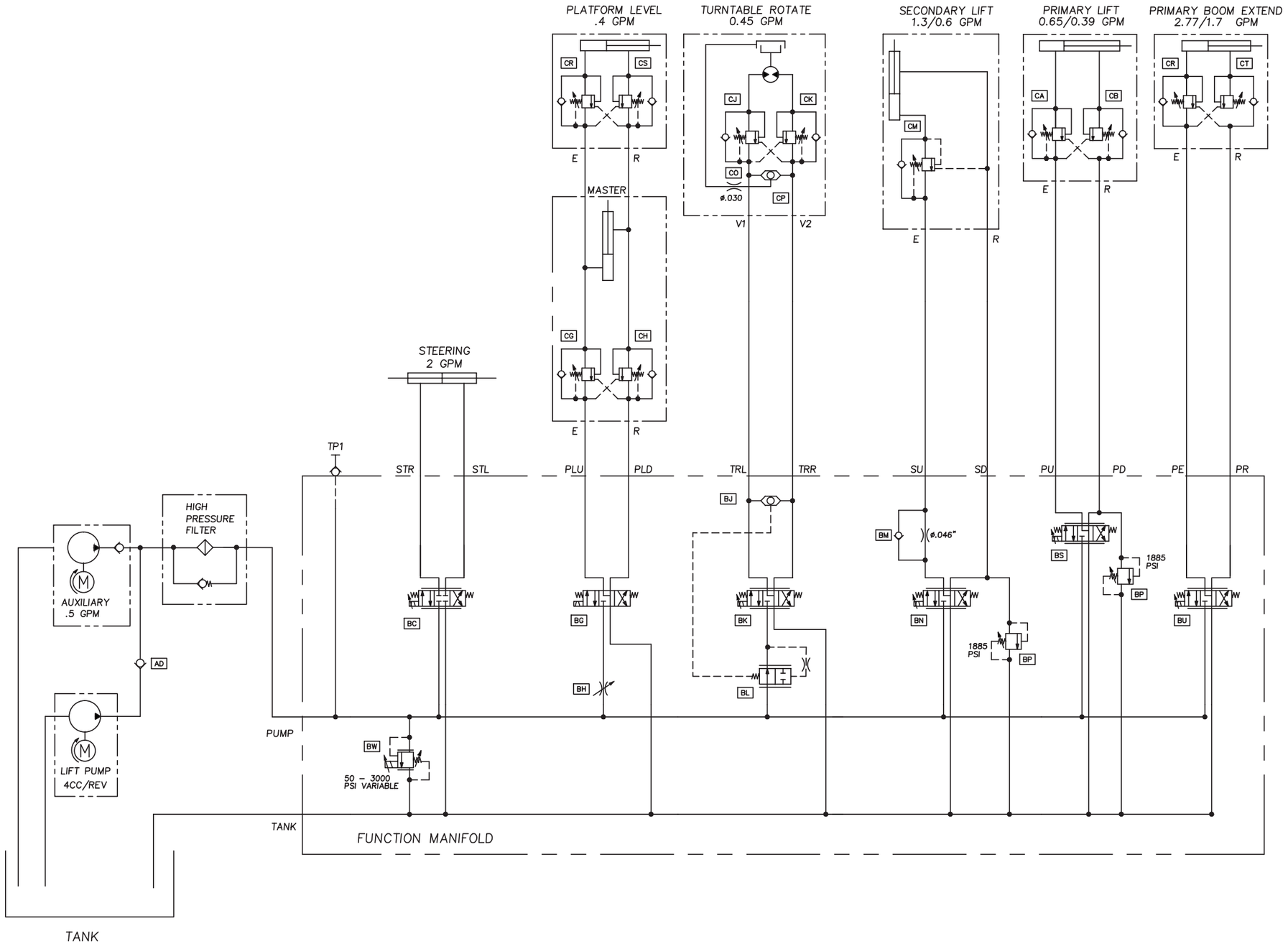
Electrical Schematic, from S/N Z3318M-2669



Electrical Schematic, from S/N Z3318M-2669



Hydraulic Schematic



COUNTERBALANCE VALVES

	RATIO	PRESS
CR CT	4.5:1	1500
CA CB	3:1	3800
CG CH	1.5:1	3000
CM	4.5:1	3500
CJ CK	4.25:1	3626
CR CS	4.5:1	3000