Genie®
A TEREX BRAND

Service Manual

Serial Number Range

Z-40/23N

Z-40/23N RJ

from Z4007-100 to
Z40N13-1901

Part No. 119817
Rev B1
April 2016

Introduction

Important

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

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

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

Compliance

Machine Classification

Group B/Type 3 as defined by ISO 16368

Machine Design Life

Unrestricted with proper operation, inspection and scheduled maintenance.

Technical Publications

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

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

Contact Us:

Internet: www.genielift.com
E-mail: awp.techpub@terex.com

Find a Manual for this Model

Go to http://www.genielift.com

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

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First Edition, Third Printing

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Revision History

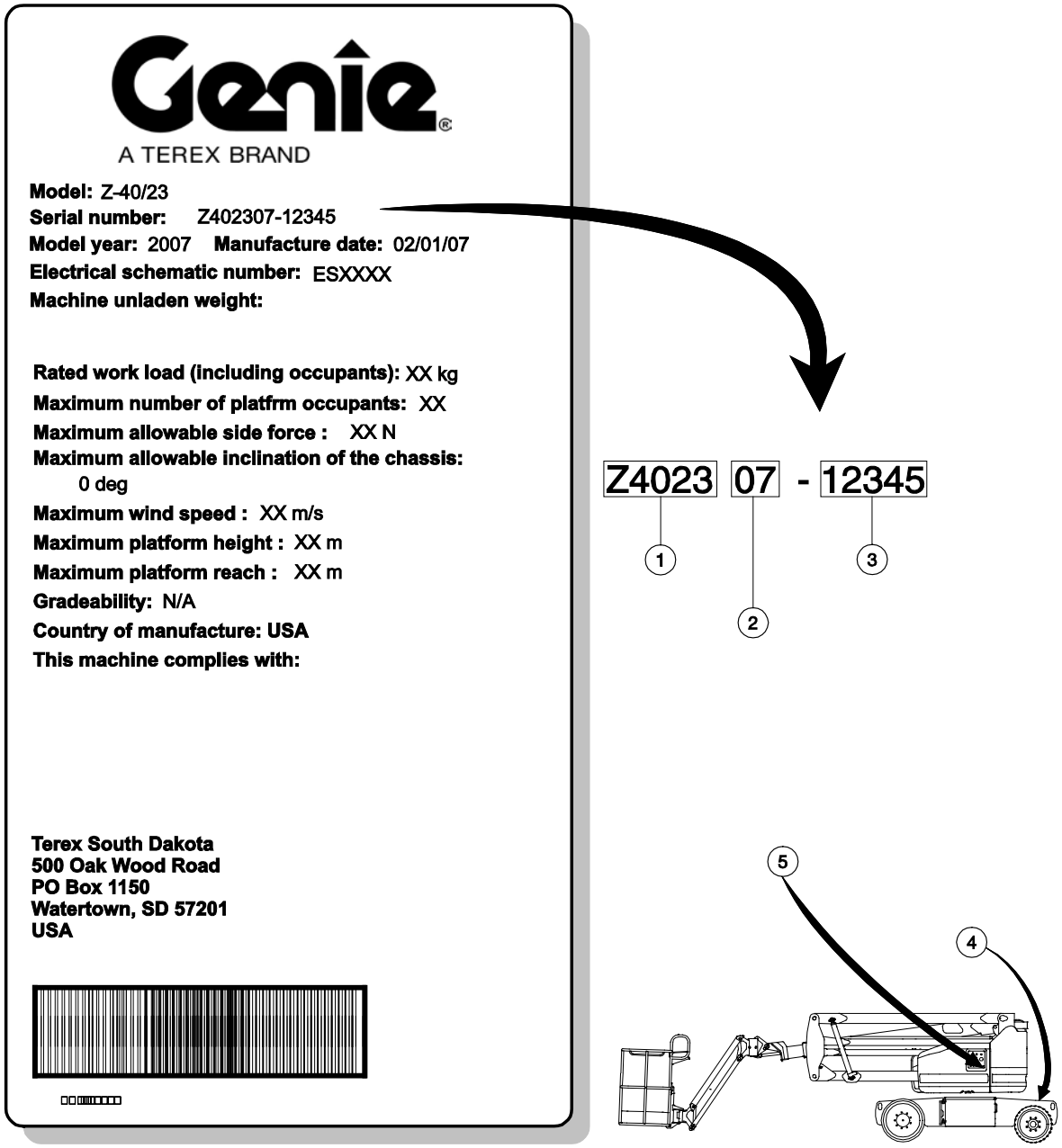
Revision	Date	Section	Procedure / Page / Description
A4	12/2014	Repair Procedures	Added 2-4, Platform Overload Recovery
B	9/2015		Added ending serial break to front cover.
B1	3/2016	Repair Procedures	Updated 1-1, How to Calibrate a Joystick
B1	3/2016	Repair Procedures	Updated 9-1, How to Calibrate the Steer Angle Sensor
B1	3/2016	Fault Codes	Updated Control System Fault Codes Chart
B1	3/2016	Schematics	Updated Chassis Schematic - Beacon option, charger interlock
B1	3/2016	Schematics	Updated Hydraulic Schematic - Orifice size, Secondary Boom circuit.
B1	3/2016	Specifications	Updated Performance Specifications - Boom function speeds
Reference Examples:			
Section – Maintenance, B-3			**Electronic Version** Click on any content or procedure in the Table of Contents to view the update.
Section – Repair Procedure, 4-2			
Section – Fault Codes, All charts			
Section – Schematics, Legends and schematics			

Introduction

Revision History

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

Serial Number Legend



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

Safety Rules



Danger

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

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

Do Not Perform Maintenance Unless:

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

☑ You read, understand and obey:

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

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

Safety Rules

Personal Safety

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



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



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

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

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

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

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



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



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

Workplace Safety

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



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



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



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



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



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



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

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Specifications

Machine Specifications

Tires and wheels	Front	Rear
Tire size	22 x 7 x 17.75 in	25.6 x 7 x 22 in
(solid rubber)	56 x 17.8 x 45 cm	56 x 17.8 x 45 cm
Overall tire diameter	22in	25.6in
	55.9 cm	65 cm
Wheel diameter	18.4 in	22 in
	46.7 cm	56 cm
Wheel width	7 in	7 in
Wheel lugs	8 @ 5/8 - 18	9 @ 5/8 - 18
Lug nut torque		
(lubricated)	94 ft-lbs	94 ft-lbs
	127.5 Nm	127.5 Nm
(dry)	125 ft-lbs	125 ft-lbs
	169.5 Nm	169.5 Nm

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

Fluid capacities	
Hydraulic tank	8 gallons
	30.3 liters
Hydraulic system	10 gallons
(including tank)	37.9 liters
Drive hubs	23 fl oz
	680 cc
Drive hub oil type:	EP 80-90W gear oil
	API service classification GL5

Batteries	
Type	6V DC
Group size	L16GH
Quantity	8
Capacity	350 AH
Reserve capacity @ 25A rate	750 minutes
Weight, each	106 lb 48 kgs

Specifications

Performance Specifications Z-40/23N and Z-40/23N RJ

Drive speed, maximum	
Drive speed, stowed	4.5 mph 7.24 km/h 40 ft / 6.0 sec 12.2 m / 6.0 sec
Drive speed, stowed (CE models)	3.75 mph 6 km/h 40 ft / 7.3 sec 12.2 m / 7.3 sec
Drive speed, boom raised or extended, all models	0.68 mph 1.09 km/h 40 ft/40 sec 12.2 m/40 sec
Braking distance	
On paved surface	5 to 7 ft 1.5 to 2m
Gradeability	See Operator's Manual

Boom function speeds, maximum from platform controls (with rated load secured to platform)	
Jib boom up	16 to 20 seconds
Jib boom down	16 to 20 seconds
Jib boom rotate, 180°, Z40/23N RJ	16 to 20 seconds
Primary boom up	26 to 30 seconds
Primary boom down	26 to 30 seconds
Primary boom extend	18 to 22 seconds
Primary boom retract	18 to 22 seconds
Secondary boom up	32 to 36 seconds
Secondary boom down°	32 to 36 seconds
Turntable rotate, 355°	62 to 68 seconds
Platform rotate, 180°	10 to 14 seconds

Hydraulic Oil Specifications

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

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

NOTICE

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

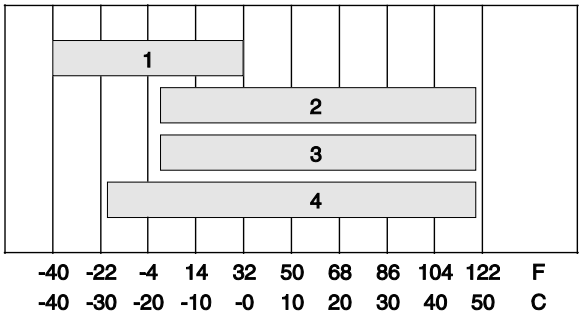
Note: Extended machine operation can cause the hydraulic fluid temperature to increase beyond it's maximum allowable range. If the hydraulic fluid temperature consistently exceeds 200°F / 90°C an optional oil cooler may be required.

NOTICE

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

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

Hydraulic Fluid Temperature Range



Ambient air temperature

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

Specifications

Chevron Rando HD Premium Oil MV Fluid Properties

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

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

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

Chevron 5606A Hydraulic Oil Fluid Properties

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

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

NOTICE

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

Petro-Canada Environ MV 46 Fluid Properties

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

Shell Tellus S4 VX Fluid Properties

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

UCON Hydrolube HP-5046 Fluid Properties

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

Specifications

Hydraulic Component Specifications

Function pump	
Type: Fixed displacement gear pump	
Displacement	0.244 cu in 4 cc
High pressure filter	Beta 3≥200 with 101 psi / 7 bar bypass
Function manifold	
Proportional relief pressure, variable	50 to 3000 psi 3.4 to 207 bar
Primary boom down relief valve pressure	2100 psi 145 bar
Platform level relief valve pressure	2500 psi 172 bar
Platform level flow regulator	1800 psi 124 bar
Turntable rotate relief pressure	0.6 gpm 2.27 L/min
Auxiliary pump	
Type:	Fixed displacement gear pump
Displacement	0.5 gpm 1.9 L/min

Manifold Component Specifications

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

Valve Coil Resistance

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

Valve Coil Resistance Specification

Description	Specification
Solenoid valve, 3 position 4 way, 20V DC (schematic item BG)	24 Ω
Proportional solenoid valve, 3 position 4 way, 20V DC (schematic items AA, AB, AC, BC, BG, BK, BN, BS, and BU)	24 Ω
Proportional solenoid relief valve, 20V DC (schematic item BW)	22 Ω

Specifications

Machine Torque Specifications

Platform rotator	
3/4 -10 center bolt, GR 8 (dry)	380 ft-lbs 515 Nm
3/4 - 10 center bolt, GR 8 (lubricated)	280 ft-lbs 379 Nm
3/8 -16 bolts, GR 8, (dry)	44 ft-lbs 60 Nm
3/8 -16 bolts, GR 8, (lubricated)	33 ft-lbs 45 Nm
Jib boom rotator, Z-40/23N RJ	
1 -8 center bolt, GR 5, (dry)	640 ft-lbs 868 Nm
1 -8 center bolt, GR 5, (dry)	480 ft-lbs 650 Nm
1/2 - 13 bolts, GR 5, (dry)	75 ft-lbs 102 Nm
1/2 - 13 bolts, GR 5, (lubricated)	57 ft-lbs 77Nm
Axles	
5/8 -11 mounting bolt, GR 5 (dry)	150 ft-lbs 203 Nm
5/8 11 mounting bolt, GR 5 (lubricated)	101 ft-lbs 149 Nm
Turntable rotate assembly	
Rotate bearing mounting bolts, lubricated	180 ft-lbs 244 Nm
Rotate bearing motor/brake mounting bolts, lubricated	93 ft-lbs 126 Nm
Drive motor and hubs	
Drive hub mounting bolts, lubricated	180 ft-lbs 244 Nm
Drive motor mounting bolts, lubricated	5 ft-lbs 6.8 Nm

Hydraulic Hose and Fitting Torque Specifications

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

Seal-Lok™ Fittings

(hose end - ORFS)

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

JIC 37° Fittings

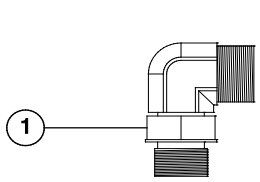
(swivel nut or hose connection)

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

SAE O-ring Boss Port

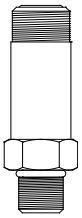
(tube fitting - installed into Aluminum)
(all types)

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



Adjustable Fitting

1 jam nut



Non-adjustable fitting

SAE O-ring Boss Port

(tube fitting - installed into Steel)

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

Specifications

Torque Procedure

Seal-Lok™ fittings

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

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

2 Lubricate the O-ring before installation.

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

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

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

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

JIC 37° fittings

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

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

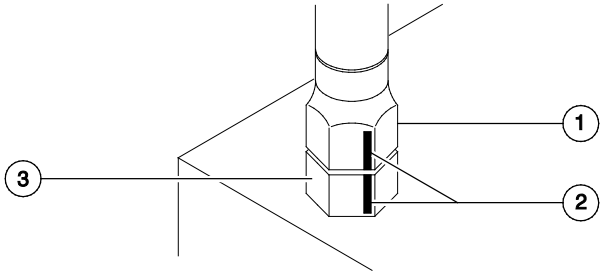


Illustration 1

1 hex nut
2 reference mark
3 body hex fitting

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

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

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

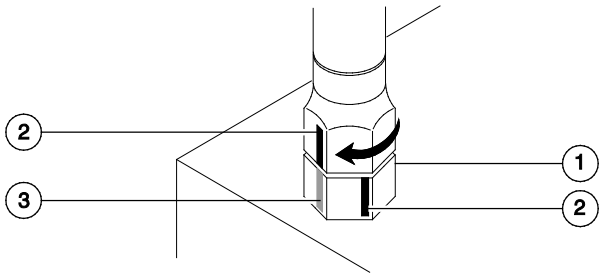


Illustration 2

1 body hex fitting
2 reference mark
3 second mark

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

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

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	Class 4.6				Class 8.8				Class 10.9				Class 12.9			
(mm)	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

Scheduled Maintenance Procedures



Observe and Obey:

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

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

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

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

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

☑ Use only Genie approved replacement parts.

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

Machine Configuration:

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

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

Scheduled Maintenance Procedures

About This Section

This section contains detailed procedures for each scheduled maintenance inspection.

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

Symbols Legend



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

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

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

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

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

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

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

Maintenance Symbols Legend

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



Indicates that tools will be required to perform this procedure.



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



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



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

Scheduled Maintenance Procedures

Pre-delivery Preparation Report

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

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

Maintenance Schedule

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

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

Maintenance Inspection Report

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

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

Pre-Delivery Preparation Report

Fundamentals

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

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

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

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

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

Instructions

Use the operator's manual on your machine.

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

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

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

Legend

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

Comments

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

Genie
A TEREX BRAND

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(605) 882-4000

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

Model

Serial number

Date

Machine owner

Inspected by (print)

Inspector signature

Inspector title

Inspector company

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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(s) to perform.

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

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

Legend

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

Checklist A		**Y**	**N**	**R**
A-1	Inspect the manuals and decals			
A-2	Pre-operation inspection			
A-3	Function tests			
Perform after 40 hours:				
A-4	30-day service			
Perform every 100 hours:				
A-5	Grease rotation bearing			

Checklist B		**Y**	**N**	**R**
B-1	Battery			
B-2	Electrical wiring			
B-3	Tires and wheels			
B-4	Drive hub bolts			
B-5	Drive hub oil			
B-6	Ground control override			
B-7	Platform leveling			
B-8	Drive brakes			
B-9	Drive speed - stowed			
B-10	Drive speed - raised			
B-11	Alarm package			
B-12	Electrical contactors			
B-13	Hydraulic oil analysis			
B-14	Test the Emergency Power System			

Checklist C		**Y**	**N**	**R**
C-1	Grease platform overload (if equipped)			
C-2	Test platform overload (if equipped)			

Checklist D		**Y**	**N**	**R**
D-1	Boom wear pads			
D-2	Turntable bearing bolts			
D-3	Axle mounting bolts			
D-4	Platform rotation bolts			
D-5	Free-wheel configuration			
D-6	Drive hub oil			
D-7	Hydraulic filters			
D-8	Turntable bearing wear			

Checklist E		**Y**	**N**	**R**
E-1	Hydraulic oil			
E-2	Wheel bearings			

Comments

A-1
Inspect the Manuals and Decals

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

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

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

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

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

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

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

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

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

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

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

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

Checklist A Procedures

A-2
Perform Pre-operation Inspection

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

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

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

A-3
Perform Function Tests

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

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

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

Checklist A Procedures

A-4
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:

All Models:

- B-3 Inspect the Tires, Wheels and Lug Nut Torque
- B-4 Check the Drive Hub Mounting Bolts
- D-2 Check the Turntable Rotation Bearing Bolts
- D-3 Check the Axle Mounting Bolts
- D-4 Check the Platform Rotation Mounting Bolts
- D-7 Replace the Hydraulic Filters

A-5
Grease the Turntable Rotation Bearing and Worm Drive Gear



Genie specifications require that this procedure be performed every 100 hours of operation. Perform this procedure more often if dusty conditions exist.

Frequent application of lubrication to the turntable bearing and rotate gear is essential to good machine performance and service life. Continued use of an improperly greased bearing and gear will result in component damage.

1 Open the ground controls side turntable cover.

2 Locate the grease fitting for the turntable rotate bearing.

3 Pump grease into the turntable rotation bearing. Rotate the turntable in increments of 4 to 5 inches / 10 to 13 cm at a time and repeat this step until the entire bearing has been greased.

4 Apply grease to each tooth of the drive gear, located under the turntable.

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

Checklist B Procedures

B-1
Inspect the Battery



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

Proper battery condition is essential to good engine and machine performance and operational safety. Improper fluid levels or damaged cables and connections can result in engine and 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 Disconnect each battery pack from the machine.

2 Release the battery pack latch and rotate the battery pack out and away from the chassis.

3 Remove the cover from each battery box.

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.

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

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

7 Put on protective clothing and eye wear.

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

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

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

⊙ Result: All battery cells display an adjusted specific gravity of 1.277 or higher. The battery is fully charged. Proceed to step 13.

☒ Result: One or more battery cells display a specific gravity of 1.217 or below. Proceed to step 10.

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

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

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

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

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

⊙ Result: All battery cells display a specific gravity of 1.277 or greater. The battery is fully charged. Proceed to step 13.

⊠ Result: The difference in specific gravity readings between cells is greater than 0.1 OR the specific gravity of one or more cells is less than 1.217. Replace the battery.

13 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.

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

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 electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

1 Open both turntable covers.

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

- Hydraulic power unit
- High pressure filter
- Inside of the ground control box
- Turntable manifold wiring

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

- All wire harness connectors to the ground control box.
- All wire harness connectors to the turntable control module (TCON) (located under the ground control box).

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

Checklist B Procedures

4 Remove the drive chassis cover from the nonsteer end of the machine.

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

- Drive motors
- Motor controllers
- Electrical contactor

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

- Motor controller wire harness connectors

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

7 Remove the drive chassis cover from the steer end of the machine.

8 Remove the cover from the fuse box located above the steer axle.

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

- Fuses
- Steer sensor and harness

10 Install the fuse box cover and both drive chassis covers.

11 Raise the secondary boom until the mid-pivot is approximately 10 feet / 3 m off the ground.

12 Remove the center turntable cover.

13 Inspect the following areas for burnt, chafed and pinched cables:

- Turntable area
- Auxiliary power unit

14 Install the center turntable cover.

15 Lower the boom to the stowed position and turn the machine off.

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

- Cable track on the primary, jib and secondary booms
- Jib boom to platform cable harness
- Inside of the platform control box

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

- All wire harness connectors to the platform control box
- All wire harness connectors to the platform control module (PCON) (located inside of the platform control box)

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

B-3
Inspect the Tires, Wheels and Lug Nut Torque

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

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

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

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

Note: The tires on some machines are foam-filled and do not need air added to them.

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

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

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

4 Check the pressure in each air-filled tire.

B-4
Check the Drive Hub Mounting Bolts

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

Maintaining proper torque of the drive hub mounting bolts is essential to safe machine operation. Improper bolt torque could result in an unsafe operating condition and component damage.

1 Remove the axle covers from the non-steer axle.

2 Check the torque of the drive hub bolts. Refer to Specifications*, Machine Specifications.*

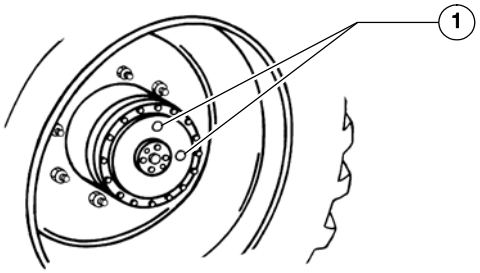
Checklist B Procedures

B-5
Check the Drive Hub Oil Level and Fastener Torque

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

Failure to maintain proper drive hub oil levels may cause the machine to perform poorly and continued use may cause component damage.

1 Drive the machine to rotate the hub until the plugs are located one on top and the other at 90 degrees.



1 drive hub plugs

2 Remove the plug located at 90 degrees and check the oil level.

⊙ Result: The oil level should be even with the bottom of the plug hole.

3 If necessary, remove the top plug and add oil until the oil level is even with the bottom of the side plug hole.

4 Install the plug(s) into the drive hub.

5 Check the torque of the drive hub mounting bolts. Refer to Specifications, *Machine Specifications*.

6 Repeat this procedure for each drive hub.

B-6
Test the Ground Control Override

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

A properly functioning ground control override is essential to safe machine operation. The ground control override function is intended to allow ground personnel to operate the machine from the ground controls whether or not the Emergency Stop button on the platform controls is in the on or off position. This function is particularly useful if the operator at the platform controls cannot return the boom to the stowed position.

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

2 Turn the key switch to ground controls and pull out the red Emergency Stop button to the 'ON' position.

3 Operate each boom function through a partial cycle at the ground controls.

⊙ Result: All boom functions should operate.

B-7
Test the Platform Self-leveling



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

Automatic platform self-leveling throughout the full cycle of boom raising and lowering is essential for safe machine operation. The platform is maintained level by the platform leveling slave cylinder which is controlled by the platform leveling master cylinder located at the base of the primary boom. A platform self-leveling failure creates an unsafe working condition for platform and ground personnel.

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

2 Lower the boom to the stowed position.

3 Hold the function enable toggle switch to either side and adjust the platform to a level position using the platform level toggle switch.

4 Raise and lower the primary boom through a full cycle.

⊙ Result: The platform should remain level at all times to within ±5 degrees.

Checklist B Procedures

B-8
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 they are actually not fully operational.

⚠WARNING Collision hazard. Be sure that the machine is not in free-wheel or partial free-wheel configuration. Refer to maintenance procedure, *Confirm the Proper Brake Configuration*.

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

1 Mark a test line on the ground for reference.

2 Lower the boom to the stowed position.

3 Turn the key switch to platform controls.

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 Bring the machine to top drive speed before reaching the test line. Release the drive joystick when your reference point on the machine crosses the test line.

6 Measure the distance between the test line and your machine reference point. Refer to Specifications, *Performance Specifications*.

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

B-9
Test the Drive Speed – Stowed Position

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

Proper drive function is 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: Select a test area that is firm, level and 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 boom 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 start and finish lines.

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

6 Continue at full speed and note the time when the machine reference point crosses the finish line. Refer to Specifications, *Performance Specifications*.

B-10
Test the Drive Speed – Raised or Extended Position



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

Proper drive function is 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: Select a test area that is firm, level and free of obstructions.

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

2 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.

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

4 Continue at full speed and note the time when the machine reference point crosses the finish line. Refer to Specifications, *Performance Specifications*.

5 Lower the boom to the stowed position and extend the boom 1 foot / 30 cm.

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

8 Continue at full speed and note the time when the machine reference point crosses the finish line. Refer to Specifications, *Performance Specifications*.

Checklist B Procedures

B-11
Test the Alarm Package (if equipped)

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

The alarm package includes:

- Travel alarm
- Descent alarm
- Flashing beacon

Alarms and a beacon are installed to alert operators and ground personnel of machine proximity and motion. The alarm package is installed on the turntable covers.

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 flashing beacon should be on and flashing.

2 Turn the key switch to platform control.

⊙ Result: The flashing beacon should be on and flashing.

3 Press down the foot switch. Move the drive control handle off center, hold for a moment and then release it. Move the drive control handle off center in the opposite direction, hold for a moment and then release it.

⊙ Result: The travel alarm should sound when the drive control handle is moved off center in either direction.

B-12
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 performance. Failure to locate a worn or damaged contactor could result in unsafe operating conditions and may cause component damage.

1 Remove the drive chassis cover from the non-steer end of the machine and locate the electrical contactor mounted to the inside of the non-steer axle.

2 Locate the electrical contactor mounted on the fuse bracket.

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

- Excessive burns
- Excessive arcs
- Excessive pitting

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

Note: Replace the contactor if any damage is found.

B-13 Perform Hydraulic Oil Analysis



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

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

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

B-14 Test the Emergency Power System



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

Testing the emergency power system regularly is essential to safe machine operation if the primary power source fails.

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 At the ground controls, break the security tie and lift the emergency power switch cover (if equipped).

3 Simultaneously hold the emergency power switch on and activate each boom function toggle switch.

Note: To conserve battery power, test each function through a partial cycle.

⊙ Result: All boom functions operate.

4 Close the emergency power switch cover and secure the cover with a security tie (if equipped).

Checklist B Procedures

5 Turn the key switch to platform controls.

6 At the platform controls, break the security tie and lift the emergency power switch cover (if equipped).

7 Press down on the foot switch and simultaneously hold the emergency power switch on and activate each boom function.

Note: To conserve battery power, test each function through a partial cycle.

⊙ Result: All boom functions operate.

8 Close the emergency power switch cover and secure the cover with a security tie (if equipped).

Checklist C Procedures

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



Genie specifications require that this procedure be performed every 500 hours or six 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.

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

C-2
Test the Platform Overload System (if equipped)



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.

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.

The platform overload system is designed to detect an overloaded platform and prevent machine operation anytime the machine is turned on. When activated, the system halts all normal boom operation, giving visual and audible warning to the operator.

Models equipped with the platform overload option are provided with additional machine components: an adjustable spring-loaded platform support subassembly, a limit switch, an electronic module which receives the overload signal and interrupts power, and an audio/visual warning indication to alert the operator of the overload.

Checklist C Procedures

The platform support subassembly utilizes two load support arms that are opposed in a full parallelogram link. This isolates platform loads into a shear or vertical state, which translates into a compressive load. A spring in the parallelogram link supports this purely compressive load regardless of where the load is placed in the platform.

As weight is added to the platform, the spring will compress until, when the platform is overloaded, the lower arm contacts a limit switch and thereby activating the overload signal. When adjusted correctly, the platform overload system will deactivate normal boom operation at platform capacity.

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

1 Turn the key switch to platform control. Start the engine and level the platform.

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

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

Note: Failure to remove all weight, tools and accessories from the platform will result in an inaccurate test.

4 Using a suitable lifting device, place a test weight equal to that of the available capacity in one of the locations shown. Refer to Illustration 1.

⊙ Result: The platform overload indicator lights should be off at both the ground and platform controls and the alarm should not sound.

⊠ Result: The platform overload indicator lights are on and the alarm is sounding. Calibrate the platform overload system. Refer to Repair Procedure, *How to Calibrate the Platform Overload System (if equipped)*.

5 Carefully move the test weights to each remaining location on the platform. Refer to Illustration 1.

⊙ Result: The platform overload indicator lights should be off at both the ground and platform controls and the alarm should not sound.

⊠ Result: The platform overload indicator lights are on and the alarm is sounding. Calibrate the platform overload system. Refer to Repair Procedure, *How to Calibrate the Platform Overload System (if equipped)*.

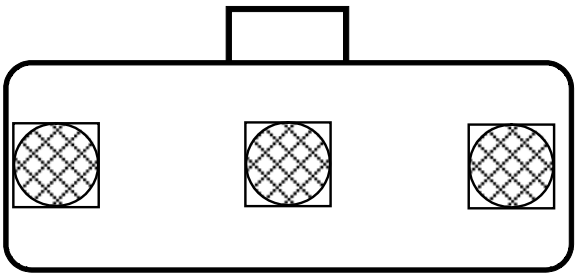


Illustration 1

6 Using a suitable lifting device, place an additional 10 lbs / 23 kg of weight onto the platform.

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

⊠ Result: The alarm does not sound and the platform overload indicator lights are not flashing. Calibrate the platform overload system. Refer to Repair Procedure, *How to Calibrate the Platform Overload System* (if equipped).

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

7 Carefully move the test weights to each remaining location on the platform. Refer to Illustration 1.

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

☒ Result: The alarm does not sound and the platform overload indicator lights are not flashing. Calibrate the platform overload system. Refer to Repair Procedure, *How to Calibrate the Platform Overload System* (if equipped).

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

8 Test all machine functions from the platform controls.

⊙ Result: All platform control functions should not operate.

9 Turn the key switch to ground control.

10 Test all machine functions from the ground controls.

⊙ Result: All ground control functions should not operate.

11 Using auxiliary power, test all machine functions from the ground controls.

⊙ Result: All ground control functions should operate normally.

Note: OVERLOAD RECOVERY will be displayed at the platform control box LCD display.

12 Using a suitable lifting device, remove all test weights from the platform.

⊙ Result: The alarm does not sound and the platform overload indicator lights are not flashing.

13 Test all machine functions from the ground controls.

⊙ Result: All ground control functions should operate normally.

14 Turn the key switch to platform control.

15 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 2-3, *How to Calibrate the Platform Overload System (if equipped).*

16 Using a suitable lifting device, remove the remaining test weights from the platform.

Checklist D Procedures

D-1
Check the Boom Wear Pads



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

Maintaining the boom wear pads in good condition is essential to safe machine operation. Wear pads are placed on boom tube surfaces to provide a low friction, replaceable wear pad between moving parts. Improperly shimmed wear pads or continued use of extremely worn wear pads may result in component damage and unsafe operating conditions.

1 Measure each wear pad. Replace the wear pad once it reaches the minimum allowable thickness. If the wear pad is still within specification, shim as necessary to obtain minimum clearance with zero binding.

2 Extend and retract the boom through the entire range of motion to check for tight spots that may cause binding or scraping of the boom.

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

Primary boom wear pad specifications	Minimum
Top and side wear pads (platform end of boom)	5/8 inch 15.9 mm
Bottom wear pad (platform end of boom)	3/8 inch 9.5 mm
Top bottom and side wear pads (pivot end of boom)	3/8 inch 9.5 mm

D-2
Check the Turntable Rotation Bearing Bolts



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

Maintaining proper torque on the turntable bearing bolts is essential to safe machine operation. Improper bolt torque could result in an unsafe operating condition and component damage

1 Raise the secondary boom and place a safety chock on the lift cylinder rods. Carefully lower the boom onto the lift cylinder safety chock.

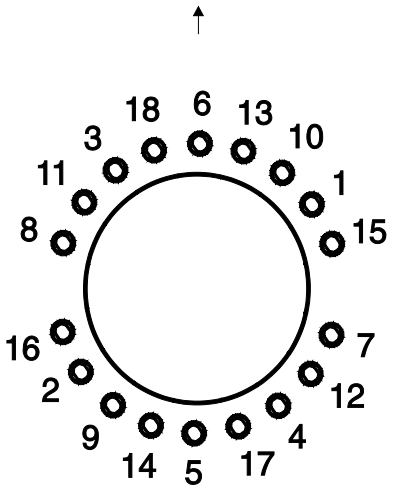
⚠WARNING Crushing hazard. Keep hands away from the cylinder and all moving parts when lowering the boom.

Note: The lift cylinder safety chock is available through Genie Parts Department. (Genie part number 33484).

2 Remove the center turntable cover fasteners. Remove the cover from the machine.

Checklist D Procedures

3 Confirm that each turntable mounting bolt is torqued in sequence to specification. Refer to Specifications, *Machine Torque Specifications.*



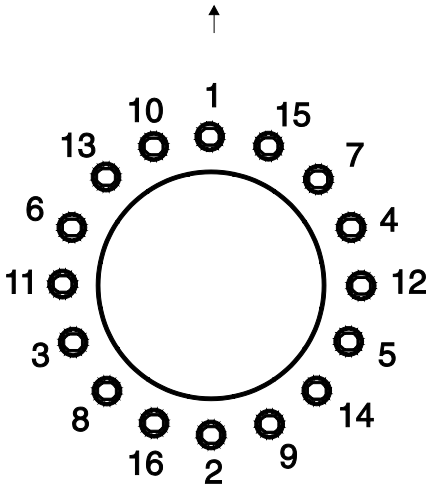
Bolt torque sequence

4 Install the center turntable cover.

5 Remove the lift cylinder safety chock and lower the boom to the stowed position.

6 Remove the drive chassis covers from both ends of the machine.

7 Check to be sure that each bearing mounting bolt under the drive chassis is torqued in sequence to specification. Refer to Specifications, *Machine Torque Specifications.*



Bolt torque sequence

Checklist D Procedures

D-3
Check the Axle Mounting Bolts



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

Maintaining proper torque of the steer axle mounting bolts is essential to safe machine operation. Improper bolt torque could result in an unsafe operating condition and component damage.

1 Remove the drive chassis covers from both ends of the drive chassis.

2 Locate the eight axle mounting bolts on each axle. Torque the bolts to specification. Refer to Specifications, *Machine Torque Specifications.*

D-4
Check the Platform Rotation Mounting Bolts



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

Maintaining proper torque of the platform rotation mounting bolts and jib boom rotation mounting bolts (Z-40/23N RJ) is essential to safe machine operation. Improper bolt torque could result in an unsafe operating condition and component damage.

1 Check the torque of the fasteners at the platform rotator. Refer to Specifications, *Machine T*orque Specifications.

2 **Z-40/23N RJ:** Check the torque of the fasteners at the jib boom rotator. Refer to Specifications, *Machine T*orque Specifications.

D-5
Check the Free-wheel Configuration

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

Proper use of the free-wheel configuration is essential to safe machine operation. The free-wheel configuration is used primarily for towing. A machine configured to free-wheel without operator knowledge could result in death or serious injury and property damage.

⚠WARNING Collision hazard. Select a work site that is firm and level.

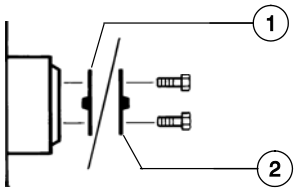
NOTICE Component damage hazard. If the machine must be towed, do not exceed 2 mph / 3.2 km/h.

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

2 Center a lifting jack of ample capacity (20,000 lbs / 10,000 kg) under the drive chassis between the non-steer tires.

3 Lift the wheels off the ground and place jack stands under the drive chassis for support.

4 Disengage the drive hubs by turning over the drive hub disconnect caps on each non-steer wheel hub.



1 Hub Disengaged Position
2 Hub Engaged Position

5 Manually rotate each non-steer wheel.

⊙ Result: Each non-steer wheel should rotate with minimum effort.

6 Re-engage the drive hubs by turning over the hub disconnect caps. Rotate each wheel to check for engagement. Lift the machine and remove the jack stands.

⚠WARNING Collision hazard. Failure to re-engage the drive hubs could result in death or serious injury and property damage.

Checklist D Procedures

D-6
Replace the Drive Hub Oil

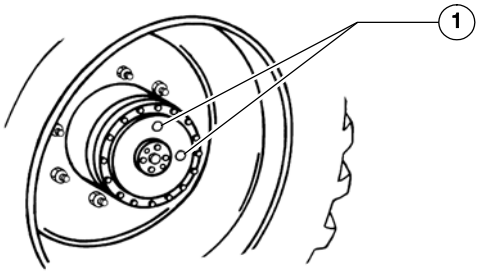
Genie specifications require that this procedure be performed every 1000 hours or annually, whichever comes first.

Replacing the drive hub oil is essential for good machine performance and service life. Failure to replace the drive hub oil at yearly intervals may cause the machine to perform poorly and continued use may result in component damage

1 Select the drive hub to be serviced. Drive the machine until one of the two plugs is at the lowest point.

2 Remove both plugs and drain the oil.

3 Drive the machine to rotate the hub until one of the plugs is located on top and the other one is at 90 degrees.



1 Plugs

4 Fill the hub with oil from the top hole until the oil level is even with the bottom of the side plug hole. Refer to Specifications*, Machine Specifications.*

5 Install the plugs into the drive hub.

6 Repeat steps 1 through 5 for the other drive hub.

D-7
Replace the High Pressure Hydraulic Filter Element

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

Replacement of the high pressure hydraulic 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 filters be replaced more often.

The high pressure hydraulic filter is equipped with a sensor that will detect a clogged filter. If the filter becomes clogged, a warning or fault message will be shown on the LCD display screen at the platform controls. The sensor and its accompanying fault should not be used as an indication of when to perform machine maintenance.

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

1 Open the power unit side turntable cover and locate the high pressure hydraulic filter above the power unit.

2 Place a suitable container under the hydraulic filter.

3 Remove the filter housing by using a wrench on the nut provided on the bottom of the housing.

4 Remove the filter element from the housing.

5 Inspect the housing seal and replace it if necessary.

6 Install the new filter element into the housing and tighten securely.

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

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

9 Activate any boom function and inspect the filter and related components to be sure that there are no leaks.

10 Use a permanent ink marker to write the date and number of hours from the hour meter on the oil filter.

D-8
Inspect for Turntable Bearing Wear




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

Periodic inspection of turntable bearing wear is essential to safe machine operation, good machine performance and service life. Continued use of a worn turntable bearing could create an unsafe operating condition, resulting in death or serious injury and component damage.

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

1 Grease the turntable bearing. Refer to Maintenance Procedure, *Grease the Turntable Bearing and Rotate Gear*.

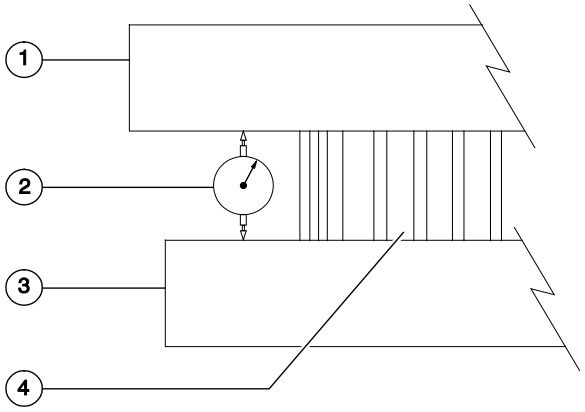
2 Torque the turntable bearing bolts to specification. Refer to Maintenance Procedure, *Check the Turntable Rotation Bearing Bolts*.

3 Start the machine from the ground controls and raise the primary and secondary booms to full height. Do not extend the primary boom.

Checklist D Procedures

4 Place a dial indicator between the drive chassis and the turntable at a point that is directly under, or inline with, the boom and no more than 1 inch / 2.5 cm from the bearing.

Note: To obtain an accurate measurement, place the dial indicator no more than 1 inch / 2.5 cm from the turntable rotation bearing.



1 turntable
2 dial indicator
3 drive chassis
4 turntable rotation bearing

5 Adjust the dial indicator needle to the "zero" position.

6 Lower the secondary boom to the stowed position and lower the primary boom to a horizontal position. Fully extend the primary boom.

7 Note the reading on the dial indicator.

⊙ Result: The measurement is less than 0.055 inch / 1.4 mm. The bearing is good.

⊠ Result: The measurement is more than 0.055 inch / 1.4 mm. The bearing is worn and needs to be replaced.

8 Fully retract the primary boom. Raise the primary and secondary booms to full height. Visually inspect the dial indicator to be sure the needle returns to the "zero" position.

9 Remove the dial indicator and rotate the turntable 90°.

10 Repeat steps 4 through 9 until the rotation bearing has been checked in at least four equally spaced areas 90° apart.

11 Lower the primary and secondary booms to the stowed position and turn the machine off.

12 Remove the dial indicator from the machine.

Checklist E Procedures

E-1
Test or Replace the Hydraulic Oil



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

Perform this procedure more often if dusty conditions exist.

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

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

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

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

1 Close the two hydraulic tank shut-off valves at the hydraulic tank.

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

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

3 Tag, disconnect and plug the two suction hoses from the hydraulic tank.

4 Tag, disconnect and plug the two supply hoses for the auxiliary power units. Cap the fittings on the hydraulic tank.

5 Tag, disconnect and plug the hydraulic hose from the drive motor case drain filter at the hydraulic tank. Cap the fitting on the hydraulic tank.

6 Tag, disconnect and plug the hydraulic hose at the return filter. Cap the fitting on the return filter housing.

Checklist E Procedures

7 Remove the turntable cover using a suitable lifting device.

⚠WARNING Crushing hazard. The turntable cover may become unbalanced and fall if not properly supported and secured to a suitable lifting device.

8 Remove the ground control box mounting fasteners. Move the ground control box out of the way.

9 Remove the cover from the auxiliary power unit batteries.

10 Tag and disconnect the cables from the auxiliary power unit batteries.

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

11 Tag and disconnect the cables from the engine starting battery located on the engine side of 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.

12 Attach an overhead crane or similar lifting device to the battery box for the auxiliary power unit batteries.

13 Remove the battery box retaining fasteners and carefully remove the battery box from the machine.

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

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

14 Remove the hydraulic tank retaining fasteners.

15 Support the hydraulic tank with 2 lifting straps. Place one lifting strap at each end of the tank and attach the lifting straps to an appropriate lifting device.

16 Remove the hydraulic tank from the machine.

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

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

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

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

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

21 Install the hydraulic tank onto the machine.

22 Install the ground control box and mounting fasteners.

23 Install the two suction hoses, return filter hose, drive motor case drain filter hose and the supply hoses for the auxiliary power units.

24 Install the turntable cover.

25 Fill the tank with hydraulic oil until the level is within the top 2 inches / 5 cm of the sight gauge. Do not overfill. Refer to Specifications, *Machine Specifications*.

26 Open the two hydraulic tank shut-off valves at the hydraulic tank.

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

28 Start the engine and check for leaks.

E-2
Grease the Steer Axle Wheel Bearings



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

Perform this procedure more often if dusty conditions exist.

Maintaining the steer axle wheel bearings is essential for safe machine operation and service life. Operating the machine with loose or worn wheel bearings may cause an unsafe operating condition and continued use may result in component damage. Extremely wet or dirty conditions or regular steam cleaning and pressure washing of the machine may require that this procedure be performed more often.

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

2 Block the non-steer wheels, then center a lifting jack under the steer axle.

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

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

5 Check for wheel bearing wear by attempting to move the wheel hub side to side, then up and down.

⊙ Result: There should be no side to side or up and down movement.

Skip to step 10 if there is no movement.

Checklist E Procedures

6 Remove the dust cap from the hub. Remove the cotter pin from the castle nut.

7 Tighten the castle nut to 158 ft-lbs / 214 Nm to seat the bearings.

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

8 Loosen the castle nut one full turn and then re-tighten to 35 ft-lbs / 47 Nm.

9 Check for wheel bearing wear by attempting to move the wheel hub side to side, then up and down.

⊙ Result: If there is no side to side or up and down movement, continue with step 11 and grease the wheel bearings.

⊠ Result: If there is side to side or up and down movement, continue to step 11 and replace the wheel bearings with new ones.

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

10 Remove the dust cap from the hub. Remove the cotter pin from the castle nut.

11 Remove the castle nut.

12 Pull the hub off of the spindle. The washer and outer bearing should fall loose from the hub.

13 Place the hub on a flat surface and gently pry the bearing seal out of the hub. Remove the rear bearing.

14 Pack both bearings with clean, fresh grease.

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

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

17 Slide the hub onto the yoke spindle.

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

18 Fill the hub cavity with clean, fresh grease.

19 Place the outer bearing into the hub.

20 Install the washer and castle nut.

21 Tighten the slotted nut to 158 ft-lbs / 214 Nm to seat the bearings.

22 Loosen the castle nut and re-tighten to 35 ft-lbs / 47 Nm.

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

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

24 Install the dust cap, then the tire and wheel assembly. Torque the wheel lug nuts to specification. Refer to Specifications, *Machine Specifications.*

Repair Procedures



Observe and Obey:

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

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

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

Before Repairs Start:

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

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

☑ Use only Genie approved replacement parts.

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

Machine Configuration:

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

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

Repair Procedures

About This Section

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

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

Symbols Legend



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

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

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

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

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

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

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

1-1 Joysticks

How to Calibrate a Joystick

The joysticks on this machine utilize digital Hall Effect technology for proportional control. If a joystick is disconnected or replaced, it must be calibrated before that particular machine function will operate.

Note: The joystick must be calibrated before the threshold, max-out or ramp rate can be set.

Note: For units with revision D software or higher, the control system continuously monitors and updates joystick calibration, therefore it is not necessary perform this procedure.

1 Turn the key switch to platform control.

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

3 Open the platform control box.

4 Select a joystick to calibrate. Do not press down on the foot switch.

5 Disconnect the wire harness connector from the joystick for approximately 10 seconds or until the alarm sounds.

⊙ Result: The alarm should sound a long beep indicating the joystick has lost calibration. After 3 seconds the alarm should sound a short beep to enter calibration mode.

6 Connect the wire harness connector to the joystick.

⊙ Result: The alarm should sound a long beep setting the neutral calibration point.

7 Move the joystick full stroke and hold for 5 seconds in each direction.

⊙ Result: The alarm should sound a short beep indicating successful joystick calibration in each direction.

8 **Joysticks with a thumb rocker switch:** Press down and hold the thumb rocker switch in each direction.

⊙ Result: The alarm should sound a short beep indicating successful joystick calibration in each direction.

9 Repeat this procedure for each joystick controlled machine function.

Note: No machine function should operate while performing the joystick calibration procedure.

Platform Controls

How to Adjust the Joystick Threshold Setting

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

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

1 Turn the key switch to platform control. Do not start the engine.

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

3 Do not press down the foot switch.

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

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

⊙ Result:The display will show FAULTS.

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

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

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

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

Toggle switch controlled functions:

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

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

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

Joystick controlled functions:

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

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

⊙ Result: The alarm should sound indicating the setting has been saved. To exit programming mode:

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

How to Adjust the Maximum Speed Setting

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

Note: There are two types of max speed settings.

High flow functions: Primary up / down, secondary up / down and extend / retract.

Low flow functions: Platform rotate, jib rotate, jib up / down and turntable rotate.

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

1 Turn the key switch to platform control.

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

3 Do not press down the foot switch.

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

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

⊙ Result: The display will show FAULTS.

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

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

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

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

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

High flow functions:

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

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

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

⊙ Result: Alarm sounds, continue to step 15.

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

Platform Controls

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

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

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

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

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

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

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

Low flow functions:

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

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

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

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

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

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

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

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

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

To exit programming mode:

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

How to Adjust the Function Ramp Up Time Setting

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

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

1 Turn the key switch to platform control.

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

3 Do not press down on the foot switch.

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

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

⊙ Result: The display will show FAULTS.

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

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

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

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

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

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

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

12 Press down on the foot switch, start a timer and activate the same function in the same direction.

Note how long it takes the function to reach maximum speed. This is the ramp up time.

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

Platform Controls

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

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

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

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

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

16 Repeat steps 11 through 13 for each machine function.

To exit programming mode:

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

Ramp rate (factory settings)	
Primary boom up/down	1 second
Secondary boom up/down	
accelerate	1 second
Turntable rotate	
accelerate	1 second
Extend/Retract	
accelerate	0.5 second
Jib up/down	
accelerate	2.5 seconds
Platform Rotate	
accelerate	2 seconds
Jib rotate (if equipped)	
accelerate	2 seconds

How to Adjust the Function Ramp Down Time Setting

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

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

1 Turn the key switch to platform control.

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

3 Do not press down the foot switch.

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

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

⊙ Result: The display will show FAULTS.

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

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

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

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

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

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

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

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

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

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

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

Note: Changing the ramp down time setting in one direction will also change the opposite direction.

Platform Controls

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

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

16 Repeat steps 11 through 13 for each machine function.

To exit programming mode:

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

Ramp down time (factory settings)	
Primary boom up/down	
decelerate	1.5 second
Secondary boom up/down	
decelerate	0.65 second
Turntable rotate	
decelerate	0.25 second
Extend/Retract	
decelerate	0.5 seconds
Jib up/down	
decelerate	0.25 second
Platform rotate	
decelerate	0.15 second
Jib rotate (if equipped)	
decelerate	0.25 seconds

How to Adjust the Max Speed Drive Settings

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

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

1 Turn the key switch to platform control.

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

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

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

⊙ Result: The display will show FAULTS.

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

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

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

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

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

⊙ Result: The alarm will sound.

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

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

⊙ Result: The display will show ACCEL RAMP.

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

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

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

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

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

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

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

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

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

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

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

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

To exit programming mode:

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

Platform Components

2-1 Platform Leveling Slave Cylinder

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

How to Remove the Platform Leveling Slave Cylinder

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

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

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

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

3 Lower the primary boom until the platform is resting on the blocks just enough to support the platform. Do not rest the entire weight of the boom on the blocks.

4 Tag, disconnect and plug the hydraulic hoses from the slave cylinder at the unions and connect them together using a connector.

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

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

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

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

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

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

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

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

10 Carefully pull the cylinder, with hydraulic hoses, out of the boom.

How to Bleed the Slave Cylinder

1 Raise the primary boom to a horizontal position.

2 Move the platform level toggle switch up and down through two platform leveling cycles to remove any air that might be in the system.

2-2 Platform Rotator

How to Bleed the Platform Rotator

Note: This procedure will require two people.

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

2 Place a suitable container underneath the platform rotator.

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

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

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

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

Platform Components

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

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

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

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

7 Clean up any hydraulic oil that may have spilled.

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

2-3 Platform Overload System

How to Calibrate the Platform Overload System

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

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

1 Turn the key switch to platform control.

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

3 Remove all weight, tools and accessories from the platform.

Note: Failure to remove all weight, tools and accessories from the platform will result in an incorrect calibration.

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

Determine the limit switch trigger point:

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

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

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

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

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

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

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

Confirm the setting:

6 Turn the key switch to platform control.

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

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

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

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

9 Add an additional 10 lb / 4.5 kg test weight to the original test weight to overload the platform.

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

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

10 Test all machine functions from the platform controls.

Result: All platform control functions should not operate.

11 Turn the key switch to ground control.

12 Test all machine functions from the ground controls.

⊙ Result: All ground control functions should not operate.

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

Platform Components

2-4 Platform Overload Recovery Message (software 1256908A and later)

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

How to Clear the Platform Overload Recovery Message

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

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

1 Turn the key switch to platform control.

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

3 Do not press down on the foot switch.

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

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

⊙ Result: The display will show FAULTS.

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

⊙ Result: The display will show ACTIVE FAULTS.

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

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

⊙ Result: The display will show ENTER PASSWORD.

9 Momentarily active the steer rocker switch in the following order.

Steer right, steer right, steer right, steer left.

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

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

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

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

⊙ OVERLOAD RECOVERY is not shown on the display.

3-1
Jib Boom

How to Remove the Jib Boom

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

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

1 Remove the platform and the platform mounting weldment.

2 Support the platform rotator with a suitable lifting device.

3 Tag, disconnect and plug the platform rotator hydraulic hoses. Cap the fittings on the rotator.Remove the platform. Remove the platform mounting weldment and the platform rotator. Refer to Repair Procedure, *How to Remove the Platform Rotator*

4 Attach a lifting strap from an overhead crane to the jib boom for support.

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

5 Remove the pin retaining fasteners from the jib boom leveling arm pivot pin at the platform rotator.

6 Use a soft metal drift to remove the leveling arm pivot pin. Let the leveling arms and jib boom lift cylinder hang down.

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

8 Use a soft metal drift to remove the platform rotator pivot pin and remove the platform rotator from the machine.

⚠WARNING Crushing hazard. The jib boom could fall when the pin is removed if not properly supported by the overhead crane.

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

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

11 Remove all hose and cable clamps from the jib boom.

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

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

Jib Boom Components

13 Remove the mounting fasteners from the jib boom/platform rotate manifold and lay the manifold to the side. Do not remove the hoses or disconnect the wiring.

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

14 Attach a lifting strap from an overhead crane to the rod end of the jib boom lift cylinder.

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

⚠WARNING Crushing hazard. The jib boom could fall when the pin is removed if not properly supported by the overhead crane.

16 Remove the pin retaining fastener from the jib boom pivot pin. Do not remove the pin.

17 Attach a lifting strap from an overhead crane to the jib boom.

18 Use a soft metal drift to remove the jib boom pivot pin. Carefully remove the jib boom from the machine.

⚠WARNING Crushing hazard. The jib boom could fall when the pin is removed if not properly supported by the overhead crane.

3-2
Jib Boom Bell Crank (models without rotating jib boom)

How to Remove the Jib Boom Bell Crank

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

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

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

2 Support and secure the jib boom bell crank to an appropriate lifting device.

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

4 Place a block of wood under the platform leveling slave cylinder for support. Protect the cylinder rod from damage.

5 Remove the pin retaining fasteners from the jib boom bell crank at the extension boom. Use a soft metal drift to remove the pin.

6 Use a soft metal drift to remove the slave cylinder rod-end pivot pin.

7 Remove the jib boom bell crank from the extension boom.

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

3-3
Jib Boom Rotator (models with rotating jib boom)

The platform rotator is a hydraulically activated helical gear assembly used to rotate the jib boom 180 degrees.

How to Remove the Jib Boom Rotator

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

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

2 Support and secure the jib boom rotator to an appropriate lifting device.

3 Remove the eight mounting bolts from the jib boom rotator mount.

4 Remove the center bolt. Carefully remove the jib boom rotator from the machine.

⚠WARNING Crushing hazard. The jib boom rotator could become unbalanced and fall when removed from the machine if not properly supported and secured to the lifting device.

Note: When installing the jib boom rotator, be sure to torque the fasteners to specification. Refer to Specifications, *Machine Torque Specifications*.

5 Support and secure the jib boom bell crank to an appropriate lifting device.

6 Remove the pin retaining fasteners from the slave cylinder rod-end pivot pin. Do not remove the pin.

7 Place a block of wood under the platform leveling slave cylinder for support. Protect the cylinder rod from damage.

8 Remove the pin retaining fasteners from the jib boom bell crank at the extension boom. Use a soft metal drift to remove the pin.

9 Use a soft metal drift to remove the slave cylinder rod-end pivot pin.

10 Remove the jib boom bell crank from the extension boom.

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

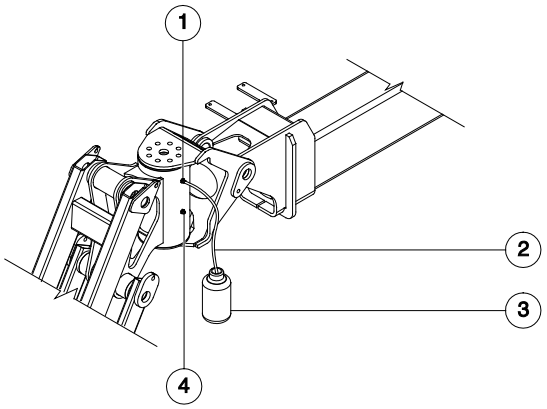
Jib Boom Components

How to Bleed the Jib Boom Rotator

Note: This procedure will require two people.

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

2 Connect a clear hose to the top bleed valve. Place the other end of the hose in a container to collect any drainage. Open the top bleed valve, but do not remove it.



1 top bleed valve
2 clear hose
3 container
4 bottom bleed valve

3 Move and hold the function enable toggle switch to either side and move and hold the jib boom rotate toggle switch to the right for approximately 5 seconds, then release it. Repeat three times.

⚠WARNING Crushing hazard. Keep hands and head clear of the jib boom during rotation.

4 Move and hold the function enable switch to either side and move and hold the jib boom rotate toggle switch to the left for approximately 5 seconds, then release it. Repeat three times.

5 Fully rotate the jib boom to the left and continue holding the jib boom rotate toggle switch until air stops coming out of the bleed screw.

⚠WARNING Crushing hazard. Keep hands and head clear of the jib boom during rotation.

6 Rotate the jib boom to the right until the jib boom is centered.

7 Open the bottom bleed screw.

8 Rotate the jib boom to the right and continue holding the platform rotate toggle switch until air stops coming out of the bleed screw.

⚠WARNING Crushing hazard. Keep hands and head clear of the jib boom during rotation.

9 Close the bleed screw.

10 Rotate the jib boom full left and right and inspect the bleed screws for leaks.

⚠WARNING Crushing hazard. Keep hands and head clear of the jib boom during rotation.

11 Turn the key switch to the off position and clean up any hydraulic oil that may have spilled.

3-4
Jib Boom Lift Cylinder

How to Remove the Jib Boom Lift Cylinder

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

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

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

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

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

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

4 Use a soft metal drift to tap the rod-end pivot pin half way out and lower one of the leveling links to the ground. Tap the pin the other direction and lower the opposite leveling link. Do not remove the pin.

5 Support the jib boom with a suitable lifting device.

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

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

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

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

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

Primary Boom Components

4-1
Cable Track

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

How to Remove the Cable Track

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

1 Tag and disconnect each electrical connector from the platform control box.

2 Remove the hose and cable clamp from the jib boom bellcrank pivot pin.

3 Remove all of the hose and cable clamps from the jib boom and platform support.

4 Remove the power to platform electrical box mounting fasteners. Remove the electrical box from the platform. Do not disconnect the wiring.

5 Remove the jib boom/platform rotate manifold cover.

6 Tag, disconnect and plug the hydraulic hoses from ports P and T at the jib boom/platform rotate manifold. Cap the fittings on the manifold.

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

7 Tag and disconnect the hydraulic hoses from the platform leveling slave cylinder at the union and connect them together using a connector. Connect the hoses from the cylinder together using a connector.

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

8 Remove the hose and cable clamp from the platform end of the cable track tube.

9 Pull all of the electrical cables out of the plastic cable track. Do not pull out the hydraulic hoses.

10 Remove all hose and cable clamps from the underside of the primary boom.

Primary Boom Components

11 Tag, disconnect and plug the jib boom/platform rotator hydraulic hoses at the union located above the primary boom lift cylinder. Cap the fittings on the unions.

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

12 Pull the jib boom/platform rotator hydraulic hoses, disconnected at the union, through the mounting ears of the rod end of the primary boom lift cylinder, towards the platform.

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

13 Remove the cover from the bottom of the cable track.

14 Pull all of the cables through the mounting ears of the rod end of the primary boom lift cylinder, towards the counterweight end of the machine.

15 Place blocks between the cable track tube and the lower cable track. Secure the cable track tube and lower cable track together.

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

16 Support and secure the cable track to an overhead crane or other similar lifting device.

17 Remove the cable track tube retaining fasteners from the platform end of the extension tube.

18 Remove the cable track mounting fasteners that attach the lower cable track tray to the primary boom.

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

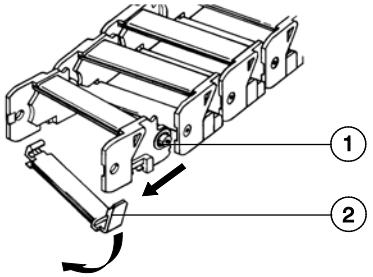
⚠WARNING Crushing hazard. If the upper and lower cable tracks are not properly secured together, the cable track could become unbalanced and fall when removed from the machine.

Primary Boom Components

How to Repair the Primary Boom Cable Track

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

Note: A 7 link repair section of cable track is available through the Genie Service Parts Department.



1 link separation point
2 lower clip

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

2 To remove a single link, open the lower clip and then use a screw driver to pry the link to the side.

3 Repeat steps 1 and 2 for each link.

How to Shim the Primary Boom

1 Extend the boom until the wear pads are accessible.

2 Loosen the wear pad mounting fasteners.

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

4 Tighten the mounting fasteners.

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

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

Primary Boom Components

How to Remove the Primary Boom

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

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

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

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

2 **Models without rotating jib boom:** Remove the jib boom bellcrank. Refer to Repair Procedure, *How to Remove the Jib Boom Bellcrank.*

Models with rotating jib boom: Remove the jib boom rotator. Refer to Repair Procedure, *How to Remove the Jib Boom Rotator.*

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

4 Remove the hose and cable guard from the upper pivot.

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

5 Raise the primary boom until the master cylinder barrel-end pivot pin is accessible.

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

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

7 Locate the primary boom drive speed limit switch inside the upper pivot.

Primary Boom Components

8 Remove the primary boom drive speed limit switch mounting fasteners and move the limit switch out of the way. Do not disconnect the wiring.

9 Locate the primary extension boom drive speed limit switch inside the extension boom.

10 Remove the primary extension boom drive speed limit switch mounting fasteners. Do not disconnect the wiring.

11 Pull the limit switch and the wiring out of the extension tube and move it out of the way.

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

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

13 Lower the primary boom to a horizontal

14 Attach a 5 ton / 5,000 kg overhead crane to the center point of the primary boom.

15 Attach a similar lifting device to the primary boom lift cylinder.

16 Place support blocks under the primary boom lift cylinder.

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

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

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

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

20 Remove the primary boom pivot pin with a soft metal drift. Carefully remove the primary boom from the machine and place it on a structure capable of supporting it.

⚠WARNING 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.

21 Attach a lifting strap from an overhead crane to the primary boom lift cylinder.

Primary Boom Components

22 Place 2 x 4 x 18 inch / 5 x 10 x 46 cm support blocks under the cylinder, across the secondary boom.

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

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

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

25 Remove the pin retaining fastener from the primary boom pivot pin.

26 Remove the primary boom pivot pin with a soft metal drift. Carefully remove the primary boom assembly from the machine.

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

How to Disassemble the Primary Boom

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

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

2 Place blocks under the extension cylinder for support.

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

4 Remove and label the location of the wear pads from the top side of the boom tube at the platform end of the boom.

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

Primary Boom Components

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

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

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

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

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

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

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

4-3 Primary Boom Lift Cylinder

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

How to Remove the Primary Boom Lift Cylinder

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

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

1 Raise the primary boom to a horizontal position.

2 Raise the secondary boom until the primary boom lift cylinder barrel-end pivot pin is above the turntable covers.

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

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

Primary Boom Components

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

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

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

7 Place a support block across both turntable covers under the primary boom lift cylinder.

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

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

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

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

10 Remove the primary boom lift cylinder barrelend pivot pin retaining fasteners. Use a slide hammer to remove the barrel-end pivot pin. Carefully remove the primary boom lift cylinder from the machine.

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

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

Primary Boom Components

4-4 Primary Boom Extension Cylinder

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

How to Remove the Primary Boom Extension Cylinder

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

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

1 Raise the primary boom to a horizontal position.

2 Extend the primary boom until the primary boom extension cylinder rod-end pivot pin is accessible in the primary boom extension tube.

3 Remove the hose and cable guard from the upper pivot.

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

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

5 Locate the primary extension boom drive speed limit switch inside the extension boom at the pivot end.

6 Remove the primary extension boom drive speed limit switch mounting fasteners. Do not disconnect the wiring.

7 Pull the limit switch and the wiring out of the extension tube and move it out of the way.

8 At the platform end of the boom, remove the external snap rings from the extension cylinder rod-end pivot pin. Use a soft metal drift to remove the pin.

9 Remove the barrel-end pivot pin retaining fasteners.

10 Place a support block under the barrel end of the primary boom extension cylinder.

11 Use a slide hammer to remove the pin.

12 Support and slide the extension cylinder out of the upper pivot.

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

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

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

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

4-5 Platform Leveling Master Cylinder

The platform leveling master cylinder acts as a pump for the slave cylinder. It is part of the closed-loop hydraulic circuit that keeps the platform level through the entire range of primary boom motion. The platform leveling master cylinder is located inside the upper mid-pivot at the pivot end of the primary boom.

How to Remove the Platform Leveling Master Cylinder

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

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

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

Primary Boom Components

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

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

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

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

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

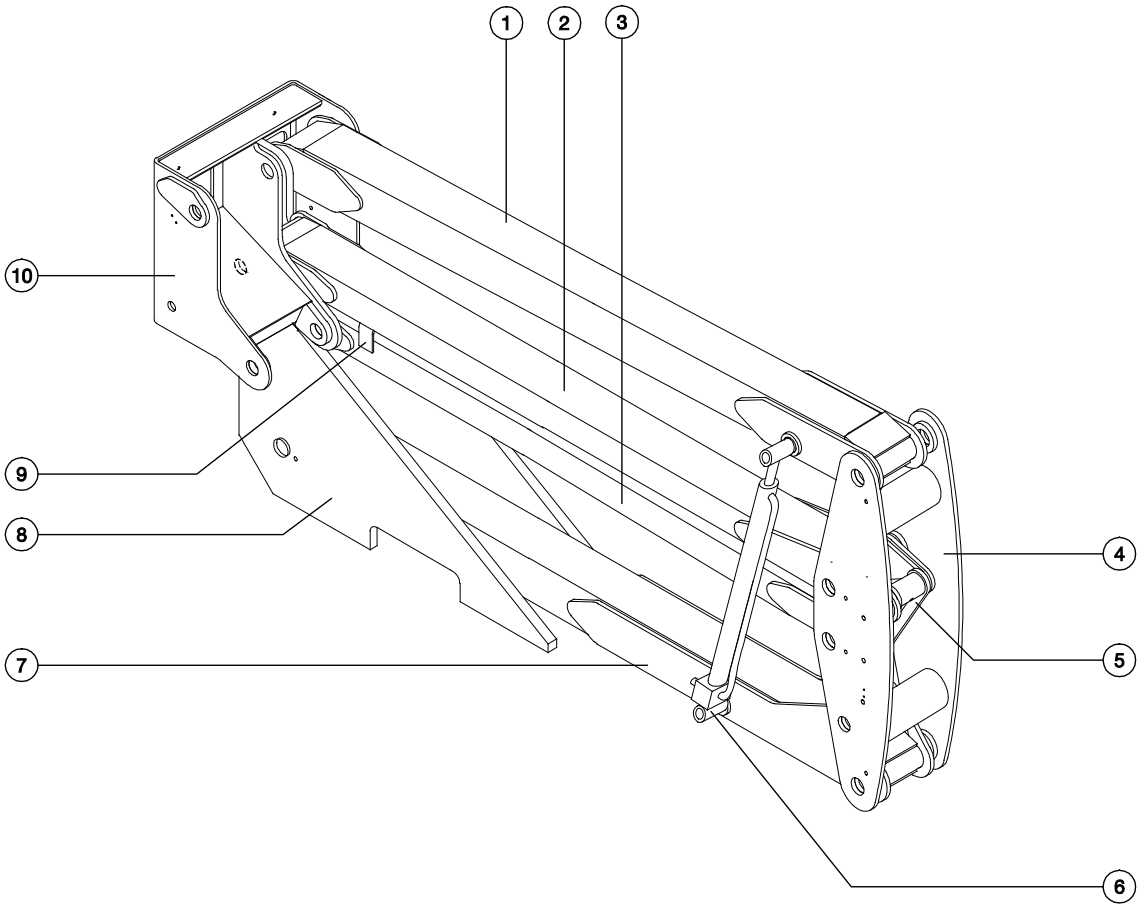
5 Remove the pin retaining fastener from the rodend pivot pin.

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

7 Remove the master cylinder from the machine.

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

Secondary Boom Components



Secondary Boom components

1 upper pivot
2 upper compression arm
3 mid-pivot
4 compression link
5 lower secondary boom
6 lower compression arm
7 turntable pivot
8 counterweight (Z-30N / Z-30N RJ)
9 upper secondary boom

Secondary Boom Components

5-1
Secondary Boom

How to Disassemble the Secondary Boom

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

Follow the disassembly steps to the point required to complete the repair. Then re-assemble the secondary boom by following the disassembly steps in reverse order.

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

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

2 Remove the master cylinder. Refer to Repair Procedure, *How to Remove the Platform Leveling Master Cylinder.*

3 Attach a lifting strap from an overhead crane to the lug on the rod end of the primary boom lift cylinder. Using the overhead crane, raise the primary boom lift cylinder to a vertical position.

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

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

5 Remove the pin retaining fastener from the primary boom lift cylinder barrel-end pivot pin.

6 Use a slide hammer to remove the pin. Remove the primary boom lift cylinder from the machine.

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

7 Lower the secondary boom to the stowed position.

8 Tag, disconnect and plug the hydraulic hoses on both of the secondary boom lift cylinders. Cap the fittings on the cylinders.

⚠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.

Secondary Boom Components

9 Remove the pin retaining fasteners from both sides of the secondary boom lift cylinder rod end pivot pin and barrel-end pivot pin. Do not remove the pins.

10 Attach a strap from an overhead crane to the lug on the rod end of one of the secondary boom lift cylinders for support. Do not apply any lifting pressure.

11 Use a soft metal drift to drive the barrel-end pivot pin half way out. Lower the barrel end of the secondary boom lift cylinder and let it hang down.

12 Use a soft metal drift to drive the rod-end pivot pin half way out.

13 Remove the secondary boom lift cylinder from the machine.

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

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

14 Repeat steps 12 through 15 for the other secondary boom lift cylinder.

15 Attach a lifting strap from an overhead crane to the upper pivot for support. Do not lift it.

16 Attach a lifting strap from a second overhead crane to the number 1 arm at the mid-point between the upper pivot and mid-pivot.

17 Remove the pin retaining fasteners from the number 1 arm pivot pins at the mid-pivot and the upper pivot. Do not remove the pins.

18 Use a soft metal drift to drive both pins out.

19 Remove the number 1 arm from the machine.

⚠WARNING Crushing hazard. The number 1 arm could become unbalanced and fall when removed from the machine if not properly attached to the overhead crane.

⚠WARNING Crushing hazard. The upper pivot could fall when the number 1 arm is removed from the machine if not properly supported by the overhead crane.

20 Attach a lifting strap from an overhead crane to the upper pivot.

21 Using the overhead crane attached to the upper pivot, raise the secondary boom assembly approximately 30 inches / 76 cm.

22 Insert a 4 x 4 x 11 inch / 10 x 10 x 28 cm block between the number 2 arm and the boom rest. Lower the secondary boom assembly onto the block.

⚠WARNING Crushing hazard. The secondary boom assembly could fall if not properly supported by the4 x 4 x 11 inch / 10 x 10 x 28 cm block.

Secondary Boom Components

23 Pull all of the cables and hoses out through the upper pivot.

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

24 Remove the hose and cable cover and clamps from the top of the number 2 arm.

25 Pull all of the hoses and cables out of the upper pivot and out through the mid-pivot. Lay the hoses and cables on the ground.

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

26 Remove the pin retaining fastener from the number 2 arm pivot pin at the upper pivot. Use a soft metal drift to remove the pin.

27 Remove the upper pivot from the machine.

⚠WARNING Crushing hazard. The upper pivot could become unbalanced and fall when removed from the machine if not properly attached to the overhead crane.

28 Attach the lifting strap from an overhead crane to the number 2 arm at the upper pivot end.

29 Raise the number 2 arm slightly and remove the 4 x 4 x 11 inch / 10 x 10 x 28 cm block.

30 Lower the number 2 arm onto the boom rest pad.

31 Insert a 4 x 4 x 81/2 inch / 10 x 10 x 22 cm block between the number 3 arm and the number 4 arm at the mid-pivot end.

32 Attach a lifting strap from the overhead crane to the mid-pivot for support. Do not apply any lifting pressure.

33 Remove the pin retaining fasteners from the number 2, 3 and 4 arm pivot pins at the mid-pivot. Do not remove the pins.

34 Use a soft metal drift to drive each pin out. Remove the mid-pivot from the secondary boom assembly.

⚠WARNING Crushing hazard. The mid-pivot could become unbalanced and fall when removed from the secondary boom assembly if not properly supported by the overhead crane.

35 Attach the lifting strap from an overhead crane to the center point of the number 2 arm for support. Do not apply any lifting pressure.

Secondary Boom Components

36 Remove the pin retaining fasteners from both compression link pivot pins. Do not remove the pins.

37 Use a soft metal drift to remove the lower compression link pivot pin at the number 3 arm.

38 Support the compression link with an appropriate lifting device.

39 Use a soft metal drift to remove the upper compression link pivot pin from the number 2 arm. Remove the compression link from the machine.

⚠WARNING Crushing hazard. The number 2 arm could fall when the compression link is disconnected from the number 2 arm if not properly supported by the overhead crane.

⚠WARNING Crushing hazard. The compression link may fall if not properly supported when removed from the secondary boom assembly.

40 Remove the number 2 arm from the machine.

⚠WARNING Crushing hazard. The number 2 arm could become unbalanced and fall when removed from the secondary boom assembly if not properly supported by the overhead crane.

41 Remove the hose and cable cover and clamps from the number 3 arm.

42 Remove the secondary boom drive speed limit switch mounting fasteners from the number 4 arm at the mid-pivot end. Do not disconnect the wiring.

43 Pull all of the cables and hoses from the number 3 arm and lay them over the turntable counterweight.

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

44 Remove the mounting fasteners from the cover located in the boom storage area to access the number 3 and number 4 arm pivot pin retaining fasteners at the turntable pivot.

Secondary Boom Components

45 Attach the lifting strap from the overhead crane to the centerpoint of the number 3 arm for support. Do not apply any lifting pressure.

46 Remove the pin retaining fasteners from the number 3 arm at the turntable pivot. Do not remove the pin.

47 Use a slide hammer to remove the number 3 arm pivot pin from the turntable pivot through the access hole in the counterweight.

48 Remove the number 3 arm from the machine.

⚠WARNING Crushing hazard. The number 3 arm could become unbalanced and fall when removed from the machine if not properly supported by the overhead crane.

49 Remove the pin retaining fasteners from the number 4 arm at the turntable pivot. Do not remove the pin.

50 Attach a lifting strap from the overhead crane to the center point of the number 4 arm. Do not apply any lifting pressure.

51 Use a slide hammer to remove the number 4 arm from the turntable pivot through the access hole in the counterweight.

52 Remove the number 4 arm from the machine.

⚠WARNING Crushing hazard. The number 4 arm could become unbalanced and fall when removed from the machine if not properly supported by the overhead crane.

5-2 Secondary Boom Lift Cylinder

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

How to Remove the Secondary Boom Lift Cylinder

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

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

1 With the secondary boom in the stowed postion, raise the primary boom until it is above the secondary boom lift cylinder rod-end pivot pin.

Secondary Boom Components

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

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

3 Remove the pin retaining fasteners from the secondary boom lift cylinder rod-end pivot pin and barrel-end pivot pin. Do not remove the pins.

4 Attach a strap from an overhead crane to the lug on the rod end of the secondary boom lift cylinder for support. Do not apply any lifting pressure.

5 Use a soft metal drift to drive the barrel-end pivot pin half way out. Lower the barrel end of the secondary boom lift cylinder and let it hang down.

6 Use a soft metal drift to drive the rod-end *pivot pin half way out*.

7 Remove the secondary boom lift cylinder from the machine.

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

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

Hydraulic Pump

6-1 How to Remove the Auxiliary Pump

How to Remove the Auxiliary Pump

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

1 Raise the secondary boom approximately 6 ft / 2 m. Turn the machine off.

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

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

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

4 Remove the center turntable cover fasteners. Remove the cover from the machine.

5 Tag, disconnect and plug the hydraulic hoses from the auxiliary pump. Cap the fittings on the pump.

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

6 Remove the auxiliary pump mounting bolts. Carefully remove the pump.

6-2
How to Remove the Function Pump

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

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

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

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

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

3 Tag, disconnect and plug the hydraulic hoses from the pump. Cap the fittings on the pump.

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

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

Note: When replacing the function pump, it will need to be calibrated. Refer to Repair Procedure, *How to Calibrate the Function Pump.*

Hydraulic Pump

How to Calibrate the Function Pump

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

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

1 Calibrate the proportional relief valve.Refer to Repair Procedure, *How to Calibrate the Proportional Relief Valve*.

2 Turn the key switch to platform control.

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

4 Do not press down the foot switch.

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

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

⊙ Result: The display will show FAULTS.

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

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

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

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

⊙ Result: The display will show THRESHOLD CURRENT.

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

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

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

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

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

To exit programming mode:

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

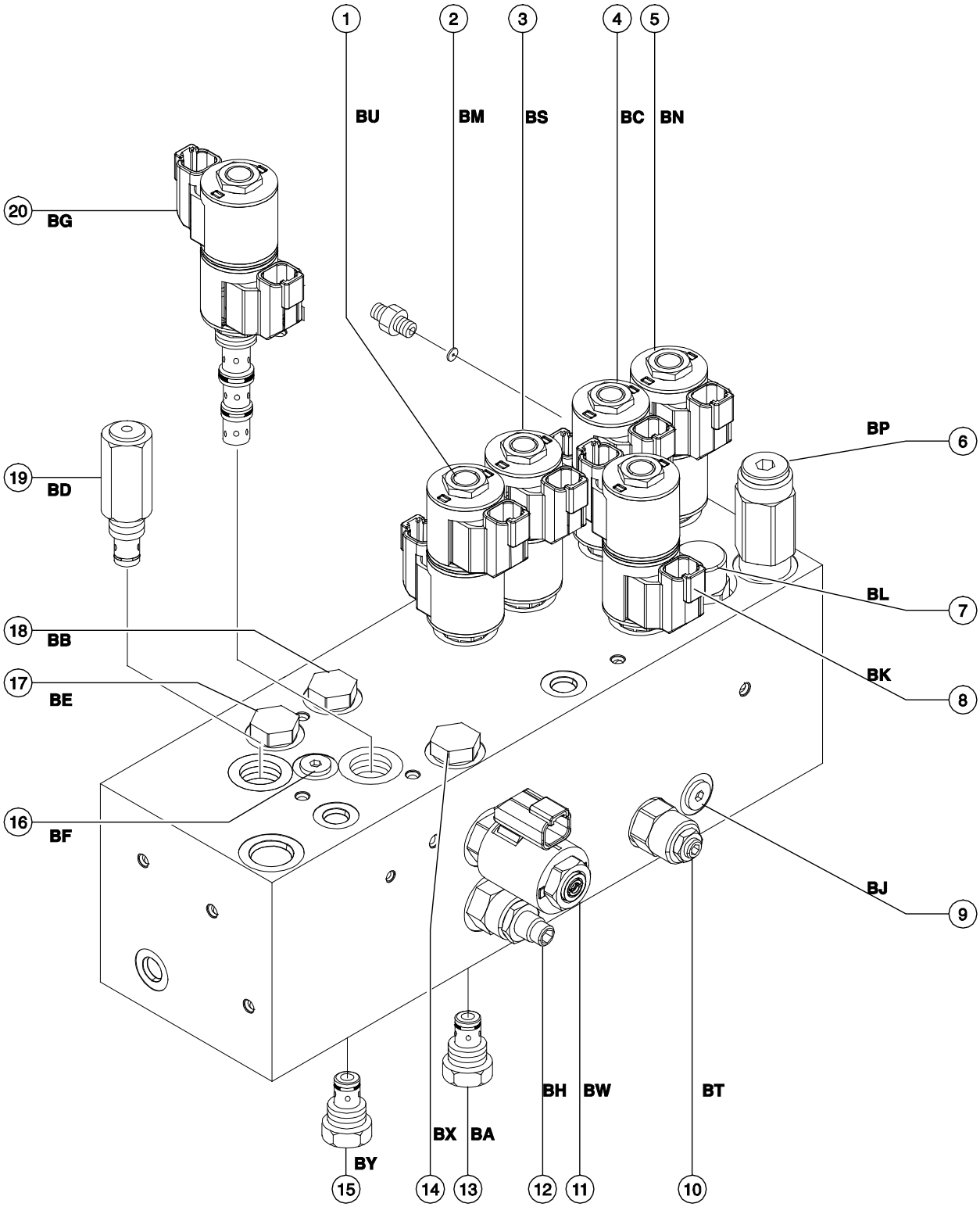
Manifolds

7-1 Function Manifold Components

The function manifold is located behind the ground controls turntable cover.

Index No.	Description	Schematic Item	Function	Torque
—	Coil nut			4-5 ft-lbs / 5-7 Nm
1	Proportional solenoid valve, 3 position 4 way	BU	Primary boom extend/retract	16-20 ft-lbs / 24-27 Nm
2	Orifice, 0.046 inch / 1.17 mm	BM	Secondary boom down	
3	Proportional solenoid valve, 3 position 4 way	BS	Primary boom up/down	16-20 ft-lbs / 24-27 Nm
4	Proportional solenoid valve, 3 position 4 way	BC	Steer left/right	16-20 ft-lbs / 24-27 Nm
5	Proportional solenoid valve, 3 position 4 way	BN	Secondary boom up/down	18-20 ft-lbs / 25-27 Nm
6	Relief valve, 2100 psi / 145 bar	BP	Secondary boom down	18-20 ft-lbs / 25-27 Nm
7	Pressure compensator valve,80 psi / 5.5 bar	BL	Turntable rotate circuit	25-25 ft-lbs / 34-36.7 Nm
8	Proportional solenoid valve,3 position 4 way	BK	Turntable rotate left/right	18-20 ft-lbs / 25-27 Nm
9	Shuttle valve	BJ	Turntable rotate circuit	4-5 ft-lbs / 5-7 Nm
10	Counterbalance valve,1000 psi / 70 bar	BT	Primary boom down	44-52 ft-lbs / 60-70 Nm
11	Proportional relief valve,50 to 3000 psi / 3 to 207 bar	BW	System relief	18-20 ft-lbs / 25-27 Nm
12	Needle valve	BH	Primary level up/down	18-20 ft-lbs / 25-27 Nm
13	Check valve, 4 psi / 0.3 bar	BA	Prevents oil from draining from turntable rotate circuit back to tank	20 ft-lbs / 27 Nm
14	Check valve, 25 psi / 1.7 bar	BX	System relief valve circuit	18-20 ft-lbs / 25-27 Nm
15	Check valve, 4 psi / 0.3 bar	BY	Prevents oil from draining out of jib/rotate manifold back to tank	18-20 ft-lbs / 25-27 Nm
16	Shuttle valve	BF	Platform level	18-20 ft-lbs / 25-27 Nm
17	Check valve, dual pilot	BE	Platform level	20 ft-lbs / 27 Nm
18	Check valve, 25 psi / 1.7 bar	BB	Prevents oil from draining out of manifold	18-20 ft-lbs / 25-27 Nm
19	Relief valve, 2500 psi / 172 bar	BD	Platform level relief	18-20 ft-lbs / 25-27 Nm
20	Solenoid valve, 3 position 4 way	BG	Platform level up/down	16-20 ft-lbs / 24-27 Nm

Manifolds


1
2
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4
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BU
BM
BS
BC
BN
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BG
19
BD
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BB
17
BE
16
BF
BP
6
BL
7
BK
8
BJ
9
BH
BW
BT
BX
BA
BY
15
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Manifolds

7-2 Valve Adjustments - Function Manifold

How to Calibrate the Proprotional Relief Valve

Note: This procedure must be performed at the ground controls with the jib boom in the fully elevated position.

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

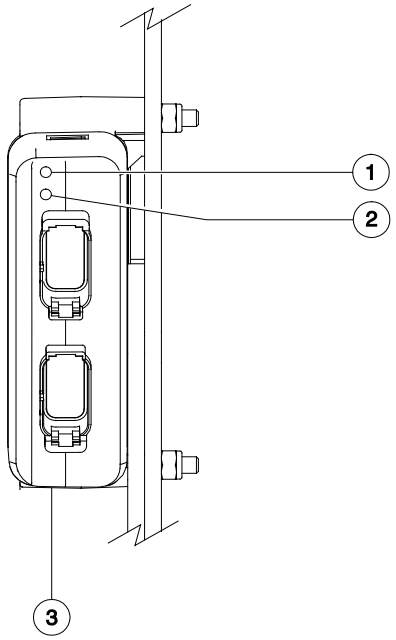
2 Connect a 0 to 3000 psi / 0 to 207 bar pressure gauge to test port TP1 on the function manifold.

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

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

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

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



1 green LED
2 red LED
3 turntable control module (TCON)

4 Move and hold the secondary boom toggle switch in the down direction.

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

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

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

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

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

6 Move and hold the jib boom toggle switch in the up direction.

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

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

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

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

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

8 Move and hold the primary boom toggle switch in the retract direction.

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

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

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

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

Note: Momentarily activating the platform level toggle switch will increase or decrease the relief pressure in increments of approximately 50 psi / 3 bar. To exit programming mode:

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

Manifolds

How to Adjust the Secondary Boom Down Relief Valve

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

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

3 Turn the key switch to ground controls.

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

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

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

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

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

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

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

How to Adjust the Platform Level Relief Valve

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

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the test port TP2 on the function manifold.

3 Turn the key switch to ground controls.

4 Move and hold the function enable toggle switch to either side and hold the platfor*m level up/down toggle switch in t*he up direction. Observe the pressure reading on the pressure gauge. Refer to Specifications, *Hydraulic Component Specifications*.

5 Turn the machine off. Hold the platform level relief valve with a wrench and remove the cap (item BD).

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

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

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

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

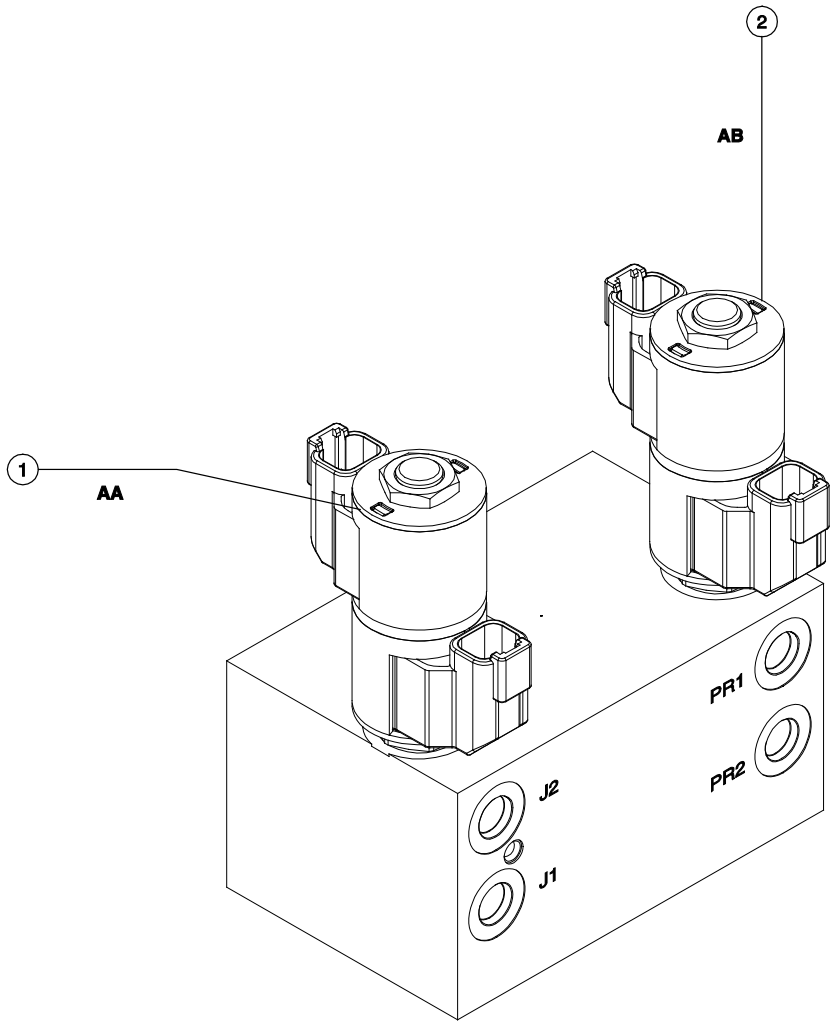
7 Turn the machine off. Remove the pressure gauge and install the proportional relief valve coil.

Manifolds

7-3
Jib Boom / Platform Rotate Manifold Components, Z-40/23N

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

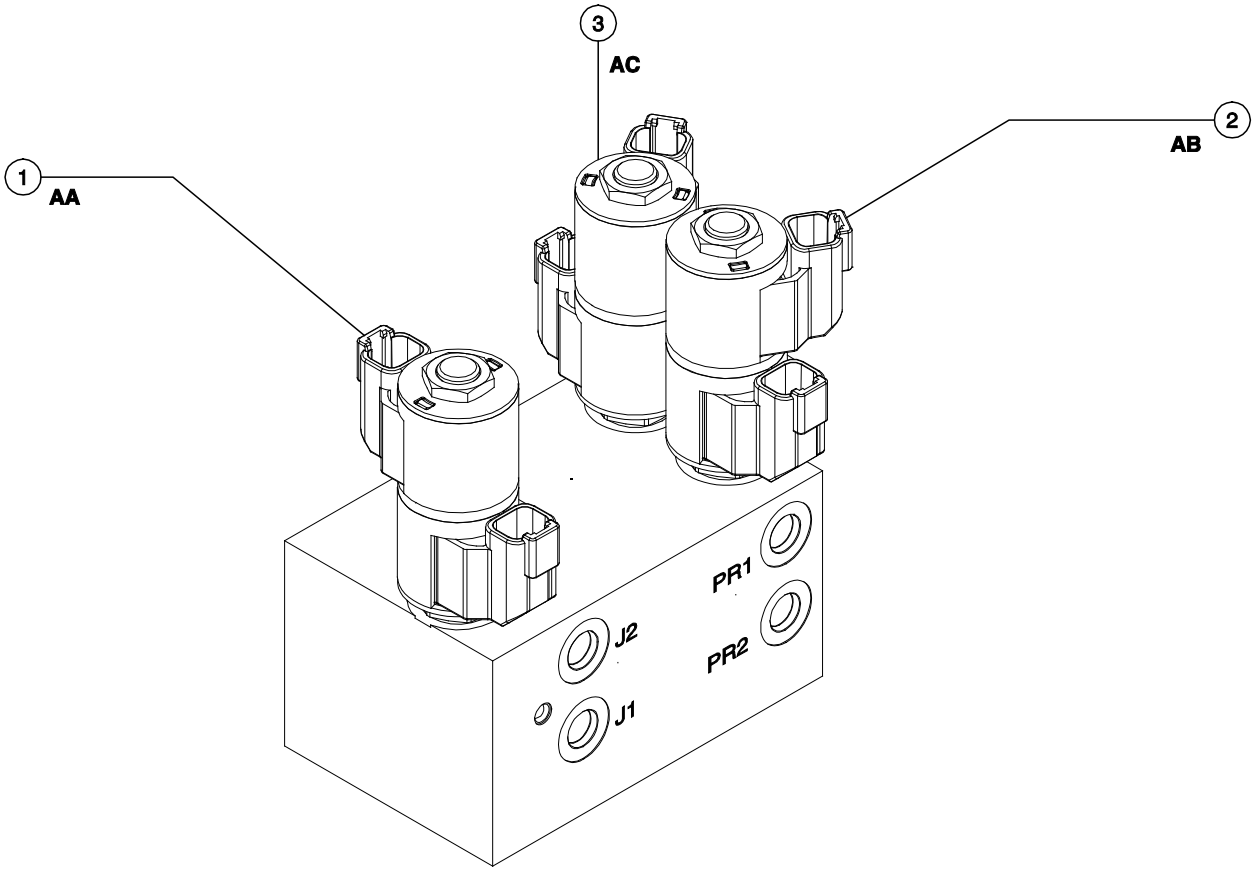
Index No.	Description	Schematic Item	Function	Torque
—	Coil nut			4-5 ft-lbs / 5-7 Nm
1	Proportional solenoid valve, 3 position 4 way	AA	Jib boom up / down	18-20 ft-lbs / 25-27 Nm
2	Proportional solenoid valve, 3 position 4 way	AB	Platform rotate	18-20 ft-lbs / 25-27 Nm



7-4
Jib Boom and Platform / Jib Rotate Manifold Components, Z-40/23N RJ

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

Index No.	Description	Schematic Item	Function	Torque
—	Coil nut			4-5 ft-lbs / 5-7 Nm
1	Proportional solenoid valve, 3 position 4 way	AA	Jib boom up/down	18-20 ft-lbs / 25-27 Nm
2	Proportional solenoid valve, 3 position 4 way	AB	Platform rotate left/right	18-20 ft-lbs / 25-27 Nm
3	Proportional solenoid valve, 3 position 4 way	AC	Jib boom rotate left/right	18-20 ft-lbs / 25-27 Nm



Manifolds

7-5 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.

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 / 10°C that your air temperature increases or decreases from 68°F / 20°C.

Valve Coil Resistance Specification

Description	Specification
Proportional solenoid valve, 3 position 4 way, 20V DC (schematic items AA, AB, AC, BC, BG, BK, BN, BS, BU)	24 Ω
Solenoid valve, 20V DC (schematic item BG)	24 Ω
Proportional solenoid relief valve, 20V DC (schematic item BW)	22 Ω

Turntable Rotation Components

8-1
Turntable Rotation Assembly

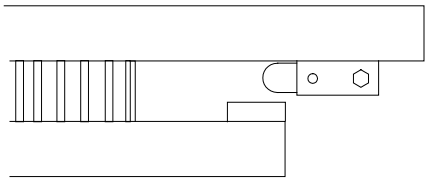
How to Remove the Turntable Rotation Assembly

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

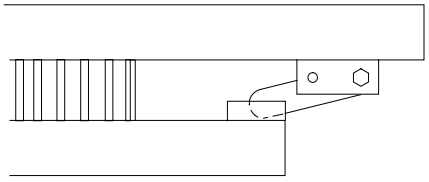
1 Raise the secondary boom until the upper pivot is above the turntable covers. Turn the machine off.

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

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



unlocked position



locked position

3 Remove the retaining fasteners from the center turntable cover. Remove the cover from the machine.

4 Disconnect the battery packs from the machine.

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

Turntable Rotation Components

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

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

6 Attach a lifting strap from an overhead crane or other suitable lifting device to the turntable rotation assembly.

7 Remove the turntable rotation assembly mounting fasteners.

8 Carefully remove the turntable rotation assembly from the machine.

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

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

9-1 Steer Angle Sensor

How to Replace the Steer Angle Sensor

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

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

2 Turn the key switch to the off position.

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

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

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

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

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

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

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

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

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

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

9 Connect the steer sensor harness to the main harness.

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

11 Turn the key switch to platform control.

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

Steer Axle Components

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

14 Tighten steer sensor cover fasteners.

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

16 Install the drive chassis cover.

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

How to Calibrate the Steer Angle Sensor

1 Turn the key switch to platform control.

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

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

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

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

⊙ Result: The display will show FAULTS.

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

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

8 Momentarily activate the drive enable toggle switch in the right direction until you see the CALIBRATE CENTER screen.

Note: Authorization is not required for steer calibrations.

Calibrate Steer Center

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

⊙ Result: The Display will show NO and ENABLE will appear at the bottom of the screen.

10 Momentarily activate the steer rocker switch in the right direction to activate calibrate steer center.

⊙ Result: ENABLE will appear at the bottom of the screen.

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

⊙ Result: The display will show YES. Proceed to step 12.

⊠ Result: System does not allow YES to appear. Press in the red Emergency stop button and return to step one. Check steer angle sensor wiring is correct and steer tires are pointing straight ahead.

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

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

Calibrate Steer Right

13 Momentarily activate the steer rocker switch in the right direction until you see the CALIBRATE RIGHT screen and press the drive enable toggle switch once to the right.

⊙ Result: The display will show NO and ENABLE will appear at the bottom of the screen.

14 Adjust the steer wheels fully in the right direction.

Steer Axle Components

15 Momentarily activate the drive enable toggle switch in the right direction to activate calibrate steer right.

⊙ Result: ENABLE will appear at the bottom of the screen.

16 Momentarily activate the steer rocker switch in the right direction.

⊙ Result: The display will show YES.

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

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

Calibrate Steer Left

18 Momentarily activate the steer rocker switch in the right direction until you see the CALIBRATE LEFT screen and press the drive enable toggle switch once to the right.

⊙ Result: The display will show NO and ENABLE will appear at the bottom of the screen.

19 Adjust the steer wheels fully in the left direction

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

⊙ Result: ENABLE will appear at the bottom of the screen.

21 Momentarily activate the steer rocker switch in the right direction.

⊙ Result: The display will show YES.

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

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

Note: After all three calibrations have been accepted, an alarm sounds to indicate the calibration procedure is successful and CALIBRATION OK will appear on the display.

To exit programming mode:

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

Non-steer Axle Components

10-1
Drive Motors

How to Remove a Drive Motor

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

1 Disconnect the battery packs from the machine.

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

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

3 Remove the axle covers fasteners from the the non-steer axle. Remove the covers.

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

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

6 Remove the drive motor fasteners.

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

10-2 Drive Brake

How to Remove a Drive Brake

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

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

2 Disconnect the battery packs from the machine.

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

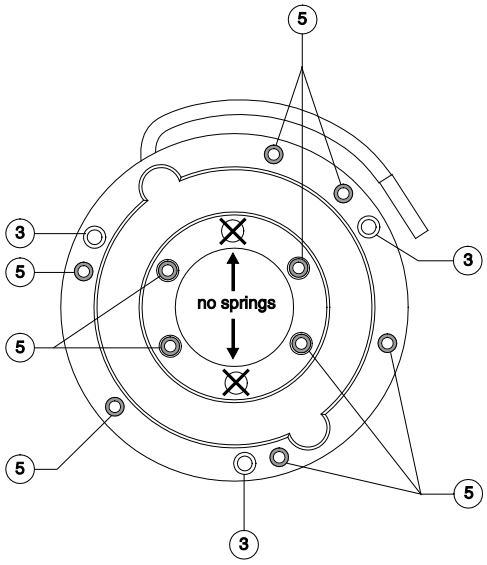
4 Tag and disconnect the electrical connector from the brake.

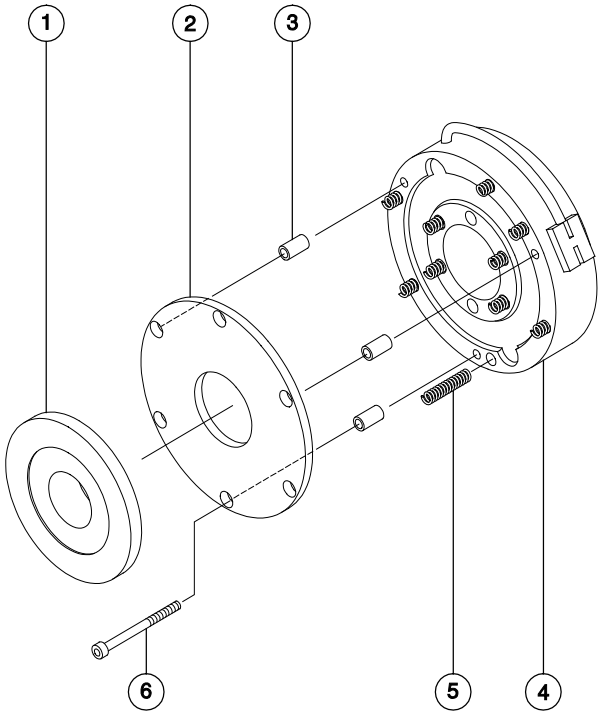
5 Loosen the brake mounting fasteners in an even pattern until all spring tension has been relieved. Remove the fasteners.

6 Remove the brake from the drive motor.

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

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





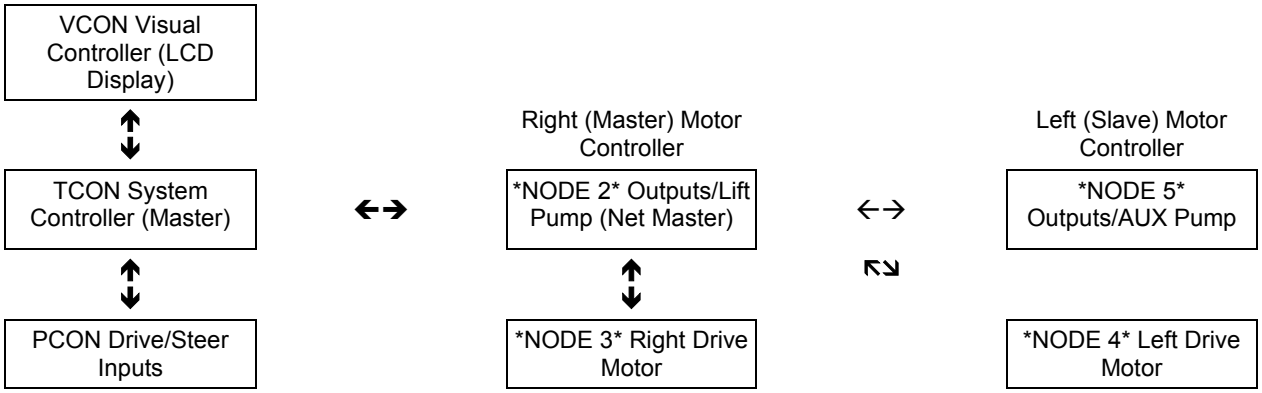
1 brake disk
2 brake plate
3 spacer
4 brake body
5 spring
6 screw

Motor Controllers

11-1 Motor Controllers

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

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



Fault Codes



Observe and Obey:

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

Before Troubleshooting:

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

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

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

Control System Fault Codes

Control System Fault Codes

How to Retrieve Control System Fault Codes from the Platform Controls

At least one fault code is present when the alarm at the platform controls produces two short beeps every 30 seconds for 10 minutes.

1 Turn the key switch to platform control.

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

3 Do not press down the foot switch.

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

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

⊙ Result:The display will show FAULTS.

To access active faults:

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

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

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

To access motor controller faults:

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

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

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

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

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

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

To exit programming mode:

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

Control System Fault Codes

How to Retrieve Control System Fault Codes from the Ground Controls

1 Turn the key switch to platform control.

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

3 Open the ground controls side turntable cover.

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

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

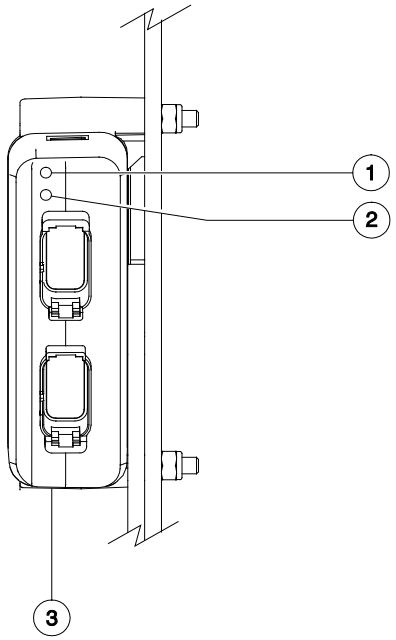
Note: The red LED indicates the source of the error and the green LED indicates the error type.

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

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

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

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



1 green LED
2 red LED
3 turntable control module (TCON)

Control System Fault Codes

Error Source		Error Type			
ID	**Name**	**ID**	**Name**	**Condition**	**Solution**
11	**BATTERY_PWR**	12	Out of range	Main contactor open or will not close. All functions disabled.	Do not operate machine with batteries charging. Batteries overcharged, exceeds 65V DC with excessive braking. Batteries undercharged, may occur under load. Replace right (master) AC motor controller.
		15	Value too low	Slow functions. Battery charge less than 10%.	Charge or replace batteries.
12	**PR5_COIL** Main contactor coil.	15	Value too low Coil shorted	All functions disabled.	Check for short to main contactor. Check diode on main contactor. Replace main contactor. Replace right (master) motor controller.
13	**PR5_CONTACT** Main contactor.	12	Value too high Contacts stuck closed	All functions disabled.	Check for voltage at main contactor coil with machine in the on position. (24V DC on red wire. 48V DC on orange wire). Replace main contactor.
		15	Value too low Contacts stuck open	All functions disabled.	Check for voltage at main contactor coil with machine in the on position. (24V DC on red wire. 48V DC on orange wire). Replace main contactor.
14	**RELIEF_VALVE**	12	Value too high Open circuit (unplugged or failed valve coil)	No primary or secondary up	Check for open at proportional relief valve.(wh/rd wire). Replace coil.
		16	Value at 0V output shorted to B-	No primary or secondary up.	Check for short to proportional relief valve. Check coil resistance (22 Ohms). Replace coil.

Control System Fault Codes

Error Source		Error Type			
ID	**Name**	**ID**	**Name**	**Condition**	**Solution**
15	**FOOTSWITCH**	22	Fault Foot switch on within 200 milliseconds of power-up	All functions disabled.	Release foot switch and recycle power. Check for power to PCON at C28-6 with foot switch not pressed. Replace foot switch
		24	Time out	All functions disabled.	Release foot switch and press again.
16	**SPEED_DIAL** Rotary Speed controller	12	Value too high > 5.2 volts	Function speeds reduced.	Check for 5V DC (orange wire). Check output. 0-4.7V DC (wh/rd). Check input at VCON at C35-3. Replace rotary controller.
17	**LIFT_PUMP**	12	Value too high Pump motor output too high with repsect to PWM applied	Lift pump disabled Auxiliary functions only.	Check for 48V DC to main function pump. Check for current leakage from motor or cables to B-. Replace right (master) AC motor controller.
		15	Value too low		Do not operate machine with batteries charging. Check for 48V DC to main function pump. Replace right (master) AC motor controller.
		22	Fault		Allow main pump to cool down. Check for air restriction to electric motor. Check relief valve settings at main manifold.
18	**TACH_LIFTPUMP** Lift pump motor encoder.	22	Fault	No primary up or secondary up.	Check 3 wire plug on encoder at pump motor. Check 5V DC (red wire). Replace lift pump encoder and wiring.
19	**AUX_PUMP** Auxiliary pump.	12	Value too high	Auxiliary functions disabled.	Check fuse F1 (200A). Check for 24V DC to Aux pump. Replace Aux. pump. Replace left (slave) AC motor controller.
		15	Value too low	Main lift pump and drive disabled.	Check for 24V DC to Aux pump. Replace Aux. pump. Replace left (slave) AC motor controller.

Control System Fault Codes

Error Source		Error Type			
ID	**Name**	**ID**	**Name**	**Condition**	**Solution**
21	**PRI_UD_JYSTK** Primary up/down joystick.	11 16	Shorted to supply Value at 0V	Primary up/down function disabled.	Inspect and repair joystick wiring. Replace joystick.
		17	Not calibrated Neutral out if range		Check neutral output range is within 2000 to 3000 mV. Calibrate joystick. Replace joystick.
22	**PRI_UP_VALVE** Primary boom up valve.	12 15	Value too high Value too low	Primary up function disabled.	Check for open or short from TCON(C14-5) to the up coil. Replace coil.
23	**PRI_DN_VALVE** Primary boom down valve.	12 15	Value too high Value too low	Primary down function disabled.	Check for open or short from TCON(C14-6) to the down coil. Replace coil.
25	**PRI_ER_JYSTK** Primary boom extend/retract joystick.	11 16	Shorted to supply Value at 0V	Primary extend/retract function disabled.	Inspect and repair joystick wiring. Replace joystick.
		17	Not calibrated Neutral out if range		Check neutral output range is within 2000 to 3000 mV. Calibrate joystick. Replace joystick.
26	**PRI_EX_VALVE** Primary boom extend valve.	12 15	Value too high Value too low	Primary extend function disabled.	Check for open or short from TCON(C14-3) to the extend coil. Replace coil.
27	**PRI_RT_VALVE** Primary boom retract valve.	12 15	Value too high Value too low	Primary retract function disabled.	Check for open or short from TCON (C14-4) to the retract coil. Replace coil.
32	**SEC_UP_VALVE** Secondary boom up valve.	12 15	Value too high Value too low	Secondary up function disabled.	Check for open or short from TCON (C14-7) to the secondary up coil. Replace coil.

Control System Fault Codes

Error Source		Error Type			
ID	**Name**	**ID**	**Name**	**Condition**	**Solution**
33	**SEC_DN_VALVE** Secondary boom down valve.	12 15	Value too high Value too low	Secondary down function disabled.	Check for open or short from TCON (C14-8) to the secondary down coil. Replace coil.
36	**JIB_UP_VALVE** Jib boom up valve.	12 15	Value too high Value too low	Jib up function disabled.	Check for open or short from PCON (C29-5) to the jib up coil. Replace coil.
37	**JIB_DN_VALVE** Jib boom down valve.	12 15	Value too high Value too low	Jib down function disabled.	Check for open or short from PCON (C29-6) to the jib down coil. Replace coil.
41	**TT_ROT_JYSTK** Turntable rotate joystick.	11 16	Shorted to supply Value at 0V	Turntable rotate functions disabled.	Inspect and repair joystick wiring. Replace joystick.
		17	Not calibrated Neutral out of range	Turntable rotate functions disabled.	Check neutral output range is within 2000 to 3000 mV. Calibrate joystick. Replace joystick.
42	**TT_CW_VALVE** Turntable rotate clockwise valve.	12 15	Value too high Value too low	Turntable rotate clockwise function disabled.	Check for open or short from TCON (C29-8) to the turntable CW coil. Replace coil.
43	**TT_CCW_VALVE** Turntable rotate counter clockwise	12 15	Value too high Value too low	Turntable rotate counterclockwise function disabled.	Check for open or short from TCON (C29-7) to the turntable CCW coil. Replace coil.
46	**PROT_CW_VALV** Platform rotate clockwise valve.	12 15	Value too high Value too low	Platform rotate clockwise function disabled.	Check for open or short from PCON (C29-3) to the platform rotate CW coil. Replace coil.
47	**PROT_CCW_VLV** Platform rotate counter clockwise	12 15	Value too high Value too low	Platform rotate counterclockwise function disabled.	Check for open or short from PCON (C29-4) to the platform rotate CCW coil. Replace coil.
51	**DRIVE_JYSTK** Drive joystick.	11 16	Shorted to supply Value at 0V	Drive functions disabled.	Inspect and repair joystick wiring. Replace joystick.
		17	Not calibrated Neutral out of range		Check neutral output range is within 2000 to 3000 mV. Calibrate joystick. Replace joystick.

Control System Fault Codes

Error Source		Error Type			
ID	**Name**	**ID**	**Name**	**Condition**	**Solution**
52	**AC_R_MOTOR** Right side drive motor.	12	Value too high	Drive function disabled.	Do not operate machine with batteries charging. Check cable connections. Check for 33V AC across any two legs on drive motor at full stick. Replace right drive motor. Replace right (master) AC motor controller.
		15	Value too low		Check cable connections. Check for 33V AC across any two legs on drive motor at full stick. Replace right drive motor. Replace right (master) AC motor controller.
		22	Fault		Check wires to thermal sensor at 6 wire deutsch plug on motor. Check resistance on thermal sensor.
53	**AC_L_MOTOR** Left side drive motor.	12	Value too high	Drive function disabled.	Do not operate machine with batteries charging. Check cable connections. Check for 33V AC across any two legs on drive motor at full stick. Replace right drive motor. Replace right (master) drive controller.
		15	Value too low		Check cable connections. Check for 33V AC across any two legs on drive motor at full stick. Replace right drive motor. Replace right (master) AC motor controller.
		22	Fault		Check wires to thermal sensor at 6 wire connector on motor. Check resistance on thermal sensor.
54	**BRAKE_RIGHT** Brake AC motor right side.	15	Value too low Coil shorted	Drive function disabled.	Check for 48V DC to brake (WH/RD). Check for 48V DC at C16-4. (48V is brake set, 0V is released). Replace brake

Control System Fault Codes

Error Source		Error Type			
ID	**Name**	**ID**	**Name**	**Condition**	**Solution**
55	**BRAKE_LEFT** Brake AC motor left side.	15	Value too low Coil shorted	Drive function disabled.	Check for 48V DC to brake (WH/RD). Check for 48V DC at C23-4. (48V is brake set, 0V is released). Replace brake
56	**TACH_R_MOTOR** Right side AC drive motor encoder.	22	Fault	Drive function disabled.	Check wiring at the 6 wire connector at the drive motor. Check for 12V DC on pins 1 and 2. Replace motor. Replace right (master) AC motor controller.
57	**TACH_L_MOTOR** Left side AC drive motor encoder.	22	Fault	Drive function disabled.	Check wiring at the 6 wire connector at the drive motor. Check for 12V DC on pins 1 and 2. Replace motor. Replace left (slave) AC motor controller.
58	**AC_R_CTRLR** Right side AC motor controller.	13	No response	All functions disabled.	Check can bus circuit for open. Check can bus resistor. Isolate all other modules simultaneously. Replace right AC motor controller.
		22	Fault	All functions disabled or limited.	Refer to MOTOR CONTROLLER FAULT CODES screen at platform. See M*otor Controller Fault Codes* chart.
59	**AC_L_CTRLR** Left side AC motor controller.	22	Fault	All functions disabled or limited.	Refer to MOTOR CONTROLLER FAULT CODES screen at platform. See *Motor Controller Fault Codes* chart.
61	**STEER_JYSTK** Joystick steer.	11 16	Shorted to supply Value at 0V	Steering function disabled.	Repair joystick wire connections or replace joystick.
		17	Not calibrated		Calibrate joystick. Replace joystick.
62	**AC_R_OUTPUT** Right side AC motor controller output.	15	Value too low Coil shorted	Steering and platform level functions disabled. Flashing beacon disabled	Check wiring and coil for function causing fault. Fault at power up, replace right AC motor controller.
		16	Value at 0V Output shorted to B-	Steering and platform level functions disabled. Flashing beacon disabled	Check wiring and coil for function causing fault. Fault at power up, replace right (Master) AC motor controller.

Control System Fault Codes

Error Source		Error Type			
ID	**Name**	**ID**	**Name**	**Condition**	**Solution**
63	**STEER_SENSOR** Steer angle sensor.	11 12 15 16 17 22	Shorted high (5V) Value too high Value too low Value at 0V Not calibrated Fault	Wheel speed correction is disabled. Drive speed reduced.	Check for 5V DC (GR/WH) at steer sensor. Check for 0-5V DC (orange) output at steer sensor. Check for 0-5V DC (orange) at C16-30 on right AC motor controller. Replace steer sensor.
					Replace steer sensor. Re-calibrate steer sensor. Verify wiring. Replace steer sensor
66	**AC_L_OUTPUT** Left side AC motor controller output.	15	Value too low	Hour meter, brake relay and tilt sensor alarm disabled. Platform overload alarm disabled (option).	Check wiring and coil for function causing fault. Fault at power up, replace left AC motor controller.
		16	Value at 0V Output shorted to B- (only detected with key switch turned to platform)	Hour meter, brake relay and tilt sensor alarm disabled. Platform overload alarm disabled (option).	Check wiring and coil for function causing fault. Look for short to B- in wire from faulted function to left AC motor controller
67	**DENA_SW_PBOX** Platform control box drive enable switch.	12 19 22	Value too high Out of Range Fault	Drive function disabled in drive disable zone.	Check for voltage output at drive enable toggle switch. (Blue) C35-4. Check for voltage output when not activated.
68	**FUNC_SW_GBOX** Ground box function enable switch.	22	Fault	Auxiliary functions only.	Check for 24V DC at function enable toggle switch. Check for 24V DC input at TCON at C14-2. Check for voltage output when not activated.
71	**ESTOP_RELAY** Emergency Stop relay.	11	Shorted to supply	All functions disabled.	With Red Emergency Stop pulled out at ground control, CR62 should close. Check for 24V DC on 30 and 87 of CR62. Replace relay. Replace red Emergency Stop button contacts.

Control System Fault Codes

Error Source		Error Type			
ID	**Name**	**ID**	**Name**	**Condition**	**Solution**
72	**JROT_CW_VALV** Jib rotate clockwise valve.	12 15	Value too high Value too low	Jib rotate clockwise function disabled.	Check for open or short from PCON (C29-8) to the platform rotate CW coil. Replace coil.
74	**JROT_CCW_VLV** Jib boom rotate counterclockwise valve.	12 15	Value too high Value too low	Jib rotate counterclockwise function disabled.	Check for open or short from PCON (C29-7) to the platform rotate CCW coil. Replace coil.
76	**OVERLOAD_SW** Platform overload switch (option).	12 22	Value too high Fault	Platform functions limited to recovery only. Primary lift pump functions at ground controls disabled. Auxiliary functions at ground control only. Extend disabled.	Do not exceed maximum platform weight. Check for 24V DC input to load sensor (black.) Check for 24V DC output from load sensor when not overloaded to PCON pin C28-7 (black at switch, WH/BK at module). Check for 0V DC output from load sensor when not overloaded to right AC motor controller pin C16-19 (white at switch, BL/WH at module).
77	**VCON_PBOX** Platform display screen.	13	No response	Platform functions disabled. Ground controls operative.	Check can bus circuit for open. Check can bus resistor (120 Ω). Isolate all other modules simultaneously.
78	**PCON_PBOX** Platform controller screen.	13	No response	Platform functions disabled. Ground controls operative.	Check can bus circuit for open. Check can bus resistor. Isolate all other modules simultaneously.
82	**LOAD SENSE RECOVERY**	22	Fault	System was overloaded and moved under AUX power.	For reporting purposes only.
83	**DISABLED BY OWNER**	22	Fault	Functions disabled.	Contact machine owner

Motor Controller Fault Codes

AC Motor controller code	Error Type	Condition	Solution
24592	Watchdog	No functions or drive.	Replace the AC motor controller.
65297	Logic failure #3	No functions or drive.	Replace the AC motor controller.
65298	Logic failure #2	No functions or drive.	Replace the AC motor controller.
8977	S TB Y I HIGH	No functions or drive.	Replace the AC motor controller.
12592	Capacitor charge	No functions or drive.	Check for 48V DC on B + , using B - for ground. Replace the AC motor controller.
12833	Contactor driver	No functions or drive.	Replace the AC motor controller.
65503	Safety feedback	No functions or drive.	Replace the AC motor controller.
12835	P OS AUX Shorted	No functions or drive.	Check for 48V DC on the WH/RD wire going to the right brake coil. Replace the AC motor controller.
8785	Hardware c oil s hort tim e out	No functions or drive.	Replace the AC motor controller.
65512	Wrong set point	No functions or drive.	Replace the AC motor controller.
6513	Power M OS shorted	No functions or drive.	Replace the AC motor controller.
65515	Tiller error	No functions or drive.	Check for 48V DC R-1, OR/RD on master motor controller. Check for 24V DC on R-29, Blue on master motor controller. Replace AC motor controller.

Motor Controller Fault Codes

AC Motor controller code	Error Type	Condition	Solution
65517	Analog input	No functions or drive.	If problem is c ons is tant, replac e the AC controller.
65520	Hardware fault	No functions or drive.	Replace the AC motor controller.
65531	Wrong set battery	Cut out valves, function pump, propel stopped, MC opened, EB applied.	Replace the AC motor controller.
21808	EEPROM time out	Functions and drive will revert to factory default settings.	Cycle power off and back on. If the fault disappears, all valve settings will have to be readjusted. If fault is maintained, replace the AC motor controller.
13912	High temperature	Functions and drive start to degrade and quit. One or both motor controllers have exceeded 85°C/185°F.	Let the AC motor controllers cool off. If fault persist with AC motor controllers cooled, replace faulty AC motor controller.
65516	Current gain	Functions and drive will revert to factory default settings.	Readjust the max current Setting.
16913	Thermic sensor time out	Function and drive speeds will slow down.	Replace the AC motor controller.
65512	Slip profile	No drive.	Replace the AC motor controller.
65360	Forward/Reverse	Propel is stopped (node 2 only).	Replace the right (master) AC motor controller.
65508	Plat-Gnd switch open	Node 2 only.	Replace the right (master) AC motor controller.
65521	Check up needed	Continuous normal operation (node 2 only).	Perform scheduled maintenance

Motor Controller Fault Codes

AC Motor controller code	Error Type	Condition	Solution
24592	Watchdog	No functions or drive.	Replace the AC motor controller.
65509	Wrong zero	No functions or drive.	Replace the AC motor controller.
65510	Output mismatch	No functions or drive.	Replace the AC motor controller.
65530	Input mismatch	No functions or drive.	Replace the AC motor controller.
65511	Safety feedback	No functions or drive.	Replace the AC motor controller.
65512	Wrong setpoint	No functions or drive.	Replace the AC motor controller.
65513	Wrong config.	No functions or drive.	Replace the AC motor controller.
65532	Hardware fault	No functions or drive.	Replace the AC motor controller.
65528	Analog input	No functions or drive.	Replace the AC motor controller.
21808	EEPROM time out	No functions or drive.	Replace the AC motor controller.
9233	I=0 ever	No functions or drive.	Replace the AC motor controller.
8977	STBY I HIGH	No functions or drive.	Replace the AC motor controller.
16912	High temperature	Function pump chopper maximum current reduced proportionally to temperature increase.	Let the AC motor controllers cool off. If fault persist with AC motor controllers cooled, replace faulty AC motor controller.
65515	Hardware fault valve	No functions or drive.	Replace the AC motor controller.
65280	Tiller mismatch	No functions or drive.	Replace the AC motor controller.
16913	Current sensor time out	No functions or drive.	Replace the AC motor controller.
21776	EEPROM warning	No functions or drive.	Replace the AC motor controller.

Motor Controller Fault Codes

Drive Motor Thermal Sensor

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

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

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

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

How to Test the Thermal Sensor

1 Disconnect the battery packs from the machine.

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

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

3 Remove the fasteners from the axle covers from the non-steer axle. Remove the covers.

4 Tag and disconnect the six pin Deutsch electrical connector for the speed and temperature sensor at the drive motor.asure the drive motor case temperature using a thermometer.

5 Measure the drive motor case temperature using a thermometer.

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

Motor Controller Fault Codes

Temperature	Resistance
°F / °C	Ohm
-40 / -40	355
-22 / -30	386
-4 / -20	419
14 / -10	455
32 / 0	493
50 / 10	533
68 /20	576
77 / 25	598
86 / 30	621
104 / 40	668
122 / 50	718
140 / 60	769
158 / 70	824
176 / 80	880
194 / 90	939
212 / 100	1000
230 / 110	1063
248 / 120	1129
266 / 130	1197
284 / 140	1268
302 / 150	1340

Temperature	Resistance
°F / °C	Ohm
320 / 160	1415
338 / 170	1493
347 / 180	1572
374 / 190	1654
392 / 200	1739
410 / 210	1825
428 / 220	1914
446 / 230	2006
464 / 240	2099
482 / 250	2195
500 / 260	2293
518 / 270	2392
536 / 280	2490
554 / 290	2584
572 / 300	2668

Schematics



Observe and Obey:

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

Before Troubleshooting:

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

About This Section

There are two groups of schematics in this section.

Electrical Schematics

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

Hydraulic Schematics

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

Schematics

Circuit numbering

1 Circuit numbers consist of three parts: the circuit prefix, circuit number and circuit suffix. The circuit prefix indicates the type of circuit. The circuit number describes the function of the circuit. The circuit suffix provides an abbreviation for the number or may be used to further define the function of this portion of the circuit. It also may be used to indicate the final end of the circuit, i.e., LS or limit sw.

2 The circuit number may be used more than once in a circuit.

For Example:

C 74 PL – This is the circuit for the lockout valve #1. C stands for control, 74 is the number of the circuit for the primary #1 lock out valve. PL stands for Primary Lockout.

S 62 BST – This is the circuit that communicates to the onboard computers of the machine that the boom is fully stowed. S stands for safety, 62 is the number of the circuit for boom stowed and BST stands for Boom Stowed.

P 48 LP – P stands for power. 48 is the circuit number for work lamps and LP stands for Lamp.

R 48 LP – R stands for relay. In this case it is the wire that feeds the relay coil for the work lamp. All other numbers remain the same.

V61AXR – V stands for valve power. Number 61 stands for axle retracted circuit; AXR stands for Axle retracted.

R46HRN – R stands for Relay output, supplying power to the horn (HRN). Number 46 is the circuit number for the horn.

Circuit prefix

C	Control
D	Data
E	Engine
G	Gauges
N	Neutral
P	Power
R	Relay Output
S	Safety
V	Valve

Schematics

Suffix	Definition
GEN	AC Generator
AF	Alternator Field
ANG	Angle
ABV	Auxiliary Boom Valve
AFV	Auxiliary Forward Valve
AH	Auxiliary Hydraulic Pump
APV	Auxiliary Platform Valve
ARV	Auxiliary Reverse Valve
ASV	Auxiliary Steer/Drive Valve
AXE	Axle Extend Valve
AXO	Axle Oscillate
AXR	Axle Retract Valve
AFP	Axle Front Position
RAP	Axle Rear Position
BAT	Battery
BEX	Boom Extended
BST	Boom Stowed
BRK	Brake
BV	Bypass Valves
CAL	Calibrate
CAN	CAN Signal
SHD	CAN Shield
CAT	CATS Module
CNK	Chain Break
DTH	Data High
DTL	Data Low
DCN	Drive Chassis Controller
DE	Drive Enable
DEL	Drive Enable Left
DER	Drive Enable Right

Suffix	Definition
EDC	Electrical Displacement Control
ENV	Envelope Light
ESP	Engine Speed Select
ESL	Engine Status Lamp
ENL	Envelope Lockout
FLR	Filter Restricted
FLT	Filter Switch
FB	Flashing Beacon
FS	Float Switch
FTS	Foot switch Signal
FWD	Forward
FP	Fuel Pump
FL	Fuel Select (gas/LP)
FSL	Fuel Solenoid
FE	Function Enable
TCN	Ground Control
GND	Ground
HRN	Horn
HS	High RPM
HG	Hydraulic Generator
IGN	Ignition
JBD	Jib Bellcrank Down
JBU	Jib Bellcrank Up
JBS	Jib Sensor
JUD	Jib Up/Down Control
JD	Jib Down
JFC	Jib Up/Down Flow Control
JSV	Jib Select Valve
JU	Jib Up
JER	Jib Extend/Retract Control

Schematics

Suffix	Definition
JBE	Jib Extend
JBR	Jib Retract
JRL	Jib Rotate Left (CCW)
JRR	Jib Rotate Right (CW)
JPW	Joystick 5V DC Power
LPS	Lamps
LF	Left Front
LFS	Left Front Steer Sensor
LR	Left Rear
LRS	Left Rear Steer Sensor
LS	Limit Switch
LSR	Lift Speed Reduction
LDS	Load Sensor
LO	Lockout
LS	Low RPM
LOF	Low fuel
MS	Motor Shift (Speed)
MFV	Multi Function Valve
PCN	Platform Control
PLD	Platform Level Down
PLF	Platform Level Flow Control
PLU	Platform Level Up
PRF	Platform Rotate Flow Control
PRC	Platform Rotate Control
PRL	Platform Rotate Left (CCW)
PRR	Platform Rotate Right (CW)
PTA	Platform Tilt Alarm
PTS	Platform Tilt Sensor
PCE	Pressure Comp Enable
PSR	Pressure Sender
PS	Pressure Switches
PBS	Primary Boom Angle Sensor
PBD	Primary Boom Down
PBL	Primary Boom Extend/Retract Lockout Valve
PBE	Primary Boom Extend
PER	Primary Boom Extend/Retract Flow Control
PBR	Primary Boom Retract
PBU	Primary Boom Up
PBF	Primary Boom Up/Down Flow Control
PLS	Primary Boom Extend/Retract Signal
PES	Primary Boom Up/Down Signal
PEL	Primary Extend/Retract Lockout
PSL	Primary Length Sensor
PL	Primary Lockout
PWR	Power
PSL	Power to Length Sensor
PSE	Program Set up Enable
JPL	Propel Signal
PLL	Propel Lockout
PRV	Proportional Valve
PXS	Proximity Sensor
REC	Receptacle
RCV	Recovery
RL	Retract Lockout
RET	Return
REV	Reverse
RF	Right Front
RFS	Right Front Steer Sensor
RR	Right Rear
RRS	Right Rear Steer Sensor

Suffix	Definition
RPM	RPM
SBS	Sec Boom Angle Sensor
SBL	Sec Boom Elevated
SBD	Sec Boom Down
SBE	Sec Boom Extend
SER	Sec Boom Extend/Retract Flow Control
SBR	Sec Boom Retract
SBU	Sec Boom Up
SUD	Sec Boom Up/Down Flow Control
SB	Secondary Boom
SLE	Secondary Boom Lockout Valve (extend)
SLD	Secondary Boom Lockout Valve (riser down)
SP	Spare
SS	Speed Sensor
SA	Start Aid (Glow Plug or choke)
STR	Starter
STC	Steer Control Signal
SCW	Steering Valve (CW)
SCC	Steering Valve (CCW)
TSR	Temp Sender
TS	Temp Switches
TET	Tether
TAX	Tilt Alarm X axis
TAY	Tilt Alarm Y axis
TCN	Ground Control Panel
TRF	Turntable Rotate Flow Control
TRR	Turntable Rotate Right (CW)
TTA	Turntable Tilt Alarm
TTS	Turntable Tilt Sensor
TSW	Test Switch

Schematics

Wire Coloring

1 All cylinder extension colors are solid and all retract functions are striped black. When using black wire, the stripe shall be white.

2 All rotations that are LEFT or CW are solid, RIGHT or CCW are striped and black. When the wire is black, the stripe is white.

3 All proportional valve wiring is striped.

Wire Color Legend

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

Power Circuits

P10	Primary boom extend valve
P11	Primary boom up valve
P30	Secondary boom down and extend valves
P38	Propel (drive) valves
P39	Turntable rotate flow control valve

Schematics

Color	Circuit #	Primary Function
RD	1	Primary boom up driver
RD/BK	2	Primary boom down driver
RD/WH	3	Primary boom up/down flow control proportional valve driver
WH	4	Turntable rotate left valve driver
WH/BK	5	Turntable rotate right valve driver
WH/RD	6	Turntable rotate flow control proportional valve driver
BK	7	Primary boom extend
BK/WH	8	Primary boom retract
BK/RD	9	Primary boom Extend/Retract proportional valve driver
BL	10	Secondary boom up valve driver
BL/BK	11	Secondary boom down valve driver
BL/WH	12	Secondary boom up/down flow control proportional valve driver
BL/RD	13	Drive enable
OR	14	Platform level up valve
OR/BK	15	Platform level down valve
OR/RD	16	Platform up/down flow control proportional valve driver
GR	17	Platform rotate left valve driver
GR/BK	18	Platform rotate right valve driver
GR/WH	19	Jib select valve driver circuit
RD	20	12V DC battery supply
WH	21	12V DC ignition supply
BK	22	Key switch power to platform
WH	23	Power to platform

Color	Circuit #	Primary Function
RD	24	Power to warning senders
WH/BK	25	Power to oil pressure sender
WH/RD	26	Power to temp sender
RD	27	Auxiliary Power
RD/BK	28	Platform level alarm
RD/WH	29	Drive Motor shift (speed)
WH	30	Forward/EDC-A
WH/BK	31	Reverse/EDC-B
WH/RD	32	Brake
BK	33	Start
BK/WH	34	Start Aid (glow plug or choke)
BK/RD	35	High Engine speed select
BL	36	Steer clockwise
BL/BK	37	Steer counterclockwise
BL/WH	38	Gasoline
BL/RD	39	LPG
OR	40	Limit switch signal stowed
OR/BK	41	RPM signal
OR/RD	42	Boom retracted signal
GR	43	Jib Up
GR/BK	44	Jib Down
GR/WH	45	AC Generator
WH	46	Horn
WH/BK	47	Output Power Enable
WH/RD	48	Work Lamp
WH/BK	49	Motion Lamp
BL	50	Auxiliary Boom
BL/WH	51	Auxiliary Steer
BL/RD	52	Auxiliary Platform

Schematics

Color	Circuit #	Primary Function
WH/BK	53	Boom envelope safety valve cutoff
BK/WH	54	Power to safety interlock switches (engine)
GR/BK	55	Axle oscillation
RD	56	Foot switch/TCON estop power
RD/WH	57	Boom down safety interlock
RD/BK	58	Safety interlock to engine
GR/WH	59	Chain break circuit
GR/WH	60	Axle extend
GR	61	Axle retract
OR	62	Boom stowed (safety)
OR/RD	63	Power to boom envelope safety switch
OR/BK	64	Power for operational switches
BL/WH	65	Low fuel indication
BL	66	Drive Enable
BL	67	Secondary boom not stowed
RD	68	Primary Boom lowered (operational)
BK	69	Primary boom #1 extended
BL/WH	70	Primary boom #2 retracted
BL/BK	71	Primary boom #2 extended
GR	72	Secondary boom extend
GR/BK	73	Secondary boom retract
RD	74	Primary #1 Lockout
RD/WH	75	Primary #2 Lockout
BL	76	Primary boom #3 extended
WH	77	Lower Angle #1 operational
WH/BK	78	Upper Angle #2 operational
BK	79	Power from TCON ESTOP
N/A	80	Can 2.0/J1939 Shield
GR	81	Can 2.0/J1939 Low
Y L	82	Can 2.0/J1939 High
GR/WH	83	Tilt signal X axis
GR/BK	84	Tilt signal Y axis
GR	85	Tilt sensor power
OR	86	Hydraulic Filter restricted
RD	87	Platform Level Safety Power
RD/BK	88	Platform Level Safety Output
BR	89	Platform Level Safety Ground
RD/BK	90	Proximity Kill
RD/WH	91	Gate Interlock
WH/BK	92	Motor Speed (LO/HI)
WH/RD	93	Motor Bypass
WH	94	Load Sensor
OR	95	Tether ESTOP return
RD	96	Tether Power
BK	97	Tether ESTOP Power
WH	98	J1708 + (high)
BK	99	J1708- (low)
WH/RD	100	Outrigger lowered
WH/BK	101	Outrigger raised
OR	102	Pothole protector up
OR/RD	103	Pothole protector down
BK/WH	104	Proprietary Data buss -(I.e. ITT or AP)
BK/RD	105	Proprietary Data buss + (I.e. ITT or AP)

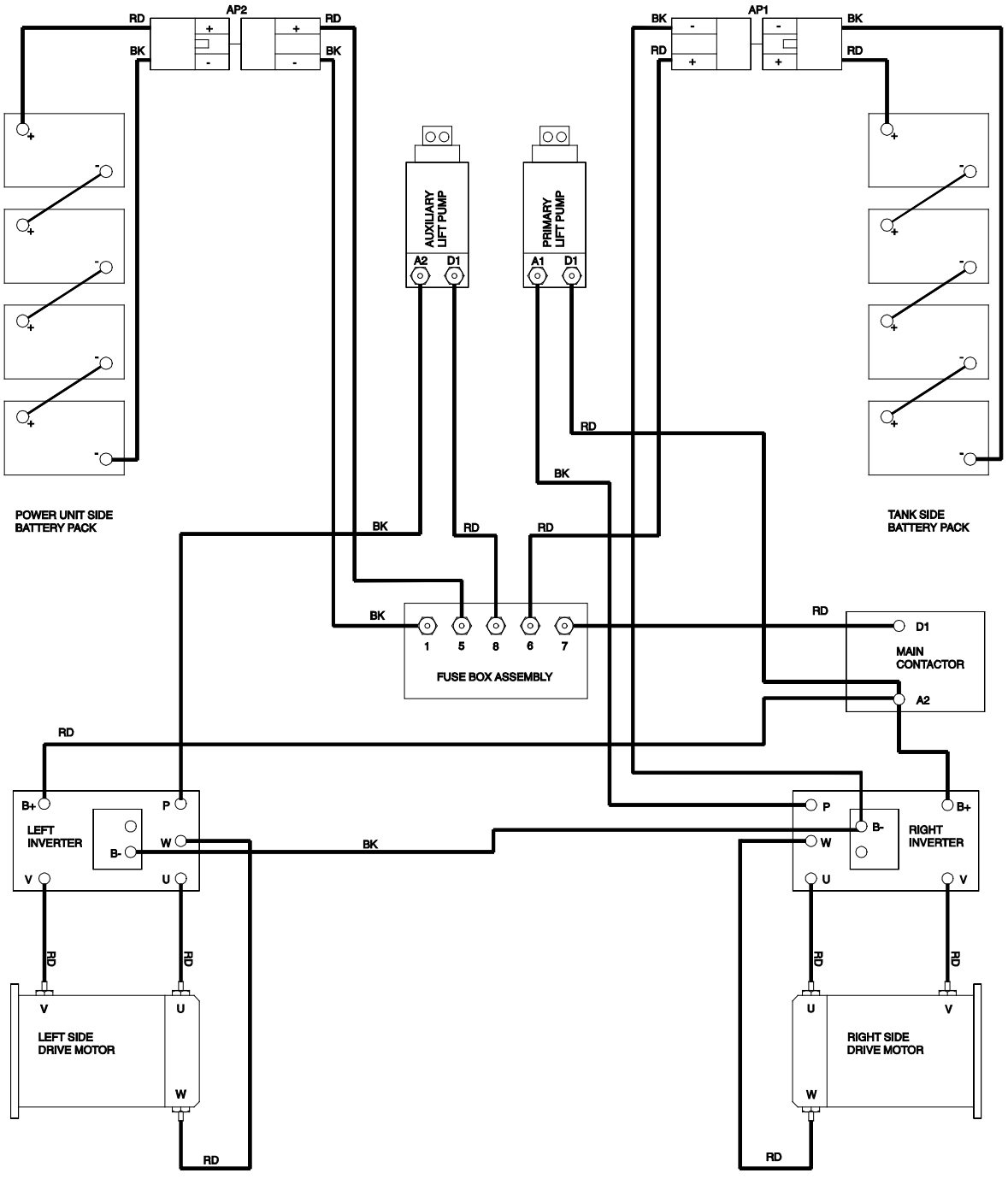
Schematics

Color	Circuit #	Primary Function
GR	106	Spare
RD	107	Alternator Field
BL/WH	108	Engine Status
GR/WH	109	Sensor Power
BK	110	Sensor Return
OR	111	Steer Signal
RD	112	Steer Signal to Solenoid Valve
OR/RD	113	Multi-function Valve
BK/RD	114	Load Moment Overweight
RD/BK	115	Load Moment Underweight
OR	116	Hydraulic Oil Cooler
RD	117	Flashing Beacon
OR	118	Lift Speed Reduction
BL	119	Hydraulic Pressure Sensor Output
OR	120	Oil Cooler Fan
GR	121	Axle Oscillate Left
GR/BK	122	Axle Oscillate Right
RD/BK	123	Primary Boom Angle Signal Operational
RD/WH	124	Secondary Boom Angle Signal Operational
WH/RD	125	Secondary Boom Lockout (Extend Enable)
WH/BK	126	Secondary Boom Lockout (Riser Down Enable)
GR	127	ECU Test Switch
OR/RD	128	Low Engine Speed
RD/BK	129	Descent Alarm
WH/RD	130	Travel Alarm
BL	131	Motion Alarm
GR	132	Platform Load Input
GR/WH	133	Platform Load Alarm
GR/BK	134	Key Switch power
BL/WH	135	Fuel Pump
RD	136	Power to Safety Module
RD/WH	137	Propel Power (P_38)
RD/BK	138	Primary Boom Up/Secondary Boom Down-Extend (P_11/30)
WH/RD	139	Turntable Rotate Flow Control Safety (P_39)
OR/RD	140	Boom Envelope Safety
RD	141	Primary Boom Angle Signal Safety
OR	142	Secondary Boom Angle Signal Safety
BL/RD	143	Drive Enable Left
BL/WH	144	Drive Enable Right
RD/WH	145	Calibrate
BL	146	Jib Bellcrank Up Flow Control
BL/BK	147	Jib Bellcrank Down Flow Control
BL/WH	148	Jib Bellcrank Sensor
GR/WH	149	Jib Up/Down Flow Control
GR/BK	150	Hydraulic Generator Bypass
GR	151	Hydraulic EDC Output
BK	152	Injector Retard
BK	153	Jib Extend
BK/WH	154	Jib Retract

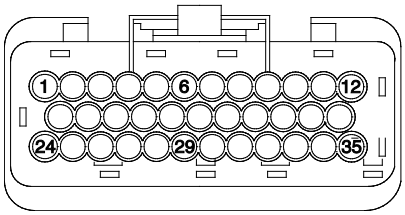
Schematics

Color	Circuit #	Primary Function
OR/RD	155	Pressure Comp. Enable
GN/WH	156	Jib Up/Down
BK/RD	157	Jib Extend/Retract
BL/RD	158	Steer Signal Rocker
BL/WH	159	Steer Joystick Signal
WH/RD	160	Propel Joystick Signal
WH/BK	161	Secondary Boom Joystick Signal
OR	162	Joystick 5V DC power
BL/WH	163	Primary Extend/Retract Signal
RD/WH	164	Primary Up/Down Signal
WH/RD	165	TT Rotate Signal
OR	166	Boom Length Signal Safety
OR/BK	167	Boom Length Signal Operational
BL/RD	168	Primary Boom Hydraulic Lockout
GN	169	Envelope Active LED
WH/RD	170	Load Sense Relay Source
WH/BK	171	Load Sense Relay Sink
BL	172	Up/Down Flow Control Ground
BK	173	Extend/Retract Flow Control Ground
WH	174	Key switch Power, Ground Position
WH/BK	175	Load Sensor Signal, Operational
GR/WH	176	Secondary Extend/Retract Flow Control
BL/RD	177	Extend/Retract Lockout
BK	178	Control Module Status Light
GR	179	Drive Power Relay
BK	180	Lift Power Relay
OR	181	48 volt Alternator Field (or battery)
RD	182	24 volt battery
BL	183	Envelope or Load Sense Recovery
WH	184	Program Set up Enable
WH	185	Encode A
BL	186	Encode B
BL	187	Bootstrap or Program Enable
GR	188	Safety Cross Check
BK	189	Data Receive
BK/WH	190	Data Transmit
WH/RD	191	Multi-function Pressure Relief
WH/BK	192	Jib Rotate Left
WH/RD	193	Jib Rotate Right
WH/RD	194	Speed Select Input
OR/RD	195	Electric Brake Source
Y L	196	2.5 volt Sensor Power
BR	N/A	Ground or Return

Power Cable Diagram



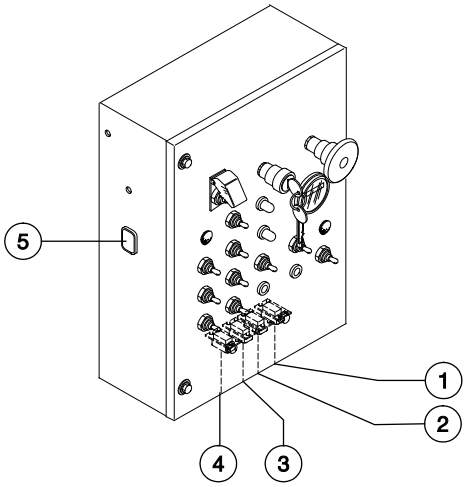
Motor Contoller Pin Legend



Pin Numbering for 35 Pin Motor Controller Connector

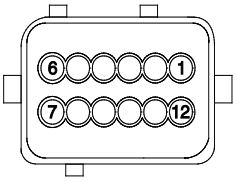
	Left Motor Controller (Slave)		Right Motor Controller (Master)
1	R195PWR - OR/RD	1	R195PWR - OR/RD
2	C32BRK - WH/RD	2	C32BRK - WH/RD
3	R181PWR - OR	3	R181PWR - OR
4	R32RET - BK	4	R32RET - BK
5	P110RET - BK	5	P110RET - BK
6	PERSONALIZE R	6	C184PSE - OR
7	SPARE DIG IN	7	C28TTS RD/BK
8	SPARE OUT	8	V14PLUA - OR
9	C130TA - WH/RD	9	C117FB - RD
10	R181PWR - OR	10	R181PWR - OR
11	C197RET - WH	11	SPARE DIG OUT
12	SPARE DIG OUT	12	C181RET - OR
13	D185SEN - WH	13	D185SEN - WH
14	D186SEN - BL	14	D186SEN - BL
15	C16PLF - OR/RD	15	C192JR - WH/BK
16	TXD- SERIAL	16	TXD - SERIAL
17	C27AUX - RD	17	C199TS - WH/RD
18	D187PSE - BL	18	D187PSE - BL
19	SPARE DIG IN	19	SL32LDS - BL/WH
20	SPARE DIG IN	20	C22PWR - BK
21	RXD- SERIAL	21	RXD - SERIAL
22	C26TSR - WH/RD	22	C26TSR - WH/RD
23	C133PLA - GR/WH	23	V15PLDA - OR/BK
24	SPARE PROP OUT	24	V191PCEA - WH/RD
25	P198SEN - RD	25	P198SEN - RD
26	TXD+ SERIAL	26	TXD+ SERIAL
27	D81CAN "-" - GR	27	D81CAN "-" - GR
28	D82CAN "+" - YL	28	D82CAN "+" - YL
29	R174PWR - WH	29	C66LS - BL
30	C156JUD - GR/WH	30	C111LFS - OR
31	C17PRL - GR	31	SPARE DIG IN
32	C18PRR - GR/BK	32	C47FE - WH/BK
33	SPARE OUT	33	V36SCWA - BL
34	C32RET - WH/RD	34	V37SCCA - BL/BK
35	SPARE DIG IN	35	C86FLR - OR

Ground Control Box Pin Legend



Harness Legend

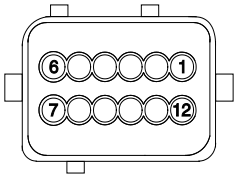
1 C4
2 C3
3 C2
4 C1
5 C5



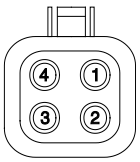
Pin Numbering for 12 pin connectors

C1 Ground Control Box Harness		C2 Ground Control Box Harness		C3 Ground Control Box Harness		C4 Ground Control Box Harness		C5 Ground Control Box Harness	
1	R195PWR - OR/RD	1	C18PRR - GR/BK	1	C41RPM - OR	1	P23BAT - RD	1	C28TTS - RD/BK
2	R181PWR - OR	2	C17PRL - GR	2	C134PWR - RD	2	P22BAT - RD/BK	2	V191PCEA - WH/RD
3	S132LDS - BL/WH	3	C27AUX - RD	3	C47FE - WH/BK	3	GND - RD/WH	3	V36SCWA - BL
4	C22PWR - BK	4	C133PLA - GR/BK	4	C165TRS - WH/RD	4	C134PWR - WH/BK	4	V37SCCA - BL/BK
5	D82CAN(+) - YL	5	C32RET - WH/RD	5	C163PLS - BL/WH	5	D82CAN(+) - YL	5	V14PLUA - OR
6	D81CAN(-) - GR	6	C156JUD - GR/WH	6	R46HRN - WH	6	D81CAN(-) - GR	6	V15PLDA - OR/BK
7	C192JR - WH/BK	7	C16PLF - OR/RD	7	SPARE	7	C27AUX - WH/RD	7	V15PLDB - OR/BK
8	P109PWR - GR/WH	8	C197RET - WH	8	P109PWR - GR/WH	8	C46HRN - BK	8	V14PLUB - OR
9	C184PSE - OR	9	D82CAN(+) - YL	9	D82CAN(+) - YL	9	S132LDS - BK/WH	9	V37SCCB - BL/BK
10	P181BAT - OR	10	D81CAN(-) - GR	10	D81CAN(-) - GR	10	R181PWR - BL	10	V36SCWB - BL
11	P182BAT - RD	11	R174PWR - WH	11	C164PES - RD/WH	11	GND - BL/BK	11	V191PCEB - WH/RD
12	C47FE - WH/BK	12	C130TA - WH/RD	12	C161SB - WH/BK	12	SPARE	12	C134PWR - RD

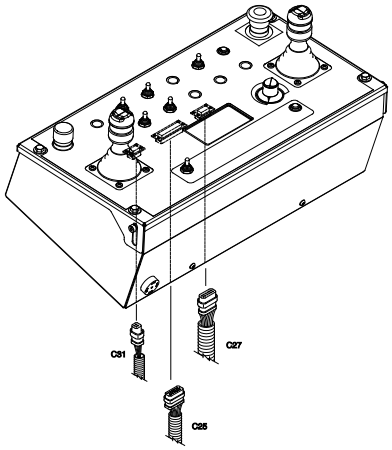
Platform Control Box Pin Legend

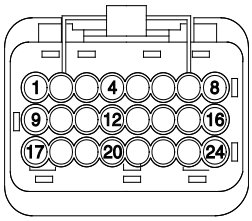


C27



C31





C25

Pin Numbering for 4 Pin Connector (C31)

1	P23BAT - WH
2	C56FTS - RD

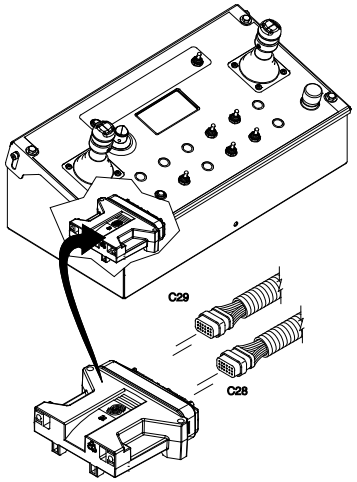
Pin Numbering for 12 Pin Connector (C27)

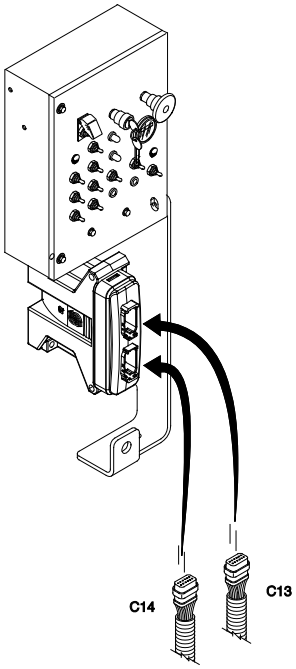
1	SPARE
2	SPARE
3	V17PRL - GR
4	V18PRR - GR/BK
5	V43JU - GR
6	V44JD - GR/BK
7	V193JRR - WH/RD
8	V192JRL - WH/BK
9	GND - BR
10	C134PWR - RD
11	S132LDS - BL/WH
12	C175LDS - WH/BK

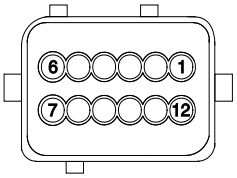
Pin Numbering for 24 Pin Connector (C25)

1	P23BAT - WH
2	P22BAT - BKD
3	GND - BR
4	C134PWR - RD
5	D82CAN(+) - YL
6	D81CAN(-) - GR
7	C27AUX - RD
8	C46HRN - WH
9	S132LDS - BL/WH
10	R181PWR - OR
11	SPARE
12	SPARE
13	P49LPS - WH/BK
14	C49GEN - GR/WH
15	GND - BR
16	SPARE
17	SPARE
18	SPARE
19	C48LPS - WH/RD
20	GND - BR
21	C48LPS - WH/RD
22	GND - BR
23	SPARE
24	SPARE

Turntable and Platform Controller Pin Legend



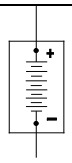
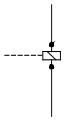
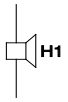
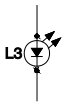
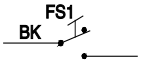
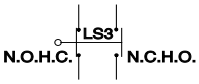
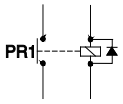
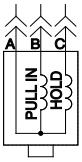
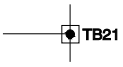
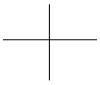
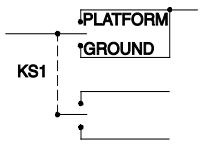
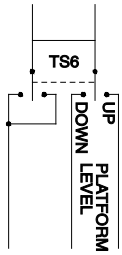
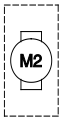
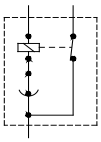
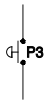
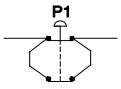
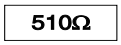
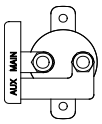
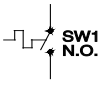
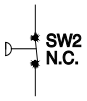
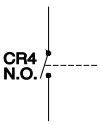




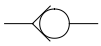
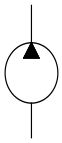
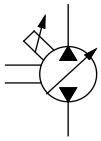
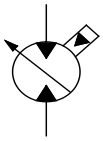
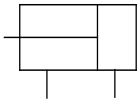
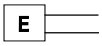
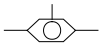
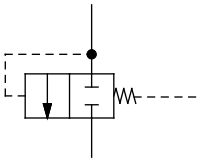
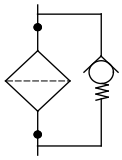
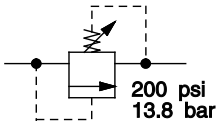
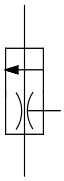
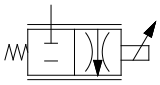
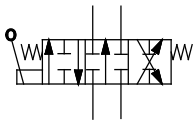
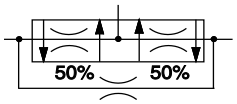
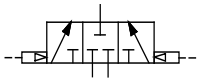
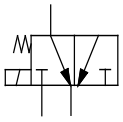
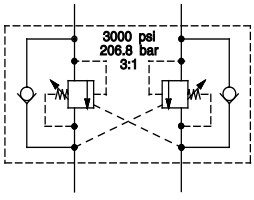
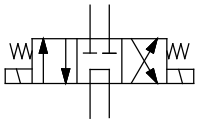
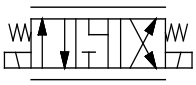
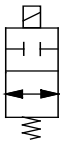
Pin Numbering for
12 Pin Connectors

PCON Platform Controller (C28)		PCON Platform Controller (C29)		TCON Turntable Controller (C13)		TCON Turntable Controller (C14)	
1	GND - BR	1	C156JUD - GR/WH	1	GROUND - BR	1	C41RPM - OR
2	C134PWR - RD	2	C160JPL - WH/RD	2	C134PWR - RD	2	C47FE - WH/BK
3	D82CAN(+) - YL	3	V17PRL - GR	3	D82CAN(+) - YL	3	V07PBE - BK
4	D81CAN(-) - GR	4	V18PRR - GR/BK	4	D81CAN(-) - GR	4	V08PBR - BK/WH
5	C163PLS - BL/WH	5	V43JU - GR	5	C163PLS - BL/WH	5	V01PBU - RD
6	C56FTS - RD	6	V44JD - GR/BK	6	C68PBD - RD	6	V02PBD - RD/BK
7	C175LDS - WH/BK	7	V193JRR - WH/RD	7	C40SBD - OR	7	V10SBU - BL
8	P162JPW - OR	8	V192JRL - WH/BK	8	P109PWR - GR/WH	8	V11SBD - BL/BK
9	GND - BR	9	C130TA - WH/RD	9	R110RET - BR	9	V04TRL - WH
10	C164PES - RD/WH	10	SPARE	10	C165TRS - WH/RD	10	V05TRR - WH/BK
11	C159STC - BL/WH	11	C134PWR - RD	11	C165PES - RD/WH	11	C134PWR - RD
12	C165TRS - WH/RD	12	C134PWR - RD	12	C161SB - WH/BK	12	C134PWR - RD

Electrical Symbol Legend

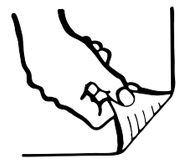
				
Battery	Coil, solenoid or relay	Horn or alarm	Flashing beacon	Gauge
				
Diode	Hour meter	LED	Fuse with amperage	Foot switch
				
T-circuits connect	Limit Switch	Power relay	Coil with suppression	Fuel or RPM solenoid
				
Connection - no terminal	T-circuits connect at terminal	Circuits crossing - no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

Hydraulic Symbols Legend

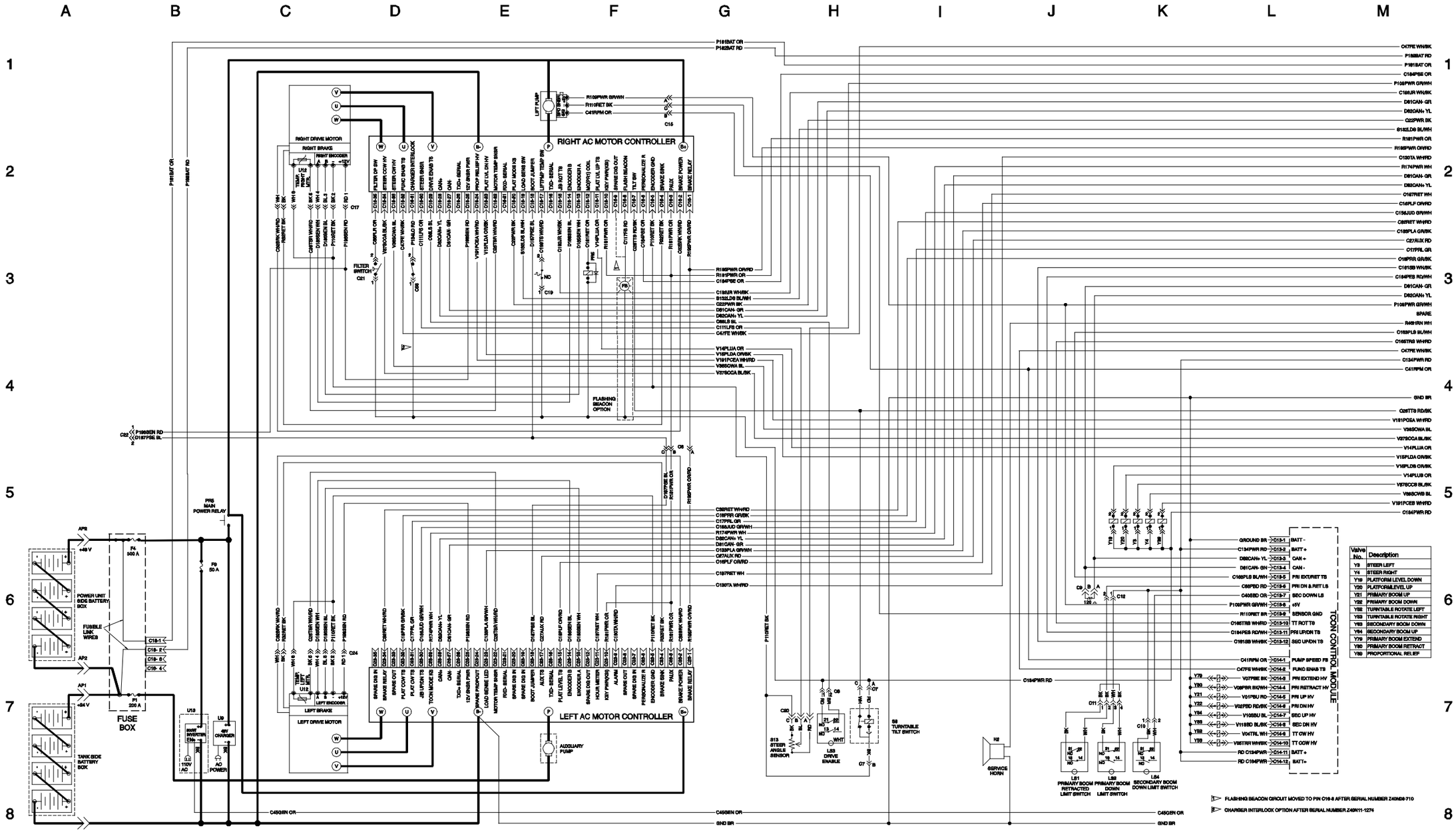
 Orifice with size	 Check valve	 Shut off valve	 Brake
 Pump, fixed displacement	 Pump, bi-directional variable displacement	 Motor, bi-directional	 Motor, 2 speed bi-directional
 Double acting cylinder	 Pump, prime mover (engine or motor)	 Shuttle valve. 2 position, 3 way	 Differential sensing valve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

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Electrical Schematic - Chassis



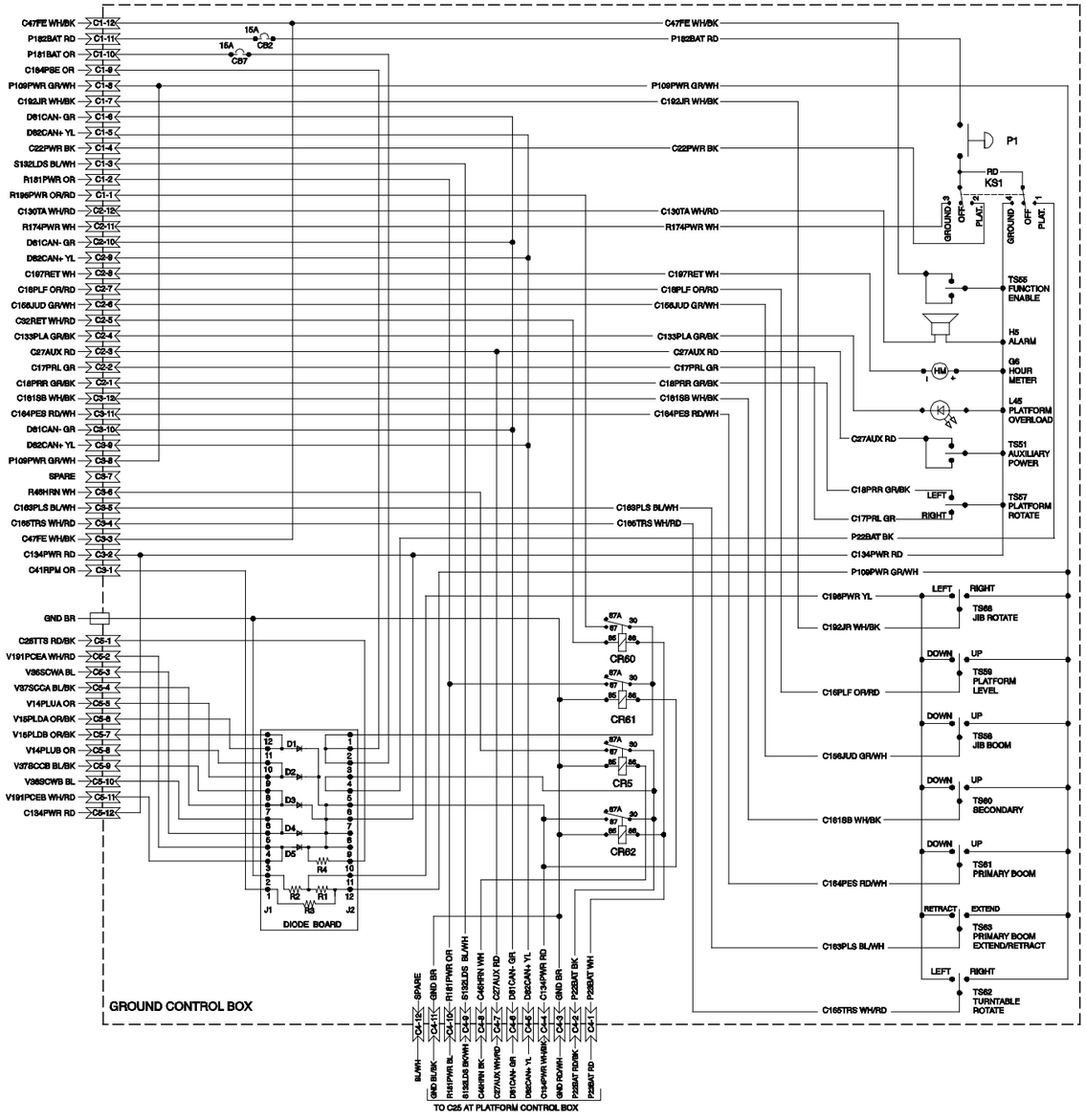
Electrical Schematic - Chassis



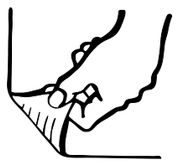
Valve No.	Description
Y3	STEER LEFT
Y4	STEER RIGHT
Y19	PLATFORM LEVEL DOWN
Y20	PLATFORM LEVEL UP
Y21	PRIMARY BOOM UP
Y22	PRIMARY BOOM DOWN
Y58	TURNTABLE ROTATE LEFT
Y59	TURNTABLE ROTATE RIGHT
Y63	SECONDARY BOOM DOWN
Y64	SECONDARY BOOM UP
Y79	PRIMARY BOOM EXTEND
Y80	PRIMARY BOOM RETRACT
Y89	PROPORTIONAL RELIEF

Electrical Schematic - Ground Controls

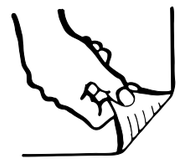
LABEL	DESCRIPTION
CB2	CIRCUIT BREAKER, 24V DC (CONTROLS)
CB7	CIRCUIT BREAKER, 48V DC (MASTER)
CR5	HORN RELAY
CR60	BRAKE RELAY
CR61	KEYSWITCH RELAY
CR62	PLATFORM EMERGENCY STOP RELAY
P1	GROUND CONTROLS EMERGENCY STOP BUTTON
KS1	KEYSWITCH



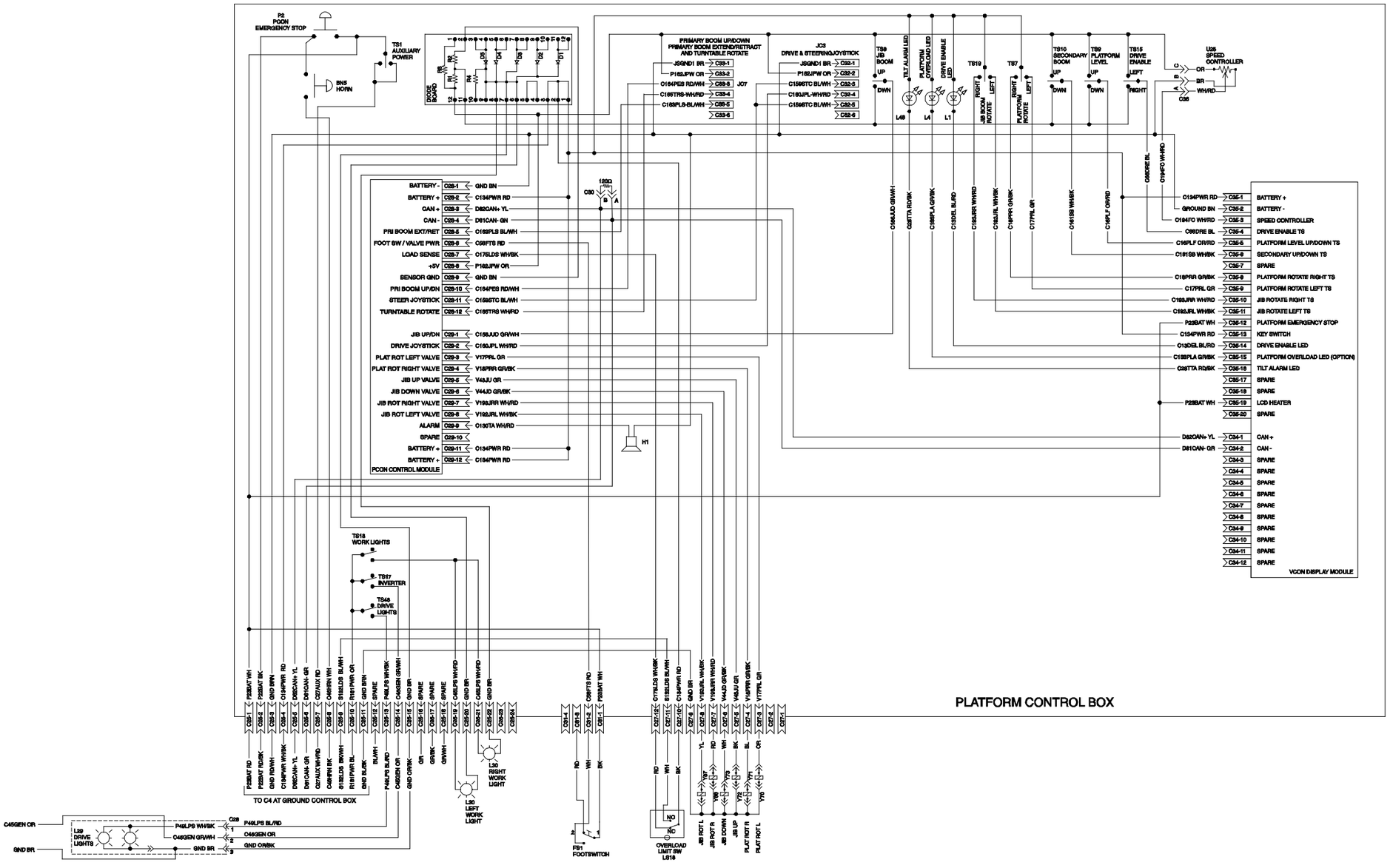
Electrical Schematic - Ground Controls



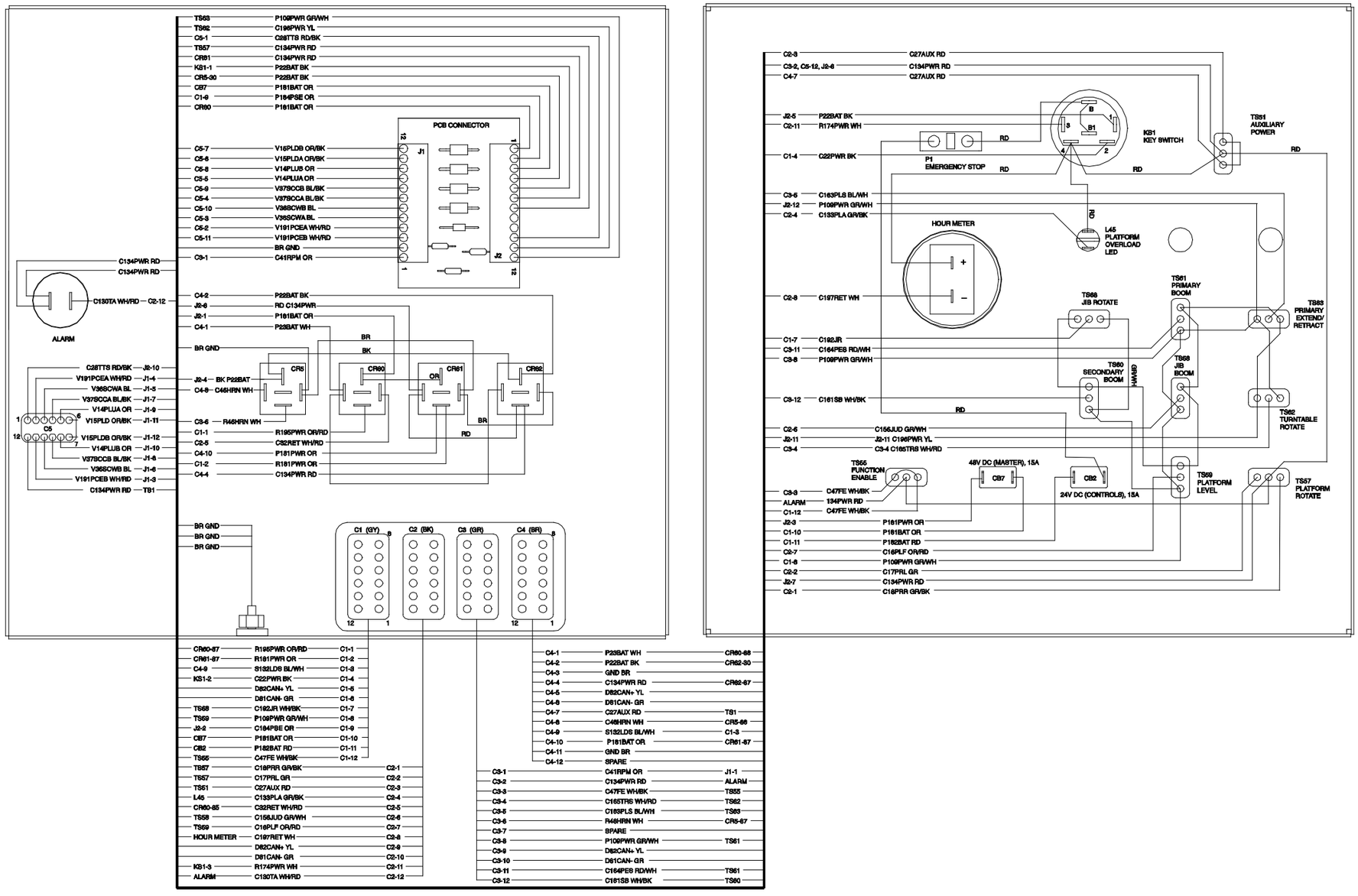
Electrical Schematic - Platform Controls



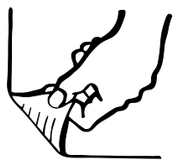
Electrical Schematic - Platform Controls



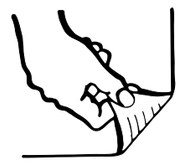
Ground Control Box Wiring Diagram



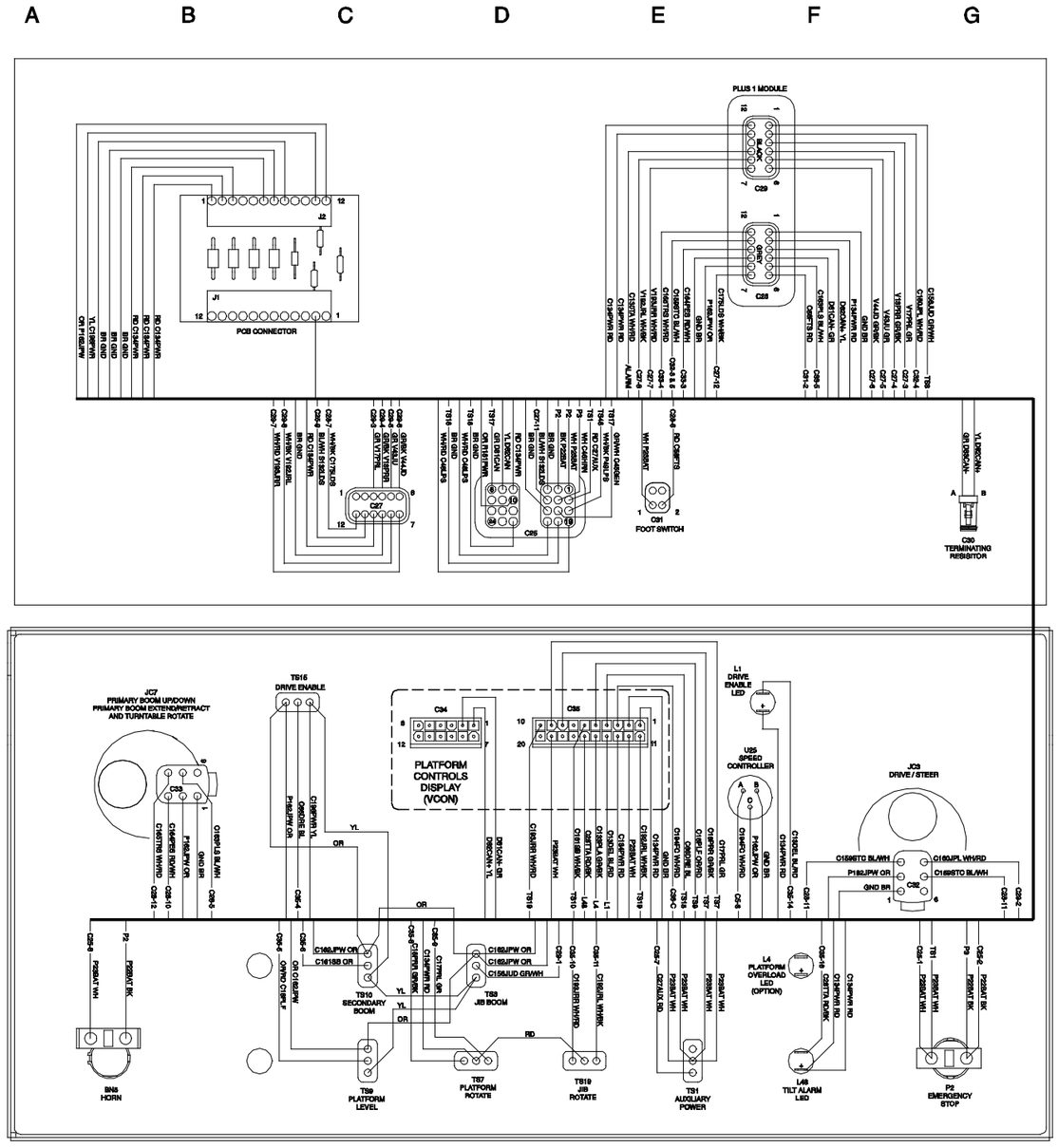
Ground Control Box Wiring Diagram



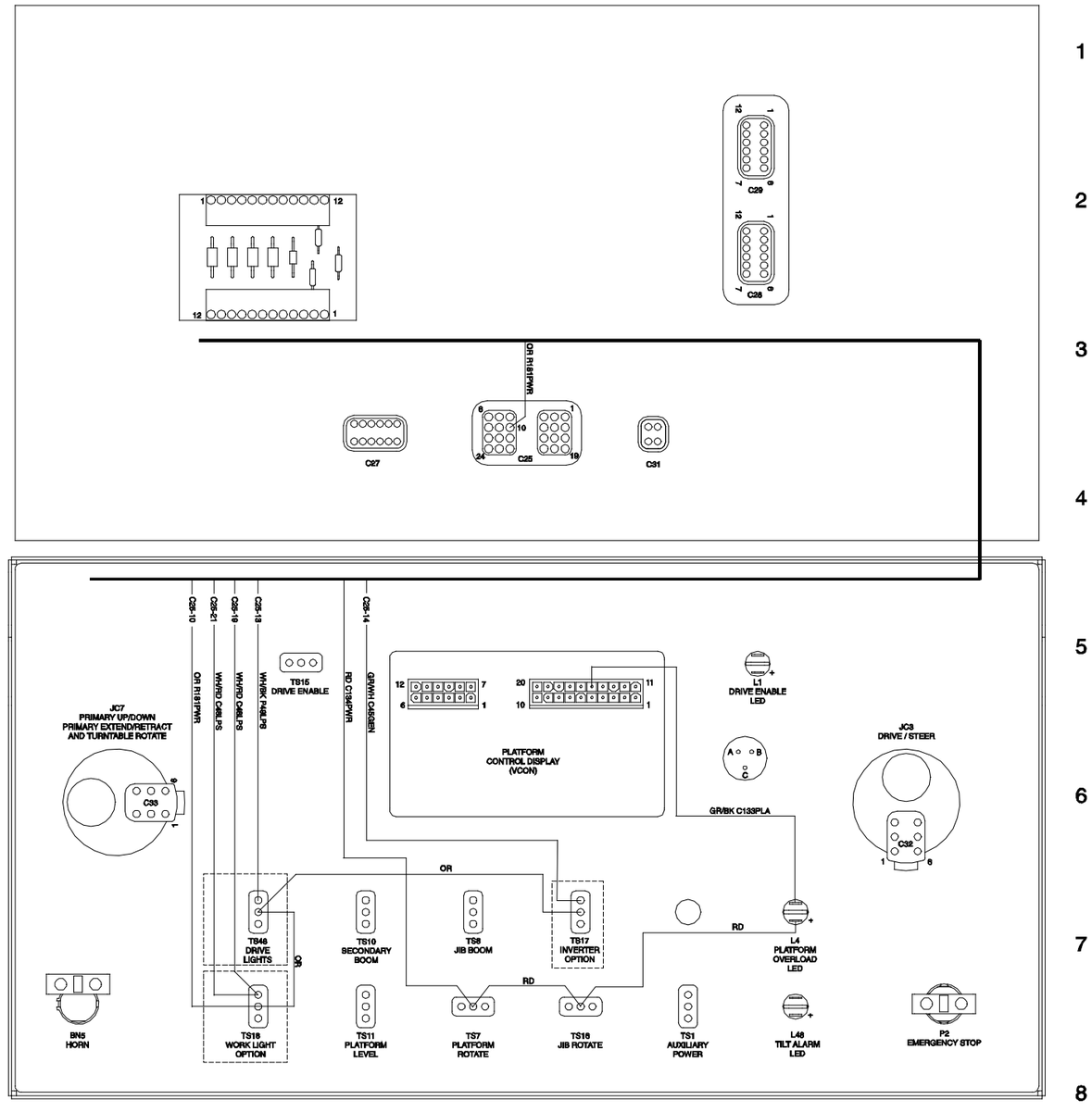
Platform Control Box Wiring Diagram



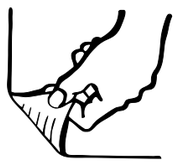
Platform Control Box Wiring Diagram



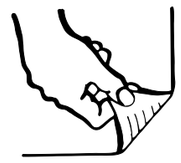
Platform Control Box Wiring Diagram - Options



Platform Control Box Wiring Diagram - Options

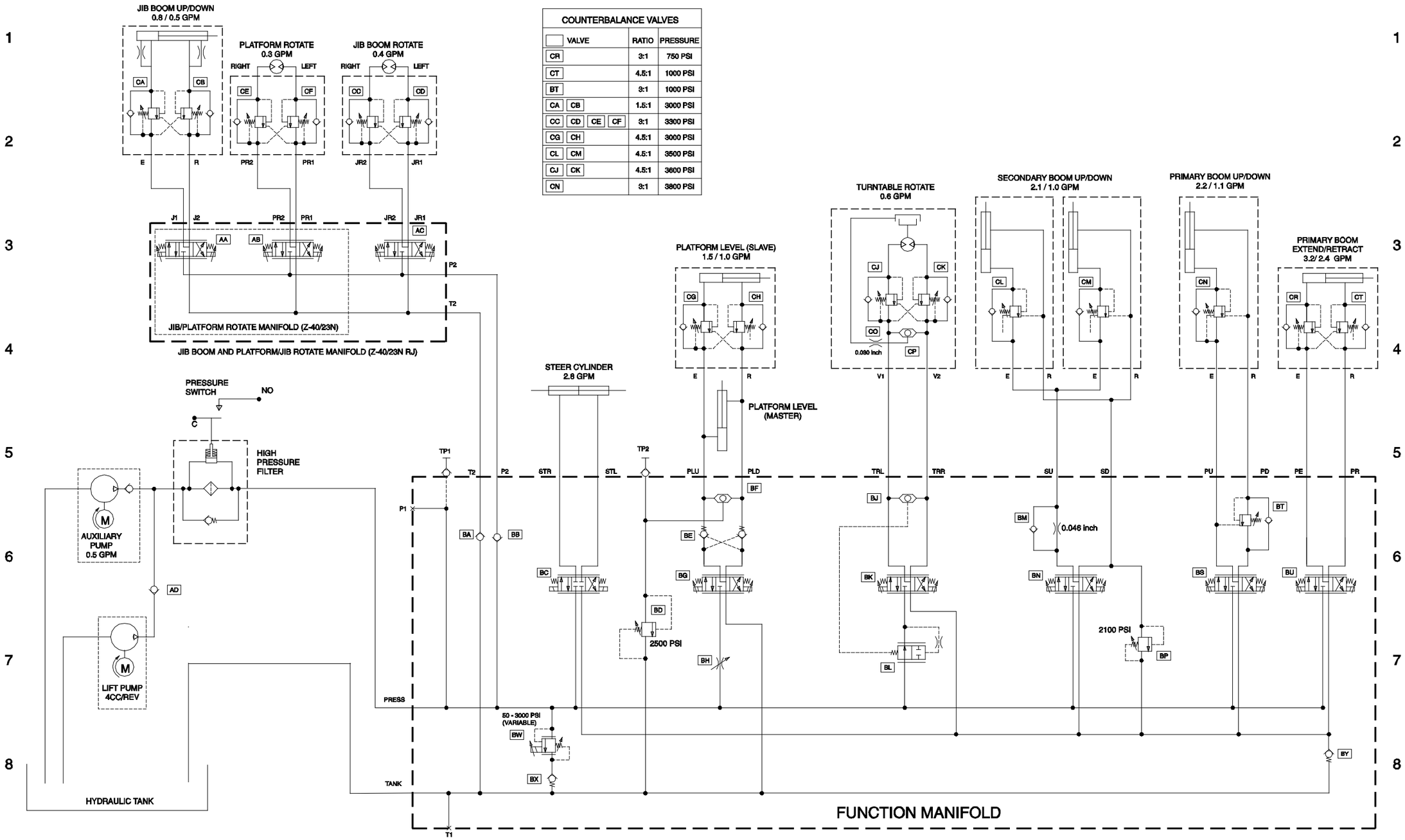


Hydraulic Schematic



Hydraulic Schematic

COUNTERBALANCE VALVES		
VALVE	RATIO	PRESSURE
CR	3:1	750 PSI
CT	4.5:1	1000 PSI
BT	3:1	1000 PSI
CA CB	1.5:1	3000 PSI
CC CD CE CF	3:1	3300 PSI
CG CH	4.5:1	3000 PSI
CL CM	4.5:1	3500 PSI
CJ CK	4.5:1	3600 PSI
CN	3:1	3800 PSI



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