Genie®
A TEREX BRAND

Service Manual

	Serial Number Range
GR™-12	from GR10-20000
GR™-15	from GR10-20000
GR™-20	from GR10-20000
QS-12R	from QS11-1000
QS-15R	from QS11-1000
QS-20R	from QS11-1000
QS-12W	from QS11-1000
QS-15W	from QS11-1000
QS-20W	from QS11-1000

Part No. T110280
Rev B1
November 2014

Introduction

Important

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

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

Compliance

Machine Classification
Group A/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:

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Serial Number Information

Genie offers the following Service Manuals for these models:

Title	Part No.
Genie Runabout Service Manual, First Edition (GR - before serial number 5001)	72965
Genie Runabout Service Manual, Second Edition (GR - from serial number 5001 to 19999) (QS - from 101 to 999)	84700

T110280 Rev B October 2011
Third Edition, Second Printing

Revision History

Revision	Date	Section	Procedure / Schematic Page / Description
A	4/2011		New release
B	10/2011	2 - Spec.	2-1
		3 - Maint.	3-5, 3-27
		6 - Schem.	6-2, 6-3, 6-4, 6-6, 6-10, 6-14, 6-18, 6-22, 6-26, 6-30, 6-34
B1	11/2014	6 - Spec.	2-5, 2-6
		4 - Repair	12-2
		6 - Schem.	6-39

REFERENCE EXAMPLES:

Section 3_Maintenance, B-3.
Section 4_Repair Procedure, 4-2.
Section 5_Diagnostic Codes, All charts.
Section 6_Schematics, Legends diagrams and schematics.

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

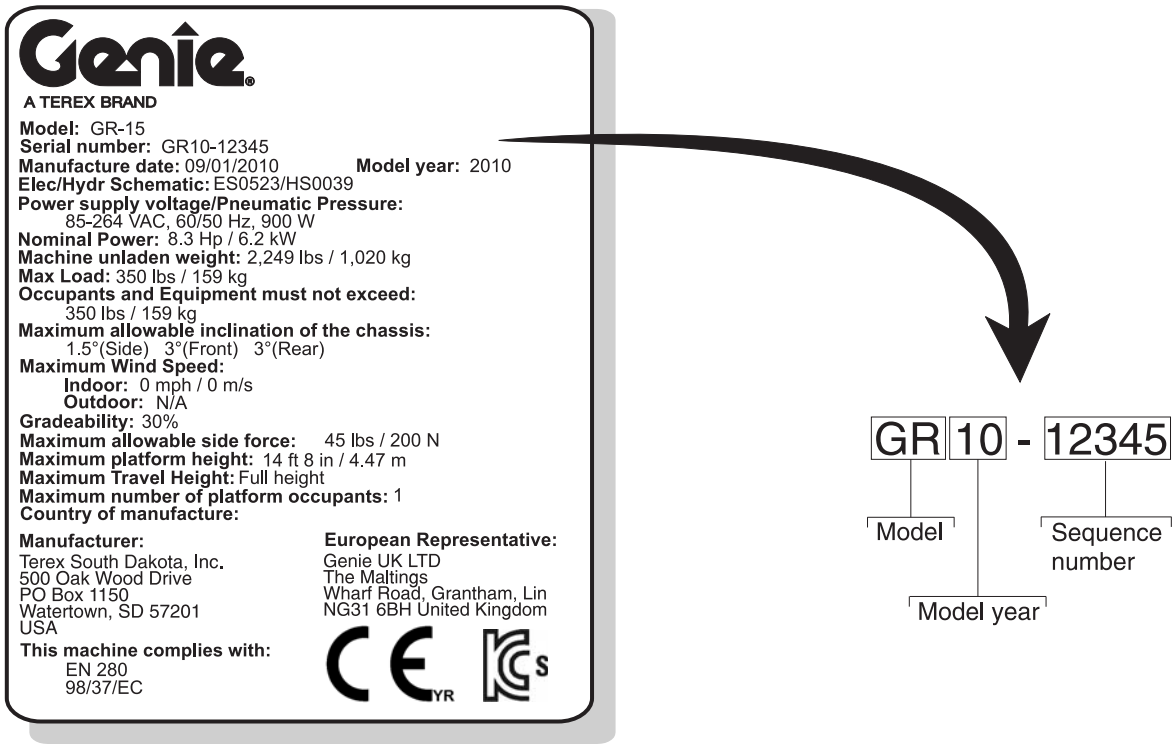
REFERENCE EXAMPLES:

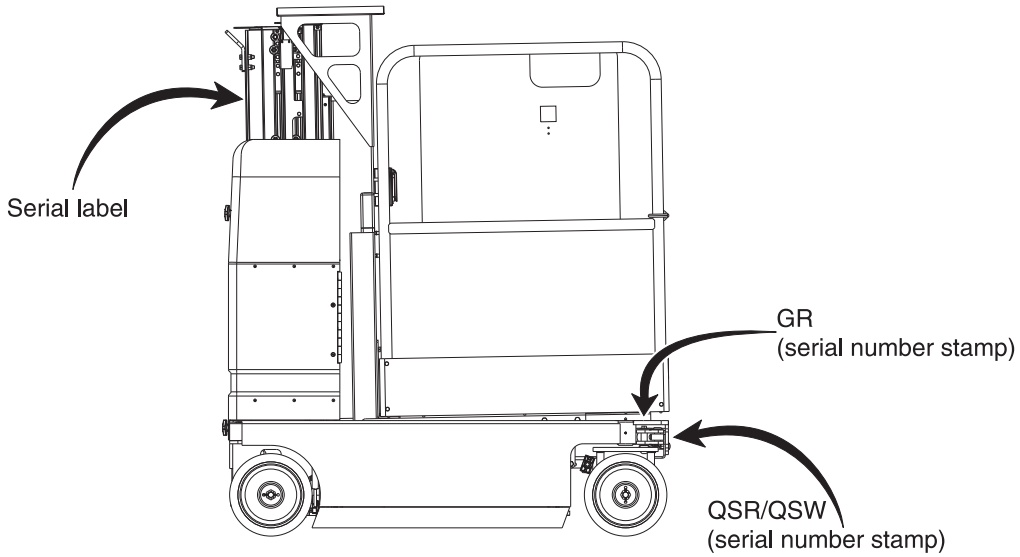
Kubota Engine_Section 2_Specifications.
A-6,B-3,C-7_Section 3_Maintenance Procedure.
3-2, 6-4, 9-1_Section 4_Repair Procedure.
Fault Codes_Section 5.
6-35, 6-56, 6-104_Section 6_Schematic Page #.

Electronic Version

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

Serial Number Legend





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.

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

Batteries, Standard	
Voltage	6V DC
Group	GC2
Type	T-105
Quantity	4
Battery capacity, maximum	C20 = 225AH
Reserve capacity @ 25A rate	447 minutes

Batteries, Maintenance-free (option)	
Voltage	6V DC
Group	GC2
Type	6V-AGM
Quantity	4
Battery capacity, maximum	200AH
Reserve capacity @ 25A rate	380 minutes

DC Motor	
Voltage	24 V
Horse Power	4.5 HP @ 2950 RPM
Kilowatts	3.3 kW @ 2950 RPM

Fluid capacities	
Hydraulic tank	1.5 gallons 5.7 liters
Hydraulic system (including tank)	2.2 gallons 8.3 liters

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

Height, stowed maximum	
GR-12, GR-15, QS-12R , QS-15R QS-12W and QS-15W (ANSI and CSA)	62 in 1.57 m
GR-12, GR-15, QS-12R , QS-15R QS-12W and QS-15W (CE models and Australia models)	68.1 in 1.73 m
GR-20, QS-20R and QS-20W (all models)	78 in 1.98 m

Tires and wheels	
Tire size (solid rubber)	10 x 3 in 25.4 x 7.62 cm
Tire contact area	6.5 sq in 41.9 cm^2
Castle nut torque, lubricated	150 ft-lbs 203 Nm

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

SPECIFICATIONS

Performance Specifications

Drive speed, maximum	
Platform stowed, fast	2.5 mph 40 ft / 10.9 sec 4 km/h 12.2 m / 10.9 sec
Platform stowed, slow	1.1 mph 40 ft / 24.8 sec 1.8 km/h 12.2 m / 24.8 sec
Platform raised	0.5 mph 40 ft / 55 sec 0.8 km/h 12.2 m / 55 sec

Braking distance, maximum	
High range on paved surface	19 in ± 6 in 48 cm ± 15 cm

Gradeability	30%

Airborne noise emissions	
Sound pressure level at ground workstation	< 70 dBA
Sound pressure level at platform workstation	< 70 dBA

Maximum slope rating,

Function speed, maximum from platform controls (with 1 person in platform)

GR-12, QS-12R and QS-12W	
Platform up (fast mode)	19 to 21 seconds
Platform up (slow mode)	30 to 32 seconds
Platform down	17 to 19 seconds

GR-15, QS-15R and QS-15W	
Platform up (fast mode)	20 to 22 seconds
Platform up (slow mode)	31 to 33 seconds
Platform down	18 to 20 seconds

GR-20, QS-20R and QS-20W	
Platform up (fast mode)	23 to 25 seconds
Platform up (slow mode)	32 to 34 seconds
Platform down	20 to 22 seconds

Rated work load at full height, maximum	
GR-12 and GR-15	
Standard Platform	500 lbs 227 kg
GR-20	
Standard Platform	350 lbs 159 kg
GR-12, GR-15 and GR-20	
AWP Platform	350 lbs 159 kg
QS-12R, QS-15R, QS-12W and QS-15W	
Stockpicker Platform	500 lbs 227 kg
QS-20R and QS-20W	
Stockpicker Platform	350 lbs 159 kg

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Hydraulic Specifications

Hydraulic Oil Specifications	
Hydraulic oil type	Chevron Rando HD equivalent
Viscosity grade	Multi-viscosity
Viscosity index	200
Cleanliness level, minimum	ISO 15/13
Water content, maximum	200 ppm

Chevron Rando HD oil is fully compatible and mixable with Shell Donax TG (Dexron III) oils.
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, corrosion inhibition, seal conditioning, and foam and aeration suppression properties.

Optional fluids	
Biodegradable	Petro Canada Environ MV 46 Statoil Hydra Way Bio SE 32 BP Biohyd SE-S
Fire resistant	UCON Hydrolube HP-5046 Quintolubric 822
Mineral based	Shell Tellus T32 Shell Tellus T46 Chevron Aviation A

NOTICE Continued use of Chevron Aviation A hydraulic fluid when ambient temperatures are consistently above 32°F / 0°C may result in component damage.

Note: Use Chevron Aviation A hydraulic fluid when ambient temperatures are consistently below 0°F / -17°C.

Note: Use Shell Tellus T46 hydraulic oil when oil temperatures consistently exceed 205°F / 96°C.

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

Function pump	
Type	Gear
Displacement per revolution	0.244 cu in 4 cc
Flow rate @ 2500 psi / 172 bar	4 gpm 15 L/min
Hydraulic tank return filter	10 micron with 25 psi / 1.7 bar bypass

Function manifold	
System relief valve pressure, maximum	3500 psi 241 bar
Lift relief valve pressure	1800 to 3500 psi 124 to 241 bar
Steer relief valve pressure	1500 psi 103 bar

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SPECIFICATIONS

Manifold Component Specifications

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

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 / -7.7°C that your air temperature increases or decreases from 68°F / 20°C.

Description	Specification
Solenoid valve, 3 position 4 way 20V DC with diode (schematic item E)	27.2Ω
Solenoid valve, 3 position 4 way 20V DC with diode (schematic item F)	19Ω
Solenoid valve, 2 position 4 way 20V DC with diode (schematic item H)	25Ω
Solenoid valve, 2 position 2 way N.C. with manual override 12V DC with diode (schematic item N)	6.25Ω

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SPECIFICATIONS

Hydraulic Hose and Fitting Torque Specifications

Your machine is equipped with JIC 37° flared 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)

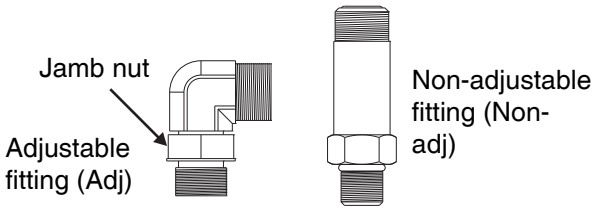
SAE Dash size	Torque
-4	10 ft-lbs / 13.6 Nm
-6	30 ft-lbs / 40.7 Nm
-8	40 ft-lbs / 54.2 Nm
-10	60 ft-lbs / 81.3 Nm
-12	85 ft-lbs / 115 Nm
-16	110 ft-lbs / 150 Nm
-20	140 ft-lbs / 190 Nm
-24	180 ft-lbs / 245 Nm

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)	15 ft-lbs / 20.3 Nm
	ORFS (Non-adj)	26 ft-lbs / 35.3 Nm
	37° (Non-adj)	22 ft-lbs / 30 Nm
-6	ORFS (Adj / Non-adj)	35 ft-lbs / 47.5 Nm
	37° (Adj / Non-adj)	29 ft-lbs / 39.3 Nm
-8	ORFS (Adj / Non-adj)	60 ft-lbs / 81.3 Nm
	37° (Adj / Non-adj)	52 ft-lbs / 70.5 Nm
-10	ORFS (Adj / Non-adj)	100 ft-lbs / 135.6 Nm
	37° (Adj / Non-adj)	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.

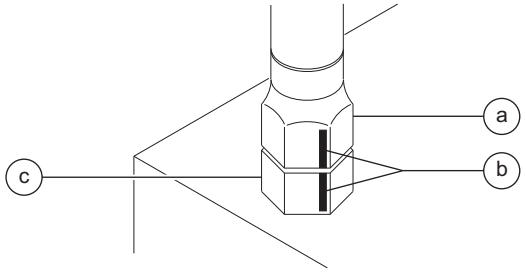


Figure 1

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.

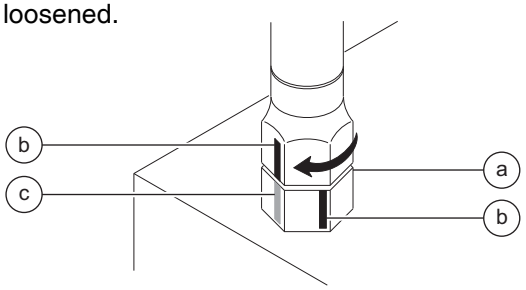


Figure 2

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

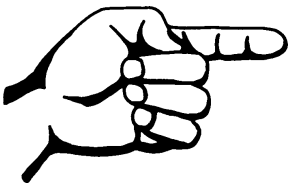
• This chart is to be used as a guide only unless noted elsewhere in this manual •

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				Class 8.8				Class 10.9				Class 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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Scheduled Maintenance Procedures

Observe and Obey:

- ☑ Maintenance inspections shall be completed by a person trained and qualified on the maintenance of this machine.
- ☑ Scheduled maintenance inspections shall be completed daily, quarterly, semi-annually, annually and every 2 years as specified on the *Maintenance Inspection Report.*

⚠WARNING Failure to properly complete each inspection when required may cause death, serious injury or substantial machine damage.

- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.
- ☑ Use only Genie approved replacement parts.
- ☑ Machines that have been out of service for a period longer than 3 months must complete the quarterly inspection.
- ☑ Unless otherwise specified, perform each procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Platform in the stowed position
  - Key switch in the off position with the key removed
  - The red Emergency Stop button in the off position at both ground and platform controls
  - Wheels chocked
  - All external AC power supply disconnected from the machine

About This Section

This section contains detailed procedures for each scheduled maintenance inspection.

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

Symbols Legend

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

⚠DANGER Indicates 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.

SCHEDULED MAINTENANCE PROCEDURES

Maintenance Symbols Legend

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

Indicates that tools will be required to perform this procedure.

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

Indicates that a cold motor or pump will be required to perform this procedure.

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

Pre-delivery Preparation Report

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

Make copies of the *Pre-delivery Preparation* report to use for each inspection. Store completed forms as required.

Maintenance Schedule

There are five types of maintenance inspections that must be performed according to a schedule—daily, quarterly, semi-annually, annually, and two year. The *Scheduled Maintenance Procedures Section and the Maintenance Inspection Report* have been divided into five subsections—A, B, C, D, and E. Use the following chart to determine which group(s) of procedures are required to perform a scheduled inspection.

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

Maintenance Inspection Report

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

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

Pre-Delivery Preparation

Fundamentals

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

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

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

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

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

Instructions

Use the operator's manual on your machine.

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

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

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

Legend

Y = yes, completed
N = no, unable to complete
R = repaired

Comments

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

Model

Serial number

Date

Machine owner

Inspected by (print)

Inspector signature

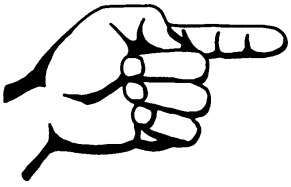
Inspector title

Inspector company

Genie
A TEREX BRAND

Terex South Dakota, Inc USA
500 Oak Wood Road
PO Box 1150
Watertown, SD 57201-6150
(605) 882-4000

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



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Maintenance Inspection Report

Model

Serial number

Date

Hour meter

Machine owner

Inspected by (print)

Inspector signature

Inspector title

Inspector company

Instructions

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

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

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

Legend

Y = yes, acceptable

N = no, remove from service

R = repaired

Checklist A		Y	N	R
A-1	Inspect the manuals and decals			
A-2	Pre-operation inspection			
A-3	Function tests			
A-4	Obstruction sensing system (QSR models)			
Perform after 40 hours:				
A-5	30 day service			
Perform every 100 hours:				
A-6	Grease steer yokes			

Checklist B		Y	N	R
B-1	Batteries			
B-2	Electrical wiring			
B-3	Tires and wheels			
B-4	Lifting chain			
B-5	Clean columns			
B-6	Sequencing cables			
B-7	Emergency stop			
B-8	Key switch			
B-9	Horn (if equipped)			
B-10	Inverter (if equipped)			
B-11	Drive brakes			
B-12	Drive speed - stowed			
B-13	Drive speed - raised			
B-14	Drive speed - slow			
B-15	Alarm (if equipped)			
B-16	Flashing beacons (if equipped)			
B-17	Hydraulic oil analysis			
B-18	Breather cap			
B-19	Electrical contactor			

Checklist C		Y	N	R
C-1	Grease platform overload (if equipped)			
C-2	Breather cap - models with optional oil			
C-3	Test platform overload (if equipped)			

Checklist D		Y	N	R
D-1	Inspect Mast			
D-2	Inspect/lubricate chains			
D-3	Hydraulic filter			

Checklist E		Y	N	R
E-1	Hydraulic oil			

Comments

Checklist A Procedures

A-1
Inspect the Manuals and Decals

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

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

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

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

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

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

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

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

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

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

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

A-2
Perform Pre-operation Inspection

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

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

A-3
Perform Function Tests

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

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

CHECKLIST A PROCEDURES

A-4
Test the Obstruction Sensing System (QSR models only)

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

1 Raise the platform approximately 4 feet / 1.2 m.

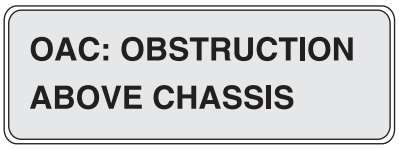
2 Place a 15 lb / 6.8 kg weight onto one of the obstruction sensing pads, of an area equal to 3 inches / 7.3 cm in diameter.

Note: The weight must be placed approximately in the center of the pad.

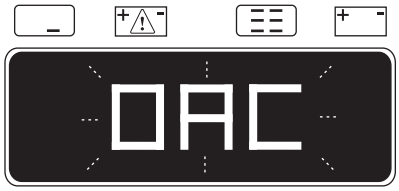
3 At the ground controls, attempt to lower the platform.

⊙ Result: The obstruction sensing alarm sounds and the platform will not lower. The system is working properly.

⊙ Result: The LCD at the ground controls should display OAC: Obstruction Above Chassis, indicating the obstruction sensing pads are working properly. The LED readout on the platform controls should display OAC. Refer to the examples below.



LCD Readout

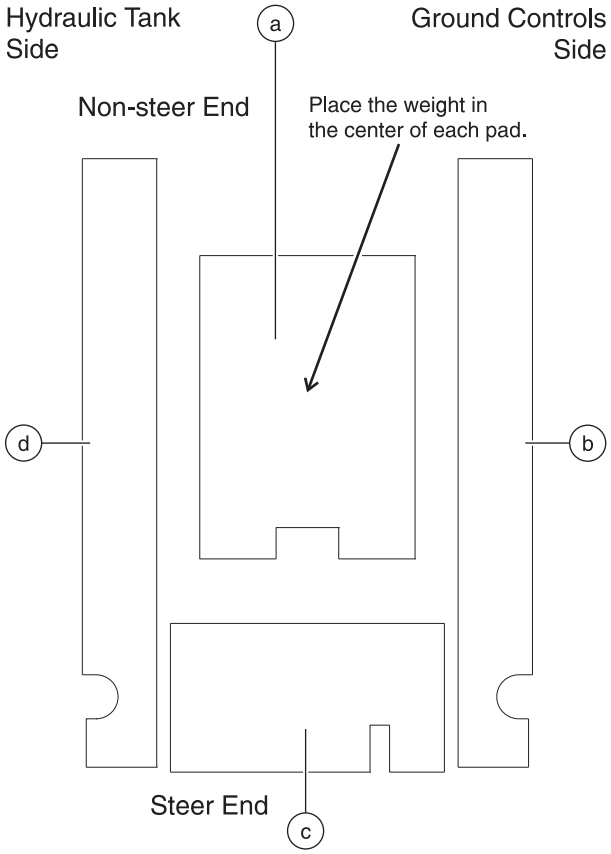


LED Readout

⊗ Result: The obstruction sensing alarm does not sound and the platform will lower. The system is not functioning correctly. Replace the pad. Refer to Repair procedure 12-1, *How to Replace an Obstruction Sensing Pad.*

4 Remove the weight from the pad. Push in the red Emergency Stop button to the off position at the ground controls, then pull out the red Emergency Stop button to the on position at the ground controls.

5 Repeat the procedure, beginning with step 2, for each of the remaining obstruction sensing pads.



a obstruction sensing pad (battery tray)
b obstruction sensing pad (ground controls side)
c obstruction sensing pad (steer end)
d obstruction sensing pad (hydraulic tank side)

CHECKLIST A PROCEDURES

A-5
Perform 30 Day Service

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

1 Perform the following maintenance procedures:

- B-3 Inspect the Tires and Wheels (including castle nut torque)
- D-3 Replace the Hydraulic Tank Return Filter

A-6
Grease the Steer Yokes

Genie specifications require that this procedure be performed every 100 hours of operation.

Regular application of lubrication to the steer yokes is essential to good machine performance and service life. Continued use of an insufficiently greased steer yoke will result in component damage.

1 Locate the grease fitting on the top of the steer yoke.

2 Pump multipurpose grease into the steer yoke until the steer yoke is full and grease is being forced past the bearings. Repeat this step for the other steer yoke.

Grease Specification
Chevron Ultra-duty grease, EP NLGI 1 (lithium based) or equivalent

Checklist B Procedures

B-1
Inspect the Batteries

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

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

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

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

1 **GR-12:** Raise the platform approximately 3 feet / 1 m.
GR-15 and GR-20: Raise the platform approximately 5 feet / 1.5 m.

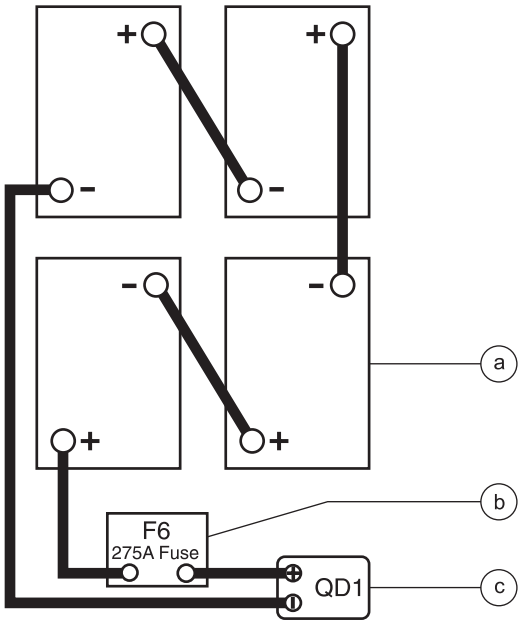
2 Open the battery cover. Rest the cover against the chassis.

3 Lower the platform until the mast just contacts the battery cover.

⚠WARNING Crushing hazard. Keep hands clear of the battery cover when lowering the platform.

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

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



a batteries B5
b 275A fuse F6
c quick disconnect QD1

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

6 Be sure that the battery separator wire connections are tight (if equipped).

7 Fully charge the batteries. Allow the batteries to rest 24 hours before performing this procedure to allow the battery cells to equalize.

8 Put on protective clothing and eye wear.

CHECKLIST B PROCEDURES

Models without maintenance-free or sealed batteries:

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

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

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

⊙ Result: All battery cells display an adjusted specific gravity of 1.277 +/- 0.007. The battery is fully charged. Proceed to step 14.

⊠ Result: One or more battery cells display a specific gravity of 1.217 or below. Proceed to step 11.

11 Perform an equalizing charge OR fully charge the batteries and allow the batteries to rest at least 6 hours.

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

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

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

⊙ Result: All battery cells display a specific gravity of 1.277 +/- 0.007. The battery is fully charged. Proceed to step 14.

⊠ Result: One or more battery cells display a specific gravity from 1.269 to 1.218. The battery is still useable, but at a lower performance so will need to be recharged more often. Proceed to step 14.

⊠ Result: One or more battery cells display a specific gravity from 1.217 to 1.173. The battery is approaching the end of its life. Proceed to step 14.

⊠ Result: The difference in specific gravity readings between cells is greater than 0.1 OR the specific gravity of one or more cells is 1.172 or less. Replace the battery.

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

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

CHECKLIST B PROCEDURES

All models:

16 Check each battery pack and verify that the batteries are wired correctly.

17 Inspect the battery charger plug and pigtail for damage or excessive insulation wear. Replace as required.

18 Connect the battery charger to a properly grounded 115V/60Hz or, 230V/60Hz or 50Hz single phase AC power supply.

⊙ Result: The charger should operate and begin charging the batteries.

⊠ If, simultaneously, the charger alarm sounds and the LEDs blink **one time**, correct the charger connections at the fuse and battery. The charger will then operate correctly and begin charging the batteries.

If, simultaneously, the charger alarm sounds and the LEDs blink **two times**, the input voltage is too low or too high. Correct the voltage issue. The charger will then operate correctly and begin charging the batteries.

If, simultaneously, the charger alarm sounds and the LEDs blink **three times**, the charger is overheated. Allow the charger to cool. The charger will then operate correctly and begin charging the batteries.

Note: For best results, use an extension of adequate size with a length no longer than 50 feet / 15 m.

Note: If you have any further questions regarding the battery charger operation, please contact Genie Product Support.

CHECKLIST B PROCEDURES

B-2
Inspect the Electrical Wiring

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

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

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

1 Inspect the underside of the chassis for damaged or missing ground straps.

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

- Mast cable
- Platform controls
- Power to platform wiring

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

- Ground control panel
- Hydraulic power unit

4 Inspect for a liberal coating of dielectric grease in all wiring connections between the ECM and the platform controls, and level sensor wiring.

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

6 Raise the platform approximately 8 feet / 2.4 m from the ground.

7 Place a lifting strap from an overhead crane under the platform. Support the platform. Do not apply any lifting pressure.

NOTICE Component damage hazard. The platform railings can be damaged if they are used to lift the platform. Do not attach the lifting strap to the platform railings.

8 Inspect the center chassis area for burnt, chafed and pinched cables.

9 Open the battery tray cover.

10 Inspect the battery tray for burnt, chafed and pinched cables.

11 Close the battery tray cover.

12 Remove the strap from the platform.

13 Lower the platform to the stowed position and turn the machine off.

CHECKLIST B PROCEDURES

B-3
Inspect the Tires and Wheels (including castle nut torque)

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

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

1 Check the tire surface and sidewalls for cuts, cracks, punctures and unusual wear.

2 Check each wheel for damage, bends and cracks.

3 Remove the cotter pin and check each castle nut for proper torque. Refer to Section 2, *Specifications.*

Note: Always replace the cotter pin with a new one when removing the castle nut or when checking the torque of the castle nut.

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

B-4
Check the Lifting Chain Adjustments

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

Maintaining proper adjustment of the lifting chains is essential to safe machine operation. Failure to maintain proper chain adjustment could result in an unsafe operating condition and may cause component damage.

1 Fully lower the platform and measure the maximum height of the machine.

⊙ Result: The machine is within specification. No adjustment required.

⊠ Result: The machine is not within specification. Adjust the chains. Refer to Repair procedure 3-3, *How to Adjust the Lifting Chains* and to Section 2, *Specifications*.

CHECKLIST B PROCEDURES

B-5
Clean and Lubricate the Columns

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

Clean and properly lubricated columns are essential to good machine performance and safe operation. Extremely dirty conditions may require that the columns be cleaned and lubricated more often.

1 Raise the platform to the maximum height.

2 Place a lifting strap from an overhead crane under the platform. Support the platform. Do not apply any lifting pressure.

NOTICE Component damage hazard. The platform railings can be damaged if they are used to lift the platform. Do not attach the lifting strap to the platform railings.

3 Visually inspect the inner and outer channels of the columns for debris or foreign material. If necessary, use a mild cleaning solvent to clean the columns.

⚠WARNING Bodily injury hazard. This procedure will require the use of additional access equipment. Do not place ladders or scaffold on or against any part of the machine. Performing this procedure without the proper skills and tools could result in death or serious injury. Dealer service is strongly recommended.

4 If needed, apply a generous amount of Boe-lube wax to the inside and outside channels of each column.

B-6
Adjust the Sequencing Cables

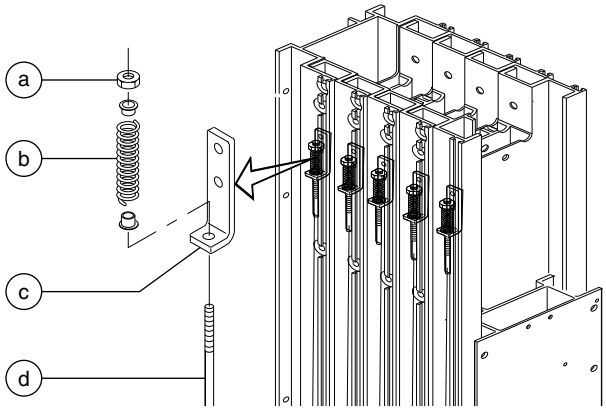
Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Maintaining proper adjustment of the sequencing cables is essential for safe machine operation. An unsafe working condition exists if the sequencing cables are improperly adjusted. A frequent check allows the inspector to identify changes in the sequencing cables operating condition that might indicate damage.

1 Fully lower the platform.

2 Locate the compression spring on each sequencing cable.

Note: The spring is located between the nylock nut and the upper sequencing bracket.



a nylock nut
b spring
c upper sequencing bracket
d sequencing cable

3 Confirm proper tension of each sequencing cable by measuring the height of the spring between the nylock nut and the upper sequencing bracket.

⊙ Result: The measurement is within specification. Proceed to step 7.

⊠ Result: The measurement is not within specification. Proceed to step 4.

Sequencing cable spring specification

Measurement, compressed	$^{15}/_{16}$ inch 2.4 cm

4 Adjust the spring compressed length by turning the nylock nut clockwise to decrease the spring length or counterclockwise to increase the spring length.

NOTICE Component damage hazard. Do not compress the spring to less than specification.

5 Raise and lower the platform through three complete cycles.

6 Repeat this procedure beginning with step 3.

7 Repeat steps 3 through 5 for each sequencing cable as required.

B-7
Test the Emergency Stop

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

A properly functioning Emergency Stop is essential for safe machine operation. An improperly operating red Emergency Stop button will fail to shut off power and stop all machine functions, resulting in a hazardous situation.

Note: As a safety feature, selecting and operating the ground controls will override the platform controls, except the platform red Emergency Stop button.

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

2 Push in the red Emergency Stop button at the ground controls to the off position.

⊙ Result: No machine functions should operate.

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

4 Push down the red Emergency Stop button at the platform controls to the off position.

⊙ Result: No machine functions should operate.

Note: The red Emergency Stop button at the ground controls will stop all machine operation, even if the key switch is switched to platform control.

Note: If in ground controls mode and the red Emergency Stop button at the platform controls is pushed in, the ground controls LCD will display, Platform EStop Depressed. The machine alarm will sound at 1 beep per second.

CHECKLIST B PROCEDURES

B-8
Test the Key Switch

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

Proper key switch action and response is essential to safe machine operation. The machine can be operated from the ground or platform controls and the activation of one or the other is accomplished with the key switch. Failure of the key switch to activate the appropriate control panel could cause a hazardous operating situation.

Note: Perform this procedure from the ground using the platform controls. Do not stand in the platform.

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

2 Turn the key switch to **platform control**.

3 Check the platform up/down function from the **ground controls**.

⊙ Result: The machine functions should **not** operate.

4 Turn the key switch to **ground control**.

5 Check the machine functions from the **platform controls**.

⊙ Result: The machine functions should **not** operate.

6 Turn the key switch to the off position.

7 Test the machine functions from the ground and platform controls.

⊙ Result: No machine functions should operate.

B-9
Test the Automotive-style Horn (if equipped)

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

The horn is activated at the platform controls and sounds at the ground as a warning to ground personnel. An improperly functioning horn will prevent the operator from alerting ground personnel of hazards or unsafe conditions.

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

2 Push down the horn button at the platform controls.

⊙ Result: The horn should sound.

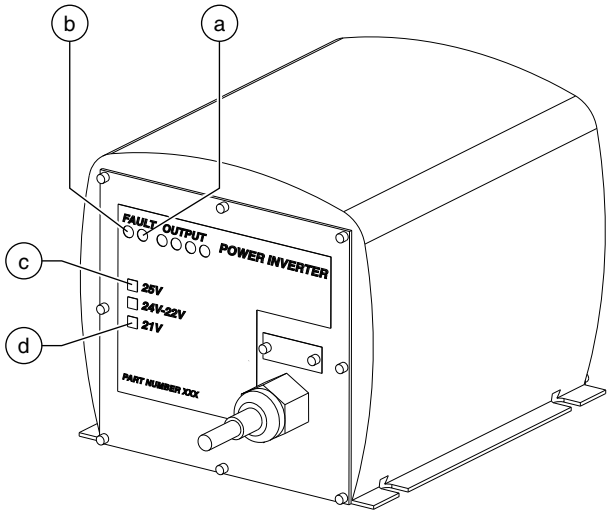
B-10
Inspect the Voltage Inverter (if equipped)

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

The inverter is activated whenever the power is on, and an electrical tool is connected to the inverter and turned on.

1 Inspect the inverter plug and pigtail for damage or excessive insulation wear. Replace as required.

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



a right fault LED
b left fault LED
c 25V LED
d 21V LED

3 Connect an appropriate power tool to the inverter. Activate the tool.

⊙ Result: The power tool should operate. There may be a brief (0.5 second) delay if the power tool has not been used in the previous 10 minutes.

⊠ If the left fault LED (REV_POL) is illuminated, the inverter is connected to batteries with the incorrect polarity. Correct the polarity issue with the red wire to battery positive and the black wire to battery negative. The inverter will then operate correctly and begin supplying AC power.

⊠ If the right fault LED (123) blinks **one time**, the power draw is too high. The tool being used requires too much power to operate or is being used at or near the limit of the inverter for an extended period of time. Reduce the power draw. The inverter will then operate correctly and begin supplying AC power.

⊠ If the right fault LED (123) blinks **two times**, the Ground Fault Interrupt (GFI) has been activated. A short circuit or partial short exists between the AC hot and ground in the tool or outlet. Check the tool for burnt, chafed, corroded and loose wires, and inspect the tool for internal moisture. Correct the short circuit or moisture issue OR inspect the wiring in the power-to-platform box. The inverter will then operate correctly and begin supplying AC power.

⊠ If right fault LED (123) blinks **three times**, the inverter is overheated. Allow the inverter to cool. The inverter will then operate correctly and begin supplying AC power.

⊠ If the battery 25 volt fault LED (25V) blinks one time, the battery voltage is over 30V. Operate the machine to lower the voltage level. The inverter will then operate correctly and begin supplying AC power.

⊠ If the battery 21 volt fault LED (21V) blinks one time, the battery voltage is less than 20V DC. The inverter will continue to operate until the battery voltage falls to 17.8V DC.

CHECKLIST B PROCEDURES

B-11
Test the Drive Brakes

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

Proper brake action is essential to safe machine operation. The drive brake function should operate smoothly, free of hesitation, jerking and unusual noise. Hydraulically-released individual wheel brakes can appear to operate normally when not fully operational.

Note: Perform this procedure with the machine on a firm, level surface that is free of obstructions.

Note: Be sure the platform extension deck is fully retracted and the platform is in the stowed position.

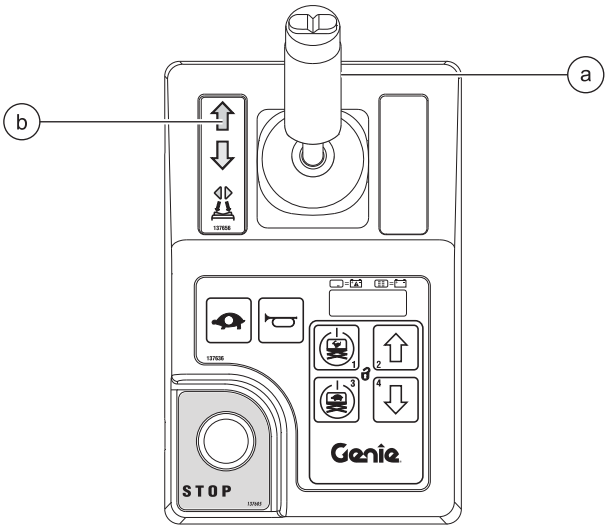
1 Mark a test line on the ground for reference.

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

3 Lower the platform to the stowed position.

4 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the test line.

5 Press and hold the drive/steer function enable switch on the control handle.



a drive/steer function enable switch
b blue arrow

6 Move the control handle in the direction indicated by the blue arrow on the control panel until the machine begins to move forward.

7 Bring the machine to top drive speed before reaching the test line. Release the drive/steer function enable switch or the joystick when your reference point on the machine crosses the test line.

8 Measure the distance between the test line and your machine reference point. Refer to Section 2, *Specifications*.

Note: The brakes must be able to hold the machine on any slope it is able to climb.

B-12
Test the Drive Speed - Stowed Position

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

Proper drive functions are essential to safe machine operation. The drive function should respond quickly and smoothly to operator control. Drive performance should also be free of hesitation, jerking and unusual noise over the entire proportionally controlled speed range.

Note: Perform this procedure with the machine on a firm, level surface that is free of obstructions.

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

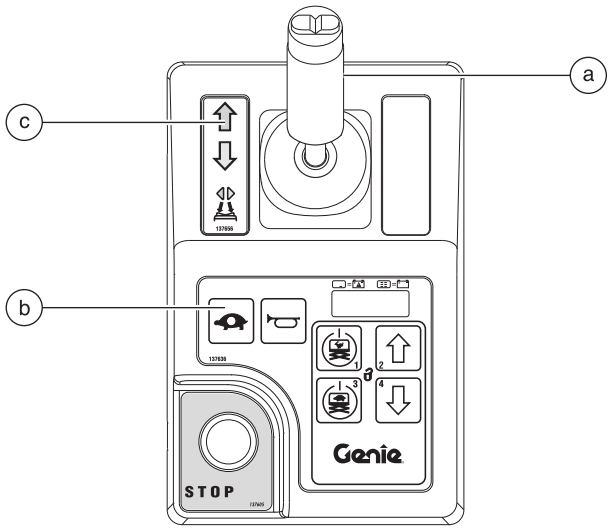
2 Turn the key switch to platform control and pull out the red Emergency Stop button to the on position at both the ground and platform controls.

3 Lower the platform to the stowed position.

4 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the test line.

5 Check to make sure the low drive speed light is off. If the low dive speed light is on, press the drive speed select button to turn off the low drive speed function.

6 Press and hold the drive/steer function enable switch on the control handle.



a drive/steer function enable switch
b slow drive speed button
c blue arrow

7 Move the control handle in the direction indicated by the blue arrow on the control panel until the machine begins to move forward.

8 Bring the machine to top drive speed before reaching the start line. Begin timing when the selected reference point on the machine crosses the start line.

9 Continue at full speed and note the time when your reference point on the machine passes the finish line. Refer to Section 2, *Specifications*.

CHECKLIST B PROCEDURES

B-13
Test the Drive Speed - Raised Position

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

Proper drive functions are essential to safe machine operation. The drive function should respond quickly and smoothly to operator control. Drive performance should also be free of hesitation, jerking and unusual noise over the entire proportionally controlled speed range.

Note: Perform this procedure with the machine on a firm, level surface that is free of obstructions.

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

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

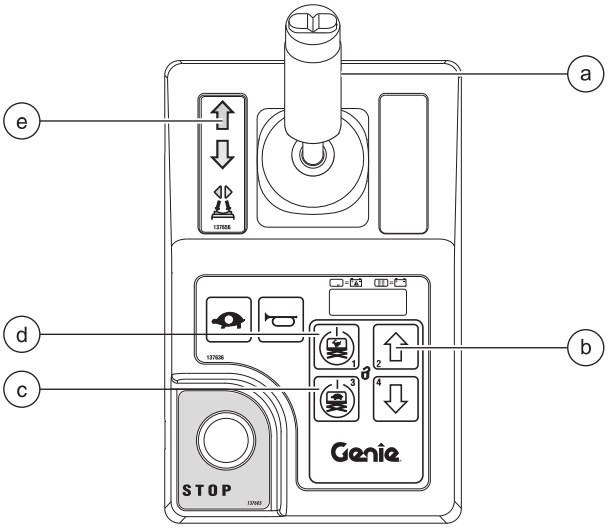
3 Press and hold the high or low speed lift enable button.

4 Press the platform up button.

5 Raise the platform approximately 4 feet / 1.2 m from the ground.

6 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.

7 Press and hold the drive/steer function enable switch on the control handle.



a drive/steer function enable switch
b platform up button
c low speed lift enable button
d high speed lift enable button
e blue arrow

8 Move the control handle in the direction indicated by the blue arrow on the control panel until the machine begins to move forward.

9 Bring the machine to top drive speed before reaching the start line. Begin timing when the selected reference point on the machine crosses the start line.

10 Continue at full speed and note the time when your reference point on the machine passes the finish line. Refer to Section 2, *Specifications*.

B-14
Test the Slow Drive Speed

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

Proper drive functions are essential to safe machine operation. The drive function should respond quickly and smoothly to operator control. Drive performance should also be free of hesitation, jerking and unusual noise over the entire proportionally controlled speed range.

Note: Perform this procedure with the machine on a firm, level surface that is free of obstructions.

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

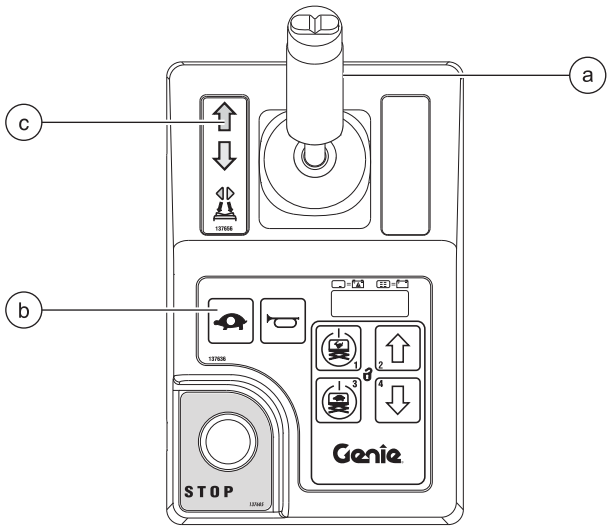
2 Turn the key switch to platform control and pull out the red Emergency Stop button to the on position at both the ground and platform controls.

3 Lower the platform to the stowed position.

4 Press the drive speed select button until the low drive speed light is on.

5 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.

6 Press and hold the drive/steer function enable switch on the control handle.



a drive/steer function enable switch
b drive speed select button
c blue arrow

7 Move the control handle in the direction indicated by the blue arrow on the control panel until the machine begins to move forward.

8 Bring the machine to top drive speed before reaching the start line. Begin timing when the selected reference point on the machine crosses the start line.

9 Continue at full speed and note the time when your reference point on the machine passes over the finish line. Refer to Section 2, *Specifications*.

CHECKLIST B PROCEDURES

B-15
Test the Motion Alarm (if equipped)

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

Alarms are used to alert operators and ground personnel of machine proximity and motion. The motion alarm is located in the ground control box and, when activated, will sound at 60 beeps per minute.

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

2 Press and hold the high speed lift enable button.

3 Press the platform up button and raise the platform approximately 1 foot / 0.3 m.

⊙ Result: The motion alarm should sound when the platform is raised.

4 Press and hold the high speed lift enable button.

5 Press the platform down button and lower the platform to the stowed position.

⊙ Result: The motion alarm should sound when the platform is lowered.

6 Press and hold the low speed lift enable button.

7 Press the platform up button and raise the platform approximately 1 foot / 0.3 m.

⊙ Result: The motion alarm should sound when the platform is raised.

8 Press and hold the low speed lift enable button.

9 Press the platform down button and lower the platform to the stowed position.

⊙ Result: The motion alarm should sound when the platform is lowered.

10 Turn the key switch to platform controls.

11 Press and hold the high speed lift enable button.

12 Press the platform up button and raise the platform approximately 4 feet / 1.2 m.

⊙ Result: The motion alarm should sound when the platform is raised.

13 Press and hold the high speed lift enable button.

14 Press the platform down button and lower the platform to the stowed position.

⊙ Result: The motion alarm should sound when the platform is lowered.

15 Press and hold the low speed lift enable button.

16 Press the platform up button and raise the platform approximately 4 feet / 1.2 m.

⊙ Result: The motion alarm should sound when the platform is raised.

17 Press and hold the low speed lift enable button.

18 Press the platform down button and lower the platform to the stowed position.

⊙ Result: The motion alarm should sound when the platform is lowered.

19 Press and hold the drive/steer function enable switch on the control handle. Move the control handle off center, hold for a moment and then release it. Move the control handle off center in the opposite direction, hold for a moment and then release it.

⊙ Result: The motion alarm should sound when the control handle is moved of center in either direction.

20 Press and hold the drive/steer function enable switch on the control handle. Press and hold the thumb rocker switch for a moment to the left position and then release it. Press and hold the thumb rocker switch for a moment to the right position and then release it.

⊙ Result: The motion alarm should sound when the rocker switch is moved off center in either direction.

B-16
Test the Flashing Beacons (if equipped)

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

Flashing beacons are used to alert operators and ground personnel of machine proximity and motion. The flashing beacons are located on both sides of the mast.

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

⊙ Result: The beacons should flash.

2 Turn the key switch to platform controls.

⊙ Result: The beacons should flash.

CHECKLIST B PROCEDURES

B-17
Perform Hydraulic Oil Analysis

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

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

Before replacing the hydraulic oil, the oil may be tested by an oil distributor for specific levels of contamination to verify that changing the oil is necessary.
If the hydraulic oil is not replaced at the two year inspection, test the oil quarterly. Replace the oil when it fails the test. See E-1, *Test or Replace the Hydraulic Oil.*

B-18
Inspect the Breather Cap

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

A free-breathing hydraulic tank cap is essential for good machine performance and service life. A dirty or clogged cap may cause the machine to perform poorly. Extremely dirty conditions may require that the cap be inspected more often.

1 Remove the breather cap from the hydraulic tank.

2 Check for proper venting.

⊙ Result: Air passes through the breather cap.

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

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

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

4 Install the breather cap onto the hydraulic tank.

B-19
Inspect the Electrical Contactor

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

Maintaining the electrical contactor in good condition is essential to safe machine operation. Failure to locate a worn or damaged contactor could result in an unsafe working condition and component damage.

1 At the ground controls, turn the key switch to the off position.

2 Push in the red Emergency Stop button at the ground controls to the off position.

3 At the non-steer end of the machine, open the cover to access the electrical tray.

4 Locate and disconnect the Anderson connector.

5 Locate the electrical contactor mounted on the fuse bracket.

6 Visually inspect the contact points of the contactor for the following items:

- Excessive burns
- Excessive arcs
- Excessive pitting

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

Note: Replace the contactor if any damage is found.

Checklist C Procedures

C-1
Grease the Platform Overload Mechanism (if equipped)

Genie specifications require that this procedure be performed every 500 hours or 6 months, whichever comes first. Perform this procedure more often if dusty conditions exist.

Application of lubrication to the platform overload mechanism is essential to safe machine operation. Continued use of an improperly greased platform overload mechanism could result in the system not sensing an overloaded platform condition and will result in component damage.

1 Locate the grease fittings on each pivot pin of the platform overload assembly.

2 Thoroughly pump grease into each grease fitting using a multi-purpose grease.

C-2
Replace the Hydraulic Tank Breather Cap - Models with Optional Hydraulic Oil

Genie specifications require that this procedure be performed every 500 hours or six months, whichever comes first OR when the machine fails to lift the maximum rated load.

The hydraulic tank is a vented-type tank. The breather cap has an internal air filter that can become clogged or, over time, can deteriorate. If the breather cap is faulty or improperly installed, impurities can enter the hydraulic system which may cause component damage. Extremely dirty conditions may require that the cap be inspected more often.

1 Remove and discard the hydraulic tank breather cap.

2 Install and new cap onto the tank.

C-3
Test the Platform Overload System (if equipped)

Genie specifications require that this procedure be performed every 500 hours or 6 months, whichever comes first.

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

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

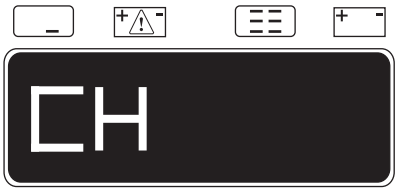
1 Turn the key switch to platform control and pull out the red Emergency Stop button to the on position at both the ground and platform controls.

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

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

⊙ Result: The LCD at the ground controls should display READY, the machine model and machine hours, indicating a normal condition. The LED readout on the platform controls should display CH. Refer to the examples below.

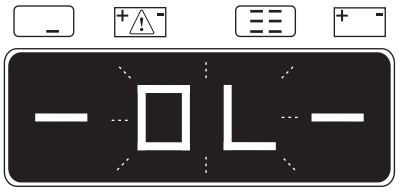
LCD Readout



LED Readout

⊠ Result: The LCD at the ground controls displays OL: Platform Overloaded and the LED readout on the platform controls displays a flashing OL. The platform overload system is not operating properly. Refer to Repair Procedure 11-1, *Calibrate the Platform Overload System (if equipped).*

LCD Readout



LED Readout

CHECKLIST C PROCEDURES

4 Add an additional weight to the platform not to exceed 20% of the maximum rated load. Refer to the machine serial plate.

⊙ Result: The LCD at the ground controls displays OL: Platform Overloaded and the LED readout on the platform controls displays a flashing OL. The platform overload system is operating properly.

⊠ Result: The LCD at the ground controls displays READY, the machine model and machine hours. The LED readout on the platform controls displays CH. The platform overload system is not operating properly. Refer to Repair Procedure 11-1, *Calibrate the Platform Overload System (if equipped).*

5 Test all machine functions from the platform controls.

⊙ Result: All platform control functions should not operate.

6 Turn the key switch to ground control.

7 Test all machine functions from the ground controls.

⊙ Result: All ground control functions should not operate.

8 Lift the test weight off the platform floor using a suitable lifting device. Turn the key switch to the off position.

9 Turn the key switch to ground control.

⊙ Result: The LCD at the ground controls displays READY, the machine model and machine hours. The LED readout on the platform controls displays CH. The platform overload system is operating properly.

⊠ Result: The LCD at the ground controls displays OL: Platform Overloaded and the LED readout on the platform controls displays a flashing OL. The platform overload system is not operating properly. Refer to Repair Procedure 11-1, *Calibrate the Platform Overload System (if equipped).*

10 Test all machine functions from the ground controls.

⊙ Result: All ground control functions should operate normally.

11 Turn the key switch to platform control.

12 Test all machine functions from the platform controls.

⊙ Result: All platform control functions should operate.

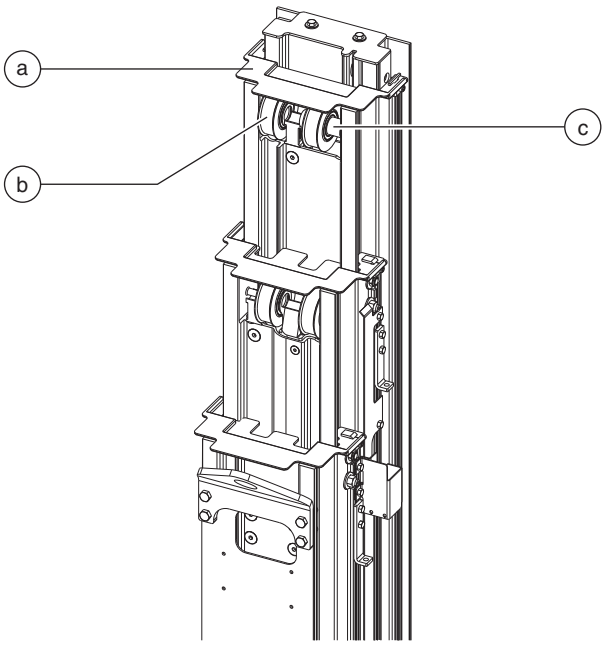
Note: If the platform overload system is not operating properly, refer to Repair Procedure 11-1, *Calibrate the Platform Overload System (if equipped).*

Checklist D Procedures

D-1
Inspect the Mast Assembly for Wear

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

Detection of excessive or unusual wear in the mast assembly is essential for safe machine operation. An unsafe working condition exists if the mast assembly has excessive wear and/or does not operate smoothly, free of hesitation and binding.



1 Remove the mast covers.

GR-15 shown

a mast cover
b idler wheel
c spacer

2 Raise the platform until approximately 4 inches / 10 cm of each column is visible.

3 **GR-12 and GR-15:** Visually inspect the top of each column for clearance between the roller wheels and the adjacent column surface.
GR-20: Visually inspect the top of each column for clearance between the slider block and the adjacent column surface.

⊙ Result: There should be an equal amount of distance between the roller wheel/slider block and the column on each side.

Note: If mast inspection results in a measurement that is not within specification, refer to Repair procedure 3-2, *How to Adjust the Glide Pads.*

4 Loosen but do not remove the adjustment nut on the sequencing cable located at the top of the first column.

5 Raise the platform approximately 3 feet / 1 m above the top of the drive chassis.

6 Place a jack stand on the top of the battery cover, centered under the platform. Adjust the jack stand height to 24 inches / 60 cm.

7 Lower the platform onto the jack stand just enough to take the weight off the lifting chains.

⚠WARNING Crushing hazard. Keep hands clear of the jack stand when lowering the platform.

CHECKLIST D PROCEDURES

8 Inspect each idler wheel for the following:

- Excessive wear on the side flanges
- Unusual wear
- Movement side to side in excess of 0.040 inch / 1 mm
- Any wheel movement front to back

Note: If idler wheel inspection results in a condition that is not within specification, refer to Repair procedure 3-1, *How to Assemble the Mast.*

9 **GR-20:** Inspect each wear pad for the following:

- Excessive or unusual wear

Note: If a wear pad displays excessive or unusual wear, refer to Repair procedure 3-1, *How to Assemble the Mast.*

10 Raise the platform slightly and remove the jack stand. Lower the platform to the stowed position.

11 Install the mast covers and adjust the sequencing cable. See B-6, *Adjust the Sequencing Cables.*

D-2
Inspect and Lubricate the Lifting Chains

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

Lubricated chains are essential to good machine performance and safe operation. Extremely dirty conditions may require that the chains be cleaned and lubricated more often.

1 Thoroughly inspect the lifting chains. Refer to Repair Procedure 3-3, *How to Inspect the Lifting Chains.*

2 Raise the platform to the maximum height.

3 Place a lifting strap from an overhead crane under the platform. Support the platform. Do not apply any lifting pressure.

NOTICE Component damage hazard. The platform railings can be damaged if they are used to lift the platform. Do not attach the lifting strap to the platform railings.

4 Lubricate each chain with a dry-type spray lubricant.

⚠WARNING Bodily injury hazard. This procedure will require the use of additional access equipment. Do not place ladders or scaffold on or against any part of the machine. Performing this procedure without the proper skills and tools could result in death or serious injury. Dealer service is strongly recommended.

D-3
Replace the Hydraulic Tank Return Filter

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

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

⚠CAUTION Burn hazard. Beware of hot oil. Contact with hot oil may cause severe burns.

Note: The hydraulic tank return filter is mounted on the function manifold next to the hydraulic power unit.

1 Clean the area around the oil filter. Remove the filter with an oil filter wrench.

2 Apply a thin layer of oil to the new oil filter gasket.

3 Install the new filter and tighten it securely by hand.

4 Use a permanent ink marker to write the date and number of hours from the hour meter onto the filter.

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

6 Activate and hold the platform up toggle switch.

7 Inspect the filter and related components to be sure that there are no leaks.

8 Clean up any oil that may have spilled.

Torque specifications	
Hydraulic tank drain plug, dry	40 in-lbs 4.5 Nm
Hydraulic tank drain plug, lubricated	30 in-lbs 3.4 Nm

Checklist E Procedure

E-1
Test or Replace the Hydraulic Oil

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

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

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

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

1 Disconnect the battery pack from the machine.

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

2 Open the power unit module tray.

3 Tag and disconnect the hydraulic tank return hard line from the hydraulic filter head and remove the hard line from the tank. Cap the fitting on the filter head.

4 Tag and disconnect the hydraulic pump inlet hard line and remove the hard line from the tank. Cap the fitting on the pump.

5 Remove the hydraulic tank retaining fasteners and remove the hydraulic tank from the machine.

6 Drain all of the oil into a suitable container. Refer to Section 2, *Specifications*, for capacity information.

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

7 Clean up any oil that may have spilled. Properly discard the used oil.

8 Clean the inside of the hydraulic tank using a mild solvent. Allow the tank to dry completely.

9 Install the hydraulic tank and install and tighten the hydraulic tank retaining fasteners. Torque to specification.

Torque specifications	
Hydraulic tank retaining fasteners, dry	35 in-lbs 4 Nm
Hydraulic tank retaining fasteners, lubricated	26 in-lbs 2.9 Nm

10 Install the hydraulic pump inlet hard line into the tank. Install the fitting onto the pump and torque to specification. Refer to Section 2, *Specifications*.

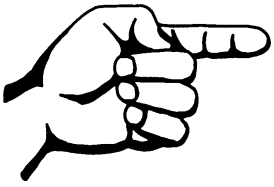
11 Install the hydraulic pump return hard line into the tank. Install the fitting onto the hydraulic filter head and torque to specification. Refer to Section 2, *Specifications*.

12 Fill the tank with hydraulic oil until the fluid is at the FULL indicator on the hydraulic tank. Do not overfill.

13 Activate the pump to fill the hydraulic system with oil and bleed the system of air.

NOTICE Component damage hazard. The pump can be damaged if operated without oil. Be careful not to empty the hydraulic tank while in the process of filling the hydraulic system. Do not allow the pump to cavitate.

14 Repeat steps 12 through 13 until the hydraulic system and tank are both full.



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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
  - Platform in the stowed position
  - Key switch in the off position with the key removed
  - The red Emergency Stop button in the off position at both ground and platform controls
  - 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.

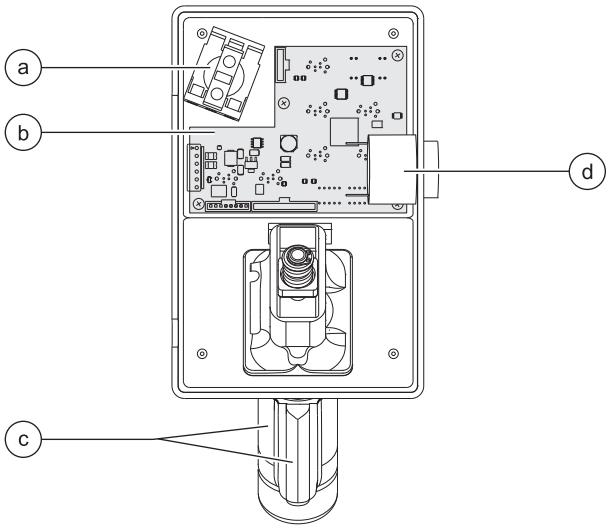
Platform Controls

The platform controls are used to operate the machine from the platform.

Activating a function button sends a signal to the Electronic Control Module (ECM). When the ECM is in the function mode, the platform controls are used to operate the various machine functions.

The platform controls consist of an Emergency Stop button, electronic circuit board, proportional control handle, drive/steer enable switch, alarm, function buttons and LED display.

For further information or assistance, consult the Genie Service Department.

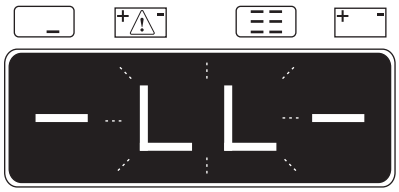


a red Emergency Stop button P2
b platform controls circuit board U3
c proportional control handle and drive/steer enable switch JC9
d alarm H1

Operational Indicator Codes

These codes are generated by the electrical system to indicate machine operating status. During normal operation a code will appear in the platform controls LED readout if a condition such as off-level, overload cutout, chassis mode operation or pothole guards stuck occurs.

If the platform controls LED readout displays an operational indicator code such as LL, the fault condition must be repaired or removed before resuming machine operation. Push in and pull out the red Emergency Stop button to reset the system.



Platform Controls LED Readout

Code	Condition
LL	Off-Level
OL	Platform Overloaded (CE and Australia)
CH	Chassis Mode Operation
PHS	Pothole Guard Stuck
OAC	Obstruction Above Chassis (QSR only)
ND	No Drive (option)

Note: A code and a description of a code can also be viewed at the ground controls LCD display.

1-1
Circuit Board

How to Remove the Platform Controls Circuit Board

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

2 Disconnect the platform controls from the control cable at the platform.

3 Remove the fasteners securing the platform control box to the platform control bracket.

4 Remove the fasteners securing the bottom cover to the platform control box. Open the control box.

5 Remove the ties securing the wire harness.

6 Disconnect the red and black wires from the alarm.

7 Carefully remove the alarm from the platform control box.

8 Carefully disconnect all wire harness connectors from the platform controls circuit board.

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

NOTICE Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

9 Carefully remove the platform controls circuit board fasteners.

10 Carefully remove the platform controls circuit board from the platform control box.

11 Remove the transparent caps from the platform controls circuit board and save.

Circuit board fastener torque specifications	
Hand tighten until screw seats	< 5 in-lbs < 0.6 Nm

Note: Before installing a circuit board, place the transparent caps removed in step 11, over the circuit board buttons.

Note: After installing the circuit board, check for proper button operation. Excessive torque of the circuit board fasteners will cause the buttons to bind. Moderate torque of the circuit board fasteners will not allow the buttons to engage.

PLATFORM CONTROLS

1-2 Joystick

How to Remove the Joystick

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

2 Disconnect the platform controls from the control cable at the platform.

3 Remove the fasteners securing the platform control box to the platform control bracket.

4 Remove the fasteners securing the bottom cover to the platform control box. Open the control box.

5 Remove the ties securing the joystick wire harness.

6 Carefully disconnect the joystick wire harness from the platform controls circuit board.

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

NOTICE Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

7 Carefully remove the joystick fasteners.

8 Carefully remove the joystick from the platform control box.

Torque specifications	
Joystick fasteners	9 in-lbs 1 Nm

1-3 Platform Controls Alarm

How to Remove the Platform Controls Alarm

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

2 Disconnect the platform controls from the control cable at the platform.

3 Remove the fasteners securing the platform control box to the platform control bracket.

4 Remove the fasteners securing the bottom cover to the platform control box. Open the control box.

5 Disconnect the red and black wires from the alarm.

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

NOTICE Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

6 Carefully remove the alarm from the platform control box.

1-4
Platform Emergency Stop Button

How to Remove the Platform Controls Emergency Stop Button

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

2 Disconnect the platform controls from the control cable at the platform.

3 Remove the fasteners securing the platform control box to the platform control bracket.

4 Remove the fasteners securing the bottom cover to the platform control box. Open the control box.

5 Disconnect the white wires from the Emergency Stop base.

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

NOTICE Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

6 Carefully remove the Emergency Stop base from the Emergency Stop button.

7 Carefully remove the retaining ring from the Emergency Stop button.

8 Carefully remove the Emergency Stop button from the platform control box.

Ground Controls

The ground controls, used to operate the machine from the ground, can also be used to tune the performance of the machine.

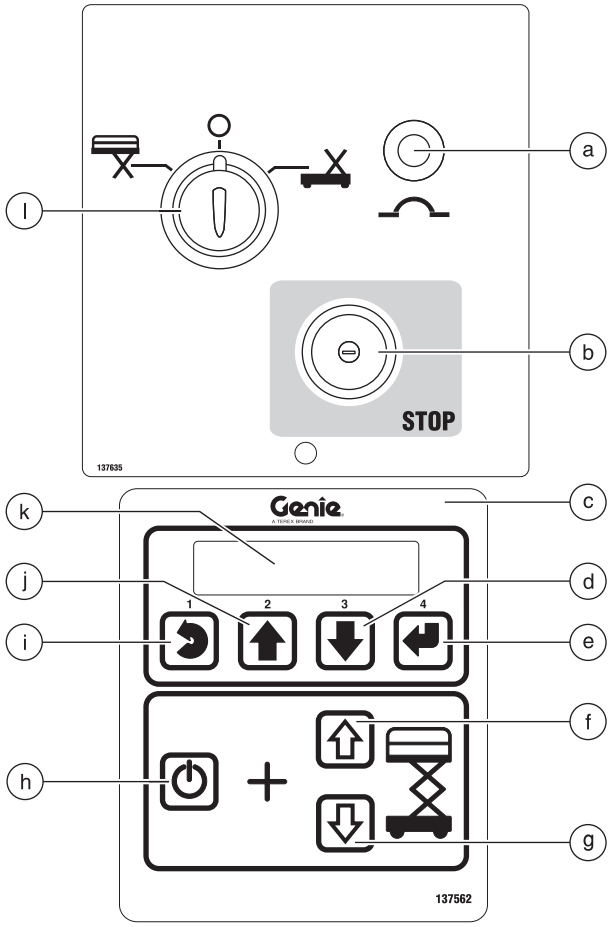
The ground controls consist of an Electronic Control Module (ECM), emergency stop button, key switch and circuit breaker.

Activating the function enable button and the up or down at the same time, sends a signal to the (ECM). This allows the platform to be raised or lowered at the ground controls.

Note: Steer and drive functions are not available at the ground controls.

When the ECM is in the set up mode, the ground controls are used to adjust the function speed parameters, machine models, or machine options.

For further information or assistance, consult the Genie Service Department.



a circuit breaker CB2
b red Emergency Stop P1
c ECM U5
d machine setup, scroll down button
e machine setup, enter button
f platform up button
g platform down button
h lift function enable button
i machine setup, escape button
j machine setup, scroll up button
k LCD readout
l key switch KS1

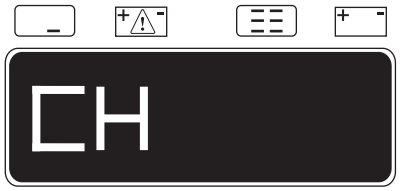
2-1
Software Revision Level

How to Determine the Software Revision Level

The machine software revision level is displayed at the ground controls LCD display.

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

⊙ Result: The display at the platform controls will show "CH". See example below.

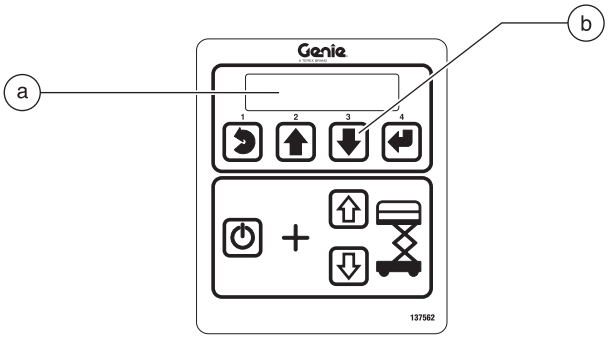


⊙ Result: The display at the ground controls will show the machine model and hour meter information. See example below.

2 Press the ground controls scroll down button.

⊙ Result: The ground controls LCD display will indicate the software revision and hour meter information. After 5 seconds, the ground controls LCD display will display machine model and hour meter information again. See example below.

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



a ground controls LCD display
b ground controls scroll down button

GROUND CONTROLS

2-2
Machine Setup

How to Setup the Machine from Ground Controls

The ground controls can be used to setup the machine parameters from the ground. Features that can be adjusted from the ground controls include machine Model, Options and Speed setup. This menu can only be entered from ground controls with the key switch in the ground controls position.

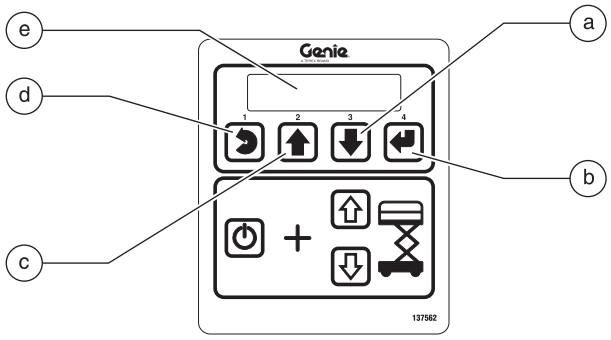
⚠DANGER Tip-over hazard. Do not adjust function speeds higher than specified in this procedure. Setting the function speeds greater than specifications could cause the machine to tip over resulting in death or serious injury.

⚠DANGER Tip-over hazard. This procedure must only be performed by a trained service professional. Attempting this procedure without the necessary skills could result in death or serious injury.

Note: Select a test area that is firm, level and free of obstructions.

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

2 Press and hold the ground controls scroll up and scroll down buttons.

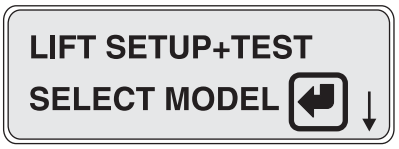


Ground Control Menu Buttons

a scroll down button
b enter button
c scroll up button
d escape button
e LCD display

3 Pull out the red Emergency Stop button to the on position at the ground controls.

⊙ Result: The ground controls LCD display will show the following:



4 Use the ground control menu buttons to select machine Model, Options and Speed Setup parameters. Follow the menu structure indicated on the ground control LCD display.

2-3

Level Sensor

The Electronic Control Module (ECM) is programmed to deactivate the lift and drive functions and activate an alarm when a signal is received from the level sensor.

The tilt alarm sounds when the incline of the chassis exceeds 1.5° to the side, or 3° to the front or rear.

How to Install and Calibrate the Level Sensor

⚠DANGER Tip-over hazard. Failure to install or calibrate the level sensor as instructed will compromise machine stability and cause the machine to tip over, resulting in death or serious injury. Do not install or calibrate the level sensor other than specified in this procedure.

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

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

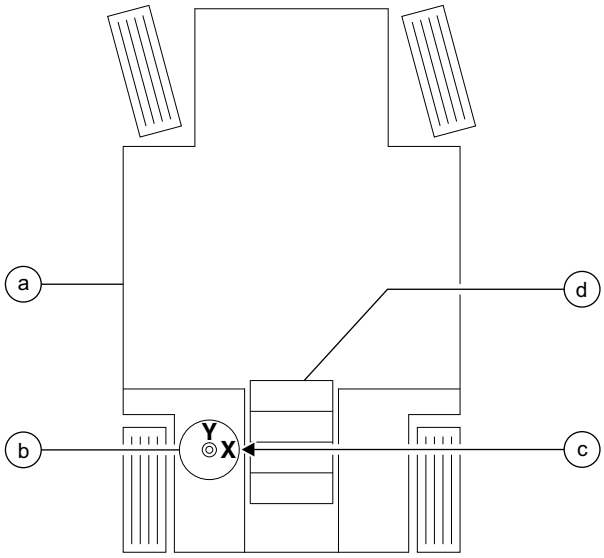
If you are not installing a new level sensor, proceed to step 6.

1 Tag and disconnect the level sensor wire harness from the chassis wire harness.

2 Remove the level sensor adjusting fasteners. Remove the level sensor from the machine.

3 Place the new level sensor onto the level sensor base with the "X" on the level sensor closest to the mast of the machine and the "Y" on the level sensor closest to the steer end of the machine.

⚠DANGER Tip-over hazard. The level sensor must be installed with the "X" on the level sensor closest to the mast of the machine and the "Y" on the level sensor closest to the steer end of the machine. Failure to install the tilt level sensor as instructed could result in the machine tipping over, causing death or serious injury.



b level sensor
c 'X' indicator
d mast

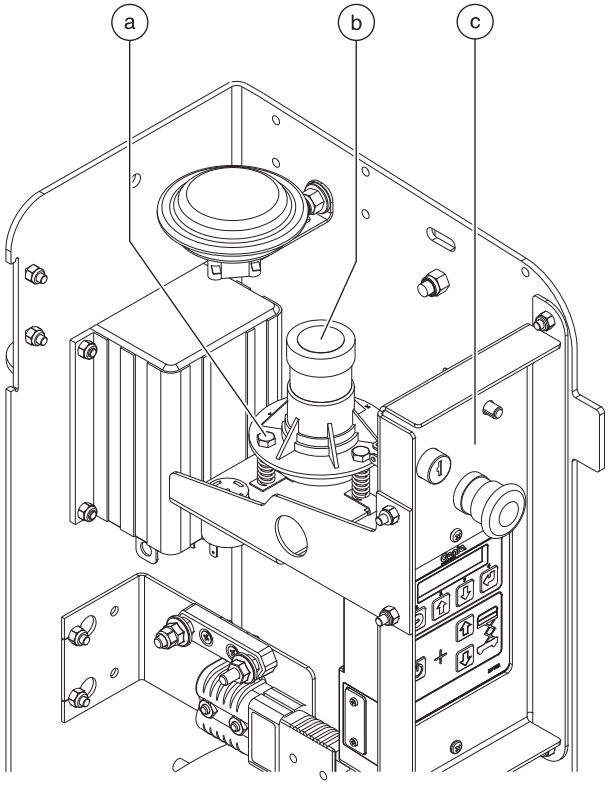
GROUND CONTROLS

4 Install the level sensor adjusting fasteners through the level sensor and springs, and into the mount. Tighten the fasteners and measure the distance between the level sensor and the level sensor mount.

⊙ Result: The measurement should be approximately 3/8 inch / 10 mm.

5 Connect the chassis wire harness to the level sensor wire harness.

6 Tighten the level sensor adjusting fasteners until the bubble in the top of the level sensor is centered in the calibration circles.



a adjusting fastener
b calibration circles
c ground controls

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

⊙ Result: The tilt sensor alarm should not sound.

8 Center a lifting jack under the drive chassis at the ground controls side of the machine.

9 Raise the machine approximately 2 inches / 5 cm.

10 **GR-12, GR-15, QS-12R, QS-15R, QS-12W and QS-15W:** Place a 0.65 x 6 x 6 inch / 1.65 x 15 x 15 cm thick steel block under both wheels at the ground controls side of the machine.

GR-20, QS-20R and QS-20W: Place a 0.7 x 6 x 6 inch / 1.78 x 15 x 15 cm thick steel block under both wheels at the ground controls side of the machine.

11 Lower the machine onto the blocks.

12 Raise the platform approximately 1 foot / 30 cm.

⊙ Result: The level sensor alarm should not sound.

⊗ Result: The level sensor alarm does sound. Adjust the level sensor retaining fasteners just until the level sensor alarm does not sound.

13 Lower the platform to the stowed position.

14 Raise the machine slightly.

15 Remove the blocks from under both wheels.

16 Lower the machine and remove the jack.

17 Center a lifting jack under the drive chassis at the tank side of the machine.

18 Raise the machine approximately 2 inches / 5 cm.

19 **GR-12, GR-15, QS-12R, QS-15R, QS-12W and QS-15W:** Place a 0.79 x 6 x 6 inch / 2 x 15 x 15 cm thick steel block under both wheels at the tank side of the machine.

GR-20, QS-20R and QS-20W: Place a 0.85 x 6 x 6 inch / 2.16 x 15 x 15 cm thick steel block under both wheels at the tank side of the machine.

20 Lower the machine onto the blocks.

21 Raise the platform approximately 1 foot / 30 cm.

⊙ Result: The platform should stop and an alarm should sound.

⊠ Result: The platform does not stop or the level sensor alarm does not sound. Adjust the level sensor until the alarm just begins to sound OR the down limit switch may need to be adjusted.

22 Lower the platform to the stowed position.

23 Raise the machine slightly.

24 Remove the blocks from under both wheels.

25 Lower the machine and remove the jack.

26 Center a lifting jack under the drive chassis at the steer end of the machine.

27 Raise the machine approximately 2 inches / 5 cm.

28 Place a 2.18 x 6 x 6 inch / 5.54 x 15 x 15 cm thick steel block under both wheels at the steer end of the machine.

29 Lower the machine onto the blocks.

30 Raise the platform approximately 1 foot / 30 cm.

⊙ Result: The level sensor alarm should not sound.

⊠ Result: The level sensor alarm does sound. The level sensor is faulty and must be replaced. Repeat this procedure beginning with step 1.

31 Raise the machine slightly.

32 Remove the blocks from under both wheels.

33 Lower the machine and remove the jack.

34 Center a lifting jack under the drive chassis at the non-steer end of the machine.

35 Raise the machine approximately 2 inches / 5 cm.

36 Place a 2.4 x 6 x 6 inch / 6.1 x 15 x 15 cm thick steel block under both wheels at the non-steer end of the machine.

37 Raise the platform approximately 1 foot / 30 cm.

⊙ Result: The platform should stop and an alarm should sound.

⊠ Result: The platform does not stop or the level sensor alarm does not sound. The level sensor is faulty and must be replaced. Repeat this procedure beginning with step 1.

38 Lower the platform to the stowed position.

39 Raise the machine slightly.

40 Remove the blocks from under both wheels.

41 Lower the machine and remove the jack.

Hydraulic Pump

3-1
Function Pump

The hydraulic pump is attached to the motor which makes up the hydraulic power unit.

How to Test the Hydraulic Pump

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications.*

1 Tag, disconnect and plug the high pressure hydraulic hose from the hydraulic pump.

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

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the high pressure port on the pump.

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

4 Activate the platform up function from the ground controls.

⊙ Result: If the pressure gauge reads 3200 psi / 221 bar, immediately stop. The pump is good.

⊠ Result: If pressure fails to reach 3200 psi / 221 bar, the pump is bad and will need to be serviced or replaced.

NOTICE Component damage hazard. There is no relief valve in the hydraulic pump and the pump can be damaged if the pressure is allowed to exceed 3200 psi / 221 bar. When testing the pump, activate the pump in one second intervals until 3200 psi / 221 bar is confirmed. Do not over-pressurize the pump.

5 Remove the pressure gauge and reconnect the hydraulic hose. Torque to specification.

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

How to Remove the Hydraulic Pump

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 Tag, disconnect and plug the hydraulic supply hard line at the pump. Cap the fitting on the pump.

2 Tag, disconnect and plug the high pressure hose at the pump. Cap the fitting on the pump.

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

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

⚠DANGER Tip-over hazard. After replacing the hydraulic pump, it is critical to return the function speed settings to original factory specifications. Failure to restore the machine to original factory specifications could cause the machine to tip over, resulting in death or serious injury.

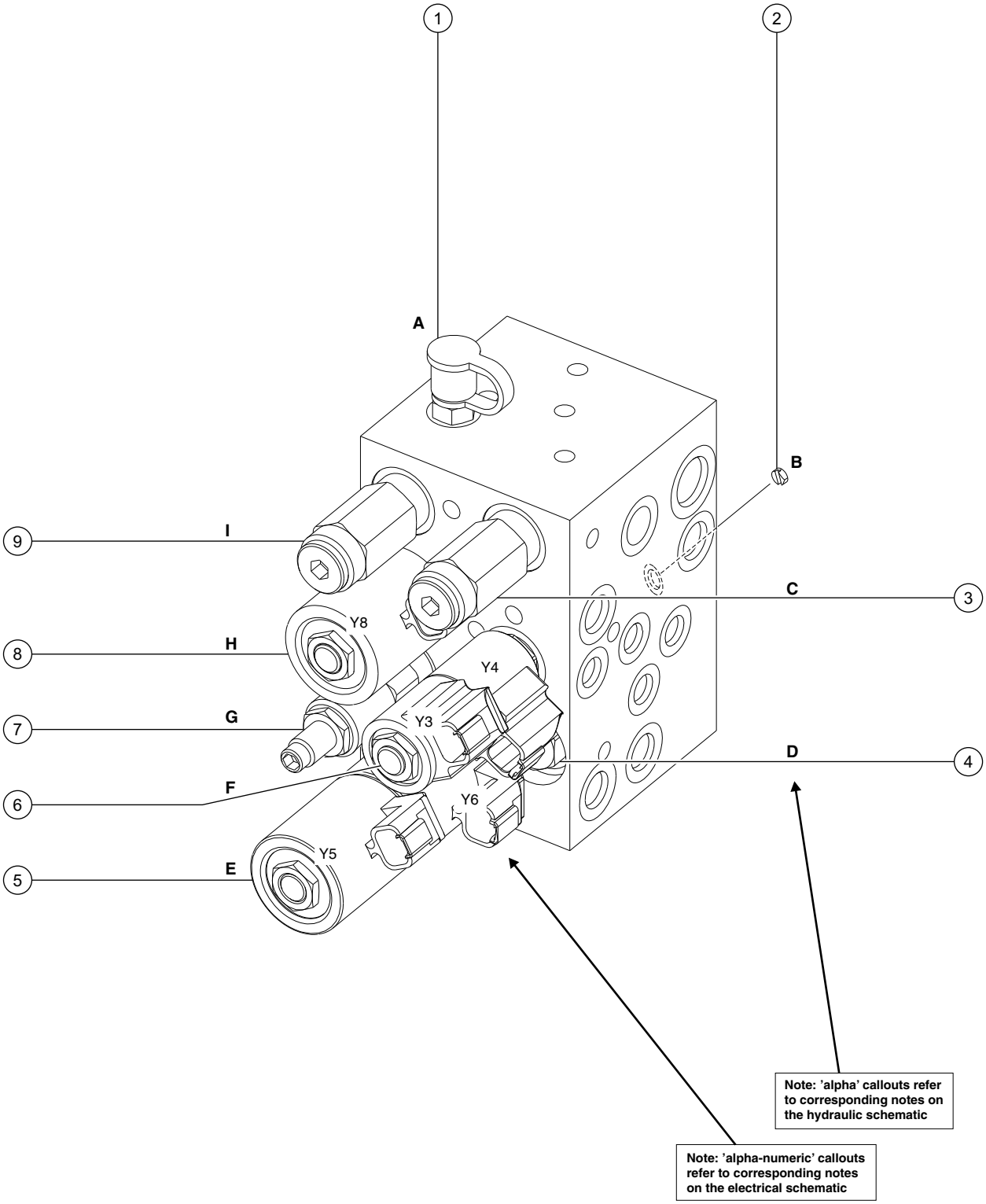
Function Manifold

4-1
Function Manifold Components

The function manifold is mounted next to the hydraulic power unit.

Index No.	Description	Schematic Item	Function	Torque
—	Coil nut (items E, F and H)			5 ft-lbs / 7 Nm
1	Diagnostic nipple	A	Testing	
2	Check disc	B	Steer circuit	18 ft-lbs / 24 Nm
3	Relief valve, 1800 to 3500 psi / 124 to 241 bar	C	Lift relief	20 ft-lbs / 27 Nm
4	Check valve, 10 psi / 0.7 bar	D	Drive circuit	20 ft-lbs / 27 Nm
5	Solenoid valve, 3 position 4 way	E	Drive forward/reverse	25 ft-lbs / 34 Nm
6	Solenoid valve, 3 position 4 way	F	Steer left/right	25 ft-lbs / 34 Nm
7	Flow regulator and relief valve, 0.75 gpm / 2.8 L/min, 1500 psi / 103 bar	G	Steer circuit	26 ft-lbs / 35 Nm
8	Solenoid valve, 2 position 4 way	H	Platform up	25 ft-lbs / 34 Nm
9	Relief valve, 3500 psi / 241 bar maximum	I	System relief	20 ft-lbs / 27 Nm

FUNCTION MANIFOLD



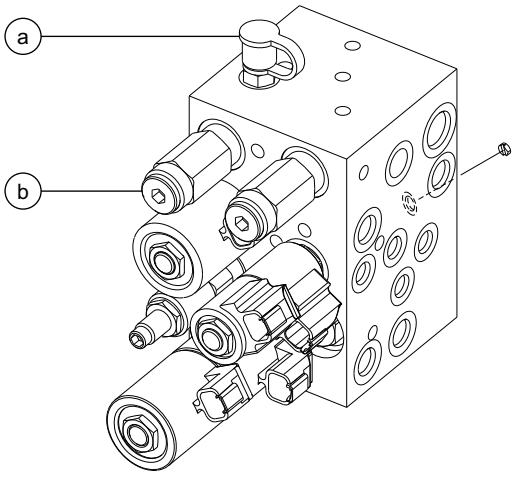
FUNCTION MANIFOLD

4-2 Valve Adjustments - Function Manifold

How to Adjust the System Relief Valve

Note: Be sure that the hydraulic oil level is at the FULL mark on the hydraulic tank.

1 Locate the system relief valve on the function manifold (hydraulic schematic item I).



a test port
b system relief valve

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test port on the function manifold (hydraulic schematic item A).

3 Chock both sides of the wheels at the steer end of the machine.

4 Remove the platform controls from the platform.

Note: Perform this test from the ground with the platform controls. Do not stand in the platform.

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

6 Press and hold the function enable switch.

7 Move and hold the joystick fully in either direction while observing the pressure reading on the pressure gauge. Note the pressure. Refer to Section 2, *Specifications*.

8 Turn the machine off. Hold the system relief valve with a wrench and remove the cap (hydraulic schematic item I).

9 Adjust the internal hex socket. Turn it clockwise to increase the pressure or counterclockwise to decrease the pressure.

⚠ DANGER Tip-over hazard. Failure to adjust the relief valves to specification could result in the machine tipping over, causing death or serious injury. Do not adjust the relief valve pressures higher than specifications.

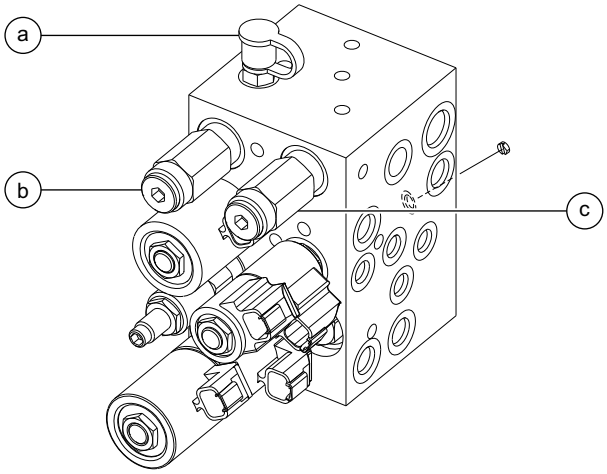
10 Install the relief valve cap.

11 Repeat steps 5 through 7 to confirm the relief valve pressure.

How to Adjust the Platform Lift Relief Valve

Note: Be sure that the hydraulic oil level is at the FULL mark on the hydraulic tank.

1 Locate the system relief valve on the function manifold (hydraulic schematic item I).



a test port
b system relief valve
c lift relief valve

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test port on the function manifold (hydraulic schematic item A).

3 Chock both sides of the wheels at the steer end of the machine.

4 Remove the platform controls from the platform.

Note: Perform this test from the ground with the platform controls. Do not stand in the platform.

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

6 Press and hold the function enable switch.

7 Move and hold the joystick fully in either direction while observing the pressure reading on the pressure gauge. Note the pressure. Refer to Section 2, *Specifications*.

8 Turn the machine off. Hold the system relief valve with a wrench and remove the cap (hydraulic schematic item I).

9 Adjust the internal hex socket. Turn it clockwise to increase the pressure or counterclockwise to decrease the pressure.

⚠ DANGER Tip-over hazard. Failure to adjust the relief valves to specification could result in the machine tipping over, causing death or serious injury. Do not adjust the relief valve pressures higher than specifications.

10 Install the relief valve cap.

11 Repeat steps 4 through 7 to confirm the relief valve pressure.

12 Place maximum rated load into the platform. Secure the load to the platform. Refer to Section 2, *Specifications*.

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

FUNCTION MANIFOLD

14 Hold the lift relief valve with a wrench and remove the cap (hydraulic schematic item C).

15 While activating the platform up function, adjust the internal hex socket clockwise, just until the platform fully raises.

16 Fully lower the platform.

17 Add an additional 50 pounds / 22.7 kg to the platform. Secure the additional weight.

18 Attempt to raise the platform.

⊙ Result: The power unit should **not** be able to lift the platform.

⊠ Result: If the power unit lifts the platform, adjust the internal hex socket counterclockwise until the platform will not raise.

19 Install the relief valve cap.

20 Remove the weight from the platform.

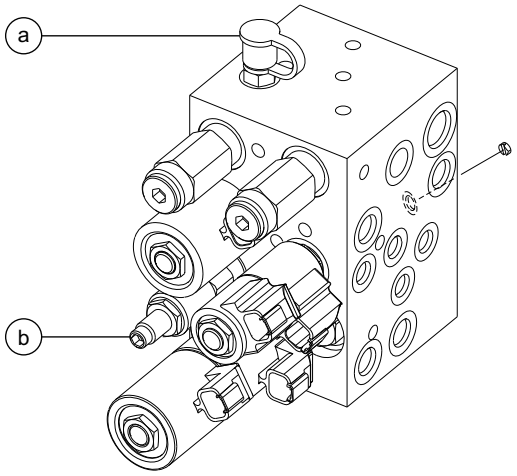
21 Bleed the hydraulic system by raising the platform to full height. If the pump cavitates or the platform fails to reach full height, add hydraulic oil until the pump is functioning correctly. Do not overfill the hydraulic tank.

NOTICE Component damage hazard. Do not continue to operate the machine if the hydraulic pump is cavitating.

How to Adjust the Steer Relief Valve

Note: Be sure that the hydraulic oil level is at the FULL mark on the hydraulic tank.

1 Locate the steer relief valve on the function manifold (hydraulic schematic item G).



a test port
b steer relief valve

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test port (hydraulic schematic item A) on the function manifold.

3 Remove the platform controls from the platform.

Note: Perform this test from the ground with the platform controls. Do not stand in the platform.

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

5 Activate the function enable switch and press and hold the steer thumb rocker switch to the right. Allow the wheels to completely turn to the right. Continue holding the switch while observing the pressure reading on the pressure gauge. Note the pressure. Refer to Section 2, *Specifications*.

6 Press and hold the steer thumb rocker switch to the left. Allow the wheels to completely turn to the left. Continue holding the switch while observing the pressure reading on the pressure gauge.

7 Turn the machine off. Hold the steer relief valve with a wrench and remove the cap (hydraulic schematic item G).

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

NOTICE Component damage hazard. Do not adjust the relief valve pressures higher than specifications.

9 Install the relief valve cap.

10 Repeat steps 5 through 6 to confirm the relief valve pressure.

FUNCTION MANIFOLD

4-3
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 / -7.7°C that your air temperature increases or decreases from 68°F / 20°C.

Valve Coil Resistance Specifications

Description Specification
Solenoid valve, 3 position 4 way 27.2Ω 20V DC with diode (schematic items E)
Solenoid valve, 3 position 4 way 19Ω 20V DC with diode (schematic item F)
Solenoid valve, 2 position 4 way 25Ω 20V DC with diode (schematic item H)
Solenoid valve, 2 position 2 way N.C. 6.25Ω with manual override 12V DC with diode (schematic item N)

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 4-3, *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.

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

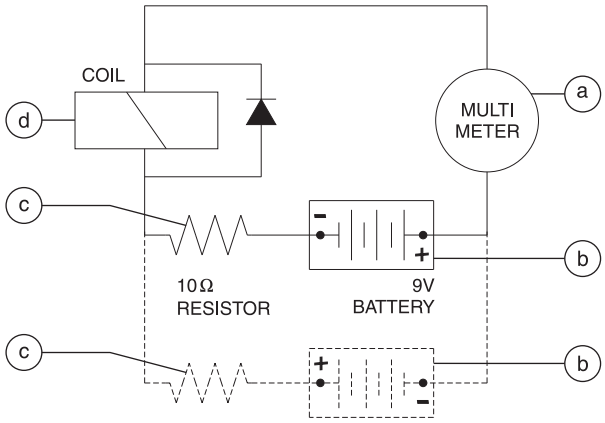
Resistor, 10Ω	
Genie part number	27287

3 Set a multimeter to read DC amperage.

Note: The multimeter, when set to read DC amperage, 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

Note: 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.

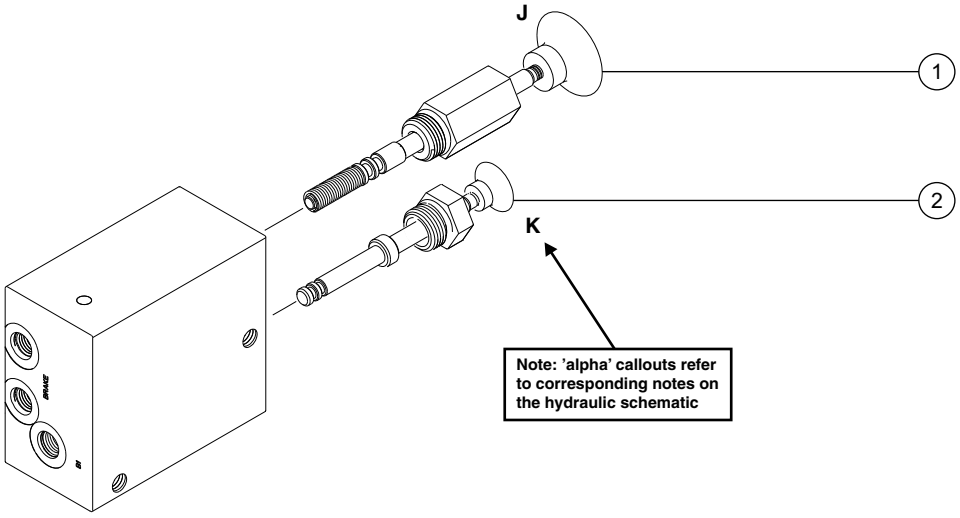
⊠ Result: If one or both of the current readings are 0 mA, or if the two current readings do not differ by a minimum of 20%, the coil and/or its internal diode are faulty and the coil should be replaced.

Brake Release Hand Pump Components

5-1
Brake Release Hand Pump Components

The brake release hand pump manifold is mounted behind the hydraulic power unit.

Index No.	Description	Schematic Item	Function	Torque
1	Hand pump	J	Manual brake release	30 ft-lbs / 41 Nm
2	Needle valve, pilot operated	K	Manual brake release enable	45-50 in-lbs / 5 Nm



Hydraulic Tank

6-1 Hydraulic Tank

The primary functions of the hydraulic tank are to cool and deaerate the hydraulic fluid during operation. It utilizes internal suction strainers for the pump supply lines and has an external return line filter.

How to Remove the Hydraulic Tank

NOTICE Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system.

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications.*

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

1 Tag, disconnect and plug the hydraulic supply hard line at the pump. Cap the fitting on the pump. Remove the hard line from the tank.

2 Tag, disconnect and plug the return hard line at the hydraulic filter. Cap the fitting on the filter.

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

3 Remove the hydraulic tank retaining fasteners and remove the hydraulic tank from the machine.

Torque specifications

Hydraulic tank retaining fasteners, dry 35 in-lbs 4 Nm
Hydraulic tank retaining fasteners, lubricated 26 in-lbs

Steer Axle Components

7-1
Yoke and Drive Motor

How to Remove the Yoke and Drive Motor Assembly

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications.*

1 Block the wheels at the non-steer end of the machine.

2 Remove the cotter pin from the wheel castle nut at the steer end of the machine.

Note: Always replace the cotter pin with a new one when removing the castle nut.

3 Loosen the wheel castle nut. Do not remove it.

4 Center a lifting jack under the drive chassis at the steer end of the machine.

5 Raise the machine approximately 6 inches / 15 cm. Place blocks under the chassis for support.

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

6 Remove the wheel castle nut. Remove the wheel.

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

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

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

8 Support and secure the yoke assembly to an appropriate lifting device.

9 Remove the retaining fastener from the steer link at the yoke assembly.

Note: Observe and note the quantity and location of the spacers, when disconnecting the steer link from the yoke assembly.

10 Remove the retaining fastener from the rear of the yoke pivot shaft.

Note: The pivot shaft retaining fastener is located below the main deck.

11 Lower the yoke assembly out of the chassis.

⚠CAUTION Bodily injury hazard. The yoke/motor assembly may fall if not properly supported when removed from the machine.

How to Remove a Drive Motor

1 Block the wheels at the non-steer end of the machine.

2 Remove the cotter pin from the wheel castle nut of the motor to be removed at the steer end of the machine.

Note: Always replace the cotter pin with a new one when removing the castle nut.

3 Loosen the wheel castle nut. Do not remove it.

4 Center a lifting jack under the drive chassis at the steer end of the machine.

5 Raise the machine approximately 2 inches / 5 cm. Place blocks under the chassis for support.

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

6 Remove the wheel castle nut. Remove the wheel.

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

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

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

8 Remove the drive motor mounting fasteners. Remove the motor.

Torque specifications
Drive motor mounting fasteners, dry 75 ft-lbs 101.7 Nm
Drive motor mounting fasteners, lubricated 56 ft-lbs 76.3 Nm

STEER AXLE COMPONENTS

7-2
Steer Cylinder

How to
Remove the Steer Cylinder

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 Block the wheels at the non-steer end of the machine.

2 Remove the steer cylinder hose guard bracket from the machine.

3 Remove the pin retaining fasteners from the steer cylinder barrel-end pivot pin. Remove the pin.

Note: Observe and note the quantity and location of the spacers when removing the pivot pin.

4 Remove the pin retaining fasteners from the steer cylinder rod-end pivot pin. Remove the pin.

Note: Observe and note the quantity and location of the spacers when removing the pivot pin.

5 Remove the steer cylinder from the machine.

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

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

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

7-3
Steer Bellcrank

How to
Remove the Steer Bellcrank

1 Remove the steer cylinder. See 7-2, *How to Remove the Steer Cylinder.*

2 Center a lifting jack under the drive chassis at the steer end of the machine.

3 Raise the machine approximately 14 inches / 36 cm. Place blocks under the chassis for support.

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

4 Turn the yokes fully to one side of the machine.

5 Remove the fasteners securing the bell crank to the steer yoke.

Note: Observe and note the quantity and location of the spacers between the bellcrank and the steer links.

6 Turn the yokes fully to the opposite side of the machine.

Note: Observe and note the quantity and location of the spacers between the bellcrank and the steer links.

7 Remove the fasteners securing the bell crank to the steer yoke.

8 Remove the bellcrank from the machine.

Note: Observe and note the quantity and location of the spacers between the bellcrank and the steer links.

Non-steer Axle Components

8-1
Drive Brake

How to Remove a Drive Brake

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications.*

1 Block the wheels at the steer end of the machine.

2 Remove the cotter pin from the wheel castle nut at the non-steer end of the machine.

Note: Always replace the cotter pin with a new one when removing the castle nut.

3 Loosen the wheel castle nut. Do not remove it.

4 Center a lifting jack under the drive chassis at the non-steer end.

5 Raise the machine approximately 2 inches / 5 cm. Place blocks under the chassis for support.

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

6 Remove the wheel castle nut. Remove the wheel.

7 Tag, disconnect and plug the hydraulic hose from the brake. Cap the fitting on the brake.

⚠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 Place a lifting jack under the brake for support.

9 Remove the fasteners that attach the brake to the drive chassis. Remove the brake.

⚠CAUTION Crushing hazard. The brake will fall if not properly supported when the mounting fasteners are removed.

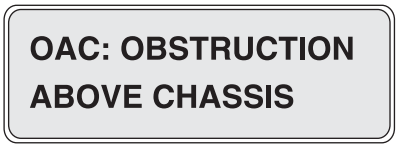
Torque specifications

Brake mounting fasteners, dry 75 ft-lbs 102 Nm
Brake mounting fasteners, lubricated 56 ft-lbs 76 Nm

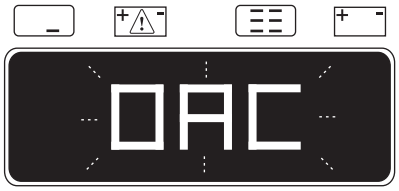
Obstruction Sensing System

9-1 Obstruction Sensing Pads

The function of the Obstruction Sensing System is to detect a person or an object standing on the machine chassis. When a person or an object is detected on top of the machine chassis, the machine platform down function will not operate, and an alarm will sound. The LCD readout at the ground controls will display OAC: Obstruction Above Chassis and the LED readout on the platform controls will display OAC. Refer to the examples below.



LCD Readout



LED Readout

How to Replace an Obstruction Sensing Pad (QSR models only)

1 **GR-12:** Raise the platform approximately 3 feet / 1 m.
GR-15 and GR-20: Raise the platform approximately 5 feet / 1.5 m.

2 Open the battery cover. Rest the cover against the chassis.

3 Lower the platform until the mast just contacts the battery cover.

⚠WARNING Crushing hazard. Keep hands clear of the battery cover when lowering the platform.

4 Turn the key switch to the off position and disconnect the battery pack 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.

OBSTRUCTION SENSING PADS

5 At the non-steer end of the machine, unlatch the covers and open the ground controls cover.

6 Working with the obstruction sensing pad to be replaced, locate the pad cables.

7 Carefully pull the cables to identify the connector cable located at the ground controls, non-steer end of the machine.

8 After the connector cable has been identified, tag and disconnect the cable from the obstruction sensing pad cables.

Note: If the ground controls side or battery box cover obstruction sensing pad is replaced, carefully remove the appropriate pin from the male Deutsch connector. A new Deutsch pin will have to be installed onto the cable wire of the new ground controls side pad, or battery box cover pad.

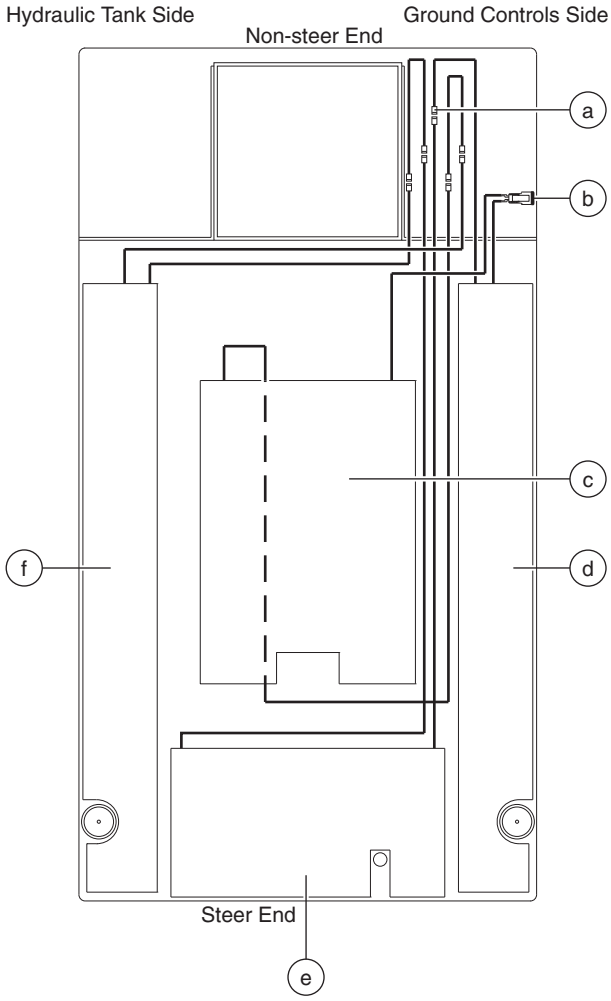
9 Using a broad flat metal blade, carefully slide the metal blade under the obstruction pad and work the metal blade under the entire pad to be replaced, until the pad is separated from the chassis or the battery box cover.

10 Remove the pad from the machine and carefully scrape away any excess adhesive from the chassis or battery box cover.

11 Using a suitable solvent, clean the surface were the obstruction sensing pad was removed. Allow the surface to dry thoroughly.

12 Install the new obstruction sensing pad.

Note: It may be necessary to use touch-up paint in the area were the obstruction sensing pad was removed. Let the paint dry completely, before installing the new obstruction sensing pad.



Obstruction Sensing Pads

a cable connectors
b Deutsch connector
c battery box obstruction sensing pad
d ground controls side obstruction sensing pad
e steer end obstruction sensing pad
f hydraulic tank side obstruction sensing pad

Platform Components

10-1 Platform

How to Remove the Platform

1 Raise the platform approximately 1 foot / 30 cm.

2 Place support blocks between the platform and the drive chassis. Lower the platform onto the blocks.

⚠WARNING Crushing hazard. Keep hands clear when lowering the platform.

3 Turn the key switch to the off position and disconnect the battery pack 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.

5 Disconnect the platform controls from the control cable at the platform. Remove the platform controls from the platform and set the controls to the side.

6 Carefully cut the cable ties securing the control cable to the platform.

NOTICE Component damage hazard. The control cable can be damaged if cut while removing the cable ties.

7 Remove the fasteners securing the junction box bracket to the mast. Set the bracket and fasteners to the side.

3 Attach a lifting strap of suitable capacity from an overhead crane and center it around the platform railing. Support the platform. Do not apply any lifting pressure.

8 Remove the fasteners securing the platform mount to the mast and set the fasteners to the side. Remove the platform and mount from the machine.

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

10-2
Platform Extension

How to Remove the Platform Extension

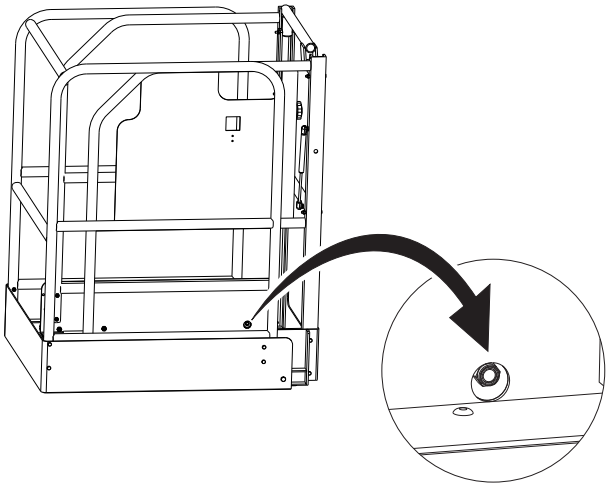
1 Turn the key switch to the off position.

2 Disconnect the battery pack from the machine.

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

3 Disconnect the platform controls from the control cable at the platform, and remove the platform controls from the platform. Set the platform controls to the side.

4 Slide the extension deck forward until the holes at the front of the extension deck are aligned with the fasteners of the slide blocks, at the front of the main deck.



5 Remove the fasteners securing the white slide blocks to the main deck. Set the slide blocks and the fasteners to the side.

6 Activate the foot release latch and slide the extension platform out of the platform.

PLATFORM COMPONENTS

10-3
Work Tray

How to Remove the Work Tray (if equipped)

1 Turn the key switch to the off position.

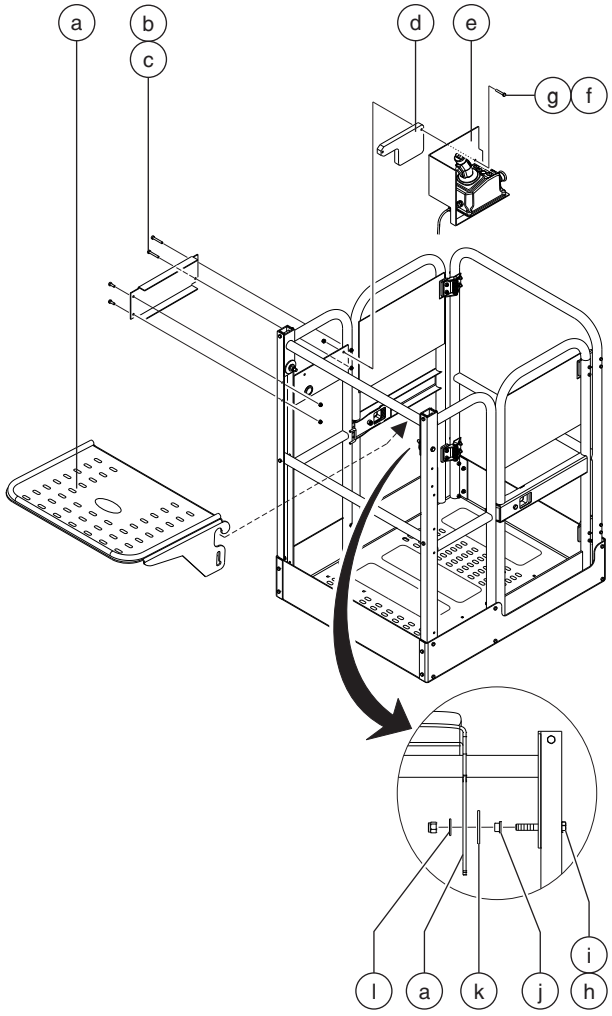
2 Disconnect the battery pack from the machine.

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

3 Disconnect the platform controls coli cord, from the control cable at the platform.

4 Remove the fasteners and spacer securing the platform controls to the platform controls mount. Remove the platform controls from the platform and set the controls to the side.

5 While supporting the work tray, remove the fasteners, bushings and spacers securing the work tray to the steer end, vertical platform rails. Set the fasteners, bushing and spacers to the side. Remove the work tray from the platform.



a work tray
b screw
c nylock nut
d platform controls spacer
e platform controls assembly
f screw
g nylock not
h screw
i nylock nut
j bushing
k spacer
l washer

Mast Components

11-1 Mast

How to Remove the Mast Assembly

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

Note: When removing a hose assembly or fitting, the O-ring 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.*

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

1 Remove the Platform. See 10-1, *How to Remove the Platform*.

2 Tag and disconnect the power to platform wire harness at the quick disconnect near the Electronic Control Module (ECM).

3 Tag and disconnect the ECM wire harness at the quick disconnect near the ECM.

4 Attach a lifting strap of suitable capacity from an overhead crane to the lifting eye at the top of the mast. Support the mast. Do not apply any lifting pressure.

5 Tag, disconnect and plug the lift cylinder hoses at the function manifold. Cap the fittings.

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

6 Remove the fasteners securing the lower rear access cover to the chassis and remove the cover. Set the cover and the fasteners to the side.

7 Tag and disconnect the wire harness from the platform down valve coil at the base of the lift cylinder.

8 Remove the retaining nut securing the platform down coil to the platform down solenoid valve and remove the coil. Set the coil and retaining nut to the side.

9 Remove the platform down solenoid valve from the lift cylinder. Set the valve to the side and plug the cylinder port.

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

10 Remove the mast retaining fasteners.

11 Carefully pull the hydraulic hoses free while removing the mast from the machine.

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

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

12 Place the mast assembly on a suitable structure capable of supporting it.

MAST COMPONENTS

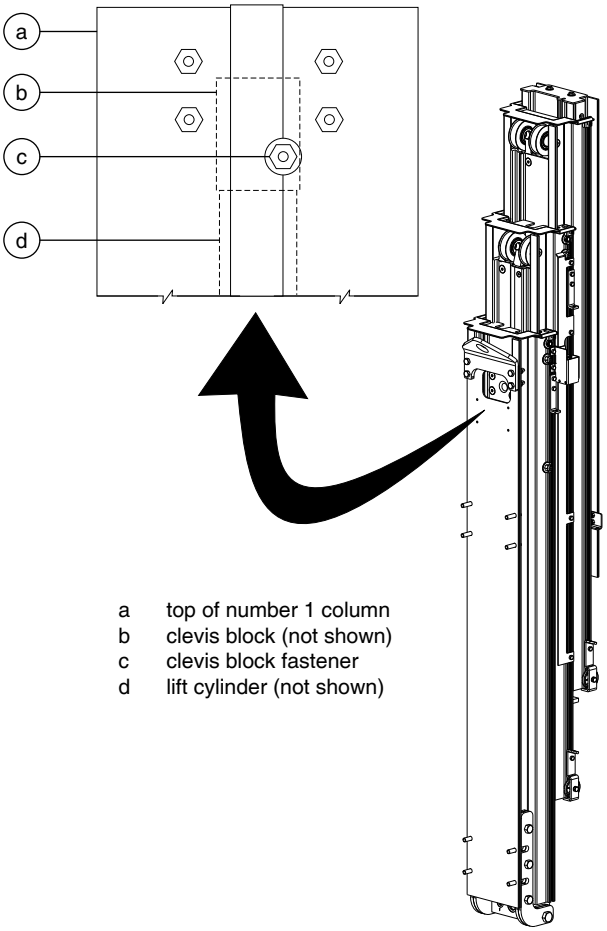
How to Disassemble the Mast

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

1 Remove the mast. See 3-1, *How to Remove the Mast Assembly.*

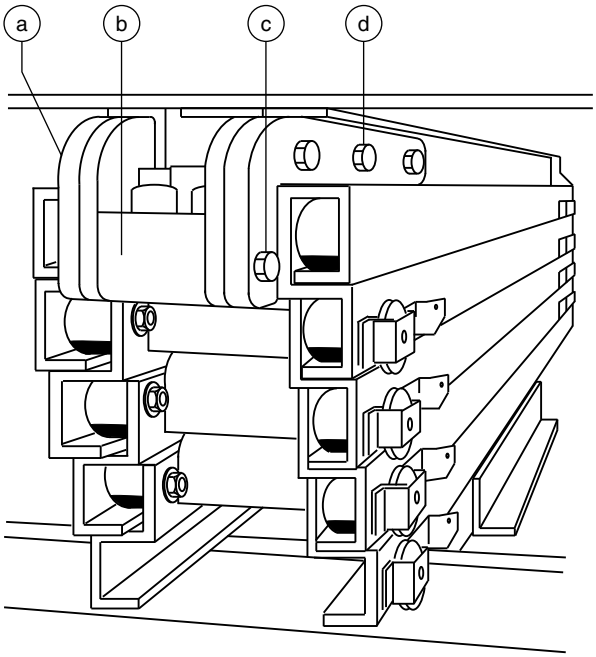
2 Rotate the mast until the carriage is facing up.

3 Remove the socket head retaining fastener from the clevis block on the lift cylinder rod end at the top of the number 1 column.



a top of number 1 column
b clevis block (not shown)
c clevis block fastener
d lift cylinder (not shown)

4 Remove the lift cylinder barrel end mounting fasteners.



a cylinder mounting plate
b cylinder
c cylinder mounting bolt
d plate mounting fasteners

5 Loosen the lift cylinder mounting bracket fasteners.

6 Support the cylinder and carefully slide it out of the mast assembly.

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

7 Remove the cover from the top of each column.

8 Remove the adjustment nuts from all of the sequencing cables.

9 Slide the carriage toward the top of the mast assembly enough to remove the tension on the lifting chains.

10 Slide the column below the carriage toward the top of the mast assembly approximately 6 inches / 15 cm to access the idler wheel mounting fasteners.

11 Hold the idler wheel axle from turning by placing a screwdriver through the hole in the axle. Remove the axle mounting fasteners and remove the idler wheel assembly.

Note: Label the location and orientation of each idler wheel assembly.

12 Remove the adjustment nuts from the chain tension rocker on the carriage.

13 Slide the carriage out the bottom of the mast assembly.

14 Lay the chains out on the floor at the top of the mast.

Note: Do not allow the chains to become twisted or dirty.

15 Remove the adjustment nuts from the chain tension rocker on the column.

16 Remove the column by sliding the column out the bottom of the mast.

17 Push the next column toward the top of the mast to access the idler wheel assembly mounting fasteners.

18 Hold the idler wheel axle from turning by placing a screwdriver through the hole in the axle. Remove the axle mounting fasteners, and remove the idler wheel assembly.

19 Remove the adjustment nuts from the chain tension rocker on the column.

20 Slide the column out the bottom of the mast.

21 Repeat steps 17 through 20 for each remaining column.

Note: If the chains are to be removed, mark the location and label each chain before removal.

MAST COMPONENTS

How to Assemble the Mast

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

1 Thoroughly clean all columns.

2 Secure the number 1 column to the work table and lay the chains out on the floor.

Note: Do not allow the chains to become twisted or dirty.

3 Apply a generous amount of Boe-lube wax to the inside and outside channels of each column.

4 Slide the number 2 column into the number 1 column.

5 Lay the number 2 column chains on the floor.

Note: Do not allow the chains to become twisted or dirty.

6 Lay the number 1 column chains inside the number 2 column.

7 Slide the number 3 column into the number 2 column.

8 When the number 3 column is almost all the way in, guide the number 1 column chains into the chain tension rocker on the number 3 column.

9 Install the adjustment nuts on the number 1 column chains. Tighten the adjustment nuts until the lifting chains have equal tension and the chain tension rocker is centered in the inspection hole in the column.

10 Lay the number 3 column chains on the floor.

Note: Do not allow the chains to become twisted or dirty.

11 Lay the number 2 column chains inside the number 3 column.

12 Follow steps 4 through 11 for each remaining column and the carriage.

13 After all the columns are assembled, the idler wheel assemblies can be installed.

14 Remove the tension from the lifting chains on the number 2 column by pushing the number 3 column towards the top of the mast.

15 Install the idler wheel assembly in the top of the number 2 column. Tighten the mounting fasteners.

Note: Confirm that all idler wheels rotate smoothly with no excessive side movement, or rub on the inside of the column. Replace worn shims if necessary.

16 Repeat steps 14 and 15 for each remaining idler wheel assembly.

17 Confirm that all of the idler wheel axle mounting fasteners are flush with the column.

NOTICE Component damage hazard. The roller wheels may be damaged if the idler wheel axle mounting fasteners are not flush with the column.

18 Install the mast assembly on the drive chassis. Adjust the lifting chains. See 11-3, *How to Adjust the Lifting Chains.*

11-2 Glide Pads

Glide pads, used on the GR-12, GR-15, QS-12R, QS-15R, QS-12W and QS-15W, and wear pads used on the GR-20, QS-20R and QS-20W, are used to provide a uniform fit between the columns as the mast extends and retracts. Over time, it may be necessary to adjust the glide pads to ensure good machine performance.

Wear pads are not adjustable and do not require servicing.

How to Adjust the Glide Pads

1 Locate the upper and lower glide pad adjustment bolts below each upper roller bolt, on both sides of each column.

2 Hold the glide pad adjustment bolt and loosen the lock nut on all glide pads.

3 Turn the glide pad adjustment bolt clockwise until the glide pad makes contact with the column. Adjust the glide pads on both sides of all columns. Be sure the sides of the columns are even to within 1/8 inch / 3 mm of each other.

4 On the number 1 column, secure the upper and lower glide pad bolts on both sides of the mast. Hold the glide pad adjustment bolt and torque the lock nut to 12 in-lbs / 1.35 Nm. Be sure the glide pad bolt does not turn.

5 Repeat step 5 for the upper and lower glide pads on both sides of the each column of the mast, Start with the number 2 column and work toward the carriage.

11-3 Lifting Chains

How to Adjust the Lifting Chains

1 Mark the column to be adjusted.

2 Raise the platform approximately 6 feet / 2 m.

3 Place a lifting strap of suitable capacity from an overhead crane under the platform. Support the platform. Do not apply any lifting pressure.

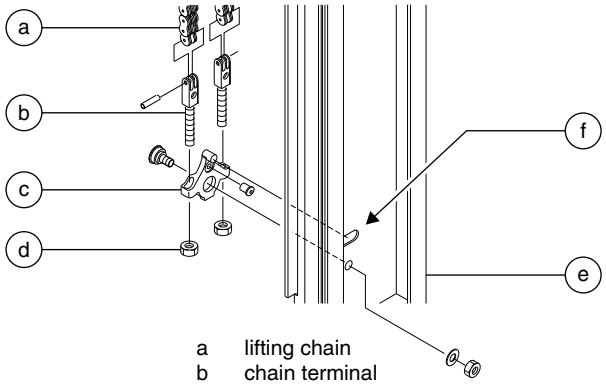
NOTICE Component damage hazard. The platform railings and platform extension deck (if equipped) can be damaged if they are used to lift the platform. Do not attach the lifting strap to the platform railings or the platform extension deck.

4 Turn the adjustment lock nuts evenly on both sides of the chain tension rocker clockwise to raise the column or counterclockwise to lower the column.

Note: The chain tensioner rocker is located near the bottom of each column.

5 Fully lower the platform and confirm the alignment of the columns. Repeat steps 2 through 5 if necessary.

6 Confirm that the chain tensioner bracket is centered in the inspection hole.



a lifting chain
b chain terminal
c chain tension rocker
d adjustment lock nut
e mast column
f inspection hole

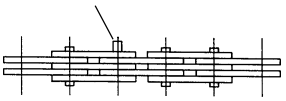
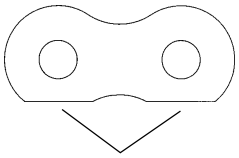
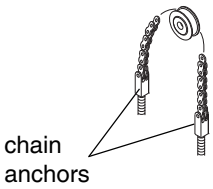
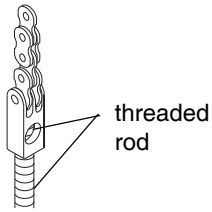
MAST COMPONENTS

How to Inspect the Lifting Chains

Inspection	Procedure	Inspection Failure	Inspection Remedy
Wear	Count out 16 chain links and measure pin to pin centerline dimension with a steel measuring tape. Note: Measure a section of chain that moves over the idler wheels.	When the length of the 16 links (pin to pin) measure more than 8.25 inches / 21 cm for 1/2 inch / 12.7 mm chain or 10.31 inches / 26.1 cm for 5/8 inch / 15.9 mm chain.	Replace both chains on that column. Replace entire chain. Do not repair just the affected portion of the chain.
Rust and Corrosion	Visually inspect the chains for rust and corrosion.	Evidence of rust or corrosion.	Remove chain and inspect for cracked plates (see inspection of cracked plates). If no cracks are found, lubricate chain with motor oil (SAE 40) and install chain.
	Visually inspect the chains for lubrication.	When external surfaces are not protected with a layer of oil.	Lubricate chain with motor oil (SAE 40W).
Tight Joints	Inspect chain link joints for easy movement.	Joints that do not flex freely or are binding.	If rust and corrosion is found, refer to Failure Remedy for rust and corrosion. If link plates or pins are bent or deformed, replace entire chain. Replace both chains on that column. Do not repair just the affected portion of the chain.

Continued to the next page

MAST COMPONENTS

Inspection	Procedure	Inspection Failure	Inspection Remedy
Raised or Turned Pins	Visually inspect for raised pins.	Raised pins. 	Replace both chains on that column section. Do not repair just the affected portion of the chain.
	Visually inspect for turned pins by insuring all the flats on the "V" heads are aligned.	Misalignment of flats on all "V" heads.	Replace both chains on that column section. Do not repair just the affected portion of the chain.
Chain Side	Visually inspect for wear patterns on heads of link pins and outside link plates where they contact the idler wheel.	Wear on pin heads or noticeable wear in the profile of the outside link plate.  link plate wear	Replace both chains on that column section. Do not repair just the affected portion of the chain. Check alignment of chain anchors and idler wheels. Replace chain anchor.
Chain Anchors  chain anchors	Visually inspect chain anchors.  threaded rod	Broken chain anchor fingers.	Replace chain anchor.
		Bent or damaged anchor.	Replace chain anchor and threaded rod.
		Twisted or misaligned chain anchor.	Re-align chain anchor to ensure even loading of chain.
		Threaded rod not visible in inspection hole.	Replace idler wheel and check chain alignment.
Idler Wheels  idler wheel	Visually inspect chain idler wheels.	Idler wheels have badly worn flanges.	Replace idler wheel.
		Idler wheels have grooves worn into chain contact surface.	Replace both chains on that column section.
Cracked Link Plates	Visually inspect chain link plates for cracks.	Cracks in any chain link plate.	Replace entire chain. Do not repair just the affected portion of the chain.

MAST COMPONENTS

11-4
Lift Cylinder

The lift cylinder is equipped with a normally closed solenoid valve to prevent movement in the event of a hydraulic line failure.

How to Remove the Lift Cylinder

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

Note: When removing a hose assembly or fitting, the O-ring 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 Remove the mast. See 11-1, *How to Remove the Mast Assembly.*

2 Rotate the mast until the carriage is facing down.

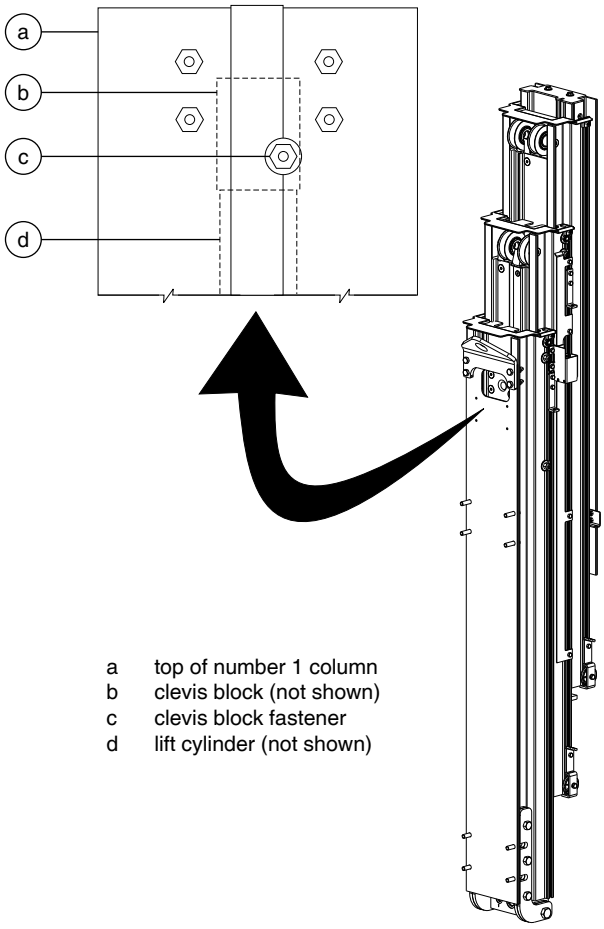
3 Remove the socket head retaining fastener from the clevis block on the lift cylinder rod end at the top of the number 1 column.

4 Remove the lift cylinder barrel end mounting fasteners.

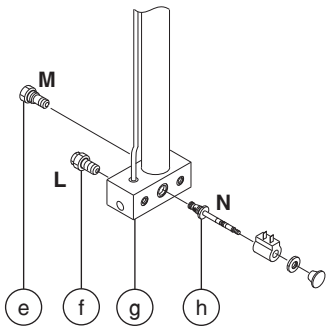
5 Loosen the lift cylinder mounting bracket fasteners.

6 Support the cylinder and carefully slide it out of the mast assembly.

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



a top of number 1 column
b clevis block (not shown)
c clevis block fastener
d lift cylinder (not shown)



e check valve
f flow control
g cylinder
h manual lowering valve

Platform Overload Components

12-1
Platform Overload System

Calibrate the Platform Overload System (if equipped)

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

1 Raise the platform approximately 2 feet / 70 cm.

2 At the platform junction box, tag and disconnect the load sense limit switch wire harness. The red and orange wires disconnect from white wire, the black wire disconnects from the red/black wire and the white wire disconnects from the yellow wire.

Note: The load sense limit switch is located near the platform support.

3 Set a multi-meter to measure continuity. Connect the leads from the multi-meter to the red and white wires disconnected in step 2.

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

5 Using a suitable lifting device, place a test weight equal to that of the maximum platform capacity at the center of the platform floor. Secure the weight to the platform. Refer to the chart below.

GR-12 and GR-15	
Standard Platform	500 lbs 227 kg
GR-20	
Standard Platform	350 lbs 159 kg
GR-12, GR-15 and GR-20	
AWP Platform	350 lbs 159 kg
QS-12R, QS-15R, QS-12W and QS-15W	
Stockpicker Platform	500 lbs 227 kg
QS-20R and QS-20W	
Stockpicker Platform	350 lbs 159 kg

PLATFORM OVERLOAD COMPONENTS

Determine the limit switch trigger point:

6 Gently move the platform up and down by hand, so it bounces 1 to 2 inches / 2.5 to 5 cm.

7 Check the continuity between the red and white wires originating from the limit switch of the platform overload assembly.

⊙ Result: **There is no continuity.** Slowly tighten the load spring adjustment nut by turning it clockwise just until the limit switch closes and shows continuity.

⊙ Result: **There is continuity.** Slowly loosen the load spring adjustment nut by turning it counterclockwise just until the limit switch opens and shows no continuity.

Note: The platform will need to be continuously moved up and down while making adjustments.

Fine adjustment of the switch trigger point:

8 Continue moving the platform up and down and adjust the load spring adjustment nut clockwise or counterclockwise just until the limit switch is alternately opening and closing.

Note: When the limit switch is adjusted correctly, there will be continuity slightly longer than no continuity.

9 Remove the continuity tester from the limit switch wires. At the junction box, securely install the wires onto the limit switch harness.

Confirm the setting:

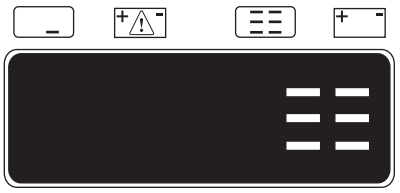
10 Turn the key switch to platform control.

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

12 Place the test weight back onto the platform floor using a suitable lifting device.

⊙ Result: The LCD display at the ground controls will show the machine model and hour meter information, indicating a normal condition, and the LED display at the platform controls will show the battery condition. Refer to examples below.

LCD Readout

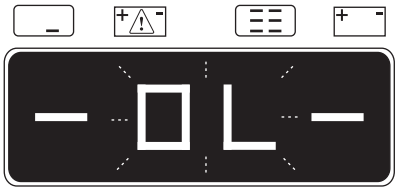


LED Readout

13 Add an additional weight to the platform not to exceed 20% of the maximum rated load. Refer to the machine serial plate.

⊙ Result: The LCD display at the ground controls will show "OL: Platform Overloaded" and the LED display at the platform controls will show "OL". The platform overload system is operating properly. Refer to examples below.

LCD Readout



LED Readout

⊠ Result: The LCD display at the ground controls will show the machine model and hour meter information and the LED display at the platform controls will show the battery condition. The platform overload system is not operating properly. Repeat this procedure beginning with step 1. Refer to the examples on page 4-42.

14 Test all machine functions from the platform controls.

⊙ Result: All platform control functions should not operate.

15 Turn the key switch to ground control.

16 Test all machine functions from the ground controls.

⊙ Result: All ground control functions should not operate.

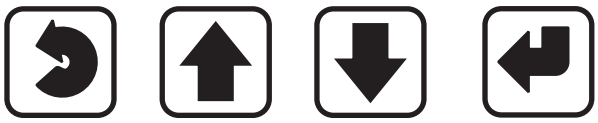
12-2
Platform Overload Recovery Message

If the ground controls LCD screen displays **OL: PLATFORM OVERLOADED**, 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 buttons used in this procedure.



Escape Scroll up Scroll down Enter

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

2 Press and hold the ground control scroll up and scroll down buttons.

PLATFORM OVERLOAD COMPONENTS

3 Pull out the red Emergency Stop button at the ground controls.

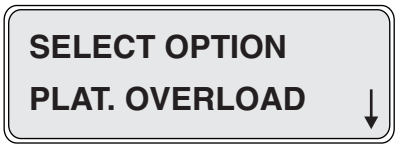
⊙ Result: The ground control LCD display will show the following.

4 Press the **scroll down** button.

⊙ Result: The ground control LCD display will show the following.

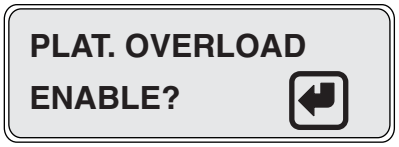
5 Press the **enter** button.

⊙ Result: The ground control LCD display will show the following.



6 Press the **enter** button.

⊙ Result: The ground control LCD display will show the following.



7 Press and hold the scroll down button for 5 seconds.

⊙ Result: The ground control LCD display will show the following.

8 Press the **enter** button.

⊙ Result: The ground control LCD display will show the following.

9 Press the buttons in the following sequence: **(down)(down)(up)(enter)**.

Note: After each key press an asterisk (*) will appear on the second line of the LCD display.

⊙ Result: The ground control LCD display will show the following.

Note: after 3 seconds the LCD display will return to **SELECT OPTION PLAT. OVERLOAD**.

10 Push in the red Emergency Stop button.

Diagnostics

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
  - Platform in the stowed position
  - Key switch in the off position with the key removed
  - The red Emergency Stop button in the off position at both ground and platform controls
  - 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.

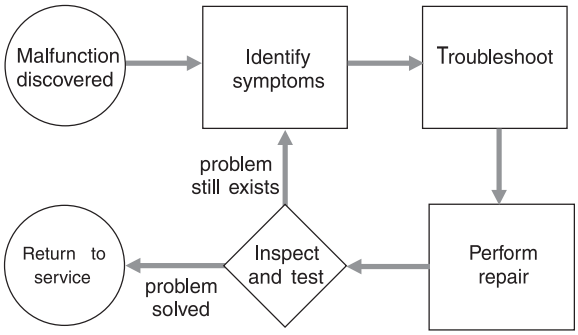
⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

DIAGNOSTICS

About This Section

When a malfunction is discovered, the diagnostic trouble code chart in this section will help a service professional pinpoint the cause of the problem. To use this section, basic hand tools and certain pieces of test equipment are required—voltmeter, ohmmeter, pressure gauges.

General Repair Process



Definitions

GSDS - acronym for Genie SmartLink™ Diagnostic System

ECM - acronym for Electronic Control Module

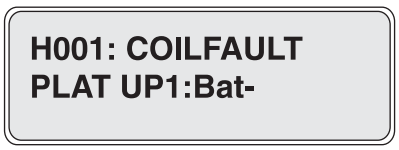
GCON - acronym for Ground Controls

PCON - acronym for Platform Controls

OIC - acronym for Operational Indicator Codes

DTC - acronym for Diagnostic Trouble Codes

GCON LCD Diagnostic Readout



The diagnostic readout displays alpha numeric codes that provide information about the machine operating status and about malfunctions.

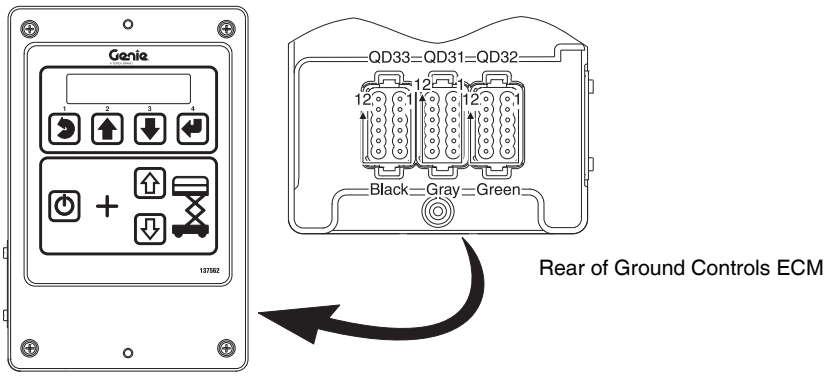
The codes listed in the Diagnostic Trouble Code Charts describe malfunctions and can aid in troubleshooting the machine by pinpointing the area or component affected.

Genie SmartLink Diagnostic System

This machine is equipped with the Genie SmartLink™ Diagnostic System (GSDS). The GSDS indicates a machine malfunction has happened by displaying Operational Indicator Codes (OIC) and Diagnostic Trouble Codes (DTC). These codes are displayed at the Platform Controls and the Ground Controls. The Ground Controls will display a brief description of the code at the LCD display as well.
Refer to the GCON I/O Maps, Operational Indicator Codes (OIC) and Diagnostic Trouble Codes (DTC) in this section, to assist in troubleshooting faults.

DIAGNOSTICS

GCON I/O MAP without LOAD SENSE			
Ground Controls Pin Number	**Circuit Function**	**I/O Type**	**Wire Gauge and Color**
J1 Connector - Gray			
J1-01	ECM Power	Power Input	14 RD
J1-02	PCON – E-Stop Power	Power Output	18 RD
J1-03	PCON – E-Stop Return	Power Input	18 WH
J1-04	Link to PCON - CANH	Data Bus	18GN
J1-05	Link to PCON - CANL	Data Bus	18 OR
J1-06	PCON – Ground	Ground Output	18 BN
J1-07	GCON – Ground	Ground Input	14 BN
J1-08	Key Switch – PCON Mode	Digital Input	18 BK
J1-09	Key Switch – GCON Mode	Digital Input	18 WH
J1-10	GCON – Emergency Stop	Digital Input	18 WH/BK
J1-11	No Circuit	N/A	N/A
J1-12	Driver Power	Power Input	14 RD
J3 Connector - Green			
J3-01	No Circuit	N/A	N/A
J3-02	GCON – Alarm	Digital Output	18 BL
J3-03	Switch/Sensor Power	Digital Output	14 RD
J3-04	Automotive Horn	Digital Output	18 WH
J3-05	Pothole Limit Switch	Digital Input	18 OR/RD
J3-06	Ground	Ground Input	18 BN
J3-07	Down Limit Switch	Digital Input	18 OR
J3-08	Level Sensor	Digital Input	18 RD/BK
J3-09	Ground	Ground Input	18 BK
J3-10	Ground	Ground Input	18 BK
J3-11	No Circuit	N/A	N/A
J3-12	Load Sense – Ground	Ground Input	18 BK
J2 Connector - Black			
J2-01	Platform Up Coil	Digital Output	18 OR
J2-02	Platform Down Coil	Digital Output	18 OR/BK
J2-03	Steer Left Coil	Digital Output	18 BL/BK
J2-04	Steer Right Coil	Digital Output	18 BL
J2-05	Parallel Coil (not connected)	Digital Output	18 RD/WH
J2-06	Drive Forward Coil	Digital Output	18 WH
J2-07	No Circuit	N/A	N/A
J2-08	Motor Controller Enable	Digital Output	18 GN/WH
J2-09	No Circuit	N/A	N/A
J2-10	Drive Reverse Coil	Digital Output	18 WH/BK
J2-11	Motor Controller Throttle	Analog Output	18 GN
J2-12	No Circuit	N/A	N/A



Rear of Ground Controls ECM

GCON I/O MAP with LOAD SENSE			
Ground Controls Pin Number	**Circuit Function**	**I/O Type**	**Wire Gauge and Color**
J1 Connector - Gray			
J1-01	ECM Power	Power Input	14 RD
J1-02	PCON – E-Stop Power	Power Output	18 RD
J1-03	PCON – E-Stop Return	Power Input	18 WH
J1-04	Link to PCON - CANH	Data Bus	18 GN
J1-05	Link to PCON - CANL	Data Bus	18 OR
J1-06	PCON – Ground	Ground Output	18 BN
J1-07	GCON – Ground	Ground Input	14 BN
J1-08	Key Switch – PCON Mode	Digital Input	18 BK
J1-09	Key Switch – GCON Mode	Digital Input	18 WH
J1-10	GCON – Emergency Stop	Digital Input	18 WH/BK
J1-11	No Circuit	N/A	N/A
J1-12	Driver Power	Power Input	14 RD
J3 Connector - Green			
J3-01	No Circuit	N/A	N/A
J3-02	GCON – Alarm	Digital Output	18 BL
J3-03	Switch/Sensor Power	Digital Output	14 RD
J3-04	Automotive Horn	Digital Output	18 WH
J3-05	Pothole Limit Switch	Digital Input	18 OR/RD
J3-06	Ground	Ground Input	18 BN
J3-07	Down Limit Switch	Digital Input	18 OR
J3-08	Level Sensor	Digital Input	18 RD/BK
J3-09	Platform Overload Pressure Transducer	Digital Input	18 BL/WH
J3-10	Platform Height Sensor	Digital Input	18 WH/BK
J3-11	No Circuit	NA	NA
J3-12	Load Sense – Ground	Ground Input	18 BK
J2 Connector - Black			
J2-01	Platform Up Coil	Digital Output	18 OR
J2-02	Platform Down Coil	Digital Output	18 OR/BK
J2-03	Steer Left Coil	Digital Output	18 BL/BK
J2-04	Steer Right Coil	Digital Output	18 BL
J2-05	Parallel Coil (not connected)	Digital Output	18 RD/WH
J2-06	Drive Forward Coil	Digital Output	18 WH
J2-07	No Circuit	N/A	N/A
J2-08	Motor Controller Enable	Digital Output	18 GN/WH
J2-09	No Circuit	N/A	N/A
J2-10	Drive Reverse Coil	Digital Output	18 WH/BK
J2-11	Motor Controller Throttle	Analog Output	18 GN
J2-12	No Circuit	N/A	N/A

DIAGNOSTICS

Operational Indicator Codes (OIC)

These codes are generated by the electrical system to indicate machine operating status such as Off-level, Overload Cutout, Chassis Mode Operation and Pothole Guard Stuck, during normal operation.
These codes are not indicators of a device malfunction in the electrical system.

Code	Condition
LL	Off-Level
OL	Platform Overloaded (CE and Australia)
CH	Chassis Mode Operation
PHS	Pothole Guard Stuck
OAC	Obstruction Above Chassis (QSR only)
ND	No Drive (option)

Diagnostic Trouble Codes (DTC)

These codes are generated by the system to indicate that a device or circuit malfunction has been detected in the electrical system.
The types of Diagnostic Trouble Codes that may occur are explained below.

Type "HXXX" - Indicate a malfunction associated with devices that control hydraulic functions in the electrical system. The "HXXX" faults are divided into short circuit battery negative, short circuit to battery positive, open circuit and generic shorts. Example of these devices are solenoid controlled hydraulic valves and motor controller.

Type "PXXX" - Indicate a malfunction associated with power type devices in the electrical system. The "PXXX" faults are divided into short circuit to battery negative, short circuit to battery positive, open circuit and generic shorts. Example of these devices are horns, sensor power and alarms.

Type "UXXX" - Indicate a malfunction associated with user interface devices in the electrical system. The "UXXX" faults are divided into short circuit to battery negative, short circuit to battery positive, open circuit and generic shorts. Example of these devices are GCON up and down switches and PCON drive joystick faults.

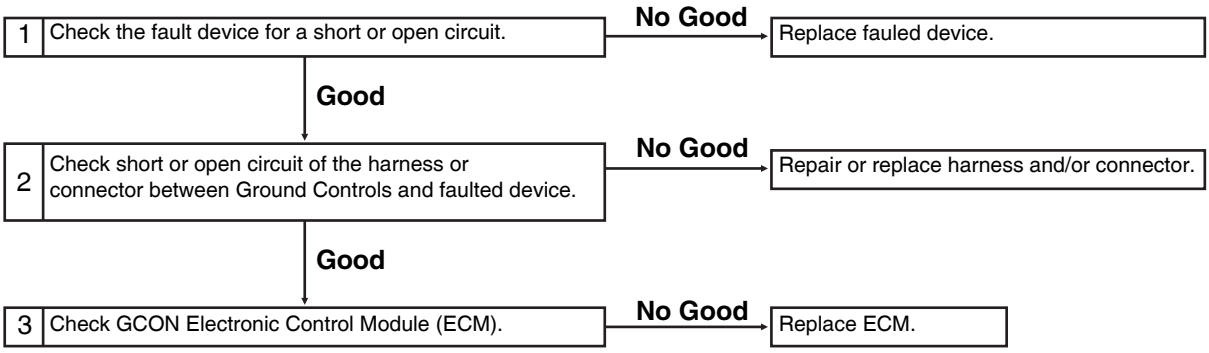
Type "FXXX" - Indicate a malfunction associated with machine feedback devices in the electrical system. The "FXXX" faults are divided into short circuit to battery negative, short circuit to battery positive, open circuit and generic shorts. Example of these devices are limit switches, height sensors and pressure transducers.

Type "CXXX" - Indicate a malfunction associated with controls devices in the electrical system. Example of these devices are platform controls and ground controls ECM.

Troubleshooting "HXXX" and "PXXX" Faults

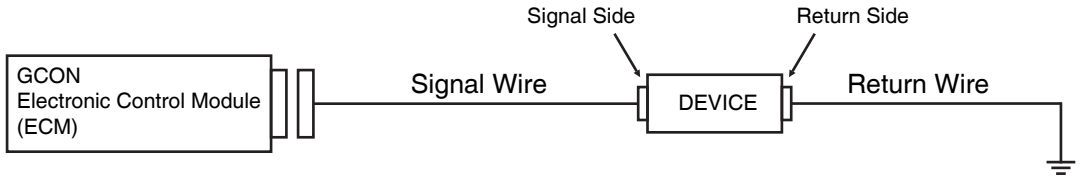
The procedure below illustrates typical steps for diagnosing and fixing faults of type "HXXX and PXXX".

Diagnostic Chart



Wiring Diagram

The wiring diagram shown below illustrates how fault type "HXXX" or "PXXX" devices are typically wired. The signal to these types of devices originates at the Ground Controls and terminates at system ground.

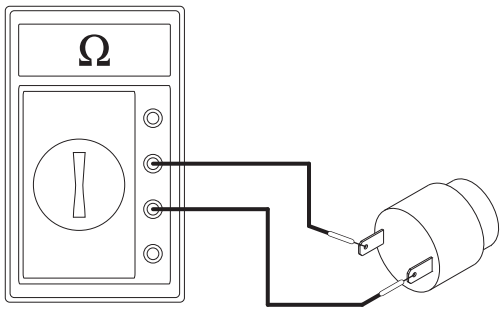


In order to successfully troubleshoot "HXXX" or "PXXX" type faults, the entire faulted out circuit needs to be investigated.

DIAGNOSTICS

Fault Inspection Procedure

1 Check the device associated with the faulted circuit



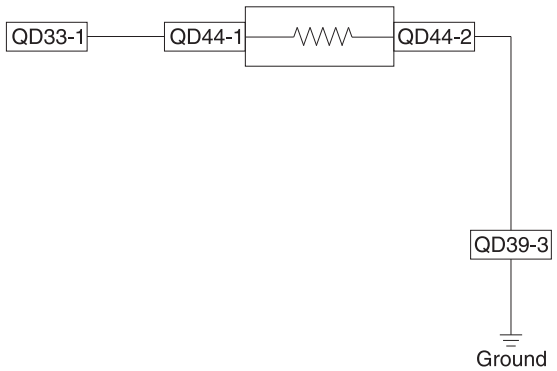
1. Disconnect the faulted device connector.
2. Using a multi-meter, measure resistance between the two terminals of the faulted device
3. Resistance should be as follows.

Device	Typical Resistance
Solenoid Valve, Drive	27.2 Ω
Solenoid Valve, Steer	19 Ω
Solenoid Valve, Platform Up	25 Ω
Solenoid Valve, Platform Down	6.25 Ω
GCON and PCON Alarm	>1M Ω
Automotive Horn	1.0 Ω
Motor Controller - Enable	5.7k Ω
Motor Controller - Throttle	5.7k Ω
Contactor Coil	47 Ω

OK Go to Step 2

No Good Replace faulted device

2 Check harness between Ground Controls and faulted device



1. Disconnect the GCON ECM connectors QD31, QD32 and QD33.

2. Disconnect the faulted device connector.

3. Check the continuity between the GCON ECM connector and the signal side of the faulted device.

⊙ Result: Resistance should be close to 0 Ω.

4. Check the continuity between the return side of faulted device and system ground.

⊙ Result: Resistance should be close to 0 Ω.

5. Check resistance between return side and signal side of the harness plug of faulted device.

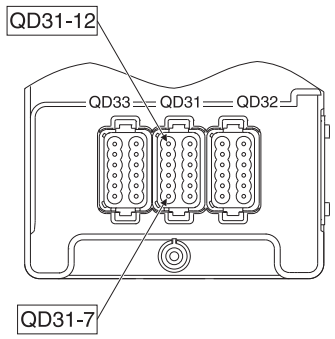
⊙ Result: Resistance should be 1 M Ω or higher.

OK Go to Step 3

No Good Replace or repair harness

DIAGNOSTICS

3 Check the GCON ECM



1. Disconnect the GCON ECM connectors QD31, QD32 and QD33.

2. For short to B- type faults, measure resistance between pins QD31-7 (ground) and the GCON pin associated with the fault code. Refer to the GCON I/O Map Table on page 5-4 or 5-5 to identify the faulted out circuit pin.

3. Resistance should be 1 MΩ or higher.

4. For short to B+ type faults, measure resistance between pins GD31-12 (driver power) and the GCON pin associated with the fault code. Refer to the GCON I/O Map Table on page 5-4 or 5-5 to identify the faulted out circuit pin.

5. Resistance should be 1 MΩ or higher.

No Good > Replace GCON ECM

Type "HXXX" Faults

DTC Number	Message on GCON LCD	Problem Description	Possible Causes	Failure Mode
H001	H001:COILFAULT PLAT UP1:Bat-	Short circuit of the platform up #1 circuit to battery negative.	• Short circuit in platform up #1 harness. • Platform up #1 coil short circuit. • GCON ECM.	Platform up function inhibited.
H002	H002:COILFAULT PLAT UP1:Open	Open circuit in the platform up #1 circuit.	• Open circuit in platform up #1 harness. • Platform up #1 coil open circuit. • GCON ECM.	Platform up function inhibited.
H003	H003:COILFAULT PLAT UP1:Bat+	Short circuit of the platform up #1 circuit to battery positive.	• Short circuit in platform up #1 harness. • Platform up #1 coil short circuit. • GCON ECM.	All functions inhibited except platform down.
H009	H009:COILFAULT PLAT DOWN1:Bat+	Short circuit of the platform up #1 circuit to battery positive.	• Short circuit in platform up #1 harness. • Platform up #1 coil short circuit. • GCON ECM.	All functions inhibited.
H013	H013:COILFAULT DRIVE FWD1:Bat-	Short circuit of the drive forward #1 circuit to battery negative.	• Short circuit in drive forward #1 harness. • Drive forward #1 coil short circuit. • GCON ECM.	Drive forward function inhibited.
H014	H014:COILFAULT DRIVE FWD1:Open	Open circuit in the drive forward #1 circuit.	• Open circuit in drive forward #1 harness. • Drive forward #1 coil open circuit. • GCON ECM.	Drive forward function inhibited.
H015	H015:COILFAULT DRIVE FWD1:Bat+	Short circuit of the drive forward #1 circuit to battery positive.	• Short circuit in drive forward #1 harness. • Drive forward #1 coil short circuit. • GCON ECM.	All functions inhibited except platform down.
H019	H019:COILFAULT DRIVE REV1:Bat-	Short circuit of the drive reverse #1 circuit to battery negative.	• Short circuit in drive reverse #1 harness. • Drive reverse #1 coil short circuit. • GCON ECM.	Drive reverse function inhibited.
H020	H020:COILFAULT DRIVE REV1:Open	Open circuit in the drive reverse #1 circuit.	• Open circuit in drive reverse #1 harness. • Drive reverse #1 coil open circuit. • GCON ECM.	Drive reverse function inhibited.
H021	H021:COILFAULT DRIVE REV1:Bat+	Short circuit of the drive reverse #1 circuit to battery positive.	• Short circuit in drive reverse #1 harness. • Drive reverse #1 coil short circuit. • GCON ECM.	All functions inhibited except platform down.
H027	H027:COILFAULT STEER RT:Bat+	Short circuit of the steer right circuit to battery positive.	• Short circuit in steer right harness. • Steer right coil short circuit. • GCON ECM.	All functions inhibited except platform down.
H030	H030:COILFAULT STEER LT:Bat+	Short circuit of the steer left circuit to battery positive.	• Short circuit in steer right harness. • Steer right coil short circuit. • GCON ECM.	All functions inhibited except platform down.
H067	H067:FAULT MC ENABLE:Bat-	Short circuit of the motor controller circuit to battery negative.	• Short circuit in motor controller enable wire. • Motor Controller. • GCON ECM. • Contactor Coil.	All functions inhibited except platform down.
H069	H069:FAULT MC ENABLE:Bat+	Short circuit of the motor controller circuit to battery positive.	• Short circuit in motor controller enable wire. • Motor Controller. • GCON ECM.	All functions inhibited except platform down.
H070	H070:FAULT MC THROTTLE:Bat-	Short circuit of the motor controller throttle circuit to battery negative.	• Short circuit in motor controller throttle wire. • Motor Controller. • GCON ECM.	All functions inhibited except platform down.
H072	H072:FAULT MC THROTTLE:Bat+	Short circuit of the motor controller throttle circuit to battery positive.	• Short circuit in motor controller throttle wire. • Motor Controller. • GCON ECM.	All functions inhibited except platform down.
H078	H078:COILFAULT PLAT DOWN1	Short circuit of the platform down #1 circuit to battery positive/negative or open circuit.	• Short or open circuit in platform down #1 harness. • Platform down #1 coil short or open circuit. • GCON ECM.	Platform down function inhibited.
H080	H080:COILFAULT STEER LEFT	Short circuit of the steer left circuit to battery negative or open circuit.	• Short or open circuit in steer left harness. • Steer left coil short or open circuit. • GCON ECM.	Steer left function inhibited.
H081	H081:COILFAULT STEER RIGHT	Short circuit of the steer right circuit to battery negative or open circuit.	• Short or open circuit in steer right harness. • Steer right coil short or open circuit. • GCON ECM.	Steer right function inhibited.

Type "PXXX" Faults

DTC Number	Message on GCON LCD	Problem Description	Possible Causes	Failure Mode
P001	P001:PWR FAULT SW PWR1:Bat-	Short circuit of the switched power #1 circuit to battery negative.	• Short circuit in switched power #1, down limit switch, pothole limit switch, digital tilt switch harness. • GCON ECM.	All functions inhibited.
P003	P003:PWR FAULT SW PWR1:Bat+	Short circuit of the switched power #1 circuit to battery positive.	• Short circuit in switched power #1, down limit switch, pothole limit switch, digital tilt switch harness. • GCON ECM.	All functions inhibited.
P004	P004:DEVICEFAULT HORN:Bat-	Short circuit of the automotive horn circuit to battery negative.	• Short circuit in automotive horn harness. • Automotive horn short circuit. • GCON ECM.	Automotive horn inhibited.
P005	P005:DEVICEFAULT HORN:Open	Open circuit of the automotive horn circuit.	• Open circuit in automotive horn harness. • Automotive horn open circuit. • GCON ECM.	Automotive horn inhibited.
P006	P006:DEVICEFAULT HORN:Bat+	Short circuit of the automotive horn circuit to battery positive.	• Short circuit in automotive horn harness. • Automotive horn short circuit. • GCON ECM.	Automotive horn inhibited.
P007	P007:DEVICEFAULT GCON ALARM:Bat-	Short circuit of the GCON alarm circuit to battery negative.	• Short circuit in GCON alarm harness. • GCON alarm short circuit. • GCON ECM.	GCON alarm inhibited.
P009	P009:DEVICEFAULT GCON ALARM:Bat+	Short circuit of the GCON alarm circuit to battery positive.	• Short circuit in GCON alarm harness. • GCON alarm short circuit. • GCON ECM.	GCON alarm inhibited.
P013	P013:PWR FAULT PCON PWRET:Bat-	Short circuit of the PCON power return circuit to battery negative.	• Short circuit in PCON power return harness. • GCON ECM.	All functions inhibited.
P015	P015:PWR FAULT PCON PWRET:Bat+	Short circuit of the PCON power return circuit to battery positive.	• Short circuit in PCON power return harness. • GCON ECM.	All functions inhibited.
P018	P018:PWR FAULT PCON POWER:Bat-	Short circuit of the PCON power circuit to battery negative.	• Short circuit in PCON power harness. • GCON ECM.	All functions inhibited.
P019	P019:PWR FAULT PCON POWER:Bat+	Short circuit of the PCON power circuit to battery positive.	• Short circuit in PCON power harness. • GCON ECM.	All functions inhibited.

Type "UXXX" Faults

DTC Number	Message on GCON LCD	Problem Description	Possible Causes	Failure Mode
U001	U001:SWITCHFAULT GCON MAIN FTN EN	Short circuit of the GCON main function enable switch at system startup.	• Short circuit of the GCON main function enable switch. • GCON ECM.	All GCON functions inhibited.
U002	U002: SWITCHFAULT GCON PLAT UP	Short circuit of the GCON up directional switch at system startup.	• Short circuit of the GCON up directional switch. • GCON ECM.	All GCON functions inhibited except platform down.
U003	U003: SWITCHFAULT GCON PLAT DOWN	Short circuit of the GCON down directional switch at system startup.	• Short circuit of the GCON down directional switch. • GCON ECM.	All GCON functions inhibited except platform up.
U004	U004:SWITCHFAULT GCON LCD UP	Short circuit of the GCON LCD scroll up switch at system startup.	• Short circuit of the GCON LCD scroll up switch. • GCON ECM.	All GCON LCD menu functions inhibited.
U005	U005:SWITCHFAULT GCON LCD DOWN	Short circuit of the GCON LCD scroll down switch at system startup.	• Short circuit of the GCON LCD scroll down switch. • GCON ECM.	All GCON LCD menu functions inhibited.
U006	U006:SWITCHFAULT GCON LCD ENTER	Short circuit of the GCON LCD enter switch at system startup.	• Short circuit of the GCON LCD enter switch. • GCON ECM.	All GCON LCD menu functions inhibited.
U007	U007:SWITCHFAULT GCON LCD ESCAPE	Short circuit of the GCON LCD escape switch at system startup.	• Short circuit of the GCON LCD escape switch. • GCON ECM.	All GCON LCD menu functions inhibited.
U014	U014:SWITCHFAULT PCON DRIVE EN	Short circuit of the PCON drive enable switch at system startup.	• Short circuit of the PCON drive enable switch. • GCON ECM.	All PCON drive and steer functions inhibited.
U015	U015:SWITCHFAULT PCON STEER LEFT	Short circuit of the PCON steer left switch at system startup.	• Short circuit of the PCON steer left switch. • GCON ECM.	All PCON drive and steer functions inhibited.
U016	U016:SWITCHFAULT PCON STEER RIGHT	Short circuit of the PCON steer right switch at system startup.	• Short circuit of the PCON steer right switch. • GCON ECM.	All PCON drive and steer functions inhibited.
U017	U017:SWITCHFAULT PCON HORN	Short circuit of the PCON horn switch at system startup.	• Short circuit of the PCON horn switch. • GCON ECM.	PCON horn switch function inhibited.
U018	U018:SWITCHFAULT PCON LO DRIV SPD	Short circuit of the PCON low drive speed switch at system startup.	• Short circuit of the PCON low drive speed switch. • GCON ECM.	The machine is limited to low drive speed.
U019	U019:SWITCHFAULT PCON LO LIFT SPD	Short circuit of the PCON low lift speed switch at system startup.	• Short circuit of the PCON low lift speed switch. • GCON ECM.	PCON platform up & down functions inhibited.
U020	U020:SWITCHFAULT PCON HI LIFT SPD	Short circuit of the PCON high lift speed switch at system startup.	• Short circuit of the PCON hi lift speed switch. • GCON ECM.	PCON platform up & down functions inhibited.
U021	U021:SWITCHFAULT PCON UP	Short circuit of the PCON up directional switch at system startup.	• Short circuit of the PCON up directional switch. • GCON ECM.	PCON platform up function inhibited.
U022	U022:SWITCHFAULT PCON DOWN	Short circuit of the PCON down directional switch at system startup.	• Short circuit of the PCON down directional switch. • GCON ECM.	PCON platform down functions inhibited.
U033	U033:JSTICKFAULT OUT OF CAL RANGE	PCON drive joystick signal is outside acceptable calibration range at system startup.	• PCON drive joystick is not in neutral position at startup. • PCON joystick. • GCON ECM.	All PCON drive and steer functions inhibited.
U034	U034:JSTICKFAULT OUT OF RANGE:HI	Short circuit of the PCON drive joystick signal to battery positive at system startup.	• Short circuit of PCON drive joystick signal circuit. • PCON joystick. • GCON ECM.	All PCON drive and steer functions inhibited.
U035	U035:JSTICKFAULT OUT OF RANGE:LO	Short circuit of the PCON drive joystick signal to battery negative at system startup.	• Short circuit of PCON drive joystick signal circuit. • PCON joystick. • GCON ECM.	All PCON drive and steer functions inhibited.
U036	U036:SWITCHFAULT GCON + PCON:ON	Mis-wiring or short circuit of GCON key switch.	• Short circuit in the GCON key switch harness. • GCON key switch. • GCON ECM.	All functions inhibited.

Type "FXXX" Faults

DTC Number	Message on GCON LCD	Problem Description	Possible Causes	Failure Mode
F003	F003:SWITCHFAULT DOWN LIMIT1:Bat+	Short circuit of the down limit #1 switch at system start up.	• Short circuit of the down limit switch circuit. • Down limit #1 switch short circuit. • GCON ECM.	All functions inhibited except platform down.
F005	F005:SWITCHFAULT POTHOLE1:Bat+	Short circuit of the pothole limit #1 switch at system start up.	• Short circuit of the pothole switch circuit. • Pothole limit #1 switch short circuit. • GCON ECM.	All functions inhibited except platform down as long as machine is in the elevated position. If machine is in stowed position, all functionality is resumed.
F007	F007:SWITCHFAULT CHASSISTILT:Bat+	Short circuit of the chassis digital tilt switch at system start up.	• Short circuit of the chassis digital tilt switch circuit. • Chassis digital tilt switch short circuit. • GCON ECM.	All functions inhibited except platform down as long as machine is in the elevated position. If machine is in stowed position, all functionality is resumed.
F008	F008:SENSORFAULT OVLD XDUCER:Bat+	Short circuit of the Platform Overload Transducer circuit to battery positive.	• Short circuit in the transducer circuit. • Faulty pressure transducer. • GCON ECM.	All functions inhibited.
F009	F009: SENSORFAULT OVLD XDUCER:Bat-	Short circuit of the Platform Overload Transducer circuit to battery negative.	• Short circuit in the transducer circuit. • Faulty pressure transducer. • GCON ECM.	All functions inhibited.
F010	F010:SENSORFAULT PLAT HEIGHT:Bat+	Short circuit of the Platform Height Sensor circuit to battery positive.	• Short circuit in the platform height circuit. • Faulty platform height sensor. • GCON ECM.	All functions inhibited. Platform down, if machine is in an elevated position. If machine is in the stowed position, all functionality is resumed.
F011	F011:SENSORFAULT PLAT HEIGHT:Bat-	Short circuit of the Platform Height Sensor circuit to battery negative.	• Short circuit in the platform height circuit. • Faulty platform height sensor. • GCON ECM.	All functions inhibited. Platform down, if machine is in an elevated position. If machine is in the stowed position, all functionality is resumed.
F034	F034:SENSORFAULT OVLD:PLAT HEIGHT	Height Sensor settings are not calibrated correctly.	• Height sensor needs calibration for stowed height and maximum height settings. • GCON ECM or PCON ECM	All functions inhibited.
F035	F035:SWITCHFAULT OVLD RANGE: LOW	Height Sensor setting is lower than calibrated stowed height.	• Height sensor not calibrated for stowed height correctly. • GCON ECM or PCON ECM	All functions inhibited.
F036	F036:SWITCHFAULT OVLD RANGE: HI	Height Sensor setting is higher than calibrated maximum height.	• Height sensor not calibrated for maximum height correctly. • GCON ECM or PCON ECM	All functions inhibited.

Type "CXXX" Faults

DTC Number	Message on GCON LCD	Problem Description	Possible Causes	Failure Mode
C001	C001:GCON ECM FAULT TYPE 1	GCON ECM CRC check error.	• Incorrect software file. • GCON ECM internal failure.	All functions inhibited.
C003	C003:GCON ECM FAULT TYPE 3	GCON ECM external memory error.	• GCON ECM.	All functions inhibited.
C004	C004:GCON ECM FAULT TYPE 4	GCON ECM master switch error.	• Short circuit in the master switch circuit. • GCON ECM.	All functions inhibited.
C005	C005:GCON ECM FAULT TYPE 5	GCON ECM safety switch error.	• Short circuit in the safety switch circuit. • GCON ECM.	All functions inhibited.
C006	C006:GCON ECM FAULT TYPE 6	GCON ECM input redundancy error.	• Input conditioning circuit failure. • GCON ECM.	All functions inhibited.
C007	C007:GCON ECM FAULT TYPE 7	GCON ECM inter-processor communication error.	• Incorrectly programmed device • Error in loading software on device. • GCON ECM.	All functions inhibited.
C021	C021:PCON NOT DETECTED	PCON not detected error.	• PCON is missing. • Communication bus failure. • GCON or PCON ECM.	All functions inhibited.
C022	C022:COMM FAULT GCON-PCON	Communication failure between PCON and GCON.	• CAN communication failure. • CAN communication harness. • GCON or PCON ECM.	All functions inhibited.
C023	C023:MACHINE MODEL FAULT	Discrepancy between model detected and model programmed.	• Incorrect machine model programmed by user. • GCON or PCON ECM.	All functions inhibited.
C024	C024:PARAMETER PROGRAM FAULT	Invalid machine parameters.	• Incorrect machine parameter programmed by user. • GCON or PCON ECM.	All functions inhibited.
C025	C025:SYSTEMFAULT PLAT OVLD:NoCal	Platform overload system not calibrated.	• Platform overload system not calibrated. • GCON or PCON ECM.	All functions inhibited.
C028	C028:SERVICE OVERRIDE MODE ON	Machine is in service override mode.	• Machine programmed for use in service override mode	All functions inhibited except for down function and up function. Platform can be elevated only once, with the maximum elevate time of X seconds. Elevate time X, depends on machine model.

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. An illustration legend precedes each group of drawings.

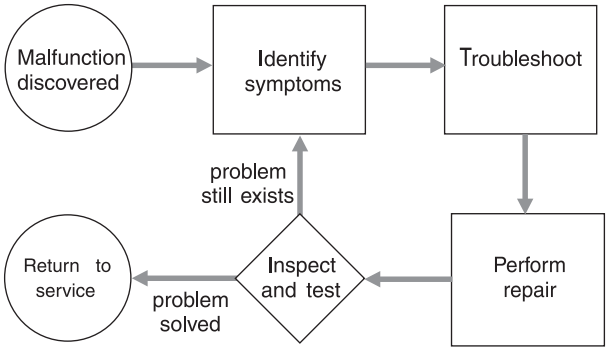
Electrical Schematics

⚠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 Component and Wire Color Legends

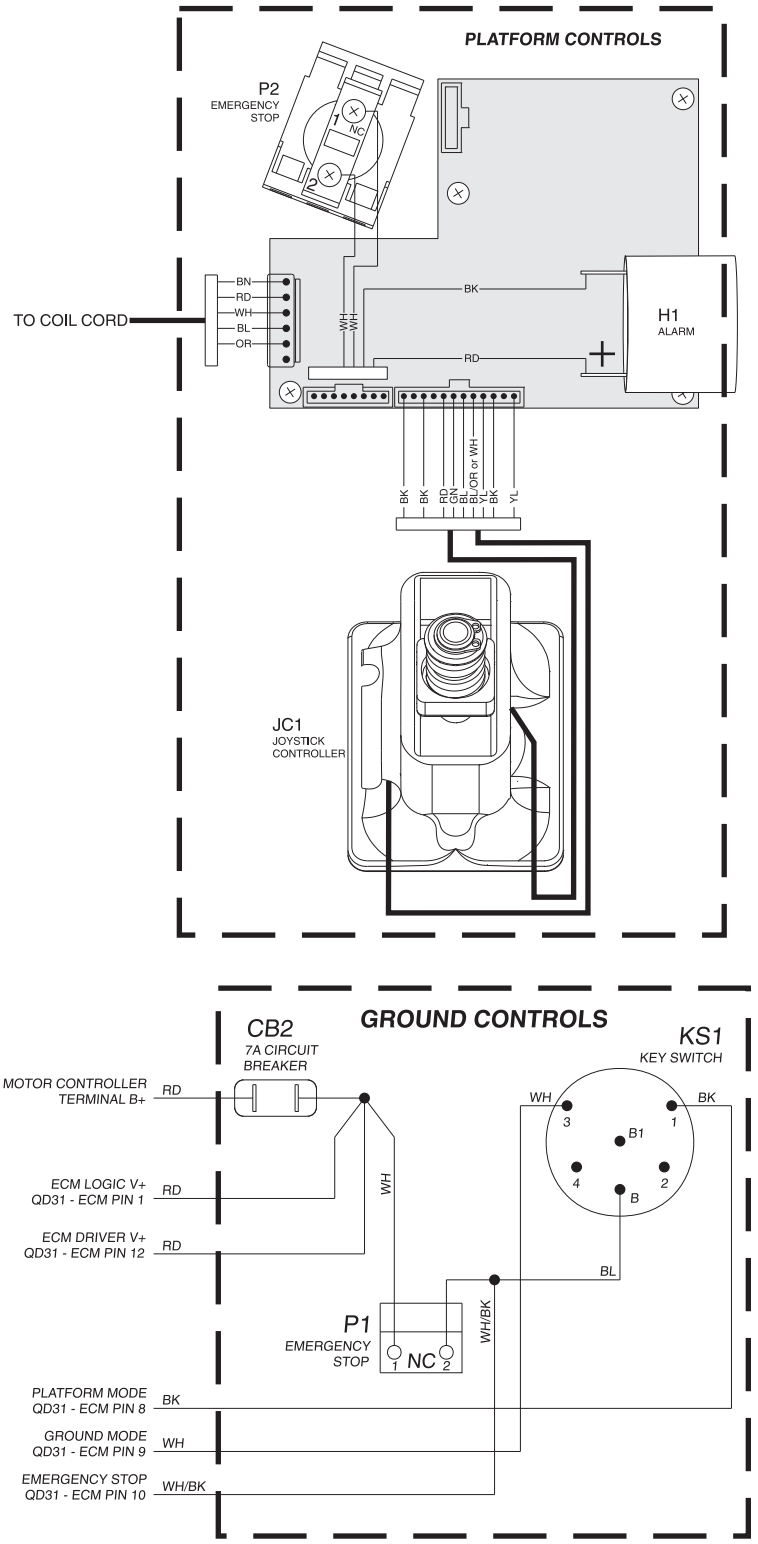
ELECTRICAL COMPONENT LEGEND	
Item	**Description**
B5	Battery
CB2	Circuit breaker, 7A
CON1	Contactor, Motor controller power, NOHC
D	Diode
	D1 = Motor controller enable, 3A D2 = Motor controller B+, 3A
EN4	Enclosure - AC outlet box
F6	Fuse, 275A
FB	Flashing beacons
GND	Ground
H	Horn or alarm
	H1 = Horn H2 = Automotive-style horn (option) H5 = Multifunction alarm
JC9	Joystick controller
KS1	Key switch
LS	Limit switch
	LS6 = Platform down LS7 = Pothole LS8 = Pothole LS19 = Load sense (option)
M5	Hydraulic power unit
NC	Normally closed
NCHO	Normally closed held open
NOHC	Normally open held closed
P	Power switch
	P1 = Emergency Stop button at ground controls P2 = Emergency Stop button at platform controls
QD	Quick disconnect
	QD1 = Battery quick disconnect QD3 = Control cable to ground QD4 = Control cable to platform QD30 = AC plug QD31 = GCON ECM, ground and platform controls QD32 = GCON ECM, switches and sensors QD33 = GCON ECM, function manifold QD34 = Power buss, switches and sensors QD35 = Ground buss, switches and sensors QD36 = Pothole guard switches QD37 = Down limit switch QD38 = Level sensor QD39 = Ground buss, function manifold QD40 = Drive reverse coil, Y5 QD41 = Drive forward coil, Y6 QD42 = Steer right coil, Y3 QD43 = Steer left coil, Y4 QD44 = Platform up coil, Y8 QD45 = Obstruction pads, power signal in (QS retail) QD46 = Obstruction pads, power signal out (QS retail) QD47 = Platform controls PCB, power/signal in QD48 = Platform controls PCB, E-Stop and alarm QD49 = Platform controls PCN, joystick

ELECTRICAL COMPONENT LEGEND cont.	
Item	**Description**
R	Resistor
	R27 = Resistor 25 Ohm, 25W (QS retail) R30 = Resistor, 200 Ohm, 10W
S7	Level sensor
U	Electronic component
	U3 = Platform controls printed circuit board U5 = Electronic control module U6 = Motor controller U9 = Battery charger U13 = Voltage inverter (option) U47A = Obstruction sensing pad (hydraulic tank side) (QS retail) U47B = Obstruction sensing pad (battery tray) (QS retail) U47C = Obstruction sensing pad (steer end) (QS retail) U47D = Obstruction sensing pad (ground controls side) (QS retail)
Y	Valve coil
	Y3 = Steer right Y4 = Steer left Y5 = Drive reverse Y6 = Drive forward Y7 = Platform down Y8 = Platform up

WIRE COLOR LEGEND	
Color	**Description**
BK	Black
BL	Blue
BL/BK	Blue/Black
BL/OR	Blue/Orange
BN	Brown
GN	Green
GN/WH	Green/White
GN/YL	Green/Yellow
LT BL	Light Blue
OR	Orange
OR/BK	Orange/Black
OR/RD	Orange/Red
RD	Red
RD/BK	Red/Black
WH	White
WH/BK	White/Black
YL	Yellow

Wiring Diagram

Ground and Platform Controls



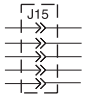
Electrical Symbols Legend

Wire with description or color

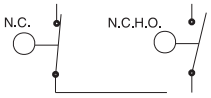
Circuits crossing no connection

Diode

Circuit connection



Deutsch connector



Limit switch

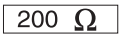
Emergency Stop button

Circuit breaker

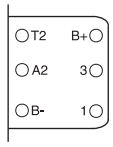
Fuse

Horn or alarm

Flashing beacon

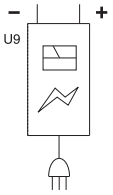


Resistor



Motor controller

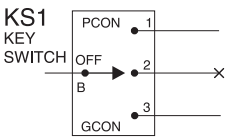
Motor



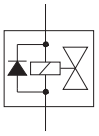
Battery charger

6V DC battery

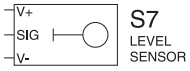
Sensor pad (QSR only)



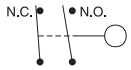
Key switch



Solenoid valve with diode



Level sensor

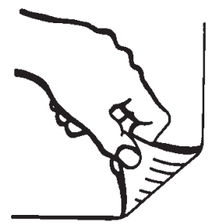


Pressure switch

Contactor

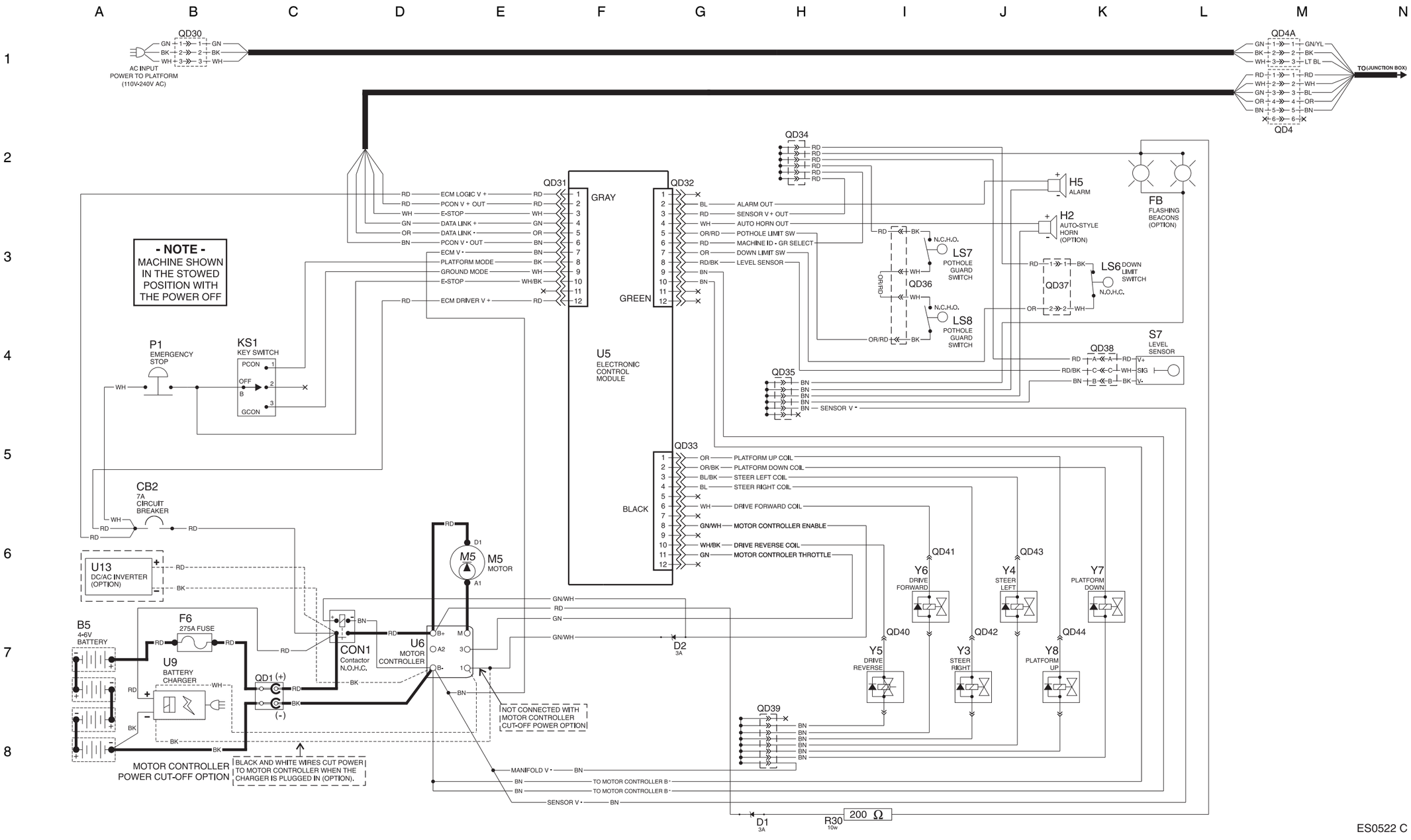
Electrical Schematic • GR and QSW

ANSI and CSA Models (from serial number GR10-20000 to GR11-20683 and serial number QS11-1000 to QS11-1015)



Electrical Schematic • GR and QSW

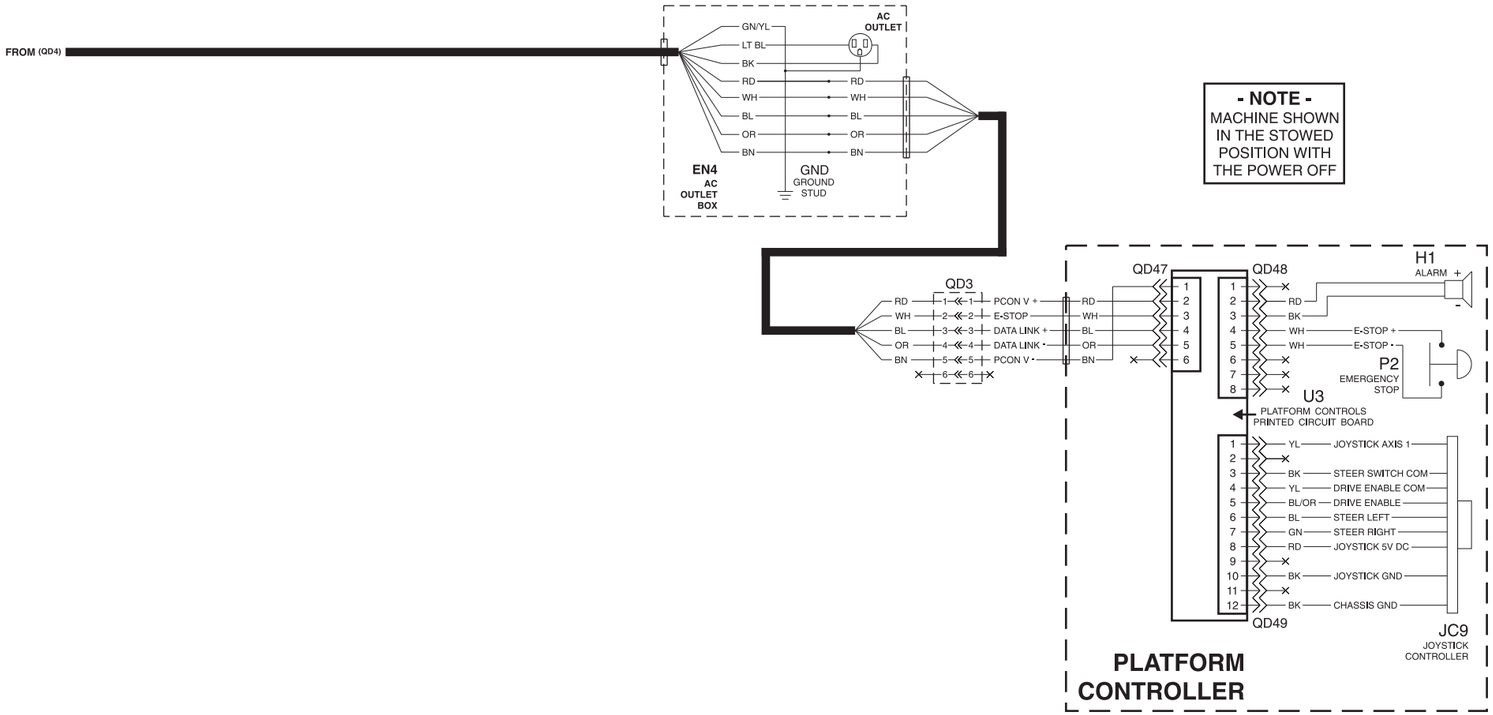
ANSI and CSA Models (from serial number GR10-20000 to GR11-20683 and serial number QS11-1000 to QS11-1015)



ES0522 C

Electrical Schematic • GR and QSW

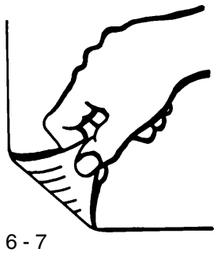
ANSI and CSA Models (from serial number GR10-20000 to GR11-20683 and serial number QS11-1000 to QS11-1015)



ES0522 C

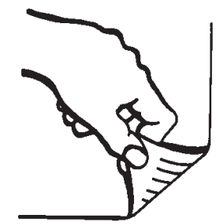
Electrical Schematic • GR and QSW

ANSI and CSA Models (from serial number GR10-20000 to GR11-2068
and serial number QS11-1000 to QS11-1015)



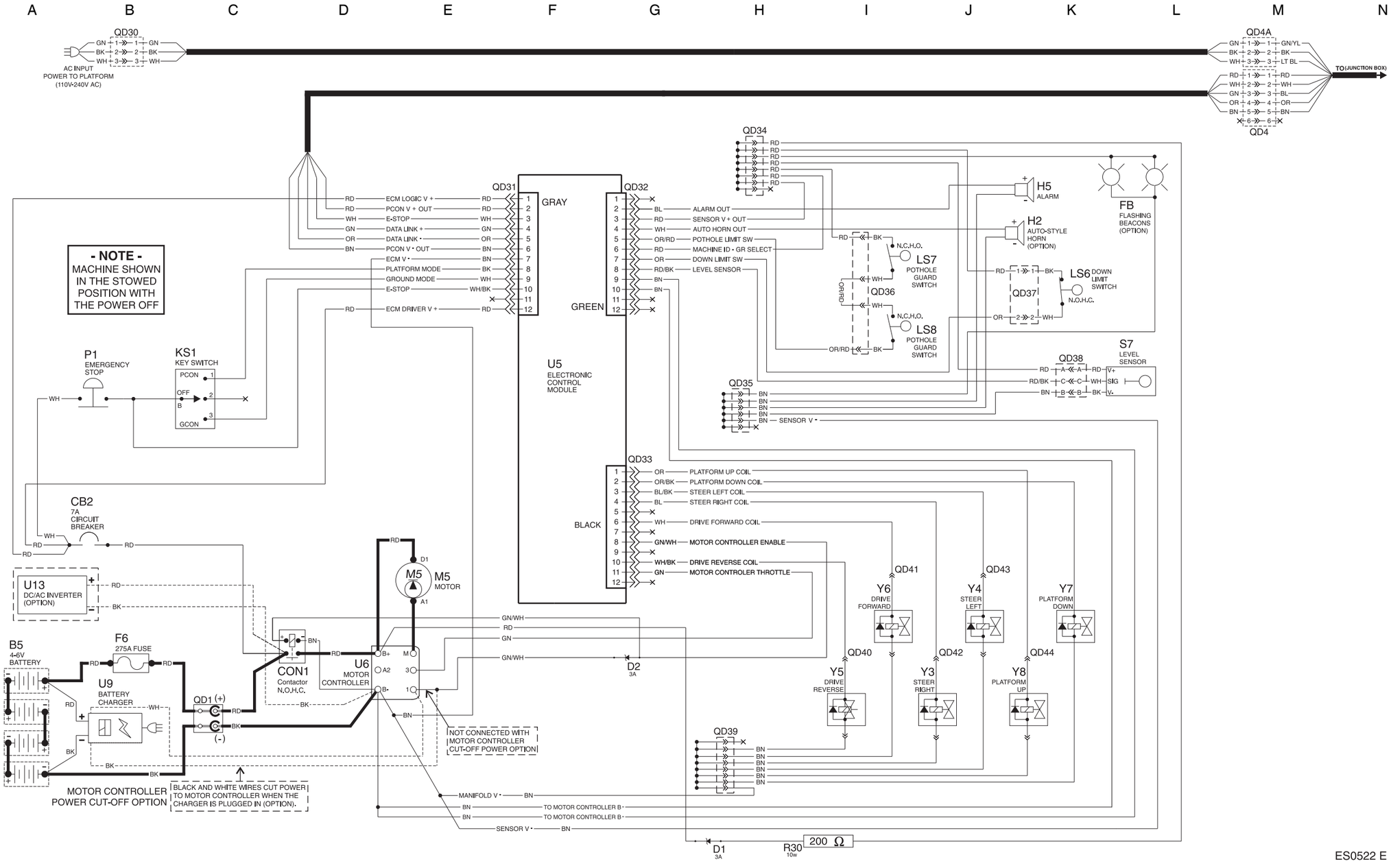
Electrical Schematic • GR and QSW

ANSI and CSA Models (from serial number GR11-20684 and serial number QS11-1016)



Electrical Schematic • GR and QSW

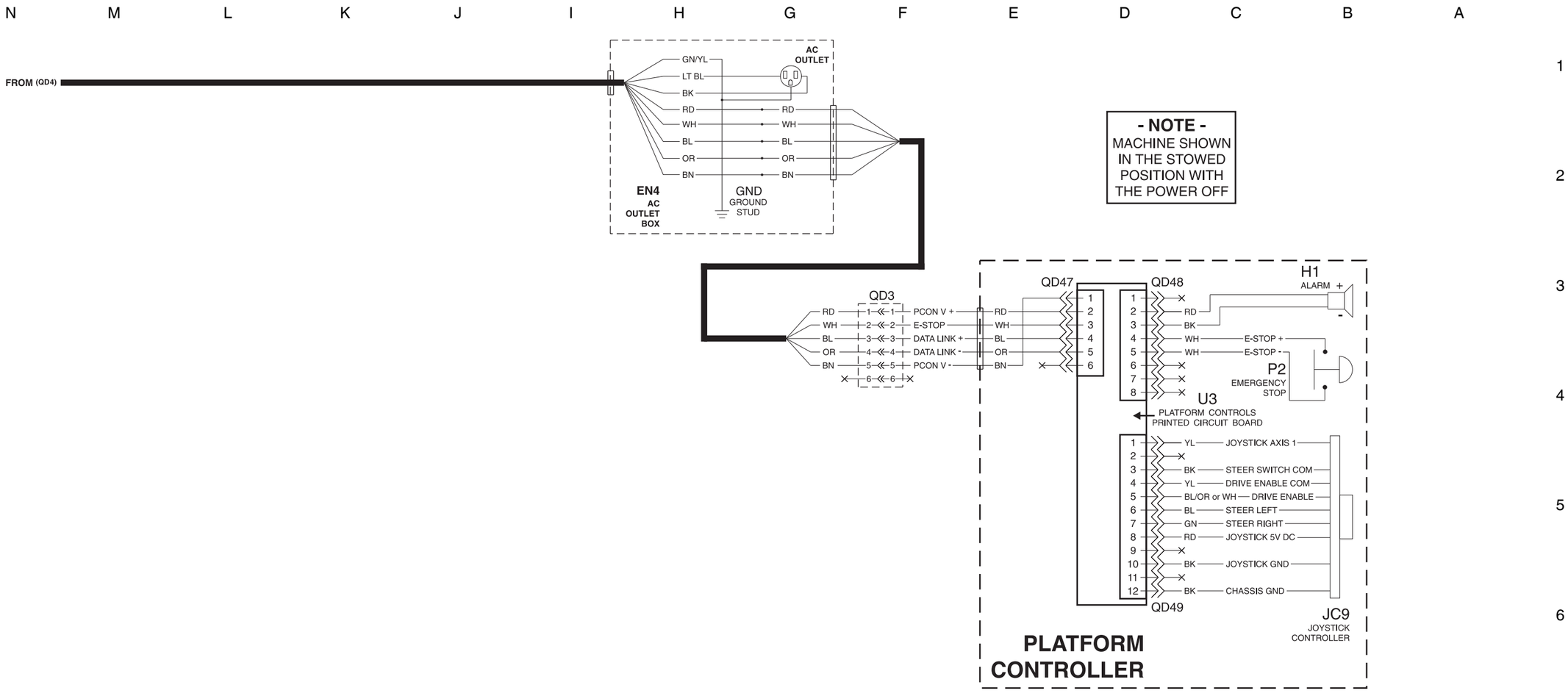
ANSI and CSA Models (from serial number GR11-20684 and serial number QS11-1016)



ES0522 E

Electrical Schematic • GR and QSW

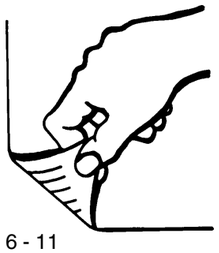
ANSI and CSA Models (from serial number GR11-20684 and serial number QS11-1016)



ES0522 E

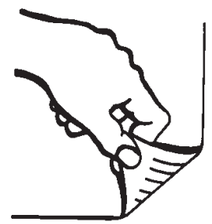
Electrical Schematic • GR and QSW

ANSI and CSA Models (from serial number GR11-20684 and serial number QS11-1016)



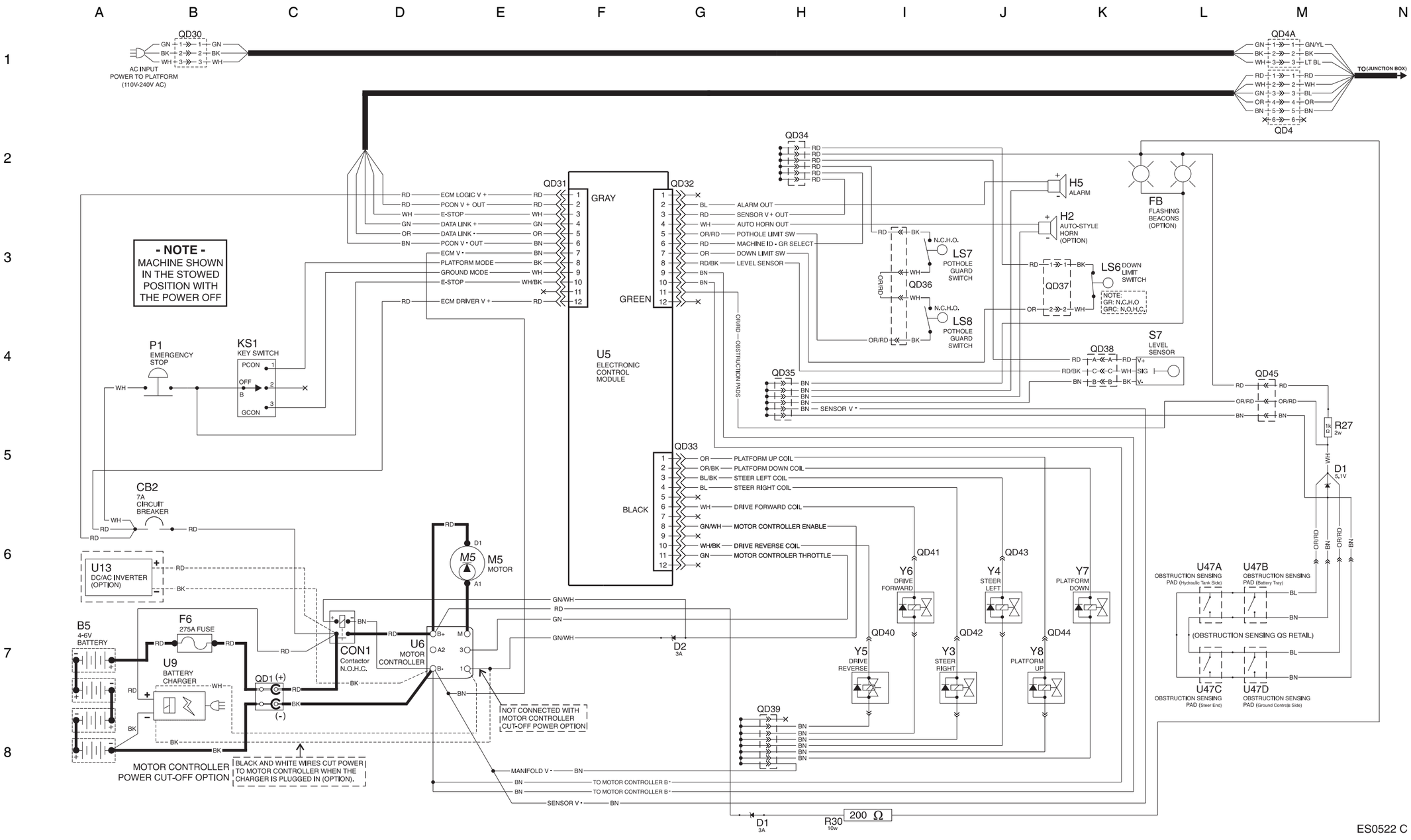
Electrical Schematic • QSR

ANSI and CSA Models (from serial number QS11-1000 to QS11-1015)



Electrical Schematic • QSR

ANSI and CSA Models (from serial number QS11-1000 to QS11-1015)



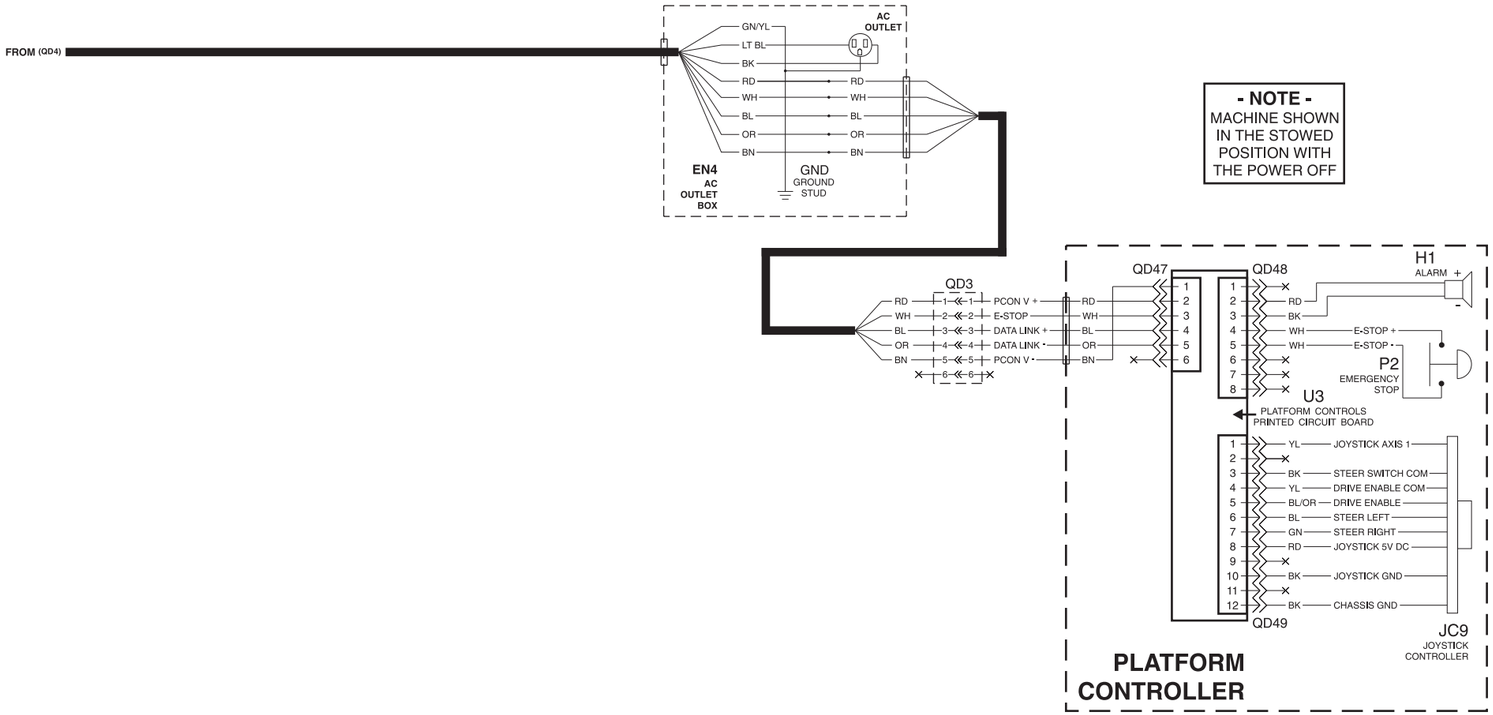
ES0522 C

Electrical Schematic • QSR

ANSI and CSA Models (from serial number QS11-1000 to QS11-1015)

N M L K J I H G F E D C B A

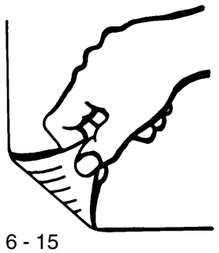
1 2 3 4 5 6 7 8



ES0522 C

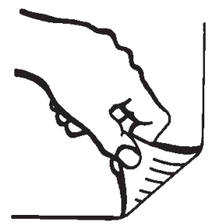
Electrical Schematic • QSR

ANSI and CSA Models (from serial number QS11-1000 to QS11-1015)



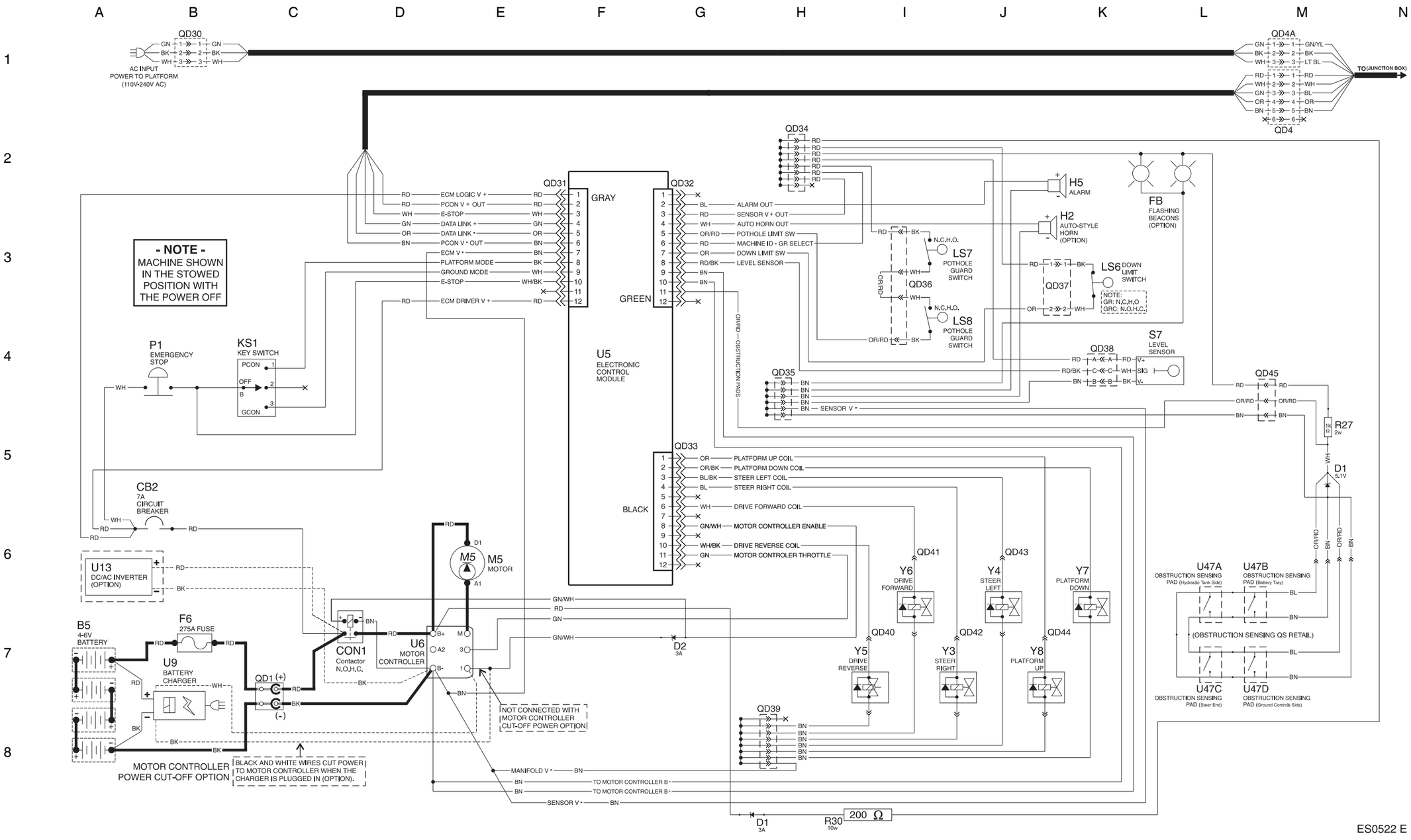
Electrical Schematic • QSR

ANSI and CSA Models (from serial number QS11-1016)



Electrical Schematic • QSR

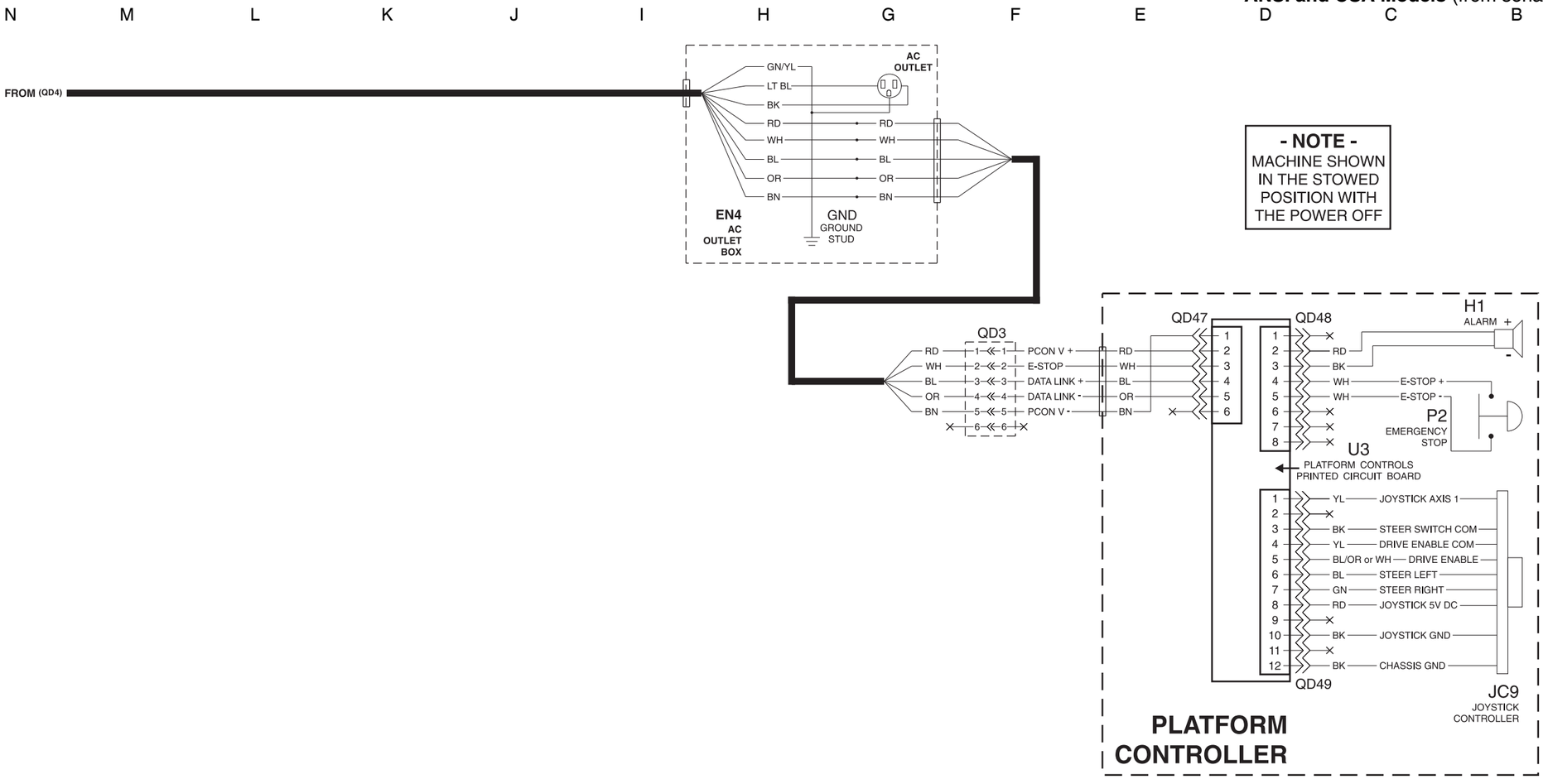
ANSI and CSA Models (from serial number QS11-1016)



ES0522 E

Electrical Schematic • QSR

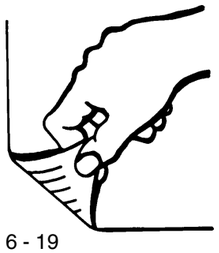
ANSI and CSA Models (from serial number QS11-1016)



ES0522 E

Electrical Schematic • QSR

ANSI and CSA Models (from serial number QS11-1016)

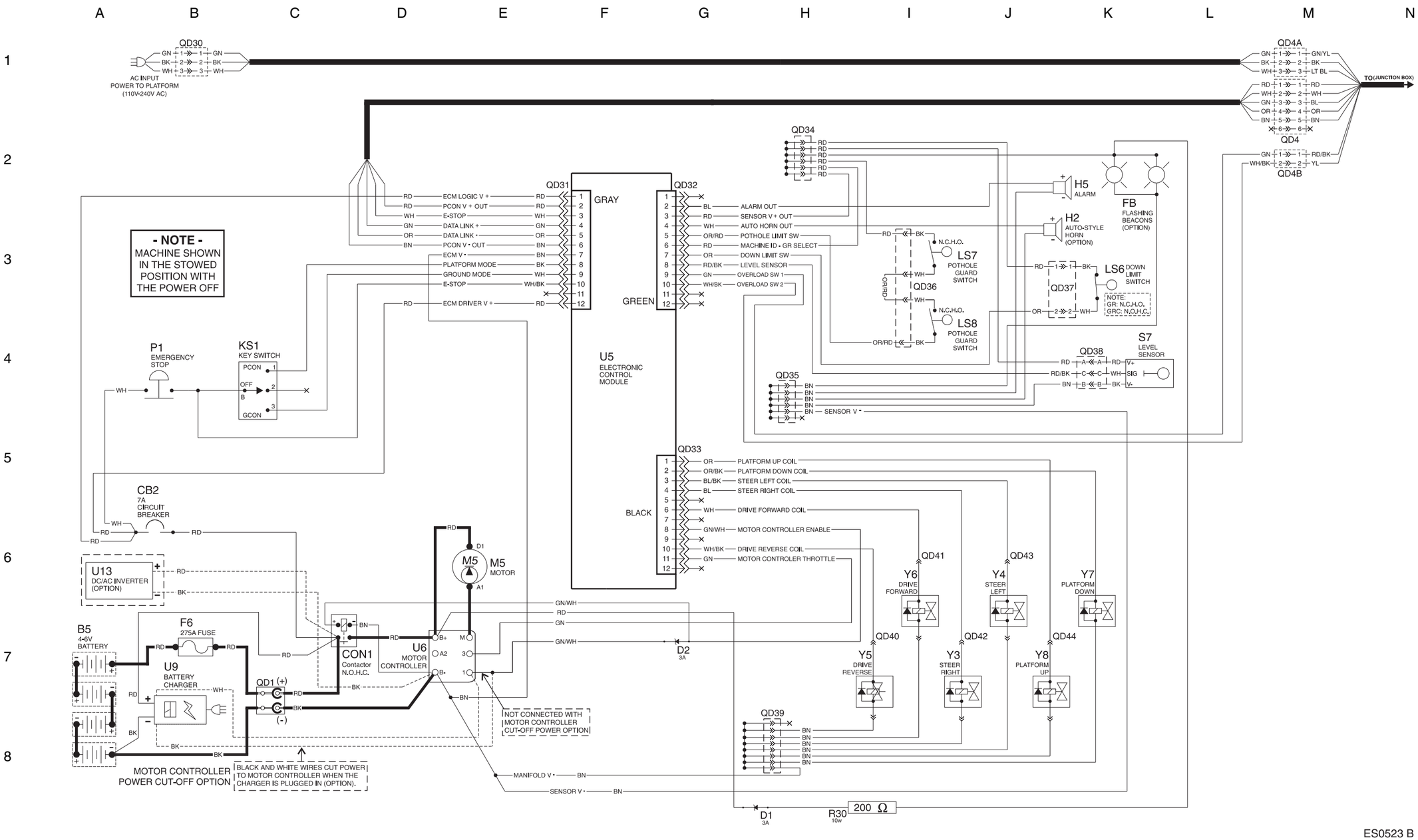


Electrical Schematic • GR and QSW

CE and AUS Models (from serial number GR10-20000 to GR11-20683 and serial number QS11-1000 to QS11-1015)

Electrical Schematic • GR and QSW

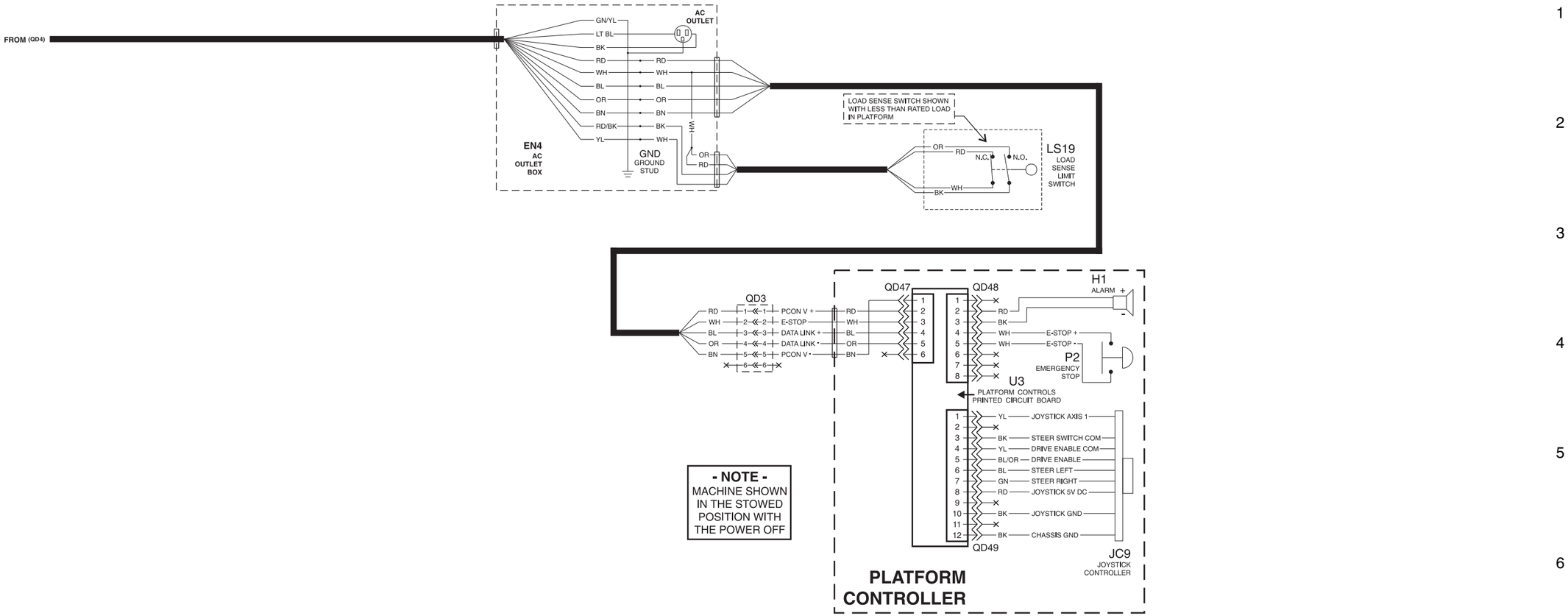
CE and AUS Models (from serial number GR10-20000 to GR11-20683 and serial number QS11-1000 to QS11-1015)



ES0523 B

Electrical Schematic • GR and QSW

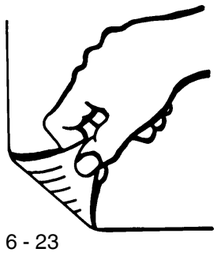
CE and AUS Models (from serial number GR10-20000 to GR11-20683 and serial number QS11-1000 to QS11-1015)



ES0523 B

Electrical Schematic • GR and QSW

CE and AUS Models (from serial number GR10-20000 to GR11-20683 and serial number QS11-1000 to QS11-1015)

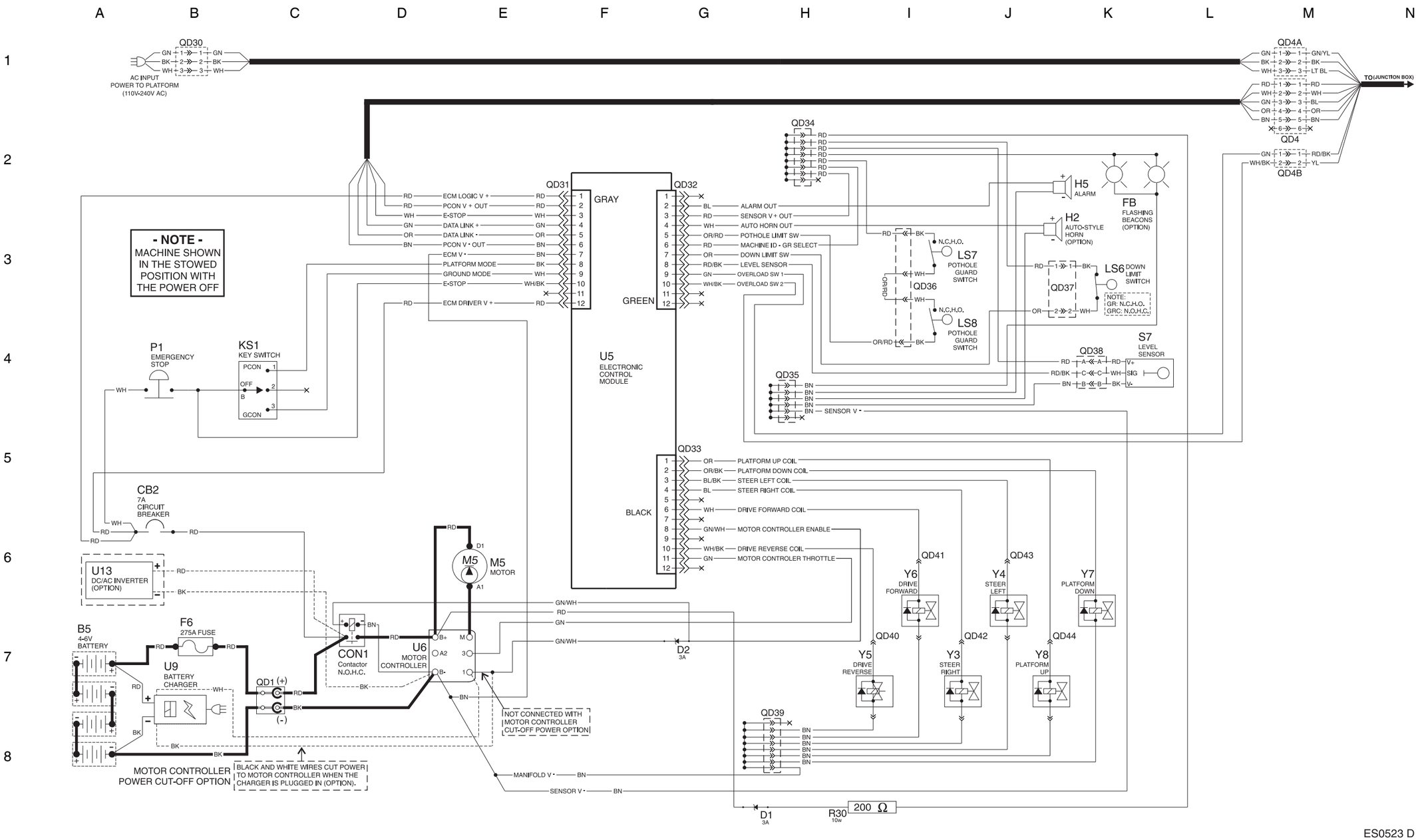


Electrical Schematic • GR and QSW

CE and AUS Models (from serial number GR11-20684 and serial number QS11-1016)

Electrical Schematic • GR and QSW

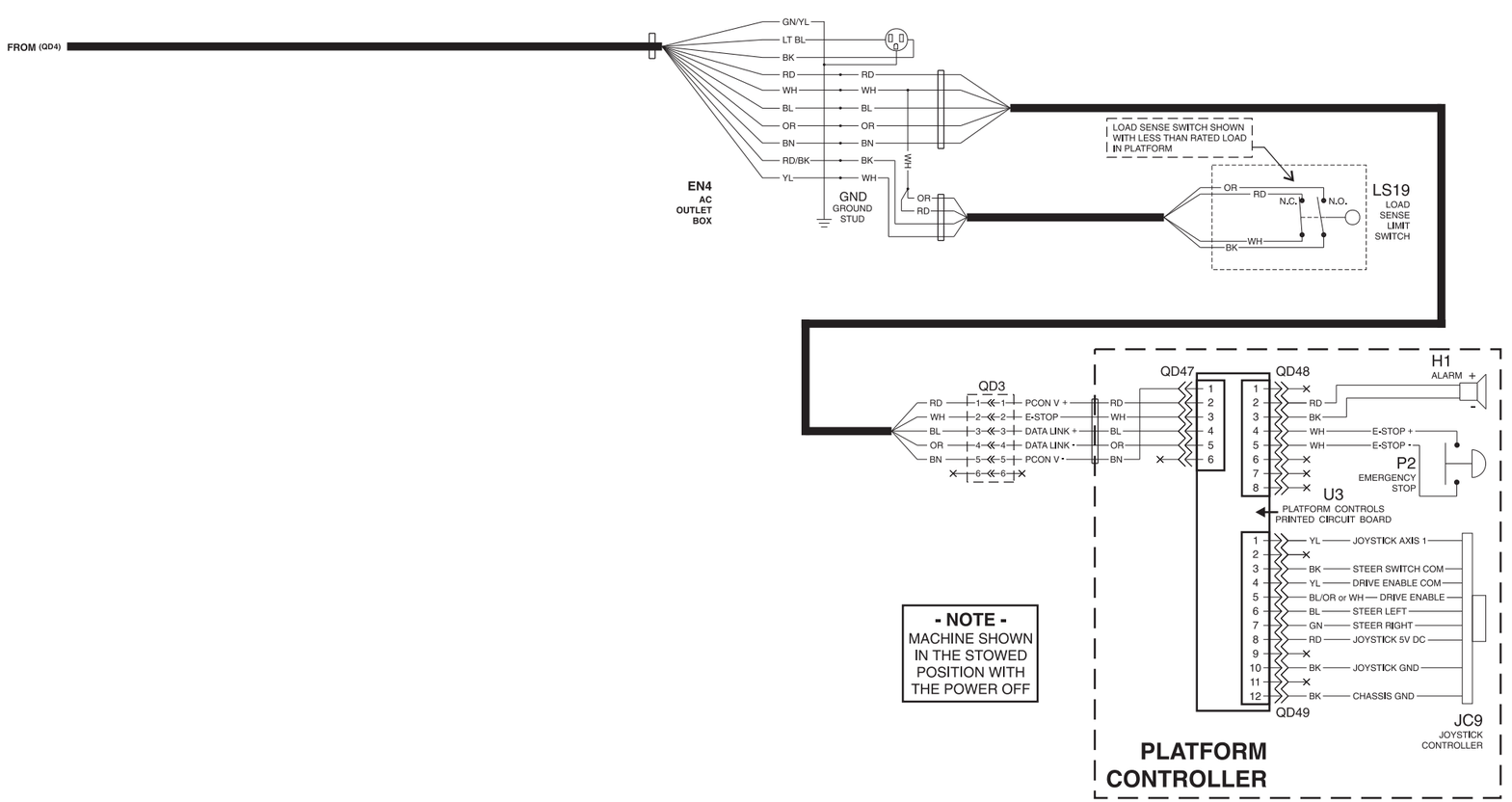
CE and AUS Models (from serial number GR11-20684 and serial number QS11-1016)



ES0523 D

Electrical Schematic • GR and QSW

CE and AUS Models (from serial number GR11-20684 and serial number QS11-1016)

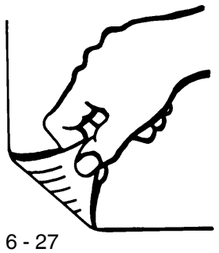


- NOTE -
MACHINE SHOWN IN THE STOWED POSITION WITH THE POWER OFF

ES0523 D

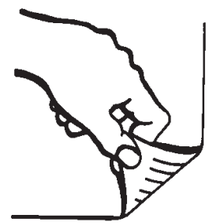
Electrical Schematic • GR and QSW

CE and AUS Models (from serial number GR11-20684 and serial number QS11-1016)



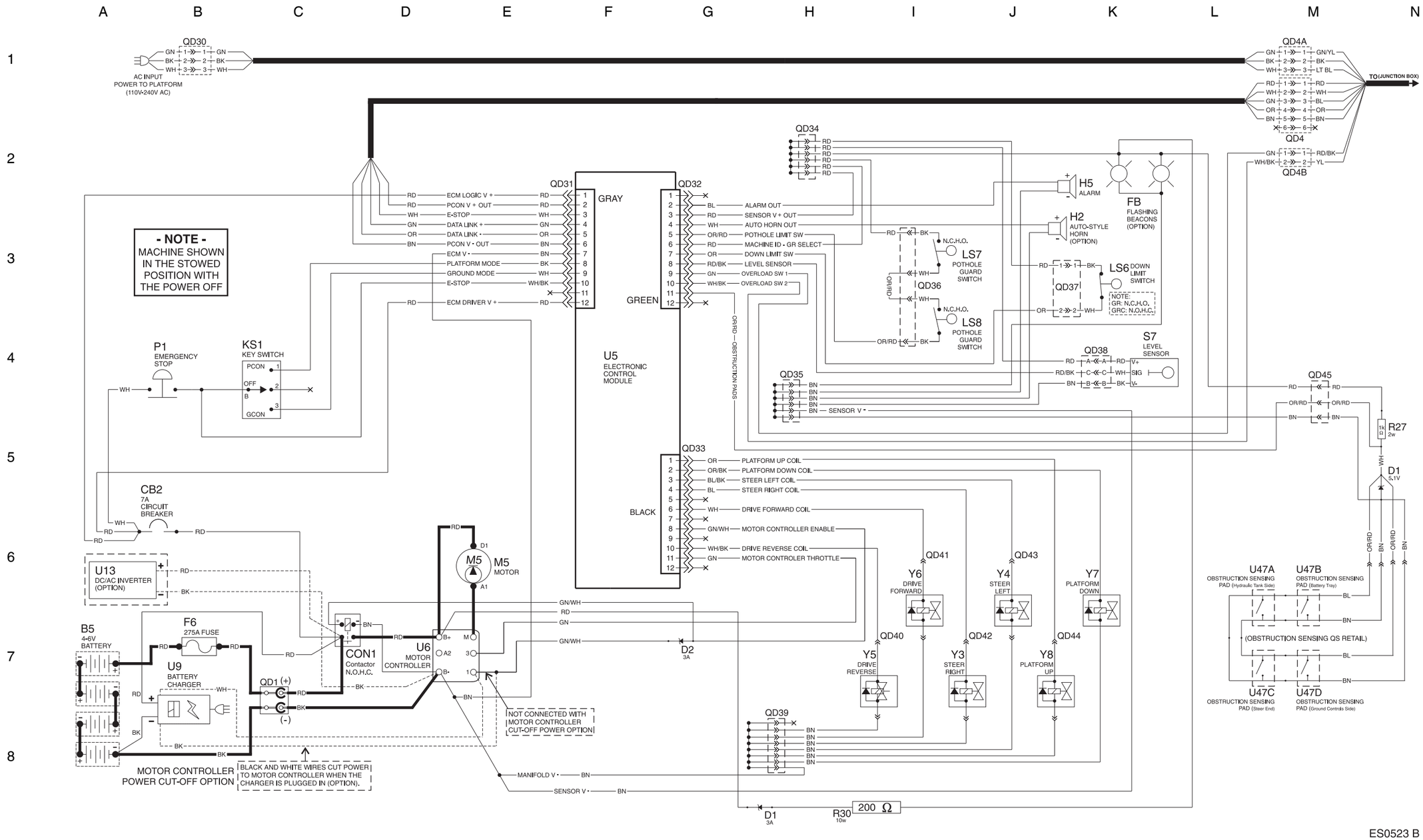
Electrical Schematic • QSR

CE and AUS Models (from serial number QS11-1000 to QS11-1015)



Electrical Schematic • QSR

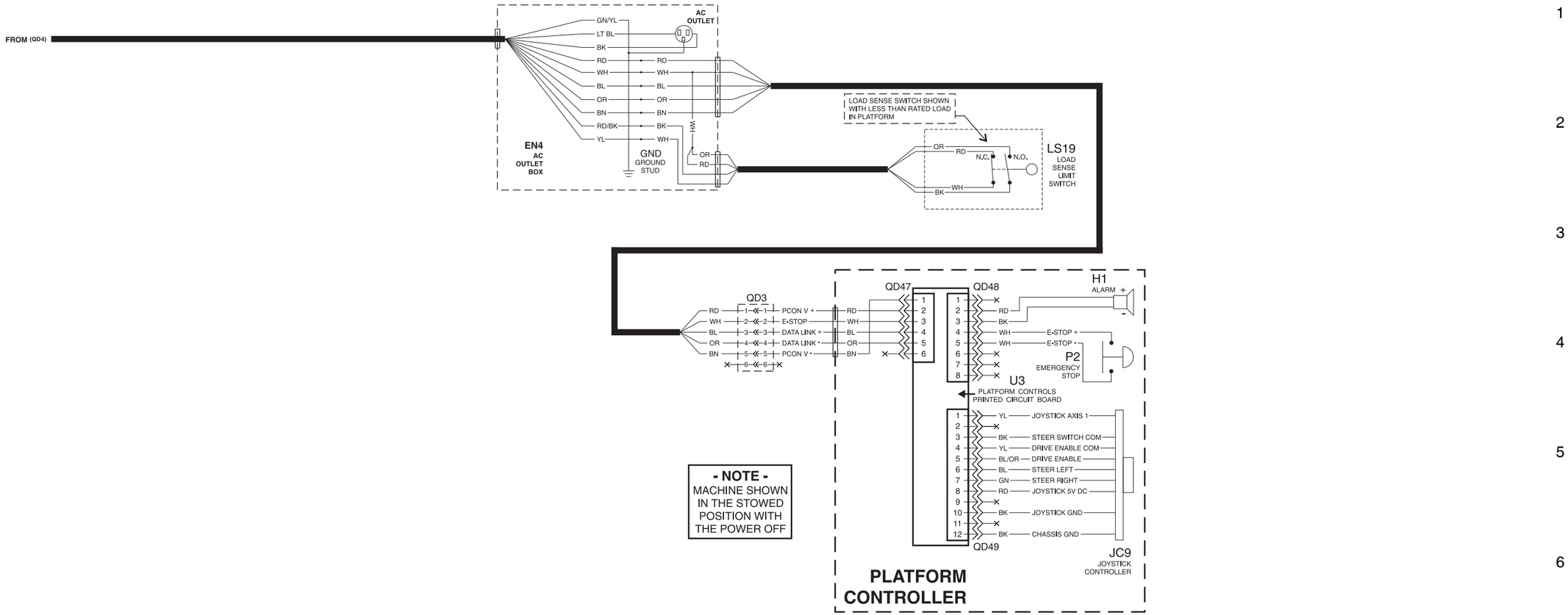
CE and AUS Models (from serial number QS11-1000 to QS11-1015)



ES0523 B

Electrical Schematic • QSR

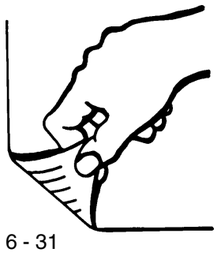
CE and AUS Models (from serial number QS11-1000 to QS11-1015)



ES0523 B

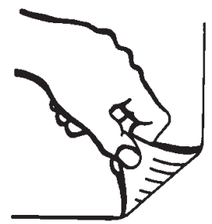
Electrical Schematic • QSR

CE and AUS Models (from serial number QS11-1000 to QS11-1015)



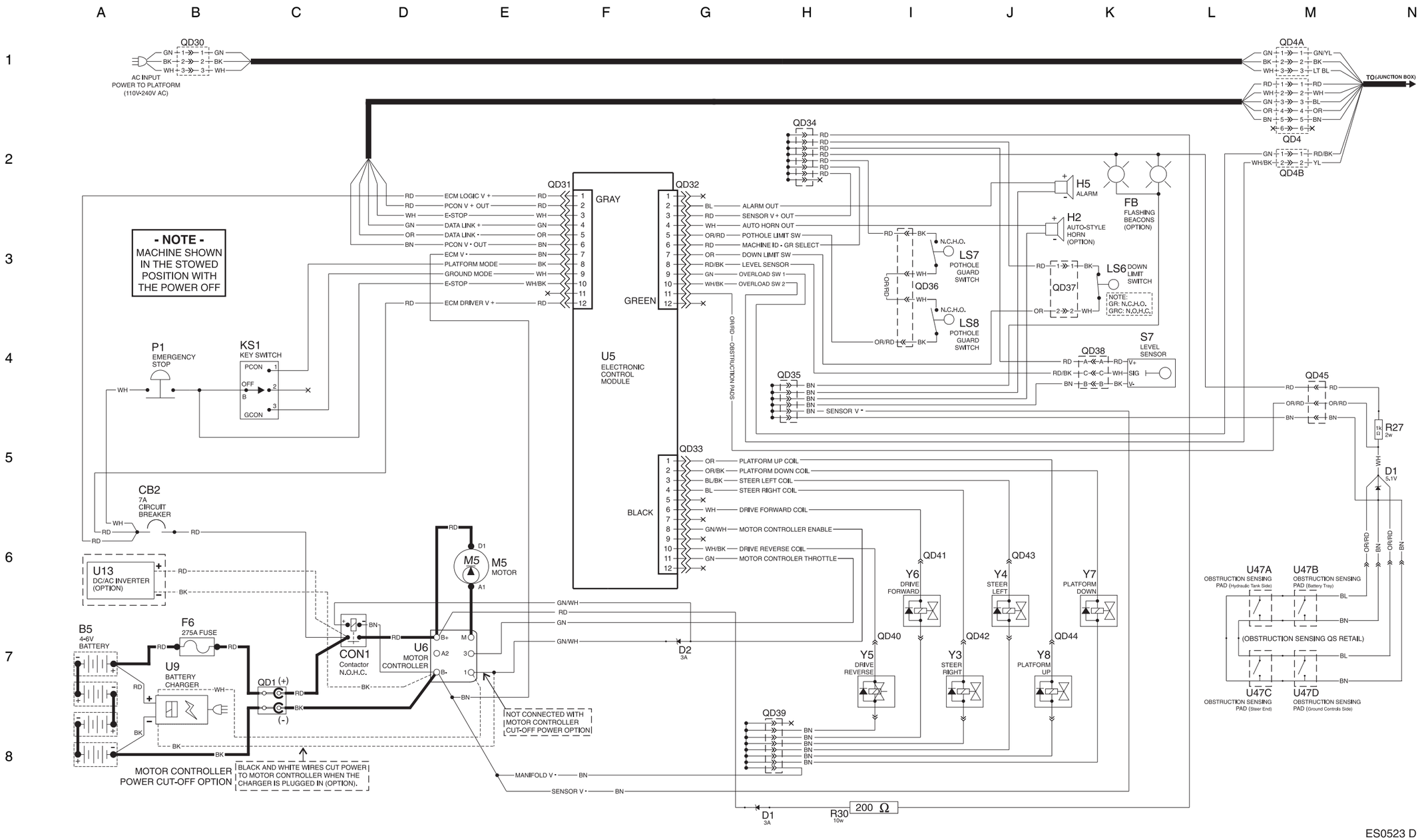
Electrical Schematic • QSR

CE and AUS Models (from serial number QS11-1016)



Electrical Schematic • QSR

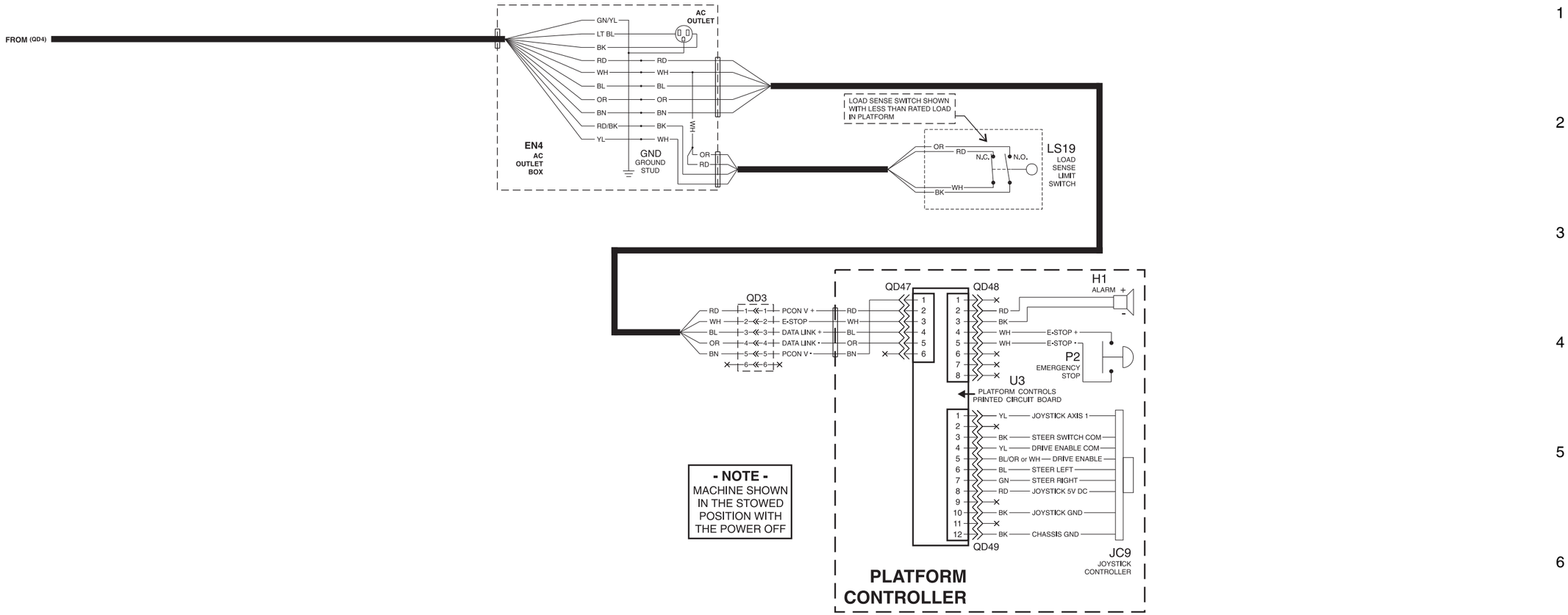
CE and AUS Models (from serial number QS11-1016)



ES0523 D

Electrical Schematic • QSR

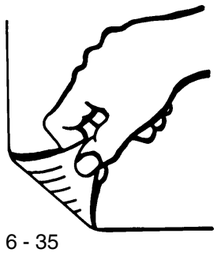
CE and AUS Models (from serial number QS11-1016)



ES0523 D

Electrical Schematic • QSR

CE and AUS Models (from serial number QS11-1016)



Hydraulic Component Reference and Symbols Legend

Orifice

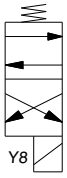
Variable speed motor

Brake

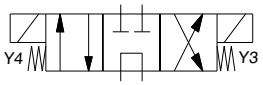
Check valve

Hydraulic cylinder

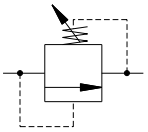
Fixed displacement pump



Solenoid operated 2 position 4 way directional valve

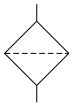


Solenoid operated 3 position 4 way directional valve

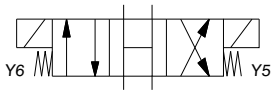


Relief valve

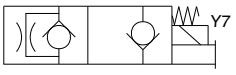
Bi-directional motor



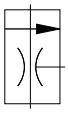
Filter



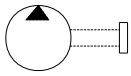
Solenoid operated 3 position 4 way directional valve



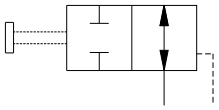
Solenoid operated 2 position 2 way directional valve normally closed with manual override



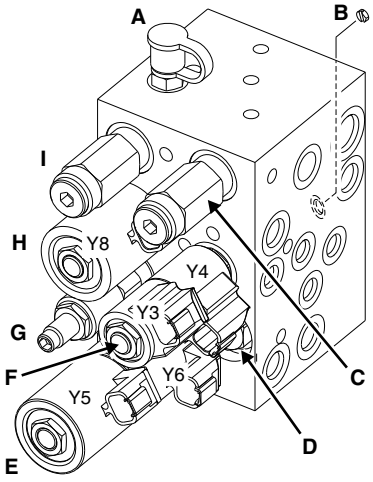
Priority flow regulator



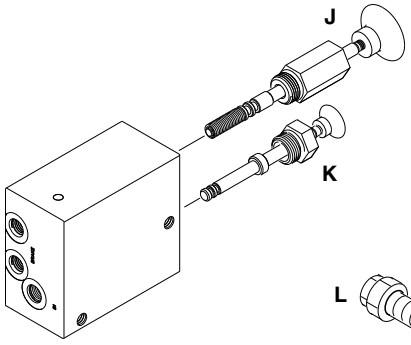
Hand pump



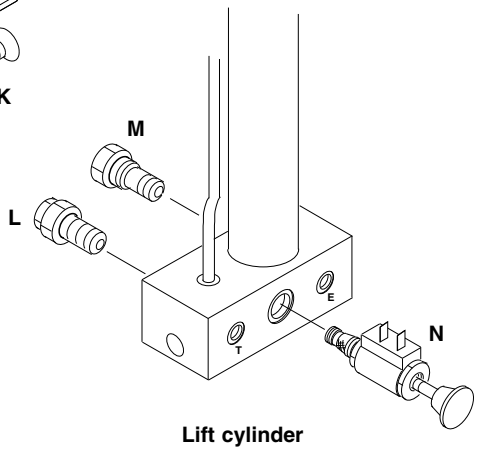
Pilot operated needle valve



Function manifold



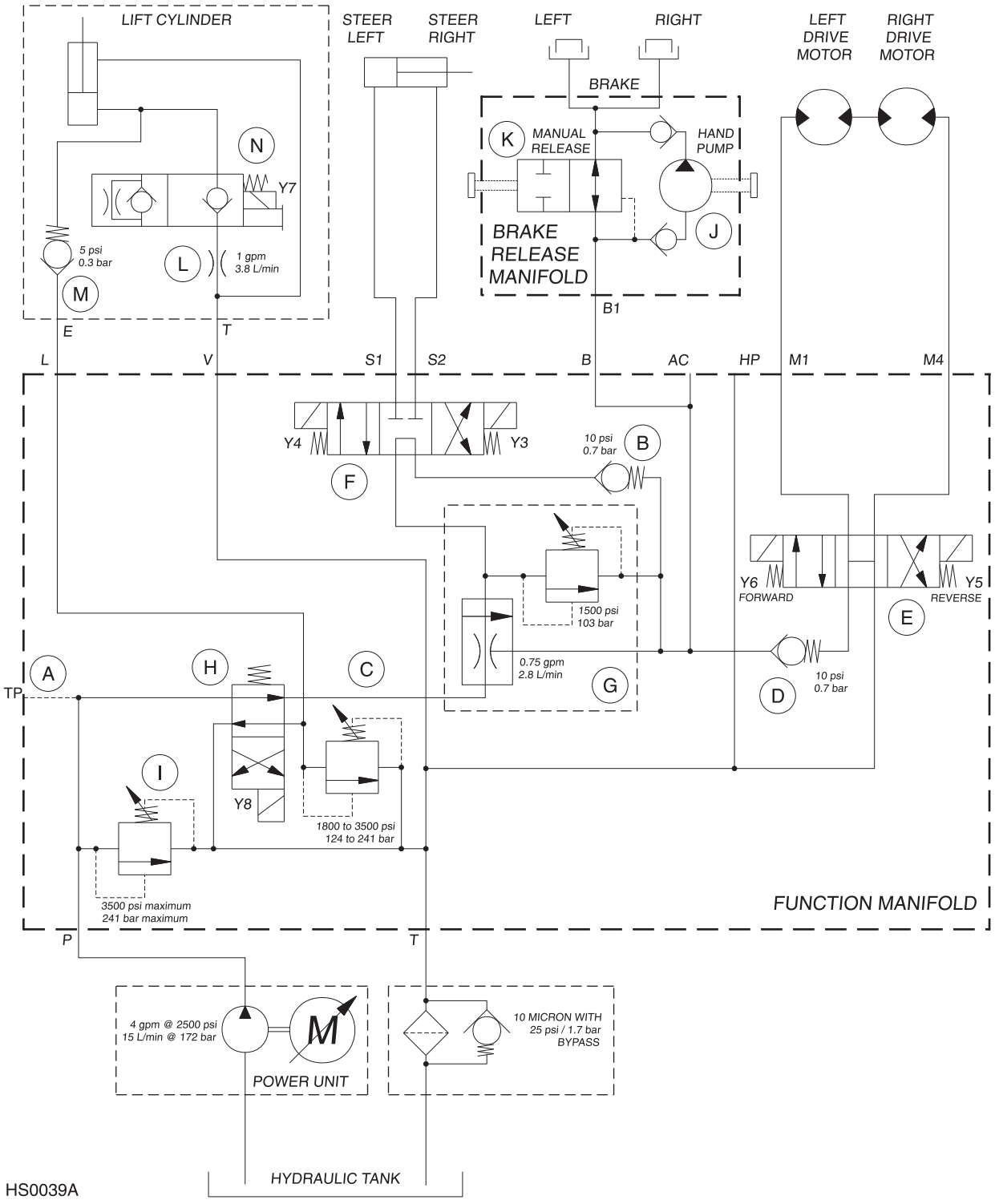
Brake manifold



Lift cylinder

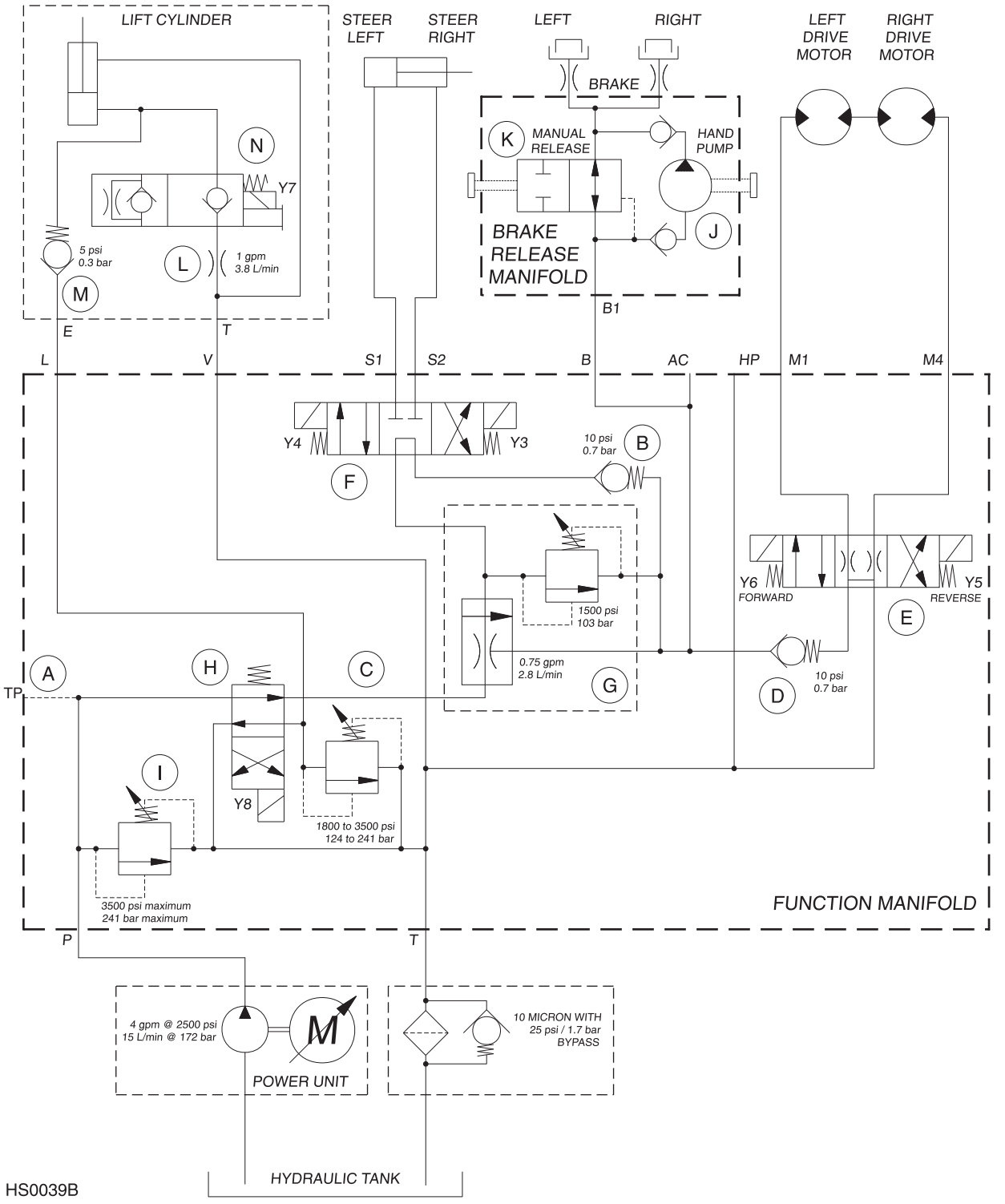
Hydraulic Schematic

(to GR12-24138 and QS12-1063)



HYDRAULIC SCHEMATIC

(from GR12-24139 and QS12-1064)



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