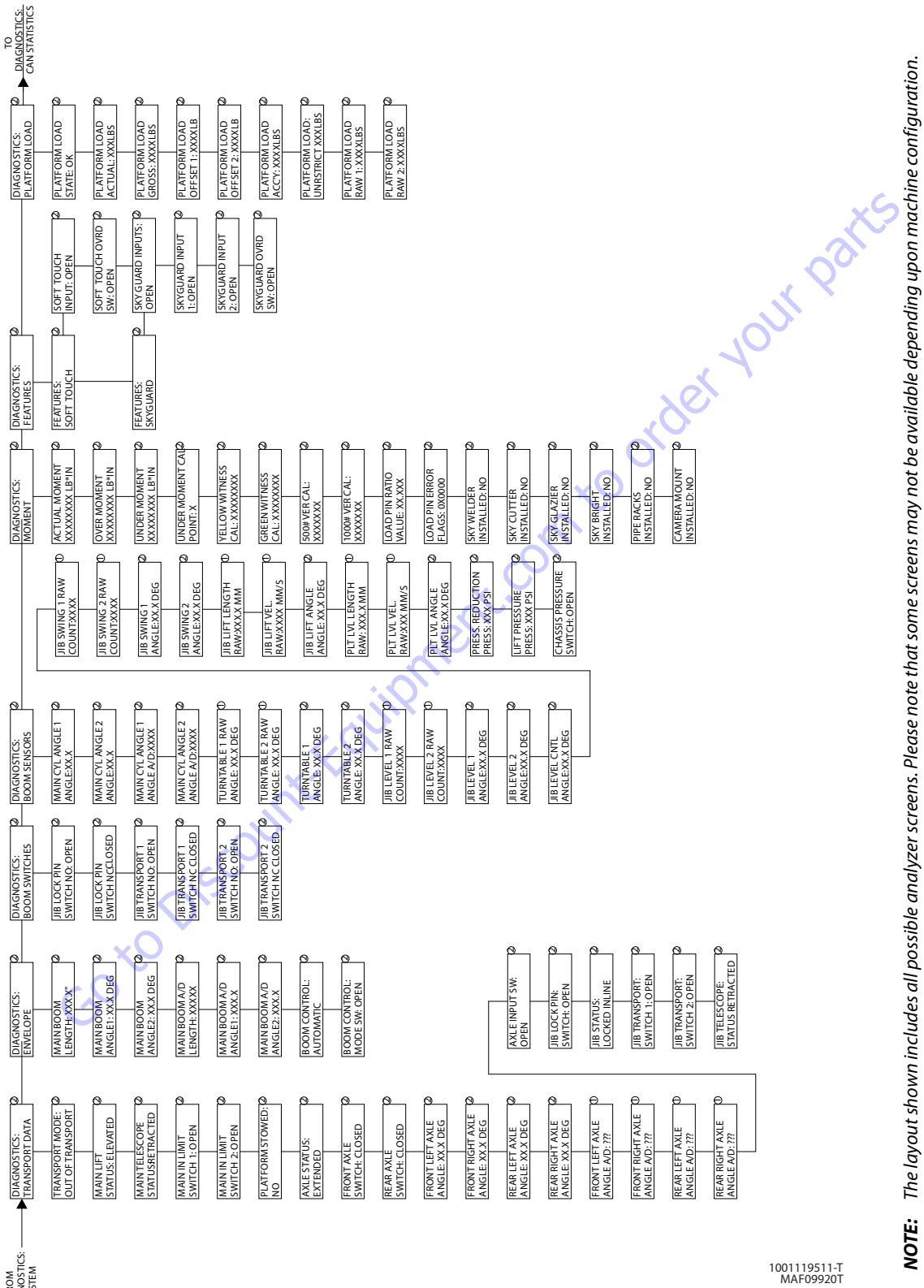
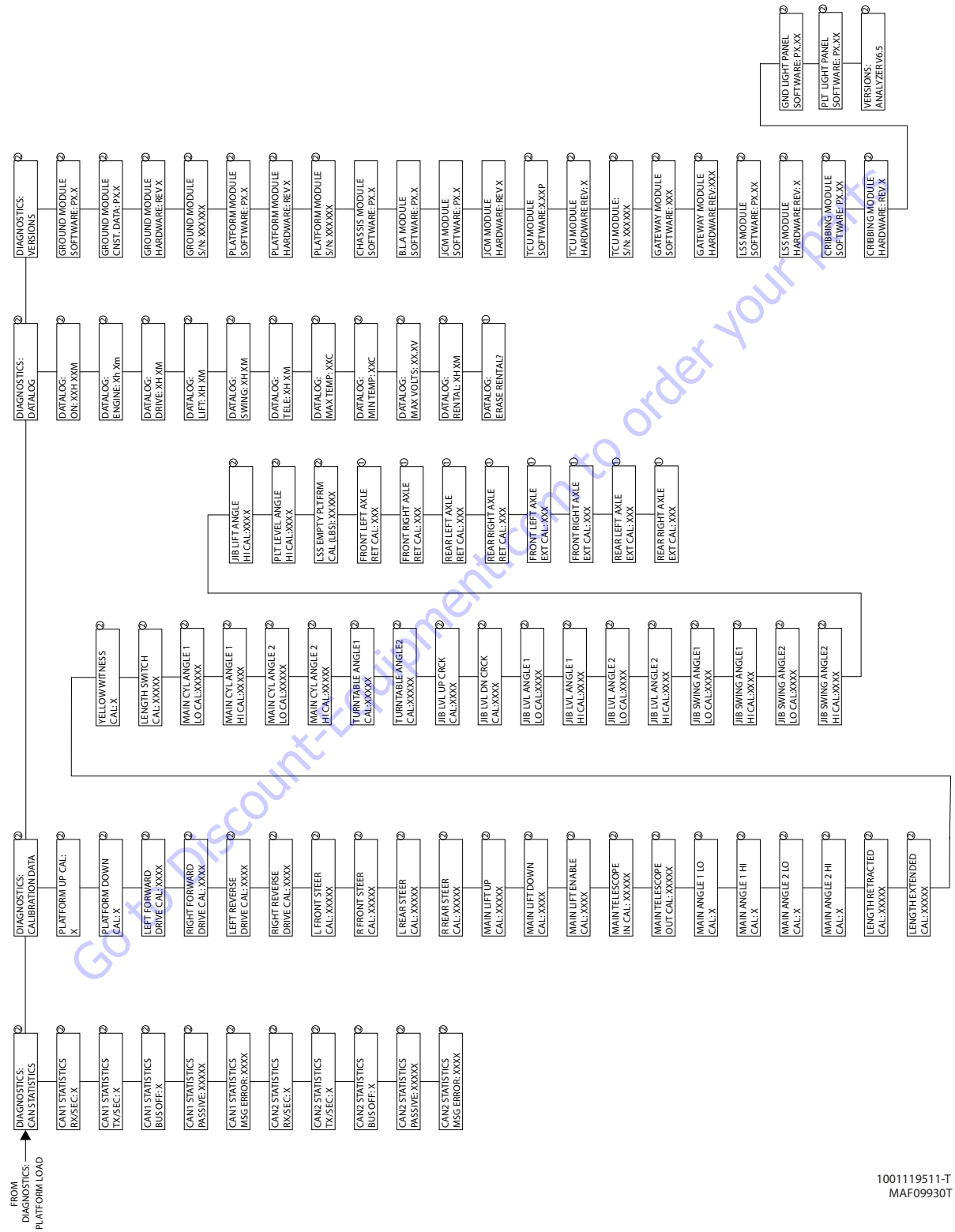


NOTE: *The layout shown includes all possible analyzer screens. Please note that some screens may not be available depending upon machine configuration.*

Figure 6-11. Analyzer Flow Chart - Sheet 4 of 5 (Software Version P7.32)



NOTE: *The layout shown includes all possible analyzer screens. Please note that some screens may not be available depending upon machine configuration.*

Figure 6-12. Analyzer Flow Chart - Sheet 5 of 5 (Software Version P7.32)

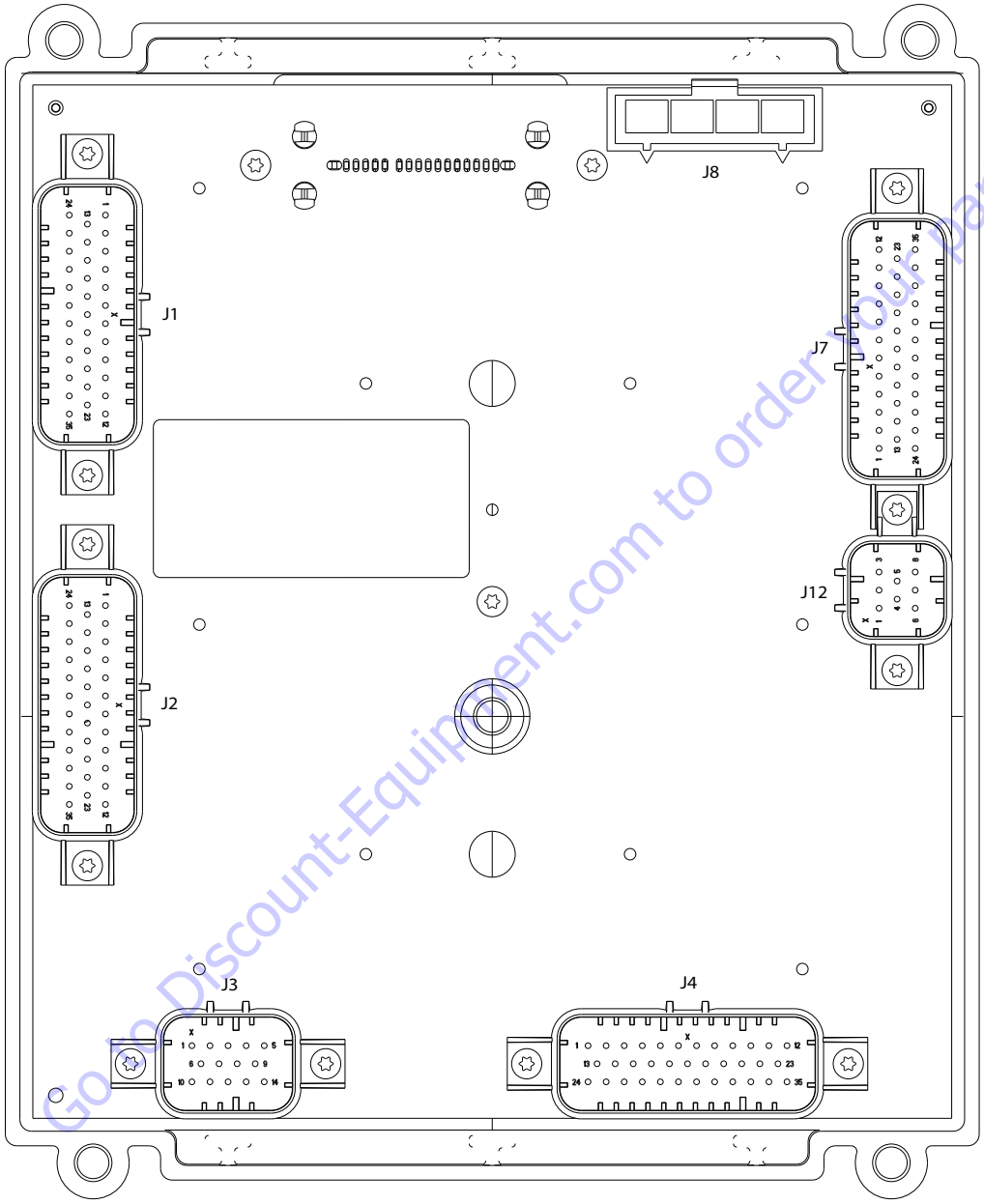


Figure 6-13. Ground Control Module

Connector	Pin	Function	Type	
J1 (Natural)	1	THROTTLE ACTUATOR (DIESEL ONLY)	DIGITAL	OUTPUT
	2	SPARE (LP NOT USED)	DIGITAL	OUTPUT
	3	TOWER BOOM LIFT POWER	DIGITAL	OUTPUT
	4	GROUND	GROUND	INPUT
	5	GROUND	GROUND	INPUT
	6	TOWER TELESCOPE ENABLE	DIGITAL	OUTPUT
	7	SPARE (LP NOT USED)	DIGITAL	OUTPUT
	8	GROUND	GROUND	INPUT
	9	GROUND	GROUND	INPUT
	10	IGNITION ON RELAY	DIGITAL	OUTPUT
	11	START SOLENOID (DIESEL ONLY)	DIGITAL	OUTPUT
	12	GLOW PLUG (DIESEL ONLY OPTION)	DIGITAL	OUTPUT
	13	AUXILIARY POWER	DIGITAL	OUTPUT
	14	COOLANT TEMP (DIESEL ONLY)	ANALOG	INPUT
	15	OIL PRESSURE (DIESEL ONLY)	ANALOG	INPUT
	16	FLYWHEEL SPEED PICKUP (DIESEL ONLY)	FREQUENCY	INPUT
	17	GROUND	GROUND	INPUT
	18	SPARE GROUND	GROUND	INPUT
	19	SPARE GROUND	GROUND	INPUT
	20	TWO SPEED	DIGITAL	OUTPUT
	21	MAIN LIFT PILOT PRESSURE SWITCH	DIGITAL	INPUT
	22	GENERATOR/WELDER (OPTION)	DIGITAL	OUTPUT
	23	PARKING BRAKE	DIGITAL	OUTPUT
	24	CONSTANT BATTERY	N/C	N/C
	25	RS-485 HI	SERIAL	I/O
	26	RS-485 LO	SERIAL	I/O
	27	GROUND	GROUND	INPUT
	28	ANALYZER POWER	VOLTAGE	OUTPUT
	29	ANALYZER RS-232 Rx	SERIAL	INPUT
	30	ANALYZER RS-232 Tx	SERIAL	OUTPUT
	31	ANALYZER GROUND	GROUND	INPUT
	32	ALTERNATOR EXCITATION	DIGITAL	OUTPUT
	33	GROUND SHIELD	GROUND	INPUT
	34	SPARE	DIGITAL	INPUT
	35	HYDRAULIC OIL TEMPERATURE SWITCH	DIGITAL	INPUT

Connector	Pin	Function	Type	
J8 (Black)	1	GROUND FROM BATTERY	GROUND	INPUT
	2	GROUND EMS	GROUND	INPUT
	3	GROUND TO PLATFORM	GROUND	OUTPUT
	4	GROUND EMS OUT TO PLATFORM	GROUND	OUTPUT

Connector	Pin	Function	Type	
J2 (Gray)	1	MAIN LIFT PILOT	DIGITAL	OUTPUT
	2	HORN	DIGITAL	OUTPUT
	3	PLATFORM CONTROL VALVE	DIGITAL	OUTPUT
	4	UPPER TELESCOPE IN	DIGITAL	OUTPUT
	5	BASKET LEVEL UP OVERRIDE	DIGITAL	OUTPUT
	6	GROUND	GROUND	INPUT
	7	BASKET LEVEL DOWN OVERRIDE	DIGITAL	OUTPUT
	8	TOWER TELESCOPE POWER	DIGITAL	OUTPUT
	9	TELESCOPE FLOW CONTROL	DIGITAL	OUTPUT
	10	LIFT PILOT	DIGITAL	OUTPUT
	11	UPPER LIFT UP	DIGITAL	OUTPUT
	12	LIFT DOWN AUXILIARY	DIGITAL	OUTPUT
	13	MAIN DUMP	DIGITAL	OUTPUT
	14	GROUND	GROUND	INPUT
	15	NOT CONNECTEDRS232 BACKUP COMM. ENABLE	DIGITAL	OUTPUT
	16	UPPER TELESCOPE OUT	DIGITAL	OUTPUT
	17	GROUND	GROUND	INPUT
	18	SPARE PIN	GROUND	INPUT
	19	LIFT FLOW CONTROL	DIGITAL	OUTPUT
	20	SPARE OUTPUT	DIGITAL	OUTPUT
	21	MAIN BOOM ANGLE SENSOR #2 POWER	DIGITAL	OUTPUT
	22	UPPER LIFT DOWN	DIGITAL	OUTPUT
	23	MAIN BOOM LIFT ENABLE	DIGITAL	OUTPUT
	24	TOWER CYLINDER TYPE	DIGITAL	INPUT
	25	FUEL SENSOR	ANALOG	INPUT
	26	HEAD/TAIL LIGHT	DIGITAL	OUTPUT
	27	ALARM	DIGITAL	OUTPUT
	28	SPARE PIN	GROUND	INPUT
	29	GROUND	GROUND	INPUT
	30	GROUND	GROUND	INPUT
	31	PVG ENABLE	DIGITAL	OUTPUT
	32	TOWER BOOM TELESCOPE PILOT	DIGITAL	OUTPUT
	33	TOWER BOOM LIFT ENABLE	DIGITAL	OUTPUT
	34	SWING LEFT	DIGITAL	OUTPUT
	35	SWING RIGHT	DIGITAL	OUTPUT

Connector	Pin	Function	Type	
J12 (Black)	1	FREQUENCY INPUT 2	FREQUENCY	INPUT
	2	FREQUENCY INPUT 2 RETURN	FREQUENCY	INPUT
	3	CAN 2 H	SERIAL	I/O
	4	CAN 2 L	SERIAL	I/O
	5	CAN 2 SHIELD	GROUND	INPUT
	6	CAN 2 TERMINATOR	TERM	I/O
	7	CAN 2 TERMINATOR	TERM	I/O
	8	SPARE LS DIGITAL INPUT	DIGITAL	INPUT

Connector	Pin	Function	Type	
J3 (Black)	1	SPARE VAVLE RETURN 1	GROUND	INPUT
	2	SPARE VAVLE RETURN 2	GROUND	INPUT
	3	GROUND	GROUND	INPUT
	4	SPARE VAVLE RETURN 4	GROUND	INPUT
	5	SPARE VAVLE RETURN 5	GROUND	INPUT
	6	SPARE VAVLE RETURN 6	GROUND	INPUT
	7	VBAT	VBAT	OUTPUT
	8	SPARE HS DIGITAL IN (FREQ. CAPABLE)	DIGITAL	INPUT
	9	ALTERNATOR EXCITATION INPUT	DIGITAL	INPUT
	10	SPARE HS SWITCH INPUT (MODEL INPUT FOR 1100S)	DIGITAL	INPUT
	11	SPARE LS DIGITAL INPUT	DIGITAL	INPUT
	12	ANALOG REF. VOLTAGE	VOLTAGE	OUTPUT
	13	SPARE ANALOG INPUT 8	ANALOG	INPUT
	14	SPARE VALVE RETURN 3	GROUND	INPUT

Connector	Pin	Function	Type	
J4 (Blue)	1	AXLES SET LAMP	DIGITAL	OUTPUT
	2	500# CAPACITY LAMP	DIGITAL	OUTPUT
	3	BOOM CONTROL SYSTEM LAMP	DIGITAL	OUTPUT
	4	START SWITCH	DIGITAL	INPUT
	5	BASKET LEVEL DOWN	DIGITAL	INPUT
	6	BASKET LEVEL DOWN	DIGITAL	INPUT
	7	UPPER TELESCOPE IN	DIGITAL	INPUT
	8	JIB DOWN	DIGITAL	INPUT
	9	JIB LEFT	DIGITAL	INPUT
	10	TOWER UP	DIGITAL	INPUT
	11	MAIN TOWER TRANSPORT ANGLE OPEN	DIGITAL	INPUT
	12	HOUR METER	DIGITAL	OUTPUT
	13	BCS CALIBRATED LAMP	DIGITAL	OUTPUT
	14	OVERLOAD LAMP	DIGITAL	OUTPUT
	15	SPARE	DIGITAL	OUTPUT
	16	AUXILIARY POWER	DIGITAL	INPUT
	17	BASKET LEVEL UP	DIGITAL	INPUT
	18	BASKET ROTATE RIGHT	DIGITAL	INPUT
	19	JIB UP	DIGITAL	INPUT
	20	JIB RIGHT	DIGITAL	INPUT
	21	TOWER DOWN	DIGITAL	INPUT
	22	MAIN BOOM TRANSPORT ANGLE CLOSED	DIGITAL	INPUT
	23	UPPER LIFT UP	DIGITAL	INPUT
	24	VBAT	VBAT	OUTPUT
	25	VBAT	VBAT	OUTPUT
	26	NO CHARGE LAMP	DIGITAL	OUTPUT
	27	1000# CAPACITY LAMP	DIGITAL	OUTPUT
	28	ENGINE HIGH TEMPERATURE LENGTH'	DIGITAL	OUTPUT
	29	ENGINE LOW OIL PRESSURE LAMP	DIGITAL	OUTPUT
	30	UPPER TELESCOPE OUT	DIGITAL	INPUT
	31	GROUND	GROUND	INPUT
	32	SPARE PIN	GROUND	INPUT
	33	UPPER LIFT DOWN	DIGITAL	INPUT
	34	SWING LEFT	DIGITAL	INPUT
	35	SWING RIGHT	DIGITAL	INPUT

Connector	Pin	Function	Type	
J7 (Black)	1	PLATFORM EMS	DIGITAL	INPUT
	2	PLATFORM MODE	DIGITAL	INPUT
	3	GROUND MODE	DIGITAL	INPUT
	4	TOWER CYLINDER PRESSURE	ANALOG	INPUT
	5	REFERENCE VOLTAGE	VOLTAGE	OUTPUT
	6	CAN TERMINATION	TERM	I/O
	7	SPARE	ANALOG	INPUT
	8	SPARE ANALOG INPUT 2	ANALOG	INPUT
	9	GROUND	GROUND	INPUT
	10	GROUND	GROUND	INPUT
	11	BOOM RETRACTED CLOSED	DIGITAL	INPUT
	12	BROKEN CABLE SWITCH	DIGITAL	IPUT
	13	CAN HI	SERIAL	I/O
	14	GROUND MODE OUT TO PLATFORM	DIGITAL	INPUT
	15	FOOTSWITCH ENGAGE	DIGITAL	INPUT
	16	REFERENCE VOLTAGE	VOLTAGE	OUTPUT
	17	CAN TERMINATION	TERM	I/O
	18	CAN SHEILD	GROUND	INPUT
	19	SPARE PIN	GROUND	INPUT
	20	SPARE ANALOG INPUT 1	ANALOG	INPUT
	21	PUSH TO TEST	DIGITAL	INPUT
	22	TOWER BOOM TRANSPORT ANGLE	DIGITAL	INPUT
	23	GROUND CONTROL ENABLE	DIGITAL	INPUT
	24	CAN LO	SERIAL	I/O
	25	GROUND	GROUND	INPUT
	26	REFERENCE VOLTAGE	VOLTAGE	OUTPUT
	27	REFERENCE VOLTAGE	VOLTAGE	OUTPUT
	28	GROUND (RESERVED FOR CRIBBING OPTION)	GROUND	INPUT
	29	VBAT	VBAT	OUTPUT
	30	VBAT	VBAT	OUTPUT
	31	VBAT	VBAT	OUTPUT
	32	VBAT	VBAT	OUTPUT
	33	VBAT (RESERVED FOR CRIBBING OPTION)	VBAT	OUTPUT
	34	CLEARSKY POWER (VBAT)	VBAT	OUTPUT
	35	BOOM RETRACT OPEN	DIGITAL	INPUT

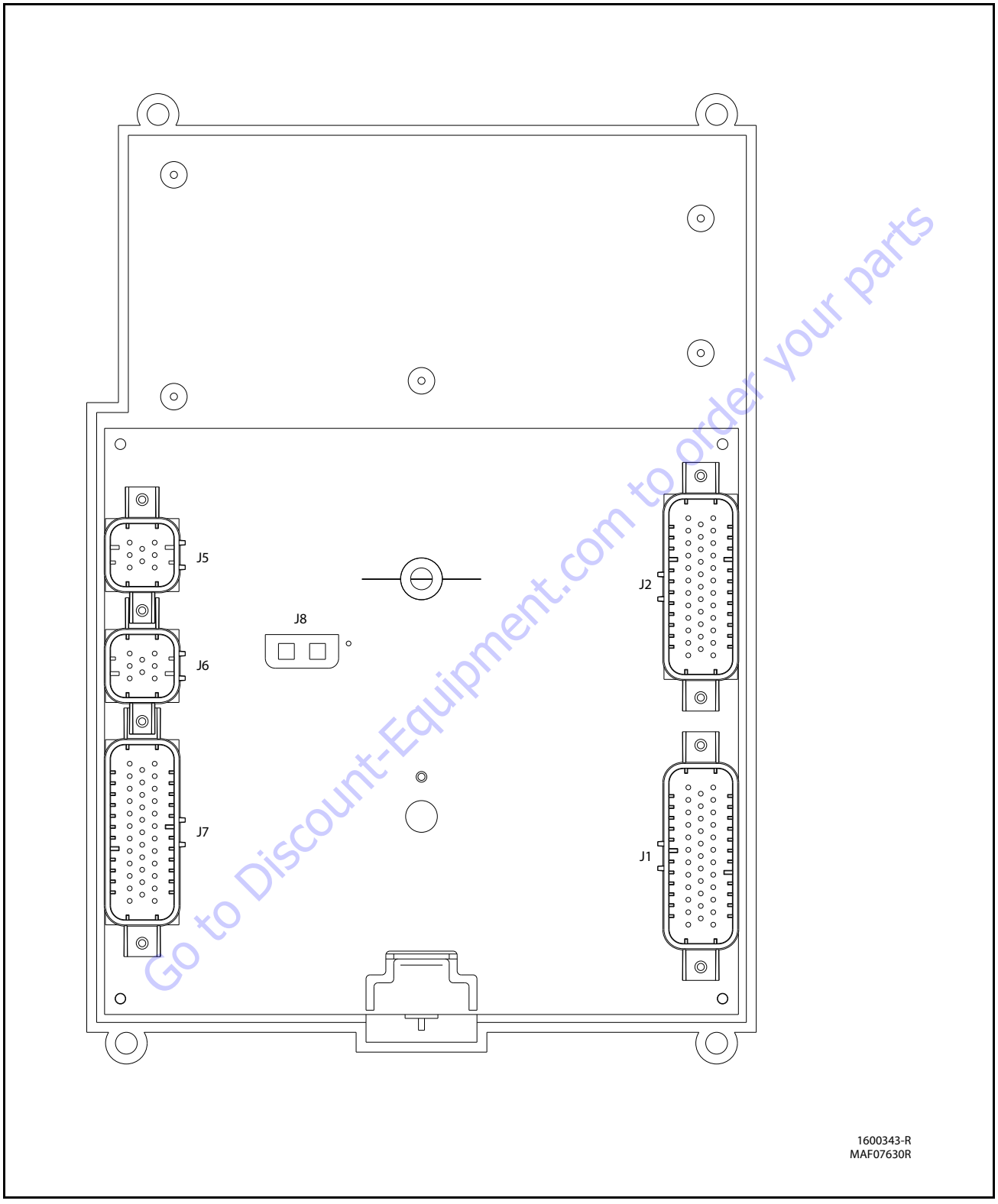


Figure 6-14. Platform Control Module

CONNECTOR	PIN	ASSIGNMENT	FUNCTION
J1 (NATURAL)	1	TOWER LIFT UP	HS DIGITAL INPUT
	2	TOWER LIFT DOWN	HS DIGITAL INPUT
	3	TOWER TELESCOPE IN	HS DIGITAL INPUT
	4	TOWER TELESCOPE OUT	HS DIGITAL INPUT
	5	MAIN TELESCOPE IN	HS DIGITAL INPUT
	6	MAIN TELESCOPE OUT	HS DIGITAL INPUT
	7	PLATFORM ROTATE RIGHT	HS DIGITAL INPUT
	8	PLATFORM ROTATE LEFT	HS DIGITAL INPUT
	9	PLATFORM LEVEL UP	HS DIGITAL INPUT
	10	PLATFORM LEVEL DOWN	HS DIGITAL INPUT
	11	JIB UP	HS DIGITAL INPUT
	12	JIB DOWN	HS DIGITAL INPUT
	13	SPEED PUMP POTENTIOMETER GROUND	GROUND
	14	ENGINE START	HS DIGITAL INPUT
	15	AUXILIARY POWER	HS DIGITAL INPUT
	16	CRAB STEER SELECT	HS DIGITAL INPUT
	17	COORDINATED STEER SELECT	HS DIGITAL INPUT
	18	SWITCH POWER	BATTERY VOLTAGE
	19	JIB 1000LB ENABLE	HS DIGITAL INPUT
	20	EIM PLATFORM OVERLOAD	HS DIGITAL INPUT
	21	500/1000 LB. CAPACITY SELECT	HS DIGITAL INPUT
	22	DRIVE ORIENTATION SYSTEM FEATURE ENABLE	HS DIGITAL INPUT
	23	SPARE PIN	HS DIGITAL INPUT
	24	SPARE PIN	HS DIGITAL INPUT
	25	LEVEL SENSOR 1 SIGNAL	HS DIGITAL INPUT
	26	LEVEL SENSOR 2 SIGNAL	HS DIGITAL INPUT
	27	TWO SPEED VALVE (HIGH ENGINE)	HS DIGITAL INPUT
	28	TORQUE MODE	HS DIGITAL INPUT
	29	SOFT TOUCH OVERRIDE	HS DIGITAL INPUT
	30	HEAD/TAIL LIGHT	HS DIGITAL INPUT
	31	HORN	HS DIGITAL INPUT
	32	CREEP MODE	HS DIGITAL INPUT
	33	DUAL-FUEL SELECT	HS DIGITAL INPUT
	34	SPEED PUMP POTENTIOMETER REFERENCE VOLTAGE	+7 REFERENCE VOLTAGE
	35	SPEED PUMP POTENTIOMETER	ANALOG INPUT

CONNECTOR	PIN	ASSIGNMENT	FUNCTION
J6 (BLACK)	1	DRIVE / STEER JOYSTICK SUPPLY VOLTAGE	SUPPLY VOLTAGE
	2	DRIVE CENTER TAP	ANALOG INPUT
	3	DRIVE SIGNAL	ANALOG INPUT
	4	STEER SIGNAL	ANALOG INPUT
	5	STEER LEFT	ANALOG INPUT
	6	STEER RIGHT	ANALOG INPUT
	7	DRIVE / STEER JOYSTICK RETURN	GROUND
	8	SPARE PIN	BLANK

CONNECTOR	PIN	ASSIGNMENT	FUNCTION
J8	1	MODULE GROUND	GROUND
	2	MODULE POWER	BATTERY VOLTAGE

CONNECTOR	PIN	ASSIGNMENT	FUNCTION
J2 (BLUE)	1	SPARE PIN	HS DIGITAL INPUT
	2	SPARE PIN	HS DIGITAL INPUT
	3	BATTERY VOLTAGE	BATTERY VOLTAGE
	4	DRIVE ORIENTATION SYSTEM OVERRIDE SWITCH	HS DIGITAL INPUT
	5	PLATFORM STOWED	HS DIGITAL INPUT
	6	CHASSIS TILTED INDICATOR	LAMP OUTPUT
	7	FUNCTION ENABLE INDICATOR	LAMP OUTPUT
	8	VEHICLE SYSTEM DISTRESS INDICATOR	LAMP OUTPUT
	9	CREEP SPEED INDICATOR	LAMP OUTPUT
	10	BROKEN CABLE INDICATOR	LAMP OUTPUT
	11	PLATFORM OVERLOADED INDICATOR	LAMP OUTPUT
	12	500 LB CAPACITY INDICATOR	LAMP OUTPUT
	13	1000 LB CAPACITY INDICATOR	LAMP OUTPUT
	14	DRIVE ORIENTATION SYSTEM INDICATOR	LAMP OUTPUT
	15	GENERATOR ON INDICATOR	LAMP OUTPUT
	16	SOFT TOUCH TRIGGERED INDICATOR	LAMP OUTPUT
	17	GLOW PLUG ENGAGED INDICATOR	LAMP OUTPUT
	18	LAMP RETURN	GROUND
	19	SPARE PIN	LAMP OUTPUT
	20	UPRIGHT TILTED INDICATOR	LAMP OUTPUT
	21	LOW FUEL INDICATOR	LAMP OUTPUT
	22	1/4 FUEL LEVEL INDICATOR	LAMP OUTPUT
	23	3/4 FUEL LEVEL INDICATOR	LAMP OUTPUT
	24	1/2 FUEL LEVEL INDICATOR	LAMP OUTPUT
	25	FUEL LEVEL INDICATORS RETURN	GROUND
	26	ANALYZER POWER	ANALYZER POWER
	27	ANALYZER GROUND	ANALYZER GROUND
	28	ANALYZER RX	ANALYZER RX
	29	ANALYZER TX	ANALYZER TX
	30	SPARE PIN	LAMP OUTPUT
	31	SPARE PIN	DIGITAL OUTPUT
	32	BATTERY VOLTAGE	BATTERY VOLTAGE
	33	BATTERY VOLTAGE	BATTERY VOLTAGE
	34	SWITCH POWER	BATTERY VOLTAGE
	35	FULL FUEL LEVEL INDICATOR	LAMP OUTPUT

CONNECTOR	PIN	ASSIGNMENT	FUNCTION
J5 (NATURAL)	1	LIFT / SWING JOYSTICK SUPPLY VOLTAGE	SUPPLY VOLTAGE
	2	LIFT CENTER TAP	ANALOG INPUT
	3	LIFT SIGNAL	ANALOG INPUT
	4	SWING SIGNAL	ANALOG INPUT
	5	SWING CENTER TAP	ANALOG INPUT
	6	NOT CONNECTED	ANALOG INPUT
	7	LIFT / SWING JOYSTICK RETURN	GRPOUND
	8	SPARE PIN	BLANK

CONNECTOR	PIN	ASSIGNMENT	FUNCTION
J7 (BLACK)	1	GROUND MODE	GROUND MODE
	2	PLATFORM EMS	PLATFORM EMS
	3	PLATFORM EMS TO GROUND MODULE	PLATFORM MODE
	4	FOOTSWITCH (FUNCTION ENABLE SWITCH) POWER	BATTERY VOLTAGE
	5	PLATFORM ROTATE LEFT	ME DIGITAL OUTPUT
	6	PLATFORM ROTATE RIGHT	ME DIGITAL OUTPUT
	7	SOFT TOUCH LIMIT SWITCH POWER	BATTERY VOLTAGE
	8	FOOTSWITCH SIGNAL	DIGITAL INPUT
	9	GENERATOR ON SIGNAL	DIGITAL INPUT
	10	+7 REFERENCE VOLTAGE	+7 REFERENCE VOLTAGE
	11	SPARE PIN	+5V REFERENCE VOLTAGE
	12	SPARE PIN	+5V REFERENCE VOLTAGE
	13	SPARE PIN	ANALOG INPUT
	14	GROUND RETURN	GROUND
	15	PLATFORM LEVEL UP	HS DIGITAL OUTPUT
	16	PLATFORM LEVEL DOWN	HS DIGITAL OUTPUT
	17	JIB BLOCK LIMIT SWITCH	HS DIGITAL INPUT
	18	SOFT TOUCH LIMIT SWITCH	HS DIGITAL INPUT
	19	PLATFORM ALARM	LAMP OUTPUT
	20	ALARM RETURN	GROUND
	21	SPARE PIN	GROUND
	22	SPARE PIN	GROUND
	23	SPARE PIN	ANALOG INPUT
	24	SPARE PIN	DIGITAL OUTPUT
	25	JIB UP	ME DIGITAL OUTPUT
	26	JIB DOWN	ME DIGITAL OUTPUT
	27	JIB RIGHT	ME DIGITAL OUTPUT
	28	JIB LEFT	ME DIGITAL OUTPUT
	29	GROUND RETURN	GROUND
	30	CAN LOW	CAN LOW
	31	CAN HIGH	CAN HIGH
	32	CAN SHIELD	CAN SHIELD
	33	SPARE PIN	GROUND
	34	SPARE PIN	GROUND
	35	SPARE PIN	ANALOG INPUT

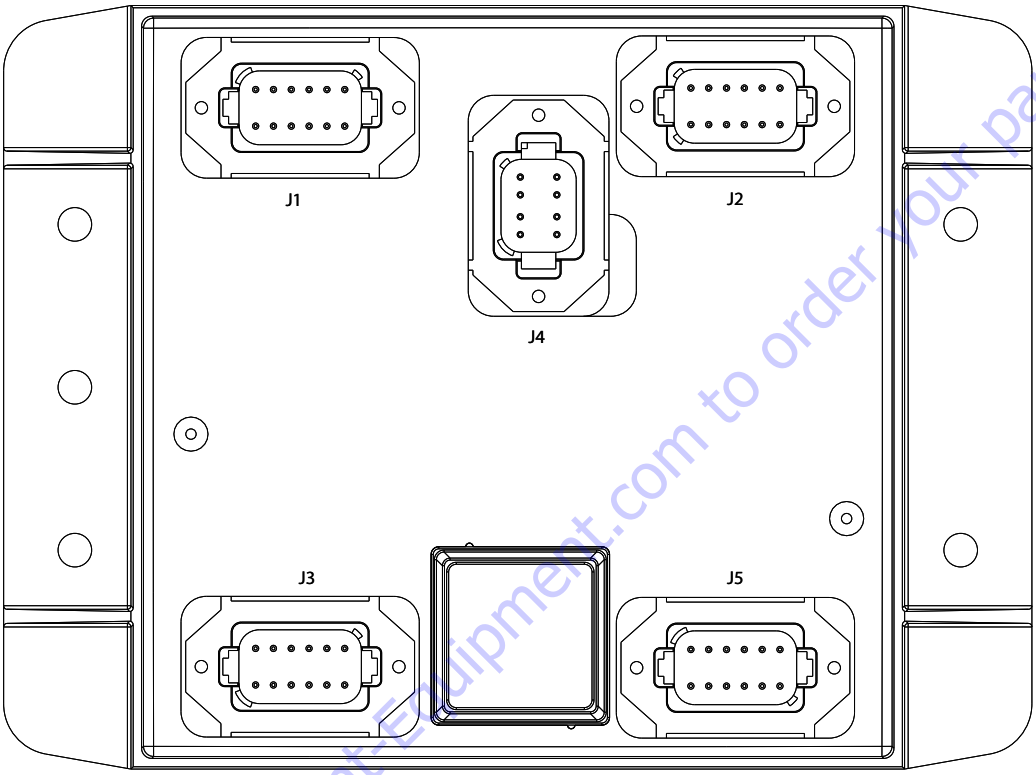


Figure 6-15. Chassis Control Module

Connector	Pin	Function	Type	
J1 (Gray)	1	POWER FEED THRU TO J2-1	POWER	I/O
	2	POWER FEED THRU TO J2-2	POWER	I/O
	3	SIGNAL FEED THRU TO J2-4	DIGITAL	I/O
	4	MASTER GROUND CONNECT	POWER	INPUT
	5	MASTER IGNITION CONNECT	POWER	INPUT
	6	CANBUS HIGH	SERIAL	I/O
	7	CANBUS LOW	SERIAL	I/O
	8	CANBUS SHIELD	SERIAL	I/O
	9	CANBUS TERMINATOR	SERIAL	I/O
	10	CANBUS TERMINATOR	SERIAL	I/O
	11	IGNITION	POWER	OUTPUT
	12	GROUND	POWER	OUTPUT

Connector	Pin	Function	Type	
J2 (Black)	1	POWER FEED THRU TO J1-1	POWER	I/O
	2	POWER FEED THRU TO J1-2	POWER	I/O
	3	GROUND	POWER	OUTPUT
	4	FRONT AXLES LIMIT SWITCH	DIGITAL	INPUT
	5	REAR AXLES LIMIT SWITCH	DIGITAL	INPUT
	6	DRIVE ORIENTATION SWITCH	DIGITAL	INPUT
	7	OSCILLATING AXLE PRES SW	DIGITAL	INPUT
	8	TURNTABLE ANGLE SENSOR #1	DIGITAL	INPUT
	9	TURNTABLE ANGLE SENSOR #2	DIGITAL	INPUT
	10	SPARE ANALOG	ANALOG	INPUT
	11	FRONT/REAR AXLE EXTEND	DIGITAL	OUTPUT
	12	FRONT/REAR AXLE RETRACT	DIGITAL	OUTPUT

Connector	Pin	Function	Type	
J3 (Green)	1	+5V ANALOG REFERENCE	POWER	OUTPUT
	2	FRONT RIGHT STEER ANGLE	ANALOG	INPUT
	3	GROUND	POWER	OUTPUT
	4	+5V ANALOG REFERENCE	POWER	OUTPUT
	5	FRONT LEFT STEER ANGLE	ANALOG	INPUT
	6	GROUND	POWER	OUTPUT
	7	+5V ANALOG REFERENCE	POWER	OUTPUT
	8	REAR RIGHT STEER ANGLE	ANALOG	INPUT
	9	GROUND	POWER	OUTPUT
	10	+5V ANALOG REFERENCE	POWER	OUTPUT
	11	REAR LEFT STEER ANGLE	ANALOG	INPUT
	12	GROUND	POWER	OUTPUT

Connector	Pin	Function	Type	
J4 (Gray)	1	IGNITION	POWER	OUTPUT
	2	GROUND	POWER	OUTPUT
	3	CANBUS HIGH	POWER	I/O
	4	CANBUS LOW	SERIAL	I/O
	5	CANBUS SHIELD	SERIAL	INPUT
	6	BOOTSTRAP MODE	POWER	INPUT
	7	IGNITION	DIGITAL	OUTPUT
	8	GROUND	POWER	OUTPUT

Connector	Pin	Function	Type	
J5 (Brown)	1	RIGHT FRONT STEER RIGHT	DIGITAL	OUTPUT
	2	RIGHT FRONT STEER LEFT	DIGITAL	OUTPUT
	3	LEFT FRONT STEER RIGHT	DIGITAL	OUTPUT
	4	LEFT FRONT STEER LEFT	DIGITAL	OUTPUT
	5	RIGHT REAR STEER RIGHT	DIGITAL	OUTPUT
	6	RIGHT REAR STEER LEFT	DIGITAL	OUTPUT
	7	LEFT REAR STEER RIGHT	DIGITAL	OUTPUT
	8	LEFT REAR STEER LEFT	DIGITAL	OUTPUT
	9	IGNITION	POWER	OUTPUT
	10	RS232 RECEIVE	SERIAL	INPUT
	11	RS232 TRANSMIT	SERIAL	OUTPUT
	12	GROUND	POWER	OUTPUT

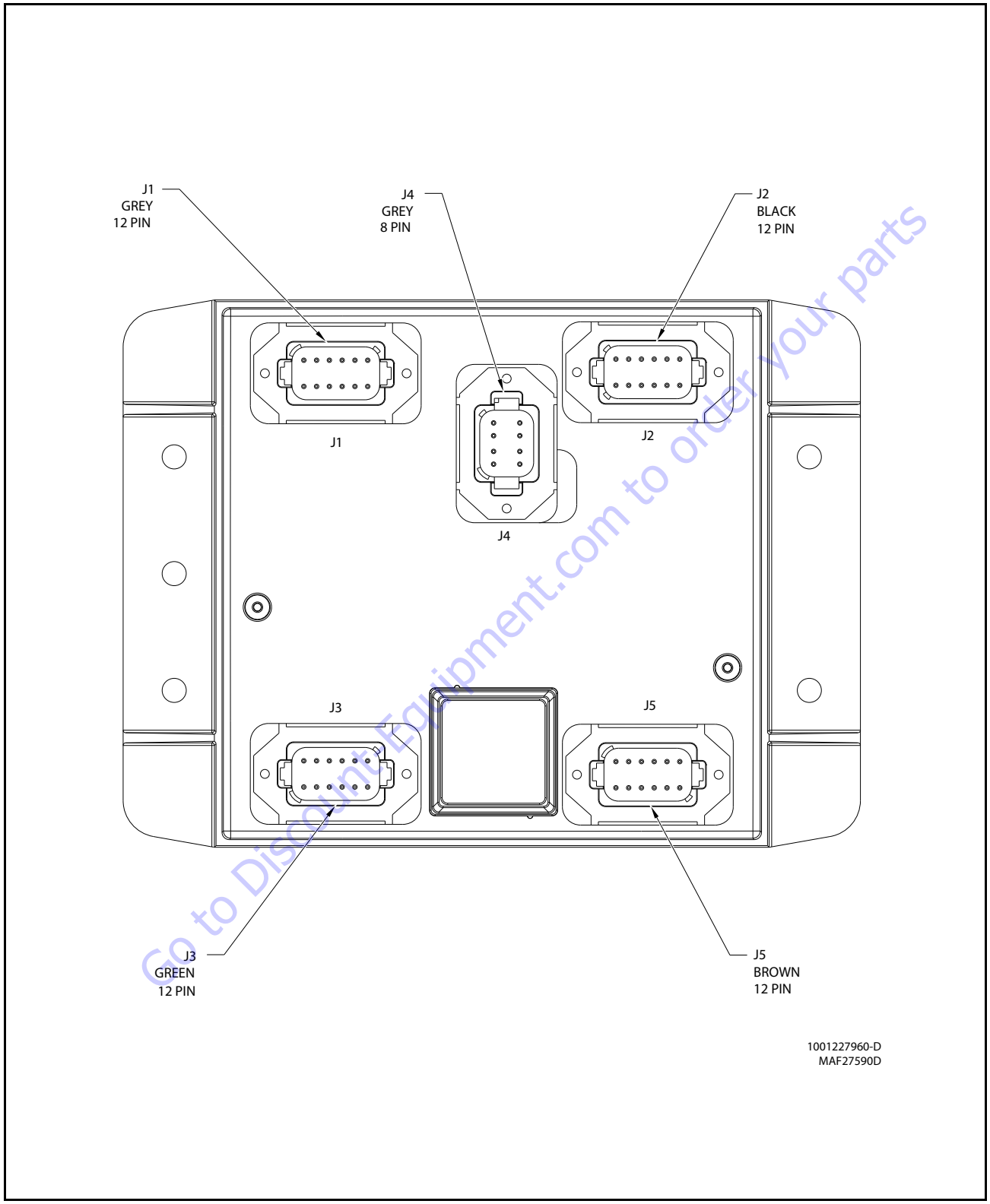


Figure 6-16. BLAM Control Module

Connector	Pin	Function	Type	
J1 (Gray)	1	POWER FEED THRU TO J2-1	POWER	I/O
	2	POWER FEED THRU TO J2-2	POWER	I/O
	3	SIGNAL FEED THRU TO J2-4	DIGITAL	INPUT
	4	MASTER GROUND CONNECT	POWER	INPUT
	5	MASTER IGNITION CONNECT	POWER	INPUT
	6	CANBUS HIGH	SERIAL	I/O
	7	CANBUS LOW	SERIAL	I/O
	8	CANBUS SHIELD	SERIAL	I/O
	9	CANBUS TERMINATOR	SERIAL	I/O
	10	CANBUS TERMINATOR	SERIAL	I/O
	11	IGNITION	POWER	OUTPUT
	12	GROUND	POWER	OUTPUT

Connector	Pin	Function	Type	
J2 (Black)	1	POWER FEED THRU TO J1-1	POWER	I/O
	2	POWER FEED THRU TO J1-2	POWER	I/O
	3	GROUND	POWER	OUTPUT
	4	SPARE INPUT	DIGITAL	INPUT
	5	SPARE INPUT	DIGITAL	INPUT
	6	SPARE INPUT	DIGITAL	INPUT
	7	SPARE INPUT	DIGITAL	INPUT
	8	MAIN BOOM ANG 1 (GRAVITY)	DIGITAL	INPUT
	9	MAIN BOOM ANG 2 (GRAVITY)	DIGITAL	INPUT
	10	SPARE ANALOG INPUT	ANALOG	INPUT
	11	RIGHT DRIVE PUMP FORWARD	DIGITAL	OUTPUT
	12	RIGHT DRIVE PUMP REVERSE	DIGITAL	OUTPUT

Connector	Pin	Function	Type	
J3 (Green)	1	+5V ANALOG REFERENCE	POWER	OUTPUT
	2	REF VOLTAGE FROM J3-1	ANALOG	INPUT
	3	GROUND	POWER	OUTPUT
	4	+5V ANALOG REFERENCE	POWER	OUTPUT
	5	SPARE ANALOG INPUT	ANALOG	INPUT
	6	GROUND	POWER	OUTPUT
	7	+5V ANALOG REFERENCE	POWER	OUTPUT
	8	BOOM LENGTH SENSOR	ANALOG	INPUT
	9	GROUND	POWER	OUTPUT
	10	+5V ANALOG REFERENCE	POWER	OUTPUT
	11	SPARE ANALOG INPUT	ANALOG	INPUT
	12	GROUND	POWER	OUTPUT

Connector	Pin	Function	Type	
J4 (Gray)	1	IGNITION	POWER	OUTPUT
	2	GROUND	POWER	OUTPUT
	3	CANBUS HIGH	SERIAL	I/O
	4	CANBUS LOW	SERIAL	I/O
	5	CANBUS SHIELD	POWER	INPUT
	6	BOOTSTRAP MODE	DIGITAL	INPUT
	7	IGNITION	POWER	OUTPUT
	8	GROUND	POWER	OUTPUT

Connector	Pin	Function	Type	
J5 (Brown)	1	LEFT DRIVE PUMP FORWARD	DIGITAL	OUTPUT
	2	LEFT DRIVE PUMP FORWARD	DIGITAL	OUTPUT
	3	OSCILLATING AXLES	DIGITAL	OUTPUT
	4	SPARE OUTPUT - D005	DIGITAL	OUTPUT
	5	SPARE OUTPUT - D006	DIGITAL	OUTPUT
	6	SPARE OUTPUT - D007	DIGITAL	OUTPUT
	7	SPARE OUTPUT - D008	DIGITAL	OUTPUT
	8	SPARE OUTPUT - D009	DIGITAL	OUTPUT
	9	IGNITION	POWER	OUTPUT
	10	RS232 RECEIVE	SERIAL	INPUT
	11	RS232 TRANSMIT	SERIAL	OUTPUT
	12	GROUND	POWER	OUTPUT

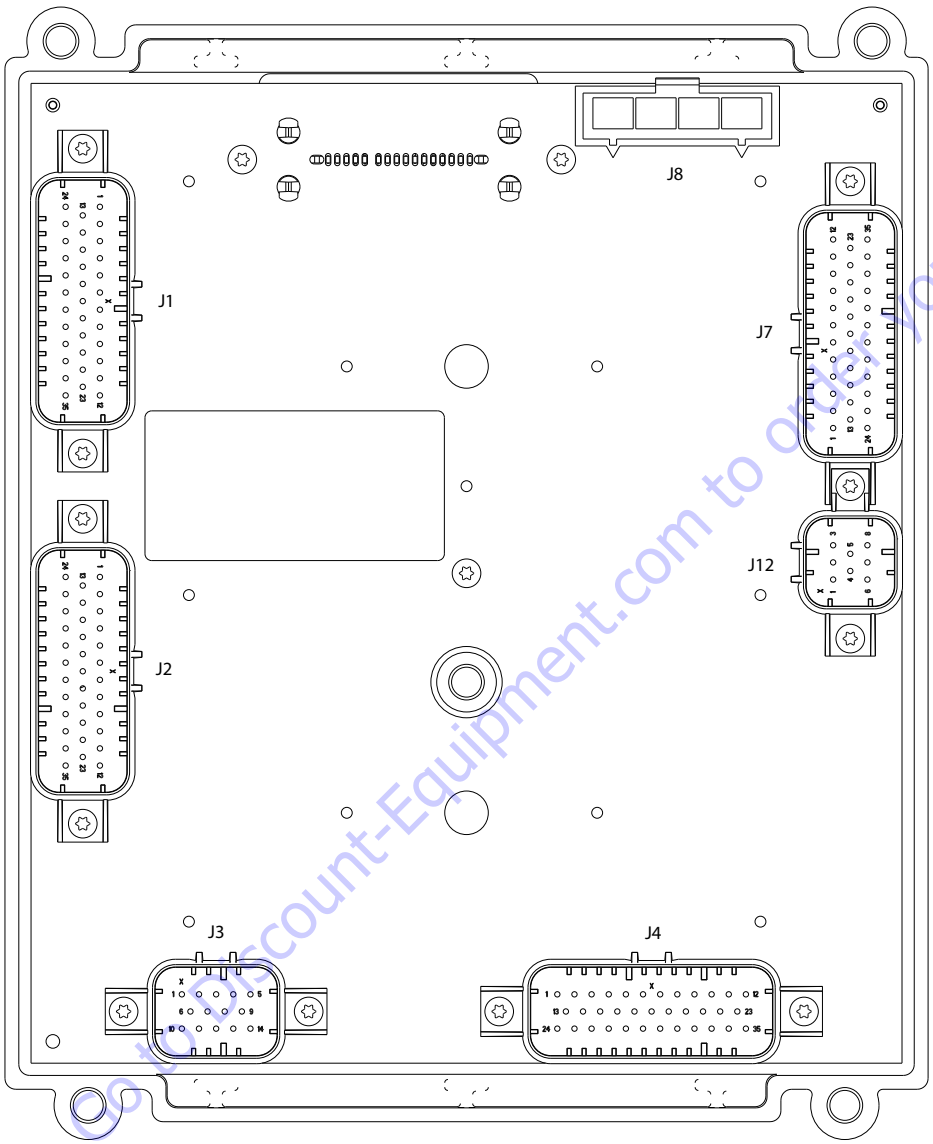


Figure 6-17. Ultra Boom Control Module

Connector	Pin	Function	Type	
J1 (Natural)	1	SPARE	DIGITAL	OUTPUT
	2	SPARE	DIGITAL	OUTPUT
	3	SPARE	DIGITAL	OUTPUT
	4	SPARE	GROUND	INPUT
	5	SPARE	GROUND	INPUT
	6	SPARE	DIGITAL	OUTPUT
	7	SPARE	DIGITAL	OUTPUT
	8	GROUND	GROUND	INPUT
	9	GROUND	GROUND	INPUT
	10	SPARE	DIGITAL	OUTPUT
	11	SPARE	DIGITAL	OUTPUT
	12	SPARE	DIGITAL	OUTPUT
	13	SPARE	DIGITAL	OUTPUT
	14	LEFT FRONT AXLE SWING	ANALOG	INPUT
	15	RIGHT REAR AXLE SWING	ANALOG	INPUT
	16	TURNTABLE ANGLE #1	FREQUENCY	INPUT
	17	SPARE	GROUND	INPUT
	18	SPARE	GROUND	INPUT
	19	SPARE	GROUND	INPUT
	20	SPARE	DIGITAL	OUTPUT
	21	SPARE	DIGITAL	INPUT
	22	SPARE	DIGITAL	OUTPUT
	23	SPARE	DIGITAL	OUTPUT
	24	SPARE	N/C	N/C
	25	SPARE	SERIAL	I/O
	26	SPARE	SERIAL	I/O
	27	SPARE	GROUND	INPUT
	28	ANALYZER POWER	VOLTAGE	OUTPUT
	29	ANALYZER RS-232 Rx	SERIAL	INPUT
	30	ANALYZER RS-232 Rx	SERIAL	OUTPUT
	31	ANALYZER GROUND	GROUND	INPUT
	32	SPARE	DIGITAL	OUTPUT
	33	SPARE	GROUND	INPUT
	34	SPARE	DIGITAL	INPUT
	35	SPARE	DIGITAL	INPUT

Connector	Pin	Function	Type	
J2 (Gray)	1	TWO SPEED	DIGITAL	OUTPUT
	2	SPARE	DIGITAL	OUTPUT
	3	SPARE	DIGITAL	OUTPUT
	4	FRONT AXLE SWING EXTEND	DIGITAL	OUTPUT
	5	REAR AXLE SWING EXTEND	DIGITAL	OUTPUT
	6	GROUND	GROUND	INPUT
	7	REAR AXLE SWING RETRACT	DIGITAL	OUTPUT
	8	RIGHT REAR STEER RIGHT	DIGITAL	OUTPUT
	9	LEFT REAR STEER RIGHT	DIGITAL	OUTPUT
	10	SPARE	DIGITAL	OUTPUT
	11	RIGHT FRONT STEER RIGHT	DIGITAL	OUTPUT
	12	SPARE	DIGITAL	OUTPUT
	13	BRAKE	DIGITAL	OUTPUT
	14	GROUND	GROUND	INPUT
	15	SPARE	DIGITAL	OUTPUT
	16	FRONT AXLE SWING RETRACT	DIGITAL	OUTPUT
	17	GROUND	GROUND	INPUT
	18	GROUND	GROUND	INPUT
	19	RIGHT REAR STEER LEFT	DIGITAL	OUTPUT
	20	LEFT REAR STEER LEFT	DIGITAL	OUTPUT
	21	SPARE	DIGITAL	OUTPUT
	22	RIGHT FRONT STEER LEFT	DIGITAL	OUTPUT
	23	SPARE	DIGITAL	OUTPUT
	24	SPARE	DIGITAL	INPUT
	25	FRONT RIGHT AXLE SWING	ANALOG	INPUT
	26	SPARE	DIGITAL	OUTPUT
	27	SPARE	DIGITAL	OUTPUT
	28	GROUND	GROUND	INPUT
	29	SPARE	GROUND	INPUT
	30	GROUND	GROUND	INPUT
	31	SPARE	DIGITAL	OUTPUT
	32	SPARE	DIGITAL	OUTPUT
	33	SPARE	DIGITAL	OUTPUT
	34	LEFT FRONT STEER LEFT	DIGITAL	OUTPUT
	35	LEFT FRONT STEER RIGHT	DIGITAL	OUTPUT

Connector	Pin	Function	Type	
J8 (Black)	1	GROUND FROM BATTERY	GROUND	INPUT
	2	POWER FROM BATTERY	POWER	INPUT
	3	SENSOR SHIELD	GROUND	OUTPUT
	4	SPARE	POWER	OUTPUT

Connector	Pin	Function	Type	
J12 (Black)	1	TURNTABLE ANGLE #2	FREQUENCY	INPUT
	2	GROUND	FREQUENCY	INPUT
	3	SPARE	SERIAL	I/O
	4	SPARE	SERIAL	I/O
	5	SPARE	GROUND	INPUT
	6	SPARE	TERM	I/O
	7	SPARE	TERM	I/O
	8	SPARE	DIGITAL	INPUT

Connector	Pin	Function	Type	
J3 (Black)	1	FRONT AXLE SWING RETURN	GROUND	INPUT
	2	REAR AXLE SWING RETURN	GROUND	INPUT
	3	GROUND	GROUND	INPUT
	4	SPARE	GROUND	INPUT
	5	SPARE	GROUND	INPUT
	6	SPARE	GROUND	INPUT
	7	SPARE	VBAT	OUTPUT
	8	SPARE	DIGITAL	INPUT
	9	SPARE	DIGITAL	INPUT
	10	SPARE	DIGITAL	INPUT
	11	SPARE	DIGITAL	INPUT
	12	ANALOG REF. VOLTAGE	VOLTAGE	OUTPUT
	13	LEFT REAR AXLE SWING	ANALOG	INPUT
	14	SPARE	GROUND	INPUT

Connector	Pin	Function	Type	
J4 (Blue)	1	SPARE	DIGITAL	OUTPUT
	2	SPARE	DIGITAL	OUTPUT
	3	SPARE	DIGITAL	OUTPUT
	4	SPARE	DIGITAL	INPUT
	5	SPARE	DIGITAL	INPUT
	6	SPARE	DIGITAL	INPUT
	7	SPARE	DIGITAL	INPUT
	8	SPARE	DIGITAL	INPUT
	9	SPARE	DIGITAL	INPUT
	10	SPARE	DIGITAL	INPUT
	11	SPARE	DIGITAL	INPUT
	12	SPARE	DIGITAL	INPUT
	13	SPARE	DIGITAL	OUTPUT
	14	SPARE	DIGITAL	OUTPUT
	15	SPARE	DIGITAL	OUTPUT
	16	SPARE	DIGITAL	OUTPUT
	17	SPARE	DIGITAL	INPUT
	18	SPARE	DIGITAL	INPUT
	19	SPARE	DIGITAL	INPUT
	20	SPARE	DIGITAL	INPUT
	21	SPARE	DIGITAL	INPUT
	22	SPARE	DIGITAL	INPUT
	23	SPARE	DIGITAL	INPUT
	24	SPARE	VBAT	OUTPUT
	25	SPARE	VBAT	OUTPUT
	26	SPARE	DIGITAL	OUTPUT
	27	SPARE	DIGITAL	OUTPUT
	28	SPARE	DIGITAL	OUTPUT
	29	SPARE	DIGITAL	OUTPUT
	30	SPARE	DIGITAL	INPUT
	31	SPARE	GROUND	INPUT
	32	SPARE	GROUND	INPUT
	33	SPARE	DIGITAL	INPUT
	34	SPARE	DIGITAL	INPUT
	35	SPARE	DIGITAL	INPUT

Connector	Pin	Function	Type	
J7 (Black)	1	SPARE	DIGITAL	INPUT
	2	SPARE	DIGITAL	INPUT
	3	SPARE	DIGITAL	INPUT
	4	RIGHT FRONT STEER	ANALOG	INPUT
	5	REFERENCE VOLTAGE	VOLTAGE	OUTPUT
	6	CAN TERMINATION	TERM	I/O
	7	LEFT FRONT STEER	ANALOG	INPUT
	8	LEFT REAR STEER	ANALOG	INPUT
	9	GROUND	GROUND	INPUT
	10	GROUND	GROUND	INPUT
	11	DRIVE ORIENTATION SWITCH	DIGITAL	INPUT
	12	SPARE		INPUT
	13	CAN HI	SERIAL	I/O
	14	SPARE	DIGITAL	INPUT
	15	BRAKE RELEASE FROM UGM	DIGITAL	INPUT
	16	REFERENCE VOLTAGE	VOLTAGE	OUTPUT
	17	CAN TERMINATION	TERM	I/O
	18	CAN SHEILD	GROUND	INPUT
	19	SPARE	GROUND	INPUT
	20	RIGHT REAR STEER	ANALOG	INPUT
	21	SPARE	DIGITAL	INPUT
	22	SPARE	DIGITAL	INPUT
	23	SPARE	DIGITAL	INPUT
	24	CAN LO	SERIAL	I/O
	25	GROUND	GROUND	INPUT
	26	REFERENCE VOLTAGE	VOLTAGE	OUTPUT
	27	REFERENCE VOLTAGE	VOLTAGE	OUTPUT
	28	GROUND	GROUND	INPUT
	29	VBAT	VBAT	OUTPUT
	30	SPARE	VBAT	OUTPUT
	31	SPARE	VBAT	OUTPUT
	32	SPARE	VBAT	OUTPUT
	33	SPARE	VBAT	OUTPUT
	34	SPARE	VBAT	OUTPUT
	35	SPARE	DIGITAL	INPUT

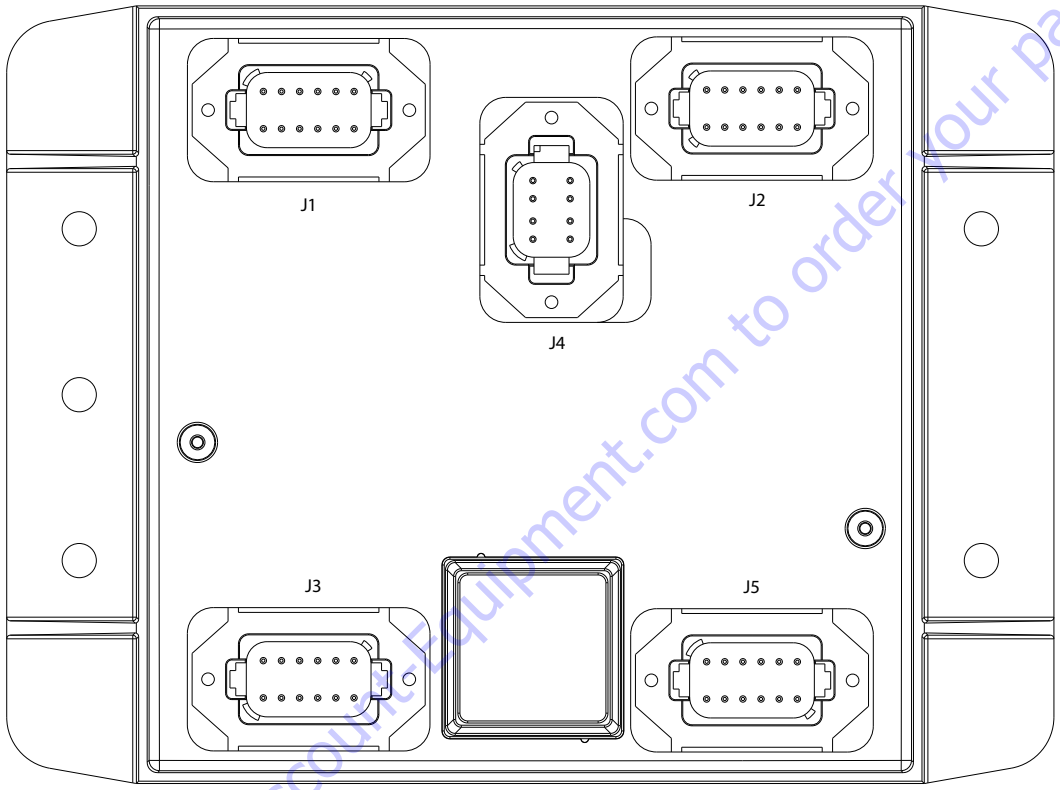


Figure 6-18. Jib Control Module

Connector	Pin	Function	Type	
J1 (Gray)	1	Power Feed Thru to J2-1	Power	I/O
	2	Power Feed Thru to J2-2	Power	I/O
	3	Signal Feed Thru to J2-4	Digital	Input
	4	Master Ground Connect	Power	Input
	5	Master Ignition Connect	Power	Input
	6	CANbus High	Serial	I/O
	7	CANbus Low	Serial	I/O
	8	CANbus Shield	Serial	I/O
	9	CANbus Terminator	Serial	I/O
	10	CANbus Terminator	Serial	I/O
	11	Ignition	Power	Output
	12	Ground	Power	Output

Connector	Pin	Function	Type	
J2 (Black)	1	Power Feed Thru to J1-1	Power	I/O
	2	Power Feed Thru to J1-2	Power	I/O
	3	Ground	Power	Output
	4	Lock Pin NO Contact	Digital	Input
	5	Lock Pin NC Contact	Digital	Input
	6	Jib Transport #1 NO Contact	Digital	Input
	7	Jib Transport #1 NC Contact	Digital	Input
	8	Spare Input	Digital	Input
	9	Spare Input	Digital	Input
	10	Spare Analog Input	Analog	Input
	11	Jib Level Up	Digital	Output
	12	Jib Level Down	Digital	Output

Connector	Pin	Function	Type	
J3 (Green)	1	+5V Analog Reference	Power	Output
	2	Jib Level Angle #1	Analog	Input
	3	Ground	Power	Output
	4	+5V Analog Reference	Power	Output
	5	Jib level Angle #2	Analog	Input
	6	Ground	Power	Output
	7	+5V Analog Reference	Power	Output
	8	Jib Swing Angle #1	Analog	Input
	9	Ground	Power	Output
	10	+5V Analog Reference	Power	Output
	11	Jib Swing Angle #2	Analog	Input
	12	Ground	Power	Output

Connector	Pin	Function	Type	
J4 (Gray)	1	Ignition	Power	Output
	2	Ground	Power	Output
	3	CANbus High	Serial	I/O
	4	CANbus Low	Serial	I/O
	5	CANbus Shield	Power	Input
	6	Bootstrap Mode	Digital	Input
	7	Ignition	Power	Output
	8	Ground	Power	Output

Connector	Pin	Function	Type	
J5 (Brown)	1	Jib Lift Up	Digital	Output
	2	Jib Lift Down	Digital	Output
	3	Jib Swing Right	Digital	Output
	4	Jib Swing Left	Digital	Output
	5	Jib Telescope In	Digital	Output
	6	Jib Telescope Out	Digital	Output
	7	Spare Output	Digital	Output
	8	Spare Output	Digital	Output
	9	Ignition	Power	Output
	10	RS232 Receive	Serial	Input
	11	RS232 Transmit	Serial	Output
	12	Ground	Power	Output

Figure 6-19. Analyzer Connecting Points

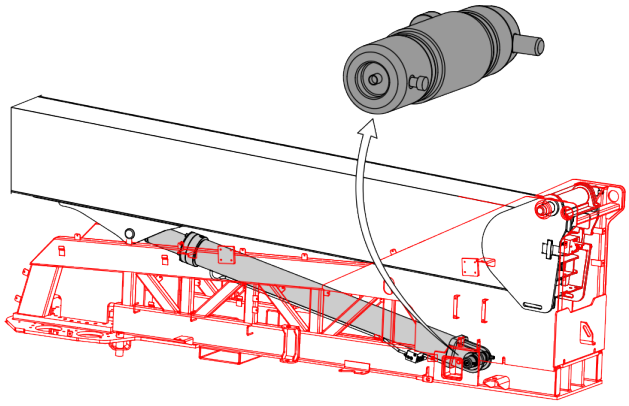
6.6 CONTROL SYSTEM BOOM SENSORS

The Boom Control System (BCS) requires the use of multiple sensors to measure the position of the boom. The sensors used to determine main boom and jib boom position are shown in the following figures.

NOTICE

THE CONTROL SYSTEM MUST BE RECALIBRATED AFTER REPLACING OF ANY SENSOR.

Sensor #1 - Load Pin (1)



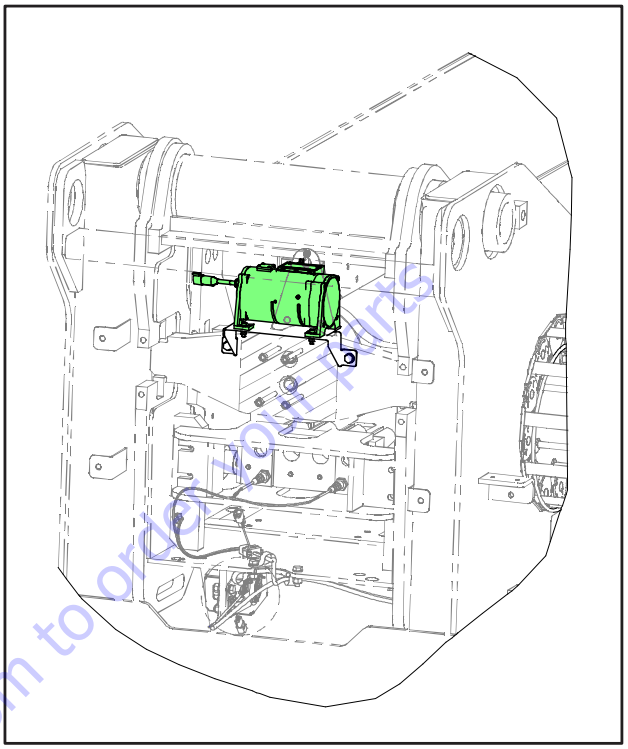
The Main Lift Cylinder is attached to the Turntable with a load cell pin. This pin is fixed to the Turntable so as to allow measurement of the force exerted by the cylinder regardless of the cylinder orientation.

Sensor #2 - Main Boom Angle Sensors (2)

See (See Figure 6-20.)

These sensors measure Main Boom angle with respect to gravity. They are located in the rear of the Section #1boom and mounted such that they generate opposing signals with respect to boom movement.

Sensor #3 - Main Boom Length Sensor (1)



This sensor is used to measure total stroke of the Main Boom. It is located in the rear of the Base Boom and consists of a wire rope attached to a rotating drum.

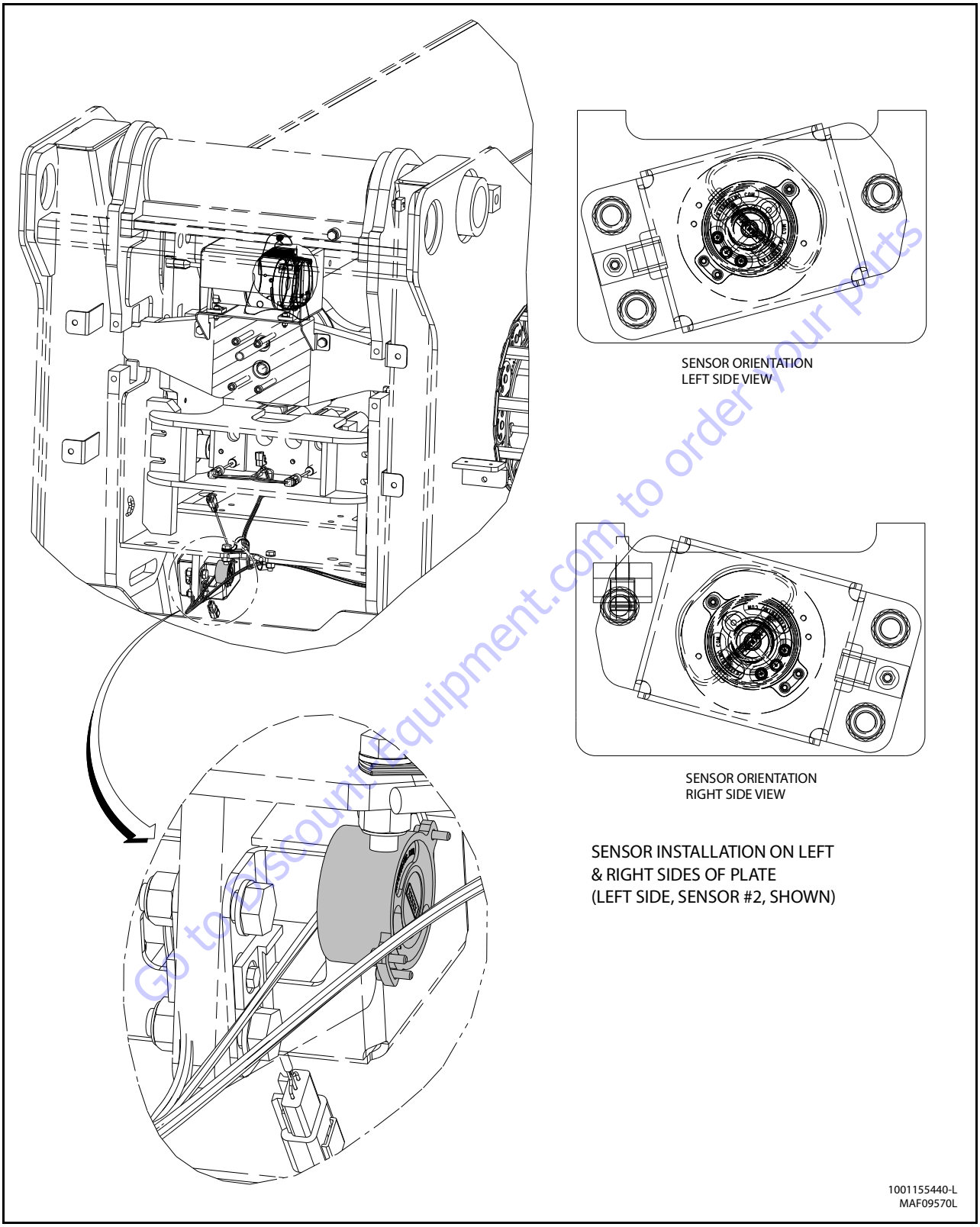


Figure 6-20. Main Boom Angle Sensors

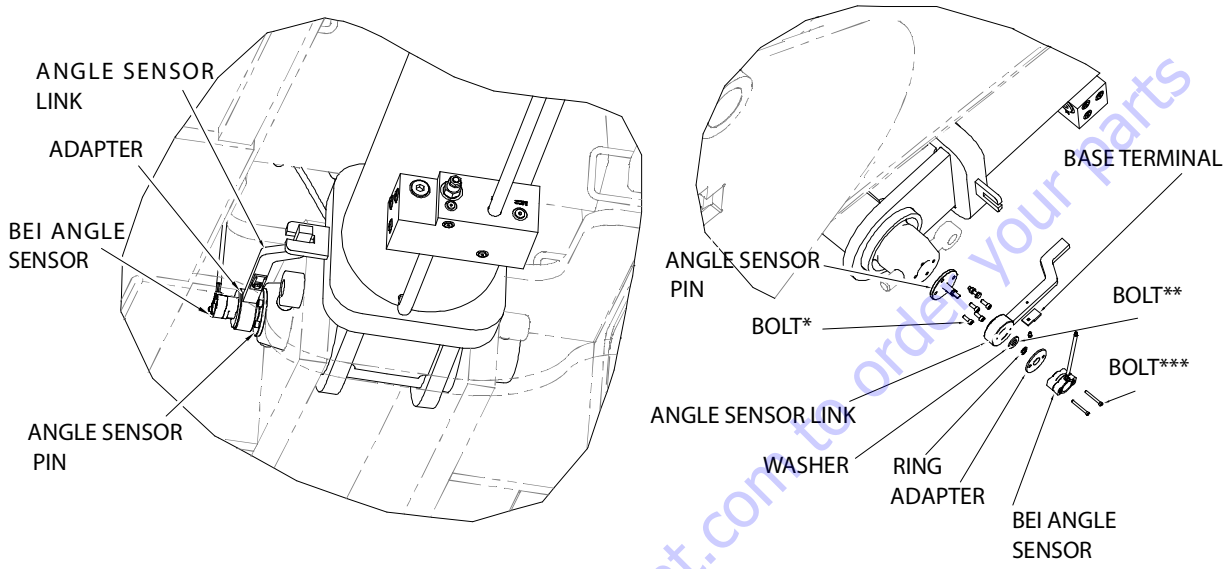
ANGLE SENSOR #1 (RIGHT)			
PIN #	**DESC**	**SENSOR**	**HARNESS**
PIN #1	POWER	RED	RED
PIN #2	OUTPUT	WHITE	BLUE
PIN #3	GROUND	BLACK	BLACK

ANGLE SENSOR #2 (LEFT)			
PIN #	**DESC**	**SENSOR**	**HARNESS**
PIN #1	POWER	RED	ORANGE
PIN #2	OUTPUT	WHITE	YELLOW
PIN #3	GROUND	BLACK	BLACK

Sensor #4 - Main Boom Cylinder Angle Sensor (1)

See (See Figure 6-21.)

This sensor's function is to measure Main Boom angle relative to the Turntable. A rotary type sensor is mounted to the Turntable and attached to the Main Lift cylinder of the base boom. It is a dual output sensor in a single mechanical body with electrically opposing signals.



NOTE: ** APPLY MEDIUM STRENGTH THREADLOCKING COMPOUND AND TORQUE 12 Nm*
*** APPLY LOW STRENGTH THREADLOCKING COMPOUND*
**** APPLY LOW STRENGTH THREADLOCKING COMPOUND AND TORQUE 3.4 Nm*

Figure 6-21. Main Boom Cylinder Angle (Protractor) Sensor

Sensor #5 - Main Boom Transport Length Switch (1)

See (See Figure 6-22.)

This switch is used to indicate Main Boom retracted position for transport. This is a mechanical limit switch.

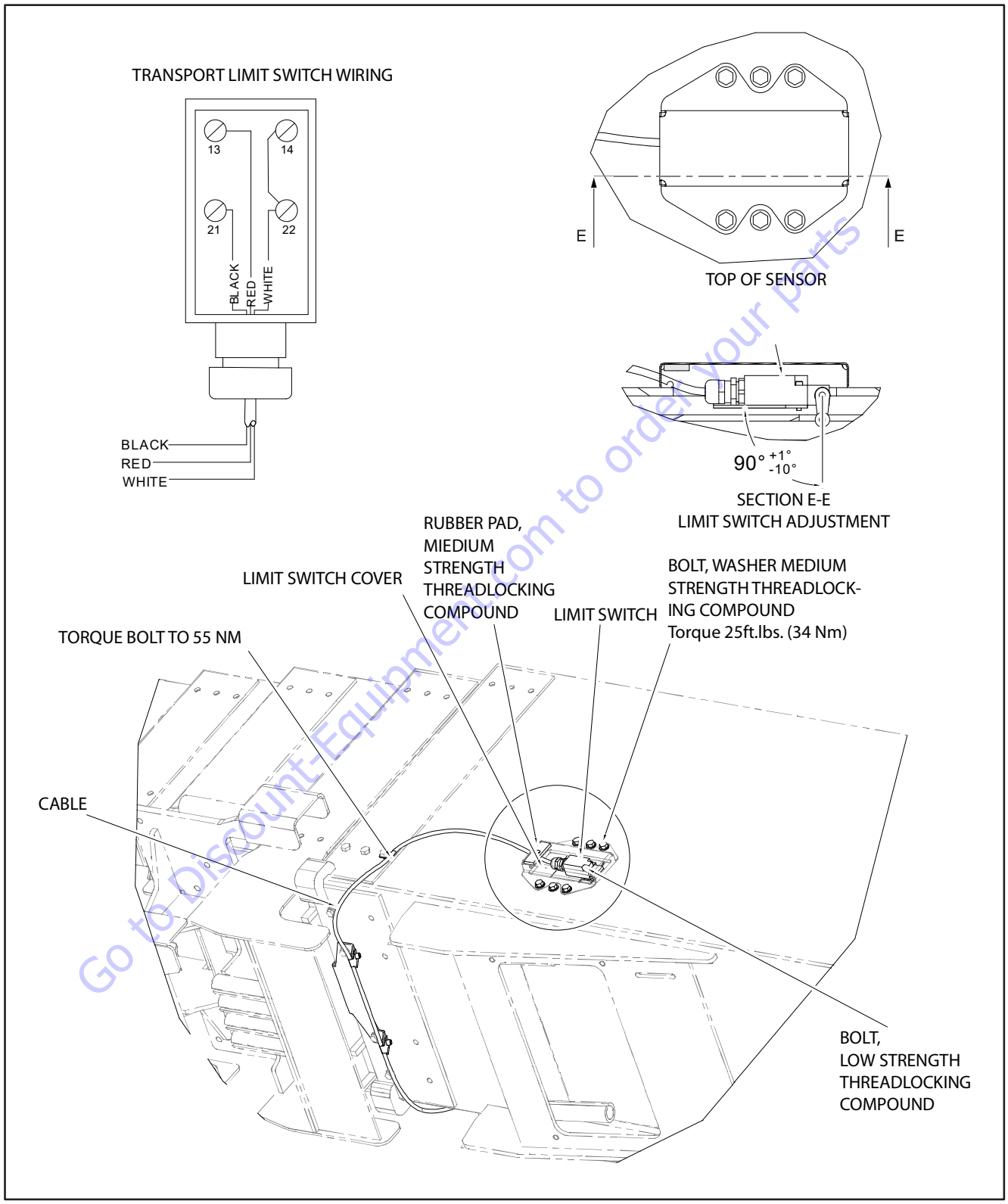


Figure 6-22. Main Boom Transport Length Switch

Sensor #6 - Jib Level Angle Sensor (1)

See (See Figure 6-24.)

This sensor is used to measure Jib Level angle relative to the Main Boom. A rotary type sensor is mounted between the Main Boom Fly nose and the Jib Pivot weldment. It is a dual output sensor in a single mechanical body with electrically opposing signals.

SENSOR INSTALLATION

1. Attach the sensor to the mounting plate.
2. Attach the link to the sensor arm.
3. Install the sensor subassembly onto the boom.
4. Connect the sensor wiring.

Sensor #7 - Jib Lock Pin Proximity Sensor (1)

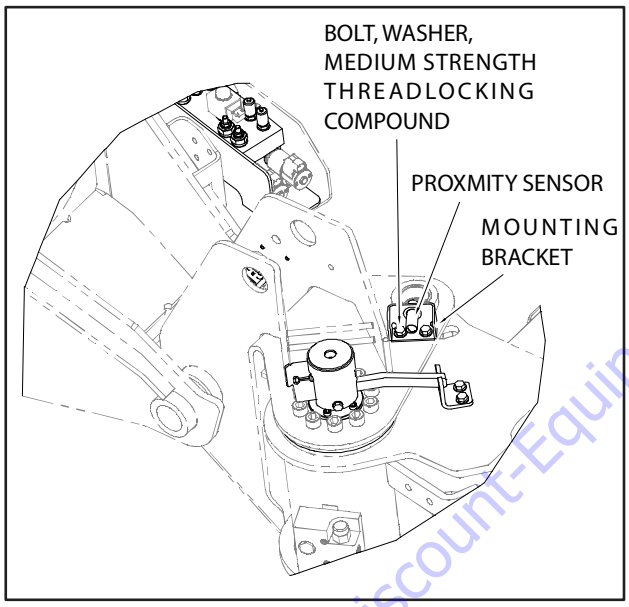
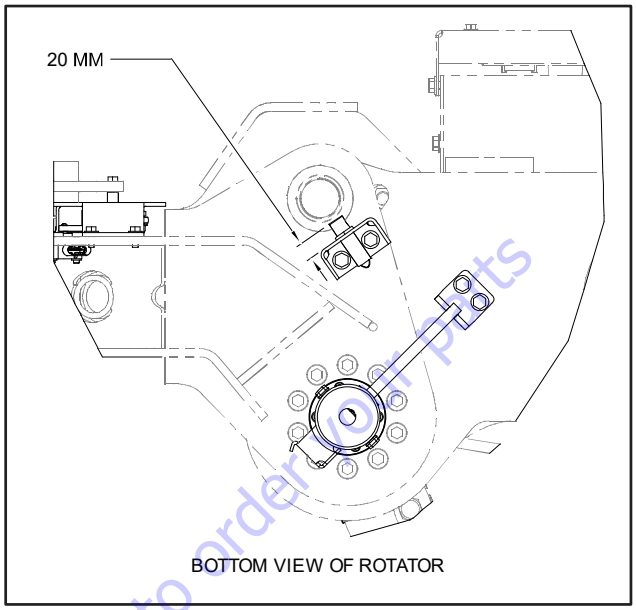


Figure 6-23. Jib Lock Pin Proximity Sensor

This sensor is used to indicate the Jib Lock Pin is fully engaged. This is a proximity switch mounted to the Jib Pivot weldment.

LOCK PIN SENSOR ADJUSTMENT

Adjust the proximity sensor to 20 mm from the front face of the proximity sensor to the front mounting face of the mounting bracket. The LED on the sensor will light when power is applied and the sensor is within range.



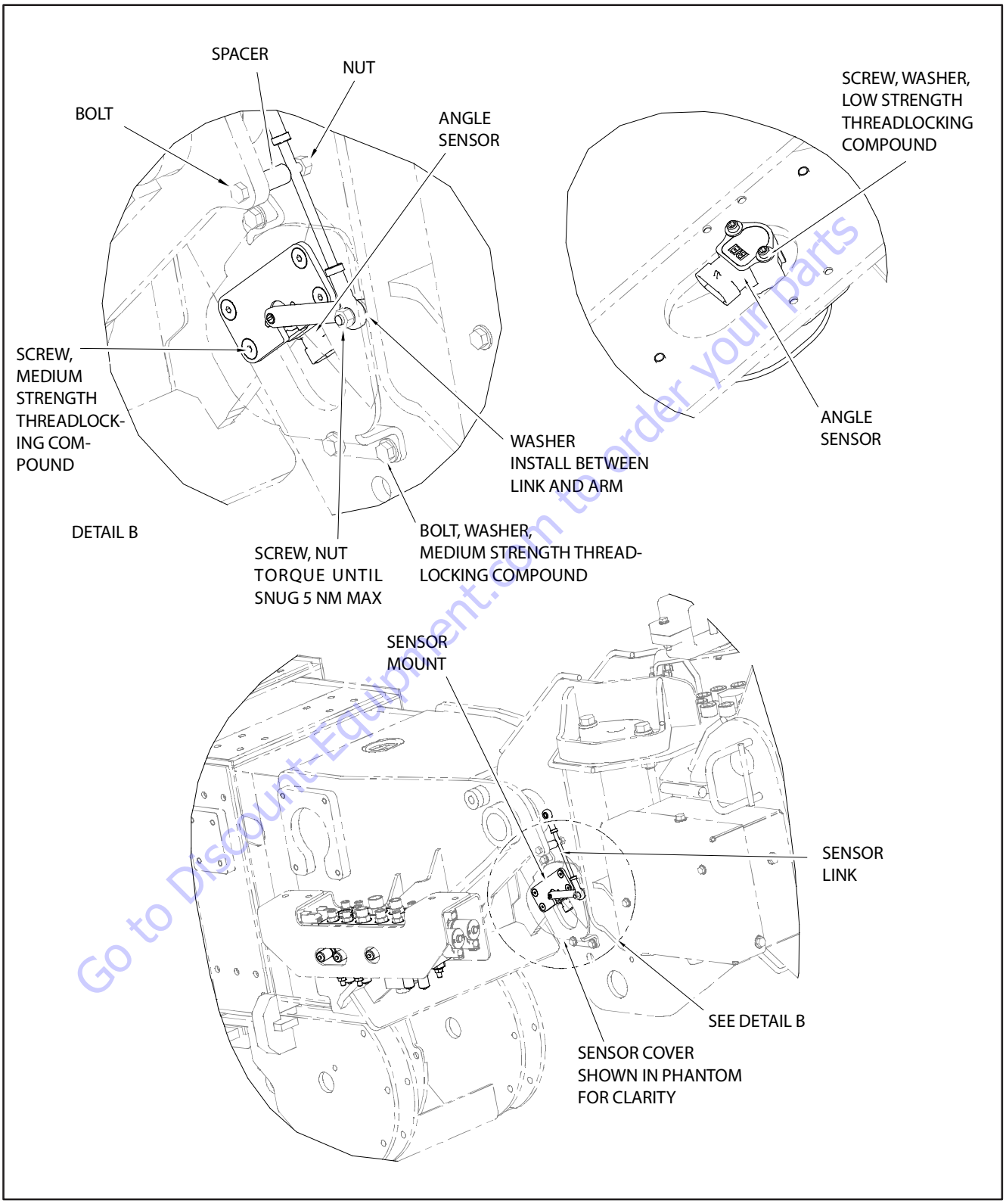


Figure 6-24. Jib Level Angle Sensor

Sensor #8 - Jib Stow Angle Sensor (1)

See (See Figure 6-25.)

This sensor is used to measure Jib swing angle. This is a rotary sensor mounted to the underside of the Jib Pivot weldment. It is a dual output sensor in a single mechanical body with electrically opposing signals.

Sensor #9 - Jib Lift Angle Sensor (1)

This sensor's function is to measure the Jib angle relative to the Main Boom Pivot weldment. A linear position sensor is located inside the Jib lift cylinder to measure cylinder stroke.

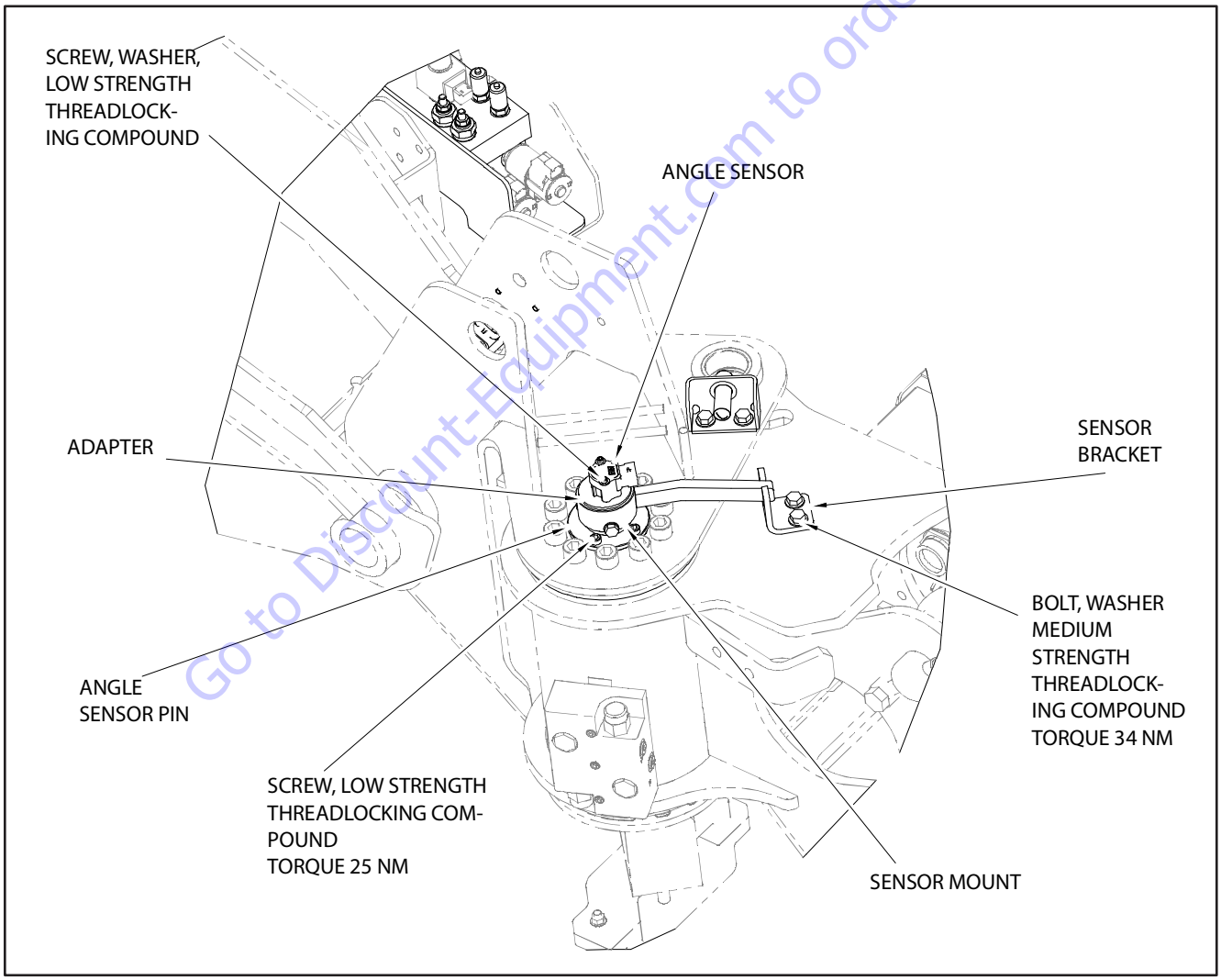


Figure 6-25. Jib Stow Angle Sensor

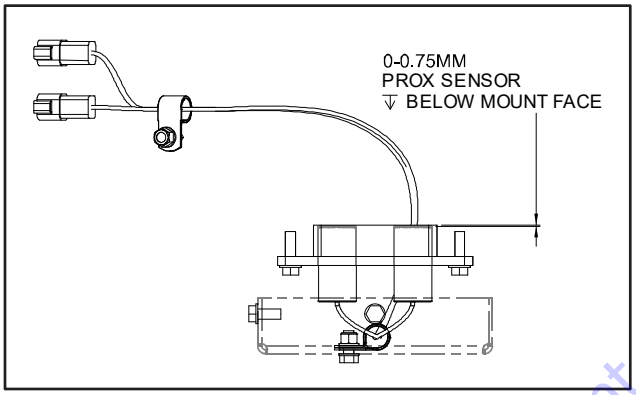
Sensor #10 - Dual Capacity / Jib Transport Length Switches (2)

See (See Figure 6-26.)

These switches are located on the Jib Base Boom and are used to measure transport position and 1000# length limit. These are proximity switches mounted such that they generate opposing signals.

ADJUSTMENT

Adjust the Proximity Sensors so the front sensing face is flush to 0.75 mm below the surface of the mounting face.



Sensor #11 - Platform Level Angle Sensor (1)

This sensor is used to measure Platform angle relative to the Jib. A linear position sensor is located inside the Platform Level cylinder to measure cylinder stroke.

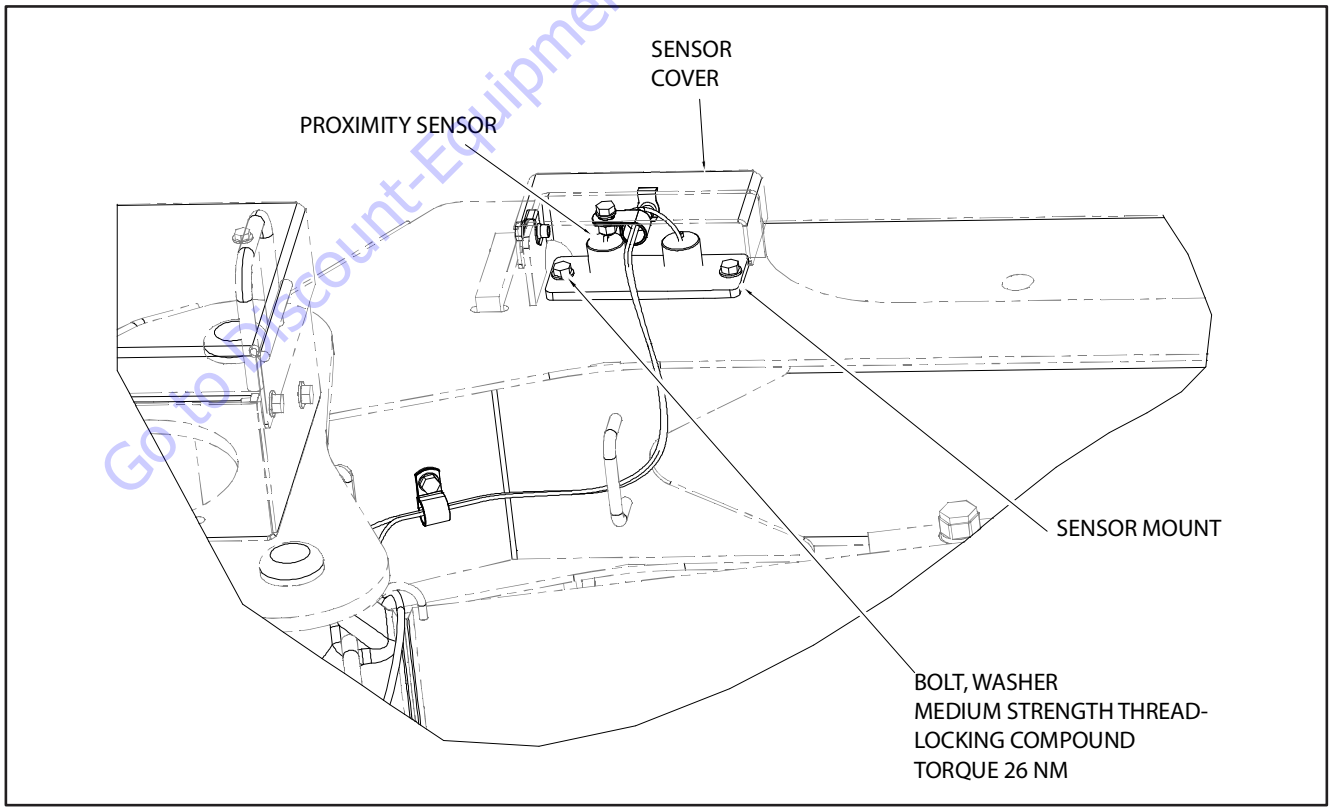


Figure 6-26. Jib Transport Length Sensors

Sensor #12 - Platform Level Angle Gravity Sensors (2)

See (See Figure 6-27.)

These sensors are located on the Platform Support and are used to measure platform angle with respect to gravity. They are mounted such that they generate opposing signals.

Sensor #13 - Turntable Swing Angle (1)

This sensor is used to determine turntable swing angle. It is used for turntable swing control when the boom is in transport position (Axles Retracted). It is a dual output sensor in a single mechanical body with electrically opposing signals mounted integral to the electrical collector ring.

Sensor #14 - Steer Angle Sensor (4)

These sensors are used to measure wheel steer angles. These rotary sensors are mounted on top of each king pin.

Sensor #15 - Axle extend/retract Sensor (4)

These sensors are used to measure axle rotation between the retracted and extended positions. Each sensor is mounted between the frame and an axle.

Sensor #16 - Brake-Two Speed Pressure Sensor (1)

This pressure switch monitors that there is no pressure present when the associated valves are not activated.

Sensor #17 - Chassis Tilt Sensor (Externally mounted) (1)

This sensor is the primary tilt sensor and measures the tilted angle of the turntable relative to gravity. It is mounted on a bracket on the left side of the turntable adjacent to the UGM and BLAM module. It is a dual axis output sensor in a single body.

Sensor #18 - Tilt Sensor (1)

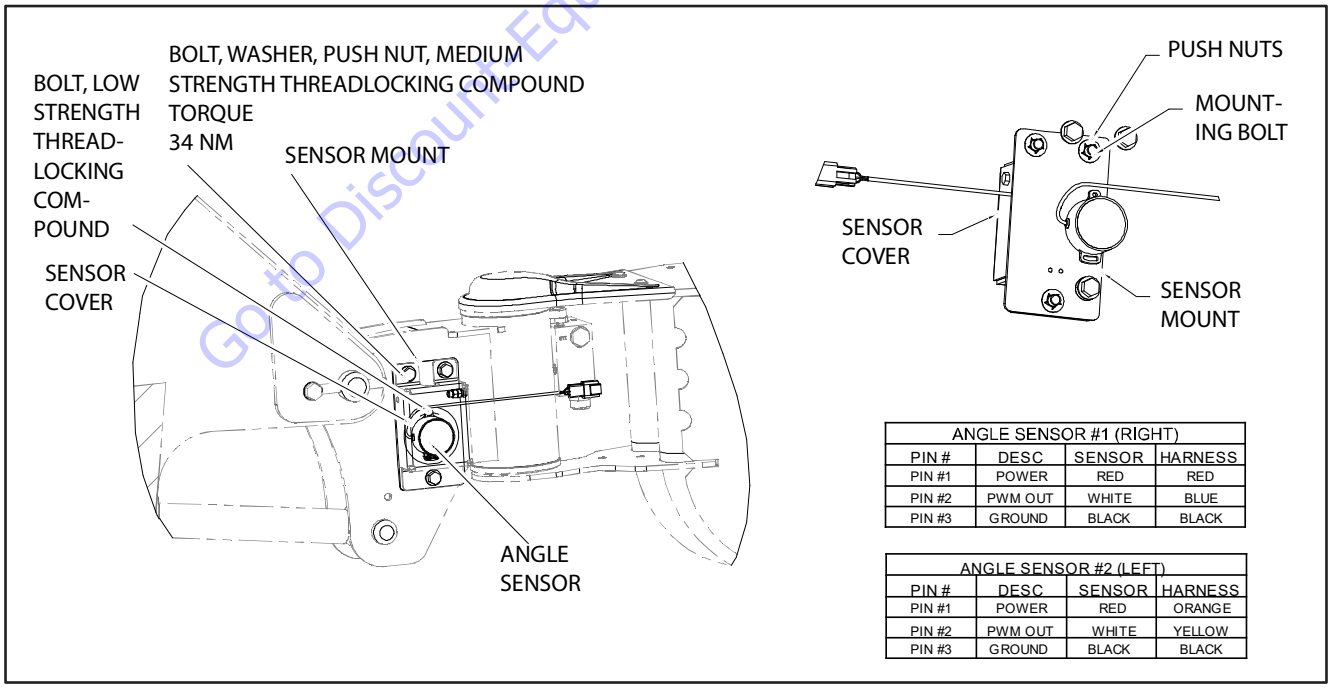
This sensor is integral to the UGM. This sensor is the secondary tilt sensor and measures the tilted angle of the chassis relative to gravity. It is used to check plausibility of the primary chassis tilt sensor reading (See Sensor #17).

Sensor #19 - Warm up Switch (1)

This switch is located on Main Control valve. It monitors the temperature of the main control valve.

Sensor #20 - Main Valve Pressure Transducer (1)

This pressure transducer is located on the main control valve. It is used to monitor pressure of the lower pressure functions of the machine (all control valve functions except Lift and Telescope), to assure that they are within the regulated range.



ANGLE SENSOR #1 (RIGHT)			
PIN #	DESC	SENSOR	HARNESS
PIN #1	POWER	RED	RED
PIN #2	PWM OUT	WHITE	BLUE
PIN #3	GROUND	BLACK	BLACK

ANGLE SENSOR #2 (LEFT)			
PIN #	DESC	SENSOR	HARNESS
PIN #1	POWER	RED	ORANGE
PIN #2	PWM OUT	WHITE	YELLOW
PIN #3	GROUND	BLACK	BLACK

Figure 6-27. Platform Level Sensor

Sensor #21 - Main Lift Cylinder Pressure Transducer (1)

This pressure transducer is located on the port block of the main boom lift cylinder. This is used for the diagnostics of the lift cylinder.

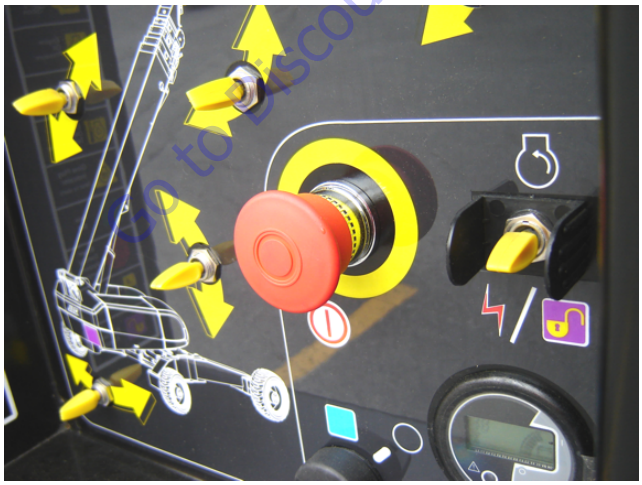
6.7 SYSTEM TEST

The Control System Incorporates a built-in system test to check the system components and functions. To use this function, use the following procedures.

Test from the Platform

1. Position the Platform/Ground select switch to the Platform position.

2. Pull out the Emergency Stop switch at the Ground Control Station.

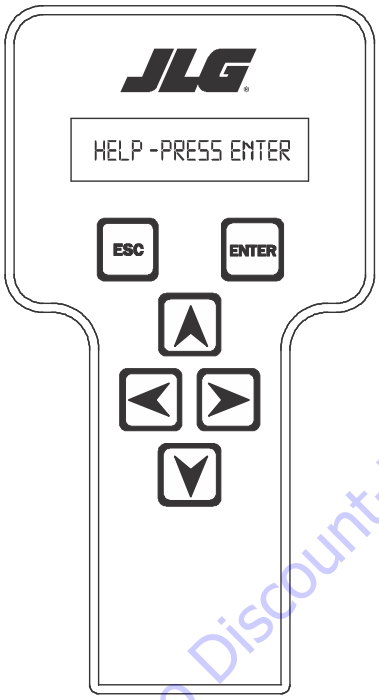


3. Plug the analyzer into the connector at the base of the platform control box.

4. Before proceeding, ensure that the switches on the platform console are in the following positions:
   a. Drive speed switch is in the Middle position. (Turtle Icon)
   b. 4WS switch is in the Middle position. (2WS mode)
   c. Capacity select switch in the 1000 lb. (450 kg) mode.
   d. Function speed potentiometer out of creep mode switch.
   e. Generator (if equipped) switched to the off position.
   f. Head and Tail lights (if equipped) switched to the off position.

5. Pull out the Emergency Stop switch and Start the engine.

6. The analyzer screen should read:



7. Use the arrow button to reach SYSTEM TEST. Hit Enter. The analyzer will prompt you asking if you want to activate the system test; hit Enter again to activate.

8. Follow the flow path in Figure 6-28., System Test Flow Chart - Platform Tests - Sheet 1 of 2 and Figure 6-29., System Test Flow Chart - Platform Tests - Sheet 2 of 2 and go through the component tests. Hit the ESC key during any part of the test to return to the main menu without completing all tests or wait until all tests are complete. During the TEST ALL INPUTS sequence, the analyzer allows control switches to be operated and shows if they are closed (CL) or open (OP).

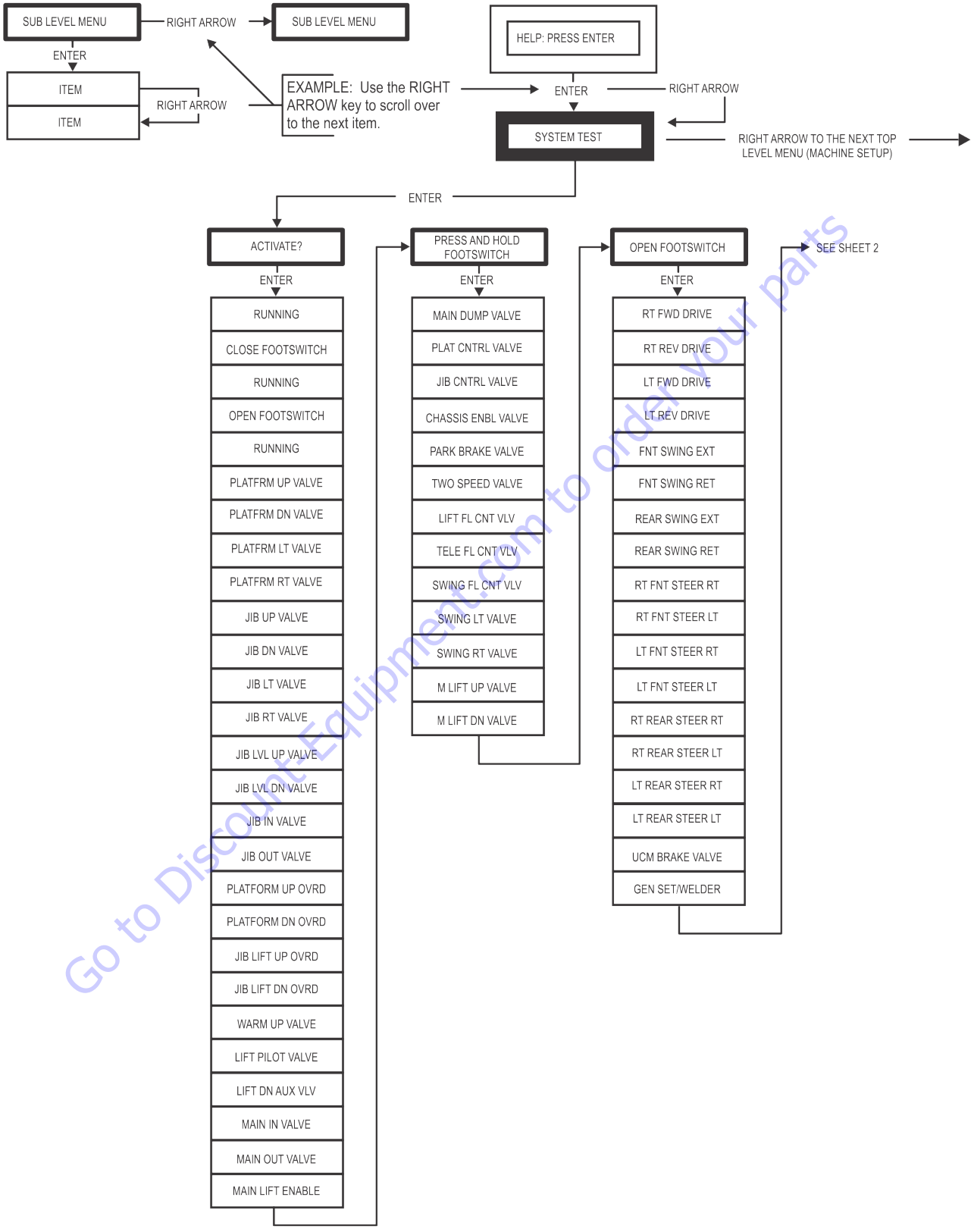


Figure 6-28. System Test Flow Chart - Platform Tests - Sheet 1 of 2

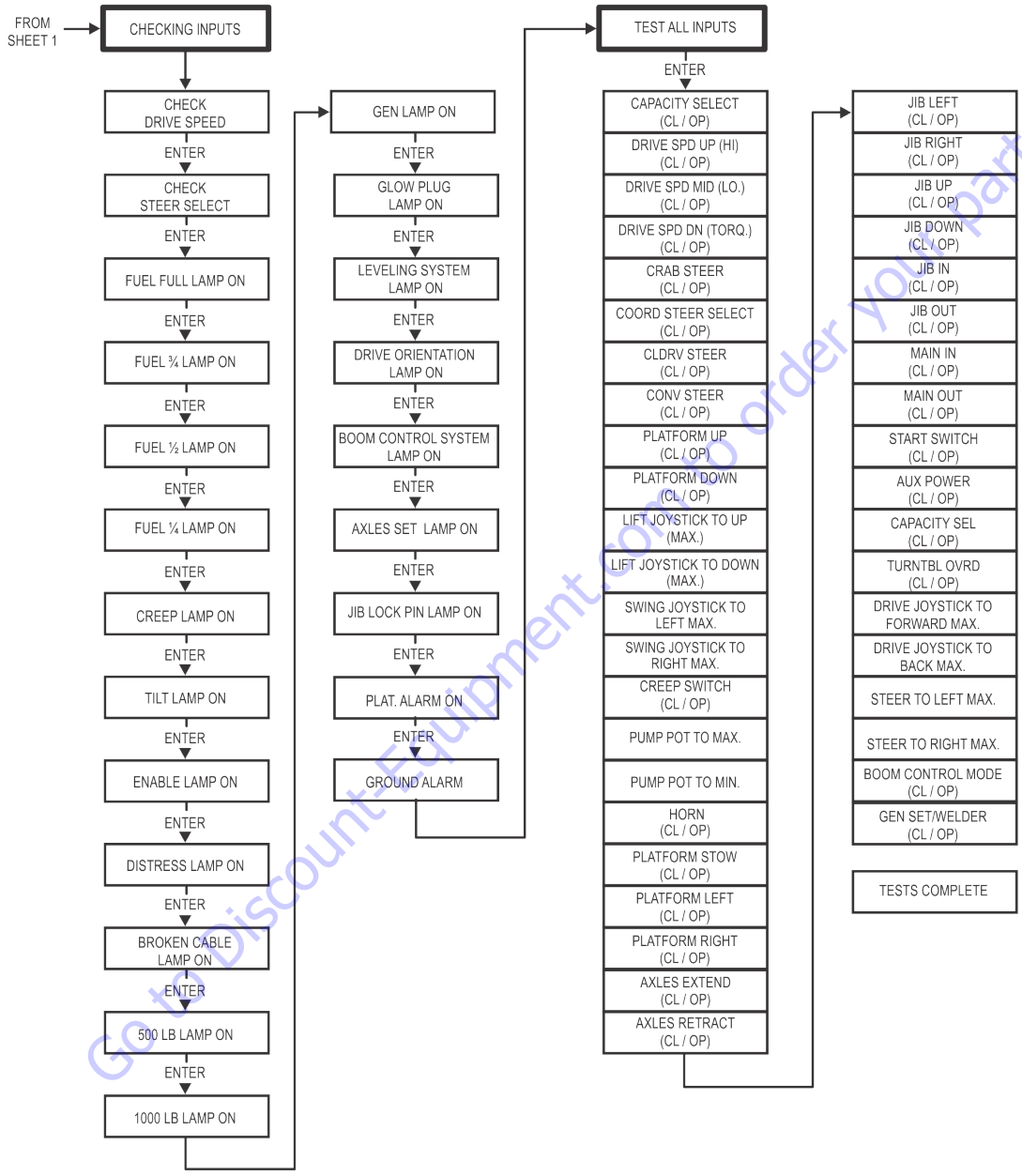


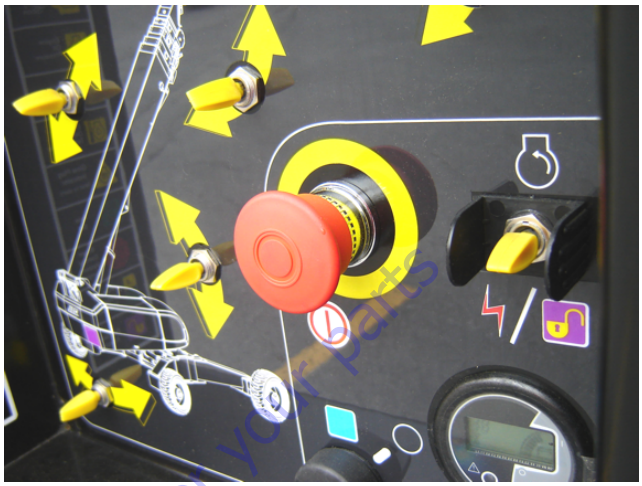
Figure 6-29. System Test Flow Chart - Platform Tests - Sheet 2 of 2

Test from the Ground Station

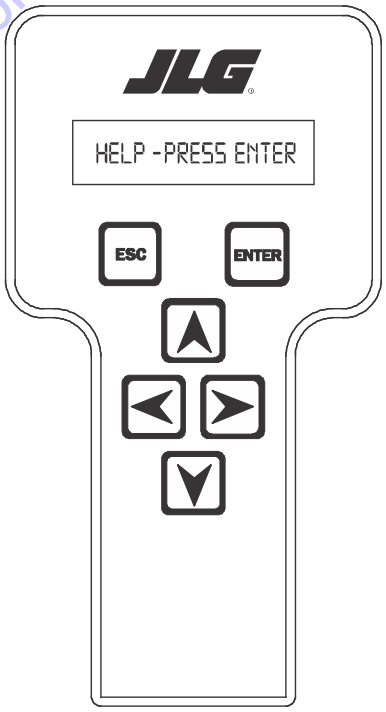
1. Position the Platform/Ground select switch to the Ground position.

2. Plug the analyzer into the connector inside the Ground control box.

3. Pull out the Emergency Stop switch. and Start the engine.



4. The analyzer screen should read:



5. Use the arrow button to reach SYSTEM TEST. Hit Enter. The analyzer will prompt you asking if you want to activate the system test; hit Enter again to activate.

6. Follow the flow path in Figure 6-30., System Test Flow Chart - Ground Station Tests and go through the component tests. Hit the ESC key during any part of the test to return to the main menu without completing all tests or wait until all tests are complete. During the TEST ALL INPUTS sequence, the analyzer allows control switches to be operated and shows if they are closed (CL) or open (OP).

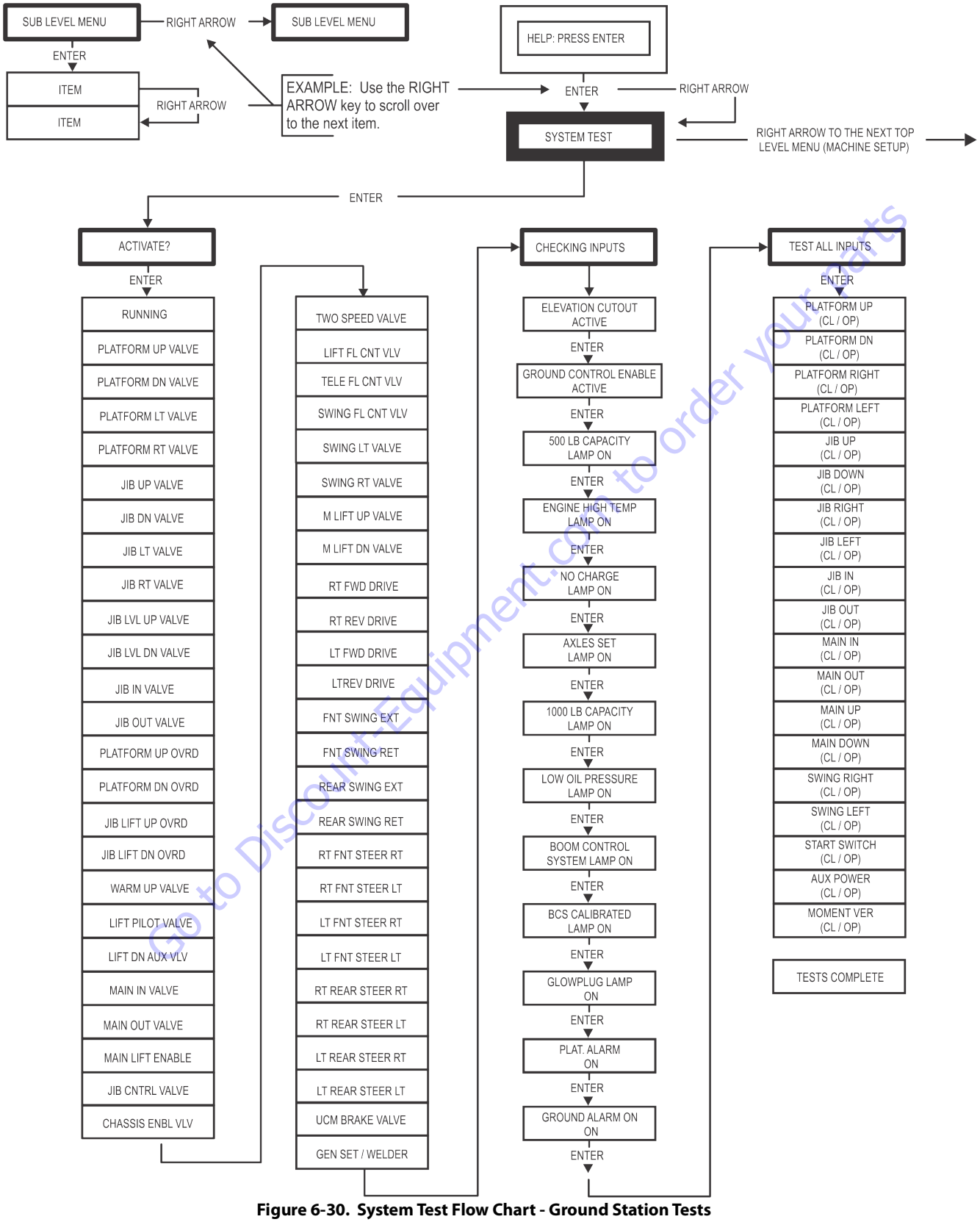


Figure 6-30. System Test Flow Chart - Ground Station Tests

Table 6-6. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
RUNNING		Initial display when system test is run; certain "critical" checks are made. Problems that can be reported include below messages.
	ONLY 1 ANALYZER!	Do not connect two Analyzers while running the system test.
	BATTERY TOO LOW	The system test cannot run with battery voltage below minimum (9V).
	BATTERY TOO HIGH	The system test cannot run with battery voltage above maximum. (16V).
	CHECK CAN WIRING	The system test cannot run in platform mode unless data is being received from the platform and ground modules. The system test cannot run in ground mode unless data is being received from the platform module.
	CHECK SPEED	There is an open- or short- circuit in the speed encoder wiring. Check speed encoder.
	BAD GROUND MODULE	An internal problem was detected in the ground module.
	HIGH TILT ANGLE	The vehicle is very tilted (19.3°), or the tilt sensor has been damaged. Check tilt sensor.
	HOT ENGINE	The engine temperature exceeds 100°C. This is only a warning.
	BAD I/O PORTS	The controller detected a problem with its internal circuits at switch on. If other problems are also detected, the controller may need replacing.
	SUSPECT EEPROM	The controller detected a problem with its EEPROM stored personality settings at switch on. Check and, if necessary correct, all personality settings.
	OPEN FSW	In platform mode, the footswitch must be open at the start of the test.
	CLOSE FSW	In platform mode, the footswitch must be closed when this message is displayed; the footswitch MUST BE KEPT CLOSED during the valve & contactor tests.
	BAD FSW	The two footswitch signals are not changing together, probably because one is open-circuit. One footswitch signal ("FSW1") is routed to the power module, the other ("FSW2") is routed to the platform module. Check footswitch and wiring.
TESTING VALVES		Indicates that the valve test is beginning. Each valve is alternately energized and de-energized; checks are made for open- and short- circuit valve coils. NOTE: In platform mode, the footswitch must be closed. NOTE: Tower lift valves are not tested if TOWER LIFT=NO. Tower telescope valves are not tested if TOWERTELE=NO. Jib valves are not tested if JIB = NO. Extendable axle valves are not tested if EXT AXLES=NO. Four wheel steer valves are not tested if 4WS=NO. NOTE: Left/right jib valves are not tested unless JIB = SIDESWING. Problems that can be reported include below messages.
	CANT TEST VALVES	There is a wiring problem, which prevents the valve test from functioning correctly. Check valve wiring. Check ground alarm & hour meter wiring.
	XXXXXXX S/C	The named valve is drawing too much current so is presumed to be short-circuited. Check valve wiring.
	XXXXXXX O/C	The named valve is drawing too little current so is presumed to be open-circuit. Check valve wiring.

Table 6-6. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
CHECKING INPUTS		Indicates that the inputs test is beginning. Every input is checked to ensure that it is in its "normal" position; function switches should be open, cutout switches should be closed, joysticks should be in neutral. In platform mode any non-neutral platform switch or joystick is reported; any active cutouts are reported. In ground mode any non-neutral ground switches is reported; any active cutouts are reported. NOTE: Switches, which are not in use (due to the settings of machine digits), are not checked. NOTE: The pump pot is checked only for a wire-off condition; it can be at any demand from creep to maximum. Problems that can be reported include below messages.
	CHECK XXXXXXX	The named switch is not in its "normal" position. Check switch & wiring.
	CHECK XXXXXXX JOY	The named joystick appears to be faulty. Check joystick.
TESTING LAMPS		Indicates that the lamps test is beginning. Each lamp is energized in turn; a prompt asks for confirmation that the lamp is lit. ENTER must be pressed or clicked to continue the test. NOTE: Lamps, which are not in use (due to the settings of machine digits), are not checked. NOTE: Platform Lamps are only tested in platform mode. NOTE: The GM overload lamp and 500# capacity lamp are not tested. NOTE: Head and tail lamps are tested in both platform and ground mode if enabled by a machine digit.
TESTING ALARMS		Indicates that the alarms test is beginning. Each alarm is energized in turn; a prompt asks for confirmation that the alarm is sounding. ENTER must be pressed or clicked to continue the test. NOTE: The platform alarm and the horn are only tested in platform mode. NOTE: The ground alarm is not tested if GROUND ALARM = NO.

Table 6-6. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
TEST ALL INPUTS?		Prompts whether to check every operator input. If ESC is pressed or clicked, the system test ends. If ENTER is pressed or clicked, each operator input is prompted for in turn. In platform mode every platform switch and joystick is tested. In ground mode every ground switch is tested. NOTE: Tower lift switches are not tested if TOWER LIFT=NO. Tower telescope switches are not tested if TOWER TELE=NO. Jib switches are not tested if JIB = NO. Extendable axle switches are not tested if EXT AXLES=NO. Four wheel steer switches are not tested if 4WS=NO. NOTE: Left/right jib switches are not tested unless JIB = SIDESWING. Prompts displayed during the operator input test below messages.
	CLOSE XXXXXXX	The named switch should be closed.
	OPEN XXXXXXX	The named switch should be opened.
	XXXXXXX XXXXXXX TO MAX	The named joystick should be pushed to its full extent in the named direction.
	XXXXXXX XXXXXXX TO MIN	The named joystick should be returned to neutral from the named direction.
	PUMP POT TO MAX	The pump pot should be turned to maximum.
	PUMP POT TO MIN	The pump pot should be turned to minimum.
	MULTIPLE CLOSURE	More than one operator input is closed; if only one has been operated, there could be a short between two inputs.
TESTS COMPLETE		Indicates that the system test is complete. Any problems reported should have been noted and should now be rectified. Press ESC/CANCEL to return to the RUN SYSTEM TEST Analyzer menu.

6.8 CALIBRATION PROCEDURES

Axle Calibration

The axle angle sensors need to be calibrated to ensure that the axle angle can be accurately calculated. The machine must be in transport position to perform an axle calibration. If the steer sensors have not been calibrated, they will be calibrated as part of the axle calibration procedure.

Axle Calibration is available under AXLE SWING under the CALIBRATIONS menu using the analyzer.

When performing a calibration, the first prompt will be to RETRACT AXLES.

The analyzer will prompt to move to the next sequence once the axle retract conditions are met and retract values are stored in the Control System.

If the steer sensors have not been calibrated when an axle calibration is attempted, the system shall require the steer sensors be calibrated. If this is the case, the analyzer prompt shall automatically redirect to the steer sensor calibration section after the axle retract position is calibrated (Refer to steer sensor calibration). If the steer sensors have been calibrated, this step shall be skipped.

The analyzer will prompt to EXTEND AXLES.

The analyzer shall prompt to move after the extend conditions are met and extend values are stored in the Control System. The axle calibration is complete at this point.

Boom Sensor Calibration

Initial conditions prior to initiating boom sensor calibration:

- Steering sensor, tilt sensor, and telescope crack point calibrations are complete
- Axle calibration is complete
- Chassis tilt calibration is complete
- Ensure the axles are completely extended and axle set lamp is ON
- Ensure the wheels are straight
- Ensure the platform is unloaded and boom is clean
- Ensure the jib is horizontal
- Ensure the jib swing is centered if Jib swing is configured
- Ensure the platform is level
- Ensure the platform is not rotated
- Ensure the turntable is centered between the rear tires
- Ensure the boom is fully retracted
- Ensure the machine indicates that it is on a level surface +/- 1.5°
- Ensure Ground Mode is selected

General notes:

During all controller lag times the controller should display "CALIBRATING…"

After each operator "ENTER" input preceding the recording of sensor values, the controller will wait 10 seconds for the boom dynamics to settle down before readings are taken.

During the calibration if the ESC key is pressed after the calibration procedure is started, the calibration will be aborted and "CAL FAILED" will be displayed on the bottom line of the analyzer and the previous calibration values will be used for the boom sensors.

1. With the analyzer, put the vehicle into Access Level 1 and enter the "BOOM SENSORS" calibration. The Controller will display "CAL. POSITION 1" on the top line and "CHECK SYSTEM?" on the bottom line.
2. After the operator presses the ENTER key, the controller will verify:

- the angle sensors and length sensors are reporting valid data,
- the axles are completely extended,
- the wheels are straight within 10°,
- the Boom Length Limit switch is in the retracted position,
- the drive orientation switch is indicating the turntable is between the rear tires,
- the Jib aligned switch is on if equipped,
- the chassis tilt sensor reads less than 1.5° out of level,
- the machine is in Ground Mode and the steering, tilt sensor calibrations have been successfully completed,
- Jib Transport sensors are healthy,
- the Jib Level, Jib Swing, Main Cylinder Angle, Jib Lift, Platform Level Cylinder Position and turntable sensors are healthy,
- the Jib is fully retracted and the Jib Pin is Locked,
- if Model 1850 the axle calibration has been performed.

3. If the initial conditions are not met, the controller will prompt the operator with analyzer messages "BLAM CAN LOST", "AXLE VALVE FAULT", OSC AXL SW FAULT", "PARK BRAKE FAULT", "ANGL SNSR1 FAULT", "ANGL SNSR2 FAULT", "MOMENT PIN FAULT", "LEN SNSR FAULT", "CAL STEERING", "CAL TILT SENSOR", "CAL UPPER TELE", "EXTEND AXLES", "LEVEL MACHINE", "CENTER WHEELS", "TELE IN", "ALIGN TURNTABLE", "CENTER JIB SWING", "SELECT GRND MODE", "JIB TRANSPORT SENSOR FAULT", "JIB LEVEL SENOSR FAULT", JIB SWING SENSOR FAULT", "MAIN CYL ANGLE SENSOR FAULT", "JIB LIFT SENSOR FAULT", "PLATFORM LEVEL SENSOR FAULT", "TURN TABLE SENSOR FAULT", "JIB TELE IN", "LOCK JIB PIN" and "REMOVE DONGLE" to satisfy the initial conditions. The controller will then prompt with "UNLOAD PLATFORM?", "JIB HORIZONTAL?", "LEVEL PLATFORM?", "CENTER PLATFORM?" and "TELE IN TO STOP?".

4. Once the initial conditions are verified, the controller will display "SKY WELDER NO". If a sky welder is installed, the operator presses an ARROW key to switch to "SKY WELDER YES. A similar set of menus will prompt the operator to select sky cutter, sky glazier, sky bright, pipe racks and camera mount.

5. If the operator selects sky bright the controller will display "CAL FAILED" and "REMOVE SKYBRIGHT". If more than one accessory is selected except for the combination of sky welder/sky cutter the controller will display "CAL FAILED" and "# OF ACCESSORIES". If a valid accessory option has been selected after the camera mount selection and the operator presses the ENTER key, the controller will display "CALIBRATE?". After the operator presses the ENTER key, the controller will check that the Main Cylinder Angle 1 sensor counts are between 100 and 14000 counts and that Main Cylinder Angle 2 sensor counts are between 15000 and 32767 counts. If they are not in the given ranges, the controller shall display "CAL FAILED" and "CYLN SNSR1 FAULT" or "CYLN SNSR2 FAULT". If the sensors are in range, the controller will disable Envelope and Moment control, Telescope out, Jib Lift/Swing, Jib Telescope and Basket Level/Rotate functions and display "CAL POSITION 2" on the first line.

6. The controller shall display "LIFT UP TO STOP". After the operator presses the ENTER key, the controller shall display "CAL POSITION 3" and "SWING 180 DEG". After the operator presses the ENTER key, the controller must see a change in the drive orientation switch or "CAL FAILED" and "DRIVE ORNT SW" shall be displayed. The boom angle sensors must also be within 10° of 40.6° (80.6° - 40.0° = 40.6° equals rough angle sensor mounting offset) or "CAL FAILED" and "ANGL SNSR# FAULT" will be displayed. The controller shall also check that the Main Cylinder Angle 1 sensor counts are between 15000 and 32767 and that sensor 2 is between 100 and 14000 counts or "CAL FAILED" and "CYLN SNSR1 FAULT" or "CYLN SNSR2 FAULT" will be displayed.

7. The controller at this point shall disable lift down. The controller will record the following: moment value based on load-pin output, both boom angle sensor raw outputs, both main cylinder angle counts and the retracted length of the boom. The retracted length will be set at 539.7". The raw length sensor A/D counts must between 100 and 1311 counts or "CAL FAILED" and "LEN SNSR FAULT" shall be displayed.

8. The controller will display "CAL POSITION 4" on the first line and "SWING 180 DEG". After the operator presses the ENTER key, the controller must see a change in the drive orientation switch or "CAL FAILED" and "DRIVE ORNT SW" will be displayed. The controller will record moment value based on load-pin output and both boom angle sensor raw outputs. If the change in right boom angle sensor readings is more than 1.0° from the change in left boom angle sensor readings, "CAL FAILED" and "ANGL SNSR FAILED" will be displayed. If this moment falls outside the expected calibration moment range of 1.288E+06 to 1.932E+06, "CAL FAILED" and "MOMENT PIN FAULT" will be displayed.

9. If no failures have occurred, The controller will enable telescope out, disable swing, and display "CAL POSITION 5" on the first line and "TELE OUT TO STOP".

10. After the operator presses the ENTER key, the controller will establish this length as 1911.7". The raw length sensor A/D counts must between 29220 and 31220 counts or "CAL FAILED" and "LEN SNSR FAULT" will be displayed.

11. The controller will disable telescope out, enable telescope in and display "CAL POSITION 6" on the first line and "TELE IN TO STOP". The controller will monitor the length sensor reading at which the length limit switch is tripped. The switch should change state at 553 +3.5"/-5.5". If the switch changes state in the wrong length range for the selected model, "CAL FAILED" and "CHECK MODEL" will be displayed. If the switch does not change state at all, the calibration should be aborted and "CAL FAILED" and "LENGTH SW FAILED" will be displayed. The length sensor reading at the precise switch trip point will be recorded for operational length calibration checks each time the boom passes through that point.

12. If no failures have occurred, the controller will enable lift functions, disable telescope out functions and display "CAL POSITION 7" on the first line and "LIFT DN TO STOP".

13. When operator presses ENTER controller will record angle 7. The controller must see a moment reading less than 50,000 lb-in, or "CAL FAILED" and "LIFT DN TO STOP" will be displayed each time the ENTER key is pressed and the moment reading is too high.

14. The Control system establishes the low angle calibration point by taking into account ground slope in the direction of the boom. Low Angle Calibration value = -1.3° +/- Ground Slope. If either of the angle sensors are not within 10.0° of –39.3° (-1.3° - 38.0° = –39.3° equals rough angle sensor mounting offset) then "CAL FAILED" and "ANGL SNSR# FAULT" will be displayed.

15. The controller shall enable telescope out and display "CAL POSITION 8" on the first line and "LIFT UNTIL STOP". The controller will disable Lift functions when the boom angle reaches 0°. When the operator presses the ENTER key, the controller will verify the measured angle is 0° +/ -1°. If not, The controller will display "CAL FAILED" and "LIFT UP(DOWN) STOP" each time the ENTER key is pressed and the angle does not match 0° +/-1°.

16. The controller shall display "CAL POSITION 9" on the first line and "TELE TO YELLOW". The swing function will be enabled and the telescope functions will be disabled when the measured length reaches 810.0" until the function is cycled. While the boom is in this state the telescope functions will be allowed to extend or retract the boom 1.0" at a time. This can be repeated until the length reading deviates from the expected witness mark by more than +/-14", when "CAL FAILED" and "LENGTH FAILED" will be displayed. When the operator presses the ENTER key, the controller will calculate and record the 500# verification moment value. If this moment falls outside the expected calibration moment value of 10.720E+06 lb-in, "CAL FAILED" and "MOMENT PIN FAULT" will be displayed. The raw length sensor A/D counts must between 5220 and 7220 counts or "CAL FAILED" and "LEN SNSR FAULT" will be displayed.

17. The controller shall display "CAL POSITION 9" on the first line and "JIB OUT TO STOP" on the second. When the operator reaches the stopping point with the Jib and presses enter, the controller will record the moment for the 500# forward calibration. If this moment falls outside the expected calibration moment range of 8.11E+06 to 10.81E+06 lb-in "CAL FAILED" and "MOMENT PIN FAULT" shall be displayed.

18. The controller shall then display "CAL POSITION 10" on the first line and "JIB IN TO STOP" on the second. When the operator reaches the retracted position for the Jib, the menu will automatically advance.

19. The controller will enable telescope in and display "CAL POSITION 10" on the first line and "TELE IN TO GREEN". When Telescope In is commanded, boom length will be controlled to 762.0" +/-0.5".

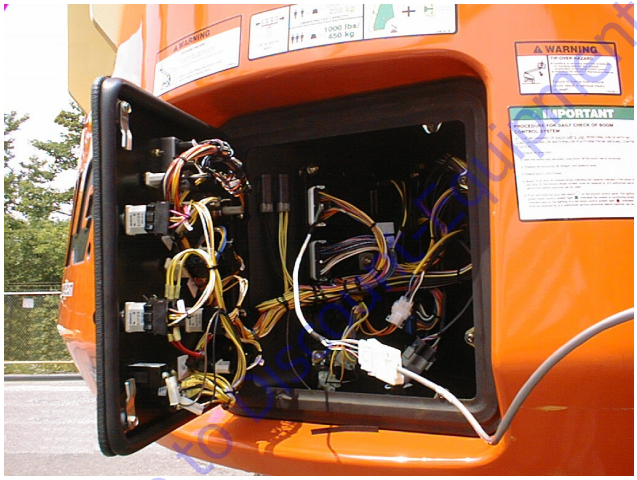
20. When the operator presses the ENTER key, the controller will verify the measured length matches the expected green witness mark location, otherwise the controller will display "CAL FAILED" and "TELE TO GREEN" each time the ENTER key is pressed and the measured length does not match the expected length. The controller will calculate and record the 1000# forward calibration moment and validate the moment is within the expected range of 7.658E+06 to 10.21E+06 lb-in. If the Moment is not in this range the controller shall display "CAL FAILED" and "MOMENT PIN FAULT". The controller will also revalidate the length switch trip point using the retracted and yellow witness mark to calculate length. If the length switch trip point is not 553 +3.5"/-5.5", the controller shall display "CAL FAILED" and "LEN SNSR FAULT". Otherwise, the controller shall display "BOOM SENSORS" on the first line and "CAL COMPLETE" on the second line.

6.9 JIB SENSOR CALIBRATIONS

To calibrate the jib sensors, the analyzer must be in access level 1. All jib sensors can be calibrated at one time or each calibration can be performed on an individual basis.

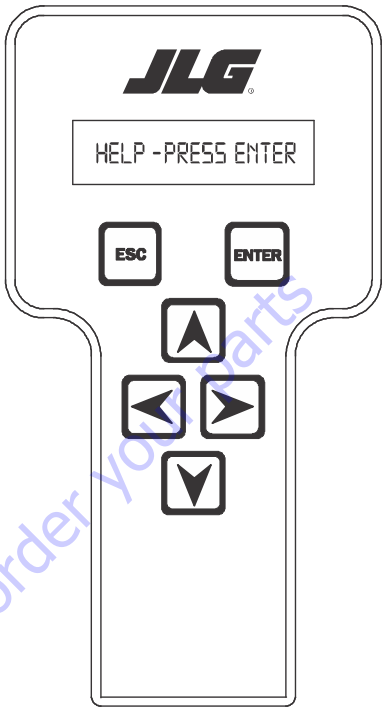
1. Position the Platform/Ground select switch to the Ground position.

2. Plug the analyzer into the connector inside the Ground control box.



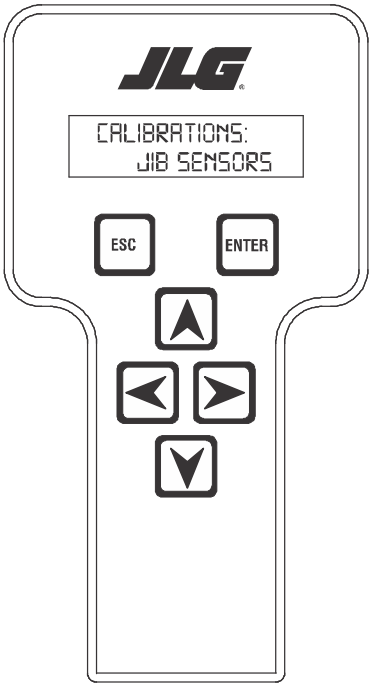
3. Pull out the Emergency Stop switch and start the engine.

4. The analyzer screen should read:

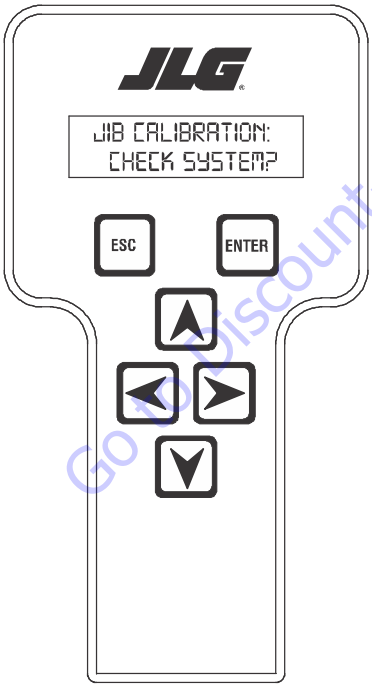


5. Use the arrow button to reach OPERATOR ACCESS. Hit Enter.
6. Enter the Access Code, 33271.
7. Use the right Arrow key to reach CALIBRATIONS. Hit Enter.

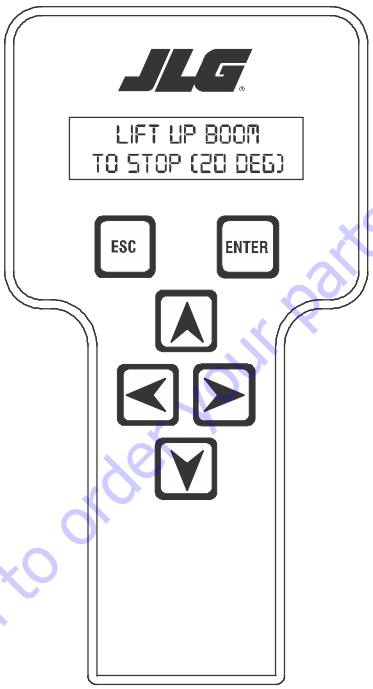
8. Use the arrow keys to reach the JIB SENSORS. The screen should read:



9. Press ENTER. The screen should read:

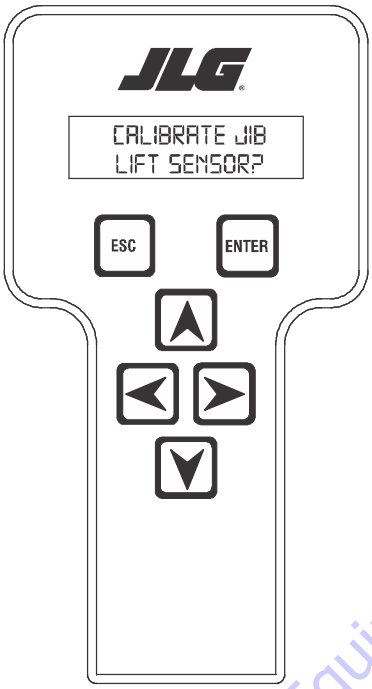


10. Press ENTER. The screen should read as shown below. When it does, activate boom lift until the control system stops it at 20 degrees boom angle.

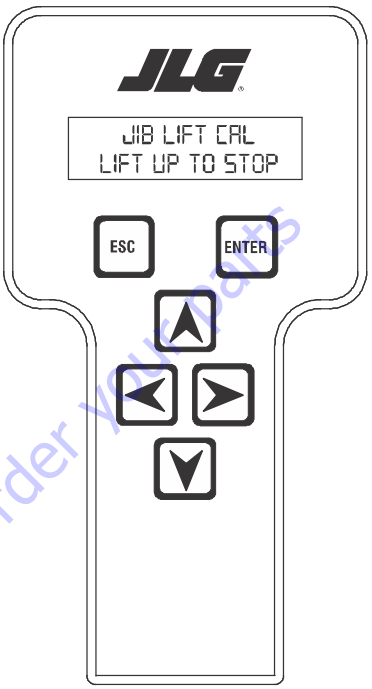


11. Press ENTER. The screen should read as shown below. When it does, the operator can either press enter to begin the jib lift sensor calibration, or use the right or left arrow key to locate the desired jib sensor calibration. The available sensor calibrations are:

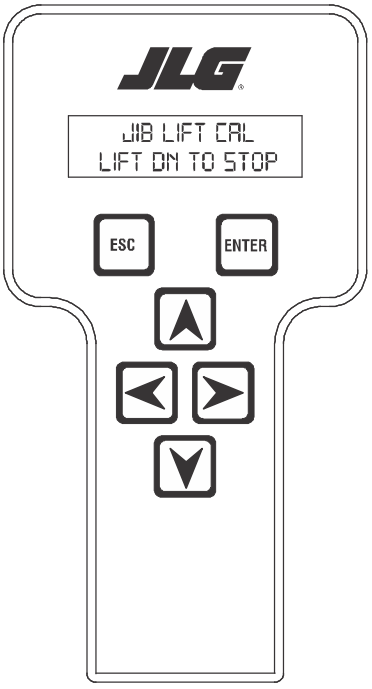
JIB LIFT
JIB LEVEL
JIB SWING
PLATFORM LEVEL



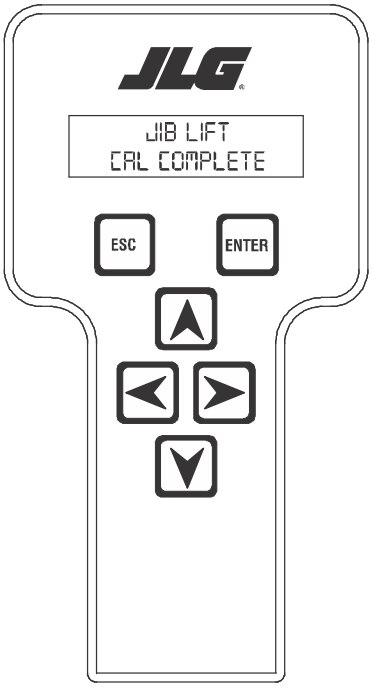
12. If the operator presses enter at the jib lift sensor calibration prompt, the screen shown below will be displayed. At this point, lift the jib up to the mechanical stop.



13. When the jib is at the mechanical stop, press ENTER. The screen shown below will be displayed. At that point, jib lift down until the control system stops the jib.



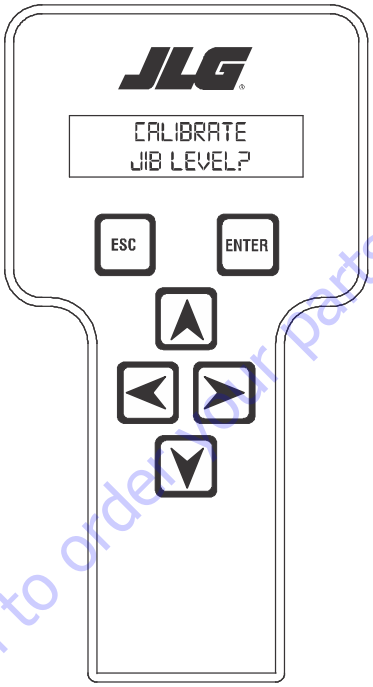
14. Once the jib is stopped the screen shown below will be displayed.



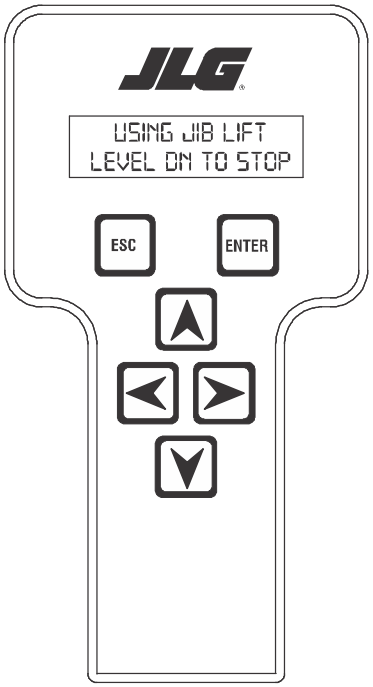
15. Hitting the escape key (ESC) will take the system back to the initial jib lift calibration display.

NOTE: *At this point the left or right arrow key may be used to skip to any of the other jib sensor calibrations.*

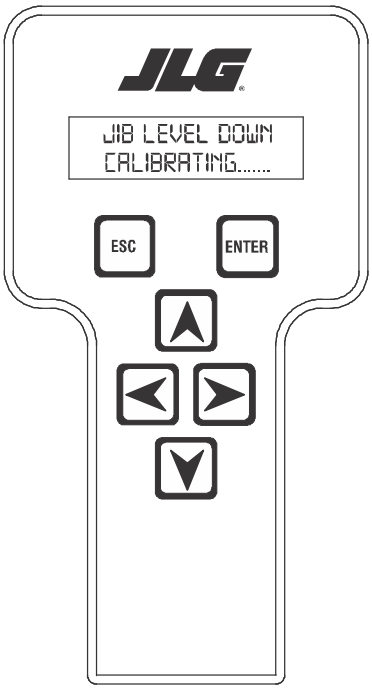
16. Hitting the ENTER key at this point will take the operator to the next jib sensor calibration. The screen will show:



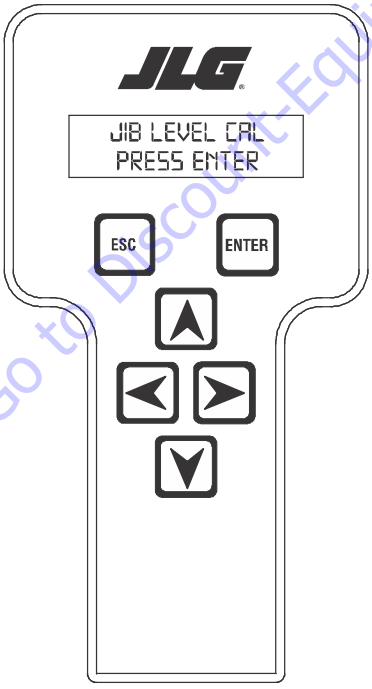
17. Press Enter. The screen will show:



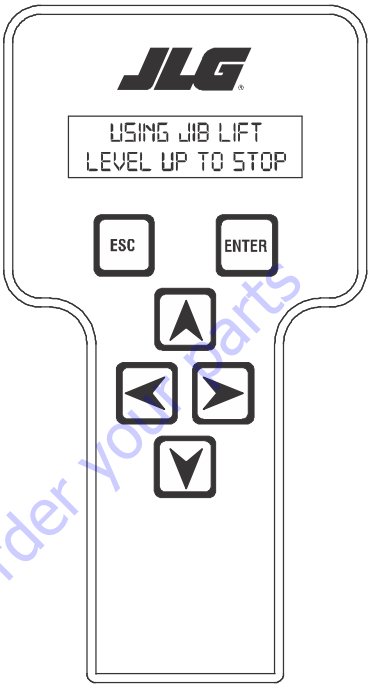
18. Operate jib lift down until the jib stops. When the jib is at the mechanical stop the operator must hit ENTER again. The screen will show:



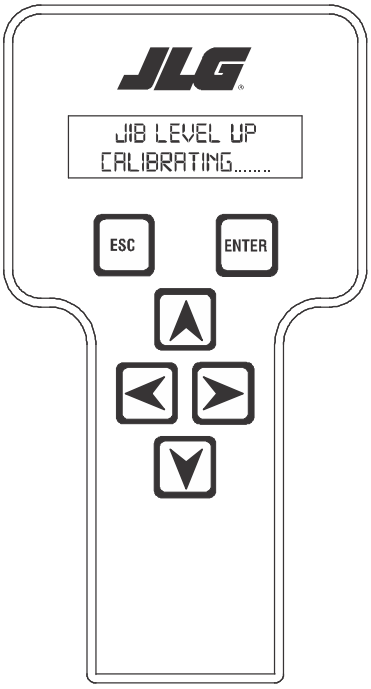
19. When the system completes this step, the next screen will show:



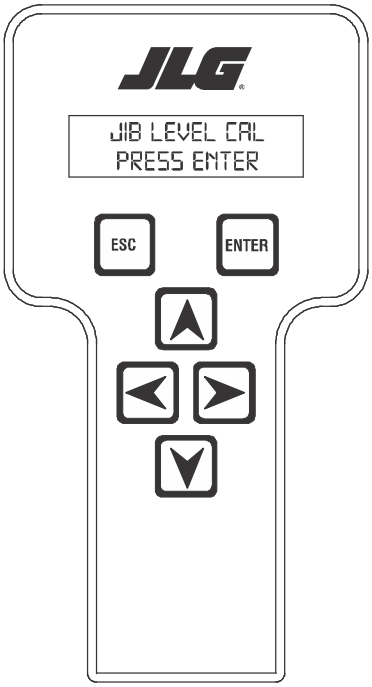
20. Press ENTER. The screen should read:



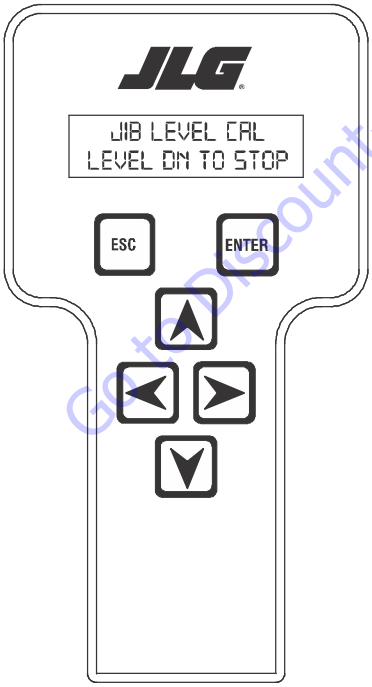
21. Operate jib lift up until the jib stops. When the jib is at the mechanical stop, Hit ENTER again. The screen will show:



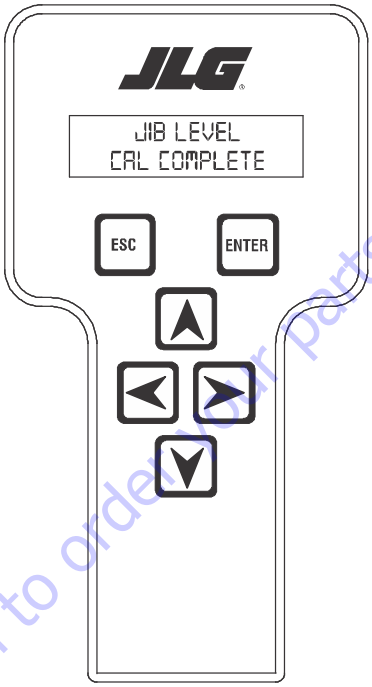
22. When the system completes this step, the next screen will show:



23. Press ENTER. The screen should read as shown below. The control system will jib level down and stop the jib leveling command.



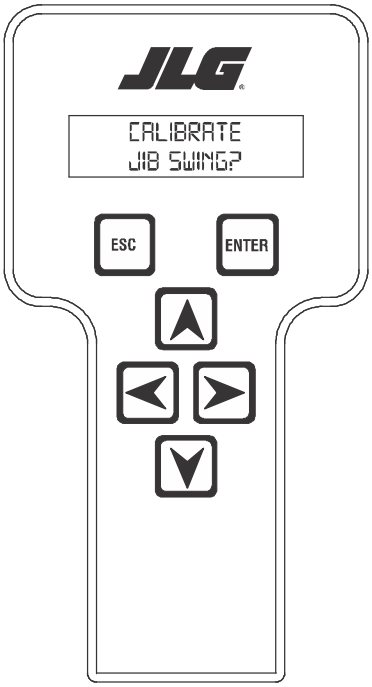
24. When the system completes the previous step, the screen will read:



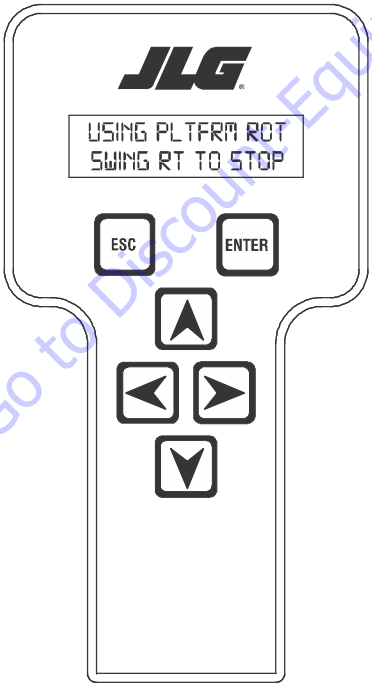
25. Hitting the escape key (ESC) will take the system back to the initial jib lift calibration display.

NOTE: *At this point the left or right arrow key may be used to skip to any of the other jib sensor calibrations.*

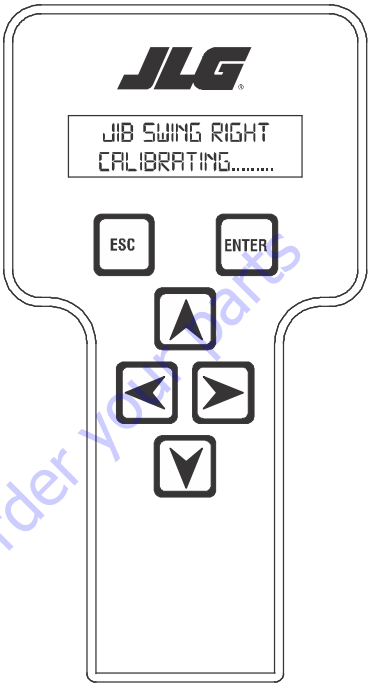
26. Hitting the ENTER key at this point will take the operator to the next jib sensor calibration. The screen will show:



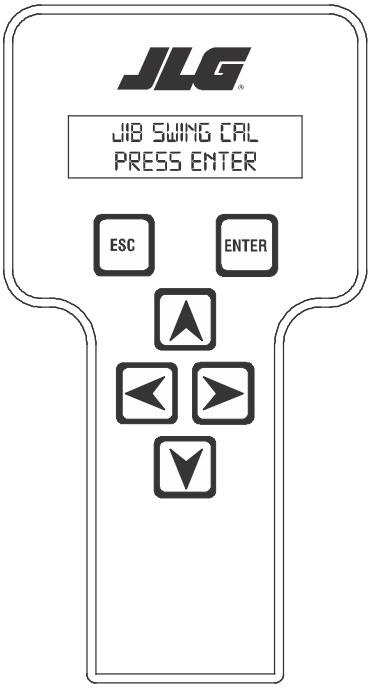
27. Press Enter. The screen shown below will be displayed. At this point, use the platform rotate right function switch to swing the jib right.



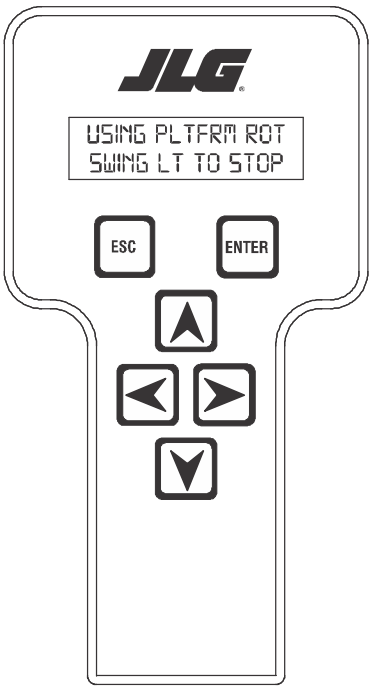
28. When the jib reaches the mechanical stop, press ENTER. The screen will show:



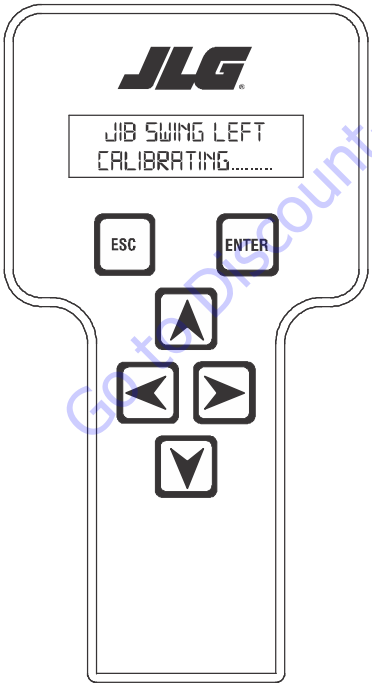
29. When the system is complete with this step, the screen below will be displayed.



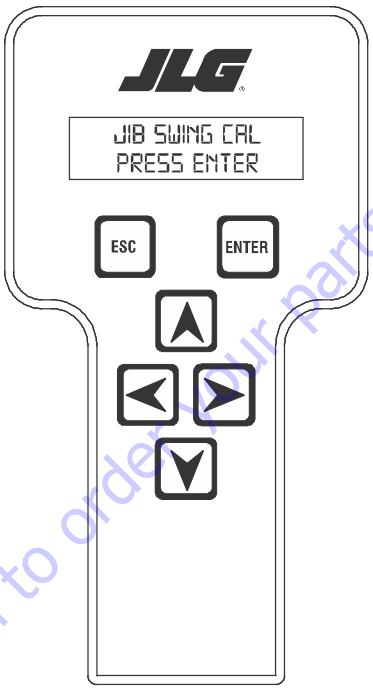
30. Press Enter. The screen shown below will be displayed. At this point, use the platform rotate left function switch to swing the jib left.



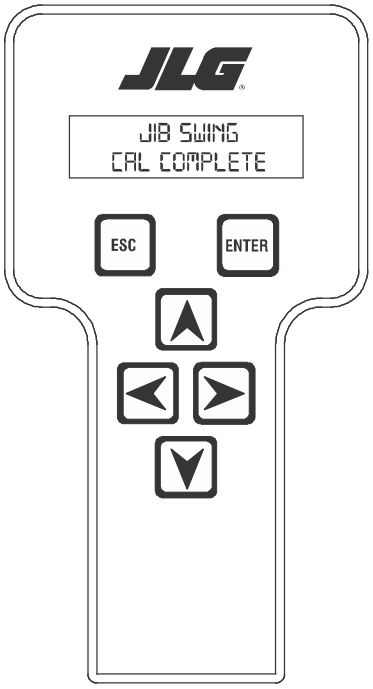
31. When the jib is at the mechanical stop, press ENTER. The screen will show:



32. At the finish of the jib swing lift calibration the jib lock pin will be locked by the control system. The screen will read:



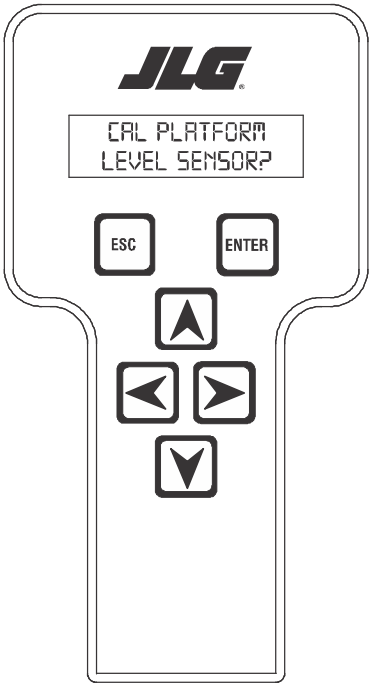
33. Press ENTER. The screen will show:



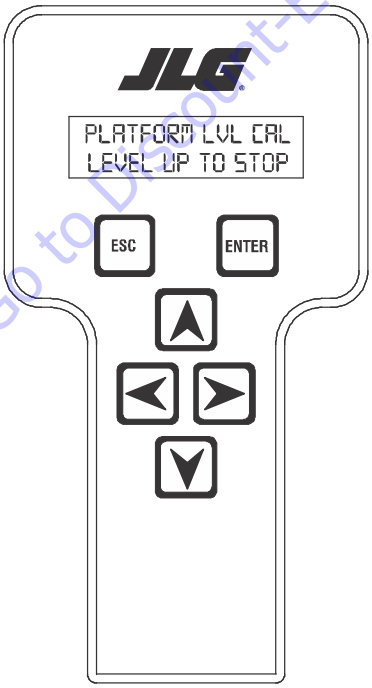
34. Hitting the escape key (ESC) will take the system back to the initial jib lift calibration display.

NOTE: *At this point the left or right arrow key may be used to skip to any of the other jib sensor calibrations.*

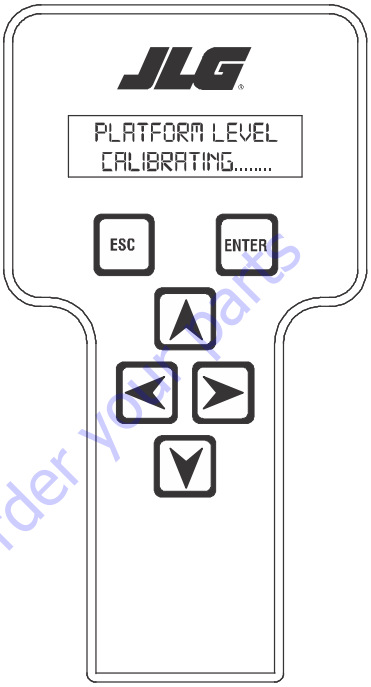
35. Hitting the ENTER key at this point will continue the calibration sequence. The screen will show:



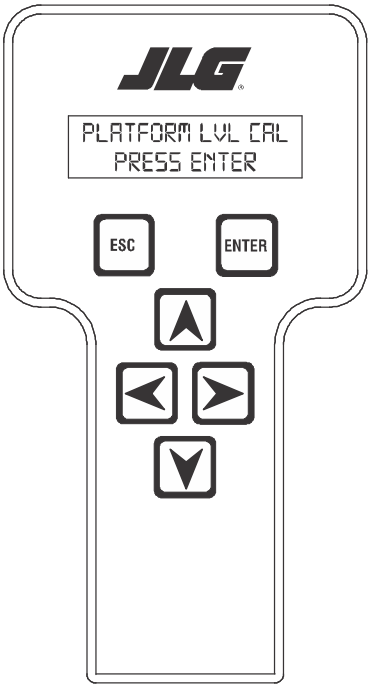
36. Press Enter. The screen shown below will be displayed. At this point, use the platform level up function switch to level up.



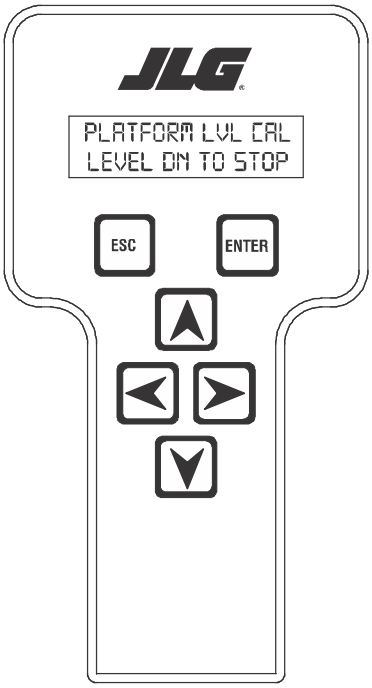
37. When the platform level up is at mechanical stop, Press ENTER. The screen will show:



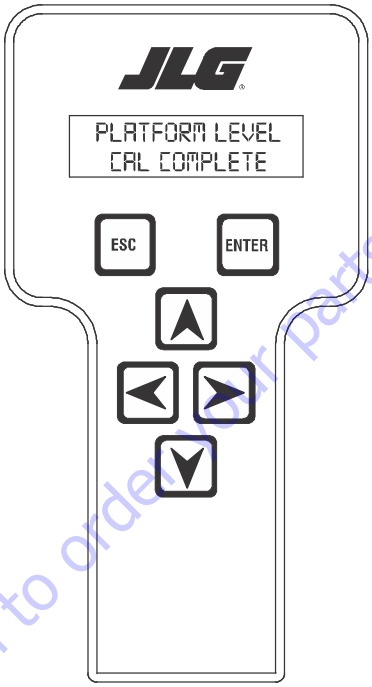
38. When the system is complete with this step, the screen below will be displayed.



39. Press ENTER. The display will then show:



40. The control system will stop the platform level and the screen will show:



41. Pressing ENTER will take you back to the beginning and escape (ESC) will take you to the initial screen.

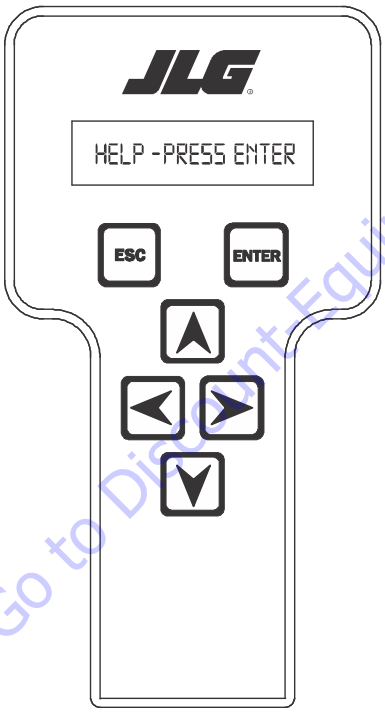
Calibrating the Jib Level Up and Down Valve Crackpoints

1. Position the Platform/Ground select switch to the Ground position.

2. Plug the analyzer into the connector inside the Ground control box.

3. Pull out the Emergency Stop switch and start the engine.

4. The analyzer screen should read:



5. Use the arrow button to reach OPERATOR ACCESS. Hit Enter.
6. Enter the Access Code, 33271.
7. Go to the CALIBRATIONS menu and hit ENTER.
8. Go to the JIB LVL UP CRKPT Screen. Hit ENTER.
9. CALIBRATE? prompt should appear. Hit ENTER again.
10. You will hear engine go to 1800 rpm.
11. Using UP ARROW, increase the value until you see the jib level movement.
12. Hit ENTER again. CAL. COMPLETE message should appear
13. Engine should again return to idle.
14. Hit ESC should return to JIB LVL UP CRKPT screen.
15. Hit RIGHT ARROW to get to the JIB LVL DN CRKPT screen. Hit ENTER.
16. CALIBRATE? prompt should appear. Hit ENTER again.
17. You will hear engine go to 1800 rpm.

Using UP ARROW, increase the value until you see the jib level down movement.

Hit ENTER again. CAL. COMPLETE message should appear

Engine should again return to idle.

Hit ESC to exit.

Cycle power to the machine.

6.10 BOOM UNLOCK PROCEDURE

If the fault "LIFT CYLINDER OVER PRESSURE" or "WRONG TELE RESPONSE" is active, then the boom will be trapped in transport.

To clear these faults, the Boom Unlock Procedure must be followed.

Initial Conditions

Before performing the Boom Unlock Procedure, the following conditions must be met:

- Booms Sensors, Jib Sensors, Axle Sensor and tilt sensor calibrations must be successfully completed
- The Boom is operating in the BCS Normal Mode
- The parking brake is not reporting a short to battery from the UGM or the UCM
- The main boom sensor is reading less than 600"
- The jib is fully retracted
- The main boom sensor is reading less than 7 degrees
- The axles are completely extended
- The machine control system indicates that it is not tilted
- The turntable is centered between the rear tires
- Ground Mode is selected

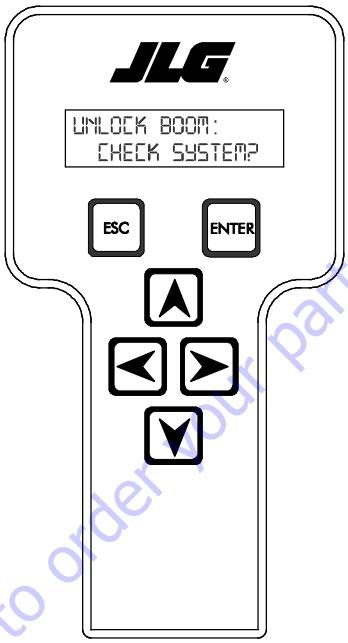
Procedure

NOTE: *During the calibration, if the ESC key is pressed after the procedure is started, the calibration will be aborted and exit back to the "UNLOCK BOOM" prompt.*

NOTE: *The envelope, moment and appropriate faults will continuously be monitored after the initial conditions are satisfied. If at any time during the test these conditions change to an unsafe state (communications lost, envelope violation, moment violation etc.) the Calibration will abort and the analyzer will display "ENVLP VIOLATION".*

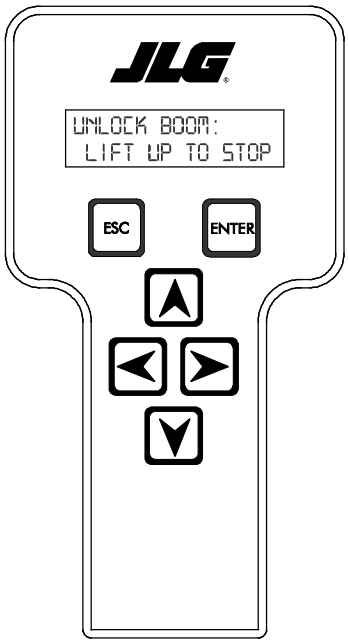
1. Using the analyzer, enter access level 1. Unlock Boom can be found under the Calibrations menu.

2. Once the operator selects the UNLOCK BOOM option, the screen will read:



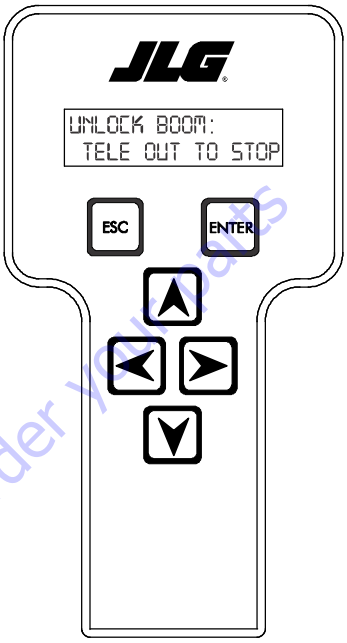
Pressing ENTER will cause the boom to check the initial conditions listed above. If any of the calibrations have not been completed "CAL. BOOM" will be displayed. If there is a problem with the envelope, moment or any of the supporting sensors (including loss of communications) "CHECK FAULTS" will be displayed. If the parking brake is shorted anywhere in the system "PARK BRAKE FAULT" will be displayed. If the jib is not fully retracted "JIB TELE IN" will be displayed. If the telescope is reading more than 600", "MAIN TELE IN" will be displayed. If the main boom angle sensors are reading more than 7 degrees, "MAIN LIFT DOWN" will be displayed, if the axles are not extended "EXTEND AXLES" will be displayed. If the DOS switch is not indicating in line and the angles are not within 10° of inline "ALIGN TURNTABLE" will be displayed. If the chassis tilt is tilted "LEVEL MACHINE" will be displayed. If the machine is in platform mode. "SELECT GRND MODE" will be displayed. If none of the above faults are present, the test will move on to the next step. As each fault is cleared, the system will make sure no other faults are active. During this time the latched faults from If the fault "LIFT CYLINDER OVER PRESSURE" or "WRONG TELE RESPONSE" is active, then the boom will be trapped in transport. These faults will be latched through key-cycle.

3. If all of the initial conditions are passed, the analyzer will display:



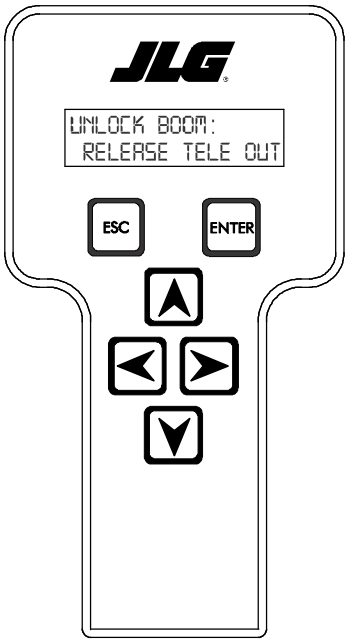
The control system will suppress the latched faults ("LIFT CYLINDER OVER PRESSURE" or "WRONG TELE RESPONSE") to allow the boom out of transport position until the boom is unlocked or the test is cancelled. Engage main lift until the control system cuts it out. The system will cut out at 7°. Only lift up and lift down will be available while on this menu, all other functions will be cut out. After the machine reaches the stop point, the menu will automatically advance.

4. After the machine has reached the set point in step 3, Lift up and down functionality will be cut out and Telescope in and out functionality will be restored. The analyzer menu will display:



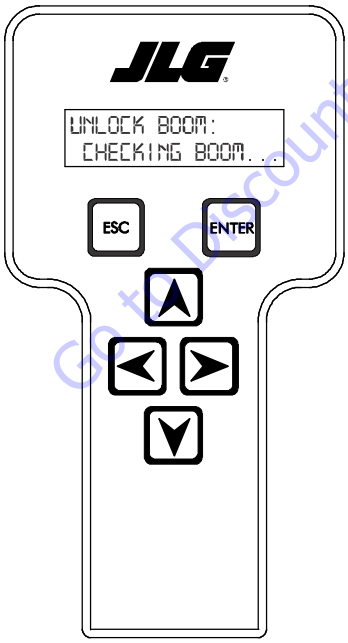
Engage Tele Out until the control system cuts it out. The system will cut out at 60.0". After the machine reaches the set point, the menu will automatically advance and Telescope in and out will be cut out. During this test, the telescope response will be tested. Telescope out will have to be commanded for at least 3 seconds, and meet the requirements for movement and for the correct direction. If the machine reaches the telescope set point without 3 seconds of continuous operation, it will be assumed that the telescope response was correct and the menu will advance. If the machine does not move, or moves in the wrong direction, the menu "CHECK FAILED WRONG TELE DIR." will be displayed and the test will end. The WRONG TELE RESPONSE fault will still be active, and the boom unlock procedure will have to be attempted again.

5. As soon as the machine had reached the set point in step 4, Telescope in and out functionality will be cut out. The analyzer menu will display:



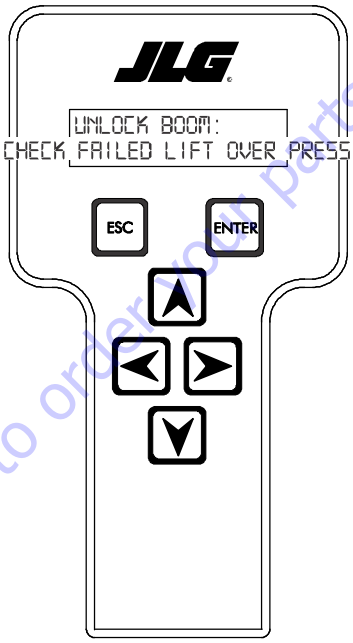
The menu will not change until the telescope controls have returned to neutral and the machine had been disabled.

6. After Step 5, the system will check the boom. The analyzer will display:



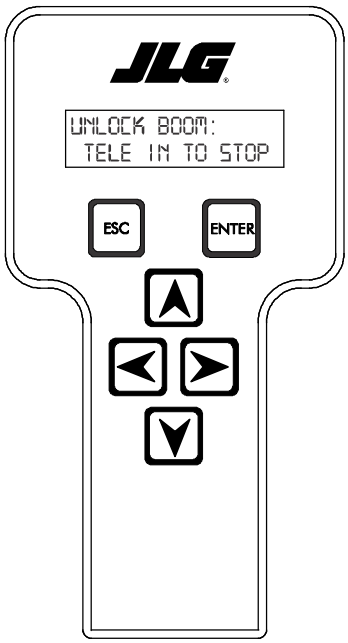
This screen will remain until the boom check has completed, the check fails, or the routine is interrupted by an attempted command. If the check is interrupted the analyzer will display "CHECK FAILED PRESS ENTER". If the check passes the analyzer will display "CHECK PASSED PRESS ENTER".

7. The next test to be performed will be the Lift Pressure over pressure check. The system will monitor the lift pressure input. If the reported PSI is above the over pressure limit then the analyzer will display:



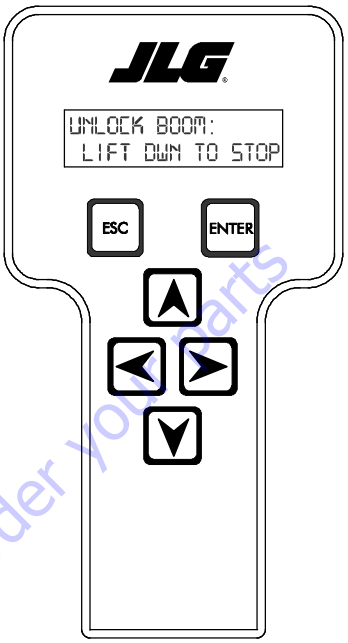
If the lift pressure is under the pressure limit, then the fault will clear at the end of the test.

8. Regardless if the check passed or failed in Step 7, after the status of the test has been reported, press ENTER the menu will advance to:



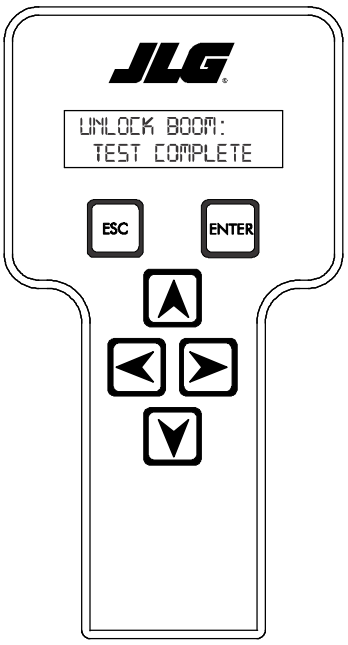
The first part of this step will be the second part of the machine response test. Telescope in and out will be the only hydraulics available. Telescope in will have to be commanded for at least 3 seconds, and meet the requirements in for movement and for the correct direction. If the machine reaches the retracted point without 3 seconds of continuous operation, it will be assumed that the telescope response was correct and the menu will advance. If the machine does not move, or moves in the wrong direction, the menu "CHECK FAILED WRONG TELE DIR." will be displayed and the test will end. The WRONG TELE RESPONSE fault will still be active, and the boom unlock procedure will have to be attempted again. If the test passes, all hydraulics will be enabled, but if the boom was not fully unlocked then the cutouts from the faults will be applied. The operator will have to tele in until the boom is retracted to advance to the next menu.

9. After the boom is retracted, the analyzer menu will advance to:



The operator will have to bring the boom down to below elevation before the menu will advance, all hydraulics are enabled, but the fault cutout rules will still apply.

10. Once the boom is in transport position again the analyzer will display:



6.11 SETTING CRACKPOINTS

Crackpoints, the point at which a valve is opened enough to induce movement, must be set for a variety of reasons: whenever related valves or cartridges are changed, software is updated, the UGM is changed, or the boom envelope control does not seem to be functioning properly.

The crackpoints covered in this section are:

- Platform Level Up and Down,
- Jib Level Up and Down,
- Main Lift Up and Down,
- Main Telescope Out and In.

⚠ DANGER

THE JLG ANALYZER WILL PROMPT USERS FOR A CODE UPON REACHING MENU: OPERATOR ACCESS. THIS FIVE-DIGIT CODE (33271) WILL DISABLE THE BOOM ENVELOPE CONTROL. WHEN THE BOOM ENVELOPE CONTROL IS DISABLED, THE MACHINE MAY TIP IF USED INCORRECTLY.

NOTICE

DO NOT ATTACH THE ANALYZER TO THE CONNECTION PORT IN THE PLATFORM. DO NOT CONDUCT ANY CRACKPOINT SETTINGS FROM THE PLATFORM.

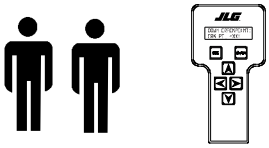
NOTE: *Cycle the boom functions (8 to 10 times, 5 seconds in each direction) prior to setting the crackpoints to ensure the hydraulic oil is at operating temperature.*

NOTE: *If ESC is pressed while calibration readings are being taken, the calibration will abort, and CAL FAILED will appear on the analyzer. The previous calibration values will be used instead. Only press ESC when instructed to do so.*

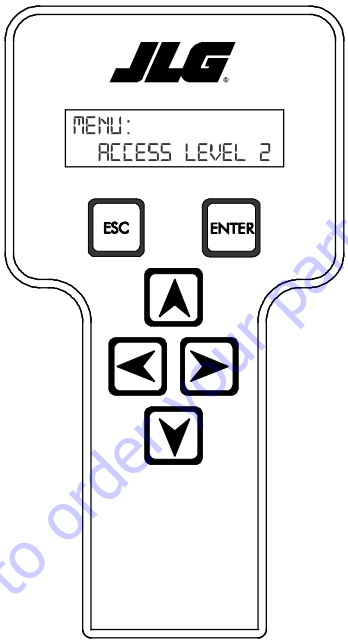
During all Control System lag times, the analyzer will display CALIBRATING...

Platform Level Up and Down Crackpoints

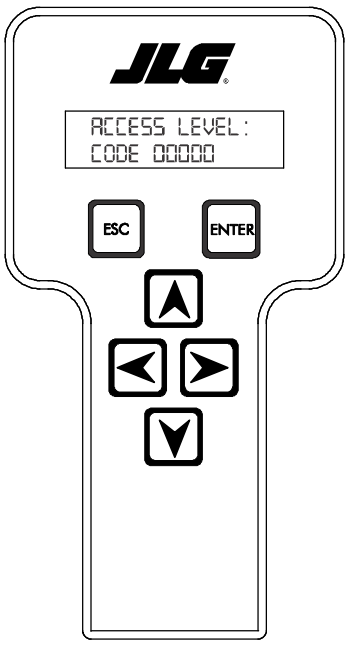
NOTE: *To set crackpoints for Platform Level Up and Down, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.*



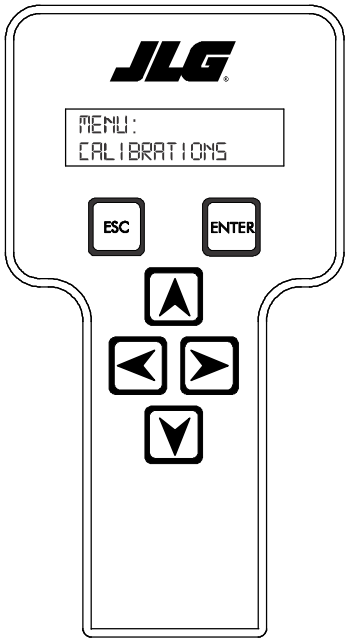
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER.



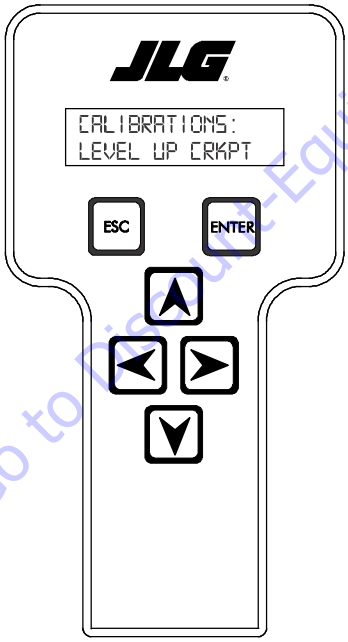
3. Enter code 33271 and press ENTER.



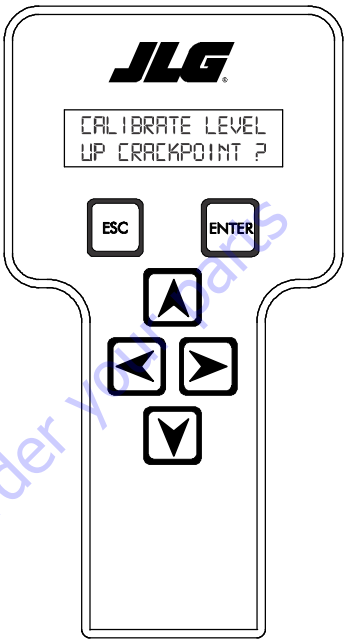
4. Scroll to MENU: CALIBRATIONS and press ENTER (ENTER).



5. Scroll to LEVEL UP CRKPT and press ENTER (ENTER).

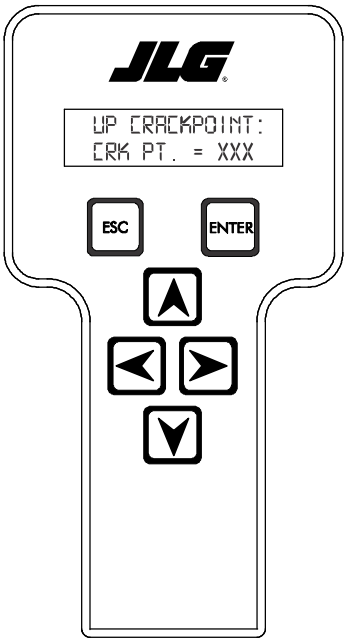


6. Press ENTER (ENTER) to calibrate Platform Level Up crackpoint.

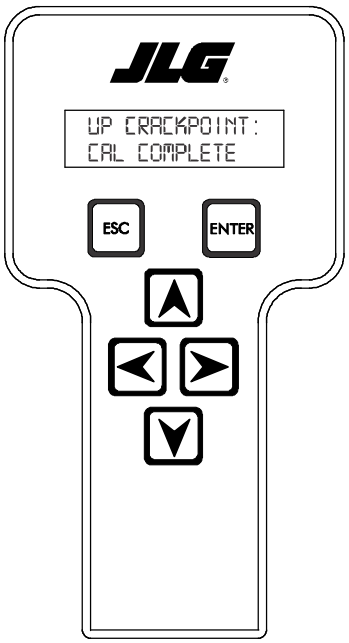


NOTE: *Have an assistant help verify that movement occurs.*

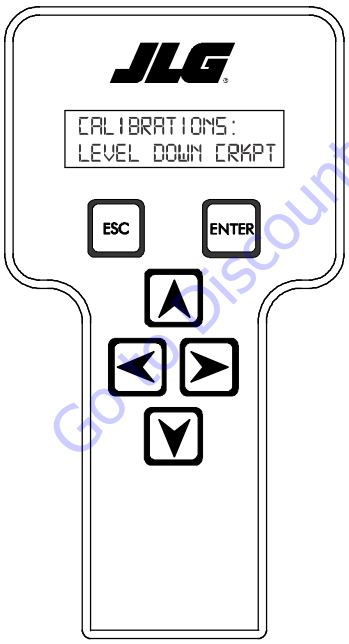
7. Using the analyzer, press and hold the Up Arrow until the function starts moving, then press ENTER (ENTER). Release the Up Arrow..



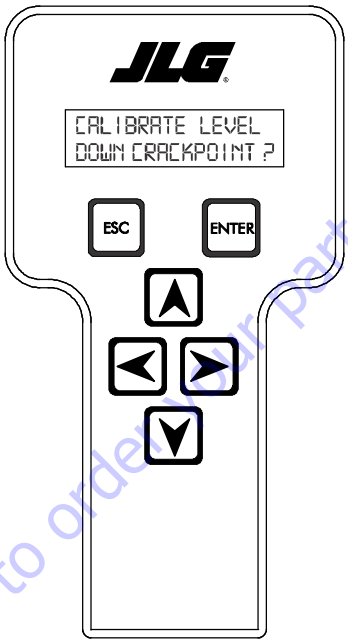
8. This completes the Platform Level Up crackpoint procedure. Press ESC (ESC) to return to the calibrations menu.



9. Scroll to LEVEL DOWN CRKPT and press ENTER (ENTER).

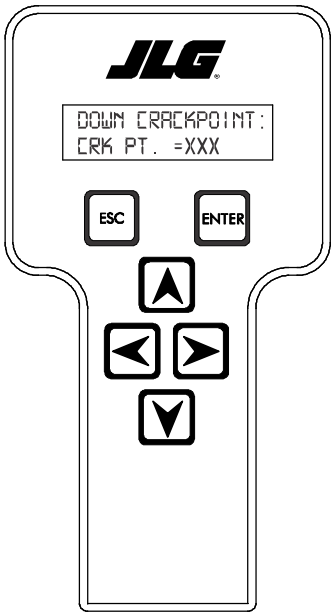


10. Press ENTER (ENTER) to calibrate Platform Level Down crackpoint.

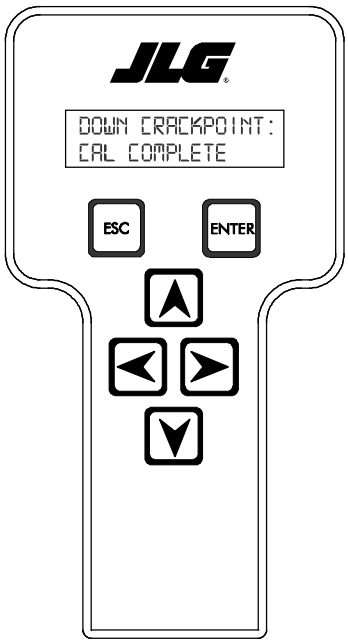


NOTE: *Have an assistant help verify that movement occurs.*

11. Using the analyzer, press and hold the Up Arrow until the function starts moving, then press ENTER (ENTER). Release the Up Arrow.

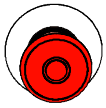


12. This completes the Platform Level Down crackpoint procedure. Press ESC [ESC] to return to the calibrations menu.



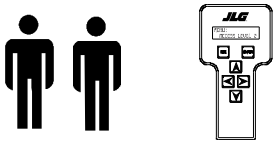
13. The crackpoint setting procedure for Platform Level Up and Down is complete. Press ESC [ESC] to exit calibrations.

14. Push in Power/Emergency stop switch to save the calibration changes.



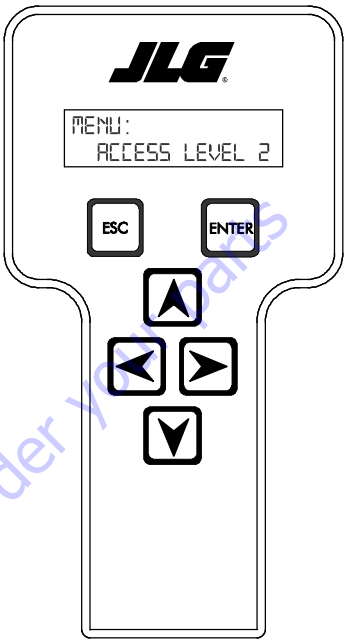
Jib Level Up and Down Crackpoints

NOTE: *To set crackpoints for the Jib Level Up and Down, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.*

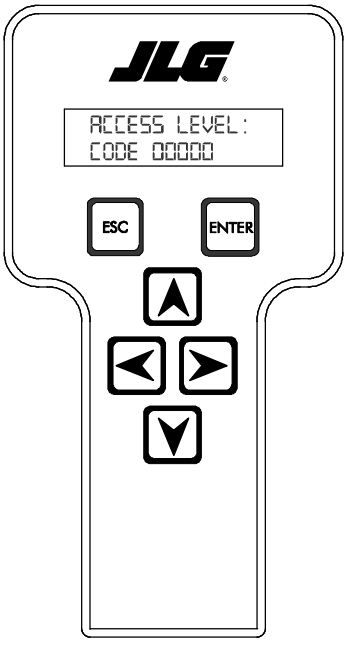


1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.

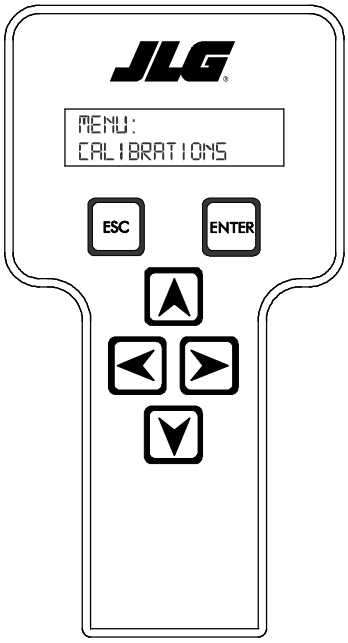
2. Scroll to MENU: OPERATOR ACCESS and press ENTER [ENTER].



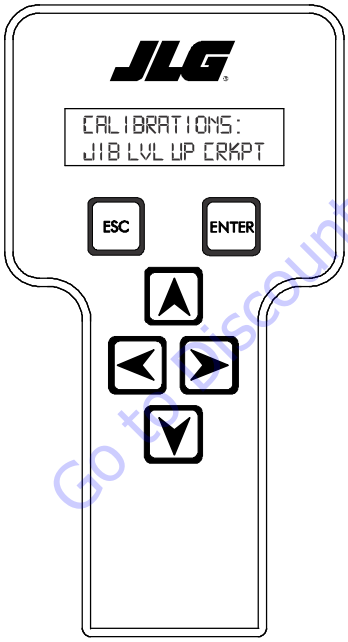
3. Enter code 33271 and press ENTER [ENTER].



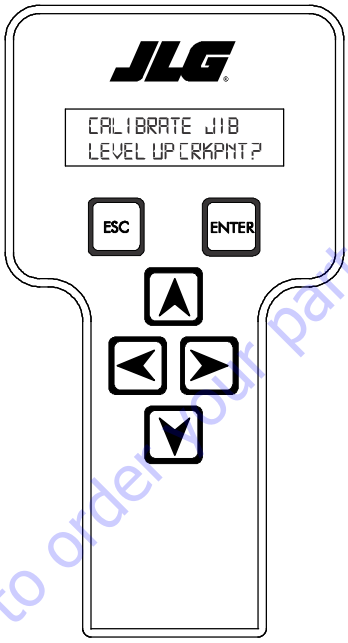
4. Scroll to MENU: CALIBRATIONS and press ENTER (ENTER).



5. Scroll to JIB LVL UP CRKPT and press ENTER (ENTER).

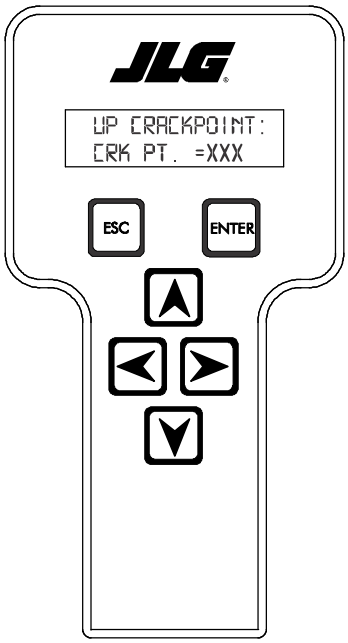


6. Press ENTER (ENTER) to calibrate Jib Level Up crackpoint.

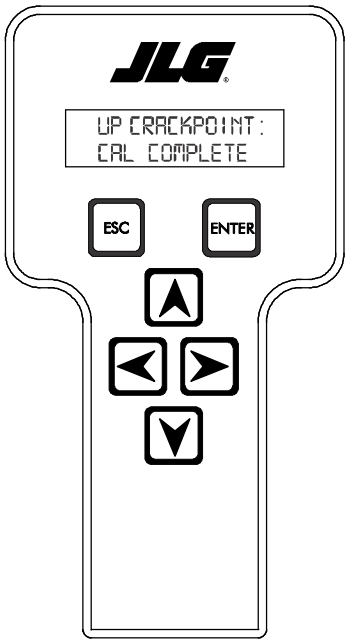


NOTE: *Have an assistant help verify that movement occurs.*

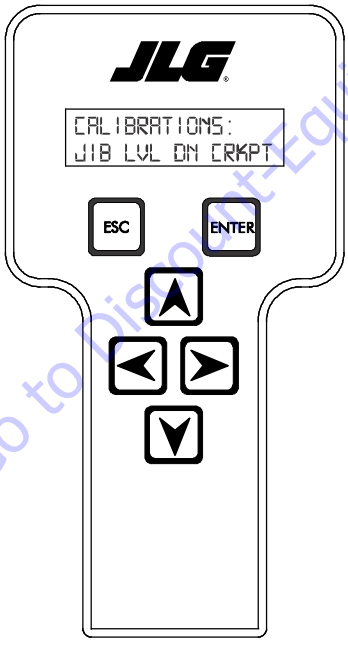
7. Using the analyzer, press and hold the Up Arrow until the function starts moving, then press ENTER (ENTER). Release the Up Arrow.



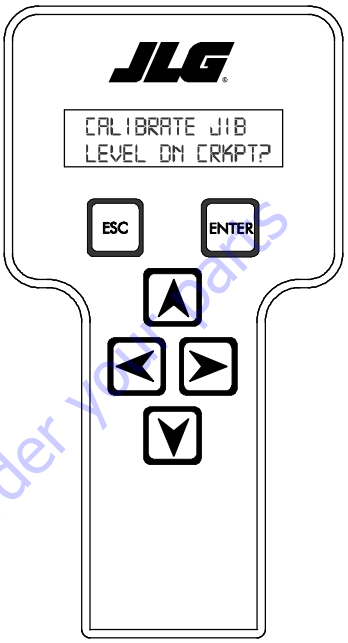
8. This completes the Jib Level Up crackpoint procedure. Press ESC [ESC] to return to the calibrations menu.



9. Scroll to JIB LVL DN CRKPT and press ENTER [ENTER].

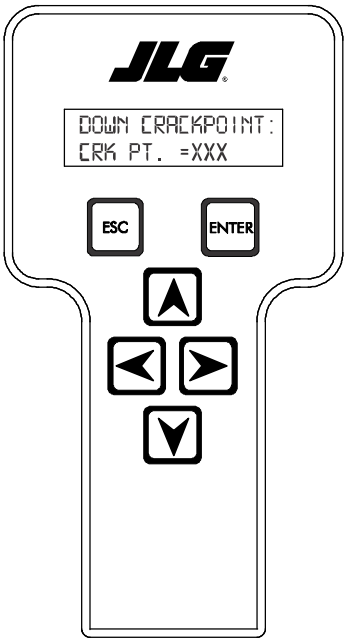


10. Press ENTER [ENTER] to calibrate Jib Level Down crackpoint.

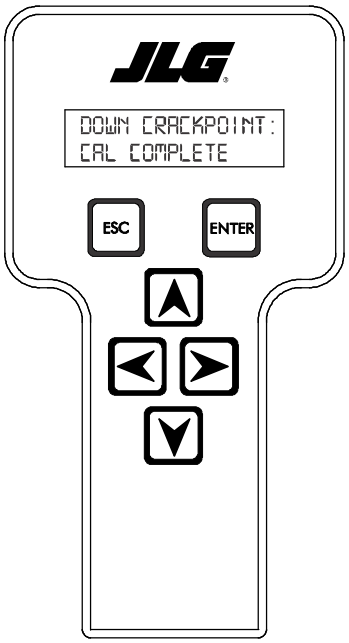


NOTE: *Have an assistant help verify that movement occurs.*

11. Using the analyzer, press and hold the Up Arrow [▲] until the function starts moving, then press ENTER [ENTER]. Release the Up Arrow [▲].

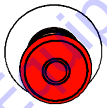


12. This completes the Jib Level Down crackpoint procedure. Press ESC [ESC] to return to the calibrations menu.



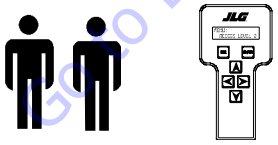
13. The crackpoint setting procedure for Jib Level Up and Down is complete. Press ESC [ESC] to exit calibrations.

14. Push in Power/Emergency Stop switch to save the calibration changes.



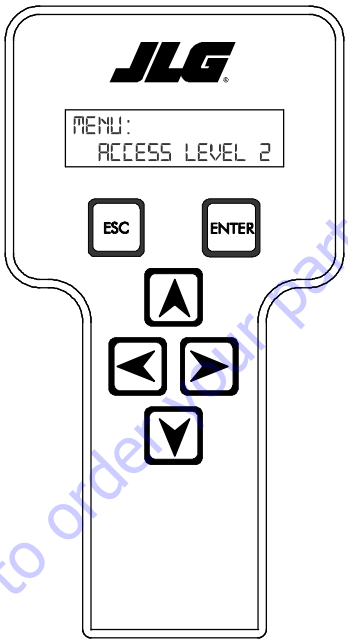
Main Lift Up and Down Crackpoints

NOTE: *To set crackpoints for the Main Lift Up and Down, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.*

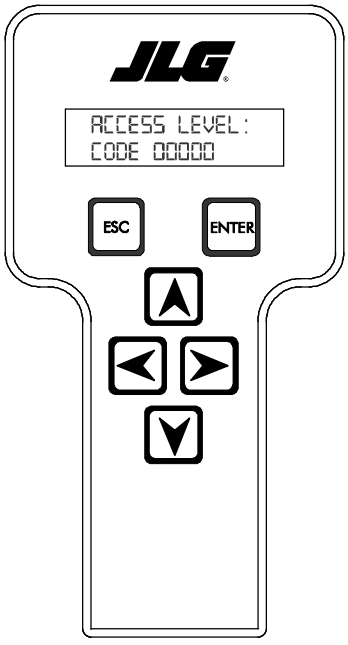


1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.

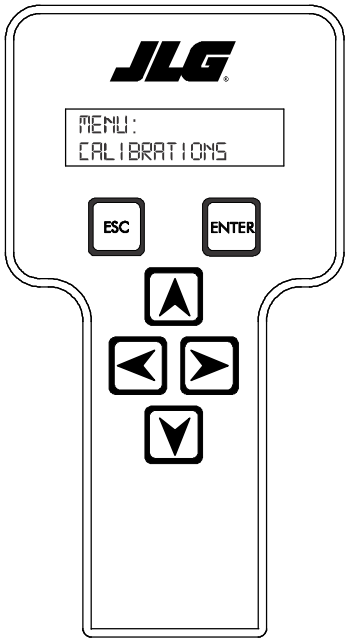
2. Scroll to MENU: OPERATOR ACCESS and press ENTER [ENTER].



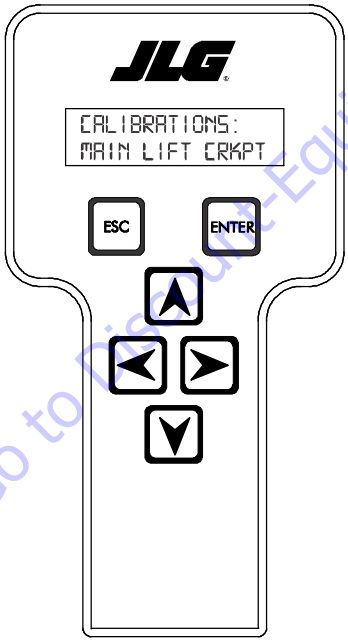
3. Enter code 33271 and press ENTER [ENTER].



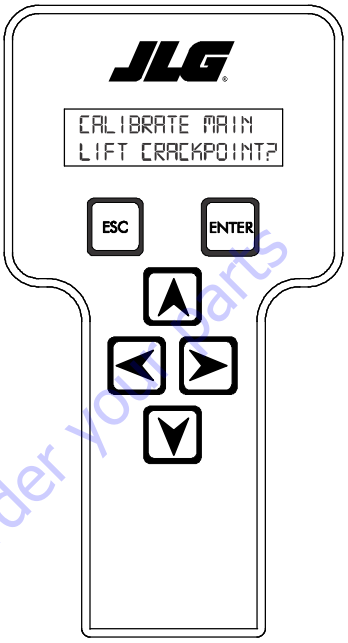
4. Scroll to MENU: CALIBRATIONS and press ENTER (ENTER).



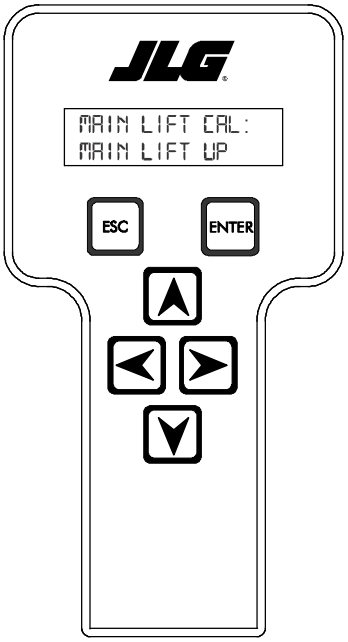
5. Scroll to MAIN LIFT CRKPT and press ENTER (ENTER).



6. Press ENTER (ENTER).

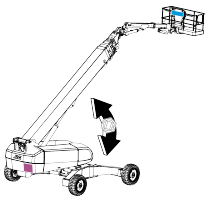


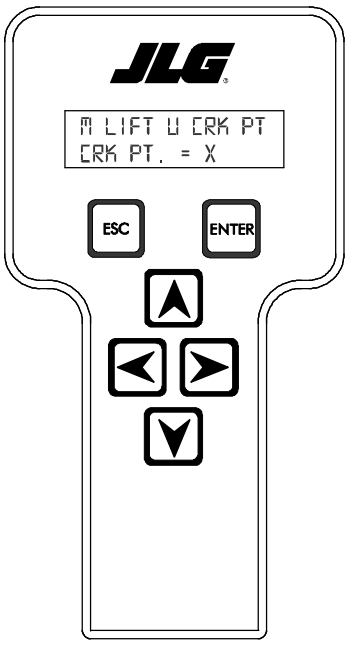
7. Press ENTER (ENTER) to calibrate Main Lift Up crackpoint.



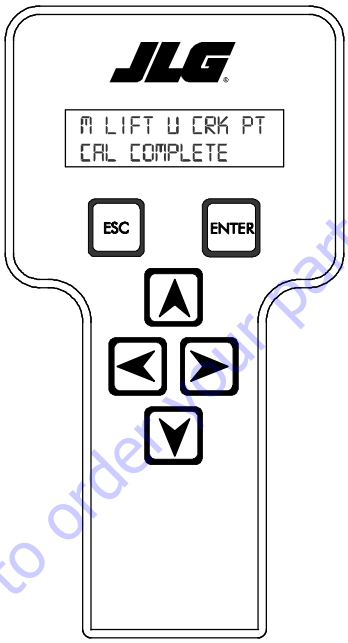
NOTE: *Have an assistant help verify that movement occurs.*

8. At the Ground Controls, press and hold the Lift Up toggle switch until the function starts moving, then press ENTER (ENTER). Release the Lift Up toggle switch.

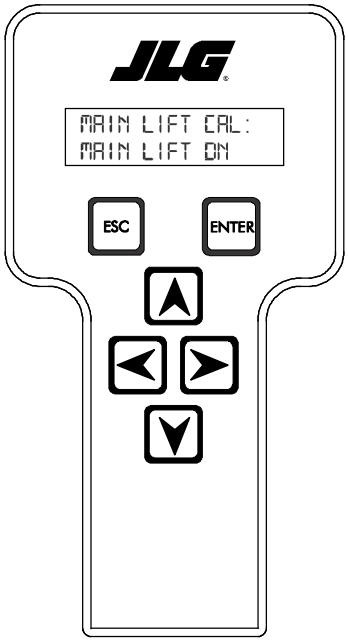




9. This completes the Main Lift Up crackpoint procedure. Press ENTER (ENTER).

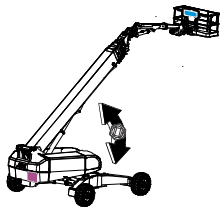


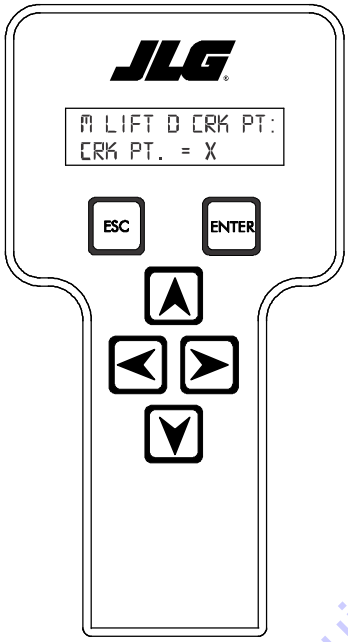
10. Press ENTER (ENTER) to calibrate Main Lift Down crackpoint.



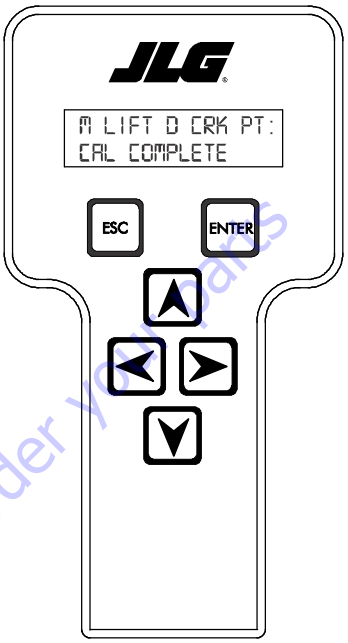
NOTE: *Have an assistant help verify that movement occurs.*

11. At the Ground Controls, press and hold the Lift Down toggle switch until the function starts moving, then press ENTER (ENTER). Release the Lift Down toggle switch.

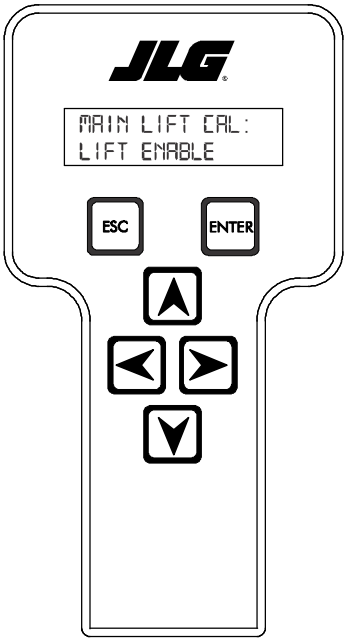




12. This completes the Main Lift Down crackpoint procedure. Press ENTER (ENTER).



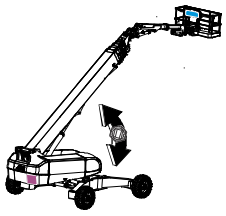
13. Press ENTER (ENTER) to calibrate Main Lift Enable crackpoint.

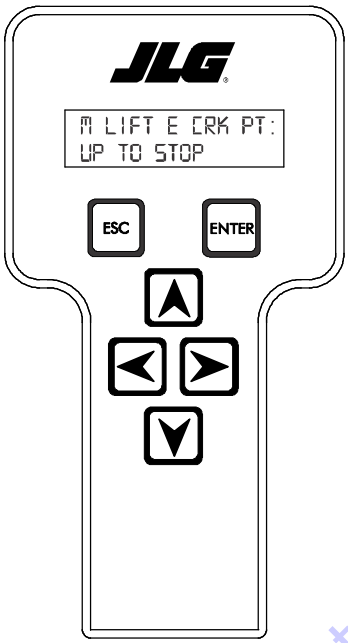


NOTICE

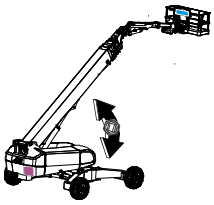
FOR THE FOLLOWING STEP, ELEVATE THE BOOM UNTIL IT STOPS IN ORDER TO CORRECTLY CALIBRATE THE MAIN LIFT ENABLE CRACKPOINT.

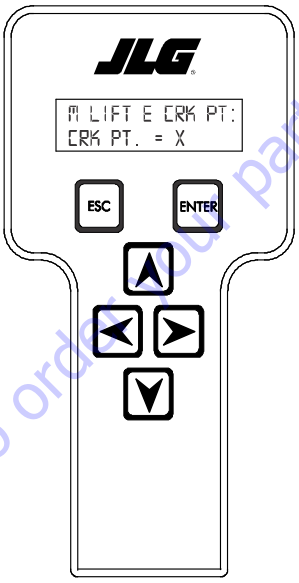
14. At the Ground Controls, press and hold the Lift Up toggle switch until the engine goes to idle speed (lift should not be moving), then press ENTER (ENTER). Release the Lift Up toggle switch.



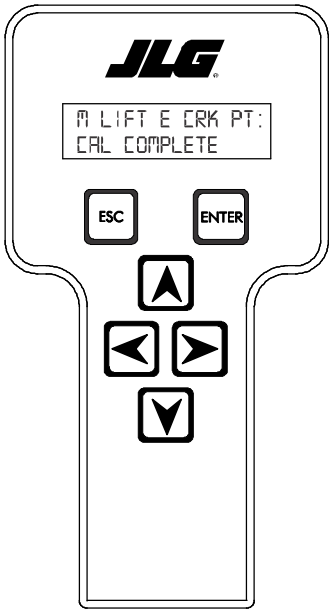


15. At the Ground Controls, press and hold the Lift Down toggle switch until the function starts moving, then press ENTER (ENTER). Release the Lift Down toggle switch.



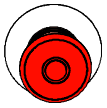


16. This completes the Main Lift Enable crackpoint procedure. Press ESC (ESC) to return to the calibrations menu.



17. The crackpoint setting procedure for Main Lift Up and Down is complete. Press ESC (ESC) to exit calibrations.

18. Push in Power/Emergency Stop button to save the calibration changes.

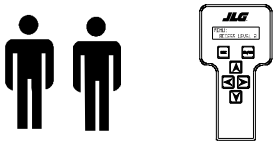


Main Telescope Out and In Crackpoints

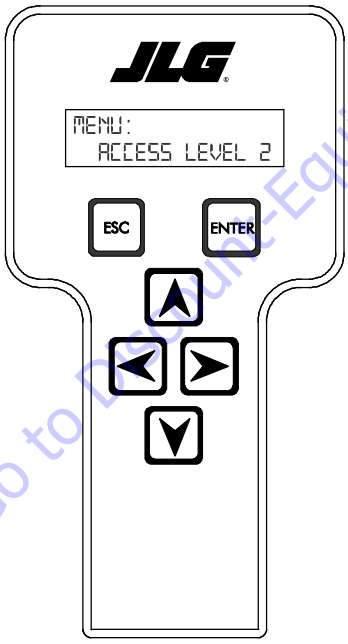
NOTICE

THE BOOM MUST BE FULLY RETRACTED AND HORIZONTAL BEFORE STARTING THE MAIN TELESCOPE OUT AND IN CRACKPOINT PROCEDURE.

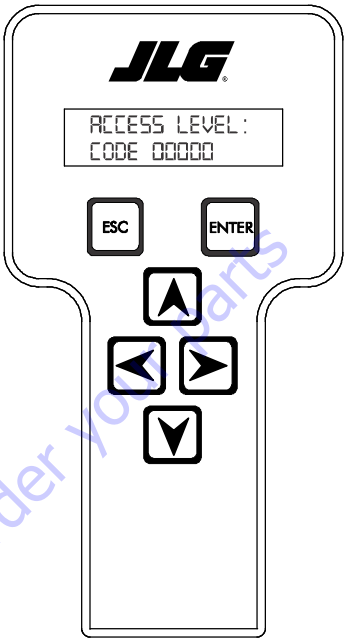
NOTE: *To set crackpoints for the Main Telescope Out and In, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.*



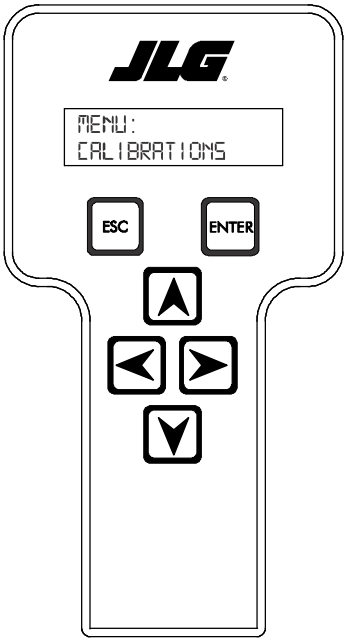
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER (ENTER).



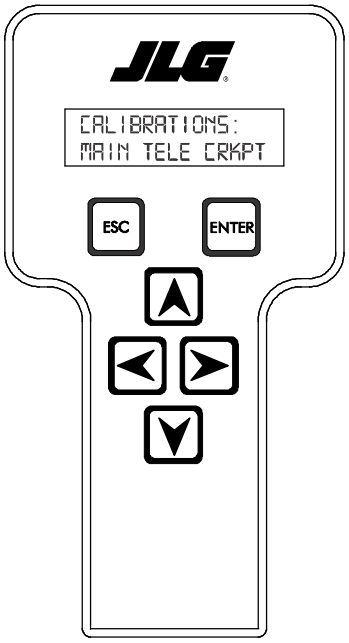
3. Enter code 33271 and press ENTER (ENTER).



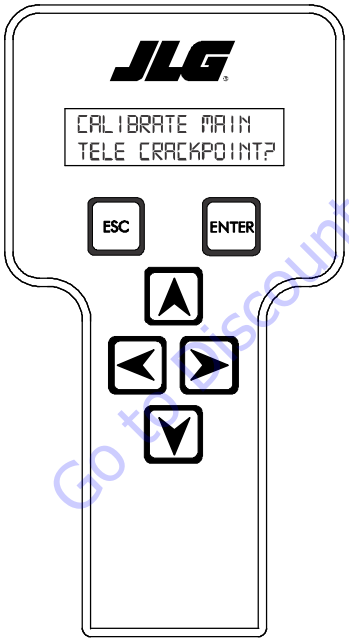
4. Scroll to MENU: CALIBRATIONS and press ENTER (ENTER).



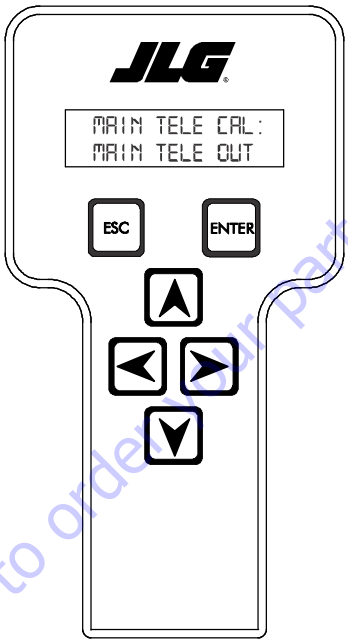
5. Scroll to MAIN TELE CRKPT and press ENTER (ENTER).



6. Press ENTER (ENTER).

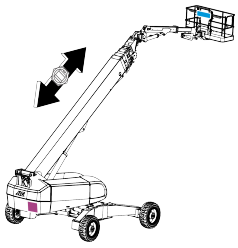


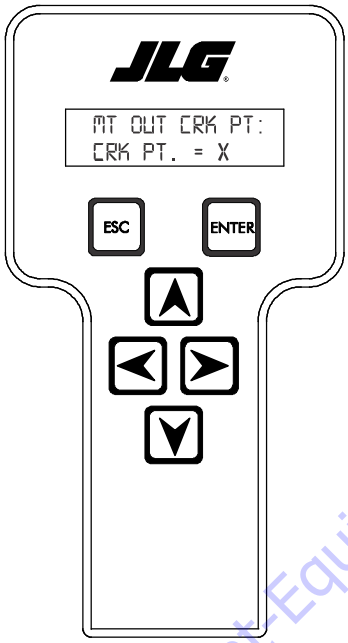
7. Press ENTER (ENTER) to calibrate Main Telescope Out crackpoint.



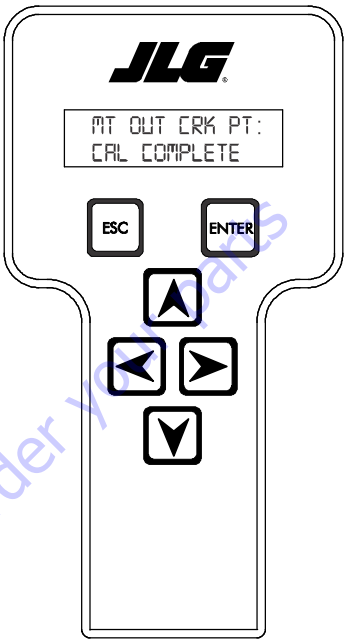
NOTE: *Have an assistant help verify that movement occurs.*

8. At the Ground Controls, press and hold the Telescope Out toggle switch until the function starts moving, then press ENTER. Release the Telescope Out toggle switch.

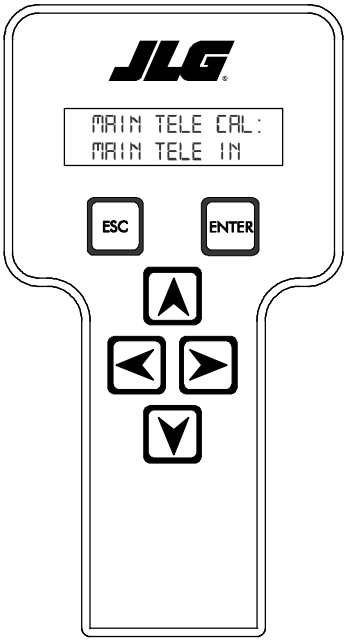




9. This completes the Main Telescope Out crackpoint procedure. Press ENTER.

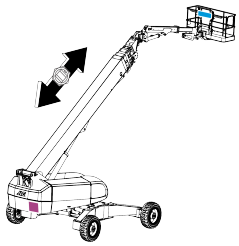


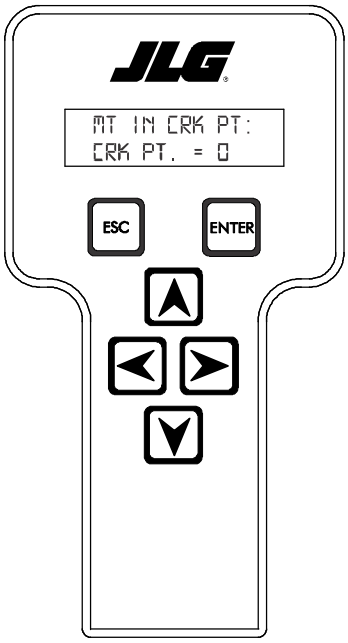
10. Press ENTER to calibrate Main Telescope In crackpoint.



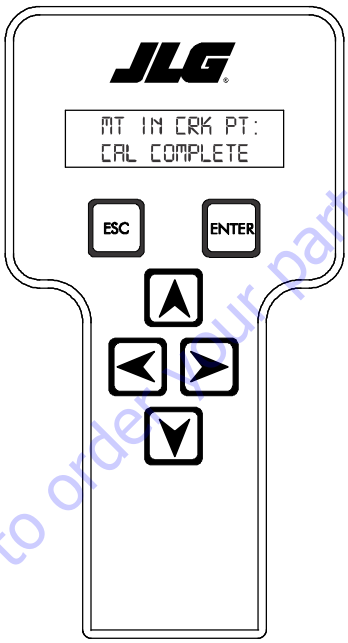
NOTE: *Have an assistant help verify that movement occurs.*

11. At the Ground Controls, press and hold the Telescope In toggle switch until the function starts moving, then press ENTER [ENTER]. Release the Telescope In toggle switch.





12. The crackpoint setting procedure for Main Telescope Out and In is complete. Press ESC [ESC] to exit calibrations.

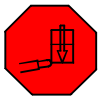


13. Push in Power/Emergency Stop switch to save the calibration changes.

6.12 LSS SYSTEM

The JLG-designed Load Sensing System (LSS) measures platform load via a sensor mounted in the platform support structure. If the actual platform load exceeds the selected Rated Load, the following will occur:

1. The Overload Visual Warning Indicator will flash at the selected control position (platform or ground).



2. The Platform and Ground Alarms will sound 5 seconds On, and 2 seconds Off.
3. All normal movement will be prevented from the platform control position (optional - ground control functions may be prevented).
4. Further movement is permitted by:
   - **a.** Removing the excess platform load until actual platform load is less than Rated Load.
   - **b.** Operation of the overriding emergency system (Auxiliary Power Unit).
   - **c.** By an authorized person at the ground control position (optional - ground control functions may be prevented).

NOTICE

THE LOAD SENSING SYSTEM MUST BE CALIBRATED WHEN ONE OR MORE OF THE FOLLOWING CONDITIONS OCCUR:

- **a.** LSS Sensor removal or replacement
- **b.** Addition or removal of certain platform mounted accessories. (Refer to Calibration)
- **c.** Platform is removed, replaced, repaired or shows evidence of impact.

NOTICE

THE LOAD SENSING SYSTEM REQUIRES PERIODIC FUNCTION VERIFICATION NOT TO EXCEED 6 MONTHS FROM PREVIOUS VERIFICATION. REFER TO TESTING & EVALUATION.

All calibration procedures are menu driven through the use of a JLG Analyzer.

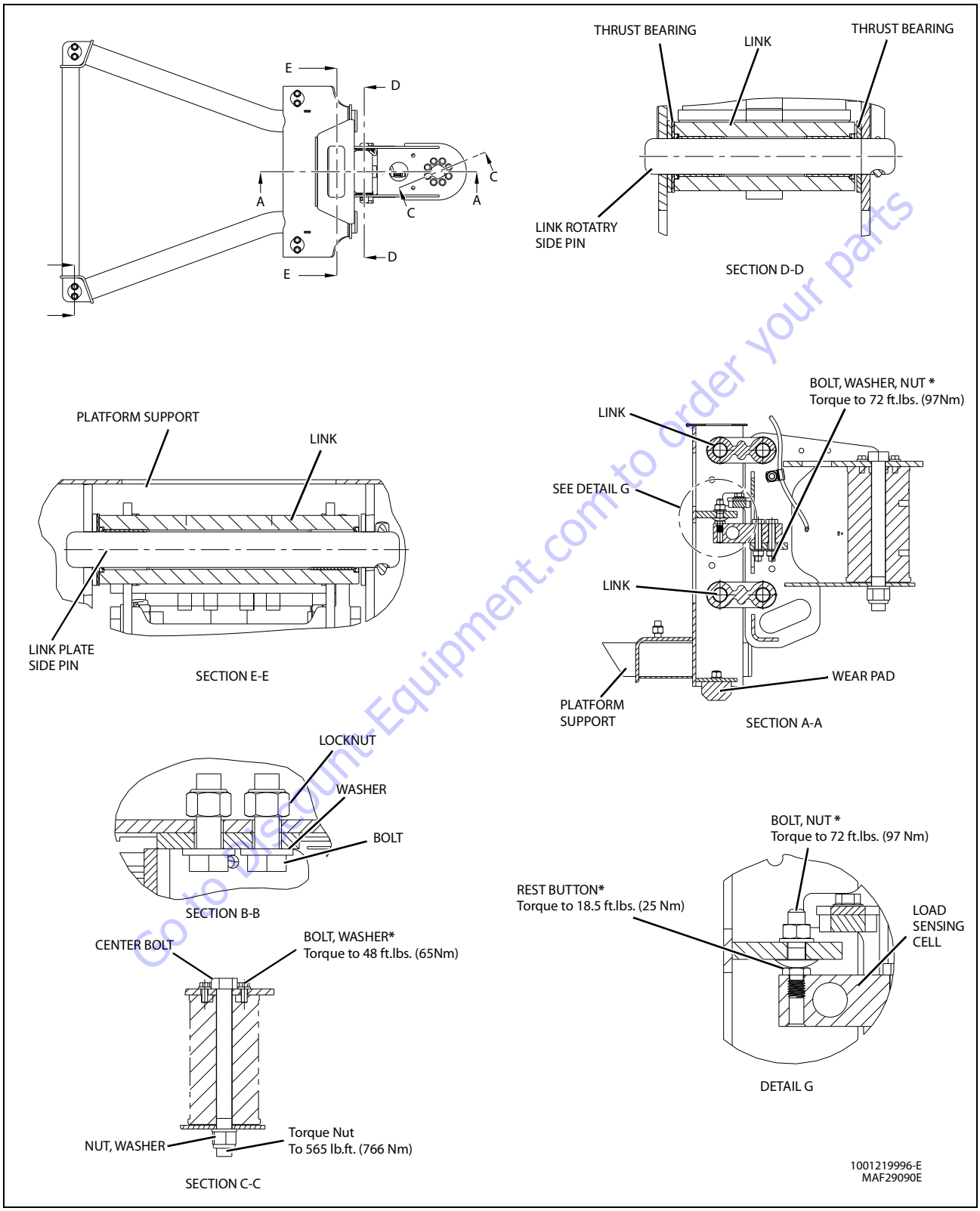


Figure 6-31. LSS Installation - Sheet 1 of 4

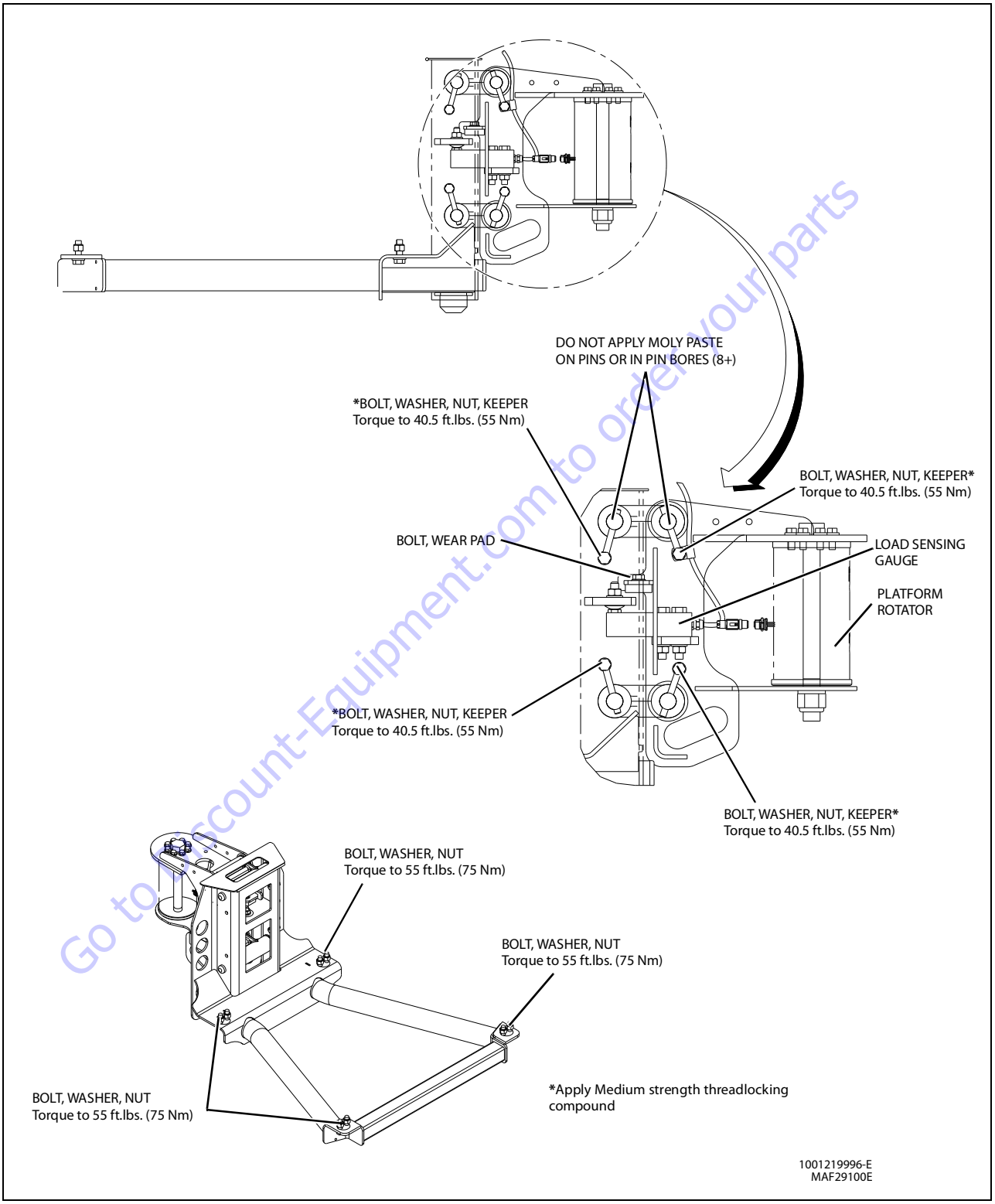


Figure 6-32. LSS Installation - Sheet 2 of 4

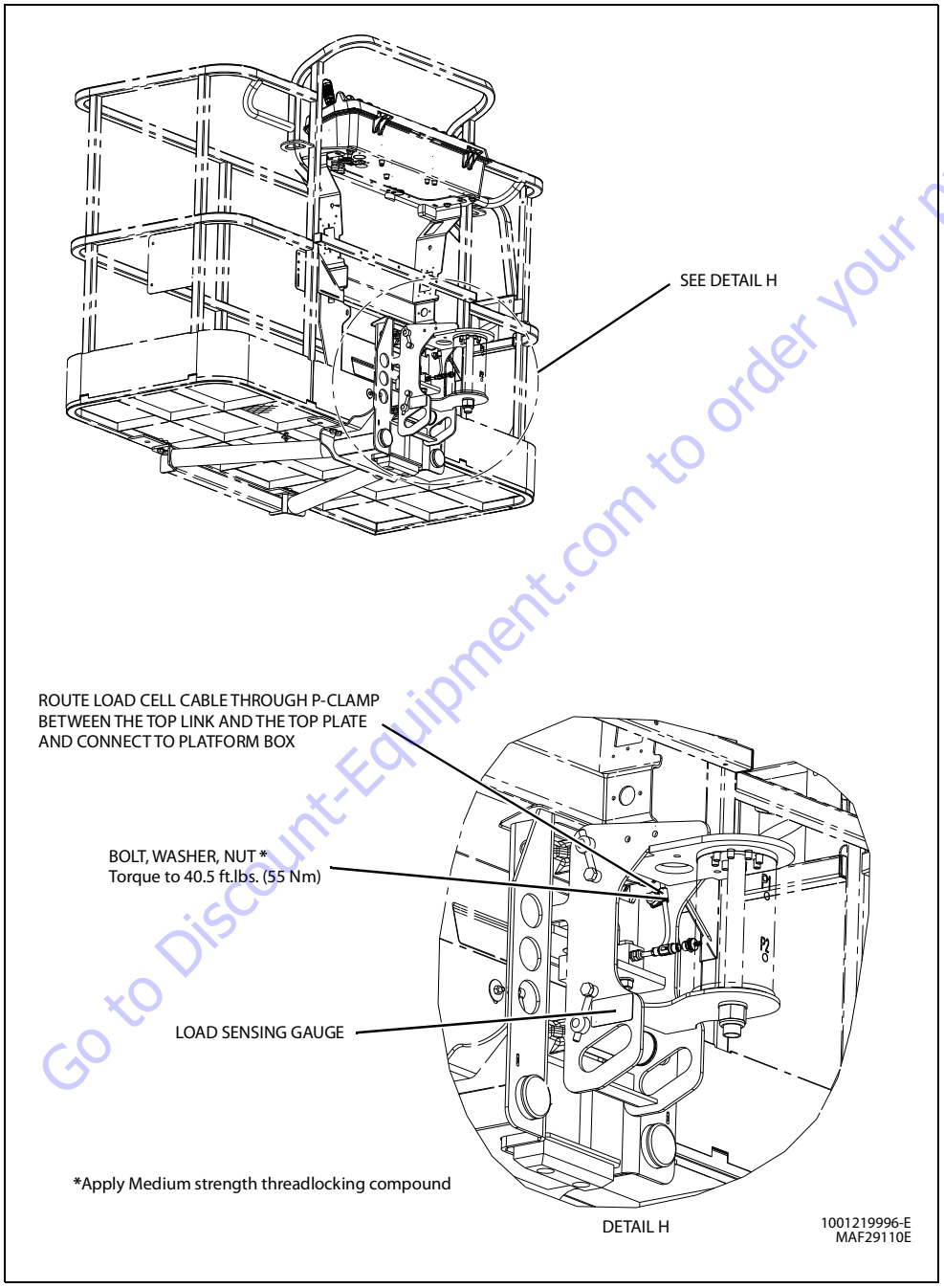


Figure 6-33. LSS Installation - Sheet 3 of 4

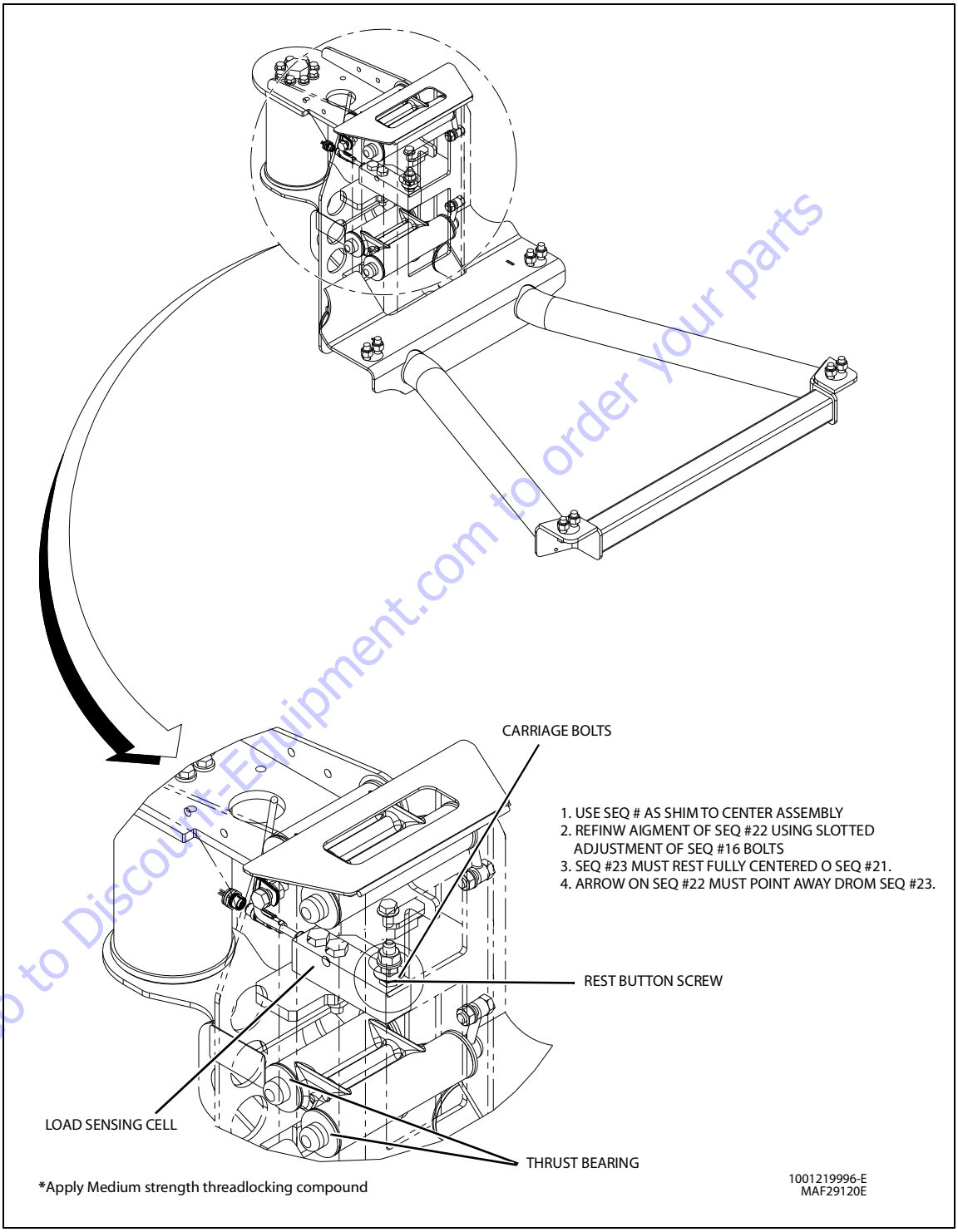


Figure 6-34. LSS Installation - Sheet 4 of 4

Diagnostic Menu

The Diagnostic Menu is another troubleshooting tool for the Load Sensing System. Sensor and status information is presented in real-time for the technician. Several sub-menus exist to organize the data.

To access the Diagnostic Menu, use the LEFT and RIGHT Arrow keys to select DIAGNOSTICS from the Top Level Menu. Press the ENTER key to view the menu.

Press the LEFT and RIGHT Arrow keys to view the displays and select the various sub-menus. To access a sub-menu, press the ENTER key. Once in a sub-menu, press the LEFT and RIGHT Arrow keys to view the various displays (just like a Top Level menu). To exit a sub-menu, press the ESC key.

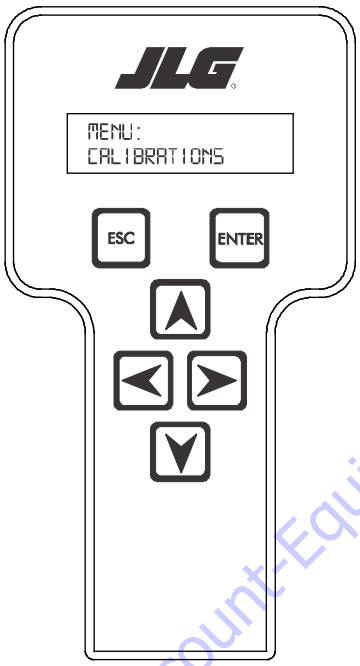
Table 6-7, Diagnostic Menu Descriptions details the structure of the Diagnostic Menu, and describes the meaning of each piece of information presented.

Table 6-7. Diagnostic Menu Descriptions

Diagnostics Menu (Displayed on Analyzer 1st Line)	Parameter (Displayed on Analyzer 2nd Line)	Parameter Value (Displayed on Analyzer 2nd Line)	Description
PLATFORM LOAD	STATE:	OK / OVERLOAD	LSS Status.
PLATFORM LOAD	ACTUAL:	XXX.X KG	Calibrated weight of the platform. ??? if Platform Load is Unhealthy**.
PLATFORM LOAD (service*)	GROSS:	XXX.X KG	Gross weight of the platform. ??? if both Cells are Unhealthy**.
PLATFORM LOAD (service*)	OFFSET 1:	XXX.X KG	Stored offset weight of Cell 1. ??? if LSS is not calibrated.
PLATFORM LOAD (service*)	OFFSET 2:	XXX.X KG	Stored offset weight of Cell 1. ??? if LSS is not calibrated.
PLATFORM LOAD (service*)	ACCESSORY	XXX.X KG	Stored accessory weight. ??? if LSS is not calibrated.
PLATFORM LOAD (service*)	UNRESTRICT	XXX.X KG	UGM will set Unrestricted Rated Load as defined by Machine Configuration.
PLATFORM LOAD (service*)	RESTRICT	XXX.X KG	UGM will set Restricted Rated Load as defined by Machine Configuration.
PLATFORM LOAD (service*)	RAW 1:	XXX.X KG	Gross value from Cell 1. ??? if Unhealthy**.
PLATFORM LOAD (service*)	RAW 2:	XXX.X KG	Gross value from Cell 2. ??? if Unhealthy**.
* Indicates only visible in service view mode ** Typically indicates a DTC is active			

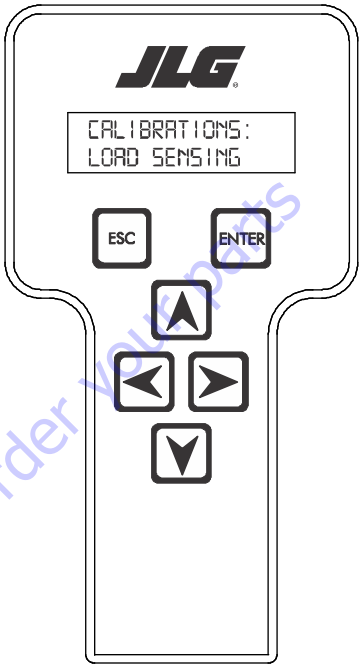
Calibration Procedure

1. Remove everything from the platform, except permanently fixed JLG Accessories, to allow the Load Sensing System to record its' weight during calibration. This includes all tools, debris, and customer-installed devices.
2. Plug the JLG Analyzer into the Machine at the Ground Station and enter Service Access Password 33271.
3. The platform should be approximately level for calibration. Level the platform from ground control (if necessary) to within +/- 5°.
4. To access the Calibration Menu, use the LEFT and RIGHT Arrow keys to select CALIBRATION from the Top Level Menu. The screen will read:

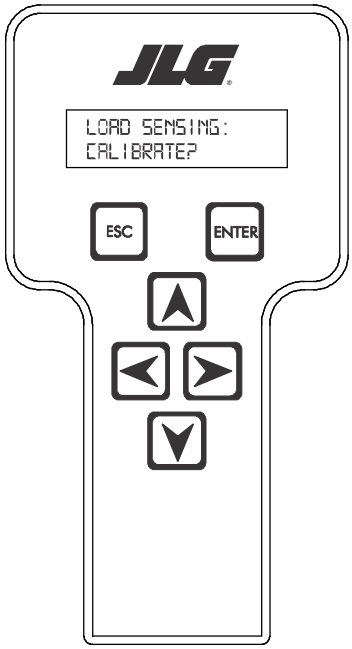


NOTE: *The Calibration Menu is not available in OPERATOR ACCESS.*

5. Press the ENTER key ENTER to view the menu. Upon entry to the Calibration Menu, the JLG Control System will link to the Analyzer and the screen will read:



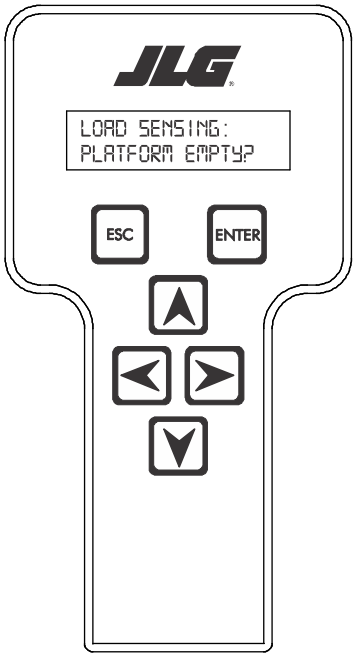
6. Press Enter ENTER. The Screen will read:



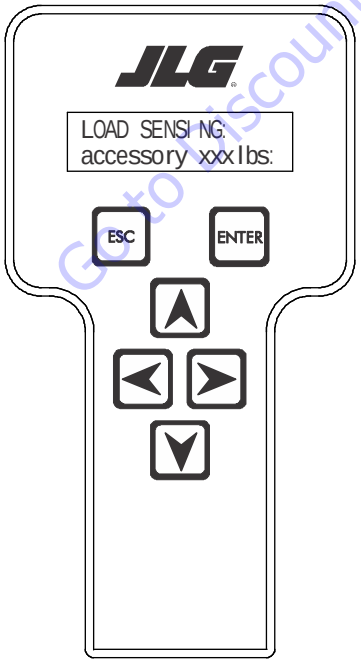
NOTE: *Calibration will auto fail if LSS DTC's are active (443, 444, 4479, 4480, 663, 821, 822, 823, 824, 8218, 8222 -> 8238, 991, 992, 993, 994 or 99285).*

Pressing the ESC key ENTER *after starting calibration and before calibration is complete will display the CAL FAILED message. This will not disturb the prior calibration information.*

7. Press ENTER ENTER. The analyzer screen will read:



8. If the platform is empty, press ENTER ENTER. The screen will read:



NOTE: *Accessory weight will reset to 0 lbs. each time the machine is re-calibrated and will need to be re-entered.*

NOTE: *The Accessory weight will be temporarily stored in the Control System until calibration has been completed successfully.*

Refer to Table 6-8, Accessory Weights. Use the up and down analyzer keys to enter the accessory weight(s) (in lbs). When all the accessory weights are entered, press ENTER ENTER. The screen will read:

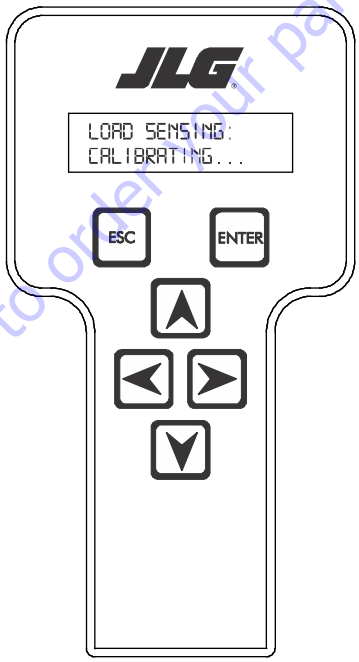


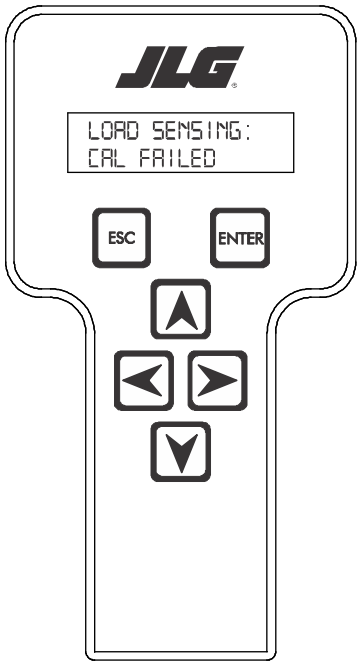
Table 6-8. Accessory Weights

Accessory	Weight
SkyWelder (stick welder)	70 lb (32 kg)
SkyWelder Prep	Prep only = 15 lb (7 kg) Full install = 70 lb (32 kg)
SkyCutter (plasma cutter)	70 lb (32 kg)
SkCutter / SkyWelder Combo	140 lb (64 kg)
Fire Extinguisher	45 lb (20 kg)
Overhead Soft Touch	80 lb (36 kg)
Work Surface	20 lb (9 kg)

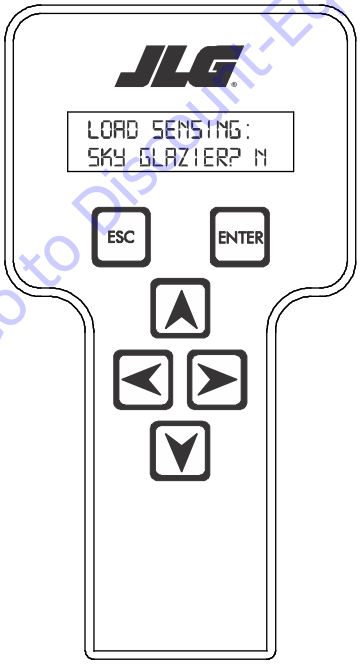
NOTE: *Not all Accessories are available on every JLG model. Some Accessory combinations are prohibited due to excessive weight and/or load restriction. If any installed JLG Accessories are labeled with weight decals but are not listed in the table above, include their weight when entering the ACC WEIGHT value.*

9. The control system will calculate the load cell readings and ensure it is greater than 130 lb (59 kg), but less than 575 lb (261 kg).

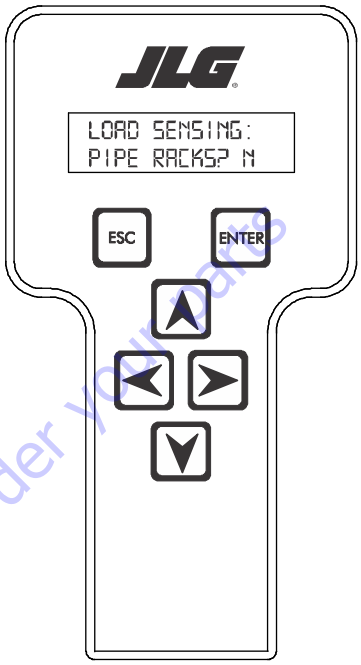
If the platform weight is not within the allowed range, the calibration attempt will be unsuccessful and the Analyzer will show the following:



10. Press ENTER (ENTER). The control system will ask for installed accessories. The screen will show the following:



11. Use the analyzer keys to select N for no or Y for yes. Press ENTER (ENTER). The screen will read:



12. Use the analyzer keys to select N for no or Y for yes. Press ENTER (ENTER). The control system will default to an estimate of unrestricted capacity, which can be adjusted if necessary. Refer to Table 6-9, SkyGlazier Capacity Reductions and Table 6-10, Pipe Rack Capacity Reductions.

The screen will read:

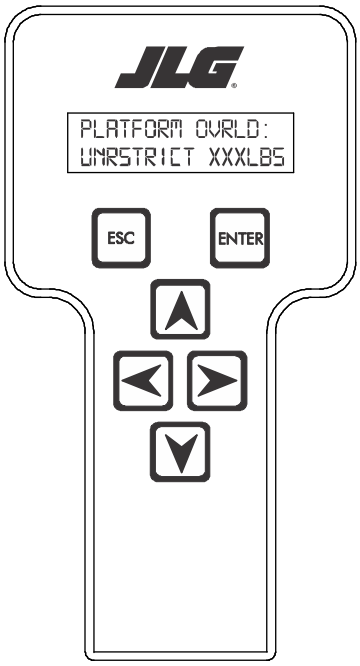


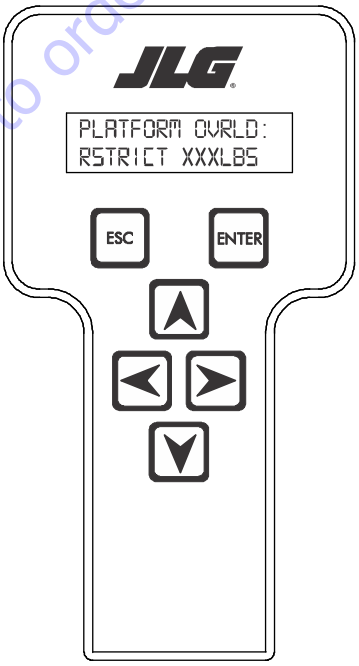
Table 6-9. SkyGlazier Capacity Reductions

Capacity	PLATFORM OVRLD	PLATFORM OVRLD RESTRICT
500 lb (227 kg)	400 lb (181 kg)	n/a
550 lb (250 kg)	400 lb (181 kg)	n/a
600 lb (272 kg)	400 lb (181 kg)	n/a
750 lb (340 kg)	n/a	590 lb (268 kg)
1000 lb (454 kg)	n/a	750 lb (340 kg)
Note: If both SkyGlazier and Pipe Racks are configured, capacity will be the lower of the two values.		

Table 6-10. Pipe Rack Capacity Reductions

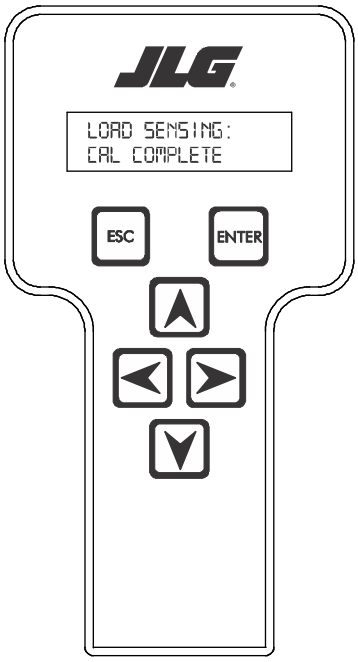
Capacity	PLATFORM OVRLD	PLATFORM OVRLD RESTRICT
500 lb (227 kg)	400 lb (181 kg)	n/a
550 lb (250 kg)	450 lb (204 kg)	n/a
600 lb (272 kg)	500 lb (227 kg)	n/a
750 lb (340 kg)	n/a	650 lb (295 kg)
1000 lb (454 kg)	n/a	900 lb (408 kg)
Note: If both SkyGlazier and Pipe Racks are configured, capacity will be the lower of the two values.		

13. Press ENTER (ENTER). The following screen will be displayed for restricted capacity, which can be adjusted if necessary. Refer to Table 6-9, SkyGlazier Capacity Reductions and Table 6-10, Pipe Rack Capacity Reductions.



14. Press ENTER 

. If calibration is successful, the screen will read:



Testing & Evaluation

Refer to Troubleshooting if the Load Sensing System fails to meet these guidelines.

1. Connect the JLG Analyzer.
2. Level the Platform. The platform should be approximately level for analysis, or the guidelines below will not be applicable. Level the platform from Ground Control (if necessary) to within ±5 degrees.
3. Observe the Empty Platform Weight. Proceed to the DIAGNOSTICS, PLTLOAD sub-menu and observe the measured platform load. All tools, debris, and customer-installed devices shall be removed during evaluation. Ideally, the PLTLOAD should be zero but can vary ± 15 lb (± 7kg). Further, the reading should be stable and should not vary by more than ± 2 lb (± 1kg) (unless there is heavy influence from wind or vibration).
4. Use the Technician's Weight to Evaluate. The technician should enter the platform and record the PLTLOAD reading while standing in the center of the platform.
5. Confirm Control System Warnings and Interlocks. Using the keyswitch, select Platform Mode and power-up. Start the vehicle's engine and ensure that all controls are functional and the Load Sensing System's Overload Visual and Audible Warnings are not active. Simulate an Overload by unplugging the Shear Beam Load Cell. The Overload Visual Warning should flash, and the Audible Warning (at Platform and Ground) should sound for 5 seconds On, and 2 seconds Off. With the engine running, all control should be prevented. Cycle the Platform EMS to stop the engine and then power-up again. The Overload Visual and Audible Warning should continue. Confirm that controls are responsive when using the Auxiliary Power Unit for emergency movement. Reconnect the Load Cell. The Overload Visual and Audible Warnings should cease and normal control function should return. Switch the vehicle's keyswitch to Ground Mode and repeat the above procedure. The Overload Visual Warning at the Ground Controls should flash, and the Audible Warning (at Platform and Ground) should sound for 5 seconds On, 2 seconds Off. However, the controls should remain functional when using the engine and the Auxiliary Power Unit (if the Control System's MACHINE SETUP, LOAD is set to "2=CUTOUT PLT". If set to "3=CUTOUT ALL", then Ground Controls will be prevented when using the engine as in the platform).
6. Confirm Control System Capacity Indication (optional for vehicles with Dual Capacity Ratings). For vehicles equipped with a Capacity Select switch on the Platform Console Box, it is necessary to examine an additional interface between the Load Sensing System and the Control System. Using the keyswitch, select Platform Mode and power-up. If necessary, put the boom in the transport position (completely stowed) and center the Jib Plus (if equipped). Place the Capacity Select switch in the unrestricted position and ensure that the proper indicator illuminates on the Platform Console Box. Plug the JLG Analyzer into the Analyzer connection and proceed to the DIAGNOSTICS, SYSTEM submenu. Ensure that the CAPACITY displays indicate OFF. Place the Capacity Select switch in the unrestricted position (if so equipped) and ensure that the proper indicator illuminates on the Platform Console Box (but does not flash). For vehicles with unrestricted capacity, ensure that the unrestricted CAPACITY display indicates ON but the restricted CAPACITY indicates OFF. For vehicles with restricted capacity, ensure that the unrestricted CAPACITY display indicates OFF but the restricted CAPACITY indicates ON.
7. Confirm Load Sensing System Performance with Calibrated Weights. Operate the vehicle from Ground Control and place the boom in the transport position (fully stowed) for safety. Plug the JLG Analyzer into the control system connection and proceed to the DIAGNOSTICS, PLTLOAD display. Place 500 lb (230 kg) in the platform and ensure that PLTLOAD is with ±5% of the actual weight. For Dual Capacity vehicles, do the same for the alternate capacity (unrestricted or restricted).

Troubleshooting

The following tables are furnished to provide possible resolutions for common difficulties. Difficulties are classified as General, Calibration, Measurement Performance, and Host System Functionality.

Table 6-11. LSS Troubleshooting Chart

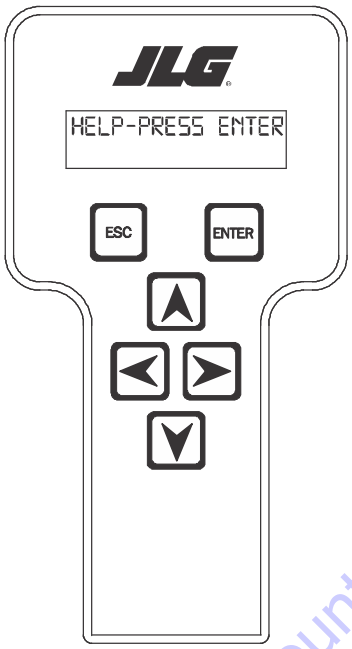
Difficulty	Possible Resolution
Empty Platform Weight (DIAGNOSTICS, PLATFORM LOAD) is not within ± 15 lb (± 7 kg) of zero. or Platform Load readings (DIAGNOTICS, PLTLOAD) are unstable by more than ± 2 lb (± 1 kg) (without the influence of vibration or wind). or There are large variations in Platform Load (DIAGNOSTICS, PLTLOAD) based on the location of the load. Tolerance to variations is 20lbs for an evaluation using the technician's weight, and ±5% of Rated Load when using calibrated weights.	The LSS System is unable to properly measure the platform weight. 1. The Load Cell is not properly plugged into the LSS Harness. It is possible poor electrical contact is made. 2. Wiring leading to the Load Cell is damaged. Carefully inspect sensor wiring where it passes through cable clamps for signs of damage. Inspect wiring where damage to the channel is apparent. 3. The Load Cell was not assembled properly during installation. Examine the sensor's reading using the JLG Analyzer. Proceed to the DIAGNOSTICS, CELL, LOAD displays and determine if the readings are reasonable. It is often helpful to apply slight downward pressure above the sensor and observe that its output increases (increasing force measurement; decreasing means the sensor is mounted upside-down). 4. The Load Cell is contaminated by debris or moisture. Examine the sensor's reading using the JLG Analyzer. Proceed to the DIAGNOSTICS, CELL, LOAD displays and determine if the readings are reasonable and stable (not changing by more than ± 2 lb (± 1 kg) (without the influence of vibration or wind). Lack of measurement stability is a key indication of contamination. Unplug the connector and inspect for dirt or moisture. Look carefully into the female connector on the sensor's cordset for evidence of contamination. Debris should be brushed away with a soft bristle brush (do not introduce any cleaners as they will leave conductive residue). Moisture should be allowed to evaporate or accelerated with a heat-gun (use low heat and be carefully to not melt connector materials). Moisture intrusion into the molded portion of the connector (capillary action into the wire bundle) or the Shear Beam Load Cell itself will require replacement of the sensor. 5. The Load Cell has been mechanically damaged. If the Load Cell is physically deformed or has damage to the cover it should be replaced immediately. It is also possible to have invisible mechanical damage resulting from an extreme overload (> 6000 lb [> 2722 kg]).
The Visual and Audible Overload Warnings fail to sound when platform is loaded beyond Rated Load, or when simulated by unplugging the Load Cell. Controls remain functional at Platform and Ground Control positions.	The Control System is failing to regard the overload signal from the LSS System, or the signal is shorted. 1. The Load Sensing System must be enabled within the Control System. Plug the JLG Analyzer into the Control System, enter the Access Level 1 password (33271), and examine the MACHINE SETUP, LOAD sub-menu. The selection "2=CUTOUT PLT" should be displayed (platform controls prevented during overload, ground controls remain operational). In country- or customer-specific circumstance, the selection "3=CUTOUT ALL" is used (platform and ground controls prevented during overload).
The Ground Audible Warning fails to sound, but the Platform Audible Warning sounds properly.	The Ground Alarm is missing or improperly installed. Verify that the device is mounted. Verify wiring from the Main Terminal Box and Ground Module.
Controls remain functional at the Ground Control position during an overload, or when simulated by unplugging the Load Cell. The Controls at the Platform Control position are prevented when using the engine, but not when using the Auxiliary Power Unit.	The JLG Control System is configured to prevent platform controls only in the event of overload. Alternately, the Host Control System can be configured to prevent ground and platform controls for country- or customer-specific circumstances. Using the JLG Analyzer, enter the Access Level 1 password (33271). Proceed to the MACHINE SETUP, LOAD sub-menu. Set this parameter to "2=CUTOUT PLT" to prevent platform controls in the event of overload. Set this parameter to "3=CUTOUT ALL" to prevent platform and ground controls in the event of overload.

6.13 RESETTING THE MSSO SYSTEM

1. Use the following procedure to reset the MSSO system.
2. Position the Platform/Ground select switch to the desired position.
3. Plug the analyzer into the connector coming from the ground control module or from the platform console.

NOTE: *If performing the procedure from the platform console, the Emergency Stop switch on the ground console must also be pulled out.*

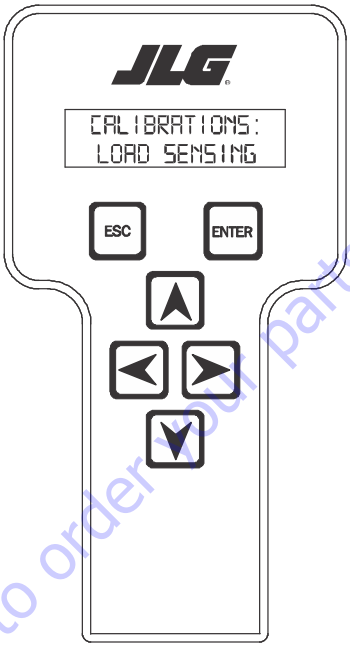
4. Pull out the Emergency Stop switch.
5. The analyzer screen should read:



6. Use the arrow button to reach OPERATOR ACCESS. Press Enter 

.
7. Enter the Access Code, 33271.
8. Use the right Arrow key to reach MENU: CALIBRATIONS. Press Enter 

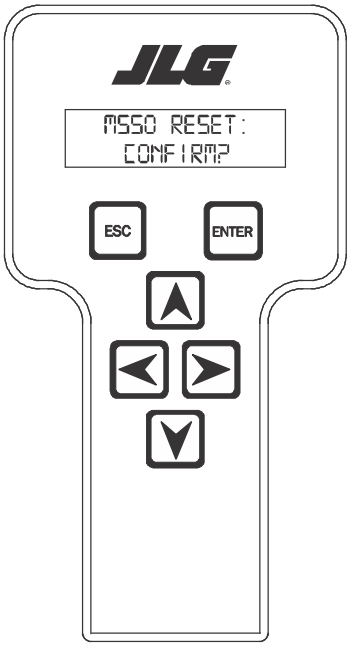
.
9. Use the arrow keys to reach the LOAD SENSING menu. The screen should read:



10. Press ENTER 

.
11. Use the Down  arrow to reach MSSO RESET.

12. Press Enter (ENTER). The screen will read:



13. Press Enter (ENTER). The JLG Control System will reset an active 873 DTC and the MSSO System will be reset. Press Escape (ESC) to return to the CALIBRATIONS menu.

6.14 ELECTRONIC PLATFORM LEVELING

Platform Leveling Fault Warning

The JLG Control System takes a snapshot of the two sensor values and records the difference once on each power up. The Control system allows a ±5 degree difference from those values. For example, if Sensor 1 is at 5 degrees and Sensor 2 is at 11 degrees, the difference is 6 degrees and the DTC is triggered when the sensors are 1 degree (or less) apart or 11 degrees (or more) apart.

If a fault occurs in the platform leveling system the following will occur:

1. Automatic platform leveling will stop (except when there is a fault in only one sensor automatic leveling will remain active as the control system will use the other sensor to control leveling)
2. The level fault lamp will flash
3. The audible alarm will sound
4. All functions will default to creep speed if the platform is out of the transport position.

To reset the fault the emergency stop switch should be recycled.

NOTICE

IF THE FAULT PERSISTS BRING THE PLATFORM TO THE GROUND POSITION, SWITCH THE MACHINE OFF AND CONTACT A QUALIFIED SERVICE REPRESENTATIVE TO INVESTIGATE THE FAULT.

Fault Response

ERROR RESPONSE

If basket level varies from the current **setpoint** by ± 5.5° for more than 1.5 seconds when the platform is not in the transport position, the following events will occur:

1. The platform dump valve will be disabled (level, rotate and jib functions disabled).
2. The level system fault lamp will flash (to indicate that the leveling function has been lost).
3. The platform alarm will sound.
4. A system fault will be logged.
5. All function speeds (lift, swing, telescope and drive) will be placed in creep mode (except when the platform is in the transport position see below).

When the unit is in the transport position and driving and the current setpoint varies by ± 5.5° for more than 8 seconds the events 1,2,3 & 4 above will occur. (note function speeds will operate normally). Cycling the EMS will clear the fault and allow the operator to operate the machine as a new level **setpoint** is taken.

VALVE DRIVER ERRORS

There are three possible level valve driver errors, short to battery, short to ground, and open circuit.

1. In the case of a **short to ground or an open circuit**, the platform valve cannot be turned on and the following will occur:
   a. All interactions with platform leveling shall cease
   b. The Electronic Leveling System Fault Lamp shall flash (to indicate that the leveling function has been lost).
   c. The platform alarm will sound.
   d. A system fault will be logged.
   e. All function speeds (lift, swing, telescope and drive) will be placed in creep mode (except when the platform is in the transport position).
2. In the case of a **short to battery** on one of the platform leveling valves, the valve cannot be turned off and the following will occur:
   a. The platform dump valve will be turned off to prevent unintended tilting of the platform.
   b. All interactions with platform leveling shall cease.
   c. The Electronic Leveling System Fault Lamp shall flash (to indicate that the leveling function has been lost).
   d. The platform alarm will sound.
   e. A system fault will be logged.
   f. All function speeds (lift, swing, telescope and drive) will be placed in creep mode (except when the platform is in the transport position)
3. In the case of a **short to battery on the platform dump valve**, the valve cannot be turned off. The controllability of the platform leveling function will be impaired and the following will occur:
   a. All interactions with platform leveling shall cease.
   b. The Electronic Leveling System Fault Lamp shall flash (to indicate that the leveling function has been lost).
   c. The platform alarm will sound.
   d. A system fault will be logged.
   e. All function speeds (lift, swing, telescope and drive) will be placed in creep mode (except when the platform is in the transport position).

Lift, swing, drive and telescope will continue to operate

In each of the cases above it shall be necessary to re-cycle the EMS to clear the fault. Operable functions shall be in the creep mode except while below elevation.

TILT SENSOR ERRORS

If the secondary tilt sensor is faulty, the control system will continue to utilize information from the primary sensor.

If the primary sensor is faulty, the control system will switch to the backup sensor for control.

In both cases above the following will occur:

1. The Electronic Leveling System Fault Lamp will flash (to indicate that there is a leveling fault).
2. The platform alarm will sound.
3. A system fault will be logged.
4. All function speeds (lift, swing, telescope, jib and drive) will be placed in creep mode (except when the platform is in the transport position).
5. Automatic leveling remains active.

Lift, swing, drive and telescope will continue to operate.

In each of the cases above it will be necessary to re-cycle the EMS to clear the fault. Operable functions shall be in the creep mode except while below elevation.

When both sensors appear to be working but have measurements that disagree by ±5.5° The following will occur:

1. All interactions with platform leveling shall cease.
2. The Electronic Leveling System Fault Lamp shall flash (to indicate that the leveling function has been lost).
3. The platform alarm will sound.
4. A system fault will be logged.
5. All function speeds (lift, swing, telescope and drive) will be placed in creep mode (except when the platform is in the transport position)

At this point, the operator must use the level up and down toggle switch to manually level during descent. It shall be necessary to re-cycle the EMS to clear the fault.

Table 6-12. Diagnostic Fault Code Chart

Fault Text	Flash 1	Flash 2	DTC	1350	1200	1250	1500	1850
EVERYTHING OK	0	0	1	✓	✓	✓	✓	✓
RUNNING AT CUTBACK - OUT OF TRANSPORT POSITION	0	0	10	✓	✓	✓	✓	✓
FSW OPEN	0	0	11	✓	✓	✓	✓	✓
RUNNING AT CREEP - CREEP SWITCH OPEN	0	0	12	✓	✓	✓	✓	✓
RUNNING AT CREEP - TILTED AND ABOVE ELEVATION	0	0	13	✓	✓	✓	✓	✓
CHASSIS TILT SENSOR OUT OF RANGE	0	0	14	✓	✓	✓	✓	✓
LOAD SENSOR READING UNDER WEIGHT	0	0	15	✓	✓	✓	✓	✓
ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED	0	0	16	✓	✓	✓	✓	✓
OVER MOMENT - HYDRAULICS SUSPENDED	0	0	17	✓	✓	✓	✓	✓
UNDER MOMENT - HYDRAULICS SUSPENDED	0	0	18	✓	✓	✓	✓	✓
MAIN ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED	0	0	19	✓	✓	✓	✓	✓
TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED	0	0	20	--	--	✓	--	--
ADS1213 REINITIALIZED	0	0	21	✓	✓	✓	✓	✓
RUNNING AT CREEP - PLATFORM STOWED	0	0	30	✓	✓	✓	✓	✓
FUEL LEVEL LOW - ENGINE SHUTDOWN	0	0	31	✓	✓	✓	✓	✓
APU ACTIVE	0	0	35	✓	✓	✓	✓	✓
JIB UNLOCKED OUT OF TRANSPORT - HYDRAULICS SUSPENDED	0	0	37	--	--	--	✓	✓
SWING ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED	0	0	38	--	--	--	✓	✓
SKYGUARD ACTIVE - FUNCTIONS CUTOUT	0	0	39	✓	✓	✓	✓	✓
KEYSWITCH FAULTY	2	1	212	✓	✓	✓	✓	✓
FSW FAULTY	2	1	213	✓	✓	✓	✓	✓
STEER SWITCHES FAULTY	2	2	227	✓	✓	✓	✓	✓
FSW INTERLOCK TRIPPED	2	2	2211	✓	✓	✓	✓	✓
DRIVE LOCKED - JOYSTICK MOVED BEFORE FOOTSWITCH	2	2	2212	✓	✓	✓	✓	✓
STEER LOCKED - SELECTED BEFORE FOOTSWITCH	2	2	2213	✓	✓	✓	✓	✓
D/S JOY. OUT OF RANGE LOW	2	2	2215	✓	✓	✓	✓	✓
D/S JOY. OUT OF RANGE HIGH	2	2	2216	✓	✓	✓	✓	✓
D/S JOY. CENTER TAP BAD	2	2	2217	✓	✓	✓	✓	✓
L/S JOY. OUT OF RANGE LOW	2	2	2218	✓	✓	✓	✓	✓
L/S JOY. OUT OF RANGE HIGH	2	2	2219	✓	✓	✓	✓	✓
L/S JOY. CENTER TAP BAD	2	2	2220	✓	✓	✓	✓	✓
LIFT/SWING LOCKED - JOYSTICK MOVED BEFORE FOOTSWITCH	2	2	2221	✓	✓	✓	✓	✓
WAITING FOR FSW TO BE OPEN	2	2	2222	✓	✓	✓	✓	✓
FUNCTION SWITCHES LOCKED - SELECTED BEFORE ENABLE	2	2	2223	✓	✓	✓	✓	✓
FOOTSWITCH SELECTED BEFORE START	2	2	2224	✓	✓	✓	✓	✓

Table 6-12. Diagnostic Fault Code Chart

Fault Text	Flash 1	Flash 2	DTC	1350	1200	1250	1500	1850
FUNCTION SWITCHES FAULTY - CHECK DIAGNOSTICS/BOOM	2	3	234	✓	✓	✓	✓	✓
FUNCTION SWITCHES LOCKED - SELECTED BEFORE AUX POWER	2	3	235	✓	✓	✓	✓	✓
FUNCTION SWITCHES LOCKED - SELECTED BEFORE START SWITCH	2	3	236	✓	✓	✓	✓	✓
START SWITCH LOCKED - SELECTED BEFORE KEYSWITCH	2	3	237	✓	✓	✓	✓	✓
TOWER LIFT PRESSURE SENSOR - OUT OF RANGE HIGH	2	3	23100	--	--	✓	--	--
TOWER LIFT PRESSURE SENSOR - OUT OF RANGE LOW	2	3	23101	--	--	✓	--	--
TOWER LIFT PRESSURE SENSOR - NOT DETECTING CHANGE	2	3	23102	--	--	✓	--	--
TOWER LIFT CYLINDER - OVER PRESSURE	2	3	23103	--	--	✓	--	--
LIFT PRESSURE SENSOR - OUT OF RANGE LOW	2	3	23124	--	--	--	--	✓
LIFT PRESSURE SENSOR - OUT OF RANGE HIGH	2	3	23125	--	--	--	--	✓
LIFT PRESSURE SENSOR - NOT DETECTING CHANGE	2	3	23126	--	--	--	--	✓
LIFT CYLINDER - OVER PRESSURE	2	3	23127	--	--	--	--	✓
REDUCTION CHECK PRESSURE SENSOR - OUT OF RANGE LOW	2	3	23128	--	--	--	--	✓
REDUCTION CHECK PRESSURE SENSOR - OUT OF RANGE HIGH	2	3	23129	--	--	--	--	✓
REDUCTION CHECK PRESSURE SENSOR - HIGH	2	3	23130	--	--	--	--	✓
REDUCTION CHECK PRESSURE SENSOR - LOW	2	3	23131	--	--	--	--	✓
MODEL CHANGED - HYDRAULICS SUSPENDED - CYCLE EMS	2	5	259	✓	✓	✓	✓	✓
GENERATOR MOTION CUTOUT ACTIVE	2	5	2513	✓	✓	✓	✓	✓
BOOM PREVENTED - DRIVE SELECTED	2	5	2514	✓	✓	✓	✓	✓
DRIVE PREVENTED - BOOM SELECTED	2	5	2515	✓	✓	✓	✓	✓
DRIVE PREVENTED - ABOVE ELEVATION	2	5	2516	✓	✓	✓	✓	✓
DRIVE PREVENTED - TILTED & ABOVE ELEVATION	2	5	2517	✓	✓	✓	✓	✓
JIB SWING PREVENTED - IN 1000# MODE	2	5	2521	✓	✓	✓	✓	✓
CAN DONGLE ATTACHED - HYDRAULICS NOT RESTRICTED	2	5	2522	✓	✓	✓	✓	✓
BACKUP BLAM COMMUNICATIONS ACTIVE	2	5	2523	--	--	✓	--	--
DISCONNECT ANALYZER AND CYCLE EMS TO PERFORM BOOM RETRIEVAL	2	5	2524	--	--	✓	--	--
MACHINE SETUP FAULT - JIB SWING	2	5	2546	✓	✓	✓	✓	✓
MACHINE SETUP FAULT - MODEL	2	5	2547	✓	✓	✓	✓	✓
SYSTEM TEST MODE ACTIVE	2	5	2548	✓	✓	✓	✓	✓
SKYGUARD SW - DISAGREEMENT	2	5	2563	✓	✓	✓	✓	✓
FRONT LEFT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE LOW	2	6	261	--	--	--	--	✓
FRONT LEFT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE HIGH	2	6	262	--	--	--	--	✓
FRONT RIGHT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE LOW	2	6	263	--	--	--	--	✓
FRONT RIGHT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE HIGH	2	6	264	--	--	--	--	✓
REAR LEFT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE LOW	2	6	265	--	--	--	--	✓

Table 6-12. Diagnostic Fault Code Chart

Fault Text	Flash 1	Flash 2	DTC	1350	1200	1250	1500	1850
REAR LEFT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE HIGH	2	6	266	--	--	--	--	✓
REAR RIGHT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE LOW	2	6	267	--	--	--	--	✓
REAR RIGHT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE HIGH	2	6	268	--	--	--	--	✓
FRONT LEFT AXLE SENSOR - NOT RESPONDING	2	6	2611	--	--	--	--	✓
FRONT RIGHT AXLE SENSOR - NOT RESPONDING	2	6	2612	--	--	--	--	✓
REAR LEFT AXLE SENSOR - NOT RESPONDING	2	6	2613	--	--	--	--	✓
REAR RIGHT AXLE SENSOR - NOT RESPONDING	2	6	2614	--	--	--	--	✓
AXLE RETRACT POSITION - NOT CALIBRATED	2	6	2615	--	--	--	--	✓
AXLE DEPLOY POSITION - NOT CALIBRATED	2	6	2616	--	--	--	--	✓
BRAKE - SHORT TO BATTERY	3	3	331	✓	✓	✓	✓	✓
BRAKE - OPEN CIRCUIT	3	3	332	✓	✓	✓	✓	✓
GROUND ALARM - SHORT TO BATTERY	3	3	3311	✓	✓	✓	✓	✓
RIGHT FORWARD DRIVE PUMP - SHORT TO GROUND	3	3	3316	✓	✓	✓	✓	✓
RIGHT FORWARD DRIVE PUMP - OPEN CIRCUIT	3	3	3317	✓	✓	✓	✓	✓
RIGHT FORWARD DRIVE PUMP - SHORT TO BATTERY	3	3	3318	✓	✓	✓	✓	✓
RIGHT REVERSE DRIVE PUMP - SHORT TO GROUND	3	3	3320	✓	✓	✓	✓	✓
RIGHT REVERSE DRIVE PUMP - OPEN CIRCUIT	3	3	3321	✓	✓	✓	✓	✓
RIGHT REVERSE DRIVE PUMP - SHORT TO BATTERY	3	3	3322	✓	✓	✓	✓	✓
LEFT FORWARD DRIVE PUMP - SHORT TO GROUND	3	3	3324	✓	✓	✓	✓	✓
LEFT FORWARD DRIVE PUMP - OPEN CIRCUIT	3	3	3325	✓	✓	✓	✓	✓
LEFT FORWARD DRIVE PUMP - SHORT TO BATTERY	3	3	3326	✓	✓	✓	✓	✓
LEFT REVERSE DRIVE PUMP - SHORT TO GROUND	3	3	3328	✓	✓	✓	✓	✓
LEFT REVERSE DRIVE PUMP - OPEN CIRCUIT	3	3	3329	✓	✓	✓	✓	✓
LEFT REVERSE DRIVE PUMP - SHORT TO BATTERY	3	3	3330	✓	✓	✓	✓	✓
ALTERNATOR/ECM POWER - SHORT TO GROUND	3	3	3336	✓	✓	✓	✓	✓
ALTERNATOR POWER - OPEN CIRCUIT	3	3	3338	✓	✓	✓	✓	✓
ALTERNATOR POWER - SHORT TO BATTERY	3	3	3339	✓	✓	✓	✓	✓
AUX POWER - SHORT TO GROUND	3	3	3340	✓	✓	✓	✓	✓
AUX POWER - OPEN CIRCUIT	3	3	3341	✓	✓	✓	✓	✓
AUX POWER - SHORT TO BATTERY	3	3	3342	✓	✓	✓	✓	✓
COLD START ADVANCE SOLENOID - SHORT TO GROUND	3	3	3343	✓	✓	✓	✓	✓
COLD START ADVANCE SOLENOID - OPEN CIRCUIT	3	3	3344	✓	✓	✓	✓	✓
COLD START ADVANCE SOLENOID - SHORT TO BATTERY	3	3	3345	✓	✓	✓	✓	✓
ELECTRIC PUMP - SHORT TO GROUND	3	3	3349	✓	✓	✓	✓	✓
ELECTRIC PUMP - OPEN CIRCUIT	3	3	3350	✓	✓	✓	✓	✓

Table 6-12. Diagnostic Fault Code Chart

Fault Text	Flash 1	Flash 2	DTC	1350	1200	1250	1500	1850
ELECTRIC PUMP - SHORT TO BATTERY	3	3	3351	✓	✓	✓	✓	✓
MAIN DUMP VALVE - SHORT TO GROUND	3	3	3358	✓	✓	✓	✓	✓
MAIN DUMP VALVE - OPEN CIRCUIT	3	3	3359	✓	✓	✓	✓	✓
MAIN DUMP VALVE - SHORT TO BATTERY	3	3	3360	✓	✓	✓	✓	✓
BRAKE - SHORT TO GROUND	3	3	3361	✓	✓	✓	✓	✓
START SOLENOID - SHORT TO GROUND	3	3	3362	✓	✓	✓	✓	✓
START SOLENOID - OPEN CIRCUIT	3	3	3363	✓	✓	✓	✓	✓
START SOLENOID - SHORT TO BATTERY	3	3	3364	✓	✓	✓	✓	✓
TWO SPEED VALVE - SHORT TO GROUND	3	3	3368	✓	✓	✓	✓	✓
TWO SPEED VALVE - OPEN CIRCUIT	3	3	3369	✓	✓	✓	✓	✓
TWO SPEED VALVE - SHORT TO BATTERY	3	3	3370	✓	✓	✓	✓	✓
GROUND ALARM - SHORT TO GROUND	3	3	3371	✓	✓	✓	✓	✓
GROUND ALARM - OPEN CIRCUIT	3	3	3372	✓	✓	✓	✓	✓
GEN SET/WELDER - SHORT TO GROUND	3	3	3373	✓	✓	✓	✓	✓
GEN SET/WELDER - OPEN CIRCUIT	3	3	3374	✓	✓	✓	✓	✓
GEN SET/WELDER - SHORT TO BATTERY	3	3	3375	✓	✓	✓	✓	✓
HEAD TAIL LIGHT - SHORT TO GROUND	3	3	3376	✓	✓	✓	✓	✓
HEAD TAIL LIGHT - OPEN CIRCUIT	3	3	3377	✓	✓	✓	✓	✓
HEAD TAIL LIGHT - SHORT TO BATTERY	3	3	3378	✓	✓	✓	✓	✓
HOUR METER - SHORT TO GROUND	3	3	3379	✓	✓	✓	✓	✓
HOUR METER - OPEN CIRCUIT	3	3	3380	✓	✓	✓	✓	✓
HOUR METER - SHORT TO BATTERY	3	3	3381	✓	✓	✓	✓	✓
PLATFORM LEVEL UP OVERRIDE VALVE - SHORT TO GROUND	3	3	3385	✓	✓	✓	✓	✓
PLATFORM LEVEL UP OVERRIDE VALVE - OPEN CIRCUIT	3	3	3386	✓	✓	✓	✓	✓
PLATFORM LEVEL UP OVERRIDE VALVE - SHORT TO BATTERY	3	3	3387	✓	✓	✓	✓	✓
PLATFORM LEVEL DOWN OVERRIDE VALVE - SHORT TO GROUND	3	3	3391	✓	✓	✓	✓	✓
PLATFORM LEVEL DOWN OVERRIDE VALVE - OPEN CIRCUIT	3	3	3392	✓	✓	✓	✓	✓
PLATFORM LEVEL DOWN OVERRIDE VALVE - SHORT TO BATTERY	3	3	3393	✓	✓	✓	✓	✓
PLATFORM ROTATE LEFT VALVE - SHORT TO GROUND	3	3	3394	✓	✓	✓	✓	✓
PLATFORM ROTATE LEFT VALVE - OPEN CIRCUIT	3	3	3395	✓	✓	✓	✓	✓
PLATFORM ROTATE LEFT VALVE - SHORT TO BATTERY	3	3	3396	✓	✓	✓	✓	✓
PLATFORM ROTATE RIGHT VALVE - SHORT TO GROUND	3	3	3397	✓	✓	✓	✓	✓
PLATFORM ROTATE RIGHT VALVE - OPEN CIRCUIT	3	3	3398	✓	✓	✓	✓	✓
PLATFORM ROTATE RIGHT VALVE - SHORT TO BATTERY	3	3	3399	✓	✓	✓	✓	✓
JIB LIFT UP VALVE - SHORT TO GROUND	3	3	33100	✓	✓	✓	- -	- -

Table 6-12. Diagnostic Fault Code Chart

Fault Text	Flash 1	Flash 2	DTC	1350	1200	1250	1500	1850
JIB LIFT UP VALVE - OPEN CIRCUIT	3	3	33101	✓	✓	✓	--	--
JIB LIFT UP VALVE - SHORT TO BATTERY	3	3	33102	✓	✓	✓	--	--
JIB LIFT DOWN VALVE - SHORT TO GROUND	3	3	33103	✓	✓	✓	--	--
JIB LIFT DOWN VALVE - OPEN CIRCUIT	3	3	33104	✓	✓	✓	--	--
JIB LIFT DOWN VALVE - SHORT TO BATTERY	3	3	33105	✓	✓	✓	--	--
SWING RIGHT VALVE - SHORT TO GROUND	3	3	33118	✓	✓	✓	✓	✓
SWING RIGHT VALVE - OPEN CIRCUIT	3	3	33119	✓	✓	✓	✓	✓
MAIN TELESCOPE IN VALVE - SHORT TO BATTERY	3	3	33120	✓	✓	✓	✓	✓
SWING RIGHT VALVE - SHORT TO BATTERY	3	3	33121	✓	✓	✓	✓	✓
SWING LEFT VALVE - SHORT TO GROUND	3	3	33122	✓	✓	✓	✓	✓
MAIN TELESCOPE OUT VALVE - SHORT TO BATTERY	3	3	33123	✓	✓	✓	✓	✓
THROTTLE ACTUATOR - SHORT TO GROUND	3	3	33130	✓	✓	✓	✓	✓
THROTTLE ACTUATOR - OPEN CIRCUIT	3	3	33131	✓	✓	✓	✓	✓
THROTTLE ACTUATOR - SHORT TO BATTERY	3	3	33132	✓	✓	✓	✓	✓
PLATFORM CONTROL VALVE - SHORT TO GROUND	3	3	33133	✓	✓	✓	✓	✓
PLATFORM CONTROL VALVE - OPEN CIRCUIT	3	3	33134	✓	✓	✓	✓	✓
PLATFORM CONTROL VALVE - SHORT TO BATTERY	3	3	33135	✓	✓	✓	✓	✓
MAIN LIFT APU VALVE - SHORT TO GROUND	3	3	33136	--	--	✓	--	--
MAIN LIFT APU VALVE - OPEN CIRCUIT	3	3	33137	--	--	✓	--	--
MAIN LIFT APU VALVE - SHORT TO BATTERY	3	3	33138	--	--	✓	--	--
MAIN LIFT PILOT - PRESSURE FAILURE	3	3	33139	--	--	✓	--	--
MAIN LIFT PILOT - NO PRESSURE	3	3	33140	--	--	✓	--	--
MAIN LIFT PILOT - PRESSURE SWITCH FAILURE	3	3	33141	--	--	✓	--	--
TOWER LIFT APU VALVE - STUCK OPEN	3	3	33142	--	--	✓	--	--
TOWER LIFT ENABLE VALVE - STUCK OPEN	3	3	33143	--	--	✓	--	--
TOWER LIFT ENABLE VALVE - SHORT TO GROUND	3	3	33144	--	--	✓	--	--
TOWER LIFT ENABLE VALVE - OPEN CIRCUIT	3	3	33145	--	--	✓	--	--
TOWER LIFT ENABLE VALVE - SHORT TO BATTERY	3	3	33146	--	--	✓	--	--
TOWER TELESCOPE APU VALVE - SHORT TO GROUND	3	3	33147	--	--	✓	--	--
TOWER TELESCOPE APU VALVE - OPEN CIRCUIT	3	3	33148	--	--	✓	--	--
TOWER TELESCOPE APU VALVE - SHORT TO BATTERY	3	3	33149	--	--	✓	--	--
LIFT PILOT VALVE - SHORT TO GROUND	3	3	33150	✓	✓	--	✓	✓
LIFT PILOT VALVE - OPEN CIRCUIT	3	3	33151	✓	✓	--	✓	✓
LIFT PILOT VALVE - SHORT TO BATTERY	3	3	33152	✓	✓	--	✓	✓
LIFT DOWN AUX VALVE - SHORT TO GROUND	3	3	33153	✓	✓	--	✓	✓

Table 6-12. Diagnostic Fault Code Chart

Fault Text	Flash 1	Flash 2	DTC	1350	1200	1250	1500	1850
LIFT DOWN AUX VALVE - OPEN CIRCUIT	3	3	33154	✓	✓	--	✓	✓
LIFT DOWN AUX VALVE - SHORT TO BATTERY	3	3	33155	✓	✓	--	✓	✓
TOWER LIFT APU VALVE - SHORT TO GROUND	3	3	33156	--	--	✓	--	--
TOWER LIFT APU VALVE - OPEN CIRCUIT	3	3	33157	--	--	✓	--	--
TOWER LIFT APU VALVE - SHORT TO BATTERY	3	3	33158	--	--	✓	--	--
MAIN LIFT ENABLE VALVE - SHORT TO GROUND	3	3	33159	--	--	✓	--	✓
MAIN LIFT ENABLE VALVE - OPEN CIRCUIT	3	3	33160	--	--	✓	--	✓
MAIN LIFT ENABLE VALVE - SHORT TO BATTERY	3	3	33161	--	--	✓	--	✓
TOWER TELESCOPE APU VALVE - STUCK OPEN	3	3	33162	--	--	✓	--	--
TOWER TELESCOPE ENABLE VALVE - STUCK OPEN	3	3	33163	--	--	✓	--	--
TOWER TELESCOPE ENABLE VALVE - SHORT TO GROUND	3	3	33164	--	--	✓	--	--
TOWER TELESCOPE ENABLE VALVE - OPEN CIRCUIT	3	3	33165	--	--	✓	--	--
TOWER TELESCOPE ENABLE VALVE - SHORT TO BATTERY	3	3	33166	--	--	✓	--	--
PVG ENABLE VALVE - SHORT TO GROUND	3	3	33167	--	--	✓	--	--
PVG ENABLE VALVE - OPEN CIRCUIT	3	3	33168	--	--	✓	--	--
PVG ENABLE VALVE - SHORT TO BATTERY	3	3	33169	--	--	✓	--	--
RESTRICTED TO TRANSPORT - AXLE LOCKOUT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	3	3	33173	✓	✓	✓	✓	✓
RESTRICTED TO TRANSPORT - BRAKE - SHORT TO BATTERY OR OPEN CIRCUIT	3	3	33174	✓	✓	✓	✓	✓
JIB ROTATE LEFT VALVE - OPEN CIRCUIT	3	3	33175	✓	✓	✓	--	--
JIB ROTATE LEFT VALVE - SHORT TO BATTERY	3	3	33176	✓	✓	✓	--	--
JIB ROTATE LEFT VALVE - SHORT TO GROUND	3	3	33177	✓	✓	✓	--	--
JIB ROTATE RIGHT VALVE - OPEN CIRCUIT	3	3	33178	✓	✓	✓	--	--
JIB ROTATE RIGHT VALVE - SHORT TO BATTERY	3	3	33179	✓	✓	✓	--	--
JIB ROTATE RIGHT VALVE - SHORT TO GROUND	3	3	33180	✓	✓	✓	--	--
MAIN LIFT UP VALVE - OPEN CIRCUIT	3	3	33181	✓	✓	--	✓	✓
MAIN LIFT UP VALVE - SHORT TO BATTERY	3	3	33329	✓	✓	--	✓	✓
MAIN LIFT UP VALVE - SHORT TO GROUND	3	3	33183	✓	✓	--	✓	✓
MAIN LIFT DOWN VALVE - OPEN CIRCUIT	3	3	33184	✓	✓	--	✓	✓
MAIN LIFT DOWN VALVE - SHORT TO GROUND	3	3	33185	✓	✓	--	✓	✓
MAIN TELESCOPE OUT VALVE - OPEN CIRCUIT	3	3	33186	✓	✓	✓	✓	✓
MAIN TELESCOPE OUT VALVE - SHORT TO GROUND	3	3	33188	✓	✓	✓	✓	✓
MAIN TELESCOPE IN VALVE - OPEN CIRCUIT	3	3	33189	✓	✓	✓	✓	✓
MAIN TELESCOPE IN VALVE - SHORT TO GROUND	3	3	33190	✓	✓	✓	✓	✓
HORN - OPEN CIRCUIT	3	3	33207	✓	✓	✓	✓	✓